Workshop

Language in Mind and Brain

10–11 December 2018

Senatssaal (room E110, LMU main building)

Book of Abstracts

Programme

9 December

Conference warming

18.00   Visit to the Christmas market and à la carte dinner at the *Hofbräuhaus* (Platzl 9)
          Meeting point: fountain in front of the LMU main building
          (Geschwister-Scholl-Platz 1)

10 December

8.00   Registration opens
8.45   Welcome

Part I: Modelling Language in Mind and Brain

9.00   Plenary talks (*Senatssaal*)

9.00	Daniel Casasanto	*The Ad hoc Construction of Linguistic Meaning*
9.30	Peter Hagoort	*On Reducing Language to Biology*
10.00	Friedemann Pulvermüller	*Language in Mind and Brain: A Role for Theoretical Neuroscience*

10.30   Coffee break

11.00   Plenary talks (*Senatssaal*)

11.00	Ewa Dąbrowska	*Language Learning as Cooperative Interaction between Implicit and Explicit Processes*
11.30	Adele Goldberg	*Explain me this: The Need to Focus on Memory and Accessibility in Context*
12.00	Hans-Jörg Schmid	*Linguistic Variation in Mind (and Brain)*

12.30   Lunch break

Part II: Current Research

14.00   Poster Session I

          14.00 Poster Pitches (*Senatssaal*)
          14.40 Poster Session (*Speerträger*)

15.30   Walk & Talk (*Englischer Garten*)

16.30   Poster Session II

          16.30 Poster Pitches (*Senatssaal*)
          17.10 Poster Session (*Speerträger*)

19.00   Conference Dinner (*Georgenhof*, Friedrichstraße 1)

11 December

Part III: Bridging the Gap between Neuroscience and Linguistics

Chairs: Christina Sanchez-Stockhammer and Franziska Günther

9.00　10-minute statements by plenary speakers

10.00　Coffee break

10.30　Panel discussion and plenary debate

12.00　Farewell

Part I: Modelling Language in Mind and Brain

Abstracts (in alphabetical order)

The Ad hoc Construction of Linguistic Meaning

Daniel Casasanto
Departments of Human Development and Psychology, Cornell University

To explain how people think and communicate, cognitive scientists posit a repository of concepts, categories, and meanings (CC&Ms) that are stable across time and shared across individuals. But if concepts are stable, how can people use them so flexibly? In this talk I'll explore a possible answer: Maybe this stability is an illusion. Perhaps all CC&Ms are constructed ad hoc each time we use them. According to the *Ad Hoc Cognition* framework, all words are infinitely polysemous, all communication is "good enough", and no idea is ever the same twice. Commonalities across instantiations of CC&Ms yield some emergent stability. I will argue, however, that even the most stable-seeming CC&Ms are constructed ad hoc, and vary (a) from one microsecond to the next within a given instantiation, (b) from one instantiation to the next within an individual, and (c) from person to person and group to group as a function of people's experiential history. Thinking depends on brains, and brains are always changing; therefore thoughts are always changing. By understanding the ad hoc construction of linguistic meaning, researchers can dissolve some of the fundamental problems in language and cognition and frame a new set of challenges for the cognitive sciences.

Language Learning as Cooperative Interaction between Implicit and Explicit Processes

Ewa Dąbrowska
Friedrich-Alexander Universität Erlangen-Nuremberg/University of Birmingham

It is often asserted that first language acquisition and adult second language learning are "fundamentally different". In contrast to L2 learning, first language acquisition is believed to rely almost entirely on implicit learning. Children, it is often asserted, are unable to focus on form, and because of this, explicit learning and aptitude (as measured by foreign language aptitude tests such as the MLAT and PLAB) are irrelevant. There are also important differences in motivation: adult learners typically have the explicit goal of learning a new language, while children's motivation is simply to communicate, and learning occurs as a by-product of engaging in communicative interaction.

While acknowledging that there are important differences between first and second language learning, I argue that they tend to be overstated. I argue that language aptitude plays a significant role in both L1 and L2 language learning, that children are not only able, but also highly motivated to pay attention to form, and that in both populations, acquisition depends on cooperative interaction between implicit and explicit processes. Thus, the same cognitive mechanisms are involved in both types of learning, albeit not necessarily to the same extent.

On Reducing Language to Biology

Peter Hagoort
Max Planck Institute for Psycholinguistics

According to some the only thing we can say about the neurobiology of language is that language happens somewhere north of the neck. The other extreme claims that one day language can be reduced to what counts as information for the brain (e.g. action

potentials or spatial maps). I will reject both of these positions. I will present a taxonomy of inferences that can be made on the basis of brain data. However, that does not solve the mapping problem. This is the problem how to map the natural kinds of language onto the natural kinds of the underlying infrastructure of the brain. I will illustrate this for different positions among neuroanatomists as to what counts as functionally relevant. I will end with some examples from the domain of semantic unification.

