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The 25th Architectures and Mechanisms of Language Processing Conference, Moscow

6-8 September

Keynote speakers

Evelina Fedorenko, MIT, USA

Antje Meyer, Max Planck Institute for Psycholinguistics, The Netherlands

Christoph Scheepers, University of Glasgow, UK

Yury Shtyrov, Aarhus University, Denmark

Linda Wheeldon, University of Agder, Norway

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Keynote presentations

Evelina Fedorenko

Assistant Professor MIT

«The language system in the human mind and brain»

Human language surpasses all other animal communication systems in its complexity and generative power. My lab uses a combination of behavioral, brain imaging, and computational approaches to illuminate the functional architecture of language, with the ultimate goal of deciphering the representations and computations that enable us to understand and produce language.

I will discuss three discoveries my lab has made over the last decade. First, I will show that the language network is selective for language processing over a wide range of non-linguistic processes that have been argued to share computational demands with language, including arithmetic, executive functions, music, and action/gesture observation. Next, I will consider the distinction between the lexicon (word meanings) and syntax (the rules for how individual words can combine to create phrases and sentences). Much prior theorizing and empirical work has focused on syntax, and most current proposals of the neural architecture of language argue that syntax is cognitively and neurally dissociable from meaning. I will challenge this view. In particular, I will show that syntactic processing is not localized to a particular region within the language network, and that every brain region that responds to syntactic processing is at least as sensitive to word meanings, including when probed with a high-spatial/high-temporal-resolution method (ECoG). Further, many brain regions show stronger responses to word meanings than to syntactic manipulations, with no regions showing the opposite preference. Finally, I will provide evidence that stimuli that are not syntactically well-formed but allow for meaning composition (operationalized within an information-theoretic framework) elicit as strong a response as intact sentences, suggesting that semantic composition may be the core driver of the response in the language-selective brain regions. Taken together, these results argue against an abstract and domain-general syntactic processing mechanism, and support strong integration between the lexicon and syntax. They further suggest that the language network is more concerned with meaning than structure, in line with the primary function of language – to share meanings across minds.

Antje S. Meyer

Professor at Radboud University and a director of the Max Planck Institute for Psycholinguistics

«Why conversations are easy to hold and hard to study»

Everyday conversation is characterized by smooth turn-taking, i.e. short gaps and frequent overlaps between turns. Switching quickly between the tasks of listening and speaking, and planning one's turn during an interlocutor's utterance should render conversation a taxing task. Yet, it is not commonly experienced as such. Why is this? We review evidence showing that (a) in everyday conversations and in dyadic laboratory tasks, speakers indeed often plan their utterances while listening to their interlocutors; (b) listening and speaking require attention in multiple ways; (c) listening and speaking interfere with each other. All of this should make holding a conversation hard. However, we also discuss that (d) speaking and listening, only require part, but not require all of a person's attention; and that (e) listening and speaking may not only interfere with each other, but can also facilitate each other. Most importantly, we argue that (f) the capacity demands imposed by speaking and listening are largely strategic rather than structural, and that in everyday conversation, speakers are free to allocate capacity to these activities as they see fit. Finally, we argue that (g) in everyday conversation, speakers are free to choose when to talk and what to say (if anything). This contrasts sharply with the tight task constraints in most laboratory sets. It is this mundane freedom of speech takes makes everyday conversations easy to hold but hard to study.

Linda Wheeldon

Professor Department of Foreign Languages and Translation, University of Agder

«Spoken sentence production: incremental planning for fluent output»

Speaking is a demanding task involving several stages in which linguistic representations must be retrieved and structures must be generated in order to convey our thoughts. Put simply, speakers need to select appropriate words and articulate them in the correct order, ideally in a timely and a fluent manner. There is now a great deal of evidence that we plan our utterances incrementally, initiating the articulation of early parts of an utterance and planning the rest as we speak. Investigating the nature of the planning increments employed during fluent sentence production can provide a great deal of information about speech production processes as well as the factors that constrain them: in particular information about the relationship between words and structure. According to some theories, syntactic planning →

Keynote presentations

is controlled by processes responsible for the retrieval of words. Alternatively, syntactic structure may be generated independently of lexical access and may even function to constrain it. Moreover, at the interface with sound structure, we can generate representations that correspond to neither lexical nor grammatical units. I will review research that has focused on planning scope during the production of fluent sentences. I will consider to what extent planning scope is determined by linguistic structures and to what extent it is flexible and subject to cognitive constraints, as well as whether the answers to these questions differ for different levels of linguistic representation – grammatical, lexical and phonological.

Christoph Scheepers

University of Glasgow

«What's the syntax behind syntactic priming?»

The tendency to repeat syntactic structure over consecutive sentence production or comprehension trials has received much attention in psycholinguistics over the past 25 years. Syntactic priming is not only informative in terms of potential cognitive architectures and mechanisms for linguistic processing, but has also (more specifically) been argued to be revealing in terms of linguistic representations (see, e.g., Branigan & Pickering, 2017). In this talk, I will review a wide range of prominent findings from the syntactic priming literature. Using Lexicalised Tree-Adjoining Grammar (cf. Joshi, 1985) as a general theoretical framework, I will argue that many – if not most – of the relevant findings in this area can be characterised in terms of basic lexical choices involving head-specific subcategorization frames or the use of different types of head-modifying adjuncts. Other types of structural priming effects concern differences in the hierarchical configuration of recursive structures and are, in a sense, more «syntactic» rather than lexical in nature. I will conclude that moving away from simple context-free grammars, and towards more recent representational formalisms, opens up new theoretical perspectives on the representations involved in syntactic priming. More generally, I will argue for a Renaissance/revival of the «linguistics» in psycholinguistics.

Yury Shtyrov

Professor at Aarhus University

«Neurophysiology as a precision tool for psycholinguistics: Disentangling morphosyntactic interactions using brain dynamics»

The debate on the nature of complex word storage and processing is ongoing. Are complex words real mental objects represented in the lexicon as such, or are they learnt, stored and processed as mere combinations of individual morphemes bound together by morphosyntactic rules? And do these mechanisms differ depending on the type of morphology under investigation? As we show in a series of studies, such questions hotly debated in (psycho)linguistic literature can be straightforwardly addressed using neurophysiology. Using MEG and EEG, we have established a distinct double dissociation pattern in neurophysiological responses to spoken language, which can reflect lexical («representational») vs. (morpho)syntactic («combinatorial») processes in the brain. These are manifest as: (1) a larger passive (i.e. obtained without any stimulus-related task) brain response to meaningful words relative to matched meaningless pseudowords, reflecting stronger activation of pre-existing lexical memory traces for monomorphemic words (= lexical ERP/ERF pattern), (2) a smaller brain response amplitude for congruous word combinations (reflecting priming via syntactic links), relative to incongruous combinations where no priming is possible (=combinatorial pattern). This double dissociation – larger response for auditorily presented simple holistic representations vs. smaller response for well-formed combinatorial sequences – allows, in turn, for clear experimental predictions. Such experiments could test the nature of morphosyntactic processing by presenting the subjects with real complex words and incongruous morpheme combinations in passive auditory event-related designs, and comparing the relative dynamics of their brain responses.

We have used this neurophysiological approach to address a range of morphosyntactic questions: neural processing of compound words, past tense inflections, particle verbs as well as differences between inflectional and derivational morphology and processes of complex word acquisition in L1 and L2. This body of results generally supports a flexible dual-route account of complex-word processing, with a range of strategies involved dynamically, depending on exact psycholinguistic stimulus properties. Furthermore, as these experiments indicate, comprehension of spoken complex words is a largely automatized process underpinned by a very rapid (starting from ~50 ms) neural activation in bilateral perisylvian areas.

Talks

Talk A1

Long-term syntactic priming: Priming affects syntactic processing one week and one month post-exposure.

Katrien Segaert[1] & Evelien Heyselaar[2]; [1]University of Birmingham, [2]Radboud University

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Syntactic priming is the tendency to repeat syntactic structures across sentences. Syntactic priming and cumulative syntactic priming effects have been demonstrated to persist for at least one week (Kaschak et al., 2011; 2014), supporting theories on implicit learning mechanisms driving these effects (Chang, Janciauskas and Fitz, 2012). We investigated whether the effects are robust enough to last even longer. We conducted a longitudinal study with 29 participants across three sessions: Session A, session B (one week interval), and session C (four week interval compared to session B). Each session contained: First, a baseline block during which participants freely described pictures and we measured the proportion of passives/actives produced; second, a production-to-production syntactic priming task with colour-coded pictures eliciting actives/passives as the prime and grayscale pictures allowing participants the choice between active/passive descriptions as the target. There was a passive priming effect across sessions ($p = .002$). Moreover, exposure to passive priming had long-term effects on syntactic processing: Firstly, in the baseline block, the proportion of passives increased from session A to B ($p = .028$) and from session B to C ($p = .045$). Secondly, during the syntactic priming experiment, participants produced passives earlier and more frequently in session B compared to A ($p < .001$). Moreover, they produced passives later but more frequently in session C compared to B ($p < .001$). These findings suggest that exposure to infrequent syntactic structures has robust effects on syntactic processing, with a 15-minute experimental session still influencing syntactic choices one month later.

Keywords: *long term syntactic priming, cumulative priming, passives*

Talk A2

Functional organization of language networks: from rest to speech production in young and elderly.

Pistono, A.[1,2], Péran, P.[3], Guerrier L.[3], Rafiq, M.[4], Giméno, M.[2], Bézy, C.[4], Pariente, J.[3,4] & Jucla, M.[2];

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a u r e l i e . p i s t o n o @ u g e n t . b e

Studies analysing functional language networks are still scarce and methods, atlases, age groups are not consistent (e.g. Doucet et al., 2017; Shirer et al., 2012) making interpretation difficult. In this study, we performed a seed-based functional connectivity analysis using Broca's area as seed: i) on two age groups, hypothesizing more extended networks in elderly; ii) during resting-state and task-related fMRI, to capture the reorganization of these networks for language production. 23 young (Age = 28±4) and 24 elder (Age = 70±4) participants underwent a full language assessment and resting-state and task-related (automatic naming) fMRI scans. Seed-based functional connectivity was measured using Broca's area (Shirer et al., 2012). Although elders had widespread grey matter atrophy, their language performance was comparable to that of younger participants. During resting-state, both groups showed an extended bilateral network of areas connected to Broca. For both tasks, elders had lower connectivity and smaller networks (summarized as supplementary material). Contrary to our hypothesis, elders showed reduced connectivity. This is in line with studies suggesting age-related decline in functional connectivity but limited behavioural outcomes (Marsolais et al., 2017). The reduction of these networks during naming argues for the adaptation of functional networks from rest to a specific language task, in accordance with the «pruning hypothesis» (Doucet et al., 2017).

Keywords: *fMRI, functional connectivity, aging*

Talk A3

The Effect of Discourse Continuity on Structural Priming.

Chi Zhang[1], Sarah Bernolet[2], Robert J. Hartsuiker[1]; [1]Ghent University, [2]University of Antwerp

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Speakers tend to spontaneously repeat sentence structures they have experienced (i.e., structural priming). A multifactorial account of structural priming posits an implicit learning process and an explicit memory-related process jointly contributing to structural priming. Specifically, implicit learning leads to long-term, abstract priming, whereas explicit memory causes a short-lived, cue-dependent effect, especially when there is lexical overlap. Some versions of the multifactorial account further assume that speakers encode sentence structure in explicit memory to maintain the coherence of discourse. We therefore hypothesized →

that speakers are more likely to retrieve previous sentence structures when there is coherence between primes and targets, which leads to larger structural priming. We tested this hypothesis by varying the presence or absence of connectives in two structural priming experiments. One hundred and ninety-two native Dutch speakers read (double object/prepositional object) prime sentences and described target pictures. We manipulated prime structure, lexical overlap, and critically, the presence of a connective (en meaning and in Experiment 1; maar meaning but in Experiment 2) joining primes and targets. Both experiments showed structural priming, which was stronger with lexical overlap. Crucially, there was stronger priming when the connective en was present, but only when there was no lexical overlap. Unexpectedly, the lexical-dependent structural priming was reduced in the presence of the connective maar. These findings suggest that speakers temporarily hold sentence structure in explicit memory to help maintain discourse coherence. Memory retrieval can be facilitated by the presence of a connective. However, this process does not seem to affect lexically-dependent priming.

Keywords: *structural priming, the multifactorial account, discourse continuity*

Talk A4 Availability-based production predicts speakers' real-time choices of Mandarin classifiers.

Meilin Zhan[1], Roger Levy; [1]Massachusetts Institute of Technology

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When multiple options are available to express more or less the same meaning, what general principles govern speaker choice? Here we investigate the influence of contextual predictability on the encoding of linguistic content manifested by speaker choice in a classifier language. In English, a numeral modifies a noun directly (e.g., three tables). In classifier languages such as Mandarin Chinese, it is obligatory to use a classifier (CL) with the numeral and the noun (e.g., three CL.flat table, three CL.general table). While different nouns are compatible with different specific classifiers, there is a general classifier «ge» (CL.general) that can be used with most nouns. We focus on the alternating options between using the general classifier versus a specific classifier with the same noun where the options are nearly semantically invariant. When the upcoming noun has high surprisal, the use of a specific classifier would reduce surprisal at the noun thus potentially facilitate comprehension (predicted by the Uniform Information Density account (Levy & Jaeger, 2007), but the use of that specific classifier may be dispreferred from a production standpoint if accessing the general classifier requires less effort (predicted by the Availability-Based Production account (Bock, 1987; Ferreira & Dell, 2000). Our picture-naming experiment confirmed two predictions made by Availability-Based Production: 1) Speakers are more likely to produce the general classifier under greater time pressure; 2) Speakers are more likely to produce the general classifier when the noun is less frequent.

Keywords: *speaker choice, language production, mandarin classifiers*

Talk B1 Subject-island constraint? The discourse function of the construction matters.

Anne Abeillé[1], Barbara Hemforth[1], Elodie Winckel[1], Edward Gibson[2]; [1]LLF, Centre national de la recherche scientifique (CNRS), Université Paris Diderot, [2]MIT

e g i b s o n @ m i t . e d u

Syntactic islands have been claimed to inhibit extraction across constructions, which has been taken as an argument for purely syntactic accounts and against discourse-based approaches (Schutze et al. 2015). Sprouse et al. (2016) for Italian, AUTHORS for English (with pied-piping) and French, found a (nominal) subject island effect for wh-questions but not for relative clauses (RCs). They propose that the subject penalty is not a syntactic constraint but results from a discourse clash: the extracted element must match the discourse status of the head noun. Extraction out of a subject, which is a default clause topic, is hard for wh-questions because the extracted element is a focus, but not for RCs. Thus languages may not only allow extraction from nominal subjects, but even prefer such extraction, given the right construction. We test a prediction of this account: it-clefts – which closely resemble RCs in their form – should nevertheless pattern with wh-questions because the extracted element is a focus (Prince 1978). We ran acceptability experiments in English and French RCs and clefts comparing subject and object extraction with no island and ungrammatical controls. Linear mixed-effect models replicate previous results for RCs across languages: extractions from the subject (1a) were rated better than extractions from the object (1e), like coordination (no-extraction) versions (1c,g), and ungrammatical controls (1b,f) were rated much worse. For it-clefts, extraction out of subjects (2a) were rated lower than out of objects (2e), contrary to simple clefts (2c,g), and slightly better than ungrammatical controls (2b,f).

Keywords: *syntactic islands, discourse processing, constraint-satisfaction theories of language*

Talk B2 Priming of (in)transitivity in reading.

Björn Lundquist[1], Martin Corley[2], Eva Wittenberg[3]; [1]UiT: The Arctic University of Norway, Tromsø, Norway [2]University of Edinburg, Scotland [3]University of California, San Diego, USA

b j o r n . l u n d q u i s t @ u i t . n o

Most current paradigms for priming rely on either semantic identity or close similarity between two potential target forms, which imposes quite strong limitations on the method. This makes dative alternations and passive-active pairs suitable objects of study, but does not easily extend to phenomena such as transitivity alternations, (e.g., object drop and causative inchoative alternations).The aim of the current study is to establish a paradigm for priming of (in)transitivity →

in comprehension, that also estimates the effects of syntactic and prosodic similarities. We report on four experiments in a novel priming paradigm that show that (1) reading an intransitive version of an optionally transitive (OT) verb increases the possibility of assigning an initial intransitive parse to another OT verb in a following sentence; (2) the same priming effect is also seen between verbs within a sentence, even across other verbs; and (3) that reading an intransitive OT verb followed by an adverbial (realised as a PP) fully removes the priming effect, i.e., a verb followed by an adverbial reduces the likelihood of an initial intransitive parse of a following verb to the same extent as a verb followed by a direct object. We discuss prosodic and syntactic explanations of these results, and argue that the results are unlikely to be triggered by underlying structural similarities between verb+adverbial and verb+DO, but are more likely to be grounded in prosody or surface structure (Bader 2002, Fodor 2003). This challenges strong syntactico-centric views on structural priming.

Keywords: *implicit prosody, syntactic priming, verb diathesis, argument structure*

Talk B3 The role of foreign accent and short-term exposure on speech-in-speech recognition.

Susanne Brouwer[1]; [1]Radboud University

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Daily speech communication often takes places in suboptimal listening conditions, in which interlocutors typically need to segregate the target signal from the background sounds. The present study investigated the influence of a fairly familiar foreign accent in background speech on speech recognition (Exp. 1) and whether short-term immediate exposure to the target talker's voice (Exp. 2) or the background babble (Exp. 3) would either help or hinder target-from-background segregation. Seventy-two native Dutch participants were asked to listen to Dutch target sentences in the presence of Dutch or German-accented Dutch babble without (Exp. 1) or with an exposure phase (Exp. 2 and 3). Their task was to write down what they heard. The results of Exp. 1 revealed that listeners received a release from masking when the background speech was accented, indicating that dissimilar and less familiar signals are easier to segregate effectively. Exp. 2 demonstrated that short-term immediate exposure to the target talker had no effect on speech-in-speech recognition, whereas exposure to the background babble could hinder separating the target from the background speech (Exp. 3). However, this reduced release from masking only appeared in the more difficult and more familiar babble condition (Dutch-in-Dutch), as the speech recognition system may have remained attuned to this information as a potential source of communicatively relevant information. Taken together, these results give novel insights into the interplay between target-background similarity, familiarity and short-term adaptation on speech-from-speech segregation.

Keywords: *adaptation, foreign accent, speech-in-speech recognition*

Talk B4 The oscillatory mechanisms supporting syntactic language comprehension in healthy aging.

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Older adults frequently display differential patterns of brain activity compared to young adults in the same task, in conjunction with widespread neuroanatomical change. These differing activity patterns in older adults are commonly interpreted as being compensatory (e.g., Wingfield & Grossman, 2006; Cabeza et al., 2002). We examined the relationship between oscillatory activity in the EEG during syntactic processing with behavioural comprehension performance. Minimizing contributions of semantics and working memory, 41 older adults listened to two-word sentences that differentially load on morpho-syntactic integration: correct syntactic binding (morpho-syntactically correct; e.g. «I dotch»); incorrect syntactic binding (morpho-syntactic agreement violation; e.g. «they dotches») and no syntactic binding (minimizing morpho-syntactic binding; e.g. «dotches spuff»). Syntactic comprehension performance, assessed in a syntactic judgement task, was characterized by high inter-individual variability, with accuracy ranging from 58-100%. Syntactic processing, assessed as the difference in oscillatory activity between the correct- and no syntactic binding condition, was associated with a smaller increase in theta (4-7Hz),alpha(8-12Hz) and beta (15-20Hz) power in the correct-, relative to the no binding condition. This suggest that the neural signature of syntactic processing in older adults is qualitatively different from younger adults, who show a larger alpha and beta power increase for binding compared to no binding in the same task (Segaert et al., 2018). We found no evidence for a relationship between behavioural comprehension performance and the neural signatures of syntactic processing. Our results do therefore not support the predictions of compensatory models of language and aging.

Keywords: *healthy aging, syntactic processing, compensation*

*Shared senior author

Talk C1 The domain-general multiple demand (MD) network does not support core aspects of language interpretation: a large-scale fMRI investigation.

Evgeniia Diachek[1*], Matthew Siegelman[2*], Idan Blank[3,4], and Evelina Fedorenko[3,5]; [1]Department of Psychology, Vanderbilt University, Nashville, TN 37203, USA [2]Department of Psychology, Columbia University, New York, NY 10027, USA [3]Department of Brain and Cognitive Sciences / McGovern Institute for Brain Research, MIT, Cambridge, MA 02139, USA [4]Department of Psychology, UCLA, Los Angeles, CA 90095, USA [5]Department of Psychiatry, MGH, Charlestown, MA 02129, USA

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Aside from the core language-specific left-lateralized fronto-temporal network, language comprehension sometimes additionally recruits a domain-general bilateral fronto-parietal network implicated in executive functions: the multiple demand (MD) network. However, the nature of the MD network's contributions to language comprehension remains debated. To illuminate the role of this network in language processing, we conducted a large-scale fMRI investigation using data from 30 diverse word and sentence comprehension experiments (481 unique participants, 678 scanning sessions). In line with prior findings, the MD network was active during many language tasks. Moreover, similar to the language-specific network, which is robustly lateralized to the left hemisphere, these responses were stronger in the left-hemisphere MD regions. However, in stark contrast with the language-specific network, the MD network responded more strongly (i) to lists of unconnected words than to sentences, and critically, (ii) in paradigms with an explicit task compared to passive comprehension paradigms. In fact, many passive comprehension tasks failed to elicit a response above the fixation baseline in the MD network, in contrast to strong responses in the language-specific network. In tandem, these results argue against a role for the MD network in core aspects of sentence interpretation like inhibiting irrelevant meanings or parses, keeping intermediate representations active in working memory, or predicting upcoming words or structures. These results align with recent evidence of relatively poor tracking of the linguistic signal by the MD regions during naturalistic comprehension, and instead suggest that the MD network's engagement during language processing reflects effort associated with extraneous task demands.

Keywords: *language network, multiple-demand network, fMRI*

Talk C2 Monolingual and Bilingual Logical Representations of Quantificational Scope in Language Comprehension: Evidence from Priming.

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Doubly quantified sentences, like «All hikers climb a hill», are scopally ambiguous. One interpretation is that all hikers climb a different hill, whereas the other interpretation is that all hikers climb the same hill. Studies have shown that these interpretations can be primed in English language comprehension, which indicates that comprehenders construct logical representations of semantic scope (Raffray & Pickering, 2010; Feiman & Snedeker, 2016). We investigated whether these findings can be generalised to Dutch and French monolingual and bilingual language comprehension, using sentence-picture matching tasks. The test sentences contained the quantifiers «all» (Dutch: «alle», French: «tous») and «a» (Dutch: «een», French: «un»). Experiments 1-2 showed no differences between Dutch (n = 69) and French (n = 62) in the spontaneous interpretation of these sentences. Experiments 3-4 showed (within-language) priming effects in both Dutch (9%, n = 66) and French (6%, n = 59). Thus, the construction of logical representations is not language-specific. Experiment 5 tested whether logical representations can be primed between languages. Here, the primes were in Dutch (L1), and the target in French (L2). This experiment showed a priming effect (9%, n = 61), which suggests bilingual logical representations are shared. Experiment 6 tested logical representation priming within L2 French. Again, we found a priming effect (12%, n = 66). Combined analyses showed that all priming effects found in abovementioned experiments were comparable (e.g. Van Gompel & Arai, 2017). This suggests that logical representations are comparably strong in the L1 and in the L2. Finally, Experiment 7, a visual search task, ruled out an explanation in terms of visual priming (n = 99).

Keywords: *semantics, logical representations, bilingualism, priming, quantification*

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Talk C3 Prediction in sentence processing across the adult lifespan.

Yuki Kamide[1] & Anuenue Kukona[2];

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Although much evidence suggests an age-related decline in language production and comprehension of complex (i.e., cognitively demanding) syntactic structures, it has been controversial whether and how ageing affects comprehension of relatively simple sentence structures. The current research presents two visual-world eye-tracking experiments on prediction and ageing, which prior research has yielded inconsistent results on (e.g., Choi, et al., 2017; Federmeier & Kutas, 2005; Huettig & Janse; 2016). We investigated prediction stemming from verb selectional restrictions in Experiment 1 (hearing «The boy will eat/move the cake» while viewing a boy, cake, toy train, ball: Altmann & Kamide, 1999) and real world knowledge in Experiment 2 (hearing «The man will ride the motorbike» while viewing a man, young girl, motorbike, carousel, beer, sweets; targets rotated across lists: «The man/girl will ride/taste…»; Kamide et al., 2003). Table 1 reports cognitive test scores (WAIS, MMSE), education, and age for younger vs. older participants; scores were also included as covariates in the fixation analyses. Fixation proportions in both Experiments 1 and 2 showed: (a) effects of prediction during the verb; (b) no effects of age; (c) no interaction between prediction and age; and (d) no effect of any covariates. Thus, both experiments revealed similar degrees of prediction across younger and older adults. Results are discussed in relation to prediction vs. integration (e.g., Federmeier & Kutas, 2005) and related sentence processing mechanisms.

Keywords: *ageing, prediction, eye movements*

Table 1. *Off-line properties of the Older and Younger participants*

	Older		Younger		t
	M (SD)	Min/Max	M (SD)	Min/Max	
1. Age	69 (5)	60-81	22 (1)	18-24	59.10*
2. Education (years)	15 (3)	9-35	17 (1)	14-19	-3.55*
3. Function (MMSE)	28 (2)	21-30	29 (1)	26-30	-3.30*
4. WM (WAIS IV - Backward Digit Span)	10 (3)	4-16	10 (2)	4-13	0.17
5. Vocab (WAIS IV – Vocab)	42 (11)	15-57	35 (6)	23-52	3.19*

Note. **p < .05; MMSE – Mini Mental State Examination; WAIS-IV – Wechsler Adult Intelligence Scale, 4th Edition.*

Talk C4 Syntactic priming and extralinguisitc information contribute to rapid automatic syntax parsing: ERP evidence.

Maria Alexeeva[1], Andriy Myachykov[1,2], Beatriz Bermúdez-Margaretto[1], Yury Shtyrov[1,3,4];

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Automatic syntax processing – most commonly reflected in ELAN component for (morpho)syntactic violations – is a well-established phenomenon, but its mechanisms are poorly understood. Two alternative hypotheses are offered: (1) syntactic priming (leading to response reduction for connected morphemes; Shtyrov et al., 2003) vs. (2) error detection (response increase for violation; Embick et al., 2002). To test these accounts, we used a non-attend design with visual distraction and recorded ERPs to spoken Russian pronoun-verb phrases (e.g., 'she/he/I walked') that either agreed or mismatched in subject-verb gender marking as well as to the same critical verbs presented in isolation. Three pronouns and ten different verbs spoken in male and female voices were used. ERPs were analysed using rmANOVAs and cluster-based permutation analysis. Results revealed both early and late syntax-processing indices, including ELAN, LAN and P600 for agreement violation, suggesting a high degree of automaticity in syntactic parsing. The largest ELAN responses were obtained for isolated verbs, followed by incongruent phrases, suggesting that its reduction for well-formed phrases is underpinned by syntactic priming between words/morphemes, potentially mediated by associative links formed during previous experience. Moreover, we also found ELAN and P600 for those first-person phrases where the speaker voice mismatched the grammatical gender (I walked[fem/masc]). Previously, such integration of extralinguistic features into syntactic analysis was only demonstrated in N400 for attended sentences. Overall, our results support rapid automatic syntactic processing that underpinned by the links between related words/morphemes and relying on both linguistic and extralinguistic information in the auditory input.

Keywords: *syntax, language perception, electroencephalography, event-related potentials*

Talk C5 Building event representations on-the-fly: A new account of event cognition.

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g e r r y . a l t m a n n @ u c o n n . e d u

To understand the sentence «the chef chopped the onion», and the corresponding real-world event, requires understanding (i) that the things under consideration have properties shared with other similar things (i.e. inherited from their type), (ii) that they have specific properties that uniquely distinguish them from other things of the same type (i.e. they are specific tokens), and (iii) that these properties change over time; the chef and the onion have (intersecting) histories that started with them in one state and ended with them in another. These histories are in fact trajectories of changes in state across time and space, and their intersection defines the interactions between objects (in this case, the action of the chef on the onion).
To comprehend events therefore requires that we access knowledge about types of objects and combine this with knowledge about the dynamic episodic properties of individual tokens – that is, it requires creating on-the-fly representations of object tokens and their changes in state. In this talk I shall outline an account of how this might be accomplished in a brain that is able to distinguish the systematic associations that define semantic memory for object types from the non-systematic accidental associations that define the episodic characteristics of object tokens. A critical claim is that the same machinery accounts for on-the-fly event cognition regardless of whether the event is experienced directly or indirectly via language.

Keywords: *event representation, sentence comprehension, episodic memory, semantic memory*

Talk D1 Conversation as a competitive sport.

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p h i l l i p . a l d a y @ m p i . n l

The gaps between turns in real-life conversations are surprisingly short, with some studies reporting mean and median gap durations around 150-200ms (cf. Torreira, and Levinson, 2015). Multi-party conversations are particularly fast. By contrast, in lab experiments, participants typically need close to a second to produce even a simple utterance. This suggests that in conversation, speech planning and articulatory preparation are already taking place during the previous turn. While the degree to which such multi-tasking indeed takes place is still a matter of some debate, the distribution of conversational gaps offers much more insight than →

the summary statistics often reported. While reaction times in experiments are famously heavy tailed and skewed, the distribution of conversational gaps is even more so, suggesting that univariate summary statistics are a poor indication of "typical" performance. More important for explaining the difference between observational and experimental data however is that observational data are inherently biased, as only the fastest respondent takes over the next turn. We simulated such race conditions using experimental data from two recent studies (Meyer et al., 2018 and Corps et al., 2018) and show that they do indeed give rise to faster responses times. This has important implications for studies of conversation and language production. It suggests that the speed difference between observational and experimental data is not purely an artefact of the experimental environment nor an issue of ecological validity and stresses the importance of understanding language production within its communicative and conversational application.

Keywords: *production, dialogue, conversation, observational bias, simulation*

Talk D2 On temporal alignment between speech and manual gesticulation: two levels of coordination.

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n _ k o r o t a e v @ h o t m a i l . c o m

When people produce and understand natural discourse, they rely on multiple resources – verbal, prosodic, gestural, oculomotor, etc. (Müller et al. eds. 2013/2014). In studies of multimodality, a salient issue is how different communication channels are aligned, or coordinated in time. McNeill (1992) proposed that manual gesticulation tends to anticipate speech; see Loehr 2012, Grishina 2017 for similar results. In our study, we test this claim using data from the Russian Pear Chats and Stories (Kibrik & Fedorova 2018), a multichannel corpus consisting of communicative sessions in which participants relate and discuss the contents of the Pear film (Chafe ed. 1980). This study is based on a subcorpus of three sessions (approx. 1 hour long). We examined two levels of temporal coordination: (i) between gestures (or «gesture phrases») and elementary discourse units (EDUs, Kibrik & Podlesskaya eds. 2009), and (ii) between gesture strokes and accented words. As it is often difficult to establish semantic / pragmatic correspondences of manual and vocal units, we applied a simple formal criterion instead. For each manual unit, a vocal unit was found that had the largest intersection with it. We obtained the following results. Strokes tend to start before the corresponding accented words rather than come with a delay (588 vs. 466 items, with an accuracy of 50ms). Gestures, however, demonstrate an opposite distribution (855 vs. 1471). This difference is statistically significant ($p < 0.001$) and suggests that temporal coordination between manual gesticulation and speech is organized in a more complex way than previously proposed.

Keywords: *multimodal discourse, speech and gesture, small corpora*

Acknowledgements: *Research underlying this study was supported by grant # 19-012-00626 from the Russian Foundation for Basic Research*

Talk D3 The language network is recruited but not required for non-verbal semantic processing.

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a n n a i v @ m i t . e d u

Consistent with longstanding findings from neuropsychology, several brain regions in left frontal and temporal cortex respond robustly and selectively to language (Fedorenko et al., 2011). These regions, often referred to as the «language network», respond more strongly to meaningful stimuli (like words and sentences) than to stimuli devoid of meaning (like pseudowords and Jabberwocky sentences). But are these regions selectively recruited in processing linguistic meaning? Or do they instead store and/or process semantic information independent of its format (pictures versus words)? In Experiment 1, we scanned participants with fMRI while they performed a semantic plausibility judgment task vs. a difficult perceptual control task on sentences and line drawings that describe or depict simple agent-patient interactions. We found that the language regions responded more strongly when participants performed the semantic task compared to the perceptual task, for both sentences and pictures. Thus, language regions do get engaged when we process non-verbal meanings. But is this engagement necessary for understanding pictorial stimuli? In Experiment 2, we tested two individuals with global aphasia, who have sustained massive damage to perisylvian language areas, and a group of control participants. As expected, patients were at chance on a task of matching the sentences and pictures. However, they performed close to controls on the semantic plausibility task on the pictures. Taken together, these results indicate that the left fronto-temporal language system is recruited during but not necessary for processing non-verbal meanings.

Keywords: *non-verbal semantics, fMRI, language selectivity, aphasia*

Talk D4 Intensive language-action therapy combined with anodal tDCS leads to verb generation improvements in chronic non-fluent post-stroke aphasia.

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Svetlana Malyutina, Ekaterina Iskra, Olga Soloukhina, Olga Buivolova, Vidya Somashekarappa, Anna Pavlova, Anastasia Nikolaeva, Andrey Prokofyev, Matteo Feurra, Tatiana Stroganova; [1]National Research University – Higher School of Economics

m a x i m . u l a n o v . r e p o r t @ g m a i l . c o m

Previous studies showed complex improvements in speech functions in chronic post-stroke aphasics after intense rehabilitation. However, it is unclear whether these improvements are driven by specific language recovery processes or by general cognitive enhancement. A group of 17 patients with chronic non-fluent mild-to-moderate aphasia caused by a single left-hemispheric stroke underwent Intensive Language-Action Therapy combined with either 1.5 mA anodal tDCS over left IFG or sham tDCS. We hypothesized that tDCS could facilitate speech improvements. To assess changes in speech production, we applied verb generation task before and after training, using two different sets of words. Patients had to respond to a visually presented noun by uttering a related verb. There was an easy condition ("sun->shines") and a difficult one ("island->emerges"). Repeated measures ANOVA indicated an increase in the number of correct responses after rehabilitation. This increase was significant in the difficult condition ($F = 6.9$, $p < 0.02$) but not in the easy one ($p > 0.5$). The response times also improved for the difficult condition only ($F = 5.04$, $p < 0.04$). As for the tDCS effect, there were no significant effects of sham/anodal tDCS assignment or its interactions with behavioral outcomes. This might be an evidence that these improvements were driven by non-specific processes associated with attention and cognitive control involved in speech production. While these effects seem to be driven by intensive speech training rather than by tDCS, future studies should use larger patient samples to scrutinize its effects more closely.

Keywords: *aphasia, stroke, speech production, verb retrieval*

Acknowledgements: *Supported by the HSE Basic Research Program and the Russian Academic Excellence Project '5-100'*

Talk D5 Segmentation impairment in dyslexia across modalities and domains: online and offline measures.

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a l u k a c s @ c o g s c i . b m e . h u

The vulnerability of statistical learning (SL) has been demonstrated in dyslexia in both the visual and acoustic domains. Since investigations so far focused mainly on explicit measures, little is known about the more specific nature and timing of the deficit. We explored segmentation abilities in the acoustic verbal and visual nonverbal domain in online target detection tasks, where the extent of learning is reflected in the differences between reaction times (RT) to predictable versus unpredictable targets. Explicit judgments of well-formedness were also elicited in a 2AFC task. We examined adolescents with and without dyslexia (DD and TD; $n = 19$ in both groups) matched on age, sex and IQ at the group level. A significant online learning effect was observed in both groups in both domains, but participants with dyslexia showed a smaller learning effect and slower learning of statistical regularities. On the explicit measures, the DD group was at chance in the visual, but not the verbal domain. These findings suggest that the SL impairment in dyslexia is present across modalities and domains. Results also imply that explicit measures may mask learning abilities, and measuring learning online can provide more sensitive indices that offer a deeper understanding of the deficit.

Keywords: *dyslexia, statistical learning, segmentation, modality effects, online and offline measures*

Talk E1 Typological or structural transfer in L3 acquisition: Evidence from artificial language learning.

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n a t a l i a . m i t r o f a n o v a @ u i t . n o

A widely discussed issue in L3/Ln acquisition is whether transfer/crosslinguistic influence at the initial stages is dependent on overall typological similarity (cf. Typological Primacy Model, Rothman et al., 2019) or can be selectively sourced from L1 and/or L2 depending on linguistic property-specific similarities (cf. Linguistic Proximity Model, Westergaard et al., 2017). For proponents of the former position, the source language is selected based on overall typological similarity to the L3, following a hierarchy of cues where the lexicon is the most salient. Focusing on the above question, we designed a picture-sentence matching task employing an artificial language as an L3, and two groups of participants: Norwegian-English ($n = 23$) and Russian-Norwegian bilinguals ($n = 23$). The L3 was constructed using Norwegian lexical roots combined with case marking in the manner of Russian. If lexical similarity prompts transfer from Norwegian for both groups, no difference between the groups is expected. If, on the contrary, case-licensed flexible word order can be selectively supported by any previous language, Russian-Norwegian bilinguals should have an edge. After a short training phase, where the participants were exposed to grammatical examples of both SVO and OVS sentences, they were asked to decide if sentences accurately described pictures on a screen. Stimuli were grammatical/ungrammatical SVO and OVS sentences. Ungrammatical sentences used the wrong case (NOM on the object or ACC on the subject). Results show a higher accuracy for both word →

orders for the Russian-Norwegian group, indicating that learners may be sensitive to structural transfer at an early stage.

Keywords: *third language acquisition, artificial language learning, grammatical case, typological primacy model, linguistic proximity model*

Talk E2 English-Korean code-switching: Looking beyond balanced bilinguals and beyond Indo-European.

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Dual-language activation in bilinguals often results in language mixing/code-switching. A core constraint constraints claimed to regulate language switching in BALANCED BILINGUALS is the Free Morpheme Constraint (FMC, Poplack'80), which states that switches cannot occur between roots/stems and bound morphemes. We tested whether the FMC applies in English-Korean code-switching by HERITAGE SPEAKERS (US-raised, Korean-speaking parents). We also assess experimentally the FMC's crosslinguistic validity, given recent corpus-based claims that it does not apply in Spanish-Korean code-switching because Korean differs from Indo-European (Kim/Kaiser'19). Experiment: Korean heritage speakers (n = 28) rated the acceptability of code-switched sentences after hearing and reading them (30 targets, 45 fillers). Language proficiency, use etc was recorded. Participants (English-dominant) had low/intermediate Korean proficiency. We manipulated (i) language of verb roots and past-tense morphology (English root+Korean past tense, Korean root+English past tense) and (ii) context (No context/English/Korean, 2x3). See Table 1. Results are in Fig.1: English roots+Korean past-tense 'haysse' were rated more acceptable than Korean roots+English '-ed' (main effect of root; lmer, $p<.001$). We found no effect of context and no contextXroot interactions. We provide novel evidence that even heritage speakers show sensitivity to the FMC with Korean roots and English suffixes: The FMC extends to (i) non-Indo-European languages and (ii) heritage speakers (non-balanced bilinguals). However, we observe a striking language asymmetry: English roots with Korean past tense are more acceptable. This, coupled with phonological considerations, suggests that a more nuanced definition of the FMC is needed.

Keywords: *code-switching, bilingualism, heritage speakers, Korean, English, morphology*

Talk E3 How does language context modulate attention?

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How does our general attentional system manage with our constantly changing linguistic conversations? Specifically, do we adjust our attentional mechanisms depending on whether we are in a bilingual or a monolingual situation? This research is based on findings by Wu and Thierry (2013) that bilingual language context modifies inhibitory control. In a non-linguistic flanker task they found enhanced inhibition when participants were in a bilingual instead of a monolingual context. This shows inhibition and language context interact. With EEG we explore whether language context also affects attentional mechanisms. The Attentional Network Task (ANT) task allows us to measure three types of attention: alerting, orienting and inhibition. During the ANT participants also saw words presented in one language (e.g., Catalan) or in two languages (Catalan and Spanish) allowing us to investigate the effect of language context on attention. Language context modified attention for alerting and inhibition, but not orienting. Specifically, the bilingual context led to a greater P3 amplitude, which is associated with greater availability of attentional resources. Thus, a bilingual context can enhance attention towards non-linguistic information. More difficult to explain is that we found enhanced attention instead of improved inhibition, as Wu and Thierry (2013) did. Further, we excluded that our main finding could be attributed to low-level variability. In a control experiment, we showed that color of the words (red only vs. red and blue) did not modulate the P3. Thus, a bilingual context may create a state of alertness preparing the system for possible changes.

Keywords: *bilingualism, executive-control, attention*

Talk E4 Lexical alignment in the two languages of bilinguals.