Language in Mind and Brain: A Role for Theoretical Neuroscience

Friedemann Pulvermüller
Brain Language Laboratory, Freie Universität Berlin, f.p@fu-berlin.de

What is the role of the linguistic, cognitive and neural sciences in investigating the neurobiology of language? One position puts that the latter two test, in exact experiments, the predictions derived from theoretical linguistics, thus aiming at precise definition of the postulated mechanisms in processing time and brain space. This view attributes all theoretical work to linguistics, and the experimental labor to neurocognition. This discussion contribution argues differently: What neuroscience can contribute to brain language research is primarily a theoretical foundation. General neuroscience principles and specialized wisdom about the structure and connectivity of the human brain provide important constraints for modelling language in the human brain and thus for linguistic theorizing. Neurocomputational simulations, using brain constrained networks, can be used to probe the neural consequences of language learning and to develop concrete models of language mechanism at the level of neuron circuits. These circuit models can mechanistically explain already established empirical observations and offer precise predictions on future experiments. In this perspective, theoretical linguistics becomes an enterprise that focuses on concrete (rather than abstract) descriptions of mechanisms and in which linguistic and neuroscience theories merge.

Linguistic Variation in Mind (and Brain)

Hans-Jörg Schmid
LMU Munich

Knowledge about situational and social variation is an integral part of linguistic knowledge. Speakers are able to adapt their utterances depending on how they frame a given situation and on the kind of social persona they wish to project. In their role as hearers, they are able to recognize how speakers frame a situation by means of their linguistic choices and to interpret the social meanings of speakers' utterances.

In my talk I will address the question of how knowledge about linguistic variation becomes established and is represented in the minds of individual speakers. Essentially, I will argue that this knowledge is derived from experience in concrete usage events and becomes entrenched in the same way as knowledge about linguistic forms, structures, meanings and functions. I will begin by proposing an associationist model of language processing. Then I will claim that all commonalities of repeated usage events – not only formal, semantic and functional characteristics of utterances but also situational and social ones – can become routinized as more or less strongly entrenched patterns of associations. My talk will end with some remarks on the psychological and neuro-biological plausibility of these suggestions.

Part II: Current Research

Poster Session I		
1.	Tanja Angelovska, Dietmar Roehm	*An EEG Study on the Effects of Processing Instruction on Processing of -ed in L2 English*
2.	Lynn Anthonissen, Peter Petré	*Mind-bending Grammars: Variation and Change across the Lifespan*
3.	Lena M. Blott, Jennifer M. Rodd, Fernanda Ferreira, Jane E. Warren	*Language Experience Influences Reading Behaviour during Lexical Ambiguity Resolution*
4.	Silke Brandt	*Putting Complex Sentences into Context: Interactions between Children's Understanding of False Belief and their Comprehension and Production of Complement Clauses*
5.	Adrian Danek, Mustafa Seckin et al.	*Utility of the Repeat and Point Test in Primary Progressive Aphasia*
6.	Isabella Fritz, Sotaro Kita, Jeannette Littlemore, Andrea Krott	*Rethinking the Role of Gesture-Speech Synchrony in Language Production and Comprehension*
7.	Sandra Kotzor, Swetlana Schuster, et al.	*Form or Structure? Effects of Morphological and Form Overlap in a Long-Lag Lexical Decision Task in L2 English*
8.	Hugues Lacroix	*Morphophonology and the Analogical Criterion at the Center of Gender Assignment in Spanish L3*
9.	Veronika Mattes	*The Acquisition of the Semantics of German Verbal Prefixes*

Poster Session 2		
10.	Susanne Flach	*Revisiting Frequency Effects on Contraction: The Role of Schema Attraction*
11.	Toivo Glatz, Wim Tops, Natasha Maurits, Ben Maassen	*Relating Phonological Awareness Skills to Auditory Mismatch Responses Using Generalized Additive Modelling*
12.	Sandra Kotzor, Swetlana Schuster, Aditi Lahiri	*Still 'native'? Processing Morphological Complexity in an L2-dominant Environment*
13.	Elena S. Kulkova, Friedemann Pulvermüller, Martin H. Fischer	*Processing Idiomatic and Metaphoric Meaning: A Grip-force Study*
14.	Alina Villalva, Carina Pinto	*Word Knowledge and Word Frequency: Intuitions and Assessment*
15.	Eleonore Schmitt	*Are Schemas Mental? Conflicting Evidence for Mental Schemas in Language Production and Processing*
16.	Mustafa Seckin, İlayda Demir, Merve Savaş	*Morpheme Selection Impairment in Turkish Speaking Patients with Primary Progressive Aphasia: Evidence from Eye Tracking*
17.	Friederike Sell	*Working Memory in L2 Speech Act Production – Evaluating the Suitability of a Dual-task Design to Bridge the Methodological Gap*

Abstracts (in alphabetical order)

An EEG Study on the Effects of Processing Instruction on Processing of *-ed* in L2 English

Tanja Angelovska, Dietmar Roehm
University of Salzburg, Austria

This neurocognitive EEG study tests the effects of the input-based grammar intervention *Processing Instruction* (PI) (Lee & Benati 2009, VanPatten, 1996, 2004, 2007) before, during and after the computer-based instruction on the acquisition of English past simple *-ed*. PI is a grammar intervention that structures the input in a way that it pushes learners to map form (e.g. grammatical marker for pastness *-ed*) and meaning (e.g. *-ed* denoting accomplished past events) – something learners would usually not do by default as they process input initially for meaning before they process it for form. We report data from (so far) 20 (ongoing recruitment) school-age (10 to 11-year old) children who are beginner learners of English as a Foreign Language, recruited in Austrian primary schools. Only subjects who score lower than 60 % are included in the pool. Further, they are assigned to two groups: experimental (PI group) and control group. Subjects for the control group have to meet several conditions: same age group and grade as the experimental group, same school type and area, and no previous PI training (both for instruction and practice) on any language feature (to avoid transfer of training effects). Our results from the EEG data corroborate the results gained through behavioral measures proving the effectiveness of PI for both production and comprehension and its durable effects. More precisely, the PI-trained group showed more proficient processing than the control group on the immediate posttest for the behavioral as well as the EEG measures. With respect to ERP correlates of *-ed* processing the PI-trained group showed an N400 component (lexical-semantic processing) followed by a P3 target effect. In the frequency domain spectral power analysis showed alpha band event-related desynchronization accompanied by theta synchronization. Both results are indicative of target-oriented lexical-semantic memory retrieval and thereby constitute neural correlates of successful PI-instruction-based learning.

Mind-bending Grammars: Variation and Change across the Lifespan

Lynn Anthonissen, Peter Petré
University of Antwerp, Belgium

While it is widely recognized that language users continue to expand their vocabulary well into adulthood (e.g. Brysbaert et al. 2016), the issue of grammatical change in adults is still largely unsettled, with views ranging from grammatical change being possible only in first language acquisition (e.g. Lightfoot 1999) to change being almost exclusively the business of adult interaction (e.g. Croft 2000). These seemingly conflicting views can be conciliated if we acknowledge that an individual's mental grammar is both systematic and adaptive in nature (cf. Beckner et al. 2009, Schmid *ms.*), and thus conceive of a person's mental grammar as a structured system that interacts with language use at the aggregate level of the community. Against this background, we investigate how much grammatical innovation is possible past adolescence.

We will demonstrate how this fundamental question is investigated in the context of a collaborative research project situated at the intersection of historical sociolinguistics, cognitive linguistics and corpus linguistics. Investigations into longitudinal change across the lifespan require not only large amounts of data, but also a number of established cases of grammaticalization. We therefore turn to the seventeenth century, in which several constructions undergo incipient or more advanced grammaticalization (e.g *be going to* and cross-linguistically rare passives such as the prepositional passive). We present EMMA (Petré

et al. 2018), a new large-scale longitudinal corpus of 50 adults, and illustrate, on the basis of this corpus, how aging affects the flexibility with which grammatical innovations are adopted.

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Schmid, Hans-Jörg. Ms. *The dynamics of the linguistic system: Usage, conventionalization, and entrenchment.*

Language Experience Influences Reading Behaviour during Lexical Ambiguity Resolution

Lena M. Blott[1], Jennifer M. Rodd[1], Fernanda Ferreira[2], Jane E. Warren[1]
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The ability to resolve ambiguity is an essential part of language processing. Understanding sentences such as "Sally worried that the ball was going to be too crowded for her liking" requires the ability to resolve competition between the different meanings of "ball", to monitor the meaningfulness of the sentence, and to initiate reinterpretation processes if the incorrect meaning was initially selected. Lexical ambiguity resolution relies on a variety of language-processing components, including language experience. Although lexical knowledge and print exposure are subject to individual differences, it is unclear how this variability affects comprehension and processing of ambiguous sentences. In this two-part study, factors underlying successful comprehension, efficiency and reading behaviour during lexical ambiguity resolution were investigated. Adult readers were asked to make speeded judgements about the meaningfulness of ambiguous and matched unambiguous control sentences.

A web-based experiment with 138 adults (aged 19–73, from a variety of educational backgrounds) found that vocabulary knowledge was a significant predictor of successful comprehension in both ambiguous and unambiguous sentences. A lab-based eye-tracking experiment on 96 university-educated adults (aged 18–34) investigated the influence of lexical knowledge as well as print exposure on the same ambiguity-resolution task. Greater language experience was associated with shorter gaze durations and regression-path durations, indicating that language experience facilitates lexical access and integration procedures. These findings suggest that readers with broader language experience may be able to detect processing difficulties and trigger appropriate reinterpretation processes more efficiently than readers with comparatively less experience.

In this study, reading processes were found to be variable even among highly literate adults. Furthermore, vocabulary knowledge and reading experience seem to exert crucial influence over language processing into adulthood. The present study provides a strong argument for the further investigation of individual differences in language processing.

Putting Complex Sentences into Context: Interactions between Children's Understanding of False Belief and their Comprehension and Production of Complement Clauses

Silke Brandt
University of Lancaster

Children's first complement clauses (*I think (that) he's nice*) often lack the *that*-complementizer. It has been suggested that these complement clauses contain foregrounded information and that the associated main clause (*I think*) could be omitted (Diessel & Tomasello 2001). However, little research has investigated whether the absence of complementizers affects the comprehension of these clauses.