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Alignment, or speakers' tendency to mimic aspects of their interlocutor's speech, may improve communicative success and bring processing facilitation (Pickering & Garrod, 2004), but little is known about its dynamics in the two languages of bilinguals. Here, we look at lexical alignment. There might be more such alignment in bilinguals' non-dominant language, because reusing a conversational partner's words would reduce the added effort of word retrieval in that language. Conversely, there might be less alignment in bilinguals' non-dominant than in a dominant language, because comprehension might be shallower in a weaker language (Francis & Gallard, 2005), and thorough comprehension is necessary for alignment to occur. In our study, 42 English-dominant and 40 Spanish-dominant bilinguals named and matched pictures with a confederate in Spanish. On critical trials, participants named objects which were either previously named by the confederate with a dispreferred but acceptable name (e.g. mano [Sp. hand] for puño [Sp. fist]; alignment condition) or were not previously named by the confederate (control condition). Participants produced ~13.5% more dispreferred responses in the alignment than in the control condition ($p < .001$). Further, this alignment effect was ~14% more for the group who spoke their non-dominant language than for the group who spoke their dominant language →

(a significant interaction between Language group and Condition, p = .03). These findings suggest that lexical alignment might reduce the processing burden of speaking a non-dominant language. Further experiments explore whether the greater non-dominant language alignment is driven by automatic priming or by belief-based decision-making.

Keywords: *language production, dialogue, picture naming*

Talk E5 Relative Processing by L2 speakers of English.

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d r o l a n d @ a o n i . w a s e d a . j p

We conducted 3 eye-tracking experiments examining how non-native speakers process English relative clauses, investigating the effects of head noun animacy (following up on L1 work by Gennari & MacDonald, 2008; Traxler, Morris, & Seely, 2002) and whether the embedded NP was pronominal or a full NP (following up on L1 work by Reali & Christiansen, 2007; Heider et al., 2014; Roland et al., 2018). The main findings were that like native speakers, L2 speakers of English had longer reading times for full NP object relative clauses following animate head nouns, and that unlike in Reali & Christiansen's self-paced L1 data, there was no reversal of processing costs for pronominal relative clauses. However, this is consistent with Roland et al. (2018), who found no reversal in costs in L1 eye-tracking data. The difficulties were only reflected in late measures of eye movement, and not in measures of initial fixation, as is typically the case for L1 speakers, indicating that while L1 speakers' difficulties are reflected in initial reading times as well as in rereading, L2 speakers' difficulties are only reflected in rereading. In addition, L2 speakers had approximately twice as many fixations per region as in previous L1 work. This suggests that while both populations may have similar difficulties with relative clause comprehension, the underlying causes may be different. Further work is needed to establish whether this is due to differences in reading strategy or differences in processing.

Keywords: *relative clause processing, second language, english*

Talk E6 Comparing methods of measuring reduced emotional resonance in bilinguals' second language.

Wilhelmiina Toivo, Christoph Scheepers; University of Glasgow

w . t o i v o . 1 @ r e s e a r c h . g l a . a c . u k

Bilinguals often feel less emotional in their second language (L2). This is called reduced emotional resonance in L2. Physiological measurement of emotion has provided consistent evidence for it, whereas explicit measures, such as affective word ratings have been less conclusive. There is no clear explanation for this discrepancy in measurement. The measures may tap into different mechanisms of affective language processing, or it may be due to the fact that lexical characteristics of experimental stimuli are often not controlled systematically. Our aim was to compare a physiological (pupillometry) and an explicit measure (affective word ratings), in a heterogeneous sample of bilinguals (English L2) vs. native English speakers, using a well-controlled set of stimuli. 240 English words (80 high arousal, 80 low arousal and 80 neutral distractor words) were selected with an algorithm that matched them on length, frequency, valence, dominance and concreteness. These lexical characteristics were also used as covariates in the analyses. 75 participants (50 bilinguals, 25 monolinguals) were shown the stimuli words while their pupillary response was measured. After each word-presentation, participants were asked to rate how exciting the word is on a 1-9 point scale (1 extremely calming, 9 extremely exciting). Preliminary cumulative link and linear mixed models show a significant interaction of word type and participant group; bilinguals had a smaller difference between high arousing and low arousing words in both ratings and pupillary reactions than monolinguals. This tentatively suggests that both pupil findings and word ratings show reduced emotional resonance in the bilingual group.

Keywords: *bilingualism, eye-tracking, affective processing*

Talk F1 Eye-movement control in the Visual World Paradigm.

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a n n a . l a u r i n a v i c h y u t e @ u n i - p o t s d a m . d e

Visual World Paradigm is a popular tool for conducting psycholinguistic research. In a typical setup participants see several images and hear related linguistic input, while their eye movements are being recorded. The assumption behind the paradigm is that eye movements to the object that currently undergoes linguistic processing are automatic, but this assumption has not been tested directly. We conducted two experiments (with 80 participants each) that tested the automaticity of language-mediated eye movements by probing whether they could be canceled by volitional control. Each experiment had two between-subjects conditions: in the eye-movement control condition, participants were asked to not look at the object that is currently being referred to. In the free viewing condition, participants had a classical 'look and listen' task. Both experiments included in each condition the same 32 short stories, each with 10 critical words. Experiment 1 had no additional task, while in Experiment 2 participants had to answer comprehension questions after each story to ensure that they indeed processed the experimental materials. The analysis of the aggregated dataset showed that fixating the referred image was less likely without comprehension questions and in the eye-movement control condition. The probability of fixating the image in the eye-movement control condition constituted ~20% without questions and ~65% with comprehension questions. At the same time, participants' ability to suppress saccades to the referred image varied greatly: in each experiment, →

8 out of 40 individuals in the eye-movement control condition fixated the referred image in less than 5% of cases.

Keywords: *visual world, automaticity, eye movements*

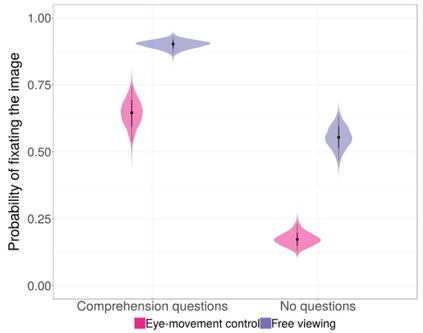

Figure 1. *Estimated probabilities of fixating the referred images across experimental conditions; black lines represent credible intervals: thick – 66%, thin – 95% CrI.*

Talk F2 Does Dialect Exposure Impair Literacy Acquisition?

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Educators have expressed concerns that dialect exposure impairs literacy acquisition due to competition between contrastive variants (e.g. 'house' vs. Scots 'hoose'). Yet dialect exposure is often confounded with negative cultural attitudes and limited educational opportunities leaving it unclear what accounts for deleterious effects. To control for these extraneous confounds we employed on-line artificial language literacy learning using an invented script. Adults (N=816) learned 30 artificial words prior to, or interleaved with, literacy training using fourteen invented graphemes to read (Experiment 1) and read and spell (Experiments 2 - 4) a transparent or an opaque orthography. Half of the participants encountered dialect variants mimicking children's exposure to different varieties at home and at school. Experiment 4 entrenched word knowledge prior to literacy training, and also introduced social cues for dialect use and explicit dialect literacy practice. After training, participants' literacy abilities and decoding skills were tested with trained and untrained words, respectively. While consistently replicating the contrastive deficit observed in natural language studies and computational simulations, we found no evidence that dialect exposure impairs decoding skills: interleaved dialect exposure in Experiments 1 and 2 showed no literacy detriment in transparent and opaque orthographies; extended interleaved dialect exposure in Experiment 3 yielded a benefit, especially for decoding untrained words; entrenched dialect knowledge prior to literacy training in Experiment 4 further confirmed no detriment in literacy and decoding skills. Thus, when extraneous confounds are eliminated dialect exposure per se does not impair literacy learning and can under some learning regimens even yield benefits.

Keywords: *dialect, literacy, artificial script*

Acknowledgements: *This work was supported by Leverhulme Grant # RPG 2016-039 to Vera Kempe*

Talk F3 Word segmentation cues in French- and German-learning infants.

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Two types of information have been proposed as relevant for infants' word segmentation: distributional regularities across segments (statistical cues) in the input (e.g Aslin, Saffran & Newport, 1998), and prosodic cues like lexical stress (e.g Jusczyk et al., 1993; Höhle, 2002). We tested the hypothesis that infants' weighting of these two cues varies cross-linguistically by comparing German and French 6-to-7-month-olds' exploitation of these cues in speech segmentation. Based on differences in the prosodic systems between these languages a stronger reliance on prosodic cues was expected for German than for French infants. Sixteen infants from each language participated in a HPP experiment similar to Thiessen and Saffran (2003). Infants were familiarized with a string of nonsense syllables in which statistical cues (transitional probabilities) and prosodic cues (stress) were pit against each other such that both cues indicated different word boundaries. In the test phase, bisyllabic parts from the string were presented that either constituted units according to a prosodic segmentation (prosodic words) or units according to a statistical segmentation (statistical words) or were a combination of two syllables that had never occurred together in the string (non-words). A preliminary analysis with linear mixed effect models shows a significant effect of the infants' language (ß = 1439.2, t = 2.2, p = .03), suggesting that German- and French-learning infants show differences in their response to the test stimuli. Further analyses and final findings will be discussed in relation to the early impact of language-specific properties on segmentation mechanisms.

Keywords: *statistical learning, prosody, word segmentation*

Talk F4 Continuous representations can support early phonetic learning.

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Infants' speech perception becomes tailored to the native language over the first year of life (Werker & Tees, 1984). For example, American 10-12-month-olds discriminate English [ɹ] and [l] better than Japanese infants do (Kuhl et al., 2006). This effect is commonly explained by phonetic category learning, yet no implemented model of such learning has been successfully demonstrated on realistic input data. Recent work presented a statistical learning model (DPGMM) that learned from raw unsegmented speech data and captured the discrimination pattern without using phonetic categories (Schatz et al., in submission). However, the DPGMM still used some categorical representations. Here we use a correspondence autoencoder (cAE; Kamper et al., 2015), a neural network that learns a continuous acoustic feature space without categorical representations from the same kind of data, using both low-level acoustic features and weak word-level supervision (under the assumption that infants rely on familiar words in phonetic learning; Feldman et al., 2013). We train the cAE on either English or Japanese speech corpus (considering two corpora per language) and test its ability to discriminate between English [ɹ] and [l] using a machine ABX discrimination task (Schatz et al., 2013). The results (Figure 1) show that the model captures the cross-linguistic differences in discrimination. Thus, purely continuous non-categorical representations are sufficient to explain some early perceptual changes. Since both DPGMM and cAE capture the infant-like pattern of cross-linguistic differences, pinning down the mechanisms of early phonetic learning requires testing the models on other phonetic contrasts and speech perception tasks.

Keywords: *early phonetic learning, phonetic categories, computational model*

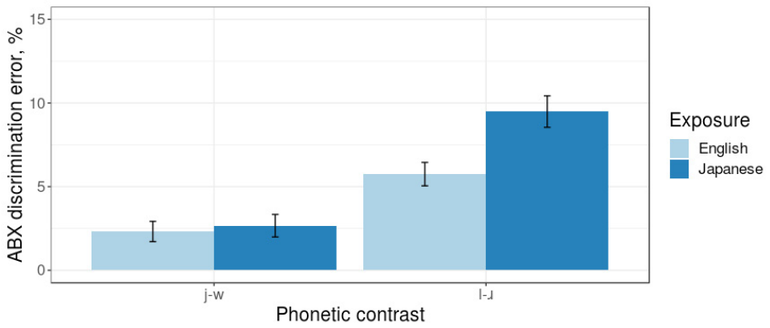

Figure 1. *ABX discrimination error rate for our cAE model. Error bars show standard error over different surrounding phonetic contexts of the target sounds. Mirroring the experimental data from infants, the cAE model trained on Japanese data has a significantly higher error than the cAE model trained on English data on the target [l]–[ɹ] contrast (present in English, but not in Japanese), but not on the control [j]–[w] contrast (present in both languages), for which no cross-linguistic difference in discrimination is expected (Tsushima et al., 1996).*

Talk F5

Online build-up of neocortical memory traces for spoken words is facilitated by novel semantic associations: MEG data.

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Recent research has shown that the brain is capable of a rapid build-up of novel cortical memory traces for words during mere perceptual exposure to new lexical items. This has been demonstrated as an online increase in the amplitude of electrophysiological responses to new word forms even when they have no specific meaning attached and are not attended to or actively rehearsed by the learners. However, the operation of this fast cortical language-learning mechanism in online acquisition of word meaning has not been sufficiently investigated yet. To this end, we presented our participants with novel word forms in a word-learning task taking place during a short magnetoencephalography (MEG) recording session. Novel word forms were either learned perceptually through auditory exposure only or were assigned a clear semantic reference using a word-picture association task, in which they were presented in conjunction with novel objects. Our findings show that, already after approximately five presentations of each stimulus, novel stimuli learnt through semantic association demonstrated stronger activation over the left perisylvian cortices than perceptually acquired word forms that lacked semantic reference. Perceptual items demonstrated a linear learning-related amplitude increase, but at a much slower pace, spread across the 10-minute recording session. This result suggests a more efficient process of online novel word memory trace build-up in the presence of semantic reference. Our results confirm rapid learning of novel words over a course of a short exposure and imply facilitatory effects of acquisition of novel semantics on the neocortical memory trace formation.

Keywords: *rapid learning, MEG, semantics, perceptual, novel word, language learning*

Talk G1

The saliency of the mentioned argument facilitates the processing of negation: a Visual World study.

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This work investigates the role of the mentioned argument of negation, namely the positive representation of its argument. We aim to address the following question: does its saliency hinder or facilitate the processing of negation? To test this, we employed a picture identification task →

with a visual world set-up. Following a two-second preview of the visual scenario, participants were auditorily presented with affirmative and negative sentences (There is (not) a pentagon and/(but) a square), and they were asked to indicate the quadrant containing the referent of the verbal description while their eye movements were recorded. The saliency of the mentioned argument (i.e., the pentagon) was manipulated by parametrically varying the number of quadrants in which it appears from one to three. Notice that mentioned arguments constitute potential targets in positive sentences, whereas they are distractors to avoid in negative sentences. If the saliency of the mentioned argument facilitates the processing of negation we expect an advantage for target identification in negative vs. positive sentences as the number of mentioned arguments increases. We found an overall penalty for identifying the target in negative vs. positive conditions ($p < .01$). However, this penalty decreased as the number of mentioned arguments increased ($p < .01$). Furthermore, the fewer the mentioned arguments are the more steadily participants fixated the mentioned pictures in negative conditions. These results indicate that the saliency of the mentioned argument facilitates the identification of the target in negative conditions, hence the processing of sentential negation.

Keywords: *negation, processing, eye-tracking*

Talk G2 Using idioms to study the effects of cognitive ageing on language processing: An ERP study.

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Given the worldwide rise in the ageing population, understanding the cognitive consequences of ageing is becoming increasingly important. Our study examines effects of age-related changes in cognition on language abilities by investigating the processing of idioms, such as the Dutch tegen de lamp lopen ('to walk against the lamp'). To activate the idiom's figurative meaning 'to get caught', the reader has to inhibit the literal meanings of the idiom constituents ('to walk' and 'lamp'). Since inhibition skills typically decline with age, increased age is hypothesized to reduce the suppression, thus increasing the activation, of the literal meanings of idiom constituents. To test this hypothesis, we recorded event-related potentials (ERPs) of 60 right-handed native Dutch speakers (aged 18-79) while they read sentences containing an idiom. We measured N400 amplitude elicited by the target word, which was either the idiom's original final noun (lamp 'lamp'), a semantically related word (kaars 'candle'), or a semantically unrelated word (vis 'fish'). Furthermore, we investigated whether an idiom's figurative meaning is only activated after encountering a specific word (idiom key) or that its activation depends on passing an activation threshold that varies with word order. Using Generalized Additive Modelling (GAMM), we provide support for the latter threshold activation model of idiom processing. Concerning the age effect, we found – contrary to our prediction - that elderly adults more strongly inhibit the literal meanings of idiom constituents than younger adults. We therefore suggest that successful idiom processing may depend more heavily on language experience than on cognitive abilities.

Keywords: *cognitive ageing, idioms, event-related potentials, inhibition*

Talk G3 Lemma frequency, form frequency and imageability in speeded inflection production.

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One question about language production is whether inflected forms are retrieved as wholes or assembled using morphological rules. To address this question, the separate effects of lemma and inflected form frequency have been used, assuming that effects of form frequency suggest direct whole-form retrieval, while lemma frequency effects suggest that morphological rules are applied. In addition, imageability was also proposed as a diagnostic for whole-form retrieval, assuming that effects of imageability are indicative of memory retrieval processes (Prado & Ullman, 2009). The presentation reports on five experiments that examined effects of the three variables in English and Czech, using the Past Tense Inflection Project data on English verbs (Cohen-Shikora et al., 2013), and collecting own data Czech noun (3 experiments) and verb (1 experiment) forms. Participants were given base forms of nouns or verbs (nominative singular or infinitive) and asked to produce a specific inflected form as fast as possible. The results mostly show lemma frequency effects, with form frequency and imageability sometimes interacting with lemma frequencies, imageability, or verb regularity (in English). Imageability and form frequency facilitated production especially in low-frequency words. However, the effect of frequency or imageability was sometimes U-shaped, with the shortest response times for words with medium-high frequencies and imageability. Also, the lemma effect was not present in Czech verbs. The results clearly show that the whole paradigm must be accessed when inflected forms are produced, but the findings are not consistent with simple morphological assembly, and memory processes are involved in inflected form retrieval.

Keywords: *morphology, inflection; base frequency, form frequency*

Talk G4 Dissociating the effects of morphemes and letters in visual word recognition: An MEG study of Japanese verbs.

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Previous magnetoencephalography (MEG) studies reported that transition probability between morphemes (morphTP) was correlated with the amplitude of the activation in the left fusiform and inferior temporal gyri (L. FG/ITG) around 170 ms after the onset of visual stimuli (M170). However, it is difficult to examine whether the M170 is modulated by morphTP or transition probability between letters (letterTP). To dissociate the effects of morphTP and letterTP on the L. FG/ITG, we targeted the Japanese verbs, in which morphological boundaries do not always correspond to letter boundaries due to the Japanese kanji and kana writing system. We recruited 22 right-handed native speakers of Japanese (nine males, 35.5±7.3 yrs.). We used 448 Japanese verbs, as well as the same number of nonwords (total 896 stimuli). The participants performed a visual lexical decision task. We used a 157-channel MEG system (KIT, Japan) for recording, and MEG-Python and Eelbrain packages for the MEG analyses. As our primary target was the M170, the region of interest was anatomically defined as the L. FG/ITG and the analysis time window was restricted to 50-250 ms after word onset. We examined whether the M170 is modulated by morphTP or letterTP. We found a significant negative correlation of the morphTP (corrected $p<0.03$), whereas we did not find any significant correlation of the letterTP in this region. These results demonstrated that morphologically complex verbs in Japanese are indeed decomposed into morphemes, but not into letters, similar to morphologically complex words in English examined in the previous studies.

Keywords: *MEG, morphology, Japanese, visual word recognition*

Posters A

A01 Are pragmatic inferences triggered by informationally redundant utterances effortless?

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There is to date no consensus on whether pragmatic inferences are cognitively effortful, with some studies reporting no cost associated with scalar implicatures (Grodner et al, 2010; Marty & Chemla, 2013), while others do report increased processing costs (Bott & Noveck, 2004; Dieussaert et al, 2011; Deneys & Schaeken, 2007). If inferences are indeed difficult, one might expect to see fewer inferences or less strong ones, given the lack of sufficient cognitive resources (Bott & Noveck, 2004; Dieussaert et al, 2011; Deneys & Schaeken, 2007). However, we here find no evidence for cost in a study on informationally redundant utterances (Kravtchenko & Demberg, 2015). This is particularly interesting given that we test particularized implicatures, which are under-studied. Adopting the stimuli set and experimental design from (Kravtchenko & Demberg, 2015), we introduce a cognitive load manipulation. In the high load condition, participants perform a mouse tracking task while listening to a story. In the low load condition, they perform only listening. Stories establish a particular topic, thus making some topic-related activities highly predictable. We manipulate the presence or absence of the informationally redundant (IR) utterance 1b in the story, and ask participants to rate the habituality of the IR activity (1c). Data analysis of ninety-eight German-native speakers showed a main effect of activity habituality ($\beta = -21.97$, $t = -6.14$, $p < .001$). Habituality estimates are significantly lower in the with-IR condition, showing that participants did draw the inference based on the IR utterance. This finding replicates results on single task in English by (Kravtchenko & Demberg, 2015). Contrary to expectations, the inference is stronger under high load than low load ($\beta = -8.07$, $t = -2.08$, $p < 0.05$). These findings are consistent with accounts under which pragmatic inferences are seamless.

Keywords: *context-dependent implicatures, cognitive load, pragmatics*

[a. Context] Lisa likes to go swimming at a pool after work. A couple days ago she was at the pool when she saw Hendrik, another regular member, and they stopped to chat. [b. IR activity description] After Hendrik ran into Jennifer, another swimmer, and said: «Lisa's here to swim, too. She brought her swimsuit!». [c. Question to participants] How strongly would you assume that Lisa usually brings her swimsuit, when going swimming?

Example 1. *Story design. a. Establishing of the story context. b. Activity description (it is included only in with-IR condition). The informationally redundant utterance is in bold. c. The question that participants were asked to answer, with the help of slider scale ranging from 'Never' to 'Always', after story listening.*

Acknowledgments: *This research was funded by the German Research Foundation (DFG) as part of SFB 1102 'Information Density and Linguistic Encoding.'*

A02 Immature mismatch responses to lexical tones in Mandarin children with specific language impairment.

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Phonological deficits have been hypothesized to account for specific language impairment (SLI). Mismatch response (MMR), an event-related potential (ERP) component to index the automaticity of auditory change detection and has been widely used to investigate the development of phonological sensitivity. Two types of MMRs have been reported: the mismatch negativity

(MMN) indexes the automatic change detection and the positive MMR (P-MMR), mainly in early childhood, reflecting the less mature processing of auditory discrimination. This study examined whether children with SLI differ from typically developing children in MMRs to Mandarin tonal changes. ERPs were measured in 12 SLI children (age range = 4y–6y 7m) and 12 age-matched controls by using a multi-deviant oddball paradigm, with the Mandarin syllable «yi3» (low-dipping tone, T3) as standard (80%), «yi1» (high-level tone, T1) as large deviant (10%), and «yi2»(high-rising tone, T2) as small deviant (10%). MMRs were identified by the cluster-based random permutation analysis comparing ERPs to the standard from each deviant. The large T1/T3 change elicited MMN between 122 and 230 ms in both control ($p = 0.037$) and SLI ($p = 0.045$) groups. For the small T2/T3 change, no MMR was found in the control group, whereas the SLI group showed P-MMR between 122 and 230 ms ($p = 0.01$) and lasting between 230 and 372 ms ($p < 0.001$). The profile of MMRs to lexical tone changes in SLI resembles that in early infancy (Cheng et al., 2013, 2018). The findings indicate SLI children were less mature in detecting lexical tones changes and support the phonological deficit hypothesis in SLI.
Keywords: *specific language impairment (SLI), mismatch negativity (MMN), positive mismatch response (P-MMR), lexical tones, ERP*

A03 It doesn't matter who you are, I still don't believe you: Disfluency and deception in native and non-native speakers.

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Bosker et al. (2014) showed that the effect of disfluency on prediction was dependent on the speaker: with a non-native speaker, the prediction effect was attenuated. This suggests that the processing of disfluent utterances can be affected by listeners' understanding of the potential causes of disfluencies. Here, we are interested in whether Bosker et al.'s findings can be extended beyond processing to the interpretation of disfluent utterances, in line with previous work which shows that disfluent utterances are more likely to be judged as being deceptive (Loy et al., 2017). In a visual world experiment, sixty-three native English speakers heard utterances identifying one of two depicted objects as the location of some treasure. Utterances were given either by a native or a non-native English speaker. Half of the utterances included a disfluency before the location (e.g. The treasure is behind thee, um, apple). Participants were more likely to click on the unmentioned object after a disfluent utterance, regardless of speaker's status. In line with Loy et al. (2017), these effects emerged early in the eye-tracking record (see attached figures).
This suggests that, unlike Bosker et al. (2014), participants did not attribute non-native disfluencies to other processes (e.g. difficulties in lexical retrieval because speaking in L2), either because of differences between the two speakers which affected the outcome, or because the association between disfluency and dishonesty is especially salient. This calls into question the idea that «external» causes of disfluency such as language proficiency have effects beyond the ephemeral.
Keywords: *pragmatics, non-native speech, disfluency*

A04 Avoiding ambiguous pronouns: A cross-linguistic study.

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Whether and how speakers avoid ambiguity for their addressee remains a central issue in language production research. Here we contrasted two accounts that explain how speakers avoid gender ambiguous pronouns. The non-linguistic competition account claims that speakers use fewer pronouns when biological gender congruence increases similarity between the referents. The ambiguity avoidance account claims that speakers avoid pronouns when gender congruence affects pronoun ambiguity independent of non-linguistic similarity. Three referential-communication experiments thus examined how biological and grammatical gender congruence affect pronoun use, by exploiting cross-linguistic variations in French, Italian, and English. Following a lead-in sentence, participants re-referred to the referent introduced in the subject position to their addressee. In French, gender congruence between the referents resulted in fewer gendered pronouns (il, elle), regardless of whether pronouns mark biological gender (humans) or grammatical gender (inanimates). In Italian, neither biological nor grammatical gender congruence affected the rates of null pronouns that do not overtly mark gender. Finally, in English, which lacks grammatical gender, the referents' grammatical gender congruence (present in French and Italian) had no effect on the use of the pronoun it, whereas biological gender congruence led to fewer gendered pronouns (he, she). These results are most compatible with the ambiguity avoidance account that claims that speakers avoid pronouns when they are gender-ambiguous independent of non-linguistic similarity. We discuss the potential mechanisms that underpin successful gender ambiguity avoidance.
Keywords: *reference, pronoun, gender, ambiguity, language production*

A05 Antilocality effects in main clauses: Evidence from Basque.

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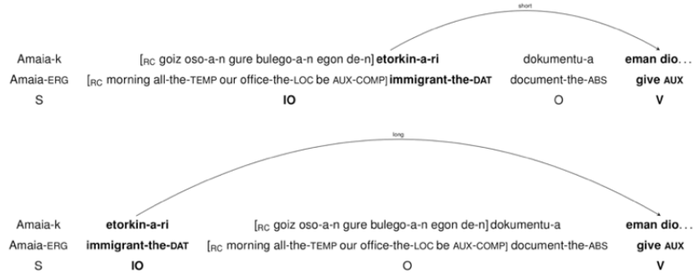
Both decreasing and increasing the linear distance between a verb and its arguments have been shown to facilitate processing (locality and antilocality effects) (Gibson, 2000; Konieczny, 2000; Vasishth & Lewis, 2006). Evidence for antilocality effects comes exclusively from rigidly final OV languages, mainly German and Hindi, and it is mostly restricted to embedded sentences, which are known to increase processing difficulty. The aim of our study is to broaden the cross-linguistic empirical basis of current psycholinguistic theories addressing both locality and antilocality effects. Crucially, we provide data from main sentences in Basque, a non-rigid OV language, which allows S, IO and O pro-drop. We conducted an SPR experiment (n=44) to investigate the effects of increasing dependency length in ditransitive sentences (S-IO-O-V). We manipulated dependency length (short/long) between the IO and the V by attaching a prenominal RC to either

the IO (short) or the O (long) (Figure 1). Results show faster reading times for long dependencies at our critical regions (O, V). There was a slowdown in the RTs in the short condition at the precritical region (IO), but our results hold also after controlling for word length and including spillover as a fixed effect. That is, we found antilocality effects in main clauses involving long dependencies in Basque. Our study thus adds a new language to the pool and broadens the cross-linguistic evidence available for current theories regarding (anti)locality. Further research will address how word order flexibility impacts predictability and (anti)locality.

Keywords: *sentence processing, locality, antilocality, dependency*



SHORT: Amaia has given the document to the immigrant that has been in our office all morning…
LONG: Amaia has given the immigrant the document that has been in our office all morning…

Figure 1. *Example of the materials used in the experiment with dependency arches representing dependency length. Critical regions are the O the V.*

A06 Distinct production and neural activity for L2 stem gradation in beginning L2 learners than in advanced learners and native speakers.

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Despite occurring in approximately 30 percent of Finnish vocabulary, consonant gradation, a form of stem allomorphy, remains understudied. Lack of linguistic crossover introduces challenges for adult second language (L2) learners of non-Finno-Ugric background. We examined if L2 learners with varying proficiency can apply morphosyntactic rules of consonant gradation in a similar manner, behaviorally and neurally, as native speakers. We recruited native speakers (N=15), beginner learners (N=15), and advanced learners (N=15) of Finnish, their L1 being Russian. We employed a mixed overt (online inflection of a stem and overt speaking) and covert production task (silent generation of an inflected stem and subsequent evaluation of an inflected form) during an event-related functional magnetic resonance imaging (fMRI) design. Stimuli consisted of gradated and non-gradated stem conditions, and three frequency stem conditions: high, low and stems with no usage frequency (pseudoword stems). Error rates of overt spoken and covert production responses showed that only advanced learners and native speakers performed similarly. fMRI results showed no differences in activation between the conditions for advanced learners and native speakers in the left inferior frontal gyrus (LIFG). Conversely, beginner learners showed different activation for areas associated with lexical retrieval (BA45) and rule-based composition (BA44). Namely, significantly stronger activation for inflections with highly frequent non-gradated stems in both BA44 and BA45, and significantly lower activation for gradated pseudowords in BA45. These results corroborate emerging findings that proficiency influences how morphologically complex words are processed by L2 learners, and that it is possible to achieve native-like competency in adulthood.

Keywords: *inflection, morphology, second language acquisition*

A07 Proficiency matters: Bilingual experience affects executive control and its cortical network.

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Putative advantages associated with bilingualism range from enhanced executive control (EC) to neuroprotection during healthy and pathological aging. Nonetheless, the mechanisms supporting these effects remain unclear. The current study investigated how interindividual differences in bilingual experience modulate bilingualism-induced benefits in EC. 22 Russian-English bilinguals with differing levels of L2, age of acquisition (AoA), exposure and proficiency, profiled with a self-assessed questionnaire and a translation task, underwent a Flanker Task, a benchmark in EC assessment, and structural MR imaging. We deployed linear mixed effects modelling to investigate how AoA, exposure and proficiency affect behavioural EC performance and grey matter volumes (GMV) of EC network areas. Higher proficiency scores reliably predicted better executive performance; moreover, a crossed proficiencyXexposure interaction reliably predicted GMV in the bilateral anterior cingulate cortex, (approaching significance in the bilateral prefrontal cortex (PFC)). Higher proficiency was associated to increases in GMV only at lower levels of exposure, suggesting that bilingualism-induced neuroplastic benefits may peak at a certain stage of bilingual experience. Eventually, we investigated the interplay between language back-

ground and GMV in modulating executive performance. To avoid the risk of overfitting related with testing a model including 5 continuous predictors, we computed a bilingual index (BI) taking into account AoA, exposure and proficiency. BI significantly interacted with GMV of the bilateral caudate nucleus and left PFC in predicting Flanker RTs: consistently with recent evidence (Del Maschio et. al, 2018), EC performance was related to GMV only at «lower levels» of BI. These results suggest that extensive training may allow expert bilingual users to progressively detach from dependence on the neural substrate to achieve optimal EC performance, possibly through enhanced efficiency of their EC network or cognitive strategies.

Keywords: *bilingualism, executive control, voxel-based morphometry*

A08 Emotional processing of ironic vs. literal criticism in adults with and without autism spectrum disorder: Evidence from eye-tracking.

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Typically developing adults are able to keep track of story characters' emotional states online while reading. Filik et al. (2017) showed that these expected emotional responses depend on whether the message is presented as ironic vs. literal, and whether the narrative depicts the protagonist vs. victim's perspective. Initially, participants expected the victim to be more hurt by ironic comments than literal, but later considered them less hurtful; ironic comments were regarded as more amusing. We examined these processes in adults with autism spectrum disorder (ASD), since previous research has demonstrated impairments in attributing mental states to others and comprehending irony in autism (Murray et al., 2017; Wang et al., 2006), despite an intact ability to integrate language in context (Yeung et al., 2015). Participants' (N = 49) eye movements were recorded while they read short narratives, in which a character (victim) was either amused or upset when another character (protagonist) criticised their actions using ironic or literal language. Results replicated Filik et al., in showing that all readers initially found it easier to integrate an emotional response following ironic than literal criticism (RegPath, β= .03, t = 2.03). Importantly, comprehension was modulated by group. TD participants found it easier to process the victim vs. protagonist's emotional responses, but participants with ASD showed the opposite pattern (Second-passRT, β=.09, t = 2.14). Additionally, TD participants expected the protagonist to intend more hurt following ironic vs. literal criticism, but the victim to feel more amused following ironic vs. literal criticism. ASD individuals did not distinguish these responses (RegOut, β = 2.35, z = 2.53).

Keywords: *online language processing, autism, emotions*

A09 Processing grammatical ambiguity in spontaneous Russian: Pilot experimental evidence

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The homophony of word endings (when the pronunciation of two or more different forms within one paradigm is the same) is one of the reasons for the grammatical ambiguity of Russian speech. In spontaneous Russian, this ambiguity increases due to the phonetic reduction that often occurs in the unstressed endings. We conducted a pilot experiment in order to find out what helps a listener to solve grammatical ambiguity while processing spontaneous Russian. The stimulus set included 20 grammatically ambiguous noun phrases extracted from spontaneous Russian. The phrases consisted of a noun and a dependent adjective or pronoun, and the endings of both words in each noun phrase were phonetically reduced (e.g., moja pozitsija 'my point of view' (Nom. Sing.) was pronounced as [mej pazjitʲs]. 43 native speakers of Russian (26 women) listened to the stimuli and had to write them down in Russian orthography. According to the results, the grammatical form of 17 out of 20 stimuli was correctly restored better than chance. We received the highest accuracy of recognition for the noun phrases in Nominative (or Accusative homonymous to Nominative). As the noun phrases in Nominative are the most frequent both among all noun phrases in spontaneous Russian and among the noun phrases with reduced endings, we can assume that the information about the frequency of different grammatical forms helps a listener to choose the correct interpretation of grammatically ambiguous word string.

Keywords: *grammatical ambiguity, phonetic reduction, noun phrases, dictation task experiment, Russian*
Acknowledgments: *The research is supported by the grant #18-00-00640 from the Russian Foundation for Basic Research (RFBR)*

A10 Causation types in bump alternation in Japanese -from data of self-paced reading studies.

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This paper deals with a kind of theme/location alternation in Japanese, tamaate daikan 'bump alternation'. The alternation consists of the mobile object variant in (1a), in which the mobile object appears as the direct object, and the immobile object variant in (1b), in which the immobile object appears as the direct one.

(1a) Tama-o	mato-ni	ateru [mobile object]	
bullet-acc	target-dat	hit	
'make the bullet hit the target'			
(1b) Mato-o	tama-ni	ateru [immobile object]	
target-acc	bullet-dat	hit	
'hit the target with a bullet'			

We proposed that the causation types (extended/onset (Talmy 1988, 2000)) could make a difference between the variants in online processing and examined this interaction through two self-paced reading studies, using the transitive/intransitive bump alternation.Our results showed an interaction between the Causation type (extended/onset) and the Variant type (mobile/immobile) at the preverbal region in such a way that the extended causation condition was read faster than the onset one in the immobile variant. In our assumption, this is because the extended

causation triggers perspective shift on what is moving. The agent in an extended causation event can move along with the mobile object, and he can perceive the immobile object as if it were moving toward him. Such an illusion might lead the participants to interpret the immobile variants as the mobile ones. Moreover, such a shift can be calculated by making use of the object NPs before the verb appears.

Keywords: *theme/location alternation, causation, self-paced reading*

A11 The effect of linguistic bias on prediction over time.

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Language users tend to adapt toward the statistical regularities of the language environment, including recently encountered syntactic structures. Error-based learning models account for such syntactic adaptation in terms of minimizing prediction errors; prediction errors are larger for less preferred structures, which leads to stronger adaptation (Chang, 2008). Under these accounts, comprehenders use their prior biases to generate predictions. This study investigated the effect of prior bias on prediction and change of predictions over the course of a visual world eye-tracking experiment. We identified participants' bias for relative clause (RC) attachment at the pre-test using ambiguous RC sentences. Then, forty eight L1 English speakers with different strength of low attachment bias were first exposed to sentences in which the RC attachment matched their initial bias (Low Attachment block: I see the woman of the cat that will wear the collar); next they were exposed to sentences with their less preferred structure (High Attachment block: I see the woman of the cat that will wear the shoes). We could not find effects of parsing bias on their initial prediction (i.e., no effect of Pre-bias on their predictive eye movements during the first half of each block). However, those with stronger bias showed more predictive looks to the targets than the competitors over time during exposure to their preferred structure, LA as well as less preferred structure, HA (Figure 1). These findings suggest that stronger bias toward a certain structure plays an important role in adaptation, regardless of structure type or prediction errors.

Keywords: *parsing bias, prediction (error), adaptation*

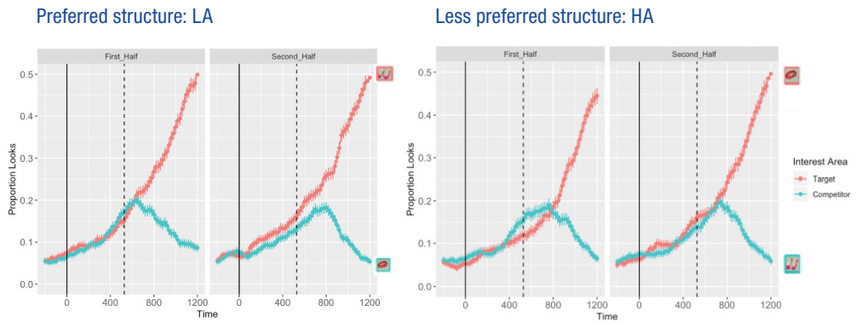

Figure 1. *Fixation proportions on the targets and competitors during the first and the second half of each block (based on data from 48 participants with different strength of LA bias). Time 0ms: the onset of the verb. The vertical dotted line: the onset of the target noun.*

A12 Lexical Processing of Affective Russian Nouns: evidence from yes/no and go/no-go lexical decision task.

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The study presents linear mixed effects (LME) models for reaction times (RTs) to Russian nouns with different emotional valences extracted from ENRuN database (Lyusin & Sysoyeva, 2016). A set of stimuli included 120 words (40 positive, 40 negative and 40 neutral ones). The sample comprised 92 students: 44 participants performed yes/no visual LDT and 48 participants performed go/no-go LDT. Both LDTs confirmed the hypothesis of the effect of word valence on RT: the fastest reaction was observed on positive words, the slowest – on negative words (Fig. 1). The interaction of emotional valence and word frequency, that was found in Kuperman`s study (2014), was not revealed in our yes/no LDT but this effect was observed in our go/no-go LDT. This interaction is observed in the fact that valence effect (faster responses to positive words than to negative words) is more typical for low-frequent Russian nouns. Fixed effects in our two LME models explain a rather low proportion of RT variance (4.9-5.8%) but, this, in general, corresponds to the results of other similar studies. The contribution of random effects (first of all, the effect of the random intercept for the subjects) is considerably higher. The total explained RT variance in our models reaches 49 and 53%. This may mean that despite the presence of some fixed effects the RT variance in yes/no and go/no-go LDT is mainly determined by stable or situational features of the subjects.

Keywords: *lexical decision task (LDT), emotional valence, Russian nouns*

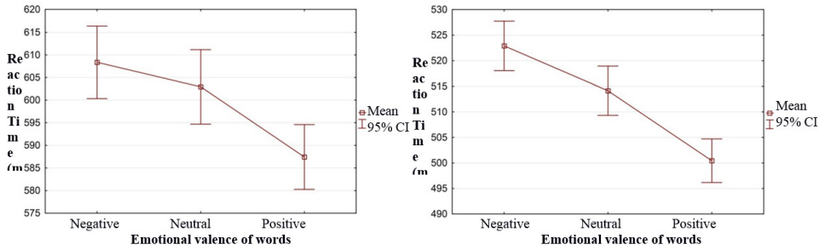

Figure 1. *RTs for Russian nouns with different emotional valences in yes/no (on the left side) and go/no-go (on the right side) lexical decision tasks.*

Acknowledgements: *The reported study was funded by RFBR and the Government of Altai Territory according to the research project № 19-412-220004.*

A13 Word order preference in the on-line processing of multiple adverbial constructions of Korean.

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The current study investigated word order preference in the processing of Korean sentences with multiple adverbial phrases, i.e. nouns marked with temporal (T), locative (L), or instrumental (I) postpositions respectively. Experiment sentences included a subject, T, L, I, a direct object (DO), and a sentence final verb, and were manipulated in terms of the order between T, L, and I (hence 6 condition). 36 Korean native speakers' reading time for 36 target sentences(pus 72 fillers, 6 targets per condition) were recorded in the self-paced reading experiment (Exp1), and 18 other participants' neural responses to the DO and the verb were also recorded in the ERP experiment (Exp2). In Exp1, the RTs for the region of the final verb turned out to be identical in terms of the relative position of T and L, but RTs to the T(L)-I-L(T) order were significantly longer than those to the I-T(L)-L(T) or T(L)-L(T)-I order ($F(2,34) = 2.730$, $p = 0.072$). Correspondingly, the P600 was elicited by the verb of the former sentences compared to the latter ones in Exp2 ($F(2,32) = 3.652$, $p = 0.052$). These results indicate that the word order of so-called free word order languages might well be constrained at the performance level. Moreover, the observed P600 implies that the word order between adverbials is constrained syntactically (cf. Cinque, 1999), and not semantically (cf. Ernst, 2004): We suggest that the I is preferred to be placed nearest to the verb; whereas the scrambling of I as a VP adjunction does not cause any processing load, that in between the T(L)-L(T) string leads to an extra processing load in Korean.
Keywords: *Word order preference, Korean, SPR, ERP, P600*

A14 Word properties over experience-related factors: Investigating the masked translation priming asymmetry.

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Research in the processing of non-cognate translation equivalents by (unbalanced) bilinguals under masked priming conditions shows an asymmetry in lexical decision tasks (e.g., Wen and Van Heuven, 2016). Responses to L2 targets are faster with L1 translation equivalent primes than with unrelated ones. In the opposite direction (i.e. L2 primes – L1 targets), the effects are significantly smaller. The Bilingual Interactive Activation + (BIA+) model (Dijkstra and Van Heuven, 2002) claims slower L2-word processing causes the priming asymmetry: factors like word frequency or L2 proficiency modulate processing speed. The Sense Model (SM, Finkbeiner et al., 2004) adduces a representational asymmetry in the senses (meanings) known for L1 and L2 translation equivalents. Priming is proportional to the amount of target senses activated, and the few meanings known of an L2 prime only activate a small proportion of the many known of an L1 target. Finally, the Revised Hierarchical Model (RHM; Kroll, et al., 2010) claims that L2 proficiency crucially modulates L2-L1 priming. We tested 60 Spanish-English unbalanced bilinguals in a masked translation priming LDT. The participants' L2 proficiency (upper-intermediate to upper-advanced) and factors related to their linguistic background were treated as continuous variables in mixed-effects models (Baayen et al., 2008). Results showed a priming asymmetry (47 ms vs 39 ms, $p < .001$). Crucially, prime and target frequency modulated the L2-L1 priming effect. Against the RHM's predictions, L2 proficiency did not affect priming. The results challenge the SM, which cannot account for the role of prime frequency, a finding that the BIA+ can accommodate.
Keywords: *lexical processing, psycholinguistics, second language acquisition*

A15 Timing of application of bilingual inhibitory control.

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Bilinguals inhibit the non-response language to avoid wrong-language intrusions (Green, 1998), but theories of inhibitory control do not specify when inhibition is applied. It could be applied once, immediately after a language switch (Zheng et al., 2019) or cumulatively over time (Kleinman & Gollan, 2018). Here, 85 Spanish-English bilinguals dominant in English named pictures first in the dominant, then in the non-dominant, and then again in the dominant language. Participants were divided into three groups depending on the length of non-dominant naming: long (9 repetitions of 32 pictures), medium (6 repetitions) or short (3 repetitions). To further investigate influences of global and local inhibition, the last dominant-naming phase contained three sets of 16 pictures each: 1) ones previously named in both the dominant and non-dominant language, 2) ones previously named only in the non-dominant language, and 3) new pictures. For pictures never previously named in the dominant language, dominant-language naming was slower after non-dominant naming (demonstrating recovery from previous inhibition). If inhibition is cumulative, dominant language responses should be slowest after the long non-dominant phase and fastest after the short non-dominant phase; if inhibition is once-only, dominant language RTs should be unaffected by the length of non-dominant phase. Reaction-time differences between the first and last dominant-naming phases were analyzed to account for between-group differences in naming speed. Overall and within each item set, there was no significant effect of the length of the non-dominant phase. Results (Figure 1) are more consistent with once-only than cumulative application of inhibition.
Keywords: *bilingualism, language control, blocked picture naming*

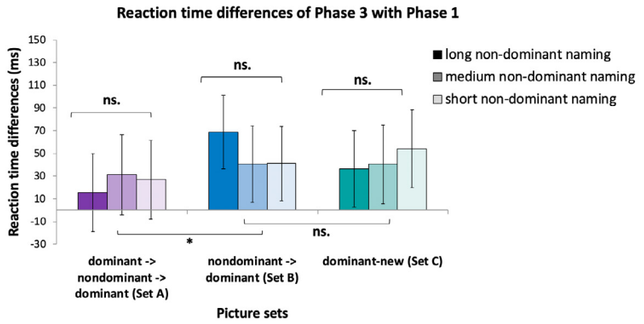

Figure 1. *Reaction-time differences between Phase 1 (first dominant-language naming) and Phase 3 (dominant-language naming after prior dominant and non-dominant naming). Error bars represent 95% confidence intervals.*

A16 Frequency and predictability effects in natural reading by simultaneously recording the eye movement and ERPs.

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Word frequency and predictability are two well-established effects on N400 in to reflect the bottom-up and top-down processes in the event-related potentials studies of reading comprehension. Words with higher frequency or predictability tend to elicited less negative N400 than those with low frequency and predictability. In the traditional ERP studies, words were presented one-by-one in foveal vision at a fixed rate (usually 800- 1000 ms/word). However, in the natural reading proceeds considerably faster (around 250 ms per word) and readers do not send their eyes to every word at fixed rate. This study aims investigate the roles of frequency and word predictability in natural reading by simultaneously recording the eye movement and ERPs from fifty-five participants in reading Taipei Sentence Corpus (TSC). The TSC consists of 160 Chinese sentences with annotated word classes, word length, word frequency, word predictability all words in the sentences. The Adjacent Response algorithm (ADJAR) was applied to overcome the issue of overlapping component introduced by the successive fixations. Then, mean amplitudes of N400 were measured in the corresponding time window that time-locked to the onsets of fixations in each channel Statistical analysis was performed using the single-trial linear-mixed model (LMM) including participants and words as random effects, and word frequency, predictability and frequency-by-predictability interaction as fixed effects. The results revealed typical word frequency and predictability effects on N400 on centro-posterior electrodes and provide solutions for the ERPs data analysis in the simultaneously recording the eye movement and ERPs in natural reading.

Keywords: *ERPs, predicability, word frequency*

A17 Planning of phrasal pitch: a comparative eye-tracking study with English and Estonian speakers.

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How early during sentence planning do speakers estimate the length of their utterances and adapt phrasal pitch accordingly? Phonetic research suggests that phrasal pitch is planned before speech onset because the scaling of phrase-initial F0 depends on the duration of entire intonation phrases: pitch is frequently higher in longer than in shorter phrases. In this study, eye-tracked participants (52 English speakers, 45 Estonian speakers) described pictures with one agent and either one or two patients, only one of which had to be named, with active sentences, e.g., «The man is pushing the car» (one-patient events), «… the purple car» and «… «the car with the surfboard» (two-patient events requiring either adjectival or phrasal patient modification). The number of initial gazes to the agent was smaller in two-patient than one-patient events, indicating that speakers encoded information about both agents and patients during message planning (0-400 ms post picture onset). Acoustic measurements in active sentences demonstrated a relationship between phrasal pitch and the conceptual complexity of sentences spoken as single intonation phrases: phrase-initial pitch peaks (calculated as the percentage of mean utterance F0) were higher in descriptions of two-patient than one-patient events (2--4 and 3--4 percentage points in English and Estonian respectively). In particular, phrase-initial F0 increased as the number of fixations to agents decreased (i.e., as the scope of message planning broadened), suggesting a tight relationship between message planning and planning of phrase-initial F0. Interestingly, phrase-initial pitch peaks were higher in Estonian than in English, possibly due to longer character names in Estonian..

Keywords: *language production, incrementality, phrasal pitch, eye-tracking, phonetics, Estonian, English*
Acknowledgements: *This research was partly supported by Estonian Research Council grant IUT2-37, by the National Programme for Estonian Language Technology project EKT71 and by the scholarship awarded to the first author by the University of Aberdeen (early career research visit award 2016-2017).*

A18 Sense of agency is flexible during speech production with altered auditory feedback.

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When confronted with unexpected pitch shifts in real time auditory feedback, speakers tend to compensate by changing their pitch in the opposite direction. While responses scale with

the perturbation magnitude for small perturbations, large feedback perturbations show a reduced response because of a diminished sense of vocal agency driven by the large discrepancy between predicted and observed auditory feedback. Here, we investigate the interaction between the sense of agency and feedback monitoring by disentangling the absolute discrepancy between predicted and observed feedback from the small feedback perturbations typically applied. Participants (N = 15) vocalized in two blocked voice conditions. In the normal voice condition, pitch shifts were applied to otherwise non-manipulated auditory feedback. In the alien voice condition, feedback was altered by a constant large +500 cents pitch shift, with brief pitch shifts applied in addition to this. The results suggest that the responses did not vary between voice conditions. In addition, speakers tended to align their pitch with the alien voice pitch over time. These findings indicate that speakers have a flexible sense of agency that quickly adapts to a large constant pitch shift, suggesting that vocal agency is not only dependent on a comparison between predicted and observed sensory feedback. Furthermore, these findings suggest that the smaller response magnitudes found for large sudden pitch shifts and the associated loss of agency is dependent on the pitch shift or change itself, rather than on the mismatch between an internal pitch target and the instantaneous pitch of the auditory feedback.
Keywords: *speech production; sense of agency; auditory feedback*

A19 The Relationship between Bilingual Experience and Gyrification in Adulthood: A Surface-Based Morphometry Study.

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Neuroimaging evidence suggests that bilingualism may act as a source of neural plasticity. However, prior work has mostly focused on bilingualism-induced alterations in gray matter volume and fiber tract integrity, with additional effects related to other neurostructural indices that might have remained undetected. Gyrification, that is, the degree of cortical folding, is a morphometric parameter which provides information about changes on the brain's surface during development, aging and disease. We used Surface-based Morphometry (SBM) to investigate the contribution of bilingual experience to gyrification from early adulthood to old age in a sample of bilinguals and monolingual controls. Despite widespread cortical folding reductions for all participants with increasing age, preserved gyrification exclusive to bilinguals was detected in the right cingulate and entorhinal cortices, regions vulnerable with normal and pathological brain aging. Our results provide novel insights on experience-related cortical reshaping and bilingualism-induced cortical plasticity across adult lifespan.
Keywords: *cingulate cortex, entorhinal cortex, bilingualism, gyrification, neuroplasticity, surface-based morphometry*

A20 Speaker modelling in language comprehension: The role of linguistic competence.

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Listeners have difficulty interpreting «If only I looked like Britney Spears» spoken in a male voice (Van Berkum et al., 2008) or «flat» spoken in the American accent to refer to accommodation (Cai et al., 2017). Cai et al. (2017) proposed that listeners process speaker-specific information (e.g., gender, age, accent) in the speech independently of linguistic information (e.g., phonemes, syllables) to arrive at a model of the speaker, against which linguistic interpretations are further evaluated. The present study asks whether listeners take the speaker's linguistic competence into account in speech comprehension. To do this, we make use of the redundancy cost: listeners have difficulty in comprehension when a native speaker use a redundant description (e.g., «the red star» is non-redundant when referring to a red star in conjunction with a yellow star, but is redundant when referring to a red star in conjunction with a yellow triangle; Engelhardt et al., 2011). In an experiment, Cantonese-speaking participants listened to a description and decided which one of four pictures was being described. The description was either redundant or non-redundant (depending the objects) and was either spoken by a native of Cantonese or a non-native speaker (manipulated between subjects). We replicated the redundancy effect: participants were slower at choosing the picture when a description was redundant. More critically, the redundancy effect is larger in the native than non-native speech. Such a finding suggests that listeners take linguistic competence into account when interpreting speech, in line with some recent findings (Gibson et al., 2017).
Keywords: *language comprehension; language competence; speaker modelling; redundancy*

A21 Saliency and frequency in the L1 acquisition of Russian nominal morphology: 30-59 months old children.

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Goal: In the study we investigate the L1 acquisition of Russian nominal morphology by children. Background: Three competing models are tested: (1) Dual-Route model (e.g., Pinker et al., 2002), where default forms are acquired first; (2) usage-based model (e.g. Ellis et al., 2016), which emphasizes the frequency of salient endings, and (3) generative-probabilistic model (Hayes et al., 2008), which stresses salient cues and the default form. The Russian gender-based nominal declensional paradigm consists of six cases and a three-way grammatical gender system with masculine (a default class, 46% of the lexicon), feminine (41%), and neuter (13%) (Akhutina et al., 2001) genders. Feminine and neuter endings are unambiguously marked

with no null inflections (Voejkova, 2011). Method: An elicitation task with 37 Russian-speaking children aged 30-59 months, 21 female. Phonotactically (words) and visually (pictures) normed stimuli were distributed across 3 lists in a Latin Square design. Novel nouns were introduced in two of three cases, NOMINATIVE, ACCUSATIVE and INSTRUMENTAL and elicited in the third case to determine how the frequency and saliency of a declension class affects its generalizability. Results and Conclusions: Accuracy was highest in neuter (56%) and feminine (54%) nouns versus masculine (41%; $p < .01$; $p < .05$). NOMINATIVE cases were more accurately ($p < .001$; $p < .01$) elicited for neuter (88%) and feminine (86%) genders then for masculine (53%). No differences across genders were observed in the ACCUSATIVE and INSTRUMENTAL case elicitations. The results support models that rely on the saliency of unambiguously marked endings as a key factor in morphology acquisition.
Keywords: *morphology, acquisition, models*

A22 Is the VSO word order canonical in Arabic? An ERP study.

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Classical/Standard Arabic allows two word orders: VSO and SVO. The former has traditionally been viewed as canonical, with the latter considered its secondary variant. We investigated the neural signatures of word-order differences in StA in a visual ERP study, employing transitive sentences in the VSO, SVO and Adverb-VO (subject-dropped; identical adverb 'yesterday') orders. Stimuli, including fillers, were grammatical and well-formed sentences; agents/subjects and patients/objects were human singular nouns; the agent was always feminine, with which the verb agreed in person, number and gender, and the patient was always masculine. Thus, there was no ambiguity at the position of the object (critical position) as to its objecthood. Thirty female native speakers of Arabic participated in the study. The results revealed a negativity effect in the 400 to 600 ms time-window for the SVO and AVO conditions, as opposed to the VSO condition. Further, there was a late-positivity effect in the 600 to 800 ms time-window for the AVO condition as opposed to the VSO condition. Based on their topography and latency, these can be plausibly interpreted as instances of N400 and P600. This pattern suggests additional processing costs ensuing from integrating the object in the SVO and AVO orders as opposed to the VSO order. The late-positivity for AVO suggests enriched composition of the inferred dropped subject. Sentence-wide difference waves showed that the critical effects are independent of effects from the pre-critical positions. Our results provide preliminary neurophysiological evidence for the canonical status of the VSO order in Arabic.
Keywords: *Arabic, word order, neurophysiology, ERPs*
Acknowledgment: *The research reported in this abstract has been supported by the Qatar National Research Fund Grant NPRP 7 - 427 - 6 - 011 from Qatar Foundation*

A23 The interaction of humanness and adjective agreement in Arabic.

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In Standard Arabic (StA), plural nouns can be of two types, namely sound plurals and broken plurals. Broken plural nouns referring to human masculine entities trigger full agreement in number and gender, whereas those referring to non-human entities, even if they are grammatically masculine, trigger singular feminine agreement. In an ERP study, we manipulated noun-adjective agreement in simple intransitive sentences to investigate how the processing system resolves this mismatch. ERP results, which we presented elsewhere, suggested that the spoken variety of our participants influences how they process StA online, and humanness interacts with morphosyntax both at the early and late stages of processing. However, behavioural acceptability judgements were above chance level (58-67%) for the violation conditions in both human and non-human referent conditions, although they were significantly less, compared to judgements of their acceptable counterparts (86-92%). Further, there was huge variation in the acceptability ratings for the human referent conditions. It has been claimed that broken plurals tend to trigger feminine agreement. Could this explain this variation? Here, we address this question by performing a linear mixed effects analysis of the relationship between sentence acceptability and the independent variables: humanness, violation, and plural type. Our analysis showed that the model involving the factors humanness and violation with by-participant and by-item random slopes for the effect of humanness best explained the acceptability data. This suggests that it is humanness rather than the type of plural morphology that explains the variation in our acceptability data.
Keywords: *animacy, agreement, Arabic, neurophysiology, ERPs*
Acknowledgment: *The research reported in this abstract has been supported by the Qatar National Research Fund Grant NPRP 7 - 427 - 6 - 011 from Qatar Foundation*

A24 Antecedent retrieval during the processing of Dutch reciprocal pronouns.

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Local antecedent-anaphor dependencies (e.g. reflexives and reciprocals) do not seem as susceptible to interference effects as subject-verb agreement is (Dillon et al. 2013, Jäger et al 2017). The absence of consistent interference is surprising in cue-based models, which predict partial-match interference regardless of dependency type. A possible explanation for different interference profiles in previous studies is that word order created a baseline activation advantage for accessible antecedents over distractor NPs. In most studies, the critical anaphor immediately followed the main clause verb, which induces reactivation of the antecedent. SOV

languages provide an opportunity to test this hypothesis, since the accessible antecedent, the distractor, and the anaphor can all occur pre-verbally. In a self-paced reading experiment we tested for interference during the processing of the Dutch reciprocal elkaar, which requires a local (Principle A), plural antecedent. The factors Grammaticality and Distractor Number were manipulated through number-marking on two NPs (the antecedent singer(s) and the distractor fan(s)). Dutch SOV+V2 word order ensures that no main clause verb intervenes between antecedent, distractor, and reciprocal pronoun, eliminating the probability of selective reactivation of the grammatical target NP. Results (N = 45) Statistical analyses reveal only a main effect of Grammaticality ($t = 2.96$) in the post-reciprocal region, and no Grammaticality*Dist.Number interaction. These results suggest that the apparent immunity of reciprocal pronouns to interference effects cannot fully be ascribed to baseline activation differences induced by an intervening main clause verb.

Keywords: *sentence processing, anaphors, cue-based retrieval, interference effects*

A25 The role of the decision stage in the recognition of reduced speech.

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Spoken language is characterized by extraordinary variability in how words are produced. In three experiments, we examined the role of the decision stage in the recognition of phonetically reduced word forms, specifically word forms produced with nasal flaps in American English (e.g., the word «counter» produced as «couner».) Previous work indicates that flapped pronunciation variants are recognized less accurately and more slowly compared with canonical forms. The present study investigates whether this reported processing disadvantage for flapped variants is located at an early perceptual stage of processing or at a post-perceptual decision stage. Experiment 1 replicates the processing advantage for canonical over flapped pronunciation variants with a lexical decision task. Experiment 2 provides evidence from the psychological refractory period (PRP) paradigm, demonstrating that the influence of pronunciation variant is located at a stage that requires central processing resources. Experiment 3 employed the shadowing task which relies less on decision processes than the lexical decision task and indicates a much smaller difference in processing performance between flapped and canonical variants compared to the lexical decision task. In concert, the results demonstrate that the processing differences between canonical and flapped variants have at least in part a decisional rather than a perceptual locus. Our findings therefore call into question representational and perceptual accounts of the variant-type effect. A mechanism is discussed that describes how decision-based factors could cause the apparent processing disadvantage for reduced variants. Word count of abstract:

Keywords: *spoken word recognition; speech reduction; flapping; psychological refractory period; shadowing; lexical decision*

A26 Task-dependent effects in the lexical boost.

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In structural priming, head verb repetition between prime and target leads to enhanced priming: the lexical boost effect (Pickering & Branigan, 1998). A boost from a non-head noun has, however, been more elusive (see Scheepers et al. 2017). To determine whether the lexical boost is driven by explicit memory (e.g., Chang et al, 2006), we tested for a lexical boost, using prepositional object or double object structures, when participants could still see the prime while completing a target (Experiments 1 & 3) or not (Experiments 2 & 4); the first two experiments tested for a boost from the head verb, the last two from the subject noun. A verb-related boost occurred regardless of whether or not participants could still see the prime (Structure x Verb Repetition for Experiment 1: $p < .001$; Experiment 2: $p < .01$). Critically, the noun boost only arose when participants could see the prime (Experiment 3: Structure x Noun Repetition $p < .001$; Experiment 4: $p = .84$), suggesting that when participants could re-inspect the prime, the prime acted as a cue boosting the activation of its structure. While the noun boost appears to be dependent on how explicit the word repetition is, the verb boost does not. Thus, the noun boost effect is a strategic effect that only occurs when participants can re-inspect the prime, whereas the verb boost is not strategy-specific. We conclude that structures are associated with the head verb but not normally with non-head nouns.

Keywords: *language production, structural priming, lexical boost, head verb, noun, task dependencies*

A27 A Perceptually-constrained Visual Word Recognition Model.

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Reading requires rapid recognition of words in printed text. Existing models of visual word recognition account for this mechanism by mapping the perceived letter strings into lexical units. In our work, we explore whether this process is mediated by the statistical properties of the input writing systems. Adopting an information-theoretic perspective, we analyze two languages from different families (English and Hebrew), and we find key differences in the available information contained in the letters in different parts of the word (beginning vs. ending) for converging on a lexical candidate. We test the implications of these cross-linguistic differences in a novel perceptually-constrained connectionist model of visual word recognition. The simulations account for a number of behavioral phenomena. First, our model predicts a tendency to fixate near the center of a word, slightly closer to the beginning of the word. Second, we demonstrate cross-linguistic differences in the likelihood of fixating at other locations than the preferred

location due to availability of information-content. Our model makes the novel prediction, which we confirmed by behavioral data, that words with an atypical distribution of information-content across letters are better recognized when fixating at an unusual location in a word. Overall, our research shows how the mechanism of visual word identification is tuned to the perceptually-constrained regularities of the writing systems, thereby driving proficient reading.
Keywords: *visual word recognition; statistical learning; computational modelling*

A28 Cross-Linguistic Homophone Auditory Recognition.

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Previous studies have found cross-linguistic differences in visual processing of homophones. Whereas native English speakers respond more slowly to homophones than to non-homophones (e.g. Pexman et al., 2001), native speakers of Mandarin Chinese or Japanese show the opposite pattern (e.g. Ziegler et al. 2000; Hino et al. 2013). Interpretation of these differences is complicated by the different orthographies these languages use. To avoid orthographic confounds, we used an auditory lexical decision task in investigating differences in homophone processing across modalities and factors that could account for cross-linguistic differences. Study 1 compared auditory lexical decision performance across those three languages. Whereas single-mate homophones showed neither inhibitory nor facilitatory effects in any of the three languages, multi-mate homophones showed significant differences across languages. Multi-mate homophones tended to inhibit lexical decision in English and Mandarin, but tended to facilitate lexical decision in Japanese, which has the highest proportion of homophonous words. Each additional homophonous mate significantly prolonged response time of lexical decisions in English and caused milder inhibition in Mandarin Chinese, but not in Japanese. Study 2 compared lexical decision performance across different types of words within Mandarin, with stricter control over frequency and neighborhood density. Results showed that homophones with more mates indeed have stronger inhibition. Together, these findings suggest that beyond differences in phonological-orthographic consistency and effects of global activation caused by multi-mate homophones, differences in homophone density (Japanese > Mandarin > English) also contribute to observed differences in processing.
Keywords: *homophone; cross-linguistic; lexical decision; word recognition*

A29 How the Age Affect Global and Local Context Effects: Constraint and Cloze Probability Effects on Chinese Classifier-Noun Agreement.

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Extensive researches have shown that older adults have difficulties in predictive processing at message-level. Chou et al., (2014) manipulated the semantic constraint (strong versus weak) of the Chinese classifiers and the cloze probability of the paring noun (high versus low) and found the interaction between these two parameters on N400 in older adults. To further examine the aging effect in the use of the global and local contextual information during reading comprehension, the current study embedded the same experimental design of classifier-noun agreement in sentences. The global contextual predictability was subdivided into high global predictability and low global predictability conditions based upon the subjective rating of predictability between the leading context and the pairing nouns. For young adults, we found the global predictability override the local predictability, as the typical global predictability effects on the N400 were significantly found in almost all conditions. The only except is when the local predictability of pairing noun was low with the weakly constrained classifier, which revealed no typical global predictability effect on N400, but in the late positivity. When the global context did not provide useful information, the weakly constrained classifiers active a large set of alternatives and thus increase the integration difficulty. In contrast, older adults revealed no facilitation on lexical processing in any conditions. In sum, the findings suggested that young adults make more use of the global contextual information to predict upcoming words. Whereas elders were less effective in using both global and local contextual cues.
Keywords: *aging, contextual constraints, chinese classifier-noun agreement*

A30 Representation of T3 sandhi in Mandarin: Significance of context.

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T3 sandhi in Mandarin is a phonological dissimilation rule where two adjacent T3-T3 are not tolerated and the first T3 is changed to T2. Note also that acoustically T2 and T3 contours are similar. Although this phenomenon has been extensively studied in previous work, concerns about how T3 sandhi is represented in the metal lexicon remain controversial; options considered are canonical, abstract, underspecified, and surface representations (cf. Zhou & Marslen-Wilson 1997; Chien et al., 2016). Assuming that dissimilation presupposes loss of a feature in a context, we approached the issue of representation in a series of experiments including form as well as semantic priming with and without context. Experiment 1 (form-priming) investigated whether the facilitatory effect of T2 primes on targets found in previous studies was largely due to phonetic similarity between primes and targets. By adopting a cross-modal semantic priming tasks, Experiment 2 and 3 aimed to explore further whether T2 could prime the targets with or without contextual information. Our results showed that despite the acoustic similarity between T2 and T3 contours, T2 could not prime a target beginning with T3 in a non-sandhi context. In addition, both T2 and T3 are able to activate the lexical entry semantically when contextual information is presented, whereas only T3 activates the lexical entry and T2 does not when such information is absent. Thus, our study suggests that T3 is specified, as expected for dissimilation, and the auditory input T2 is resolved by a re-writing rule only under appropriate contextual information.
Keywords: *context, dissimilation, T3 Sandhi*

A31 Associative acquisition of action word meaning leads to activation of perisylvian speech-related areas time-locked to action initiation.

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Meaning of action words is presumably acquired in the course of co-activation of cortical areas related to speech processing and motor control. We hypothesized that as a result of Hebbian coincidence learning, an attractor neural network may form, that could involve both forward and backward connections and thus induce activation of speech-related cortical areas during planning and initiation of the associated motor action. On order to test this prediction, we recorded MEG in 28 adult subjects who were involved in a novel auditory-motor learning procedure. The participants were required to discover meaning of novel pseudowords by way of «trial-and-error» learning during one experimental session. Cortical sources of response-locked magnetic field were reconstructed using MNE software. We found that in the course of such speech-motor learning, strong activation emerged in perisylvian areas, including STG/STS/MTG, posterior insula, and an area at the temporoparietal boundary. The effect was time-locked to the movement onset and lasted from -500 to -150 ms relative to the movement onset. Our results demonstrate for the first time that experiential association between acoustically presented pseudowords and actions involves activation of speech-related cortical areas during action planning and initiation. Presumable, newly formed auditory-motor attractor neural networks induce recurrent reactivation of phonological and lexical circuits during planning and initiation of associated motor actions, thus likely promoting further increase in the strength and specificity of the association between newly learned pseudowords and corresponding actions.
Keywords: *action words, word meaning, trial-and-error learning, magnetoencephalography*
Acknowledgment: *Supported by RFBR grant 17-29-02168*

A32 Segmentation of transparent and opaque compounds for poor readers.

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The status of easy-to-read (ETR) German is controversial since it is mainly based on introspection. The aim of the present study was to test a controversial rule concerning compound segmentation. Hypotheses derived from psycholinguistic studies with skilled readers predict an interaction of segmentation and semantic transparency (Sandra, 1990; Koester, Gunter, & Wagner, 2007). A sample of adults, some with intellectual disability and others functionally illiterate, performed a timed lexical decision task (cf. McKoon & Ratcliff, 2016) on unsegmented and segmented two- to four-syllable noun-noun compounds that were semantically transparent or opaque (Luftpumpe 'air pump' composed of 'air' and 'pump' vs Drahtesel 'bicycle' composed of 'wire' and 'donkey'; compounds were matched for length and frequency of occurrence). The results show an advantage of segmentation that was not modulated by semantic transparency (for recent evidence suggesting that skilled readers of German segment opaque compounds cf. Smolka & Libben, 2017). At the same time, a main effect of semantic transparency indicates that the meaning of the compounds was accessed. Post hoc analyses reveal that the frequency of occurrence of the first constituent affected decision times, showing that unsegmented compounds were decomposed, too (cf. Hasenäcker & Schroeder, 2019). The study shows that compounds of the type tested should be segmented in ETR German to ease reading and that further research on the exact conditions is feasible. Two potential loci of the segmentation advantage are discussed: a prelexical one referring to phonological recoding and a lexical one related to access to phonological word forms.
Keywords: *reading, morphological processing, linguistic heterogeneity*

A33 Effortful verb retrieval from semantic memory drives beta suppression in higher-order motor areas.

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The contribution of the motor cortex to the semantic retrieval of verbs remains an unresolved question in neuroscience. We examined whether the increased involvement of the cortical motor system was required under hindered access to verbs semantics during a verb generation task. 33 participants were asked to name verbs related to presented noun cues. The nouns were either strongly associated with a single verb and prompted fast and effortless verb retrieval, or were weakly associated with multiple verbs and more difficult to respond to. Using power suppression of MEG beta oscillations (15-30 Hz) as an index of cortical activation, we performed a whole-brain analysis in order to identify the cortical regions sensitive to the difficulty of verb semantic retrieval. Suppression of beta oscillations was observed from 250 ms after the noun cue presentation up to the onset of verbal response ($p < 0.0001$, FWE-corr.). It was localized to multiple cortical regions, mainly in the temporal and frontal lobes of the left hemisphere. Crucially, the only cortical regions where beta suppression was sensitive to the semantic difficulty, were the premotor and supplementary motor areas. Stronger activation of the higher-order motor areas accompanied the effortful verb retrieval at -700 and -550 ms pre-response time interval ($p < 0.05$, FWE-corr.), which precedes the preparation of vocal response and likely overlaps with the semantic search for the target verb. We suggest that the observed prefrontal beta suppression reflects re-activation of verb-related motor plans in higher-order motor circuitry that serves to promote the verbs semantic retrieval.
Keywords: *embodied cognition; verb generation; magnetoencephalography (MEG), beta oscillations*

A34 Mechanisms of response inhibition are involved in the processing of sentential negation. Evidence from EEG theta and beta rhythms.

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Two-step theories of negation understanding posit an initial representation of the negated events, followed by a representation of the actual state of events. Behavioral and neurophysiological studies provided evidence that linguistic negation suppresses or reduces the activation of the negated events. Recently, we have suggested that linguistic negation partially relies upon the neurophysiological mechanisms of response inhibition; specifically, on those signaled by modulations of fronto-central theta oscillations in GNG tasks (de Vega et al., 2016; Beltrán et al., 2018). In the current EEG study, we ponder this proposal by testing whether negation reuses of response inhibition is selective for action related sentences, or on the contrary, involves a more general-purpose mechanism. To that end, we employed the same dual task paradigm than in our prior study – sentence comprehension plus GNG task – but including both action and non-action (abstract) related sentences. Results confirmed that theta power increases elicited by NoGo trials were smaller in the context of negative sentences than in the context of affirmatives. There were no differential effects between the motor and the mental content on beta rhythms modulations, supporting the involvement of content-free inhibition associated with processing of sentential negation.
Keywords: *sentential negation, two-steps model, response inhibition, Theta rhythms, Beta rhythms*

A35 Ellipsis and the QuD: evidence from sluicing with nominal antecedents.

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We evaluate two competing theories of sluicing, a form of clausal ellipsis exemplified in (1): IDENTITY theories, which require the elided material to be identical to its antecedent, and QUD theories, which require sluices to correspond to a salient Question under Discussion. We distinguish them by examining sluices with nominal antecedents, exemplified in (2). According to IDENTITY theories, the lack of a clausal antecedent should render such cases categorically ungrammatical. QUD theories, on the other hand, predict that the acceptability of such sluices will depend on the propensity of the context to serve up the relevant QUD. Experiment 1 (N = 63) measured the acceptability of 30 nominal-antecedent sluices, as shown in (2), and revealed considerable variability across, which is unexpected under IDENTITY theories. Under QUD theories, on the other hand, such gradience may arise if the availability of the relevant QUD varies as well. To test this prediction, Experiment 2 (N = 47) measured the availability of the QUD associated with each sluice from Expt 1 in a forced-choice passage completion task. The possible continuations consisted of overt wh-questions corresponding to each sluice, which were determined in a separate norming experiment (N = 31). As predicted, this measure of QUD availability explained a significant amount of the variance in acceptability we found in Expt 1 (t_S = 1.8, p = 0.037). Our results thus favor QUD theories over IDENTITY theories.
Keywords: *sluicing, ellipsis, Question under Discussion*

A36 Phonological/Orthographic Facilitation and Inhibition in Spoken/Written Word Production: Evidence from a Chinese Blocked Cyclic Task.

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It is well established that in language production tasks such as «blocked cyclic naming», phonological overlap between response words facilitates naming latencies. These well-established effects are theoretically important and have long been taken as evidence for spreading activation among co-activated entries during phonological encoding. However, few existing studies have demonstrated that phonological relatedness elicited inhibition, not facilitation effects (Breining et al., 2015; Sevald & Dell, 1994; Stemberger, 1985, Wheeldon, 2003). A series of four experiments examined phonological/orthographic facilitation and inhibition in spoken and written production using the blocked cyclic naming paradigm. Chinese speakers repeatedly reported the names of a small set of objects within a block, and phonological overlap between responses words within a block was manipulated. In Experiment 1, in the «position-consistent» condition object names shared an initial syllable within a word. In the «position-distributed» condition, the overlap of syllables distributed unpredictably within words. The results showed a cross-over-interaction between position type and phonological relatedness: phonological overlap at the same position exhibited a facilitatory effect whereas position-distributed overlap produced an interference effect. In Experiment 2, critical trials were interleaved with filler trials but inhibition still emerged, suggesting a persistent origin. Experiment 3&4 have been conducted with written production responses in which the orthographic unit of Chinese characters (radical) was manipulated. The identical pattern of results has been found, and again orthographic inhibition still emerged when critical trials were interleaved with fillers, suggesting a persistent origin.
The implications for theoretical models of word production are discussed.
Keywords: *word-form encoding; implicit priming task; Chinese word production*

A37 Association of Functional Connectivity in the Right Superior Temporal Gyrus with Compensation of Speech Impairment in Fluent Aphasia.

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This study focused on the role of the intact hemisphere in language compensation in post-stroke fluent aphasia using the mismatch negativity concept. Fourteen aphasia patients with speech perception impairment in the chronic stage after a left hemisphere stroke and 16 healthy volunteers participated in the fMRI session while passively listening to speech sounds in the oddball paradigm. The general linear model analysis showed a deviant-elicited response in bilateral temporal cortices in healthy volunteers and only in the right posterior parts of the superior and middle temporal gyri in patients. We found between-group differences in responses to deviant sounds in the left middle temporal and supramarginal gyri. Further, the right hemisphere areas revealing significant deviant-elicited activation in the control group have served for the region of interest in the functional connectivity (FC) analysis after additional functional parcellation. The FC of the right homolog of Wernicke's area with eight adjacent regions was significantly higher in aphasia patients than the control group. The FC of the region, including the right supramarginal and postcentral gyri with seven adjacent regions positively correlated with speech assessment test scores in patients. Our findings suggest that altered FC in the right superior temporal gyrus in aphasia patients reflects the functional reorganization of the intact hemisphere areas involved in phonological perception, while the increased FC of the right supramarginal gyrus could play a compensative role in speech perception via its greater involvement in the attentional processing of speech stimuli in fluent aphasia.
Keywords: *stroke, aphasia, fMRI*

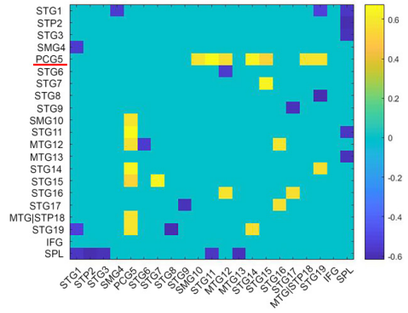

Figure 1. *The significant ($p < 0.05$) correlation of FC values of area in the right postcentral gyrus (PCG) with 7 brain nodes obtained after functional parcellation of the region showed deviant-elicited BOLD-response (STG- superior temporal, MTG – middle temporal, SMG –supramarginal gyri) with speech test scores in patients.*

A38 Two closely related languages and L1 attrition & L2 acquisition: Slovaks in Czechia.

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The proposed poster summarizes results of a lexical decision task aimed at how Slovaks who sojourn long-term in Czechia process Czech and Slovak words. Thus, the study addresses the issue of L1 attrition and L2 acquisition in the situation of two closely related languages. This topic has been not extensively investigated in the context of this research agenda. Moreover, lexical decision task has not been employed in L1 attrition studies so far. The investigation therefore offers a new look at established and hotly debated topics. Two groups of Slovaks took part in the experiment: a control group of Slovaks living in Slovakia (n = 50) and an experimental group of Slovaks in Prague (n = 66). Apart from that, 49 Czechs living in Czechia served as another control group. They carried out only the task containing Czech stimuli. The stimuli in both sets (the set of Slovak words and the set of Czech words) comprised three types of words: identical cognates, similar cognates and non-cognates. The results have revealed that both groups of Slovaks responded faster to Slovak similar cognates and non-cognates than to respective Czech words. Reaction times on Czech non-cognates were the slowest. Nevertheless, signs of L1 attrition have not been detected. The explanation of results is provided and it takes into account also sociodemographic characteristics of participants, such as the length of the residence in Czechia and the amount of the use of Czech and Slovak – pieces of information which were collected via special sociolinguistic questionnaires.
Keywords: *L1 attrition; L2 acquisition; bilingualism; lexical decision task; Czech; Slovak*

A39 Morphosyntactic prediction during reading in Russian.

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Efficient language comprehension involves generating predictions about upcoming input based on available context (Kuperberg & Jaeger, 2016). However, the nature of the predicted unit remains unclear: do we predict a particular lemma or can we predict specific morphosyntactic features of a word without predicting the exact lemma? Luke and Christianson (2016) demonstrated that in reading when people cannot guess the lemma but can predict upcoming word's class or morphological form, this morphosyntactic prediction speeds up processing. We investigate morphosyntactic prediction during reading in Russian, a language that has overt inflectional markers for several nominal and verbal categories. We expect that highly predictable morphosyntactic features will facilitate reading beyond lemma predictability. Predictability measures for 144 sentences were obtained in the cloze task (Taylor, 1953). Morphosyntactic predictability was computed for 10 word classes; for number, gender, and case in nouns; and for tense, person, number, and gender in verbs. Then the same 144 sentences were presented to participants (N = 96), whose eye movements were tracked during reading. We found that high word class predictability had a facilitative influence on gaze duration and total reading time. The same was true for tense predictability: highly predictable tense forms had shorter gaze duration and total reading time. We also found that gender predictability in nouns influenced total reading time. These results suggest that highly predictable morphosyntactic information facilitates reading beyond lemma predictability, however, the effect sizes are small.
Keywords: *prediction, predictability, reading, morphosyntactic predictability*

A40 Temporo-frontal cortical networks for automatic visual word recognition: a vMMN study.

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Automatic processing of lexical information in spoken language is typically indexed by an increase of early (50-200 ms) EEG/MEG responses to unattended words as opposed to phonologically matched meaningless pseudo-words. This lexically-specific response enhancement, reflecting early attention-independent activation of pre-existing long-term memory traces for words in the brain, has been most often reported in auditory oddball mismatch negativity (MMN) paradigms. As language is an inherently multi-modal function, a similar automaticity may also be hypothesised for the processing of visually presented language. Here, we adopted the MMN paradigm to investigate the neural processing of unattended lexical stimuli in the visual modality using high-resolution MEG recordings and anatomically constrained source analysis algorithms. In a visual oddball sequence, visually and psycholinguistically matched English words and pseudowords were tachistoscopically presented outside the foveal focus of attention while participants attentively tracked combinations of geometric shapes in the centre of the screen. We found that a lexicality effect distinguishing parafoveally presented familiar words from meaningless pseudo-words emerged in a distributed occipito-temporo-frontal cortical network, starting from as early as ~90 ms. This lexically-specific response was accompanied by a visual analogue of mismatch negativity (vMMN) distinguishing frequent standard and unexpected deviant orthographic stimuli. These results suggest that the automatic processing of lexical information may be a supra-modal neural mechanism, shared by the auditory and visual word recognition processes. Neural activity associated with unattended lexical stimuli may index the first processing stages of linguistic information in the brain, well before task-dependant attentional neural resources come into play.
Keywords: *lexicality, automaticity, visual mismatch negativity (vMMN), MEG, spatio-temporal dynamics, language systems*

A41 Cross-domain Visuospatial Processing of Affective Valence and Abstract Magnitude.