Children's comprehension of complement clauses is also linked to their false-belief understanding (Milligan et al. 2007). However, these studies have focused on children's comprehension of the syntactic structure rather than the discourse function of these clauses. We presented complement clauses with and without complementizers in a story context and tested how children's comprehension and production of these clauses were related to their understanding of the characters' beliefs.

We tested 25 English-speaking 4-year-olds, 25 5-year-olds and 24 adults. In a 2 (+/- *that*-complementizer) by 3 (belief: false, true, neutral) design, participants heard 18 complement clauses embedded in story contexts supported by pictures: *Dan wants to play football with Sue. But he thinks (that) she's on holiday*. The belief was conveyed as true (*she really is on holiday*), false (*she actually isn't on holiday*), or left neutral (*there's a blue star*). The test question (*Why doesn't Dan play football with Sue?*) elicited a main- plus subordinate clause (*he thinks (that) she's on holiday*) or a subordinate clause (*she's on holiday*).

We found significant main effects for age ($\chi^2=41$; *p*<.001) and belief ($\chi^2=248$; *p*<.001), indicating that the production of main- plus subordinate clauses increased with age and was most frequent when the character had a false belief, followed by neutral and true belief (Figure 1). The absence of the *that*-complementizer did not affect choice of sentence structure, questioning claims that omitting complementizers foregrounds complement clauses. Children's performance in standardised false-belief tests did not predict their choice of sentence structure either.

Figures

Percentage of main plus subordinate clauses produced
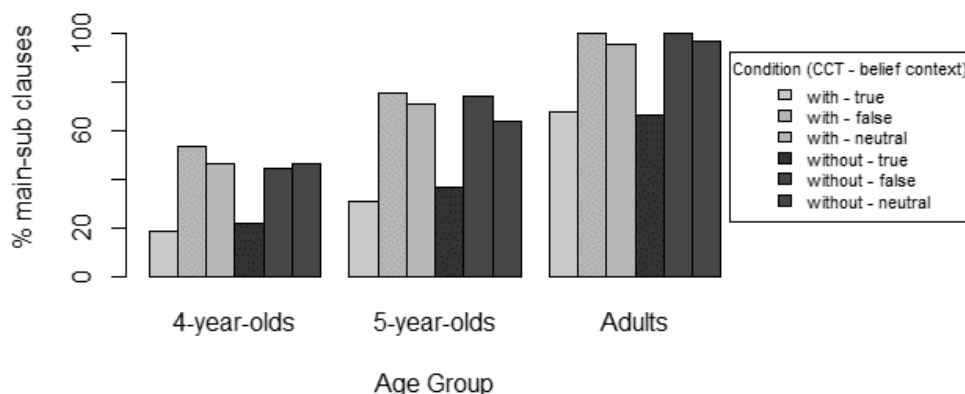(out of main plus subordinate and subordinate only) by each age group

Figure 1. Percentage of main- plus subordinate constructions produced by each age group; grouped by condition (with/out complementizer; true, false, neutral belief).

References
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Utility of the Repeat and Point Test in Primary Progressive Aphasia

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Background/Objective: Primary progressive aphasia (PPA) is a focal dementia syndrome caused by neurodegeneration of the language network. PPA may present with currently three internationally acknowledged distinct phenotypes. Semantic variant PPA (svPPA) is characterized by single-word comprehension impairment with preserved speech fluency, nonfluent/agrammatic variant PPA (nfvPPA) by effortful speech with speech sound errors and/or agrammatism. Patients with logopenic variant PPA (lvPPA) present with word finding difficulties and impaired repetition. Our goal was to examine the utility of the German Repeat and Point (R&P) Test for classification of PPA (English original: Cortex 2008; 44:1265-70).

Design/Methods: Data from 244 PPA patients and 33 healthy controls from the German Frontotemporal Dementia Consortium were included. The patients were diagnosed with svPPA (n=68), nfvPPA (n=85), lvPPA (n=51) and as unclassified (n=40). During the task, the examiner reads out aloud a noun and the participants is to first repeat the word and then point to the corresponding picture on a 7-item array. 10 items are tested and participants receive scores between 0 and 10 for repetition and single word comprehension, respectively.

Results: Controls completed both tasks with >90% accuracy. Patients with svPPA had high scores in repetition (mean=9,2) but low scores in pointing (mean=6). In comparison, patients with nfvPPA and lvPPA had lower scores in repetition (mean=7,4 for nfvPPA and 8,2 for lvPPA) but higher scores in pointing (mean=8,9 for nfvPPA and 8,6 for lvPPA). Unclassified cases scored low in both tasks (mean=7,5 for repetition and 7,1 for pointing). Discriminant analysis showed that the R&P Test had high accuracy (>80%) discriminating between svPPA and nonsemantic subtypes (i.e. nfvPPA and lvPPA combined). However, the test had low accuracy (<60%) for differentiating nfvPPA and lvPPA.

Conclusion: The R&P Test can be used to differentiate svPPA from other PPA variants. Differentiation of nfvPPA and lvPPA requires additional tests.