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Existing literature suggests that co-activation of concepts from different domains leads to the establishment of cross-domain priming effects (Myachykov, Chapman & Fischer, 2017; Scheepers, et al., 2019). One example of such cross-domain effects is the interplay between words denoting numbers and words of spatial semantics. Existing research indicates that concurrent processing of words denoting spatial semantics and of spatial valence results in shared spatial biases, with positively valenced words associated with upper and right space, and negatively valenced words corresponding with lower and left space (Dudschig, de la Vega & Kaup, 2015; Lachmair et al., 2012). Similarly, the SNARC effect demonstrates that small numbers are associated with lower and left space and large numbers – with upper and right space (Dehaene, Bossini & Giraux, 1993). In two studies, we examined the relationship between the words denoting emotional valence and numbers. In Study 1, participants read words of positive/negative valence before performing on a standard SNARC task (Dehaene, Bossini & Giraux, 1993). Overall, participants were quicker to process the numbers denoting smaller magnitudes when primed by the negatively valenced words and the numbers denoting larger magnitude – when primed by the positively valenced words. In addition, this interaction was stronger when participants responded with their dominant (right) hand. Study 2 replicated these findings by tested the strength of this interplay by manipulating valence words' locations.
Keywords: *valence, magnitude, cross-domain, visuo-spatial, semantics, priming, facilitation, SNARC*

A42 Bilingual Experience Changes Concept Associations.

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Acquisition of a second language can change non-linguistic conceptual representations. We examined how association strengths among concepts differed between monolinguals and bilinguals with varying degrees of proficiency. Three behavioral and one ERP experiments were conducted. In Experiment 1, Spanish-English bilinguals rated semantically unrelated picture pairs (e.g., cloud-present) as significantly more related in meaning than English monolinguals did. Experiment 2 demonstrated that increased concept associations in bilinguals depended on the inherent relatedness of the items. Korean-English bilinguals rated semantically unrelated (e.g., pencil-lake), but not related word pairs (e.g., nurse-doctor) as more related than English monolinguals. In Experiment 3, an effect of language proficiency was observed, with high-proficiency Spanish-English bilinguals rating concepts as significantly more related than both monolinguals and low-proficiency bilinguals. In Experiment 4, ERPs were measured to assess whether bilinguals neurologically distinguish related and unrelated stimuli pairs differently from monolinguals. Results suggest that bilinguals may perceive increased semantic relationships between both unrelated and related concepts, but that more sensitive measures like the ERPs may be required to capture bilinguals' increased associations between highly related concepts. These results show that extensive bilingual experience can change the strength of perceived semantic associations. Consistent with connectionist models of language that allow for phonological and lexical influences on conceptual representations, we propose that bilinguals' denser and more interconnected lexical networks may decrease semantic distances between concepts by providing shorter paths to link them.
Keywords: *bilingualism, language and thought, semantic network*

A43 Differences in processing of polysemous and homonymous words: an ERP study in Russian.

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Previous studies showed that polysemous (metonymy and metaphor) and homonymous words are processed differently (Klepousniotou et al., 2012; MacGregor et al., 2015). However, processing metonymies and metaphors has been studied using different lexemes, which is a confounding factor. We investigated event-related potential (ERP) responses to the same polysemous words with three senses (literal, metonymic, and metaphorical) and homonyms with two meanings. Thirty healthy Russian speakers participated in the experiment. Experimental materials included two-word phrases. Target phrases with polysemous words with literal sense were preceded by either prime phrases with the same sense (control condition), a different metonymic or metaphorical sense. Similarly, target phrases with homonyms were preceded by phrases with the consistent (control condition) or inconsistent meaning. Participants read phrases and made a sensicality judgement. According to the results, polysemous phrases with literal senses preceded by primes with the same and metonymic senses did not differ in the ERP response. In contrast, prime phrases with metaphorical sense resulted in an N400 and a P600 effects accompanying comprehension of the target phrase. Processing of homonymous words preceded by the prime with inconsistent meaning elicited a P600 effect as compared to the control condition. Our results show that, in contrast to metonymy, metaphorical and literal senses of polysemous words might be stored in different representations. Different meanings of homonymous words should also have separate representations in the mental lexicon. However, the absence of an N400 effect for homonyms with inconsistent primes may reflect a later latency of switching between the two meanings.
Keywords: *metonymy, metaphor, homonymy, event-related potentials*

A44 Brain Dynamics of Rapid Word Learning with and without Semantic Reference: EEG Investigation.

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Different studies have demonstrated rapid changes in human brain activity after a short exposure to novel spoken or written word-forms, interpreting this effect as a neural marker of memory-trace formation. However, little is known about the contribution of semantic information during the process of rapid word acquisition in the auditory domain. To this end, we recorded electrophysiological brain activity in a group of 18 participants during repeated exposure to four novel spoken word-forms in two training conditions involving different amount of semantic information. During ~8 minutes of exposure (30 repetitions per word), half of novel words were repeatedly associated with pictures of novel objects (semantic condition) whereas the other half was trained without picture association (non-semantic condition). Cluster-based random permutation analysis of ERP data was implemented to examine the online effect of training (first 15 vs. next 15 exposures) in both semantic and non-semantic conditions. Results showed that the repeated exposure to novel word forms caused a progressive enhancement of the negativity ~150 ms after the word recognition point, which was similar in both conditions. However, single-trial based multiple linear regression analysis of the data revealed a different modulation of brain dynamics across both training conditions ~200 ms after word recognition, with faster brain activations elicited by novel words in semantic than in non-semantic condition. These results show faster neurophysiological plasticity when novel word learning is carried out under a semantic-associative context, suggesting that rapid formation of neural memory traces for novel spoken word-forms is expedited by semantic reference availability.
Keywords: *novel word learning, semantics, ERPs*

A45 Tense and number agreement in agrammatic and anomic patients.

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The Tree Pruning Hypothesis (TPH) predicts that verb tense agreement is upper than number agreement in the grammatical tree of verbal production, resulting more affected when syntactic processing is impaired (Friedmann & Grodzinsky, 1997). Accordingly, agrammatic patients are expected to commit more errors in the production of verbs in agreement with tense than with number. This research addressed to explore the influence of superficial cues on the verbal production of agrammatic (n = 10), anomic (n = 10) and healthy controls (n = 10). Two elicitation tasks were designed based on Ullman's test (Ullman et al., 1997), in which a verbal form was asked to be produced in agreement with a sentence provided by the experimenter. Half of sentences contained a superficial cue —a tense suffix or a plural suffix—, meant to help patients to produce verbs in agreement with tense or number. The other half of sentences was not marked and therefore tense and number should be deduced from the presence of an adverb (yesterday) or two subjects, respectively. Results showed no differences between agrammatic and anomic patients in tense production, with similar number of errors for verbs in tense agreement. Furthermore, production of agrammatic patients did not result benefited from superficial cues whereas anomic patients improved their performance with number cues. Overall, these results partially support the TPH, suggesting that tense agreement is impaired in verbal production of aphasic patients regardless of the syntactic or lexical process damaged. Moreover, they show that performance in tense agreement is unaffected by superficial cues.
Keywords: *agrammatism, verbal production, tense agreement*

A46 Neurophysiology of concrete vs. abstract concept acquisition: EEG evidence of concreteness effect.

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Differences between concrete and abstract words at behavioural and neurophysiological levels have been the focus of intense scrutiny in psychology and language sciences (Hoffman, 2015; Borghi et al., 2018). Here, we investigate the brain responses of 30 healthy adult monolingual Russian speakers to 20 newly acquired concrete and abstract words. Novel word forms were constructed from existing tri-syllabic Russian words by switching word-final syllables. At the training stage, participants had to extract each novel word meaning from five consequently presented contextual sentences containing a new word form. Immediately after training, ERPs to these and similar control items were recorded in a passive reading task. Responses at three most prominent peaks (~106, 146 and 206 ms) were analysed and compared between three conditions (novel concrete words, novel abstract words and control pseudowords) using Wilcoxon signed-rank test, cluster permutation statistics, and rmANOVA. Brain activity significantly increased for concrete vs. abstract words in the 2nd time interval, and for both of them – in comparison with control pseudowords, but in different areas. The acquisition of new items was also assessed behaviourally. Abstract words were better recalled and faster responded in recognition and lexical decision tasks, whereas concrete words were (at trend level) better defined and matched with their definitions. Thus, concreteness appears to produce opposite effects on the lexical (word forms) and semantic (meaning) levels of word acquisition. Furthermore, brain responses to novel concrete and abstract lexicon diverge, which may indicate different neural mechanisms for their acquisition.
Keywords: *concrete concepts, abstract concepts, language acquisition, ERP, EEG, concreteness effect*
Acknowledgments: *Supported by RF Government grant contract No.14.W03.31.0010*

A47 Transposed-letter similarity effects in Russian when primes and targets are of different frequency.

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Introduction. Experiments with orthographic neighbors are one of the main methods to explore the early stages of visual word recognition. In this paper, we study the process of activating word candidates during lexical access. Previous priming experiments using word–word transposed letter (TL) pairs (e.g. trail – trial) are rare (Andrews, 1996; Duñabeitia, Perea, & Carreiras, 2009) and inconclusive: e.g. it is not clear whether one neighbor activates the other during word recognition. Method. We conducted a masked priming lexical decision experiment on Russian. Targets were real nouns in nominative singular or nonce nouns. Primes (real nouns in nominative singular) were presented for 200 ms. Two factors were manipulated: whether the prime was a TL neighbor of the target (e.g. sekta 'sect' vs. setka 'net', experimental vs. control condition); whether the prime was more/less frequent than the target. 68 native speakers of Russian took part in the experiment. Results. Statistical analysis using mixed-effect linear modeling showed that TL neighbors significantly increased response latencies compared to the control condition and this negative priming effect was more pronounced when primes were more frequent than targets. Discussion. Results suggest that both members of a TL pair are activated when one of them is presented. The other member, which is not selected, is inhibited (therefore it is read slower if it is subsequently presented), and the extent of this inhibition depends on its frequency.
Keywords: *masked priming, transposition neighbors, Russian, visual word recognition*
Acknowledgements: *Funded by RFBR #18-00-00001(18-06-00045)*

A48 EEG study on the Misinformation effect.

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Because of the reconstructive nature of memory, we are often prone to accept false events and recall them as truthful. Our main aim was to study the temporal dynamics of retrieving false information with the use of EEG and the misinformation paradigm. In this paradigm participants are presented with a story (original information). After some time, parts of this story are presented again but now including some modifications (misinformation). Finally, the memory is measured for the original information, the misinformation, and, as control, some other incorrect information never presented before. In this experiment, participants' neural activity was recorded using EEG during the recognition memory test. Our results show that for the contrasts of misinformation accepted vs rejected, and false information accepted vs rejected (correct rejections), P3b was significantly more positive when the inaccurate information was accepted. These differences suggest a larger cognitive workload on accepting this type of information than when it is correctly rejected. Furthermore, in both contrasts we found differences in P600 which is linked to reprocessing of detected anomalies in the input. Here, we found a more expressed P600 for accepted than for rejected misinformation. P600 was also stronger for correct rejections than false alarms. In this latter case, the higher P600 amplitude may reflect the detection and reanalysis of the rejection of this false information. Interestingly, in the case of acceptance of misinformation, the higher P600 amplitude suggests that participants are not totally blind to the inaccuracy of the misinformation, though still they accept it.
Keywords: *misinformation effect, false memories, SDT, EEG*
Acknowledgements: *The work was supported by the Russian Science Foundation (project No. 19-18-00534)*

A49 Erroneous processing of garden-path sentences in Czech.

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The poster addresses the idea of Good-Enough processing of garden-path sentences. Results of four experiments on Czech using self-paced reading will be presented. The experiments suggest that native speakers of Czech often process garden-path sentences incorrectly based on their answers on comprehension questions, just as the Good-Enough approach would predict. However, the experiments also show a strong general tendency to answer comprehension questions after garden-path sentences more incorrectly than after control, non-garden-path sentences, independently on the question content. In other words, the garden-path sentences yield more erroneous answers even on comprehension questions which do not address the initial misanalysis at all (even on questions which ask on a very simple, unambiguous transitive first clause). This suggests that speakers have strong computational problems in analyzing garden-path sentences and that they often do not form any coherent representation of the sentence content. On top of that, the last experiment suggests, that the speakers' answers on comprehension questions seem to be influenced by the general, sentence independent plausibility of the answer. Speakers' analysis thus seems not to be «good-enough» in any sense of this term – one could say that speakers often do not come to any meaningful understanding of the garden-path sentence and that they answer the comprehension questions by guessing to a large extent.
Keywords: *syntactic ambiguity; misanalysis; sentence processing*

A50 Event perception and description are embodied: An eye-tracking study in Japanese sentence production.

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This Japanese language production study explores connections between language processing and motor experiences by investigating whether the speaker's motion influences (i) their perspective in subsequent apprehension of a transitive event and (ii) their choice of word order (between equally acceptable alternations) and grammatical voice when describing that event. Thirty native Japanese speakers either remained still («Static» condition), pulled a stick («Pull-Agent» condition) or were unexpectedly pulled («Pull-Patient» condition). They then saw and verbally described a picture of a transitive event (e.g., girl-chases-boy). Speakers' eye movements and verbal descriptions were recorded, across 40 target and 60 filler trials. Eye-movement results during the 0ms–500ms time window (representing very rapid scene apprehension) showed numerically more looks at the agent character, and significantly fewer looks at the patient character in the Pull-Agent condition compared to the Static condition ($\beta = -0.10$, SE = 0.03, $t = -3.37$, $p < .001$). Gaze did not differ significantly between the Pull-Patient and Static conditions. Sentence production results showed an overwhelming bias toward active voice (95.9%). Additionally, the Pull-Patient condition significantly increased utterances using Patient-Agent-Verb word order ($\beta = 0.91$, SE = 0.36, $z = 2.52$, $p = .012$). These results suggest that (i) different types of motion may immediately influence speakers' relative attention toward the agent or patient element and (ii) speakers mention an entity conceptually highlighted by their own prior motion experience earlier in their incremental production of an utterance. The study supports the link between embodied cognition and linguistic alternations in Japanese language production.
Key words: *physical motion, sentence production, eye-tracking study*
Acknowledgments: *This study was supported by Grant-in-Aid for Scientific Research (B), JP19H01263*

A51 The effect of the learning context on novel word learning.

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Introducing new vocabulary in semantic categories has long become the gold standard in second language teaching, even though empirical evidence suggests that this practice might have a detrimental effect on word learning. We sought to extend previous research by contrasting two learning contexts: categorically related (new words from the same semantic category) and categorically unrelated (from different semantic categories). Specifically, we aimed to investigate how manipulating the learning context modulates novel word learning speed and subsequent recall. 60 participants learned novel labels for familiar concepts in both categorically related and unrelated contexts. The learning phase consisted of two sessions, conducted on separate days. The second learning session was followed by a test phase. Differences between the two learning contexts were measured during both learning sessions and in the test phase by examining response accuracy and latency of picture naming and translation tasks. We also analyzed learning curves across learning sessions to examine the effect of the learning context on the speed of acquisition of the novel labels. The influence of context on performance during the learning phase and on the naming and translation tasks is evaluated in light of the Interference Theory and the Distinctiveness Hypothesis, that relate the difficulty of learning and remembering target information to the degree of similarity between the target and the surrounding information.
Keywords: *word learning, learning context, semantic categories, word recall*

A52 Age-related disruption in the use of lexical information in sentence production, despite preserved syntactic planning.

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Healthy ageing does not affect all features of language processing equally (Peelle, 2019). In this study, we investigated the effect of ageing on the retrieval and management of multiple lexical items during sentence planning. Young (N = 44) and older (N = 46) adults were instructed to describe moving picture-word pairs on screen using specific sentence types (similar to Smith & Wheeldon, 2004). We manipulated whether the lexical items in the picture-word pair were semantically related or unrelated and whether they fell within the same phrase («the watch and the clock/hippo move apart») or different phrases («the watch moves above the clock/hippo»). Both age groups were slower to initiate sentences containing a larger initial phrase (same phrase condition) compared to a smaller initial phrase (different phrase condition), indicating a similar phrasal planning scope. However, while young adults displayed similar semantic inference effects in both phrase conditions (slower to initiate sentences when the nouns were semantically related), older adults displayed significantly larger semantic inference effects when the nouns were in different phrases compared to the same phrase. This suggests that older adults experienced increased difficulty inhibiting information relating to the distractor lexical item when it fell outside of the initial phrase, leading to increased time taken to plan the first phrase prior to articulation. Thus, while syntactic planning mechanisms may be preserved with age, older adults appear to encounter problems with managing the temporal flow of lexical information during sentence production.
Keywords: *healthy ageing, sentence planning, lexical retrieval*

A53 The production of Object Relative clauses in Italian-speaking children: a syntactic priming study.

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For children, Object Relative (OR) clauses with two animate noun phrases (e.g., This is the goat that the cows are pushing) are difficult to comprehend and to produce across a number of languages. One study investigated the priming of ORs in comprehension (Brandt et al., 2017), showing no priming effect in 6-year-old German-speaking children, and a robust priming effect in 9-year-olds, a result explained as a delayed development of abstract representations of ORs in the younger group. In the present study, we designed a new production task to explore the effects of syntactic priming on the production of ORs in Italian-speaking children aged 6. The aim is to address the following research questions: (i) can ORs be successfully primed in production, a modality that has not yet being tested in previous syntactic priming studies for ORs? (ii) Do children younger than 9 years-old have underlying representations for ORs with two animate noun phrases? Eleven Italian-speaking children participated in a baseline picture description task (mean age = 6:6; SD = 0.26) and seventeen children participated in a priming task (mean age = 5.9; SD = 0.2). The results demonstrate a significant priming effect between-subjects ($p < 0.0001$) and within-subjects ($p < 0.004$). The study shows that 6-years-old Italian-speaking children can be primed to produce ORs, and that they have underlying representations for ORs with two animate noun phrases, contra Brandt et al. (2017). Our results are in line with previous studies suggesting that children have abstract representations for several types of syntactic structures.
Keywords: *child language acquisition; syntactic priming; object relative clauses*

A54 How do dialogue partners jointly manage mental load to navigate the interaction?

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In dialogue, one conversational partner is often more knowledgeable than the other. This affects their use of project markers (e.g., okay, or uh-huh) to enter, exit and pursue the subtasks that must be completed throughout the interaction. More knowledgeable partners use vertical markers (VMs; e.g., okay, right) to indicate the beginning of a subtask, whereas less knowledgeable partners use horizontal markers (HMs; e.g., yeah, uh-huh) to acknowledge information during a subtask. This contributes to mutual comprehension by making the partners' progression in the interaction more explicit (Bangerter & Clark, 2003). A central question concerns how dialogue partner navigate the interaction under cognitive constraints such as mental load. Our hypothesis was that to ensure dialogue success, mental load only affects the production of markers which are not central to mutual comprehension, i.e. HMs by the more knowledgeable partner and VMs by the less knowledgeable partner. In a variation of the matching task in which a director was given the solution to a puzzle and instructed a matcher on how to solve this puzzle. Mental load was manipulated by asking them to memorise a series of numbers before the task, or not. Directors produced fewer HMs when they experienced an increased mental load. Matchers produced more VMs when their partner experienced an increased mental load, but only when they did not experience an increased mental load themselves (Figure 1). In line with the collaborative approach to dialogue, the results shed light on how dialogue partners adapt to each other to reach mutual comprehension.
Keywords: *dialogue; mental load; project marker; interaction navigation*

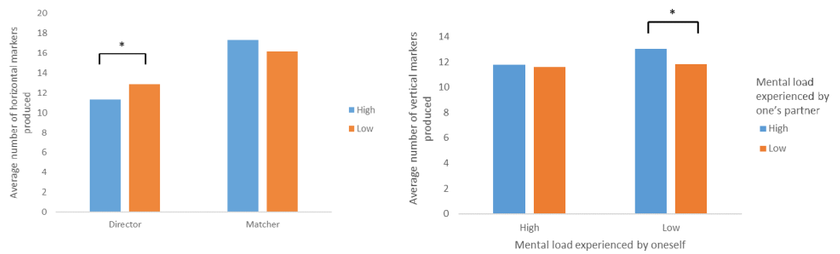

Figure 1. *Left panel: Average number of HMs used in each session as a function of participant role and of mental load experienced by oneself. Right panel: Matcher data only – average number of VMs used in each session as a function of mental load experienced by oneself and mental load experienced by one's partner.*

A55 Effects of lexical frequency and compositionality on phonological reduction in English compounds.

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This work investigates the interplay between phonological reduction, lexical frequency effects, and relative compositionality of compounds. That is, are more opaque compounds (cupboard) different from more transparent ones (blueberry)? We establish a gradient measure for compositionality of a compound by conducting a survey of 24 native American English speakers. As a measure of phonological reduction, we utilize the duration of the final rime of the compound in the Buckeye Corpus compared to the duration of the same rime in monosyllabic nouns. For a measure of lexical frequency, we calculate the Pointwise mutual information (PMI) score for each compound using the frequency data from the Corpus of Contemporary American English. Using a two-sample t-test we show that compounds with lower ratings of compositionality are significantly shorter in duration than would be predicted given the expected duration of their rimes. Additionally, we show that after controlling for a number of factors, compositionality in 21 compounds is a significant predictor of degree of phonological reduction in a linear regression model. Specifically, the degree of compositionality attributed to a nominal compound in English is a statistically significant factor in predicting the duration of the final rime of a compound. This yields a positive correlation, where the less compositional a compound is the shorter its final rime. These results provide evidence that semantic opacity in compounds has reflexes in phonological form. We argue that phonological reduction needs to be addressed by both theoretical and empirical aspects of compound representation.
Keywords: *compounds, phonology, semantics-phonology interface, corpus linguistics*

A56 Rapid semantic prediction in the developing brain.

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Event-related Potentials (ERPs) make online use of semantic memory traces measurable in the N400 component. In adults, N400 amplitude reduction reflected top-down predictions of specific words and their semantic features (Federmeier & Kutas, 1999). So far, it is not clear whether children likewise use sentence contexts to form such semantic predictions. To fill this gap, we tested ten-year-olds and adults in a semantic expectancy ERP paradigm. Participants listened to sentences with highly predictable final words (On vacation, they built a castle out of sand), or versions in which the final word was replaced by an unexpected word that was either semantically related to the expected final word (rocks) or semantically unrelated (cake). Both age groups showed graded N400 amplitudes dependent on their semantic expectancy: While both unexpected exemplars elicited higher N400 amplitudes than expected words, unrelated exemplars elicited highest N400 amplitude. Moreover, N400 effects were larger, longer lasting and starting earlier for children than for adults. We conclude that children have available powerful top-down semantic prediction mechanisms serving rapid speech recognition.
Keywords: *N400, development, semantic prediction*

A57 The role of inhibition in inflectional encoding: Producing the past tense.

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According to a prominent account of inflectional encoding (Pinker, 1999; Pinker & Ullman, 2002), regular forms are encoded by a rule-governed combination of stems and affixes, whereas irregular forms are retrieved from memory while inhibiting rule application. Previous research has shown that when speakers switch between tasks, languages, or phrase types, an asymmetrical switch cost is obtained, which has been attributed to overcoming previous inhibition of the predominant response. If generating an irregular form involves inhibition of rule application, then switching from an irregular to a regular form should require overcoming previous inhibition and delay responding. We tested this in two experiments on producing the past tense in Dutch. We observed that an asymmetrical switch cost is obtained when participants switch between inflecting and reading verbs, but not when they switch between encoding irregular and regular forms. These results suggest that the production of irregular forms does not involve inhibition of rule application. We discuss an alternative to inhibition for rule blocking that is compatible with our findings.
Keywords: *inflectional encoding; inhibition; past tense; task switching; switch cost asymmetry*

A58 Early pseudohomophone and orthographic priming during reading in Russian.

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Previous studies of orthographic and phonological priming effects during reading in English, Dutch and French have shown that orthographic priming arises from 24 ms onwards, while phonological (pseudohomophone; PH) priming emerges only at 83 ms (as shown for Dutch: Zeguers et al., 2014; English: Lee et al., 2005; French: Grainger et al., 2003). The present study investigates the time course of orthographic and phonological priming in Russian, an alphabetic language with a Cyrillic writing system. Forty-two native speakers of Russian were asked to read sentences. In the present eye-tracking experiment we utilized the foveal fast-priming paradigm (Sereno & Rayner, 1992) with the orthographic and phonological primes. When readers fixated on a specified target region, a prime word was shown for a brief duration and then was replaced by a target word. Three prime exposure durations were employed: 32, 50 and 80 ms. Analysis of gaze durations showed significant PH priming at 32 ms, which is earlier than in the phonological and PH data from English, French, and Dutch. The orthographic priming in Russian was obtained at all three durations, which is in line with the previous data from fast-priming and masked-priming studies for languages using the Latin alphabet. Implications for the statistical analysis and the Orthographic Depth hypothesis are discussed.
Keywords: *reading, eye-tracking, orthographic priming, pseudohomophone priming, Russian*

A59 Syntactic and prosodic means encoding information structure: an experimental study on Russian.

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It is well known that different means can be used to encode IS: prosodic, syntactic or morphological. However, we know much less how these means may interact. We address this question in three experiments on Russian, which was chosen because it can use both word order and prosody to encode IS. Analyzing prosody, we used Praat, logistic regression was used for statistics. Production Exp1. In five texts, some sentences were replaced with blanks followed by words in parentheses. Participants were asked to put the words together and to read the texts aloud. Every text contained several dialogues in which the answers had the same words, but different ISs, e.g. "Where is the soup? — Masha ate the soup", "What did Masha eat? — Masha ate the soup". Results: focused words always carried the main stress, while syntactic means were used much less frequently: both to make the focused constituent sentence-final and sentence-initial (focus-fronting is very infrequent in written texts, but was often used in our study). Comprehension Exp 2 & 3. Firstly, we cut out crucial questions and answers (read by different speakers) and recombined them, so that in some pairs, they were from the same dialogue, and in the others — from different ones (with different IS). Participants were asked to rate their appropriateness (1-5). Secondly, we gave another group of participants only answers and asked them to come up with appropriate questions. Results: participants detected the IS of the answers well, although syntactic means were significantly more effective than pure prosodic encoding.
Keywords: *information structure, syntax, prosody, Russian*

A60 Individual differences in focus processing.

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Focus (lexical, grammatical, prosodic) influences how information is encoded and interpreted. Felicitous use of focus requires various linguistic abilities: perceiving prosodic focus marking, drawing inferences about focus alternatives, and producing focus with distinct prosodic patterns. A series of exploratory studies investigated (a) whether individuals differ in these abilities and (b) whether individuals' ability to perceive, comprehend and produce focus correlate with one another. Exp.1 Perception task manipulated the presence/placement of the prosodic marking of contrasts to investigate participants' ability to perceive and interpret prosodic focus. Exp.2 Inference task manipulated the presence/absence of the focus particle 'only' to investigate participants' ability to draw exhaustive inferences about focus alternatives. Exp.3 Dialogue reading task manipulated the contrastiveness of the contexts to investigate participants' ability to pronounce focused and non-focused elements differently. We found large individual differences in all three experiments. Correlation analyses showed that individuals who are better at perceiving prosodic focus are also better at deriving exhaustive inferences. However, there was no relation between individuals' ability to perceive and interpret focus and their ability to realize focus prosodically. Additional comparisons of Exp. 1 and 3 showed that participants used different strategies to mark focus in their own productions (pitch and intensity) than those present in the stimuli in the perception experiment (pitch and duration). However, there was no relation between how strongly participants used intensity as a focus marker and how well they did in the perception experiment where this cue was absent. This suggests a dissociation between focus perception and production.
Keywords: *information structure, focus, perception, comprehension, production*

A61 Infant speech sound acquisition as error-driven discriminative learning of the speech signal.

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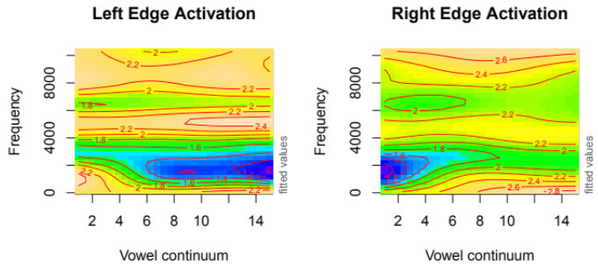
How do infants learn the sounds of their language? During the first year of life, infants progress from being able to discriminate the sounds of all the world's languages to a system increasingly refined for their native language. One proposal is that speech cues are learned through exposure to words and their semantic contrasts. This idea has been challenged by the argument that early infant vocabulary is limited and provides an insufficient number of contrasts. Subsequently, statistical acoustic clustering systems have become perhaps the most popular current models of first-language speech-sound acquisition. However, recent empirical evidence and computational modelling suggests that statistical clustering may be insufficient to explain speech sound acquisition. We propose that learning of speech sounds results at least partially from error-driven, discriminative learning of the unfolding speech signal. This requires neither semantic contrasts nor similarity-based acoustic clustering. We trained a Naive Discriminative Learner (NDL) network to discriminate 10ms acoustic sequences from one hour of the Karl-Eberhards-Corpus (outcomes/output), based on acoustic cues from the surrounding signal (input). The trained network was then tested with a [i]-[I] vowel continuum to compare the model with human perception tasks in the literature. Figure 1 shows the by-bandwidth activations across the continuum as predictors of the leftmost and rightmost continuum steps. In the first to third formant range, the closer the step is to the edges, the greater the activation. These results suggest that perceptual sensitivity to native speech sounds observed in infants over the first year of life – before rich lexical knowledge develops – may be at least partially explained by error-driven learning of the speech signal.
Keywords: *error-driven learning, discriminative learning, prediction, first language acquisition, speech cues, acoustic signal*



A62 Resolving German demonstrative pronouns through prominence among three antecedents.

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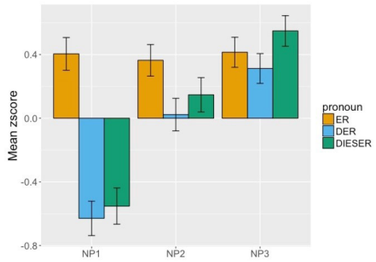
In contrast to personal pronouns, less is known about the processing of demonstrative forms. In German, the demonstrative pronouns «der» and «dieser» can, like personal pronoun «er», be used to refer to person and object entities from prior discourse. It has been proposed that processing the demonstrative «der» involves computing a prominence hierarchy of the prior referents, and excluding the referent with the highest prominence rank (Schumacher et al, 2015). Past experiments have presented only two potential antecedents, leaving open whether prominence is binary in nature or is instead graded (as a ranking system would suggest). A further limitation is that «dieser» has not been extensively tested, despite a claim that it is reserved for referring to the last-mentioned antecedent – suggesting insensitivity to a prominence hierarchy (Zifonun, et al., 1997). These limitations were addressed by investigating personal and demonstrative forms following ditransitive contexts, where three potential antecedents are available. We conducted an acceptability rating experiment (60 participants, 36 items), with factors Pronoun (er/der/dieser) and Antecedent (NP1/NP2/NP3). Antecedent gender and plausibility disambiguated coreference. When referring to the most prominent (NP1) or medium prominent (NP2) antecedents, ratings for demonstratives were significantly lower than for the personal pronoun (see Figure 1). For the least prominent antecedent (NP3), «dieser» was rated significantly better than «er». Interestingly, when compared across antecedents, scores for both demonstratives significantly improved as antecedent prominence decreased. Our findings suggest that both demonstratives are sensitive to antecedent prominence, and furthermore, that prominence-sensitivity is graded in nature rather than binary.

Keywords: *pronoun resolution, prominence, discourse*



A63 How three types of pronouns influence story progression.

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Little is known about the contribution of referential expressions on subsequent discourse. We present a text continuation task that investigated the potential of two types of German demonstrative pronouns (vs. personal pronouns) to shift a referent's status. It has been claimed that demonstrative pronouns shift the focus of attention in upcoming discourse whereas personal pronouns signal referential continuity (Abraham &Werner, 2002; Weinrich & Harald, 1993). Moreover, the difference between the two demonstrative pronouns (der/dieser) may be reflected in the persistence of the attentional shift (Ehlich, & Konrad. 1983). We thus hypothesized that different proforms provoke different referential dynamics. Participants (n = 110) received an incomplete sentence pair and added six sentences (Gernsbacher, Morton Ann & Suzanne Shroyer, 1989). The first sentence contained a prominent (first-mentioned/agent) and a less prominent character (second-mentioned/patient). The second sentence contained an ambiguous pronoun. We annotated for referential preference of the pronoun, referential persistence and referential dynamics. We calculated the probability that an animate referent in the continuations refers to the second-mentioned referent from the first sentence to measure referential shift. When participants referred the pronouns to the second-mentioned referent from the first sentence, all pronouns exhibited a high referential shift potential. In the few cases where the demonstratives were referred to the first-mentioned character, persistence of the second-mentioned character dropped for dieser. This is further reflected in story progression, where dieser appears to have a short-lived impact while der shifts referential structures more permanently. The two demonstrative pronouns therefore differ in persistence and duration of their referential shift potential. The data indicate a codependence of referential preferences and referential progression.

Keywords: *Pronouns, discourse, referential shift*

A64 Focus alternatives in language production: evidence from lexical decision.

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Focus evokes a set of alternatives to the focused expression (e.g., in 'Sarah photographed the [monkeys]F.' with prosodic focus on monkeys, 'giraffes' and 'lions' are possible focus alternatives). Previous studies on focus comprehension showed facilitation if a target word in a lexical decision task (LDT) was an alternative to a focused element. It is unknown whether a speaker activates focus alternatives and if focus production induces similar facilitation effects. Seventeen native German participants named line drawings of coloured objects, e.g., 'The elephant is grey'. We introduced alternative sets (i.e., «the set of grey things») implicitly during familiarisation. Contrastive focus intonation or neutral intonation in a prime sentence (supplementary material, 1B) was induced by a preceding context sentence (1A/A'). In addition to the naming task, participants performed a LDT on a target word during the speech preparation period. Lexical decision targets shared the prime's prototypical colour (e.g., key, elephant, stone: «set of grey things»; norming study, n = 29). Thus, targets were contextually relevant alternatives

but semantically unrelated to the prime. Statistical analyses (LMM) revealed significantly slower reaction times in the LDT in the Contrastive-condition compared with the Neutral-condition ($t = -2.10$, $p < 0.05$). Thus, target words were recognised more slowly when they were marked for focus alternative to the prime word and when the prime word was explicitly marked for focus. This suggests that contextually relevant alternatives are activated during focus production, and that they compete with the focused element, in line with the lexical competition account in language production.

Keywords: *focus alternatives, speech production, lexical decision, focus, lexical competition*

(1) Example of an item set for each condition:

A. Context sentence	Das Iglu ist weiß.	(‘The igloo is white.’)	Contrastive
B. Prime sentence	Das [Schaf]F ist weiß.	(‘The [sheep]F is white.’)	
A’. Context sentence	Die Hose ist blau.	(‘The trousers are blue.’)	Neutral
B’. Prime sentence	Das Schaf ist weiß.	(‘The sheep is white.’)	
C. Target (probe)	Zahn	(‘tooth’)	

Category: *prototypical white-colored objects/animals; introduced alternative set: Teller (‘plate’), Spargel (‘asparagus’), Schaf (‘sheep’), Kissen (‘pillow’), Iglu (‘igloo’), Zahn (‘tooth’)*

A65 Incrementality in the processing of adverbial order variations.

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Research on the processing of word order variations in sentences has shown that deviations from the canonical complement order induce processing difficulties (e.g. Rösler et al., 1998). These were interpreted as evidence for serial syntax-first parsing models (Frazier, 1987) and for the high degree of incrementality in complement processing. However, few studies have been concerned with parsing of adjunct order. Since German is a language with relative flexible word order, it provides a suitable testing ground for the processing of adjuncts. Based on theoretical (Frey & Pittner, 1998) and psycholinguistic (Stolterfoht, Gauza, & Störzer, 2019) evidence for syntactic base positions for adverbials in German, we conducted a self-paced reading and an acceptability judgment study in which we manipulated adverbial order. First, we found further evidence for the postulated base positions of adverbials. Second, we attested that deviations from the canonical order lead to increased processing times. In contrast to the cost for moved complements the increase in processing time is delayed and also reflected in sentence wrap-up effects. We conclude that syntactic position does influence adverbial processing but it does not guide initial parsing decisions. The attested delay corroborates the Construal theory of adjunct processing (Frazier & Clifton, 1997) according to which adjuncts are only loosely associated to their processing domain and that structural and interpretative principles are used to specify the syntactic structure. Furthermore, it indicates that adjuncts and complements vary in the degree of incrementality.

Keywords: *adjunct processing, adverbial order, on-line processing*

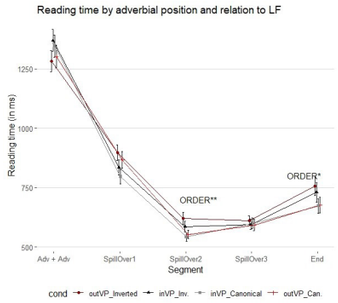

Figure 1. *Mean reading time per segment starting from the critical region (Adv+Adv) for canonical or inverted adverbial order (in/outVP reflects the modification domain of the adverbials); error bars represent the standard errors. $p < .05$.*

A66 Modeling misretrieval and feature substitution in agreement attraction.

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Agreement attraction in comprehension occurs when an ungrammatical sentence (*"The key to the cabinets are on the table") appears grammatical due to a match between the attractor noun phrase "cabinets" and the verb "are". Two classes of accounts have been put forward: The retrieval-based account claims that the plural attractor noun is sometimes misretrieved as the subject of the verb, as opposed to the correct subject head "key" (e.g. Wagers et al., 2009). Meanwhile, the encoding-based account claims that the plural feature of the attractor can be illicitly copied over to the subject head (e.g. Eberhard et al., 2005), introducing an unlicensed feature into the representation ("keys"). Recent work has investigated if feature copying can be observed in participants' sentence interpretations (Patson & Husband, 2016), finding an increased number of unlicensed plural interpretations ("keys") in attraction contexts. Our study uses Armenian object-extracted relative clauses ("The painter(s).ATTRACTOR that the sculptor. SUBJECT ignored.sg/pl") with a free-response end-of-sentence comprehension task ("Who ignored Ø?"). Results show evidence of feature copying (answer: "the sculptors"), but also of misretrieval (answer: "the painters"). To compare the predictive range of two accounts, we implemented the encoding account as a multinomial processing tree and the retrieval account as a lognormal race. Posterior predictive checks indicate that neither model satisfactorily accounts for the data, whereas a better fit is obtained with a hybrid model, assuming that features from the verb can also be copied (see Figure 1).

Keywords: *agreement attraction, misinterpretation, computational modeling*

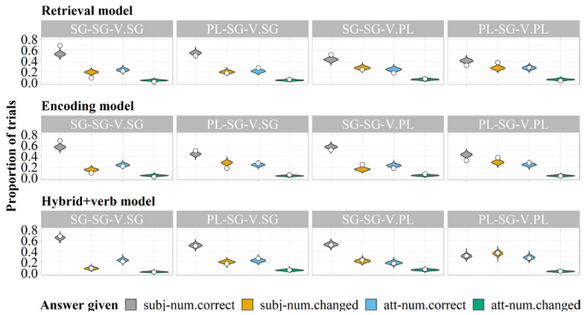

Figure 1. *Posterior predictive performance of the models. White circles indicate data means.*

A67 Quantifications of morphological family size: combining word-embeddings with lexical decision in Russian.

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Morphological family size (MFS), defined as the number of different complex words in which a stem appears as a constituent, has been shown to facilitate processing speed in a number of different languages. This co-activation of morphological family members has also been shown to be semantic in nature. However, in a morphologically rich language such as Finnish, the facilitatory effect of MFS was only observed when semantically unrelated morphological family members were excluded. In the present study, we follow this line of investigation by focusing on the computational quantification of semantic structuring of MFS in another morphologically rich language, namely Russian, which has not been investigated before. We quantified the semantic similarity relations among the morphological family members using word embeddings as implemented in the fastText algorithm trained on the Araneum corpus. FastText not only considers word co-occurrences but also letter n-grams. Pairwise cosine similarity was used to quantify the semantic similarity between a given base and its morphological family members.
To test the performance of this measure, we conducted a visual lexical decision experiment on 300 base nouns with 42 native speakers of Russian. The results of the preliminary analysis indicated that the strongest facilitatory effect of MFS on reaction time was observed when MFS included only semantically highly similar members based on uni- and bigram co-occurrences. Thus, a measure that combines combines a word's broad contextual appears to efficiently capture the semantic structuring of morphological relations in Russian.
Keywords: *morphological family size, word embeddings, lexical decision*

A68 The effects of cross-script semantic representations in Sino-Korean processing.

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The Korean lexicon comprises two sub-lexicons, one containing native Korean words, and one containing Korean words of Chinese origin (Sino-Korean). The latter contributes 60+% of the lexicon and, unlike native Korean, comprises words composed of one-syllable homographic morphemes (Hangul), each of which maps onto the semantics of all the Chinese characters (Hanja) that share that Korean pronunciation. The relative number of available meanings varies significantly between morphemes. For each morpheme, certain meanings are more salient. Furthermore, the Hanja semantic mappings may not create categorically related meanings, in contrast to the mappings of polysemous or homonymous forms. We investigated the interaction between semantic competition and semantic salience in the processing of Sino-Korean words, conducting two lexical decision tasks (n = 189) with semantic priming. Our primes were words containing a Sino-Korean morpheme with more than one meaning. Each target item was preceded by one of three possible primes (with no overlap in visual or phonological properties): (1) a Directly Related prime where the meaning of the homograph instantiated in the prime is also related to the meaning presented in the target; (2) an Indirectly Related prime where the target is related to a different Hanja mapping that is not directly lexicalized in the prime itself, with any semantic access mediated by the shared Hangul representation; or (3) completely Unrelated to the target. Our findings suggest: speakers are sensitive to multiple meanings at the sub-lexical level; lexical processing of Sino-Korean benefits from increasing semantic competition; and the effects of semantic saliency are varied.
Keywords: *cross-script semantic access, Hanja characters, Korean*

Posters B

B01 Good-enough processing in adolescents and adults under no-noise and auditory-noise conditions.