Revisiting Frequency Effects on Contraction: The role of Schema Attraction

Susanne Flach
Université de Neuchâtel

Frequency of use is known to facilitate contraction: items that co-occur more frequently are also more likely to be contracted, which has been shown for a number of phenomena such as *don't*, *won't*, *gonna*, or *wanna* (Bybee & Scheibman 1999; Jurafsky et al. 2001; Krug 1998; Lorenz 2012). For instance, *don't* is more likely with high-frequency verbs (*don't know*) than with low frequency verbs (*do not dramatize*). This frequency-reduction hypothesis models contraction as an essentially linear function of frequency. However, usage in spoken American English for *going to/gonna* V suggest that the picture is more complex.

This case study revisits the frequency-reduction hypothesis and investigates whether contraction is better accounted for in terms of schema attraction (building on ideas of contingency, cf. Stefanowitsch & Gries 2003; Schmid 2000). Based on regression and classification models (CART/tree), the data show that association measures systematically emerge as more important predictors of contraction than simple corpus or construction frequencies. In addition, association and frequency affect low- and high frequency ranges differently, which cannot be captured by the frequency-reduction hypothesis. Some methodological challenges arise in determining the right level of granularity, for instance with verbs that are themselves (semi-)auxiliaries (*gonna* <u>*be able to*</u>, *gonna* <u>*have to*</u>, etc.); these issues will also be up for discussion.

Nevertheless, despite a seemingly mixed picture, the overall results suggest that reduction is a complex function of association rather than raw frequency. This provides evidence for the hypothesis that, while speakers are generally sensitive to frequency effects, generalizations across low-level schemas are also a relevant contributor for contraction. Thus, we aim to illustrate how distributional information gained by corpus-linguistic means can (and should) feed into renewed hypotheses and the modelling of linguistic knowledge.

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Rethinking the Role of Gesture-Speech Synchrony in Language Production and Comprehension

Isabella Fritz (isabella.fritz@ntnu.no)[1,2], Sotaro Kita[3], Jeannette Littlemore[1], Andrea Krott[4]
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According to McNeill (1992) gesture-speech synchrony is essential because these two modalities share the same idea unit in production. Although ERP studies on gesture-speech comprehension confirm the importance of synchrony for gesture integration due to gestures' ambiguity, evidence for this *Semantic Synchrony Rule* in production is sparse.

In a production study, we tested whether linguistic surface structure influences gesture onset and duration. The study was conducted in German where the manner verb ("rolling") and the path particle ("down") can be separated linguistically by other speech elements. Large proportions of motion event gestures were placed between the verb and particle despite the lengthening of the gesture aiming for synchrony. Gesture onset was predicted by the surface distance (ms) between verb and particle; i.e. the larger the distance between rolling and down, the later the gesture's onset. We argue that semantic affiliates competing for gesture

synchronisation caused these asynchronies (Attraction Point Hypothesis). As for comprehension, can such asynchronous gestures be integrated with speech because discourse information preceding the gesture (i.e., verb) disambiguated its meaning?

In an ERP study we manipulated discourse information preceding iconic gestures, i.e. related vs. unrelated to the gesture's meaning. ERPs time-locked to the semantic affiliate later in the sentence, showed P600-like gesture mismatch effects in both discourse conditions but with different topographies (related discourse = posterior; unrelated discourse = anterior). The different topographies may result from different reanalysis processes (related = mismatch effect, unrelated = effect of non-expectancy) (van Petten & Luka, 2012). Generally, the P600-like effects suggest that asynchronous gestures *can* be integrated with speech. However, integration processes differ from synchronous gestures-speech combinations (P600-effect instead of N400-effect).

The link between synchrony and surface structure plus the integration of asynchronous gestures shaped by discourse information suggest that our production and comprehension systems are more flexible than previously assumed.

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Relating Phonological Awareness Skills to Auditory Mismatch Responses Using Generalized Additive Modelling

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Background and Objective: The mismatch negativity (MMN) is an event related potential (ERP) component, which is widely considered to be an indicator of auditory discriminatory capabilities (Näätänen et al. 2007) and which often correlates with phonological awareness (PA) and reading proficiency. In an oddball paradigm, the MMN usually peaks around 100-230 ms after stimulus deviancy and is sometimes followed by a long-lasting component named the late discriminative negativity (LDN) from 250 ms onwards. In this work, we are investigating possible interactions of these auditory mismatch components with PA skills in Dutch speaking first graders.

Design and Methods: We recruited 40 first grade children who underwent behavioural tests measuring reading-related abilities as well as electroencephalography (EEG) recordings of MMN & LDN responses to changes of consonant and vowel quality, as well as vowel duration. We compare two analyses for this ERP dataset: i) using conventional grand averaging across two groups (average vs. poor PA skills, below 1 SD of the sample mean) and ii) a single trial mixed effects regression using generalized additive models (GAM; Wood 2006) which investigates the mismatch responses in relation to a continuum of PA skills.

Results and Discussion: While we expected to find an interaction of MMN with PA skills, we saw that only the LDN is modulated by PA skills. With the conventional analysis we found differences between average and poor performers in the later LDN time window. Using GAMs we found a more fine-grained picture of the underlying nonlinear interactions of PA skills and single trial ERP amplitudes. Our data suggests that an arbitrary dichotomous split of an experimental group into average and poor performers should be avoided, but to rather analyse brain responses in relation to the entire range of cognitive abilities.