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Sentence comprehension relies not only on algorithmic parsing of grammatical structure but also on good-enough parsing (Ferreira et al., 2002). This means that sometimes we establish the relations between words based on their meaning and our world knowledge, without building accurate syntactic representations. One can hypothesize that reliance on good-enough parsing increases with age, due to the growth of language exposure and world knowledge. Therefore, adolescents should rely on good-enough parsing less than adults. Few studies have tested this experimentally (Engelhardt, 2014; Traxler, 2002). We aim to investigate whether adolescents rely on good-enough parsing less than adults and whether the reliance on good-enough processing increases in auditory linguistic noise. Participants (49 adolescents, mean age = 15 and 58 adults, mean age = 25) performed a self-paced reading and a sentence comprehension task. In half of the experiment, stimuli were presented in auditory noise. Stimuli sentences (N = 56) were either semantically plausible or implausible: i.e., the syntactic structure either matched or contradicted the semantic relations between words. We expected greater decrease of comprehension accuracy in the implausible condition in adults than adolescents. We also expected a decrease of accuracy in the implausible condition in noise. Indeed, we found that adolescents were more accurate in implausible sentences than adults (Est. = -0.08, SE = 0.03, z = -2.51, p = 0.01), possibly due to greater reliance on syntactic information. However, we found no evidence for greater reliance on good-enough processing in auditory noise.

Keywords: *adolescents; good-enough parsing; sentence processing; noise*
Acknowledgements: *The study was supported by RFBR grant № 18-012-00640.*

B02 Early language development after unilateral ischemic stroke

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The right-left hemisphere contribution to language debate is still ongoing, but the subject is better researched in adults than infants in the process of acquiring language. The aim of the research was to compare language development of children with unilateral ischemic stroke (N = 26) aged 9-18 months with percentile norms of typically developing children of the same ages. Parents completed adapted to the Russian language MacArthur-Bates Communicative Development Inventory (CDI): Words & Gestures. Binomial test was used to compare expressive vocabulary, receptive vocabulary, phrases understood and total gestures performed. Children with right hemisphere stroke (N = 15) have almost no differences from the norms, except for expressive vocabulary, where significantly more children than expected fall below the 50th percentile ($p > .001$). However, children with left hemisphere damage (N = 11) show more delays. They fall below 50th percentile ($p > .001$) on expressive vocabulary; below 50th ($p > .001$), 25th ($p > .008$) and 10th ($p > .000$) percentiles on receptive vocabulary; below 50th ($p > .001$), 25th ($p > .03$) and 10th ($p > .003$) percentiles on total gestures produced. There are no delays found in phrases understood in either of the groups. Findings suggest that LH plays a significantly more important role in early pre-grammar language development, contrasting the evidence existing in the literature (Thal et al, 1991; Bates at al, 1997).

Keywords: *stroke, early language development, functional organization*

B03 Eye movements during connected-speech production: effects of lexical and grammatical selection.

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Eye-movements are closely tied to speech production. For example, gaze duration before naming a single picture increases with its linguistic difficulty (Griffin, 2001). However, it is not clear whether this pattern holds for connected-speech production. We therefore manipulated two levels of difficulty (name agreement and grammatical gender, corresponding to lexical and grammatical processing) during networks tasks (Hartsuiker & Notebaert, 2010), where participants describe the path of a dot through networks of pictures, at a fixed pace. 15 native Dutch speakers performed 20 Network Tasks (total = 2400 pictures) while an EyeLink 1000+ monitored eye-movements. For each picture we analysed: pupil size; number of gazes; gaze duration before/after name onset, etc. We performed linear-mixed effects models with pictures' name agreement (low/high), gender (neuter/common), and their interaction as fixed effects. Additionally, we used multivariate pattern classification (Mitchell, 1997). Classifiers were trained for each participant to identify whether s/he was facing a picture with low/high agreement, neuter/common gender. There was a main effect of agreement on gaze duration before name onset ($p < 0.05$). Classifications demonstrate that this condition is well predicted by the pattern of eye-movements ($p < 0.01$). Gender had no effect. During connected-speech production, lexical selection difficulty was predicted by eye-movements. Grammatical selection seemed less demanding and not predictable. The analysis of eye-movements related linguistic difficulty is applicable to connected-speech production.

Keywords: *eye movements; connected-speech production; lexical selection*

B04 Integration of tense, aspect and biographical knowledge during language processing.

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Language comprehension often involves the integration of linguistic and non-linguistic knowledge. One such example is the 'Lifetime Effect', where non-linguistic knowledge about whether the subject of a clause is alive or dead is integrated with linguistic knowledge of tense and aspect, as in 'Albert Einstein *is/was a theoretical physicist'. Previous work has shown that violations of the Lifetime Effect elicit processing costs when deceased narrative characters are referred to in the simple present (e.g., 'John died last year. He *is very handsome') (Chen & Husband, 2018), but little is known about how non-linguistic knowledge comes into play when a lifetime effect violation involves the present perfect, which serves as an aspectual marker (e.g., 'John died last year. He *has met the Queen of England twice'). In the present pilot study, 8 participants read short biographies of famous cultural figures (e.g., 'Whitney Houston was an American entertainer. She died in California) followed by a sentence containing the present perfect or the simple future (control condition) ('She has won/will win prestigious awards in the past/future'). There were two two-level factors (lifetime: living x dead, tense: present perfect x simple future), and therefore four critical conditions. We recorded eye-movements during reading and reaction times in a binary judgement task. A reliable interaction of lifetime/tense was found: total reading times at the verb (Figure 1) and end-of-sentence reaction times (Figure 2) were longer in the dead/present perfect condition than any other condition. This suggests processing costs associated with the aspectual lifetime effect violation.

Keywords: *tense, aspect, world knowledge, language processing, eye tracking*

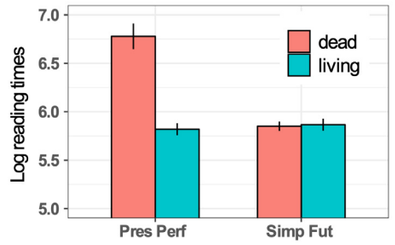

Figure 1. *Total reading times (with 95% CI bars) at the verb region (Pres Perf = Present Perfect: has won, Simp Fut = Simple Future: will win) for critical items with accurate responses.*

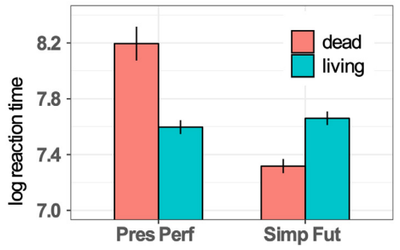

Figure 1. *Log reaction times (with 95% CI bars) for accurate end-of-sentence binary judgement responses to critical items.*

B05 Neural processing of taboo words: A functional imaging study in native and foreign language speakers.

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The use of socially inappropriate words (taboo words) is a cross-cultural phenomenon occurring between individuals from almost all social extractions. From a psycholinguistic perspective, taboo words are, among linguistic stimuli, the most offensive and arousing ones. Moreover, taboo words are of particular interest since they may act as an interface between language and social-pragmatic competences. The neurocognitive correlates of taboo words processing in both the native (L1) and the second (L2) language are largely unknown. We ran two fMRI experiments to investigate the processing of taboo and non-taboo stimuli in Italian monolinguals (Experiment 1) and Italian-English highly proficient bilinguals (Experiment 2) engaged in lexical decision tasks. The results show that for L1 socio-pragmatic knowledge is automatically activated and taboo words are processed with less effort than non-taboo words. For L2 the processing of taboo words is more effortful and engages additional structures (anterior cingulate cortex, insula) involved in social-norm representation and evaluation. Our results contribute to understand the interface between language and social-norm processing indicating that lexical processing is affected by socio-pragmatic knowledge, but only when the speaker uses the language in the context.

Keywords: *fMRI; taboo words; bilingualism; lexical decision task*

B06 What ERPs (do and do not) tell us about language retrieval difficulty in bilingual language production.

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The accumulating evidence suggests that prior usage of a second language (L2) leads to processing costs on the subsequent production of a native language (L1). It has been proposed that the L1 cost reflects inhibition of L1 representation acting during L1 production; however, previous studies exploring this issue were inconclusive. It is also unsettled whether the mechanism operates on the whole-language level or is restricted to translation equivalents in the two languages. We report a study that allowed us to address both issues behaviorally and using ERPs. In our experiment, 79 native speakers of Polish (L1) and learners of English (L2) named a set of pictures in L1 following a set of pictures in either L1 or L2. Half of the pictures were repeated from the preceding block and half were new; this enabled dissociation of the effects on the level of the whole language from those specific to individual lexical items. Behaviorally, we observed a clear processing cost on the whole-language level and a small facilitation on the item-specific

level. The whole-language effect was accompanied by an enhanced, fronto-centrally distributed negativity in the 250–400ms time-window which we identified as the N3, a component that reflects the difficulty of word retrieval during picture naming. The ERP results warrant reconsideration of the mechanism underlying language after-effects in bilingual language production. They suggest that the language after-effects reflect inhibition that does not take place during L1 production, but rather, in the preceding L2 block.
Keywords: *bilingual language production, language after effects, inhibition*

B07 Structure prediction in Chinese sentence comprehension: Evidence from the verb bias effect in a visual-world structural priming paradigm.

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Structural priming studies in English comprehension have found that larger prediction error triggered stronger priming effects of unexpected structure (inverse preference effect), consistent with error-based implicit learning accounts of priming. However, it is not clear whether this mechanism holds for languages like Chinese, which has been argued to depend relatively strongly on semantics to predict syntax in language comprehension. We manipulated verb bias and structure type in a visual-world paradigm, to examine whether Chinese comprehenders would show a similar inverse preference effect. In this experiment, 72 participants repeated 48 double object (DO) and prepositional object (PO) dative prime sentences. Structure was factorially crossed with verb bias (DO-bias or PO-bias). Next participants looked at a target picture depicting the three entities of agent, recipient, and theme while listening to the corresponding target sentence with neutral-biased verb. In target sentences, the priming effect is expressed as the proportion of looks to the predicted referent (i.e, the recipient after a DO-prime, the theme after a PO-prime), for two critical time windows: the verb and the first syllable of NP1 (which was identical in theme and recipient). We conducted linear mixed effects analyses. We found a clear priming effect in both time windows. Importantly, the inverse preference effect (i.e, stronger priming effect after DO prime with PO-biased verb than with DO-biased verb) showed up in the time window of the first syllable of NP1. These results support a language-general implicit learning mechanism in comprehension.
Keywords: *implicit learning; verb bias; structural priming; comprehension; Chinese*

B08 Can local coherence effects lead to illusions of grammaticality?

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Tabor, Galantucci & Richardson (2004) found that sentences containing a substring that could constitute its own clause ("The coach smiled at [the player tossed a frisbee]") were more difficult to process than control sentences, even though the local syntactic analysis is ruled out by previous input. Such local coherence effects are possible evidence for self-organized parsing (e.g. Tabor & Hutchins, 2004), in which strong local match between lexical items creates competition with the globally correct analysis. Under this account, a locally coherent analysis may even be so strongly favored that it overrides the global analysis, especially when the global analysis is not grammatically well-formed. To investigate the possibility of such grammaticality illusions, we ran an eye-tracking study with 75 subjects using verb-final sentences in German. Global grammaticality was manipulated through agreement between the subject and the verb, and sentences were either locally coherent or not ("... that [one/some of the snitches exposed(.sg) informants] warned.sg/pl"; see Figure 1). The critical words "exposed informants" are globally constrained to be an adjective-noun sequence but could locally be a verb and its object. Results indicate a local coherence effect in first-pass reading times at the critical region. Furthermore, in the presence of local coherence, total reading times for the sentence-final verb were shorter in grammatical sentences but longer in ungrammatical sentences. There is no evidence of grammaticality illusions due to local coherence in off-line judgments. The findings suggest initial competition between the local and global analyses, as well as an unpredicted effect of local coherence on end-of-sentence wrap-up.
Keywords: *local coherence, self-organization, eye tracking*

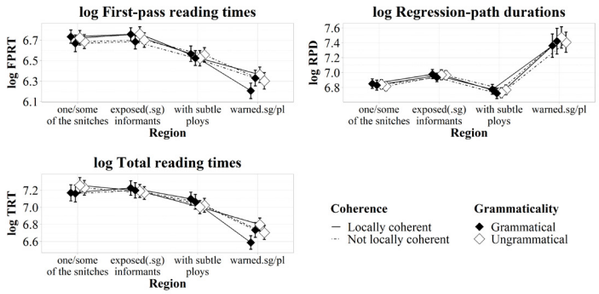

Figure 1. *Log-transformed reading measures by region of interest. German example sentence: «Heute weiß man, dass einer/einige der Spitzel enttarnte Informanten […] warnte/n».*

B09 Executive Functioning and Syntactic Ambiguity Resolution: No Evidence for Conflict Adaptation Effects.

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Previous studies suggest that an executive functioning (EF) conflict trial (e.g. incongruent Stroop trial) can facilitate revision of a following garden path sentence through conflict adaptation (Hussey & Novick, 2012; 2016; Hsu et al., 2014). The goal of the present study was

to a) replicate this adaptation using the reduced relative clause (RR) versus main clause (MC) ambiguities and b) investigate whether a preceding EF trial can modulate priming effects. If the unintended MC reading of an RR sentence can be more inhibited following an incongruent (harder) EF trial, then processing a following RR sentence should be even easier than when that EF trial is congruent (easier). Furthermore, an MC sentence following an incongruent EF trial and RR sentence should be harder to process since the MC reading is more inhibited. We conducted two studies (N1 = 56, N2 = 39) using different versions of a Stroop task in a word-by-word self-paced reading paradigm. Congruent and incongruent Stroop trials were interleaved with prime-target sentence pairs. Contrary to our prediction, reading times (RTs) starting from the disambiguating «by» phrase of RR prime sentences were not affected by preceding Stroop trial congruency. RR-primed RR target sentences showed longer residual RTs and smaller priming effects following incongruent over congruent Stroop trials. RR-primed MC target sentences showed no significant difference in residual RTs in either experiment. These findings provide no evidence of EF conflict adaptation. We propose that these results can be explained by increased monitoring.
Keywords: *executive functioning, syntactic priming, stroop task, self-paced reading*

B10 Experimental L2 Semantics/Pragmatics of Scalar Implicature: An ERP Study.

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There have been a few studies investigating the processing of scalar implicature by using ERPs. Noveck and Posada (2003) found a reduced N400 at the critical word such as ‘ears’ in underinformative sentences such as «Some cats have ears». Niewland et al. (2010) reported a greater N400 for the underinformative relative to the informative critical word. The present study examined nineteen Korean English L2ers’ comprehension of scalar implicature of English ‘some’ and ‘no’ to examine whether they make a distinction between semantic and pragmatic interpretations. In our experiment we adopted a picture-sentence verification design (modelled after Politzer-Ahles et al. 2012) to compare the neural responses to scalar quantifiers such as some and no. ERPs were measured at the critical phrase (e.g., some candies or no candy). EXP 1 showed (i) a significant anterior P600 in No (semantic violation: SV) condition, (ii) a significant P200 in All (pragmatic violation: PV) condition, and (iii) a significant N400 in lexical violation (like ‘some pineapples’ in the picture) condition, relative to Some condition, respectively. EXP 2 showed (i) a significant N400 in Some (SV) condition, (ii) a marginal P700 in All (PV) condition, and (iii) a significant N400 in lexical violation (like ‘no banana’ in the picture) condition, relative to correct No condition, respectively. These findings suggest that semantic/pragmatic aspects of meaning are processed using different mechanisms, and that different quantifiers may make a distinct contribution in semantics/pragmatics.
Keywords: *scalar implicature, ERP, N400*

B11 Distinguishing between intuition and hypothesis testing in phonological learning.

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Non-linguistic pattern learning research finds distinct implicit and explicit mental processes which have different architectures, are facilitated by different conditions, and are biased towards different patterns (Ashby et al. 1998, Love 2002, Kurtz et al. 2013). The implicit system learns gradually and unconsciously, and is modeled as incremental reweighting of cues, while the explicit system can improve abruptly, learns consciously, and is modeled as serial hypothesis testing. We present evidence that both are available for phonological «artificial language» experiments, and that their use depends on the experimental procedure and the target pattern. In a series of experiments subjects were trained on a unique set of spoken nonce-words conforming to a pattern defined by one of 6 phonological features (e.g., all consonants are labial). We manipulated task conditions and measured both objective (proportion correct, reaction time, abruptness of the learning curve) and subjective (analysis of participants' introspective reports) signatures of learning mode. The main conclusion is that certain task conditions favor one of the learning modes, but in all experiments both implicit (intuitive, cue-based) and explicit (rational, rule-based) learning is possible, with the latter being more common in all conditions. Additionally, the two modes differ in sensitivity to different patterns: rule-seeking amplifies an advantage of family-resemblance patterns over exclusive-or patterns. The behavioral signatures of implicit and explicit learning are similar to what is found in non-linguistic learning; however, the effect of rule-seeking on relative difficulty is the opposite of the classic finding in visual pattern learning.
Keywords: *implicit, explicit, dual-architecture, phonology, artificial-grammar learning*

B12 Garden-path misinterpretation in reading while listening

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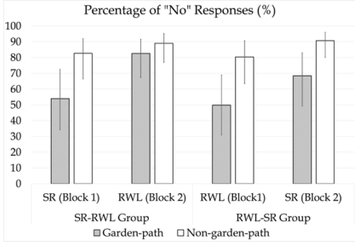
Reading while listening (RWL) to the same text is a common educational technique thought to improve reading ability and language comprehension among young L1 readers, L2 learners, and those with disabilities. We designed an experiment to examine the effects of RWL on eye movements and interpretation of temporarily ambiguous garden-path sentences (e.g., While Anna dressed the girl that was stylish appeared on TV.). We tested 40 participants in a 2 (SENTENCE TYPE: garden-path vs. non-garden-path) by 2 (READING CONDITION: silent reading vs. RWL) study with a between-subjects factor counterbalancing the presentation ORDER of the reading condition blocks (either SR-RWL or RWL-SR). The behavioural result revealed that the lingering misinterpretation of garden-path was not affected by RWL. However, we observed an effect of RWL dependent on the presentation ORDER, in which an initial block of RWL lead to less overall

improvement in the comprehension accuracy of the subsequent SR block. In addition, the eye movement data indicated that the reading patterns of garden-path sentences were disrupted by concurrent auditory stimuli. Eye movement data also showed the interaction between ORDER and READING CONDITION in critical regions in multiple measures, in which the directions of changes from the first block to the second differed between two reading conditions. These data challenge the efficacy of RWL as an appropriate educational technique to improve reading skill.
Keywords: *eye movements, garden-path misinterpretation, reading while listening*

Figure 1. *Mean accuracy as fitted by the model (the percentage of correct «No» responses). Error bars stand for 95% confidence interval.*



B13 Parafoveal processing of morphology in reading Russian: a case of Russian native speakers and Tatar-Russian bilinguals.

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The research focusing on whether high-order word information can be processed in parafovea has been scarce and yielded mixed results. Recent studies by Yan et al. (2014) and Hyönä et al. (2018) have observed an effect of parafoveal morphological preview – morphologically complex words had initial landing positions closer to the beginning of the word, i.e. closer to the stem of the word. The goal of the current study is twofold. Firstly, we aimed to replicate the findings from previous studies in Russian – a language typologically different from both Uighur and Finnish in terms of morphological structure. Russian is an inflected language, where word endings contain several grammatical meanings, as opposed to agglutinative languages, in which every grammatical meaning is represented by a separate morpheme. Secondly, we investigated whether the same effect could be obtained in high-functioning Tatar-Russian bilinguals. As Clahsen and Felser (2006) pointed out, it is a question of theoretical significance whether the typological distance between speaker's L1 and L2 influences L2 processing. We hypothesise that speakers of agglutinative language are prompted to constantly analyse morphological structure of the words, and as such, Tatar speakers might apply the same strategy when reading Russian. We conducted an eye-tracking experiments where participants red Russian sentences for comprehension. Morphological complexity of target words (monomorphemic and multimorphemic) was manipulated. The preliminary results indicate no effect of morphological preprocessing for Russian speakers, but points to signs of parafoveal morphological preprocessing for Tatar-Russian bilinguals.
Keywords: *parafoveal processing, morphology, russian, bilingual reading, L1 reading*

B14 The processing of diacritics in Arabic visual word recognition: An ERP studyю

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We investigated ERP responses probing Arabic diacritic processing in lexical decision employing a 2x3 design: LEXICALITY (real-/pseudo-words) x DIACRITIC DENSITY (fully-marked/(FULL), minimally-marked/(MIN), Non-marked/(NON). Additionally, violations were tested with diacritics either indicating attested word patterns mismatching the root, or possible but unattested patterns. Adult Qatari Arabic native speakers (n = 33) judged 720 items (half real-words) for LEXICALITY. ERPs were examined in three sets of time-windows; here we focus on early evoked potentials and on the N400. The former varied parametrically with DIACRITIC DENSITY but in the opposite direction of previous studies (negativities largest for NON>MIN>FULL). DIACRITIC x LEXICALITY interactions revealed earlier N400 onset for NON than FULL cases for real-words only, while the opposite held for pseudo-word N400 offset, which was later for NON than FULL. Unattested diacritic patterns yielded the largest early negativity of any condition, followed by a sustained negativity for real-words only. Diacritic/root mismatches indicating possible word patterns did not show this large early negativity, though the subsequent sustained effect emerged later on. Our opposite direction early effects coupled with the response for unattested diacritic patterns shows early processing is sensitive to more than just visual load/complexity, contra claims made in previous studies. The possible/attested diacritic mismatch cases provide information about the timing of root/word-pattern integration, which we discuss relative to masking priming findings. Finally, the N400 effects suggest diacritics manipulations could aid in understanding both the etiology of this ERP component and how orthographic depth influences access/retrieval of semantic LTM during lexical decision.
Key words: *vowel diacritics, Arabic, ERPs, lexical decision*
Acknowledgment: *The research reported in this abstract has been supported by the Qatar National Research Fund Grant NPRP 7 - 427 - 6 - 011 from Qatar Foundation.*

B15 A Constructional Account of Word Formation in Persian: Evidence from Compounding.

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In this article I will present a number of arguments to support a Construction Morphology (CM) (Booij, 2010b) and Cognitive Grammar (Langacker, 1987; 1991) approach to word formation in Persian. In CM, instead of speaking of word formation rules or concatenation of morphemes, we speak of word formation schemas with a systematic correlation between form and meaning. In this paper holistic properties of complex words are shown to be an argument for constructional schemas at the word level. The second argument is related to the embedded productivity in which the productivity of a certain word formation pattern may be dependent on its being embedded in another morphological pattern. In this case words have been created by means of the conflation of two word formation schemas. The last argument comes from the systematic co-occurrence of two or more word formation patterns. The unification of word formation schemas accounts for such cases. These arguments can provide evidence for a constructional account of word formation in Persian. Based on this analysis compounds including exocentric and endocentric compounds are dominated by the following schemas in Persian lexicon. The schema in (1) is the schema for endocentric compounds. Exocentric compounds are not compositional so they are represented as specific constructions with a fixed meaning as (2).The schemas in (1) and (2) pair a form with a specific meaning in the form of a morphological construction. (1) [[X]X [Y]Y]Z 'Y with relation R to X' (2) [[X]X [Y]Y]Z 'FIXED MEANING'

Keywords: *construction, word formation schemas, hierarchical lexicon*

B16 How Two Morphological Systems Shape Processing of ACC Case in Bilingual Children.

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Differences in (a) word order and (b) case marking cues result in different processing strategies in monolinguals (Bates, & MacWhinney, 1989): Turkish children interpret case-marking incrementally (Özge, Küntay, & Snedeker, 2019) but disregard word order (Özge, et al, 2019; Brouwer et al, 2019), Dutch children anticipate upcoming arguments but only rely on word order Brouwer et al, 2019). In contrast, Russian provides multiple case cues (on nouns and adjectives, (1)), with case being the strongest in monolinguals (Kempe, & MacWhinney, 1996). In Hebrew, the [ACC] particle (definite nouns, (2) is less reliable (Frankel, & Arbel, 1981). This difference predicts reliable anticipation of argument structure in Russian but not Hebrew. What happens with predictive processing in bilingual children whose two languages Russian and Hebrew differ in (a)-(b) weight? Children (25 L1-Russian/L2-Hebrew bilinguals M = 5.8, 10 Hebrew controls M = 6.1, and 62 Russian controls M = 4.8) participated in production (Exp. 1) and Visual-World eye-tracking comprehension (Exp. 2) experiments. Exp. 1: In both languages, bilinguals were less accurate in producing [ACC] morphology. Exp. 2 employed a 2x2 design: Word_Order (OVS vs. SVO) and Task (3-single-referent vs. 2-event-picture). In 3-REF task, Russian controls used case-marking cues predictively, but Hebrew controls didn't. Bilinguals revealed an early agent anticipation in OVS at VERB in L1-Russian but only later (at ADVERB) in L2-Hebrew showing transfer of cue hierarchy from L1 to L2. In 2-PIC task, there was no anticipation in L2-Hebrew. We conclude that cue weights shape on-line processing strategies in monolinguals. Bilingual processing can be boosted by an interaction between L1 and L2 processing strategies as weaker cues in L2 are reinforced by stronger L1 cues and task selection.

Keywords: *bilingualism, accusative case, processing, eye-tracking*

B17 Interrogative extraction from nominal copular sentences: a SPR study.

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Nominal copular sentences can be distinguished in canonical (1) subject+copula+predicative expression and inverse predicative expression-copula-subject (2) (Moro 1997): (1) [TP [SubjDP. The picture [PP of the wall]]i is [SmallClause_ti [DPthe cause [PP of the riot]]]]. (2) [TP [PredDP. The cause [PP of the riot]]j is [SmallClause [SubjDPthe picture [PP of the wall]]_tj.]] In a Self-Paced Reading experiment combined with a sentence comprehension task on Italian nominal copular sentences (40 native Italian participants) we tested the sub-extraction of a wh- PP, either from the referential DP («of which wall …»), namely the subject, or from the predicative DP («of which riot»), the predicative nominal, in both canonical (1) and inverse copular sentences (2). Italian shows overt number agreement between the copula and the grammatical subject independently of the position of the subject. We expect sub-extraction to be acceptable from the predicate (according to L-marking; cf. Chomsky 1986, Cinque 1990) but not from the subject. Theoretically only sub-extraction from the canonical predicate position should meet the requirement of L-marking, but these contrasts were never tested before in a Self-Paced Reading. Participants show faster reading times in various regions and are more accurate in answering the comprehension question when the extraction takes place from a predicative DP («of which riot») in both canonical (1) and inverse (2) sentences, confirming that the structural asymmetry between referential subject and predicative DP has a central role in both the processing and the comprehension of nominal copular sentence as predicted by Moro (1997, 2006).

Keywords: *copular sentences, syntax, Wh extraction*

B18 Syntactic priming of sentence production in Czech: testing the effects of verb and case suffix overlap.

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There are only few reports on syntactic priming from highly inflected languages such as Slavic languages. Consequently, little is known about how the presence of different morphemes marking syntactic roles, such as case, interacts with syntactic priming. This contribution reports on two experiments that opened investigations in the syntactic priming in Czech, a highly inflected Slavic language. Experiment 1 (N = 62) replicated the classic study by Bock, except that the OVS

active sentences were used instead of passives in transitive sentence trials. The experiment replicated a robust priming effect for dative-accusative ordering in ditransitive structures but found no priming of SVO vs. OVS word order. The experiment included neutral primes, which indicated that dative-accusative primes have no effect, but accusative-dative primes result in increased the use of accusative-dative order in target sentences. Sentences were also manipulated to test lexical priming effects were numerically stronger in same-verb condition, but the effect was not significant. Experiment 2 focused on dative-accusative structures only. In one type of primes, nouns were chosen so that the dative and accusative were marked with the same endings as in the target structures. In the other condition, the dative and accusative endings differed from the targets. The preliminary results (N = 36) suggest that the overlap between case-marking morphemes has no effect on the overall priming effects, confirming analogous findings on free function morphemes in English (Bock, 1989). Subsequent examination found that syntactic priming grew stronger across the experiment, which is in line with the learning accounts of priming.
Keywords: *syntactic priming; case morphology; slavic languages; word order*

B19 Pronoun comprehension biases adapt to referential frequencies in context.

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Ambiguous pronouns depend on the context for interpretation. In «Ana went to the store with Liz. She bought bread,» people tend to assume that «she» refers to the subject of the prior sentence, Ana (Brennan, 1995). Where does this bias come from? We test the hypothesis that it develops from exposure to frequent discourse patterns. Participants read sentences like the one above and answered questions like «Did Ana buy bread?» or «Did Liz buy bread?» The average rate of saying yes to the Ana question and no to the Liz question signals the bias to assign the pronoun to the previous subject. Our key question was whether this bias varies as a function of exposure to 32 unambiguous prime sentences. In the subject-prime condition, primes only referred to the subject («Ana played music with Matt. She ….»). In the nonsubject-prime condition, they only referred to the nonsubject («Ana played music with Matt. He….»). Participants did indeed adapt to the local context, but only for certain prime types. When the prime stories used he/she pronouns (Exp. 1), the subject bias was higher in the subject-prime than nonsubject-prime condition. With name primes (Exp. 2; Ana played music with Matt. Ana…»), adaptation occurred only for participants with high print exposure (as measured by the Author Recognition Task, Stanovich & West, 1989). When primes used I/you reference (Exp. 3; I played music with you. I…), there was no adaptation. In sum, pronoun comprehension biases are sensitive to reference frequencies, but only for 3rd-person reference.
Keywords: *adaptation, pronouns, priming*

B20 Revising reading-related neural mechanisms with a natural reading approach.

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Reading-related cortical responses have been observed to be modulated by the reading task. Such task-induced effects highlight the importance of investigating the reading process in a natural setting, in order to better understand the nature of the underlying mechanisms involved. However, the highly dynamic and fast nature of self-paced reading convolutes brain responses related to consecutive fixations, leading to various analysis-related challenges. In this study we employed a natural reading paradigm in which participants (N = 25, typical readers) read long texts freely at their own pace while electroencephalography (EEG) and eye movements were recorded. All words in the texts were extensively annotated with syntactic descriptives (such as part-of-speech class, morphological features, dependency relation), word and lemma frequency information, as well as word identity and syntactic predictability values. Eye-fixation events were supplemented with the descriptives of their target word and a regression based event-related potential technique (rERP) was used to examine how these word properties are reflected in the fixation time-locked brain responses. We highlight how well-known reading-related ERP components such as the N170 are expressed during natural reading, and how a comprehensive treatment of confounding variables is necessary to address questions of the types of representations involved in the processes that these components reflect. Our results demonstrated that this combination of eye-tracking, EEG, natural language processing (NLP) tools and advanced statistical methods provide the means to precisely examine brain responses related to word and phrasal properties during natural reading.
Keywords: *EEG, eye tracking, reading, rERP, naturalistic*

B21 Does interactional context modulate conflict resolution? Evidence from oculomotor Stroop task.

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Dynamically changing demands of the interactional contexts require the exercise of control mechanisms for appropriate language selection. This selection depends on factors like situation, language choice of the interlocutor, culture and prior experiences. But, what mechanisms do bilinguals adopt for the same and do these interactional contexts directly modulate domain-general executive function? The current study examines how the interactional context, defined based on the interlocutor proficiency, affects conflict resolution. We administered an oculomotor Stroop task (Singh & Mishra, 2013) on thirty-seven Malayalam-English high L2-proficient bilinguals.

The participants had to make saccade towards the colour patch in the same colour as the central arrow, ignoring the arrow direction. Interlocutors with different proficiency (high-proficient, low-proficient, and neutral interlocutors) were introduced before the task and were presented on each trial before the main task stimuli. A control block without interlocutors was also administered. We found that the presence of interlocutors facilitated the quick orientation of attention towards the targets and fewer saccadic errors compared to the control condition. Importantly, the presence of high-proficient interlocutor led to faster saccadic latency compared to low-proficient and neutral interlocutor. These results suggest that the presence of interlocutors modulates the general executive processing in bilinguals. Previous studies have shown that bilinguals have better executive control in demanding situations. In line with this, we observed fastest latency in the presence of high-proficient interlocutors indicating that they imposed greater demands. To our knowledge, this is the first study to demonstrate the influence of interactional context on oculomotor control.

Keywords: *interactional context, adaptive control, conflict monitoring*

B22 Bilingual Difficulties in Lexical access: What can we learn from the cost of language shifting?

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Bilinguals often experience difficulties in lexical access, as reflected in frequent Tip-of-the-Tongue (TOT) states. Initially, bilingual TOT studies focused on general long-term differences in language experience between bilingual and monolingual speakers. The current study focused on the contribution of short term-effects associated with language shifting on bilinguals' lexical access difficulties. In three experiments we used picture naming tasks to examine the effects of language shifting on lexical access in two different populations of bilinguals. In all experiments participants performed two blocks of picture naming tasks in one language, interleaved by exposure to the other language. Experiment 1 examined Russian-Hebrew bilingual immigrants, and showed increased TOT rate in the second language (L2) following exposure to the first language (L1). Experiment 2 and 3 focused on Arab-Hebrew bilinguals who shift more often between languages. The results of Experiment 2 showed higher error rates in L2 post-exposure to L1 compared to pre-exposure, but this effect was observed only in the first half of the post exposure block revealing its time limits. Experiment 3 showed comparable effects in the opposite direction, revealing higher error rates in L1 (Arabic) following Brief exposure to L2 (Hebrew), importantly, many of the errors were cross-language errors (borrowed words). Jointly the results indicate that language shifting increases lexical access difficulties in both L1 and L2. The mechanisms underlying these difficulties will be discussed in terms of a theoretical model that integrates the effects of long- and short-term processes operating at the bilingual language system.

Keywords: *bilingualism, Tip-of-Tongue, lexical access*

B23 An fMRI study of case agreement processing in Russian.

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Grammatical agreement is often studied experimentally, but most experiments use behavioral methods, a number of studies relies on EEG, and neuroimaging experiments are still very infrequent. They revealed a number of facts regarding different functional roles of the brain areas comprising the frontotemporal language processing system: their involvement in semantic or syntactic analysis, in person and number agreement error detection etc. The current fMRI study aims to extend these findings focusing on adjective-noun agreement, which has not been studied before, and on a novel feature: case. Russian has six cases, and adjectives agree with nouns in case, as well as in number and gender (in singular); some forms are syncretic giving rise to agreement-attraction-like phenomena. In our study, grammatically correct sentences and sentences with two types of agreement errors were compared: involving or not involving agreement attraction (see Table 1). Attraction in subject-predicate agreement has been extensively studied using behavioral methods and EEG, but not fMRI; only a couple of behavioral studies examine case agreement attraction (e.g. Slioussar & Cherepovskaia 2013, 2014). The left inferior frontal gyrus (LIFG, BA 45/47) and the supplementary motor area were involved in error processing in all conditions. At the same time, the relative decrease in local activity within the left middle frontal gyrus (LMFG, BA 10) was demonstrated for the sentences with attraction errors. The revealed differential involvement of the LIFG and LMFG supports the domain general role of the LIFG and the language-specific involvement of the LMFG sensitive to morphological features.

Keywords: *fMRI, case agreement, Russian*

P taking Gen, correct sentence	Sažency seedling$_{NOM.PL}$	dlja jablonevyx for apple$_{GEN(=LOC).PL}$	sadov garden$_{GEN.PL}$	byli were carefully	tščatel'no otobrany selected
P taking Gen, attraction error	Sažency seedling$_{NOM.PL}$	dlja jablonevyx for apple$_{GEN(=LOC).PL}$	sadax garden$_{LOC.PL}$	byli were carefully	tščatel'no otobrany selected
P taking Gen, no attraction error	Sažency seedling$_{NOM.PL}$	dlja jablonevyx for apple$_{GEN(=LOC).PL}$	sadam garden$_{DAT.PL}$	byli were carefully	tščatel'no otobrany selected

Table 1. *Examples of target sentences with the preposition requiring genitive case in three experimental conditions. The target noun is underlined.*

B24 Working Memory and Language Proficiency in EFL Learners' Attachment Ambiguity Resolution.

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The present study examined the question of whether L2 learners acquire the similar parsing strategies as L1 speakers, and what are the primary source contributing to L1/L2 differences. Sentences like 'The doctor examined [NP1 The nurse] of [NP2 the pupil (s)] [RC who was/were feeling very tired].' There are two possible attachment sites for the RC: NP1 or NP2. While L1 English speakers unanimously showed an NP2 preference, the results of L2 speakers remains controversial. 129 Chinese EFL learners participated in an SPR task (2x2 design, structure: of/with; attachment: NP1/NP2), a grammatical judgment questionnaire, an English placement test and a reading span working memory test. The results showed that advanced learners (N = 61) acquired native-like NP2 preference regardless of their working memory (ts > 2), while for the intermediate-level learners, only those with high span working memory favored NP2 preference ($t > 2$). Our findings provide evidence that 1) L2 learners could acquire the native-like structure-based parsing strategies (Witzel et al. 2012; Hopp 2014), which against the claim that non-native speakers are largely limited to shallow syntactic computation during online sentence comprehension (Felser et al. 2003; Clahsen & Felser 2006); 2) support the role of WM in L2 sentence processing (Cunnings 2017) and 3) the role of WM capacity is modulated by L2 proficiency. These results suggest that, L2 learners could construct fully-specified syntactic parsers, but that intermediate proficiency learners are more susceptible to interference during memory retrieval than learners with advanced L2 proficiency.

Keywords: *working memory; language proficiency; RC attachment; EFL learners*

B25 Lexically partitioning the colour space for efficient communication.

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The World Colour Survey (Berlin and Kay, 1969) tested colour naming conventions across a number of languages and found a hierarchical pattern of emergence depending on the number of core colour terms used by a given language. Participant naming choices over colour chips result in the partitioning of a map of colours by majority colour term. These "colour universals" could be seen as being driven by "innate" aspects of human cognition or colour perception. However, what if these universals actually emerge in response to constraints on communication? Regier et al. (2007, 2015) show that colour partitions emerge from a trade-off between a drive towards perceptual well-formedness and a drive towards low communicative cost or reconstruction error. We apply a reinforcement learning (RL) paradigm that operationalizes communication cost and perceptual well-formedness to simulate the emergence of colour term maps. Our approach involves repeated games between a sender agent and a receiver agent using the WCS map as the environment, wherein the sender communicates a colour via a limited vocabulary, and the receiver identifies the chip. Both agents work from separate colour map labellings which are iteratively updated. We show that this simulation produces colour maps with key properties very similar to those of the systems investigated in the World Colour Survey (Fig. 1). The approach also provides a testing environment for controlled variation of the influence of noise in the channel, demonstrating the potential of RL-based agent simulations in the investigation of the emergence of lexical distinctions.

Keywords: *reinforcement learning, colour, lexical semantics*

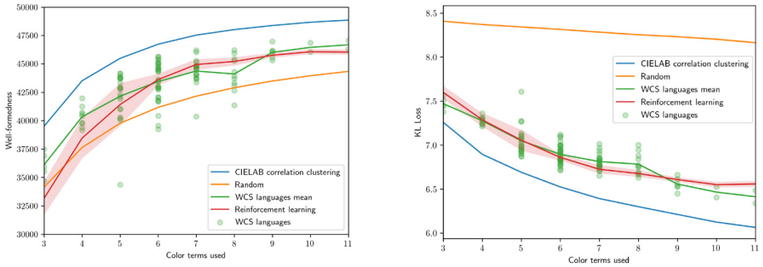

Figure 1. *Number of colour terms vs. KL-divergence loss and well-formedness with our reinforcement learning-based colour partitioning, the World Colour Survey languages, and «ideal» correlation clustering-based maps and random maps.*

Acknowledgments: *This work was supported by the framework grant dnr 2012-5738 «Towards a knowledge-based culturomics» and by grant 2014-39 «Centre for Linguistic Theory and Studies in Probability (CLASP)» from the Swedish Research Council.*

B26 Implication of directional processing of Catenators

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The writing systems of Indian subcontinent are, derived from Brāhmī. They share common aksara-based architecture and phonemic arrangement of symbols in the alphabet. This script gives us pointers to understand what role aksaras (the unit of graphemic representation) play in learning. This experimental study explores the reasons of reading latency among the adult learners. Presumably, these could be the same factors that pose as a challenge in learning the language to the children as young as grade 2, and sometimes, to the foreign language learners. The study was conducted amongst the Tamil speakers. Aksaras were presented in self and auto-paced experiment, using Psychopy.

a. கே /ke/ b. கேள் வி /kelvi/ («Question») c. கோ /kou/

In (a), the vowel is written to the left of the consonant, but articulated temporally after the consonant. In (b), there is a mismatch between the organization of segments into syllables and the organization of graphemes denoting the segments into aksaras. The kind under (c) has vowel

on both the sides. This study has shown that default processing (left to right, top-to-bottom) to have an advantage over the others and directional processing is imperative to the processing of an aksara, with the need to bring uniformity to script. When the eye is forced to read the non-default way, a processing lag is noted, as indicated by the vowel that was placed on the left of the consonant. The vowel placed on top took the least RT of all, followed by the vowel on the right. This is indicative of the reading strategy adopted by readers.
Keywords: *Alphasyllabic, processing, catenation, Brahmi*

B27 Processing reduced word forms: From psycholinguistic evidence to algorithmization.

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Phonetic reduction of words remains one of the main problems for automatic recognition of spontaneous speech. The algorithmization of the strategies used by a native speaker while processing reduced word forms is a possible way to overcome this problem and thus to improve the existing automatic speech recognition systems. We introduce a written in Python algorithm of reduced word forms restoration for automatic recognition of Russian speech which takes into account the results of psycholinguistic experiments on spoken word recognition. Referring to the results of the word association and perceptual experiments, we argue that a word form (not a lexeme) is a unit of the mental lexicon of a native speaker of Russian and the mental lexicon of a listener can include all possible phonetic realizations of a wordform. We used the Corpus of Transcribed Oral Russian Texts (http://narusco.ru/search/trn-search.php) which includes orthographic and acoustic-phonetic transcriptions of spontaneous Russian as the source for the list of word forms and their phonetic realizations. While processing a transcribed word string, the program retrieves from the wordlist all possible orthographic variants of every acoustic-phonetic realization. The algorithm also includes the module that retrieves the morphological information about candidates for recognition and the rules for word form processing and syntactic grouping. The algorithm showed to be able to successfully restore phonetically reduced noun phrases in the clauses extracted from the above-mentioned corpus of spontaneous Russian.
Keywords: *spontaneous speech, reduced word forms, automatic speech recognition, Russian, Python programming language*
Acknowledgements: *The research is supported by the grant #19-012-00629 from the Russian Foundation for Basic Research (RFBR).*

B28 Language-Specific Morphology Facilitates Predictive Use of Case Marking in Bilingual Children.

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There is an ongoing debate on whether German children can anticipate OS word order from Accusative case marking (ACC) on the object and assign such sentences a correct parse (No: Schipke et al. 2012; Sauermann & Höhle 2016 vs. Yes: Özge et al. 2016). Russian children do it faster due to the salience of the Russian case system and a higher frequency of the non-canonical word order (Sekerina & Mitrofanova 2017). In the present study, we extend the debate to bilinguals and test the predictive strength of ACC case in two languages, Russian and German, in 3-to-6-year-old Russian-German children growing up in Germany (N=37) and age-matched Russian (N=66) and German (N = 37) monolingual children. The children participated in a Visual World eye-tracking study that employed a 2x2 design, with Word Order (OVS (1) vs. SVO (2)) crossed with Task (3 referents as in Özge et al. 2016 vs. 2 pictures of events). The results indicate that bilinguals can use Russian case markers predictively but are slightly slower than monolinguals (effect of case on Adv for the bilinguals, on NP1 for the monolinguals). For the bilinguals, the predictive effect was evident in the 2-Pic condition. In German, neither mono- nor bilinguals used case predictively: the effect of case was only visible at NP2 (monolinguals) or Verb (bilinguals) in both conditions. We discuss these findings in light of the recent proposal regarding fundamental variation in mono- and bilingual processing (Fricke et al. 2018).
Keywords: *grammatical case, predictive processing, bilinguals, visual world paradigm, German-Russian bilingual children*

B29 Comparing the production mechanism across interpreting types using priming paradigm.

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In contrast to the general assumption that simultaneous interpreting (SI) is a more complex and demanding cognitive tasks than consecutive interpreting (CI), our previous corpus-based studies on quantitative linguistic factors have found that CI yields more lexically and syntactically simplified output than SI. In addition, a significant correlation of the distribution of sequential units was only found between input and output. We reasoned that the production mechanisms differed across interpreting types due to different cognitive constraints. SI interpreters retain the minimal units of the input message and produce the structural correspondence in the target language. Conversely, CI interpreters have to retain a larger volume of information, and regenerate the output with the conceptual representation extracted from the longer input message into simplified syntax and other linguistic forms to reduce the working memory load. In three experiments simulating both interpreting types with Chinese interpreter trainees, we found asymmetric priming effect across two interpreting types. We reported from Experiment 1 and Experiment 2 that in SI task, participants almost invariably repeated the syntax of both ditransitive alternatives and

multiple-modified noun phrases alternatives. CI output showed a significantly less priming effect and two possible simplifying strategies were detected in Experiment 2. Importantly, Experiment 3 found that CI was subject to the influence of input complexity levels. The complexity of the source speech structures increased the likelihood of CI interpreters employing the less demanding alternatives whereas the source structures persisted in SI output in all complexity levels.
Keywords: *simultaneous interpreting, consecutive interpreting, production mechanism, priming effect, simplifying strategies, complexity levels*

B30 Semantic training facilitates the acquisition of novel morphemes: MEG evidence.

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Learning to recognize morphemic boundaries is essential for fluent language use. In languages with rich morphology, the question of morphological learning is particularly relevant. Some neurocognitive models propose that morphologically complex words are parsed and their constituents are stored as separate units in lexical memory. Neural mechanisms underlying the acquisition of such novel morphological units, however, remain largely unexplored. Here, we trained 19 native Finnish-speaking participants with novel derivational suffixes through a word-picture association task. Following this short training session, we used magnetoencephalography to record the participants' brain responses to trained and untrained suffixes combined with new real and pseudoword stems in a 22-minute passive listening task. Existing Finnish suffixes served as controls. We compared the responses measured early and late (first/last 5 minutes) during passive exposure to investigate the online build-up of novel suffix representations. In the left frontal and temporal cortices, source activation for real suffixes was significantly higher than for both trained and untrained novel suffixes in the 60-80 ms, 120-140 ms and 220-260 ms time-windows (around ERF peaks) following the suffix onset, suggesting the activation of pre-existing long-term memory traces. However, we also found increased source amplitudes for the trained as opposed to the untrained suffixes already early in exposure. Although such a brief exposure may not be sufficient for the integration of novel morphological units into lexical memory, our findings suggest that a short semantic training of novel affixes facilitates morphological decomposition and speeds up suffix memory trace formation in the left fronto-temporal language networks.
Keywords: *morphology, semantics, learning, magnetoencephalography*

B31 Intervention in adult processing of relative clauses and control structures?

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Object relative clauses are harder to process than subject relative clauses. The processing complexity of object relatives is assumed to result from intervention of an NP between the relative head and the empty object position, which renders the filler-gap dependency costly. Subject control structures with ditransitive verbs parallel object relatives in that subject control, but not object control, instantiates a dependency between an NP and an empty position across an intervening NP. Therefore, it is a question of interest whether subject control patterns like object relatives in terms of processing complexity. Within a Relativized Minimality approach, identical processing patterns are expected if control constructions, like relatives, are derived via movement. Cue-based parsing models, on the other hand, expect memory similarity-based interference to hinder performance with both object relatives and subject control, regardless of syntax. Here, 69 participants read sentences and answered comprehension questions in a self-paced reading task with moving window display. There were four conditions: Subject Control; Object Control; Subject Relatives; Object relatives. Our results show lower response accuracy and slower response times for object than for subject relatives, but equal accuracy for subject and object control and faster response times for subject than for object control. These results suggest that relative clauses and control structures are distinct mental phenomena. We conclude that grammatical and memory models that approximate relatives to control (i.e. movement theory of control and cue-based parsing models) fall short of empirical support and argue for closer dialogue between grammatical and processing models of sentence comprehension.
Keywords: *intervention; similarity-based interference; relative clauses; control structures; relativized minimality; cue-based parsing*

B32 Competing models of retrieval in sentence processing: the case of aphasia.

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Research on interference has shown that the completion of long-distance dependencies may rely on a cue-based retrieval mechanism (Jäger et al., 2017). Two models of sentence processing that are compatible with cue-based retrieval theory are the Lewis and Vasishth model (LV05, Lewis & Vasishth, 2005) and the direct-access model by McElree (DA, McElree et al, 2003).These models have different assumptions: LV05 holds that the latency and probability of retrieval of an item in memory depend on its activation. In contrast, DA assumes that the probability of retrieval of the items can differ, whereas retrieval times are on average the same. An important open question

is whether these models can account for impairments in sentence processing. LV05 has been previously used to model aphasic performance (Maetzig et al, 2018; Patil et al., 2016), but DA has never been tested with impaired populations. Building on the computational implementation in (Nicenboim & Vasishth, 2018), we implement LV05 as a lognormal race of accumulators, and DA as a mixture process. We fit the models to data from 33 individuals with aphasia (IWA) and 46 controls (self-paced listening task, object and subject relative clauses, picture-selection accuracies, Caplan et al, 2013). For model comparisons, we performed 10-fold cross-validation (Vehtari et al., 2016). Posterior predictive checks show that both models can account for IWAs' online and offline data, although DA tends to overestimate listening times. Overall, LV05 provides a better quantitative fit, since it has a smaller elpd (a measure of distance between predicted and observed data): elpd DA = -28318, se 70.4, elpd LV05 = -28107, se 68.2. We discuss what these results imply for the models and for sources of comprehension difficulties in aphasia.

Keywords: *aphasia, computational modeling, cue-based retrieval*
Acknowledgments: *Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – Projektnummer 317633480 – SFB 1287, Project B02*

B33 Effects of discourse status, representational complexity, and locality on object-extracted relative clause processing.

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Representational complexity and integration costs have been argued to affect the processing of filler-gap dependencies. In object-extracted relative clauses (ORCs), filler retrieval can be (a) FACILITATED by the filler's syntactic and semantic complexity and (b) HINDERED by new discourse referents between the filler and gap which are claimed to increase integration cost. Yet, it is unclear how effects of representational complexity vs. integration cost interact and whether they can be modulated by context. Context could decrease integration cost, by making referents discourse-old, or augment representational complexity effects, by reinforcing representations. We conducted a self-paced reading study on ORCs (with Linger, 77 native English-speakers, 40 targets, 50 fillers). We manipulated the presence and type of filler modifiers (representational complexity), the number of new discourse referents between filler and gap (integration cost), and whether participants saw a context (making new referents discourse-old) before reading ORCs. We analyzed reading times at the critical region (sub-categorizing verb, using lmer) and three spillover words. At the verb, there was an effect of representational complexity ($p < .05$), context ($p < .001$), and an interaction between all fixed effects ($p < .05$), but no main effects of integration cost. We did not find effects in the spillover region. Increased representational complexity facilitated retrieval of the filler even when new discourse referents were introduced between the filler and gap (increasing integration cost). Context further facilitated this, suggesting that filler-gap processing is modulated by top-down, sentence-external factors.

Keywords: *filler-gap dependencies, discourse information, representational complexity, dependency locality theory, object-extracted relative clauses*

B34 Retrieving Semantic Content in Online Processing: Case Study of Presupposition.

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In the literature on the processing of syntactic dependencies, there is a growing body of data showing that the level of activation of potential antecedents is affected by the presence of inaccessible antecedents. This has been used as evidence supporting theories of memory recall that understand recall as (immediate) content-addressable retrieval that is subject to interference. Our study turns to a case of semantic dependency that supposedly involves a similar memory retrieval operation. We present results and a preliminary analysis of a study with the so-called additive "too". The expression "too" carries a presupposition that there is a salient referent, described by the prejacent property, in the preceding discourse. We conducted two experiments: an acceptability judgment task followed by a self-paced reading task. In the first task, we found that distance affects acceptability, but to similar extents with or without the presupposition trigger. The goal of the self-paced reading study was to see whether the distance between the trigger and the referent influences reading time. Similar to studies on syntactic dependency, we hypothesized a trade-off between activation - operationalized here as distance - and ease of processing. Preliminary results suggest that there is no such trade-off. In other words, there seems to be no difference in reading times of the trigger and the words following it, with respect to the distance between the trigger and the referent. If proven correct, these results show an exciting direction that extends the above work into a field of semantics.

Keywords: *memory retrieval, semantics, self-paced reading, online processing*

B35 Does age or intelligence influence adults' second language learning in visual contexts?

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In second language (L2) learning, both language transfer and visual context have been shown to play a role. However, few empirical studies have compared L2 learning across the lifespan (e.g., 18-65 years) to assess the effect of individual differences in L2 learners (e.g., age but also cognitive abilities) on learning success. We investigated whether German (first language – L1) adults in different age groups (18-31, 32-45, and 46-65 years) experience facilitation in learning Vietnamese (L2) verb-noun phrases in contexts that varied in transfer (L1/L2 features similar vs. dissimilar) and visual context (event photos present vs. absent). We had four learning conditions (present-similar; absent-similar; present-different; absent-different). German native speakers (N = 32/experiment, L1 = German, no L2 < age 6; ages 18-31 in exp2 R, 32-45 in exp3, and 46-65 in exp4; no prior knowledge of Vietnamese) participated in three experiments (three main

parts per experiment). We measured participants' scores via subsets of the WAIS-IV test (e.g., picture completion, digit symbol coding, digit span, vocabulary, and similarities) before measuring their accuracy and reaction time in vocabulary learning. Results: Participants were faster and more accurate when event photographs were present versus absent. Moreover, these effects changed across experiment learning (post-trial testing in Part 1 vs. delayed testing in Part 3). Importantly, age can strongly affect adults' L2 learning success. When learners were older, they were both less accurate and slower during testing. Interestingly, intelligence as measured by WAIS subtests did not affect their L2 learning success.
Keywords: *L2 learning, visual context, age of acquisition, intelligence, individual differences*

B36 On the difficulties of processing nominal compounds: Evidences from eye-tracking study.

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One frequent construction in academic writing is the nominal compound (NC). They contain a head noun (e.g., action), modified by elements that extend/focus its meaning (e.g., inflation constraint action). NCs communicate information efficiently, but can be difficult to understand, given their high information density and working memory burden, and the implicit relationships between their component words. Offline (e.g., Gleitman & Gleitman, 1970) investigating longer compounds and online methods investigating two-words NCs (e.g., Gagné & Shoben, 1997) have shown these difficulties. This eye-tracking study investigates the L2 online processing of NCs and their counterpart prepositional phrases (NPPs) – which make the relationships between elements clearer – in speakers whose L1 allows compounds (Spanish; n = 31) or not (German; n = 29). We compare two lengths of NCs/NPPs. We hypothesize that NCs and longer phrases will evoke longer reading times than NPPs and shorter phrases, especially for Spanish L1-speakers. Participants read sentences while having their eyes tracked. We compared first-fixation duration (FFD), gaze duration (GD), and total duration (TD) in two regions of interest (ROI) following the critical NC/NPP using LMEM. Results showed longer FFD for Spanish speakers in ROI1 ($p < .003$); Bonferroni corrections (0.5/3 = .016) led to trends of length ($p = .05$) and type ($p = .04$). In ROI2, GDs yielded trends in length ($p = .04$), type ($p = .09$) and length-by-language ($p = .07$). However, length effects and interaction were in the direction opposite of the hypothesis. These results contrast with those of previous research, raising questions on the validity of such measures in assessing difficulties perceived by speakers when reading compounds
Keywords: *nominal compounds, eye-tracking, crosslinguistic influence*

B37 Variation in French partial interrogatives: Social meaning tells us what?

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French partial interrogatives exhibit considerable syntactic variation, with the wh-element either in a declarative position (in situ, IS), or in a fronted position, with subject-verb inversion (FINV) or without (F). Contrasting with descriptions involving structural complexity, we argue that this variation can also be explained in the framework of social meaning games (Burnett, 2017), where variation becomes a «sociopragmatic» tool to socially position oneself in interaction. In an auditory matched-guise task (Lambert, Hodgson, Gardner, & Fillenbaum, 1960), 52 participants listened to short dialogues and positioned one speaker on six different 7-point scales, represented by drawings previously normed for social stereotypes. In 30 target items, a speaker uttered a question after a context sentence from an interlocutor provided a formal or an informal setting. Voices from 2 male and 2 female French native speakers were crossed so that all gender combinations were presented: 1st male/2nd female, 1st female/2nd male, both male, both female. For analysis, we used cumulative link mixed models (Christensen, 2018). Judgments on the social scales vary depending on the question type: e.g. FINV interrogatives are associated with higher education, but also with some degree of «social-awkwardness», compared to F and IS (Figure 1, ps <0.05). Context formality nuance preferences (e.g. a speaker will seem more educated when using FINV structure in formal contexts, ps <0.05). Gendered-interaction stereotypes are also at play (e.g the same speaker will be judged differently depending on whether his/her interlocutor is male or female (ps <0.05).
Keywords: *experimental sociolinguistics, French partial interrogatives, stereotypes*

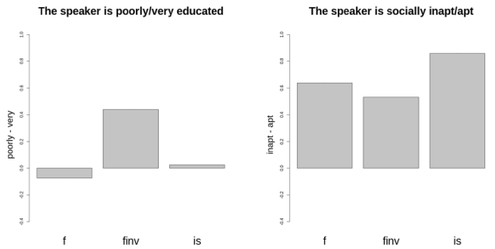

Figure 1. *Social ratings on the speaker depending on the type of the interrogative uttered.*

B38 The role of attention in visual language information processing.

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Previous research in auditory modality shows that strong connections within lexical circuits determine activation independent of attention/inhibition. In contrast, pseudowords activate several circuits partially - the activity is dependent on the inhibition level. Yet no experiments

with control for attention in visual modality, as well as investigation of automated semantic processing, have been conducted before. Moreover, there exists a consistent controversy as to timing and localisation of automated responses. We conducted an experiment with 128 EEG channels recording. The stimuli included Russian words (100 action vs. 100 non-action) vs. pseudowords vs. non-words as controls. The task was to find on the screen either a letter combination (attend condition) or color pattern (non-attend). We predicted stable activation for words, activation for pseudowords dependent on attention, and additional activation for action words in sensorimotor cortex (embodied semantics hypothesis). The results indicate three of stages visual processing: 140 (pre-attentive/automatic), 240 (attentional) and 300 ms (reprocessing). Our first hypothesis was confirmed: at 140 and 300 ms, the responses for words had smaller range than for pseudowords (statistically significant). There was also evidence for early semantic processing at 140 ms and reprocessing at 300 ms. As to the topographic results, attended stimuli exhibited strong central negativity and occipital positivity at 240 and 300 ms. Both words and pseudowords elicited fronto-temporal right-biased negative responses in non-attend condition and more central responses in attend. Additional activation in motor cortex for action words confirmed our second hypothesis.

Keywords: *neurolinguistics, ERP, attention, language automaticity, lexical processing, embodied semantics*

B39 An ERP study of time reference and tense in Arabic.

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In a visual ERP study, we investigated the processing of temporal adverbs and verb tense morphemes in Arabic. Specifically, we examined the broad time reference of the adverb l-yaum «today» employing grammatical intransitive sentences of the form Adverb-Verb-Subj-PP. Verbs showed either present, past or future tense, and agreed in tense with the sentence-initial adverb; the temporal adverb was either l yaum «today», or it was specific to one of the tenses (bi-l-?ams «yesterday»; l ?aan «now»; ghadan «tomorrow»), thus yielding 6 critical conditions. Thirty native-speakers of Arabic participated in the study. Results showed a broadly distributed negativity effect (300-500 ms) for the past tense condition, when the adverb was «yesterday» as opposed to «today». No other effect was significant. Our results confirmed that «today» indeed covers a broad time reference such that there are no differences for the three tense conditions with this adverb. The negativity effect for the past-tense specific adverb bi-l-?ams «yesterday» was surprising, given that it is the prototypical past-tense adverb that appears to incur more processing cost than the broad-scoped adverb «today». Closer inspection revealed that the ERPs at the verb were more negative-going for all critical conditions as opposed to the past tense condition in which the adverb was «today». Thus, the broad-scoped adverb «today» incurred the least processing cost as opposed to all other conditions, and indeed even the comparable present tense condition with «now». We speculate that this may be a consequence of processing the fused morphology of aspect and tense in Arabic.

Keywords: *tense, time reference, Arabic, neurophysiology, ERPs*
Acknowledgment: *The research reported in this abstract has been supported by the Qatar National Research Fund Grant NPRP 7 - 427 - 6 - 011 from Qatar Foundation.*

B40 The role of contextual predictability in the word processing during reading.

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This study focuses on investigating the effect of the contextual predictability on the processing of words during the text reading. We examine two types of predictability: (a) global predictability that arises from the topic of the text, and (b) local predictability, which is conditioned by the words directly preceding the target. We created 24 short entitled texts in Russian (50-60 words) containing 69 target words – 23 from each condition: (a) globally predictable, (b) locally predictable, and (c) neutral, i.e. plausible but non-predictable in the given context. The target words were selected based on the results of two cloze-tests, one of which determined the predictability score in the whole text, and another one – in the isolated clause. In the main eye-tracking experiment Russian speaking participants were asked to read the texts and answer comprehension questions. The results showed the general effect of predictability on word processing during reading: highly predictable words (a) and (b) are processed faster than non-predictable words (c). However, the mechanisms of the two types of predictability differ: local predictability effect was reflected in so-called early eye-tracking measures (skip rate, 1st fixation duration, gaze-duration), while global predictability tends to be expressed in so-called late measures (spillover, i.e. duration of the first fixation made on the word following the target). Thus, our results demonstrate that local predictability affects the early stages of processing, i.e. lexical access, while global predictability, tentatively, affects the late stages of processing, i.e., facilitates the integration of the target word in context.

Keywords: *contextual predictability, reading, eye movements, text processing*

B41 Relative clauses in French Sign Language – an eye-tracking study.

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Subject relatives (SRs) have been shown to be easier to process than object relatives (ORs) in many spoken languages. However, relative clauses (RCs) are not solely found in this modality, sign languages also display them. While few experimental works exist on sign language none of them focused on RC processing. We address this issue by replicating a previous eye-tracking experimental design successfully used to investigate RC processing in Mandarin, French, English

and Cantonese. The major challenge of our study comes from the adaptation of the original audio-visual paradigm to a new, visual-only, design. Participants had to watch a video containing the target sentence (written, for French speaking controls and signed for French Sign Language (LSF) Deaf signers) while judging a pair of pictures with the same three characters, each performing different actions. One of the pictures was only compatible with a SR interpretation, the other one only with an OR interpretation. We ran an experiment with hearing native French speakers (N = 21) as a control group and compared their results to those previously obtained through the audio-visual design. We replicated the SR advantage, showing the validity of the visual-only protocol. We then turned to RC processing in LSF by testing Deaf LSF signers (N = 33). Their results are presented in Fig.1, showing proportions of correct fixations depending on the RC type. Using maximal linear mixed model, we found a SR advantage in LSF, which is in line with the robust SR advantage found in many spoken languages.
Keywords: *relative clauses, LSF, processing*

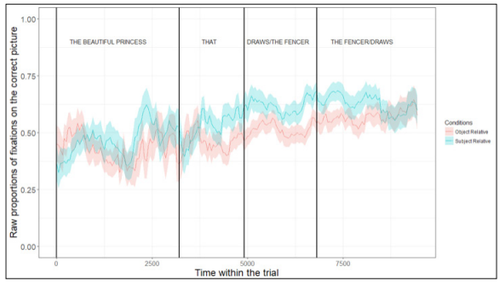

Figure 1. *The curves (red = SR, blue = OR) illustrate proportions of fixations on the correct picture every 50ms. The difference between the two is significant.*

B42 The Influence of Verb Bias on Online Mandarin Subjective Relative Clause (SRC) processing: an ERP study.

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The preference of processing either subjective (SRC) or objective relative clause (ORC) in Mandarin has been extensively investigated in studies of sentence comprehension. However, inconsistencies were found across theories and psycholinguistic studies. Those studies focus on RC structure itself rather than taking contexts into account. This study aims to investigate how verb bias which carries both syntactic and semantic information incrementally modulates SRC processing in Mandarin. 41 verbs from Sinica Corpus were classified into three types of verb biases: Direct object (DO), Sentential Complement (SC), and Equilibrium Balanced (EQ). They were manipulated in sentences with SRC (RC verb + 1st RC noun + RC marker DE + head noun). Distinct processing difficulty between conditions indicates the verb bias effect and the significance of word order in RC processing. The difficulty of processing SRC following DO-bias verb lies on the processing of unpreferable but grammatical structure, reflected by larger frontal positivity on RC verb. Although the SC-bias verbs were expected to take multiple syntactic structures, the larger N400 on RC verb in DO-SC contrast suggested the advantage was not taken. Moreover, difficulty lasts on the subsequent DE and head noun. EQ bias verbs without clear tendency did not exhibit a similar pattern with either condition. This study provides ERPs evidence on the incremental influence of verb bias on SRCs processing and addresses which level of language processing is involved in each constituent of the RC.
Keywords: *ERPs, verb bias, mandarin relative clause processing*

B43 Closest or Highest Conjunct agreement? Evidence from French.

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Verb agreement with «N1 or N2» is determined by general rules (e.g. singular with Nsg in English) but also by proximity: Closest Conjunct Agreement (CCA). It has been shown (e.g. Haskell & MacDonald 2005) that CCA is stronger for verb-subject than for subject-verb order. Assuming an asymmetric structure for coordination, Willer-Gold et al. (2018) suggest that N1 is structurally and linearly closer to the verb in VS order, while N2 is only linearly closest in SV order. In French, contrary to English (Keung & Staub 2018), plural agreement is generally preferred with two Nsg, and CCA would yield a singular verb. Moreover, it allows conjunction doubling with the two conjuncts at the same level (Mouret 2007). Thus, if structural distance is the relevant factor for «ou» (or), no interaction is expected between order and agreement for «ni…ni» (neither… nor). We ran two acceptability judgment experiments (with 'ou' and 'ni…ni'). Each has 24 items (12 humans and 12 non-humans)(1-4). Both nouns are singular with verb number (sg/pl) and subject position (preverbal or postverbal) as fixed factors. 54 native French speakers participated in Exp1 (ou), and 44 in Exp2 (ni ni). The preference for CCA with VS order is confirmed in Exp1, leading to a significant interaction between order and agreement. In Exp2, VS order only reduces the preference for plural agreement, with a significant interaction for humans.
We conclude both linear and structural distance play a role for agreement with coordination.
Keywords: *agreement, coordination, linear proximity*

B44 Discourse conditions on Verb Phrase Ellipsis and the question of syntactic identity: New evidence from acceptability experiments.

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VP Ellipsis with a syntactically mismatching antecedent (4) has been claimed to be ungrammatical although examples for mismatch ellipsis can easily be found in natural corpora. We suggest that unless rather special conditions are met, examples involving VPE with a category-mismatched antecedent are very likely to violate discourse conditions that generally hold for VPE. While retrieval of the antecedent may be easier for syntactically identical antecedents in VPE for processing reasons, we suggest that it is governed by the following discourse constraint: If the Question Under Discussion (QUD) addressed by the anaphoric clause is entirely inferable from the antecedent clause VPE (1a) is preferred to VP Anaphora (Table1, 2a). If not, i.e., if the anaphoric clause addresses a non-entirely inferable QUD (e.g. by adding an adverb in 1b, 2b) then VPA (2b) is preferred to VPE (1b). QUD violations will affect syntactically identical (matching) (3) as well as syntactically non-identical (mismatching) (4) antecedents. We ran two acceptability studies with 20 items in Exp 1 and 25 in Exp2 (48 participants each) run on Amazon Mechanical Turk with a 7 point Likert scale. Exp1 tested the acceptability of examples like (1, 2), Exp2 included materials like (3,4) as well as a non-ellipsis condition (… if he participates). Maximal CLMMs show the expected interaction of VPE/VPA and QUD violations. Exp2 shows that VPE is most acceptable with a matching antecedent and QUD conformity (main effects of match and QUD; maximal CLMMs, ps <.001).

Table 1. *Materials for Experiments 1 and 2*

	VP-Ellipsis	**VP-Anaphor**
QUD+	(1) a. Sue didn't write a song. Sam did.	(2) a. Sue didn't write a song. Sam did.
QUD-	(1) b. Sue didn't write a song. Sam did for her.	(2) b. Sue didn't write a song. Sam did for her.
	Match	**Mismatch**
QUD+	(3) a. We are uncertain whether he will participate in the study. It will improve the results if he does.	(4) a. We are uncertain of his participation in the study. It will improve the results if he does.
QUD-	(3) b. We are uncertain whether he will participate in the study. It will improve the results if he a does actively.	(4) b. We are uncertain of his participation in the study. It will improve the results if he does actively.

B45 Comprehenders aggregate over speakers when adapting to the noise in the input.

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In everyday communication, speakers/writers make errors, conversations take place in a noisy environment, and listeners mishear. Comprehenders may deal with noise in the linguistic signal by integrating prior information about the probability of a sentence with an implicit model of how noise affects utterances (Gibson et al., 2013). Further, previous work (Ryskin et al., 2018) suggests that the noise model is adapted to the nature of noise in the environment. However, it is unknown whether readers maintain and update multiple, speaker-specific noise models or whether they continuously update a single noise model. The former may allow comprehenders to account for different error patterns across speakers (e.g., speaking to a child and an L2 speaker in the same conversation) at the cost of added model complexity. Here, we asked readers (N = 987) to correct sentences generated by two speakers (A and B, identified by red vs. blue sentence font) if they noticed errors. A and B always had different patterns of errors (e.g., either containing obvious deletions, insertions, exchanges, or mixed errors) in their respective exposure sentences. On test sentences for A (e.g., The bat swung the player.), participants' corrections were adapted to the types of errors that A was producing (replicating Ryskin et al., 2018), but were also affected by the errors produced by B. The results demonstrate that participants adjust their noise model to the distribution of errors in their input but, at least in this paradigm, they aggregate input statistics over speakers.

Keywords: *comprehension, noisy-channel, learning*

B46 Generalizing properties based on the morphosyntax of the subject: generic and non-generic interpretations.

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We investigate how varying the morphosyntax of a generic subject affects learning about novel animals and their properties. Gelman et al. (2010) and Lawler (1973) argue that generic indefinite singulars imply principled connections. Further, Borik & Espinal (2012 et seq.) argue definite singulars directly refer to kinds. We predicted that these linguistic distinctions would result in behavioral differences. We carried out two 4x2 between-subject match-to-sample experiments (WORDING: bare plural, indefinite, definite singular, and control «this»; PROPERTY TYPE: principled vs. statistical). Participants learned principled (e.g. Vorzyds have red wings) and statistical (e.g. Vorzyds play with tiles) properties about novel animals. Then, they were asked to find «another one» by choosing one of two new pictures. Given a shape preference in categorization tasks (Hollander et al. 2009), one option was similar in shape but lacked the predicated property, the other was dissimilar in shape but had the predicated property. Both studies found a main effect of connection type (property chosen more for principled than statistical connections, $p < .0001$), indicating participants generalized the property more than shape. In Experiment 1 each item was introduced with a bare-plural generic question (Do you know about vorzyds? Vorzyds…), and all generic subjects differed from the control ($p < .001$), but there was no difference among them. Experiment 2 only provided a label as introduction (A vorzyd. Vorzyds…) and obtained the predicted PROPERTY*WORDING*BLOCK ORDER interaction. This demonstrates that morphosyntax is used to distinguish between different types of generalizations.

Keywords: *generics, morphosyntax, language acquisition*
Acknowledgements: *This research was funded by the Grand Union DTP and the University of Michigan.*

B47 The influence of cathodal and anodal tDCS of Wernicke's area on the acquisition of novel concrete and abstract words

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The brain mechanisms underpinning word acquisition remain poorly understood; it is nevetheless clear that core language areas of the neocortex play the key role in it. Existing evidence suggests that tDCS over Wernicke's area can positively influence semantic processing of linguistic input. Here, we tested whether it may have a similar effect on word acquisition. Experimental participants learnt new concrete and abstract words contextually after cathodal, anodal or sham tDCS. Learning outcomes were assessed using a battery of tasks immediately after the training and following an overnight sleep. On Day 1, cathodal group demonstrated better accuracy than sham group in lexical decision task when responding to pseudoword competitors of novel abstract words, suggesting poorer acquisition of abstract items. This was also reflected in slower recognition for new abstract words after cathodal than anodal tDCS following the overnight consolidation stage. Anodal tDCS, however, led to enhanced consolidation of concrete words, indicated by lowered (in comparison to cathodal and sham) accuracy for their competitors on Day 2. Semantic matching task showed higher accuracy of the anodal (vs. sham) group for concrete semantics on Day 1 and for both semantic types on Day 2. Free-form definition revealed better performance of the cathodal than sham group in defining abstract semantics on Day 2. In conclusion, Wernicke's area tDCS can influence integration of new words into the lexicon selectively, depending on specific semantics, stimulation polarity and assessment task. This suggests overlapping but distinct mechanisms for acquiring these knowledge types.
Keywords: *word acquisition, concrete and abstract semantics, tDCS*
Acknowledgements: *Supported by RF Government grant No.14.W03.31.0010*

B48 The use of prediction error in language learning

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The classic error-driven learning model by Rescorla and Wagner (1972), RW, has been surprisingly successful in accounting for a variety of phenomena in language acquisition as well as language learning in the lab, (Ramscar et al., 2010, 2013, 2014; Baayen et al., 2011; Olejarczuk, Kapatsinski & Baayen, 2018). However, the key assumptions that distinguish it from other approaches to error-driven learning have not been subject to systematic empirical evaluation. In the last two years, we found two unique and surprising predictions of RW not to hold of language learning. In particular, Harmon, Idemaru & Kapatsinski (2019) found that RW downweights predictive cues when it encounters prediction error even if this does not reduce error. In contrast, human listeners downweigh a predictive cue to a sound category only when another cue is more predictive during training and relying on it reduces error. Caballero & Kapatsinski (in press), found that RW learns spurious form-meaning associations when exposed to the lexicon of a natural language whenever a cue co-occurs with two or more other cues that strongly inhibit a meaning. In such a situation, the co-occurring cue often becomes the strongest cue to the meaning despite never co-occurring with it. Ongoing experimental work suggests that these associations are indeed spurious, and does not hold in miniature artificial language learning. An alternative reinforcement learning model is shown to accurately predict these results by 1) treating predictions as categorical rather than numeric, and 2) changing behavior only when doing so would reduce prediction error.
Keywords: *learning mechanisms, acquisition, prediction error, Rescorla-Wagner model, supervised learning*

B49 Enhance Metacognition through Reflective Learning.

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Studies found that it is crucial for learners to reflect and to make changes based on the reflections during language learning. Being adaptive and self-directed are two critical elements to improve foreign language proficiency. This presentation will first introduce Schön's Reflective Practice, which consists of Reflection before Action (RbA), Knowing in Action (KiA), Reflection in Action (RiA), and Reflection on Action (RoA). Then, the presenters will introduce the Think Aloud Strategy and Ogle's KWL Chart, and how these tools can be utilized during the reflection to acquire metacognitive knowledge and enhance metacognitive strategies. Subsequently, the presenters will share demos of utilizing these strategies in a classroom to train students to become more adaptive and self-directed, therefore, attain higher foreign language proficiency. Audiences will be encouraged to intervene and discuss how to apply these strategies in their teaching context. Finally, a list of references will be shared with the audience.
Keywords: *metacognition; reflective learning; think aloud strategy*

B50 Syntactic and semantic contributions of pitch accents during sentence comprehension.

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Syntactic, semantic, and prosodic cues all establish expectations that guide sentence comprehension. In the prosodic domain, pitch accents can assign contrastive focus and resolve a syntactically ambiguous phrase. However, can prosodic focus marking (by pitch accenting) influence the interpretation of a sentence in the presence of syntactic and semantic cues? Our auditory experiment revolved around the sentence (in German) «Yesterday the policeman arrested the thief, not the murderer». A pitch accent on either POLICEMAN or THIEF placed one of those

arguments in contrastive focus with the ellipsis structure ("the murderer»). The two contrasted arguments could contain violations: in the syntax condition, the grammatical case of the article in the ellipsis structure mismatched the focused constituent in the main clause (nominative vs. accusative). In the semantic condition, the thematic roles of the contrasted words were incongruent (typical agent vs. patient roles of «arrest»). Visual comprehension questions probed the agent/patient role of the arguments in the sentence (subject or object), followed by a button-press response. Reaction times showed that if the pitch accent marked syntactic information that mismatched the syntactic information in the ellipsis structure, responses were delayed. The direction of the semantic effect depended on the focused noun. The response patterns showed that participants were led by the syntactic information to make their syntactic judgements, despite a conflicting expectation established by prosody. The experiment shows that pitch accents establish a syntactic expectation during sentence comprehension. However, these expectations are overwritten by incoming syntactic information to yield an interpretation of the sentence.
Keywords: *prosody, information structure, syntax*

condition	Stimulus (translated from German)	focus location	violation
baseline 1	Yesterday, [theNOM POLICEMAN]CF arrested theACC thief, not [theNOM INSPECTOR]CF	subject	-
baseline 2	Yesterday, theNOM policeman arrested [theACC THIEF]CF, not [theACC MURDERER]CF	object	-
semantic 1	Yesterday, [theNOM POLICEMAN]CF arrested theACC thief, not [theNOM MURDERER]CF	subject	semantic (nouns)
semantic 2	Yesterday, theNOM policeman arrested [theACC THIEF]CF, not [theACC INSPECTOR]CF	object	semantic (nouns)
syntactic 1	Yesterday, [theNOM POLICEMAN]CF arrested theACC thief, not [theACC INSPECTOR]CF	subject	syntactic (articles)
syntactic 2	Yesterday, theNOM policeman arrested [theACC THIEF]CF, not [theNOM MURDERER]CF	object	syntactic (articles)

Table 1. *Overview of experimental conditions. Pitch accented words indicated by capital letters.*

B51 Processing cost of complement coercion in Mandarin Chinese: Evidence from a self-paced reading study.

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This study aims to investigate the processing of complement coercion in Mandarin Chinese. English entity-denoting complements elicit processing difficulty when they are preceded by verbs requiring an event complement; this may be due to type mismatch, or to the complements' lower expectedness in this situation. The present study examines whether this processing cost could also be found in Mandarin due to the typological difference between English (nouny language) and Chinese (verby language) (Liu, 2010). Following the paradigm of McElree and colleagues (2001), we recorded self-paced reading times in 30 native Mandarin speakers for entity-denoting complements in sentences with three different verb types (aspectual verbs which require an event-denoting complement, preferred verbs, and non-preferred but acceptable verbs), as in 医生开始/阅读/检查这份病例已经几个小时了 'The doctor has started/read/examined the medical record for several hours.' With linear mixed-effect analyses, we found longer reading times in coercion sentences than in non-coercion counterparts at the complement NP position (e.g., 这份病例 'the medical record'). Within the two non-coercion sentence types, processing non-preferred type took longer reading times than the preferred one at the NP position. The results support the previous finding that aspectual complement coercion sentences are relatively difficulty to be processed. The study contributes new evidence to coercion studies cross-linguistically.
Keywords: *complement coercion, Mandarin Chinese, self-paced reading*

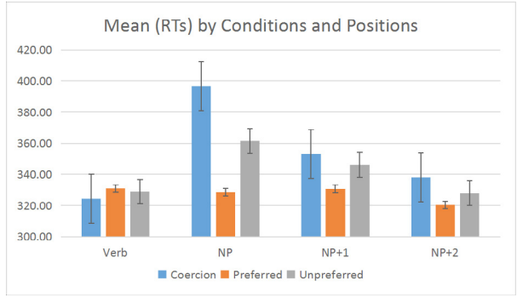

Figure 1. *The bars illustrate the mean reading times (RTs) of the three sentence types at four sentence positions; error bars represent the standard errors.*

B52 Traveling back in time: does switching the focus to the initial state of the changed object come at a cost?

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The theory of Intersecting Object Histories (Altmann, & Ekves, 2019) postulates that the processing of a previously encountered object entails activation of its previous states, and these compete for selection. Hindy et al. (2012) used language as a test case and found that such competition manifests in increased activation in the brain area pVLPFC, recruited during Stroop interference, and occurs regardless of whether the target state required by the context is the initial or the end state of the object. Previous research suggests that comprehending events described out of chronological order comes at increased processing cost (Mandler, 1986; Nieuwland, 2015). Here, we tested whether reversing the order of events (via language) affects the interplay between alternative object states. EEG was acquired while participants read sentences presented one word at a time. We manipulated the degree of change that the object underwent (The chef will chop/weigh the onion) and the order of events (and then/but first, she will smell the onion). A time-frequency analysis of EEG, time-locked

to the sentence-final determiner phrase, revealed a stronger suppression of alpha/beta power in sentences describing substantial change (chop) in a chronological order (and then) compared to all other sentences. Such pre-target alpha/beta decreases have been associated with preparation for the input (Rommers et al., 2017). We conclude that the interplay between the order in which the events are presented and the degree of change that the events entail manifests in the anticipatory region as increased prediction for the substantial change & chronological order condition.
Keywords: *event representation, sentence processing, neural oscillations*

B53 Contrasting Cross-linguistic Effects of Semantic Transparency: Evidence from Cantonese and Farsi Compounds.