Form or Structure? Effects of Morphological and Form Overlap in a Long-lag Lexical Decision Task in L2 English

Sandra Kotzor[1,2], Swetlana Schuster[1], Beinan Zhou[1], Hilary S. Z. Wynne[1], Aditi Lahiri[1]
[1]University of Oxford, [2]Oxford Brookes University

Whether L2 speakers process morphological complexity using native-like strategies has recently been investigated in an increasing number of studies, but no comprehensive answer has been provided. Accounts of non-native morphological processing suggest different strategies: greater reliance on declarative knowledge rather than decomposition processes (e.g. Bowden et al. 2010, Ullman 2001) or stronger influence of morpho-orthographic factors in visual processing (e.g. Heyer & Clahsen 2015).

In this study, we conducted a visual lexical decision task with **delayed priming** using three separate conditions: form (*fluently-influential*), semantic (*exceptional-remarkable*) and morphological (*natural-unnatural*). Participants were native English speakers (n=52) and highly proficient Bengali L2 speakers of English (n=59) in English-medium education in Kolkata, India.

Both groups show robust morphological priming and no facilitation in the form or semantic conditions. Crucially, unlike in recent masked priming studies, while L2 speakers display a difference in their processing of semantic and form-related stimuli, neither condition shows significant facilitation. Thus, L2 learners may well rely more on surface similarity in early stages of processing but are also able to capitalise on structure in processing as the facilitation for morphologically related pairs is significantly different from a tendency observed for form-related items. These results lend support to accounts which show L2 processing to take longer (e.g. Bosch et al. 2016) and indicate the need to investigate differences in time-course between native and non-native processing. The evidence presented here shows clearly that L2 morphological processing cannot be reduced to reliance on morpho-orthographic overlap (as suggested by Heyer & Clahsen 2015) but must include a stage where morphological structure is identified.

Morphophonology and the Analogical Criterion at the Center of Gender Assignment in Spanish L3

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Unlike Basque, Romance languages like French and Spanish display noun gender agreement (i.e. are gendered languages). This study focused on gender agreement accuracy within the determiner phrase (e.g. *una nariz roja* 'a_FEM nose_FEM red_FEM') at the initial stages of Spanish acquisition as a third language (L3) in bilingual French/Basque children. Our goals were (1) to investigate the effect of variables usually related to gender agreement accuracy in L2/L3 research, including morphophonology, default gender and the analogical criterion (i.e. the extent to which the gender of a noun in L1 influences that of its L2/L3 equivalent) and (2) to explore cross-linguistic influence through factors known to impact L3 acquisition (e.g. language proficiency/use, typology/proximity and order/context of acquisition).

We tested 53 French/Basque bilingual children (age: 10–11) who had received less than 30 hours of Spanish training. Subjects took part in a written picture description task that included 24 images depicting inanimate nouns. Although all subjects already mastered French and Basque before the study, the order, age and context of acquisition of those languages varied. These variables were therefore accounted for in the analyses, along with other variables related to language use.

Consistent with previous research, subjects' higher error rates with the feminine suggest that masculine is used as the default gender. Results also show that the effect of morpho-

phonology was stronger in subjects who acquired French in a formal context but who do not use it at home. Conversely, the analogical criterion seems to have a stronger effect in subjects who acquired French in a natural context and use it on a daily basis. These results indicate that multiple factors interact in shaping the way cross-linguistic influence occurs at the various levels of representation in the multilingual lexicon.

Still 'native'? Processing Morphological Complexity in an L2-dominant Environment

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Since native speaker competence has traditionally been considered unaffected by extraneous factors, language processing experiments are frequently conducted using bilingual L1 speakers in an L2-dominant immersion setting. However, in view of evident performance effects in language attrition research (cf. Schmid & Jarvis 2014), a more dynamic approach to the relationship between L1 and L2 has been proposed, challenging the viability of testing L2-immersed speakers.

In the present study, we report the results of a morphological priming task with L2-immersed German native speakers living in the UK (LoR > 2 yrs, daily use of L1 < 15%) in comparison with native German speakers in an L1 setting. In a visual lexical decision task with delayed priming, we focus on participants' processing signatures for two sets of non-existing forms differing in their internal morphological composition. Both types of non-existing items follow a viable derivational sequence in German (base adjective > verb > noun in *-ung*), but differ regarding the lexicality of the intermediate verb form (see Table 1).

Table 1 *Examples of non-existing conditions in a delayed priming task*

Condition	Prime (noun)	Target (adjective)	Type of violation
NonEx1	*Grünung*	GRÜN 'green'	*Grünung* does not exist
NonEx2	*Schlimmung*	SCHLIMM 'bad'	*Schlimmung* **and** the verb *schlimmen* do not exist

Only L1-immersed speakers show significantly stronger priming for condition *NonEx1* than for *NonEx2* and therefore sensitivity to internal levels of morphological complexity. These findings point to possible differences in processing mechanisms with L1-immersed speakers applying step-wise decompositional processes, while L2-immersed participants may rely on across-the-board decomposition regardless of complexity. Crucially, these findings present difficulties when making claims about 'native' processing and indicate the need to consider factors such as L2 immersion.