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Introduction: This study examined the effect of semantic transparency in Cantonese and Farsi. Light Verb Constructions (LVC) are different from Verb-Noun Compounds (VNC) in that a non-canonical argument sharing phenomenon exists in LVCs. This could induce higher processing demands in LVCs compared with other compounds. Methods: 95 Cantonese and 42 Farsi native speakers performed a masked priming lexical decision task at two SOAs: 30ms and 100ms. Two types of compounds were used: LVCs and VNCs crossed with semantic transparency and opacity. We expected no differences between transparency levels and compound types at 30ms SOA. At 100ms, where semantic priming is typically observed, we predicted effects of semantic transparency, but only for the transparent LVC conditions, where the semantic properties of the constituents need to be accessed to support argument sharing. Results and Conclusion: We used Linear Mixed Effects modelling for the analysis. In Cantonese, priming effects were similar at both short and long SOAs; transparent and opaque did not differ and did not interact with compound type. Contrasting findings emerged in Farsi. At 30ms SOAs, form priming occurred for all compounds. At 100ms we saw a significant interaction between compound type and transparency level: opaque LVCs were processed faster than transparent ones, while in VNCs no differences were observed. The effects for Farsi (which uses Arabic script) are broadly consistent with results for other Indo-European languages. The effects for Cantonese may reflect language-specific representational differences for LVCs vs VNCs, but also possible differences in lexical access from characters.
Keywords: *semantic transparency, Farsi, Cantonese, compound, light verb vonstruction, argument sharing*

B54 Syntactically-mismatched questions are easy to sluice if you know how.

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Current theories of sluicing (Merchant, 2013; Rudin, 2018, inter alia) predict ungrammaticality for cases in which a syntactic mismatch exists between the antecedent and ellipsis clauses, based on a highly constrained set of examples (e.g., active/passive voice mismatches like *Someone murdered Joe but I don't know who by). Motivated by the novel observation that syntactically-mismatched examples of how-sluicing involving tough-movement appear to be relatively acceptable, we conducted a 2x2x3 acceptability study with 41 Mechanical Turk participants who rated the acceptability of 24 items like (1) on a 1-5 Likert scale, along with 48 fillers sampled from the ellipsis literature (see supplementary material). For comparison, each item included variants involving when- and where-sluicing (WH condition), syntactically-matched variants of each (1b; MISMATCH condition), and their unelided counterparts (1c and 1d; ELLIPSIS condition). In line with our predictions, but counter to those of existing theories, the results reveal that how-sluices show no effect of MISMATCH or ELLIPSIS, demonstrating (to our knowledge) the first known class of acceptable sluices involving a full syntactic constructional mismatch. The results also reveal an effect of WH (across-the-board degradation for when- and where-sluices), which is magnified in the ellipsis condition, but with no significant effect of mismatch. In line with Question-Under-Discussion (QUD) theories of sluicing, we hypothesize that this degradation may reflect the comprehender's lower expectation for an ensuing when- or where- QUD after tough constructions («...is easy/hard to…») compared to how- QUDs. A follow-up experiment that tests this prediction is currently underway.
Keywords: *sluicing, ellipsis, syntactic mismatch, tough alternation*

B55 Antecedent animacy in pronoun resolution: differences between European and Brazilian Portuguese

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We present two experiments in European (EP) and Brazilian Portuguese (BP) to verify the impact of referents animacy on pronoun resolution. Experiment 1: paper-pencil questionnaire, 24 subordinate sentences with same gender subject and object referents; object animacy was manipulated: animate vs. inanimate. Participants had to select the antecedent (subject/object) for the null or overt pronoun in subject position of the following sentence. Experiment 2: self-paced reading task, two different gender referents. Antecedent retrieval (always object) was forced by gender agreement and reading times at the onset of the overt pronoun, the following verb and the comprehension question were recorded, as well as answer accuracy. In experiment one there were more subject choices with inanimate object ($p = .001$) in both varieties. In experiment two, there were higher reading times in EP with inanimate antecedent ($p = .03$) but not in BP. In BP there were higher reading times ($p = .002$) regardless of antecedent animacy, compared to EP. Regarding answer accuracy, there were more wrong answers with inanimate antecedent in both varieties ($p = .002$) and more overall wrong answers in BP ($p = .02$) regardless of antecedent animacy. Results confirm BP is losing the null subject pronoun, and thus complimentary distribution of null and overt pronoun in reference assignment but contradict claims

(Barbosa, Duarte, Kato, 2005) that the overt pronoun preferably retrieves inanimate antecedents. In EP we conclude the overt pronoun is unsuitable to retrieve inanimate antecedents. The findings contradict the Position of Antecedent Hypothesis and the Accessibility Theory and support the form-specific multiple constraints approach (Kaiser, Trueswell, 2008).
Keywords: *animacy; pronoun resolution; null and overt pronoun*

B56 Perceptual priming and syntactic choice in Russian language: Multimodal study.

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Perception provides an input of information about the event, attention foregrounds relevant/important information for the conceptual analysis, and subsequent language production mechanisms collaborate to generate speech (Levelt, 1989). A part of this complex process is the necessity to select between simultaneously available syntactic alternatives. Existing evidence suggests that the system responsible for assigning the grammatical roles is sensitive to the distribution of the speaker's attention within the described scene (Myachykov, Pokhoday, Tomlin, 2018). This indicates a regular interplay between attention and syntactic choice. Unfortunately, most experiments exclusively used variants of the visual cueing paradigm (Posner, 1980). As a result, the reported link between attention and syntactic choice cannot be generalised beyond the visual modality. In 3 experiments participants described transitive events (Pokhoday et al 2018) following either (1) auditory, (2) motor or (3) visual lateral cues to (1) the agent or (2) the patient. A within-subjects, within-items design was used with Event Orientation and Cue Location manipulated on 2 levels (2x2). DV - the proportion of cued referents assignment to the most prominent position in the sentence. Experiment 1 a main effect of visual cue location: $X2(1) = 4.15$, $p = .042$. A main effect of event orientation: $X2(1) = 3.91$, $p = .048$. No interaction. Experiment 2 no effect of auditory cue. A main effect of event orientation: $X2(1) = 5.23$, $p = .022$. Experiment 3 Main effect of Cue Location: $X2(1) = 4.04$, $p = .04$. No effect of Event Orientation: $X2(1) = 0.1$, $p = .99$. No interaction. Overall these results show differences in effects of modality of primes on syntactic choice.
Keywords: *priming, syntactic choice, Russian language*
Acknowledgements: *Supported by the HSE Basic Research Program and the Russian Academic Excellence Project'5-100'.*

B57 Automatic and rapid access to L1 and L2 lexicons in bilinguals: Evidence from ERPs.

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Bilingualism is a widespread phenomenon: recent estimates suggest that bilinguals constitute the majority of the world's population. One of the debated questions in the field is whether two or more languages have separate lexico-semantic storages, or a common one. The present study investigated the crosslinguistic phonological and semantic similarity effects on the bilingual lexicon in a masked priming task using EEG. The primes and the targets either overlapped – only phonologically, only semantically, both phonologically and semantically – or did not overlap at all. Language-related differences in N170 and N400 were previously reported; however, recent investigations into L1 processing suggest that lexico-semantic access commences much earlier, around 30-80 ms, i.e. in the P50 component interval. This raises a question whether L2 lexical access and interactions between L2 and L1 may also commence at an earlier time. Our analysis of amplitudes in a 40-60 ms post-stimulus interval demonstrated a marginal main effect of semantics ($F = 3.62$, $p = 0.057$), as well as a reliable interaction between semantic and phonological overlap ($F = 21.09$, $p < 0.0001$). These findings suggest that lexico-semantic co-activation of the two lexicons happens as early as 50 milliseconds after visual word presentation, and a semantically matched prime may facilitate the perception of the target. This evidence of ultra-rapid cross-linguistic effect suggests a high degree of automaticity and parallelism in access of both L1 and L2 items. This supports the notion of a shared storage with common access. We conclude that semantic and phonological interplay between L1 and L2 suggest an integrated bilingual lexicon.
Keywords: *bilingualism, ERP, P50, priming, lexical access, early effects, crosslinguistic effects*

B58 Metacognitive monitoring on future performance: an ERP study.

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JOLs are estimations of future success in recalling recently learned information. JOLs are used to evaluate the need to rehearse the information or move on. Perceptual fluency (font size) leads to differences in JOLs (higher JOLs for bigger font-size), although do not affects accuracy. Animacy of the words (dog vs. table) does not affect JOLs but animate words are remembered better. Our main aim was to study JOL brain correlates for variables that differently affect JOLs and memory. Participants were presented with words in an easy- or difficult to-read font that referred to animate or inanimate objects while EEG was recorded. For each word, participants choose on a 0-100% scale the confidence they had in remembering it in near future. We found a higher P2 response for high- (70-100%) than to medium-JOLs (40-60%) ratings, which may reflect attentional recruitment. Furthermore, we found a greater P600 response for medium- than high-JOLs, suggesting a deeper reanalysis of these type of «less confident» answers. When splitting animacy and perceptual fluency between medium and high-JOLs, we found LPC only for animacy, showing higher amplitude for the high- than medium-JOLs. This suggests a higher involvement of memory processes for animacy-related information. Finally, when comparing dif-

ficult type font words rated with medium and high-JOLs, we obtained larger P3b for high-JOLs rated words, which may attributed to their deeper evaluation. This is the first evidence of differential ERPs for JOLs with different experimental manipulations. Our results highlight the relevance of metacognitive evaluations in the cognitive processing.
Keywords: *metacognition, judgments of learning, EEG, animacy, perceptual fluency*
Acknowledgements: *The work was supported by the Russian Science Foundation (project No. 19-18-00534).*

B59 The nature of the homophone boost in structural priming in language production: Evidence from Chinese.

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Structural priming research has shown a boost in the priming effect when lexical heads of the prime and the target fully overlap in phonology (i.e. homophones) but not when they only partially overlap. As homophones tend to also show the same orthography, it remains unclear whether the homophone boost requires the lexical head to also fully overlap in orthography. To address this issue, we make use of homomyms (words that sound and spell the same, e.g., , the dative verbs [in block] in [1]) heteragraphs (words that sound the same but spell differently, e.g., the dative verbs in [2]) in Chinese. There was a larger priming effect when the prime and the target used homonym verbs (Experiment 1) or heteragraphs (Experiment 2) compared to unrelated verbs. A between-experiment comparison revealed no difference in magnitude between homomym and heteragraph boosts. Experiment 3 directly compared the two boosts and again showed similar boosts due to homomyms and heteragraphs. These results suggest that the people develop links between lemmas of phonologically identical words (homophones) and orthography seem to play little role in such development.

1. 厨师 打了一碗水 / 打了一顶帽子 给男生. [The chef poured some water / a hat for the boy].
2. 医生颁了一个证书 / 搬了一桶水 给尼姑. [The doctor awarded a certificate / carried a bucket of water to the nun]

Keywords: *structural priming; phonology; orthography; syntax*

B60 Interlingual Homographs as semantic primes in sentence contexts: does prime duration matter?

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The consensus in bilingualism literature is that words from both languages are stored in a single lexicon, and accessed non-selectively. This is potentially problematic in the case of interlingual homographs (IHs) because although the spelling is shared across languages, the meaning is not (e.g. PIE means foot in Spanish). This problem can also be extended to non-identical IHs, (e.g., CARPET-CARPETA, the latter meaning folder in Spanish), although there is limited research on these types of stimuli. We have previously reported (Dean Marshall, Di Betta, Morgan & Playfoot, 2018) that lexical decision responses are significantly slower if the target is related to the Spanish (L1) translation of an identical and non-identical IH that concluded a preceding prime sentence in English (L2). Similar research has been conducted using homographs within one language, also known as homonyms. Elston-Güttler and Friederici (2005) used sentences to contextually prime the dominant or subordinate meanings of the homonyms in natives and non-natives. When the homonym prime was onscreen for 200 ms, natives and non-natives showed priming for both meanings whether contextually appropriate or not. However, when the prime duration was altered to 500 ms, both groups showed priming effects for only the contextually appropriate targets. Under the assumption that the bilingual lexicon stores all words irrespective of language in a single lexical network, altering the IH prime duration should affect responses in the similar way. The experiments reported here set out to test that prediction.
Keywords: *bilingualism; L1 activation in bilinguals; identical interlingual homographs; non-identical interlingual homographs; bilingual sentence processing; word recognition; semantic priming*

B61 Structural priming affects the comprehension of the passive voice in German-speaking adults – eye tracking data.

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Structural priming has so far only been detected in language production experiments when the German passive voice was tested. German speakers tend to produce more passive sentences after previous exposure to unrelated passive sentences. The same effect has not been found in language comprehension. Structural priming in comprehension would mean that exposure to passive voice sentences increases the expectation for hearing passive voice when the context does not necessarily require such a structure. An eye tracking experiment was devised to test this claim. A visual-world paradigm with a reduced single image layout was developed. One part of the target image corresponds to an active sentence and the other part to a passive sentence interpretation of the auditorily presented sentence. The expectation was that successful structural priming would lead to more looks towards the target figure earlier than when no priming was present. Fifty monolingual German speakers were divided into two groups: priming and no-priming. The results show that participants in the priming group were quicker to look at the target image on the screen during the presentation of a passive target sentence after they had been primed with another passive sentence. This effect was present at 3500 ms post sentence onset, which corresponds to the very end of the sentence presentation. The interpretation is that adult German speakers need to hear the lexical verb before fully committing to the passive interpretation of the passive voice, and structural priming can accelerate this process.
Keywords: *syntax, comprehension, adults, eye tracking, German*

B62 Full Transfer and retraction in L2: Evidence from Norwegian-English bilinguals.

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Full Transfer models predict that L2 learners may have difficulty acquiring new syntactic generalizations when L2-structures comprise a proper subset of their L1. We tested how learners fare in one such case by investigating how native Norwegians judge structures that constitute island violations in English, but not in Norwegian. Norwegian and English both allow filler-gap dependencies (FGDs) into embedded declarative clauses, but Norwegian allows FGDs into embedded questions (EQs), which are islands in English. Since the set of acceptable English FGDs is a subset of Norwegian FGDs, we might expect native Norwegians to not treat embedded questions as islands in English. We ran two acceptability judgment studies that tested the acceptability of RC-movement from EQs, using the factorial design popularized by Sprouse et al (2012). Island effects were defined as the super-additive interaction of two factors: Structure and Dependency Length. Experiments 1 & 2 (N = 26, 48) had Norwegians judge experimental sentences in English and their Norwegian equivalents. Participants also judged FGDs into subject islands as a control. Results. Norwegians showed large subject island effects in Norwegian and English (ps < 001). They accepted FGDs into EQs in Norwegian, but showed an island effect in English (island effect ps < .01, <.05). Despite the significant island effect, FGDs into English EQs were judged in the intermediate range on average. Intermediate average judgments reflect significant inter-trial and inter-speaker variation: >80% of participants accepted English Wh-Trace sentences on at least half of all trials. We discuss implications for Transfer and learnability.

Keywords: *transfer; islands; Norwegian; syntax*

B63 Neural bases of statistical learning in artificial language.

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Statistical learning is a set of cognitive mechanisms allowing for extracting regularities from the environment and segmenting the continuous sensory input into discrete units. The current study used functional MRI (N = 25) in conjunction with the artificial language learning paradigm to provide new insight into the neural mechanisms of statistical learning, considering both the online process of extracting statistical regularities, and, the subsequent offline recognition of the learned patterns. Prior fMRI studies of statistical learning only recorded brain activity during learning or during recognition. Here we found that learning is supported by the superior temporal gyrus and the anterior cingulate gyrus, while subsequent recognition relied on the left inferior frontal gyrus. Notably, prior work studies only assessed the brain response during the recognition of trained words relative to novel non-words. Hence a further key goal of this study was to understand how the brain supports the recognition of word like units vs. mere statistical structure, in addition to non-words. Behavioural recognition performance indicated that statistically congruent novel tokens were likely to be confused with the words from the training phase. However, we found evidence that the left intraparietal sulcus and the angular gyrus can support the recognition of word like units relative to statistically congruent items, likely reflecting the contribution of additional memory representations of the trained items.

Keywords: *segmentation, statistical learning, recognition, encoding, neural mechanisms*

B64 Evidence against preserved syntactic comprehension in healthy aging.

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We investigated age-related differences in syntactic comprehension in 50 young and 50 older adults. Most previous research found no evidence of age-related decline in syntactic processing (e.g., Shafto & Tyler, 2014; Samu et al., 2017). We investigated elementary syntactic comprehension of minimal sentences (e.g. I cook), minimizing the influence of working memory. We also investigated the contribution of semantic processing by comparing sentences containing real verbs (e.g. I cook) versus pseudoverbs (e.g. I spuff). We measured the speed and accuracy of detecting syntactic agreement errors (e.g. I cooks, I spuffs). We found that older adults were significantly slower and less accurate than younger adults in detecting syntactic agreement errors for both real and pseudoverb sentences, suggesting there is age-related decline in syntactic comprehension. The age-related decline in accuracy was significantly smaller for the pseudoverb sentences, and the decline in speed was significantly larger for the pseudoverb sentences, compared to real verb sentences. We suggest that syntactic comprehension decline is stronger in the absence of semantic information, which causes older adults to produce slower responses in order to make more accurate decisions. In line with these findings, performance for older adults was positively related to a measure of processing speed capacity. Taken together, we found evidence that elementary syntactic processing abilities decline in healthy aging.

Keywords: *healthy aging, syntactic comprehension, individual variability*

B65 Incidental learning of irrelevant information during reading acquisition.

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In this study we investigated if the way in which the alphabet was acquired during childhood determines orthographic processing during adulthood. A series of experiments were conducted with a group of native Spanish young adults who learned the alphabet in a linear fashion (namely, from A to Z), and with a group of native English young adults who learned it via the ABC song. All participants performed a series of letter searching operations requiring highly demanding orthographic/alphabetic processes (e.g., which letter comes 2 positions before the letter P?).

The first relevant finding corresponded to the seemingly sequential manner in which the letters are stored in memory, from A to Z, leading to a predictable linear increase in the reaction times and error rates associated with operations performed on the letters as a function of their position in the alphabet. More strikingly, the second effect that we found was a clear-cut mapping between participants' behavior and the manner in which the alphabet had been acquired during childhood. While Spanish participants' responses were correctly accounted for by the position of the letters in the alphabet, English participants' behavior was better accounted for by a distribution of letters in blocks corresponding to the rhythmic bars of the ABC song. These experiments highlight the long-lasting effects of being introduced to the alphabet using specific music during childhood, demonstrating that the method of acquisition of the alphabet leads to different mental representations of the letters and the alphabet which persist during adulthood.
Keywords: *reading; orthography; alphabet*

B66 ITABOO: An Italian database for taboo words

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Despite taboo words – i.e., socially inappropriate words – are very frequent in everyday communication, fulfilling multiple communicative functions, they have received very little attention in the psycholinguistic and neurolinguistic research. The present work aims to contribute to overcome this gap, by presenting ITABOO, a database containing normative data for taboo words in Italian. ITABOO contains measures for emotional dimensions – valence, arousal, and dominance – and semantic dimensions – imageability, familiarity, and concreteness. Data have been collected from 119 Italian participants by means of online questionnaires. With regard to semantic dimensions, distribution analyses show that taboo words are similar to other categories of words, with familiarity and imageability showing a normal distribution, and concreteness a bimodal distribution with peaks at medium and high values of concreteness. With regard to emotional dimensions, while arousal and dominance show a normal distribution centred around the mean value of the scale, valence shows a bias toward the negative pole of the scale. Emotional dimensions are also analysed in relation to participants gender: results indicate that males rate taboo words more positive than females. Other than giving a detailed semantic characterisation of stimuli, ITABOO is an essential tool for psycholinguistic and neurolinguistic research with taboo words, allowing researchers interested in this topic to build experiments with highly controlled materials.
Keywords: *taboo words; database; emotion; semantic variables*

B67 Structural Prediction in Native and Non-Native Processing: Evidence from Russian and English.

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The prediction-based approach to processing puts together the linearity of word-for-word presentation of a sentence in real life and its hierarchical syntactic parsing (Croker 1999, Schneider & Phillips 2000). The study investigates how the structural prediction is built and checked in native and non-native processing. In a self-paced reading task (Linger), native speakers and adult second language learners of English and Russian read sentences seeing one word at a time and answered comprehension questions. The stimuli manipulated perception and non-perception matrix verbs and the type of anaphora.

Bill saw / arrested the mother of the woman [RC that was speaking about herself / her in the yard].

This person was speaking about: *(a) the mother* *(b) the woman*

In both native and non-native speakers, a perception verb saw makes the reader anticipate an eventive complement. It triggers a projection that modifies the matrix verb: Bill saw (what) [the mother of the woman('s) talking in the yard] and competes with the RC reading. The complementizer that annuls the anticipated eventive complement. This causes a slowdown in processing ($p < .05$). The possibility to attach the RC high in Russian and low in English (Fodor 2002) leaves [NP the mother] as the nearest c-commanding element to the anaphora in Russian and [NP the woman] in English. Binding resolution depends on the language of testing ($p < .001$). Reflexives are processed faster than pronouns ($p < .001$). All participants anticipate a possessive phrase after a pronoun and slow down after the preposition in cancels this prediction ($p < .001$).
Keywords: *non-native processing, structural prediction, processing cycle*

B68 Changing comprehenders' pronoun interpretations: immediate and cumulative priming at the discourse-level in English.

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In English, according to the first-mention bias, ambiguous pronouns refer to the subject/first-mentioned entity, which is the most salient referent in the previous discourse. Existing research on pronoun resolution has not yet looked at immediate and cumulative priming at the discourse level (e.g., Fernandes et al., 2018). In the present study, we aim to understand how probabilistic inference in tracking referents across sentences can change as a function of the statistical information presented in the context, as predicted by probabilistic models of reference (e.g., Kehler et al., 2008). In a sentence comprehension task, sixty English monolingual speakers interpreted sentences containing an ambiguous pronoun ((1) Johni met Paul while hei was in high school). Half of the sentences were preceded by a sentence that did not contain a pronoun ((2) baseline condition), and half were preceded by a sentence with an unambiguous pronoun

referring to the second-mentioned entity ((3) NP2 priming = Emily despised Briani because hei was an evil person). The results of the comprehension questions demonstrate a significant effect of immediate priming, showing that participants are more likely to interpret an ambiguous pronoun as referring to the NP2 (e.g., Paul in (1)) after encountering a NP2 priming sentence (3) than a baseline sentence (2) (Prime Type = $p < 0.0001$). An effect of cumulative priming is also found (Order of the items = $p < 0.0001$). The study shows that the first-mention bias is susceptible to priming and that the processor adapts to the probability of pronominal forms interpretations occurring in the environment, in line with probabilistic models of reference.
Keywords: *anaphora resolution; first-mention bias; immediate and cumulative priming; English*

B69 L2 learners' memory for newly-learned idioms and constituent words.

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Using a training paradigm, we investigated L2 learners' memory for newly-learned idioms and their constituent words. While the holistic, figurative nature of idioms has been shown to boost L1 memory for idioms compared to literal phrases (Reuterskiöld & van Lancker Sidtis, 2012), this quality might also hamper access to constituent words since they typically do not contribute to the idiomatic meaning. Thus, word-learning might be greater in literal phrases than in idioms. We tested these assumptions on L2 learners. Sixty proficient German L2 learners of English were exposed to 30 novel phrases that were given an invented figurative meaning or a literal paraphrase. For example, participants learned either 'do not catch the salmon', meaning figuratively to be beware of asking about something and literally to not hook this specific type of fish. In half of the items presented, an unfamiliar word replaced a familiar one (e.g., perch/salmon), and German glosses were provided. Three days later, participants were tested on form, meaning, and word translation recall. Preliminary analyses show no differences in recall between literal and idiomatic phrases in form and meaning tasks. However, phrases with familiar words were recalled better and faster than those with unfamiliar words. Additionally, unfamiliar words were recalled better in literal phrases than in idioms. These results suggest that the holistic nature of idioms does hinder constituent word recall but does not provide the same phrasal recall advantages present in L1 users, and unfamiliar words may draw attention away from phrase learning.
Keywords: *L2, memory, idioms, word-learning*

B70 Language as a tool: Towards a cognitive architecture.

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While processing good enough linguistic representation, dialog partners rely on different perspectives - their own point of view, their addressees' one, common/shared beliefs - or on existing linguistic representations built during preceding interactions. Rational model of dialog based on a distinction between belief and acceptance (Saget & al., 2006, Saget & al. 2007) demonstrates that adding the notion of acceptance enables to support different kinds of backgrounds, notably mixing perspective-taking and reuse. In this model, rational behavior is refashioned so that constructing good-enough linguistic tools is considered as the standard rational behavior. Central to this model is the inclusion of acceptance. Acceptance here differs from the speech act of assent, ie. agreeing to a proposal whether or not this agreement is in line with one's mental state. Acceptance is a belief-like mental representation aiming at encapsulating knowledge involved in goal-oriented reasoning (Cohen, 1989). In our computational approach, the rational model has to be transcribed and complemented with a cognitive architecture in order to be implemented in a realistic and tractable way. To do so, we extend the belief and acceptance distinction (Paglieri, 2006) with a fact (declarative knowledge) versus tool (procedural knowledge) distinction. We explore insights both from formal epistemology and cognitive science to specify «belief space» and «acceptance space» as two kinds of memory space with distinguishing properties and cognitive processes. Basing the distinction on one property rather than a collection of properties enables to go beyond distinctions such as voluntary/involuntary reasoning process (Hakli, 2006; Saget, 2007).
Keywords: *model of dialog, common ground, memory, cognitive architecture*

B71 The processing of natural and grammatical gender in Hindi: An ERP study.

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Previous studies on the computation of natural and grammatical gender of nouns have revealed heterogeneous cross-linguistic results with respect to gender agreement. These studies, however, have been mostly modifier-head centric, with verb-argument relations garnering less attention. The current ERP study on Hindi investigated potential differences ensuing at the verb as a result of natural versus grammatical gender of the subject noun. Given that case and agreement are symbiotic in Hindi, with the finite verb agreeing only with nominative case-marked nouns, we examined whether animacy played a role in the processing of gender agreement dependencies. In a 2x2 factorial design, the animacy of the subject and verb agreement were manipulated in intransitive sentences, resulting in the following four conditions: "aadmii [man] gir-taa [fall]masc hai [aux]" vs. *"aadmii [man] gir-tii [fall]fem hai [aux]" & "ghar [house] gir-taa [fall]masc hai [aux]" vs. *"ghar [house] gir-tii [fall]fem hai [aux]". ERPs at the verb revealed a late-positivity effect (650-850ms) for agreement violations (as opposed to acceptable counterparts) if the subject was animate, whereas a negativity effect (500-900ms) was observed if the subject was inanimate. This finding indicates qualitatively different processing mechanisms for natural versus grammatical gender, and reveals animacy to be an important cue in the processing of gender agreement, despite the primacy of case in Hindi. We argue that the late negativity is due to more complex gender retrieval mechanisms for inanimate arguments. Further, as has been shown previously, we attribute the absence of a late-positivity for the inanimate condition to dialectal variations (Choudhary, 2011).
Keywords: *EEG/ERP, agreement, gender, animacy, Hindi*

B72 Differences Processing Events and States.

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Embodied theories of cognition (e.g., Barsalou, 1999) argue that when reading a sentence we re-enact the perceptual memories that have been stored on previous occasions. So when reading about an event, like Die Pflaumen wurden reif' ('The plums became ripe'), one might form a dynamic representation of the pre-state (a green, small plum), the change of state and the resultant state (a violet plum). When reading about a state like Die Pflaumen waren reif ('The plums were ripe'), the formed representation is less dynamic due to only representing a single state, the violet plum. We hypothesized that when reading about events, the reading times should be longer than when reading about states due to the more elaborate representation. In a self-paced sentence-by-sentence moving-window task, where participants moved through a three-sentence long story with the critical event/state sentence being preceeded by a scenery setting sentence and followed by round-up sentence, we found an effect in the sentence reading times: In accordance with our hypothesis, event sentences were read significantly longer than state sentences. We used a linear-mixed-effect model on the residual reading times (having accounted for the additional character in the event sentences) and found a beta coefficient for the fixed event-state effect of -60.89 msec ($p = 0.0128$). This effect speaks in favor of a linguistically induced representation of events and states: In case of events, one needs to represent the pre-change state, the actual change, and the post-change state, whereas in the case of states one only needs to represent the denoted state. This finding delivers empirical evidence for a long-standing theoretical debate about the nature of events and states (Vendler, 1957; Maienborn, 2005)
Keywords: *events, states, sentence reading times*

B73 Processing of control structures in German under cue-based retrieval.

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We investigate the predictions of the cue-based retrieval account (Lewis & Vasishth, 2005) for the processing of sentences with control structures in German. In control structures, the interpretation of the subject of an embedded clause (either PRO or a pronoun) is controlled by a noun of a matrix clause. In two self-paced-listening experiments (each $N = 50$ participants), we focus on two factors that might influence the identification of the controlling noun: (1) control type comparing subject (1a) and object (1b) control structures, and (2) argument similarity comparing pronoun resolution when two matrix NPs match (2a) or mismatch (2b) in grammatical gender (see sentence examples in the supplementary materials). In experiment 1, listening times at the spill-over region (to pet) are faster for object control (1b) than for subject control (1a). This effect can be explained by the cue-based parsing model: The object interferes between the subject and PRO in (1a), while no constituent interferes between the object and PRO in (1b). In experiment 2, we didn't find evidence consistent with the model prediction that pronoun resolution is slower when the matrix NPs' gender matches than when it mismatches. Listening times are similar across conditions (2a) and (2b) in the pronoun region (that he) and the spill-over region (the lamb). Differences only occur at the sentence end where reaction times are shorter for the mismatch condition (2b). Reasons for this result will be discussed.
Keywords: *control structures, self-paced listening, cue-based parsing, subject control, object control, bayesian analysis, gender match, gender mismatch*

B74 Training and modality effects of artificial grammar learning across linguistic and non-linguistic domains.

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Modality and domain effects have been demonstrated in statistical learning by several studies (SL; e.g. Conway & Christiansen, 2005, 2006; Frost et al., 2015). Our aim was to directly compare the efficiency of SL in extracting linguistic (L) and non-linguistic (NL), visual (V) and acoustic (A) patterns in an artificial grammar learning (AGL) task in young adults. We also tested how characteristics of input presentation (starting small--incremental presentation of stimuli of different length versus random presentation; and 1x versus 2x training length) influence learning across these conditions. Learning was tested with serial presentation of items with the following stimuli: acoustic nonsense syllables (AL), pure tones (ANL), visual nonsense syllables (VL) and non-linguistic symbols (VNL). Significant domain and modality effects were observed: learning was more effective in the acoustic than in the visual modality, and in the verbal versus nonverbal domain (ANL~<VL = VNL<AL). The linguistic advantage was only present in the acoustic modality. Starting small only improved learning with AL materials, and with shorter training. Doubling training length enhanced performance only in the visual modality. Our findings support the acoustic advantage of sequential learning for linguistic stimuli, and suggest that the starting small effect might be language-specific.
Keywords: *artificial grammar learning, training effects, starting small, modality effects, linguistic and non-linguistic domains*

B75 Do masculine generic pronouns cause a male bias in online processing? Evidence from eye-tracking.

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Masculine generic pronouns (e.g., 'To each his own') are still highly common across languages. Despite the prevalent use of masculine pronouns to refer to all genders, little is known about their online processing and interaction with linguistic and extralinguistic factors. We present two

eye-tracking reading experiments, testing if the Dutch possessive pronoun zijn 'his' leads to a male bias in online processing. We further tested the robustness of the hypothesized male bias by varying the gender stereotype context and number, respectively. Experiment 1 (N = 120) embedded zijn 'his' in stereotypically male (e.g., repairing one's car), female (e.g., dyeing one's hair) or neutral contexts as in (1): (1) Everyone was putting on his seatbelt, among whom a few women/men […]. Our analysis suggests that zijn leads to a male bias: reading time increased when female referents were mentioned, but in neutral contexts and for male participants only. Thus, zijn only informed gender inferences when no other gender information was given. Experiment 2 (N = 84) tested whether number mediates the pronoun's male bias in truly generic contexts: (2) Someone/everyone(/people) with a long vacation can forget about his(/their) stress, for example the woman/man in the dunes […]. We found a male bias for male participants in semantically singular contexts featuring someone, but not for semantically plural everyone. In summary, both experiments suggest that men in particular are prone to interpreting the masculine generic pronoun zijn 'his' as referring to men instead of all genders, and that this male bias is affected by (extra) linguistic context.
Keywords: *masculine generics, pronouns, male bias, gender stereotypes, number*

B76 A cross-linguistic investigation of similarity-based interference and depth of processing in English and German.

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Cue-based retrieval theories (Lewis & Vasishth, 2005; Van Dyke & Lewis, 2003; Van Dyke & McElree, 2006) propose that real-time linguistic dependency formation relies on cue-dependent memory retrieval; sentence-external material is assumed to interfere with the establishment of within-sentence dependencies. Van Dyke & McElree (2006) showed this interference effect in English. To establish robustness of the effect, we conducted two larger-sample eye-tracking experiments in English (N = 65), and two in German (N = 120), implementing Van Dyke & McElree (2006)'s 2 (memory load) x 2 (interference) design. In load conditions (Table 1; a,b), participants memorized three nouns before reading the sentence; in (c) and (d) nothing had to be memorized. The nouns were plausible objects of the relative-clause verb fixed (b), but not for sailed (a). We expected longer reading times in (b) vs. (a) and no difference between (c) and (d). Cue-based accounts assume that complete syntactic dependencies are built, and interference arises conditional on complete sentence processing. The model predicts that if shallow processing is induced, interference effects may be reduced or disappears altogether. We tested the prediction that processing depth modulates interference, manipulating question complexity (Swets, Desmet, Clifton & Ferreira, 2008): in two sessions, participants read items with complex or simple questions. In English, first-pass reading times showed an interaction of complexity with load and interference (b > a; c ≈ d), in simple conditions only. For German (simple conditions), total reading times showed an interaction not predicted by theory: no difference in load conditions and a slowdown for interfering compared to non-interfering conditions in no-load conditions. For German, we find no indication that extra-sentential material interferes with within-sentence dependency processing. Contrary to our predictions, only superficial processing yielded effects.
Keywords: *sentence processing, similarity-based interference, eye-tracking, Bayesian data analysis*

Table 1: German example item (adapted from Van Dyke & McElree, 2006)

Memory load conditions:										
Kühlschrank	Waschmaschine	Computer								
fridge	*washing machine*	*computer*								
a. No interference										
Das Boot,	das	der Mann,	der	am Meer	lebte, gestern	steuerte,	schien	schon alt	zu sein.	
The boat ,	that the	man,	who at	sea	lived, yesterday	sailed,	seemed	quite old	to be.	
b. Interference										
Das Boot,	das	der Mann,	der	am Meer	lebte, gestern	reparierte,	schien	schon alt	zu sein.	
The boat ,	that the	man,	who at	sea	lived, yesterday	fixed,	seemed	quite old	to be.	
No memory load conditions:										
—		—			—					
c. No interference										
Das Boot,	das	der Mann,	der	am Meer	lebte, gestern	steuerte,	schien	schon alt	zu sein.	
The boat,	that the	man,	who at	sea	lived, yesterday	sailed,	seemed	quite old	to be.	
d. Interference										
Das Boot,	das	der Mann,	der	am Meer	lebte, gestern	reparierte,	schien	schon alt	zu sein.	
The boat,	that the	man,	who at	sea	lived, yesterday	fixed,	seemed	quite old	to be.	

'The boat that the man who lived by the sea sailed/fixed seemed to be quite old.'

B77 Spanish relative clause processing: Influence of lexico-semantic information on syntactic processing.

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Previous studies have shown that lexical frequency and semantic features of content words, like nouns or verbs, can influence syntactic processing (Mak et al., 2006; Johnson et al., 2011; Fedorenko et al., 2012). However, this question has been scarcely analyzed with function words, and the few studies available present methodological limitations that leave it unanswered (Tabor et al., 1997; Schmauder et al., 2000; Gibson, 2006). Bearing this in mind, an eye-tracking experiment was conducted, in which native speakers read Spanish relative clauses (RCs). This type of sentences is headed by function words known as relativizers, which, in certain contexts, may vary without modifying the syntactic structure of the sentence (e.g. la ciudad en la que nací –the city that I was born in- vs la ciudad donde nací –the city where I was born). However, relativizers have different linguistic features: For instance, "donde" (where) is less frequent than "que" (that) but bears a locative semantic feature that is absent in the latter. These features can thus be analyzed in order to determine whether they influence RC processing. Our results show that relativizers' lexical frequency influenced not only their lexical activation, but also their integration into the syntactic structure, as shown in first-pass and go-past measures. Similarly, relativizers' semantic features determined the cost of integrating subsequent units (e.g. the RC verb). These results are more compatible with an interactive view of language processing, whereby parsing processing is not blind to non-syntactic information, but lexical and semantic features can also guide this process when manipulating both content and function words.
Keywords: *syntactic processing, lexico-semantic influence, relative clauses*

B78 Processing comparatives and superlatives – ERP studies on monotonicity effects in picture-sentence verification.

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Recent studies have shown that semantic meaning is not always processed in an incremental fashion. For instance, downward-monotone quantifiers like 'few', 'fewer than half', 'fewest', etc. were shown to be notoriously difficult to process and can lead to a delayed truth evaluation compared to their upward-monotone counterparts ('more', 'more than half', 'most'…), as indicated, for instance, by an absence of an N400 for false vs. true sentences. In two ERP studies, we examined whether delayed effects can be attributed to the fact that previously-examined quantifiers did not constitute semantically homogeneous classes. Particularly, structurally complex superlative forms like 'most' and 'fewest' were sometimes compared to simpler comparatives like 'more' and 'few'. Additionally, superlative quantifiers comprise an ambiguity between a relative and an absolute reading, which comparatives lack (Hackl, 2009). We tested potential online processing differences between ambiguous superlatives ('most' vs. 'fewest') and unambiguous comparatives ('more than half' vs. 'fewer than half') using picture-sentence verification. Contrary to previous research, we studied monotonicity processing without the involvement of additional mental processes linked to plausibility or lexical associations. Our results reveal cross-study monotonicity effects: In both studies, an N400 for false vs. true sentences was restricted to positive quantifiers, whereas no such effect was found for negative quantifiers. The present studies are thus in line with approaches that attribute non-incremental effects to downward monotonicity per se rather than to contextual ambiguity or plausibility. The current studies are a basis for future research manipulating adjectives vs. quantifiers, prosody, and visual vs. linguistic context.
Keywords: *incremental processing, semantic processing, quantifiers, monotonicity, ERPs, N400, picture-sentence verification*

B79 Do we need phonemes in speech perception? An auditory selective adaptation study.

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For decades now, there have appeared propositions that speech perception does not involve decoding phonemes from the acoustic stream. In a recent example (Hickok, 2014) syllables are reconstructed directly from the auditory features, skipping the phoneme stage. The argumentation for this skipping is largely based on the failure of previous studies to dissociate the effects of phonemes from the effects of the syllables they are a part of. Our experiment allows for such a dissociation and thus attempts to provide a counterargument to these propositions. We employ the selective adaptation paradigm: participants listen to a sequence of words each containing the critical phoneme (e.g. /s/) and then hear an ambiguous blend of a minimal pair (e.g. «sauna» and «fauna»). Due to the phoneme detectors having adapted to /s/, the participants are more likely to interpret the ambiguous blend as «fauna». Critically, the syllable in the test word (here, /sɔ:/) does not occur among the adaptors - hence the desired dissociation. Before the experiment, the individual threshold of ambivalence is established for all the test words. Using a single threshold per word proved detrimental to the adaptation effects in a similar study that ours stems from. The experiment is run online. An acoustic check is employed to ensure that the participants are wearing headphones. The experiment is a stepping stone to the next stage where we dissociate the phonemic effects simultaneously from the syllabic effects and the acoustic ones.
Keywords: *selective adaptation, speech perception, phonemes*

Posters C

C01 Locality in unbounded and local dependencies in Spanish

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Increasing dependency length hinders processing in SVO languages (locality effects) (Gibson, 2000) but leads to facilitation in SOV languages (antilocality effects) (Konieczny, 2000; Vasishth & Lewis, 2006). Evidence for locality comes mostly from unbounded dependencies (e.g. relative clauses), whereas evidence for antilocality comes from local dependencies (e.g. S-V). The aim of our study is to investigate whether the inherent properties of these two dependencies impact (anti)locality. Crucially, unbounded dependencies can be completed in a different clause, whereas local dependencies must be completed within the same clause, reducing the uncertainty as to when the second co-dependent will appear. This difference may have implications for currently available data, since antilocality is explained in terms of expectation-based facilitation (Levy, 2008). We conducted an SPR experiment in Spanish (n = 60) to test the effect of dependency type when increasing dependency length. We constructed ditransitive sentences with a fronted IO, fully crossing dependency type (unbounded/local) and dependency length (short/long).
If unbounded dependencies lead to locality and local dependencies to antilocality, we predicted an interaction between dependency type and length. Results show slower RTs at the critical regions for long dependencies in both local and unbounded dependencies, yielding a main effect of length. In two critical regions, we found an interaction, but in the opposite direction to our predictions. Overall, results suggest locality effects arise regardless of dependency type, replicating previous eye-tracking experiments (Bartek et al., 2011). Our study provides further evidence of locality as a pervasive phenomenon in sentence processing.
Keywords: *sentence processing, locality, antilocality, dependency*

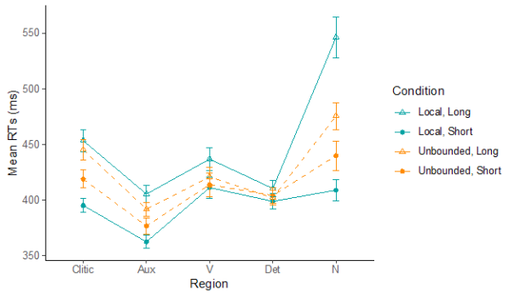

Figure 1. *Word-by-word mean reading times at the critical regions (Clitic, Aux, V) and post-critical regions (Det, N).*

C02 Null and overt subjects pronouns in Italian and Spanish: a comparative study.