Processing Idiomatic and Metaphoric Meaning: A Grip-force Study

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Embodied cognition suggests that conceptual knowledge is grounded in sensorimotor experience: Sensorimotor cortical areas active during concept's acquisition are inter-connected with brain areas underpinning language and semantically related to the concept. However, the evidence of sensorimotor involvement in *non-literal* language processing is still controversial. In the study, we use grip force sensor to investigate motor areas involvement in idiom and metaphor processing. We measure spontaneous changes in grip force triggered

by the semantic features of hand-related and hand-unrelated action verbs and state verbs, embedded in literal, idiomatic, and metaphoric sentences. Motor structure activation during action verb sentence processing is hypothesized to demonstrate a pattern of dynamic changes based on the integration of the *lexical meaning components of an action verb* and *the features of the context* the verb is embedded in. We suggest that sentence meaning is constructed online and is updated during the course of processing. Thus, after the presentation of a disambiguation sentence component (2000 ms. after sentence onset), literal meaning, which is more grounded in sensorimotor experience compared with metaphoric, idiomatic or abstract one, should lead to a larger grip force (see Aravena et al. 2012). Compared to literal sentences, we expect a decrease in grip force elicited by metaphoric expressions, because they use motion verbs at a higher level of abstraction. If Idiomatic meaning processing uses compositional strategies, the grip force is expected to exceed the one for Metaphoric meaning. However, if only an arbitrary relationship between the literal and the global figurative meaning is established in idioms, that should lead to a pronounced decrease in grip force. The effect is also expected to be observed during sentence meaning integration stage (3600–4000 ms. after sentence onset). Overall, the study deepens the understanding of the embodied and simulation-based aspects of figurative meaning comprehension.

The Acquisition of the Semantics of German Verbal Prefixes

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In early acquisition of German, inseparable verbal prefixes are almost irrelevant (Behrens 1998). The acquisition starts in the fourth year of life and is a slow development during preschool-age that continues during school-age.

Dewell (2015) argues that – in terms of Cognitive Semantics – the core function that all German prefixes have in common and distinguishes them from (the early acquired) verb particles, is prompting a synoptic construal of the activity expressed by the base, mainly by foregrounding of the semantic landmark (Langacker 1987).

All prefixes are polyfunctional, and most verbs that they derive are polysemous. Many of them have abstract meanings that are more or less tightly linked metaphorically to concrete meanings (*ver+schieben* 'to shift', *zer+streuen* 'to scatter, to dispel'). Furthermore, many prefixed verbs have particle or simple verb cognates, i.e. in many cases there is a choice between two or three verbs, the difference is mainly a choice of style, while the prefix usually signals a more literate style (cf. Dewell 2015), e.g. *ent+fernen* vs. weg#machen 'remove', *er+wachen* vs. *auf#wachen* 'awake', *er+blühen* vs. *auf#blühen* 'bloom'.

Considering these cognitively complex properties of verbal prefixes, the presented study investigates the usage of the five German verbal prefixes *be-, ent-, er-, ver-* and *zer-* in various sources of spontaneous speech data up to age 10, as well as the knowledge on their meanings in elicited definitions of children between 5;0 to 10;0. Conventional as well as newly coined prefixed verbs are considered.

The results are analyzed against the background of schematic images of the prefixes as proposed by Dewell (2015), demonstrating, that children start to acquire the overall semantic schema of prefixes in general, and slowly advance to the subschemas of the individual prefixes.

Influencing factors are transparency and semantic salience, leading to different levels of difficulty in the acquisition.

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Are Schemas Mental? Conflicting Evidence for Mental Schemas in Language Production and Processing

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Mental schemas are a set of formal features associated with a certain function (Bybee 1985). Schemas have been posited, for instance, for English irregular verbs (Bybee and Molder 1983) and for the so-called weak declension class in German (Köpcke 1995). Masculine nouns belonging to the weak declension class are prototypically polysyllabic, stressed on the penultimate syllable, end with schwa, and refer to animate referents, e.g. *der Matróse* 'the sailor'. The existence of this schema has been corroborated by corpus studies and production tasks (Schäfer 2016, Köpcke 2000).

In this study, the question is raised whether schemas influence processing. With the help of a self-paced-reading (spr) task, reading times of the genitive suffixes -*n* (weak declension) and -*s* (strong declension) were compared. To control for token frequency, pseudo-nouns were used. The pseudo-nouns – taken from Köpcke (2000) – were introduced as referring to humans. The nouns are associated with the weak declension class to a different extent. The schema-compatible noun *Schettose* is hypothesized to elicit higher reading times for -*s* than for -*n*. In contrast, the non-compliant noun *Grettel* is expected to evoke reverse reading times. Additionally, a schema-compliant noun (*Truntake*) was used in dative singular with -*n* (weak declension) and without a suffix (strong declension), in order to test the influence of the schema in other cases than the genitive. Using a within-subject design, 53 German native speakers read texts in the style of an encyclopedia entry. In addition to the spr-task, participants completed a production task including the same pseudo-nouns.

As expected, the participants chose schema-conformant endings in the production task. However, the results for the spr-experiment are conflicting: While suffixes influenced the reading times of *Grettel* and *Schettose* significantly (MLM: p < 0.05, R2c= 0.5), the reading times of *Truntake* were not influenced by the suffixes.

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Morpheme Selection Impairment in Turkish Speaking Patients with Primary Progressive Aphasia: Evidence from Eye Tracking.

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Background/Objective: The use of inflectional morphology in Turkish as an agglutinative language can be more functional in communication compared to word order/syntax.

Design/Methods: We used a remote eye tracker to measure eye movement patterns during a sentence-completion paradigm. Eighteen verb-object pairs with strong semantic association were chosen to create sentence cues in the form of "SUBJECT + OBJECT + TIME ADVERB + [GAP]". Nine agrammatic primary progressive aphasia (PPA) patients and 12 controls were presented with an incomplete sentence cue followed by a visual array of 6 written words (one target and 5 distractors) on a touch screen. Participants were asked to read the sentence cue and point to the word that best completes the given sentence. The target verb on the visual array was semantically associated with the object in the sentence cue and inflected with the tense marking that was congruent with the time adverb (V+T+). Two of the distractor verbs (V+T- distractors) had the same stem (free morpheme) as the target but were presented with a progressive aspect or a different tense marking (bound morphemes). Remaining 3 distractors (V- verbs) had different verb stems (one with a congruent and the remaining two with incongruent tense markings).

Results: Controls pointed to the correct verb in 98% of the trials and spent greater time looking at the target (47% of total viewing time) and did not view any of the distractor verbs more than chance level of 16.6%. PPA patients spent less time (24.3%) viewing the target and were distracted by V+ distractors more than V- distractors regardless of the tense markings and only the V+ distractors were viewed greater than by chance.

Conclusion: Morpheme selection was impaired in PPA patients and the competition between free morphemes was more pronounced compared to the competition between bound morphemes.

Working Memory in L2 Speech Act Production – Evaluating the Suitability of a Dual-task Design to Bridge the Methodological Gap

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The processing that underlies foreign language (L2) comprehension and production has been found to crucially rely on working memory (WM; e.g. Linck et al. 2014). Research on the connection of WM with L2 production tends to resort to correlational measures due to methodological challenges when integrating the two experimentally (e.g. Weissheimer & Mota 2009). These challenges are amplified in the case of pragmatic production in particular, because it is highly variable and context-dependent. Yet, it has been posited that processing control is a vital component of L2 pragmatic competence (Bialystok 1993; Hassall 2014).

The purpose of the present study is to determine the relative WM demands involved in the production of two different speech acts in the L2. A dual-task design, usually used to assess WM demands of learning tasks in the form of cognitive load (see e.g. Korbach et al. 2018), was chosen as a means to tackle the methodological balancing act between the controlled test setting required for WM testing on the one hand, and variable, context-dependent pragmatic production on the other. In this design, participants complete two concurrent tasks. The primary task involved producing requests and responses to thanks in oral Discourse Completion Tasks (oDCTs). The secondary task served to induce additional cognitive strain: simultaneous to the oDCTs, participants continuously tapped a simple rhythm (Park & Brünken 2015). Magnitude of cognitive load was measured in irregularities between this tapping and the respective participant's tapping of the same rhythm before the oDCTs.

This new application of the design for an interdisciplinary purpose calls for an evaluation of its suitability. To this end, the results are compared to those of more discipline-specific validation tasks. The discussion focuses on shortcomings and potential of dual-task designs for an enquiry into the WM demands of L2 speech act production.

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Word Knowledge and Word Frequency: Intuitions and Assessment

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For many linguistic frameworks of analysis, the lexicon is the *locus* of idiosyncrasy: they may see it as a grammar module or as an independent entity; they may modulate its internal structure and hypothesize lexical specification formats; and they may even present claims about its dimension. Nevertheless no theoretical approach seems to be willing to take the risk of deciding which real words are really known by real individuals. Corpus linguistics has helped solving this practical problem by providing word lists that may be ordered according to their frequency. However, frequency rates are biased by the nature of the corpus (written vs. oral and temporal reference, for instance), but also by the morphological nature of words (compositional derivatives are always less frequent than their bases). Thus, frequency rates are counterintuitive.

The psycholinguistic viewpoint on VWP takes frequency as a fundamental measurement criterion. The centrality of frequency may, nonetheless, introduce distortions that are often visible over nonsensical results. This was our initial motivation to perform an offline test that envisages to find out if the informants consider that a given word, specifically nouns in –*ção* (in Portuguese mean 'the action of' the verb that they derive from – e.g. *utilização* 'use' is

the action of *usar* 'to use'). We have analysed and compared the results of the test with the frequency values that are provided by the largest contemporary corpus that is available for European Portuguese. The results show that words that get a higher error percentage are those classified as less frequent. But we have also found many discrepancies between the frequency rates and the real knowledge demonstrated by the participants. For instance, a large number of low frequency words display a very small error percentage. These results merit, at least, further research.