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Although Italian and Spanish are two syntactically-related languages, it has been shown that they present distinct discourse-pragmatic biases on the interpretation of anaphoric subject pronouns. In particular, while in Italian overt anaphoric pronouns signal a topic-shift, in Spanish this interpretation preference is less strong (e.g., Filiaci et al., 2014; Chamorro, 2018). However, it is unclear what role the clause order plays in the difference observed, and whether there may be differences also in the interpretation of null subject pronouns in the two languages.
The present study compares the interpretations of anaphoric and cataphoric overt and null pronouns in Italian and Spanish, manipulating the order of the main and subordinate clause in the sentence (Main-Subordinate; Subordinate-Main). Twenty-six speakers of Italian and thirty Spanish speakers participated in a two-session sentence comprehension task in which anaphoric and cataphoric pronouns had potentially ambiguous interpretations. The results confirm that Italian speakers interpret overt anaphoric pronouns as referring to the preceding subject significantly less often than Spanish speakers, regardless of clause order (all $p < 0.001$). The results also indicate that in Italian speakers prefer to interpret anaphoric and cataphoric null pronouns as referring to the subject referent significantly more than in Spanish (all $p < 0.001$). Our study suggests that Italian and Spanish differ not only on the interpretation bias of explicit anaphoric pronouns, but also on the interpretation of null pronouns, and that clause order does not have an effect on this result. Production biases are currently investigated in the two languages to complement the comprehension results.
Keywords: *pronoun resolution, Spanish, Italian, null and explicit pronouns*

C03 Oculomotor resonance during processing past and future tense in Russian and Hebrew.

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Existing research suggests that spatial-conceptual mappings underlie processing of words in different knowledge domains. For example, processing of words of temporal semantics was shown to trigger perceptual biases in horizontal space with speakers associating words denoting past with the left and the words denoting future – with the right, space. Furthermore, research in rendered similar spatial-conceptual mapping to be largely automatic and dependent on oculomotor resonance as a similar horizontal-space bias established during processing of number words (i.e., SNARC effect) was registered in lateral ocular drift – an involuntary and highly automatic component of oculomotor behavior. Here, we used lateral ocular drift to investigate spatial biases established during processing of past and future tensed verbs in languages with different writing directions. Equal native-speaker samples (62) of a left-to-right language (Russian), and a right-to-left language (Hebrew) participated in the study. Participants listened to past-tensed verbs, future-tensed verbs, or to filler nouns before detecting a visual probe presented in the center, left, right, top, or bottom of the screen. Analysis of ocular drift during word apprehension revealed a main effect of verb tense: When Russian speakers listened to a past-tensed verb, their gaze systematically shifted to the left compared to when they listened to a future-tensed verb. Conversely, a reliable tense-by-language interaction showed that when Hebrew speakers listened to the past-tensed verbs, their gaze shifted to the right as compared to when they listened to a future-tensed verb. Our results support oculomotor resonance in temporal-semantics concepts expressed via grammatical tense markers.
Keywords: *eye-tracker, space, drift*

C04 Processing of allomorphic and non-allomorphic verb forms in Russian. Effects of Ageing.

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One of the questions in psycholinguistics is how morphologically complex words are processed. Previous studies often claim that such words are decomposed into their constituents during initial stages of processing (Crepaldi et al., 2016) and that morphological processing could be affected by ageing (Clahsen & Reifegerste, 2017). Therefore, we investigate two potential sources of variability in processing comparing processing of stems with and without allomorphic alternations in Russian and examining processing differences between older and younger speakers.

To test whether allegedly automatic decomposition is affected by these factors we use the masked priming technique. We examine processing of verb forms without allomorphic alternations (igr-aj-u – igr-a-t' «play») and with alternations (e.g., koš-u – kos-i-t' «mow») in younger (N = 39, Mage = 23) and older (N = 37, Mage = 67) speakers. Materials include identity (e.g., igrat' – igrat'), related (e.g, igraju – igrat') and unrelated (e.g., kurit' – igrat') conditions. Crucially, we observe a contrast between allomorphic and non-allomorphic verbs. Non-allomorphic verbs (igraju) are as effective primes as identity primes whereas allomorphic stems (košu) elicit reduced effects. This contrast is also reflected in larger priming (related vs. unrelated conditions) for non-allomorphic compared to allomorphic verbs. This supports an account which differentiates between combinatorial and lexically stored items (Clahsen et al., 2003). With regard to ageing, our results indicate a contrast between general aspects of language performance and specific mechanisms of morphological processing. The former ones show effects of ageing as revealed by longer RTs for the older participants. By contrast, the latter ones are preserved in ageing.
Keywords: *morphology, priming, ageing, allomorphy, Russian, decomposition*

C05 Inter-language gender congruency has facilitative effects on L2 production and comprehension of grammatical gender, but only for highly proficient speakers.

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This study targets the effects of gender-congruency and proficiency in Greek L2-learners' production and online comprehension of grammatical gender markers in Norwegian. Both languages have grammatical gender, sharing a three-gender system, but as feminine is unstable in Norwegian, we restricted the study to Masculine and Neuter. Based on a naming task eliciting overt gender in Norwegian, the L2-learners were spilt into two groups: Low.prof (median or below, N = 13) and high.prof (above median, N = 10). The production task showed that speakers tended to default to the unmarked Masculine gender, but in addition, an effect of congruency was found, but only for the high.prof group: high.prof speakers made more errors for nouns with conflicting gender values in the two languages. In an eye tracking comprehension task, gender cues on the articles facilitated looks to the target in the high.prof group to the same extent as in the Norwegian controls (N = 19). In contrast, the low.prof group did not show any such effect (Fig.1). Lastly, there was an early effect of gender congruency, but only for the high.prof group. We conclude that proficient L2-speakers, just as L1-speakers, can integrate gender information during speech processing (Dussias et al 2016). The results further suggest that congruency effects do not arise as a result of an initial transfer of noun/gender values; rather, a single integrated gender system develops with increased proficiency.
Keywords: *the bilingual lexicon, eye tracking, production vs. comprehension, Norwegian*

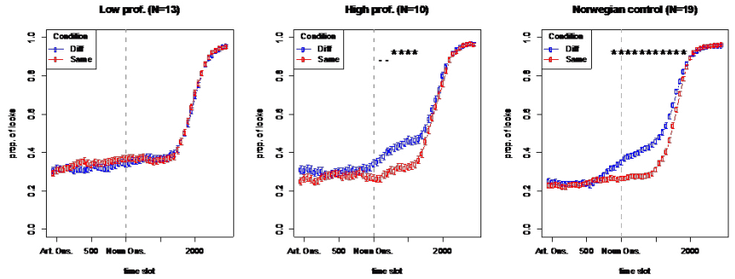

Figure 1. *Proportion of looks to target picture in the gender-cued (diff/blue) and neutral condition (same/red) for low and high proficient Greek speakers, and Norwegian controls.*

C06 Unaccusatives versus unergatives: ERP evidence from L1/L2 speakers of Basque.

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This study compares the electrophysiological responses of non-native speakers of Basque to native responses when processing intransitive sentences (unergative and unaccusative). We found L1-L2 differences in early and proficient non-native speakers: absence of grammaticality effects in unaccusatives in early components and reduced amplitude of the P600 in unergatives. 24 right-handed native and 24 non-native (L1 Spanish) Basque speakers were tested using subject-verb agreement violations. The EEG (32 electrodes) was recorded while participants read grammatical and ungrammatical sentences (word-by-word, 350 ms; ISI = 250 ms) and performed an acceptability judgment task. Regarding response times and acceptability task, non-natives behaved native-like, responding faster to unaccusatives than to unergatives. The electrophysiological results in the early time window (300-400 ms) revealed a difference between L1 and L2 speakers: for non-natives, grammaticality effects emerged only in the unergative condition, while for natives they were observed in both predicate types. In the late time window (400-700 ms), verb agreement violations elicited larger grammaticality effects (P600) for unaccusatives than for unergatives in both L1 and L2 speakers of Basque. Nevertheless, the ungrammatical unergative condition yielded larger positivity in natives than in non-native participants. To conclude, event-related potentials provided us with some valuable insights into the processing of unaccusative and unergative predicates in native and non-native speakers of Basque, and non-native effects were found even with early and highly proficient L2 speakers.
Keywords: *unaccusativity, ERPs, non-natives*

C07 Does bilingual experience facilitate novel morphology learning?

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Learning different languages involves learning new word forms, and new mappings between forms and meanings. The majority of words in a language can be constructed by combining word stems and affixes. Since affixes are frequent constructions that appear in a combinatorial manner, learners can easily separate them into chunks of meaning when learning a language. However, little is known about how previous linguistic experience interferes with or facilitates novel morphology learning. To test this, we contrasted a group of Spanish monolinguals and a group of Spanish-Basque bilinguals in an artificial suffix learning task. Known Spanish stems (e.g., laboral) were randomly paired with novel artificial suffixes (e.g., suti). Participants performed a learning phase so that they were exposed to the words and the novel suffixes, and a test phase. During the test phase, participants completed a lexical decision task where they were presented with the learned stems and suffixes (laboralsuti), learned stems and novel suffixes (laboralboru), novel stems and learned suffixes (finalsuti) and recombinant pairs of the learned words and suffixes (laboralibe). Importantly, they completed this task right after the learning phase and the next day after consolidation had occurred. Results indicate an interaction between day of test and group in overall accuracy, with bilinguals showing better performance than monolinguals on the first test day, but not the second. Furthermore, d-prime measures show an interaction between type of test and day. These results are discussed taking into account the differences in affixal morphology between the two languages.
Keywords: *language learning, bilingualism, affixal morphology*

C08 Agreement attraction in grammatical sentences.

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Agreement attraction errors speed up the reading of ungrammatical sentences, but evidence for the slowdown in grammatical sentences is scarce. Due to this seemingly robust grammaticality asymmetry, attraction effects are attributed to faulty repair. We suggest that attraction in grammatical sentences (1b) is masked by interference that arises in (1a) due to the attractor matching the subject's number. Three high-powered experiments aimed to decrease the interference so that attraction could surface (see Fig. 1). In each experiment, 16 items were tested manipulating semantic and number match/mismatch between the verb and the attractor. Each participant read just one sentence in an online self-paced reading paradigm. Spill-over from the plural attractor was controlled in Experiments 1 and 3 by adding RT on the pre-critical word in the model for the critical word. Experiments 1 (N = 4296) and 3 (N = 3600) showed a main effect of attraction (CrI: [0.3 ms, 54 ms]; CrI:[7.8 ms, 70.6 ms]). Experiment 2 (N = 3920) showed an attraction effect only in semantic match conditions (1b vs. 1a, CrI: [4.1 ms, 62.6 ms]). The idea that agreement attraction in grammatical sentences is masked by interference received no support. Instead, all experiments provide evidence for attraction effects in normal sentence processing. These results suggest, contrary to earlier research, that attraction cannot be attributed to faulty repair alone.
(1) {a. The admirer of the singer / b. The admirer of the singers / c. The admirer of the play / d. The admirer of the plays} supposedly thinks that the show was a big success.
Keywords: *interference, agreement attraction, grammatical sentences*

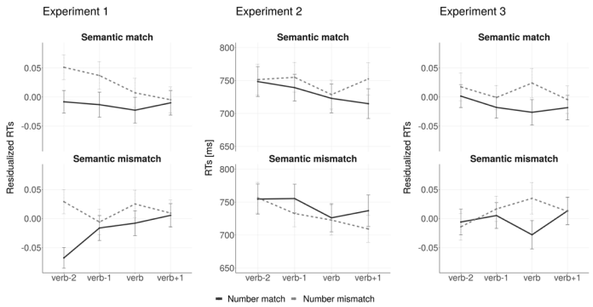

Figure 1. *Reading times across experimental conditions (residualized for Experiments 1 and 3); error bars represent 95% CI.*

C09 A deeper functional explanation of island constraints.

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An island is a syntactic constituent which contains an element that cannot be extracted out of it. The term was introduced by Ross (1967), who proposed certain structural constraints on movement. Soon it became evident that a purely structural approach cannot account for all empirical facts of extraction. Erteschik-Shir (1973) suggested a functional approach. She argued that extraction is allowed only from that part of a sentence which is not presupposed and does not have a contextual reference. Goldberg (2014) generalizes that to a simple rule: Backgrounded constructions are islands (BCI). While these are very insightful observations, questions still remain. Why are backgrounded constituents islands? I answer these questions in the framework of instructional semantics. In this framework, a sentence consists of a number of functional chunks and the content of each chunk plays a certain function with respect to a head referent of the chunk. Each chunk instructs the hearer to create, find or update a certain mental referent. All instructions except the main update (the focused part) are backgrounded. And each instruc-

tion represents an island because no semantic content can be removed out of it without making a set of instructions incoherent. An incoherent set of instructions results in a strong island, the one which cannot be recovered by the context. A weak island arises when an instruction includes the content which is not relevant for its purpose. Since relevance is context-dependent phenomenon weak islands normally disappear in an appropriate context. See examples in Figure 1.

Keywords: *island constraints, dynamic semantics, information structure*

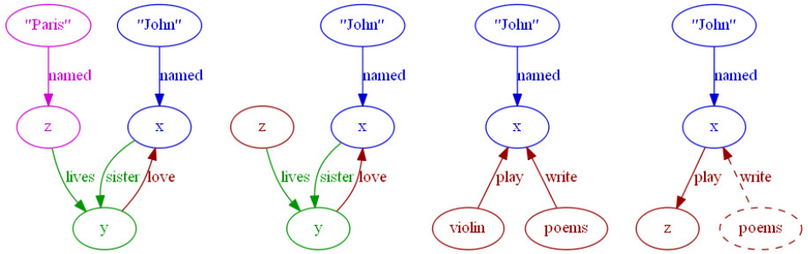

Figure 1. *Semantic graphs for four sentences. Each instruction is colored in its own color.*
a) John loves the sister who lives in Paris *(find x, find z, find y, update x)*
*b) *Where does John love [the sister who lives in __]* *(find x, find y, request z)*
c) John plays the violin and writes poems *(find x, update x)*
*d) *What does John [play __ and write poems]* *(find x, request z)*
Graphs a) and c) illustrate grammatical sentences. Graph b) shows an incoherent set of instructions: variable z is used to identify y while being not yet defined itself. Graph d) illustrates a relevance problem: that John writes poems is not relevant for requesting which instrument John plays.

C10 Can nativeness, proficiency, attention and motivation account for individual differences in syntactic priming?

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Syntactic priming has been defined as a mechanism underlying error-based implicit learning of syntax in first (L1) and second (L2) language speakers. This predicts that 1) priming effects will be stronger in L2 than in L1 speakers; 2) the degree of priming will depend on individuals' learning rate varying with individual differences in proficiency, attention and motivation. In two picture description tasks, we compared English L2 French learners' and French L1 speakers' primed production of a syntactic (Study 1- active/passive) and a word order alternation (Study 2- fronted/non-fronted adverbial phrases). We measured immediate priming (repeating a syntactic structure immediately after a prime); long-term priming (continuing to use target structures in post-priming tests without primes relative to pre-priming tests); and cumulative priming (increased target structure production as a function of previously experienced target structures). We assessed proficiency, attention and motivation with questionnaires. In both studies, both groups showed long-term and cumulative priming; however, immediate priming was only observed for Study 2. Contrary to the predictions, there was no interaction between L1 vs L2 group and any measure of priming. More proficient learners were more likely to show priming for passives. Participants' attention to syntactic forms increased their likelihood of being primed on fronted sentences (L2 speakers) and on passives (L1 and L2 speakers). Thus, individual variation in attention and proficiency could explain within-group differences in syntactic priming. Learners' motivation did not affect syntactic priming for either structure. Follow-on research is examining priming, and its interaction with individual differences, with lexical overlap.

Keywords: *syntactic priming, second language learning, attention, motivation*

C11 The role of case marking and word order in cross-linguistic structural priming in late L2 acquisition.

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Several studies found priming of syntactic structures between languages with various language combinations. This priming is considered to reflect the sharing of syntactic representations between prime and target language. But which factors are crucial for the presence or absence of this sharing? Here, we investigated the role of two important domains of language variation: case marking and word order. We varied these language features in an artificial language (baptized «PP02») learning paradigm using three different language versions that were equally distributed across subjects. Priming was assessed between Dutch (no case marking, SVO word order) and a) a baseline PP02 version with SVO word order, b) a case marking PP02 version, and c) an PP02 version with SOV word order. There was similar within-language and cross-linguistic priming in all versions for transitive sentences, indicating that cross-linguistic structural priming was not hindered. In contrast, for ditransitive sentences there were similar within-language priming effects for all versions, but for none of the language combinations cross-linguistic priming was obtained. However, a previous study using this paradigm in a multiple-session design only found ditransitive priming between languages from the second day on. This suggests that ditransitives need more time than transitives to be shared across languages. The finding that cross-linguistic priming is possible between languages that vary in morphological marking or word order, is compatible with studies showing cross-linguistic priming between natural languages that differ on these dimensions.

Keywords: *artificial language learning, structural priming, sentence production*

C12 Degrees of incrementality in German as a second vs first language.

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Evidence regarding the use of verb information during sentence production in German is mixed. There are methodological issues since picture-word interference paradigms do not permit measurements when structure unfolds (Schriefers, Teruel, & Meinshausen, 1998) whereas eye-tracking methods record fixations on referents but not on events (Sauppe, 2018; Wu, 2019). We run four structural priming experiments (Branigan & Pickering, 2017) to investigate the question of lexicalist sentence encoding in German as a second vs first language. Second language speakers had various first languages. They had attained a relatively high proficiency in German (at least B2 according to the Common European Framework of Reference for Languages). Forty-eight participants per experiment heard 24 active (NPcause V NPpatient) and passive prime sentences (NPpatient Aux PPcause V) and generated responses from word lists. Verb repetition (same vs different verb in prime and target) was manipulated within experiments, in addition the position of the verb in the target (V-N-N vs N-N-V) varied between experiments. In all experiments structural priming was boosted by verb repetition. First language speakers produced more passive responses with verb-final than with verb-initial targets, indicating an alignment with the sentence-final verb position in passives. In second language speakers, the production of passives was enhanced when the verb was target-initial and not target-final, indicating that they needed the verb to encode nominal constituents. These findings favour the assumption of linear incrementality in the first language (Gleitman, January, Nappa & Trueswell, 2007) and of structural incrementality in the second language (Griffin & Bock, 2000).
Keywords: *sentence production, second language, German*

C13 Morphological processing across the lifespan: Evidence for dual-route processing with a special status of citation forms.

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Morphological processing concerns the way in which multi-morphemic words are processed: namely, whether they are decomposed into morphemes (full decomposition models; Taft & Forster, 1975), accessed as single units (full-listing models; Butterworth, 1983), or processed via a combination of these mechanisms (dual-route models; Schreuder & Baayen, 1995). Research by Reifegerste et al. (2016) suggests that speakers of morphologically rich languages may employ full decomposition early in life and switch to dual-route access with age due to greater language exposure. To test this hypothesis, we collected lexical decision data from 190 Russian speakers of different ages (9-87 years old). The stimuli were number-dominant nouns, i.e., nouns more frequently used in singular (mother) or plural (eyes) form. Their recognition times allow for identification of the morphological processing mechanisms. We also tested whether the processing mechanisms depended on the type of plural formation: a non-zero ending replacement (mam-a - mam-y) or affix addition to a zero-ending (glaz - glaz-a). A linear mixed-effect model with subjects and items as random factors showed a significant interaction of number-dominance and form ($p < .001$) but no three-way interaction with age. This suggests the dual-route model for Russian speakers across ages, contrary to the hypothesis of Reifegerste et al. (2016). There was no interaction of processing mechanisms with the type of plural formation, meaning that singular nominative (citation) forms are stored regardless of their morphological structure (zero or non-zero ending). This finding supports evidence for a special status of citation forms (Gor et al., 2017).
Keywords: *morphological processing, dual-route models, mental lexicon, citation forms, age effects*
Acknowledgments: *Supported by the RFBR grant №18-312-00101.*

C14 Tracking the time-course of linguistic control mechanisms in the bilingual brain: An MEG study.

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While extensive work has been conducted on how bilingual speakers control language selection during speech production, one question that remains unanswered is whether between- and within-language control mechanisms differ or not in the bilingual brain. To test this, we recorded neuromagnetic signals with a 306-sensor Elekta Neuromag system while 20 early high-proficient Spanish-Basque bilinguals performed a picture-naming task under two different linguistic contexts. In the first context, participants had to switch between languages (i.e., naming in Spanish or in Basque); while in the second one, they had to switch between semantic categories (i.e., naming nouns or verbs) within a given language. We compared event-related fields (ERFs) elicited by switching and repetition trials in the different contexts using cluster-based permutation tests. The analysis revealed significant modulations in the M200 and M400 components, with the switching condition showing greater power decreases as compared to the non-switching one, regardless of the type of linguistic context. While both effects displayed a similar time course, their lateralization differed. Language switching effects were localized in the right hemisphere, while semantic switching effects were left lateralized. Overall, these results suggest that distinct control mechanisms might be at play depending on the linguistic context established by the task at hand.
Keywords: *MEG, ERF, bilingualism*

C15 The problem of illusory power for imaginary interactions.

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A commonly observed statistical fallacy, even in high-profile publications, is the following: An experimental study is conducted in which two factors with two or more levels each are manip-

ulated. The effect of one of the factors (Factor 1) is tested for within each level of the other factor (Factor 2). If one of the nested tests shows a significant effect of Factor 1 and another one does not, the authors argue for a statistical interaction between Factor 1 and Factor 2, despite no such interaction having been tested for. Under this scheme, false negative results for one of the tests systematically lead to an "illusion of power" for the claimed but untested-for interaction, which we call an "imaginary interaction" (see also Gelman & Stern, 2006; Nieuwenhuis, Forstmann & Wagenmakers, 2011). Simulations and closed-form analytical calculations reveal how low-power situations can be exploited under the fallacious approach to make unwarranted discovery claims. We also show that there is a non-linear relationship between the illusory power derived from separate tests and the power to detect an actual interaction: The former depends (inter alia) on the magnitude of the effects of Factor 1 viewed in isolation across the levels of Factor 2 while the latter depends on the difference between the effects. We provide a standalone Shiny app (https://dpaape.shinyapps.io/ipower/) that allows the user to interactively compute real and illusory power for an interaction in a 2x2 design in psycholinguistics.

Keywords: *imaginary interactions, illusory power, statistical fallacy*

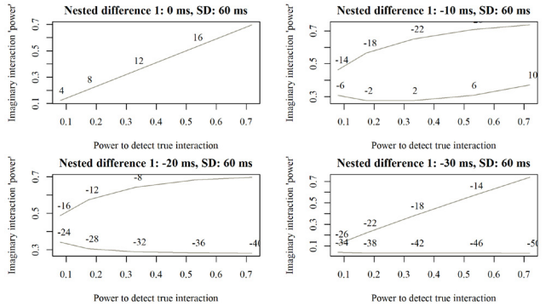

Figure 1. *Relationship between real and illusory power in a 2x2 design. Numbers on graphs indicate nested difference 2.*

C16 How the Brain Processes Word Order in Japanese Sign Language: an fMRI Study.

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Japanese Sign Language (JSL), like spoken Japanese, permits a fair degree of freedom of word order. The basic word order SOV can be changed into its topicalized order OSV and OVS with topicalized O accompanied by a set of non-manual markers (NMM). In recent years, sign language research involving, for example, comparisons with spoken Japanese grammar, has revealed a large number of grammatical phenomena. There have been hardly any behavioral experiments regarding word order processing or research reports based on neuroscience. Therefore, in this study, we used functional Magnetic Resonance Imaging (fMRI) to verify how sign language sentence word order would affect sentence processing. We recruited 20 deaf signers of JSL, none of whom had a history of neurological disorders. The 168 stimuli were equally distributed across the two-task conditions (SOV and OSV), and there were 56 semantically plausible («correct») transitive sentences and 28 semantically implausible («incorrect») transitive sentences, except for the R condition, in which the participant made no response. They were asked to judge the semantic plausibility of each sentence by pushing a YES or NO button as quickly and accurately as possible. The data were acquired with a 3.0 Tesla MRI scanner using an EPI sequence. All data processing and group analyses were performed using SPM8. We compared SOV and R in order to identify the cerebral cortex regions that are activated during sign language sentence processing. Results revealed significant activation of areas such as L.MTG and L.IFG. Comparison of OSV and R also indicated brain activity in roughly the same regions. These results are consistent with regions that have previously been shown to be language areas. This suggests that cognitive processing is shared to a high degree regardless of word order. We directly compared SOV vs. OSV and OSV vs. SOV in order to identify areas of brain activity that are significantly involved in SOV or OSV sentence processing. The former comparison showed no activation in any region, while the latter revealed activations in the L. IFG and L. MFG. This result shows that OSV sentence process is more demanding than SOV sentence processing, suggesting that OSV has a more complex syntactic structure than SOV in JSL as well as spoken Japanese.

Keywords: *Japanese Sign Language (JSL), word order, sentence processing*

C17 Investigating Russian-English translation and word characteristics in verbal memory with machine-learning.

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There have been numerous reports of a replication crisis in Psychology (Open Science Collaboration, 2015), and language could be an important factor in explaining inconsistencies between studies that examine verbal memory. The current study examined the role of language in two studies that implemented an identical procedure in different countries and languages, using the same word set that was translated from English to Russian and matched in word frequency. The aim was to identify whether differences in language could explain the differences in baseline memory accuracy found between the studies. The reliability of the memory test was examined, considering language as a source of error, using Generalizability theory. Moreover, a machine-learning approach (including ROC analysis) was conducted to identify the contribu-

tions of semantic and phonological factors to memorability. Although G theory revealed no significant error due to language and high reliability of the test in both languages, the ROC analysis showed that memory accuracy for individual words approached guessing, suggesting that poor memory performance could obscure the effects of linguistic characteristics. A preliminary linguistic analysis of the most memorable words in Russian (as identified by ROC) showed unusual phonology that was not present in the set of memorable English words. Distinctiveness in other word characteristics, such as orthography, has been shown to enhance recollection (Roediger et al., 2001). Thus, language overall may not play a large role, but word characteristics such as phonology may remain an important consideration and may be examined in future studies that encourage higher memory accuracy.

Keywords: *semantics, phonology, frequency, verbal memory, reliability*

C18 Form, meaning, and morphology in Arabic masked priming: An ERP study.

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Transposed letter priming (jugde-JUDGE) and other orthographic/form priming found in Indo-European languages have been unreliable in Hebrew and Arabic. Together with Semitic root priming, this has motivated the suggestion that lexical memory for Hebrew/Arabic is qualitatively different in organization. However, non-word primes derived from real words by single root letter replacement can indeed prime in Arabic, dovetailing with literature questioning the status of the consonantal root as a morphological unit of lexical organization in Semitic. Our masked priming ERP study (with go/no-go semantic categorization task for non-critical items) manipulated prime duration (40/120 ms) between-participants and examined six conditions: (i) identity; (ii) root/meaning identity ([Saliib – maSluub] «cross – crucified»); (iii) root without meaning identity ([Saliib – Salaaba] «cross- hardness»), (iv) transposed real root orthographic overlap ([Saliib – baSal] «cross - onions»); (v) semantic relatedness ([Saliib – qasaawisa] «cross - pastors»); (vi) unrelated prime-target pairs. Present results are based on 29 Qatari Arabic native-speakers (N = 15 short-prime (40 ms); N = 14 long-prime (120 ms)). Short primes reduced ERP amplitudes for all conditions except semantics/(v). Importantly, this includes our root letter transpositions/(iv), contra much previous literature. Long primes showed facilitation in all conditions but with differences in effect size: largest for Identity, followed by root priming (ii/iii), with semantic primes and root-transpositions (iv/v) showing the smallest effects. We argue that (1) there may not, in fact, be qualitative crosslinguistic differences with respect to orthographic priming, and (2) previously observed Arabic root effects in masked priming may be due to orthographic rather than morphological overlap.

Keywords: *morphology, Arabic, ERPs, priming*
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C19 Attraction effect in the processing of number agreement in English as a second language.

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The present study investigated 1) whether Korean L2 learners of English show the attraction effect observed in the L1 processing of English, i.e. a tendency for the verb to erroneously agree with local noun phrases that precede it much immediately than the head noun (Zandvoort, 1961; Bock & Miller, 1991), 2) whether the property of Korean that the conceptual number of plural noun is different depending on the animacy of the noun is transferred, and 3) whether such L1 transfer depends on the learners' L2 proficiency. We constructed 64 sentences manipulated by the animacy of local noun, grammaticality of the whole sentence in terms of number agreement, and the local number congruency between the local noun and the main verb ([Table 1]). Eye movements of 38 participants (19 high-proficient and 19 intermediate learners) were recorded while they read the experiment sentences. The reading time for the main verb region revealed different patterns of attraction effect depending on the L2 proficiency. In high-proficient learners, the interaction effect between grammaticality and local agreement was significant in total reading time ($F(1,18) = 5.935$, $p < .05$) and the main effect of local congruency is significant in the proportion of regression ($F(1,18) = 10.646$, $p < .01$), indicating that the grammaticality modulated the attraction effect. In intermediate learners, by contrast, the main effect of animacy is only significant in total reading time ($F(1,18) = 6.729$, $p < .05$), second pass reading time ($F(1,18) = 4.320$, $p < .05$) and the proportion of regression ($F(1,18) = 4.656$, $p < .05$), implying the absence of attraction effect as well as the L1 transfer effect. Overall, our results demonstrate that learners show native-like processing pattern as their L2 proficiency develops.

Keywords: *attraction agreement, L1 transfer, L2 proficiency*

Table 1. *Example of materials*

Animacy of Local noun	Grammaticality	Local Congruency	Sentences
Animate	O	O	The dancers that attracted the musicians were very charming.
		X	The dancers that attracted the musician were very charming.
	X	O	The dancer that attracted the musicians were very charming.
		X	The dancer that attracted the musician were very charming.
Inanimate	O	O	The explorers that found the treasures were very lucky.
		X	The explorers that found the treasure were very lucky.
	X	O	The explorer that found the treasures were very lucky.
		X	The explorer that found the treasure were very lucky.

C20 Ambiguity Resolution in Natural Reading.

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How can people effectively understand ambiguous messages? A possible answer is that understanding is not always effective, and ambiguity may not be resolved at all. Swets, B., Desmet, T., Clifton, C., Ferreira, F. (2008) showed that syntactic ambiguities are read faster when sentence meaning was underspecified. We aim to find out whether similar meaning underspecification is possible with lexical ambiguities. If no ambiguous word`s meaning is favored by the sentence context, any meaning that comes to reader`s mind will fit the sentence, and ambiguous words in such contexts might be read faster than in more restrictive ones. In a restrictive context, the reader will need time to activate the correct meaning of the ambiguous word and suppress the competing ones. We tested 33 nouns with three meanings each (direct, metaphorical, and metonymic). For each noun, an experimental set with four conditions (contextual sentence favoring direct, metaphoric, metonymic or none of the meanings) was created. The contextual sentence was followed by the target sentence with the ambiguous word, which was constant across conditions. 80 people read experimental sentences while their eye-movements were tracked. We expected to see a speedup on the ambiguous word in the underspecified condition compared to the other conditions. But we found that it was read longer in the metaphoric sense condition instead: SFD – 95% CrI = [1, 25]ms, TT – 95% CrI = [1, 25]ms. These findings demonstrate that lexical ambiguities are processed in a different way than syntactical ones.

Keywords: *ambiguity, eye tracking, lexical ambiguity, polysemy, underspecification*

C21 The role of gender-related cues in inflectional operations: A Rapid Event-related fMRI Study on Italian.

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Grammatical gender is a common feature of human languages: it drives agreement between nouns and modifiers, allows the generation of inflected forms of nouns and, in some languages, it can be probabilistically accessed on the basis of its distributional correlations with noun formal markers. The aim of the study is to exploit the Italian gender-suffix system to reveal whether (or not), and eventually how (and where) in the brain, the processing of different gender-related cues embedded in nouns affects the computation of gender-dependent inflectional operations. A rapid event-related fMRI experiment was carried out where 50 healthy participants were administered with an overt inflection task. The experimental task (singular-to-plural inflection vs. plural-to-singular inflection), the grammatical gender (masculine vs. feminine) and the type of noun ending (opaque vs. non opaque) of the stimuli were manipulated. Masculine and feminine nouns elicited significantly different patterns of cortical activation in the cerebellum (bilaterally) and in the right middle temporal gyrus. A significant interaction between gender and type of word ending was obtained in the left inferior frontal gyrus, the left posterior cingulate cortex, the right middle temporal gyrus and the left cerebellum. A 3-factors significant interaction was found in the left temporal gyrus, in the right superior frontal gyrus and in the left posterior cingulate cortex. These results show that the reliability of gender suffixes modulates the neural processing of noun inflection and corroborate the hypothesis that lexical access is sensitive to the distributional association between genders and different inflectional paradigms of nouns.

Keywords: *grammatical gender, inflection, fMRI*

C22 Standardized tools for exploring patterns of phonological development in Russian-speaking monolingual and bilingual preschoolers: the Russian version of the Speakaboo test.

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Some phonemic contrasts tend to be acquired in a universal order (Olmsted, D. L. (1971). Preliminary evidence from Russian seems to support this theory (Bel'tjukov, & Salaxova, 1975, Eliseeva, 2008; Timm, 1974; Yakobson, 1985). However, there is currently limited empirical evidence on the acquisition of consonants by Russian-speaking children (Vinarskaya, & Bogomazov 2005). Specifically, the main body of research focuses on a selection of consonants (Gvozdev, 1948), and the reported findings typically come from observations of individual children (Bel'tjukov, & Salaxova, 1975, Eliseeva, 2008; Timm, 1974; Yakobson, 1985; Zharkova, 2005), raising questions about generalizability of these results. In addition, the lack of normative data on phonological development in Russian leads to clinical problems of misdiagnosis and delayed diagnosis across monolingual and bilingual children. The aims of the current study are, therefore, twofold. First, we test the hypothesis of the universal order of acquisition of phonemic contrasts in Russian-speaking monolinguals and bilinguals. Second, we compare the patterns of acquisition of Russian consonants using cross- sectional data against those theoretically predicted and previously reported using longitudinal data (Eliseeva, 2008). This talk presents data from typically developing monolingual and Russian-Dutch bilingual 2–5-year-old children collected with the Russian version of the Speakaboo test (Blumenthal, et al, 3016). Both monolingual and bilingual data supported the hypothesis of the universal order of acquisition of phonemic contrasts: nasality is acquired first, followed by friction. Interestingly, the observed patterns of consonant acquisition differed notably from those reported for individual children using longitudinal data. Importantly, the great proportion of consonants appear to be acquired much later than it has been previously assumed. Theoretical and clinical implications of these findings are discussed.

Keywords: *Russian language, child language development, phonology, articulatory screening, bilingual, monolingual*

C23 Tri-morphemic words in processing.

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Tri-morphemic words are not necessarily a linear string of morphemes since affixed words can themselves attract a suffix or a prefix: (un-(helpful)) vs. ((unhappy)-ness)). Although transparent morphologically related words readily prime, priming of suffixed-suffixed words remains controversial (Marslen-Wilson et al., 1994; Grainger et al., 1991). Two issues are investigated: (i) Are tri-morphemic words decomposed allowing stem-activation? (ii) Do tri-morphemic words with different structures (Pfx-Suffixed) vs. (Prefixed-Sfx) prime their suffixed counterparts equally? Three experiments, visual lexical-decision priming tasks with 5-to-7-item lag, were run in Bengali; three groups of native speakers participated in Kolkata, India. To provide a baseline measure for morphological priming, independent of form and semantics, bi-morphemic suffixed items (koth-ito) were used to prime stem targets (Exp-1). In Experiments 2 & 3, primes were tri-morphemic while targets were respectively stems and suffixed words. To ensure that facilitation of morphologically related words is not due to form and semantic overlap, equal numbers of form-related and semantically-related pairs were added. If tri-morphemic words are decomposed, facilitation of their stems is expected (Experiment-2). In Experiment-3, where the target is suffixed, inhibition is conceivable as both primes and targets are suffixed (cf. Marslen-Wilson et al., 1994), particularly for Exp-3(ii) where a genuine suffix cohort exists (cf. (O-(kothi-to))~(kothito)). Overall, only morphologically related words prime including both suffixed-suffixed conditions, Pfxed-Sfx and Pfx-Sfxed (Exp-3). Thus, despite the increase in the number of morphemes, all morphologically complex words facilitated their stems and suffixed counterparts and suffixation did not lead to inhibition.
Keywords: *multimorphemic word processing; morphology; suffix inhibition*

C24 An ERPs study on the lexical markedness and the truth value in the Korean comparative sentences processing.

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In recent years, there has been much debate about functional interpretation of the N400. The N400 reflects the difficulty of accessing at the lexical level and reflects the integration difficulty at the sentence or discourse level. Previous studies have attempted to elucidate the differences in peak timing or topographical distribution of the N400 component, which reflects the processing difficulty at different linguistic levels. In this study, we tried to identify the difference of ERP components reflecting the processing difficulty of lexical level and sentence level using Korean comparative sentence. To confirm this, we employed 15 participants (7 females, mean age 24.2) and they performed a verification task on the Korean comparative sentence manipulated such as «A는 B보다 크다/작다(A is bigger/smaller than B)». In Korean, 크다(big) is unmarked and 작다(small) is marked predicate(Kim and Kang, 2000). Since the truth-value could be calculated right after the onset of these predicate, the lexical effect and the truth-value effect could be identified at the predicate simultaneously. The ERPs results, in the 200-400 ms, showed that the negativity effect was elicited in the unmarked condition compared to the marked condition ($F(1,14) = 30.897^{***}$) and in the true condition compared to the false condition ($F(1,14) = 6.206^{*}$). In the 400-600ms, the positivity was larger in the false than the true condition ($F(1,14) = 17.388^{**}$)(Figure 1). This implies that in Korean, lexical processing difficulty is fully reflected in early N400 component, whereas the processing difficulty in the sentence and/or semantic integration difficulty in the sentence level enlarged not only N400 but also P600 component. Conclusively, the underlying neuro-cognitive mechanisms engaged the two linguistic levels are qualitatively different and P600 component is also affected by the verification processing as well.
Keywords: *lexical markedness, truth-value, Korean comparative sentence, ERP, N400, P600*

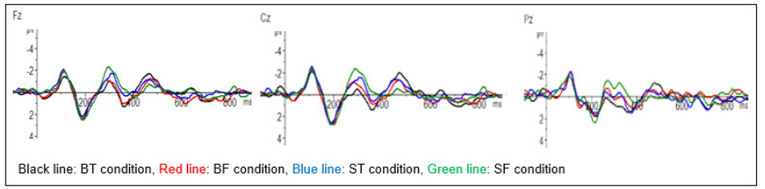

Figure 1. *Average amplitudes of the brain response at the predicate position, Fz, Cz & Pz electrodes.*

C25 On the semantics-driven disambiguation in the processing of Korean comparative constructions.

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This study investigates the role of the lexical-semantic features of incoming words for the disambiguation of locally ambiguous comparative constructions in Korean, illustrated in the following:

Tasha-TOP Mary-POSTPOSITION(="than") Sue-OBJ like

(1) [Tasha-TOP Mary-OBJ(Theme) like]-than Sue-OBJ more like
«Tasha likes Sue more than Tasha likes Mary.»
(2) Tasha-TOP [Mary-NOM(Experiencer) Sue-OBJ like]-than Sue-OBJ more like
«Tasha likes Sue more than Mary likes Sue.»

Given Minimal Attachment, (1) is expected to be selected at the OBJ position. However, the strength of semantic association between the compared words might play a critical role in the disambiguation process. In the example like (3), it could be hypothesized that the interpretation like (2) would be preferred against Minimal Attachment due to the strong semantic relationship between 'a chef' and 'cooking'.

(3) Tasha-TOP chef-than cooking-OBJ well do

To test this hypothesis, we constructed 60 experiment sentences (20 per condition) which were manipulated in terms of semantic association between the words to be compared: (a) no association (b) weak association (c) strong association; 34 Korean native speakers were required to supplement the sentence final verb which was missing. Our results indicate the proportional increase of the sentence completion such as (2) when the strength of semantic association between the words to be compared increases: (a) vs. (b): $t(33) = 15.50$, $p < .001$; (b) vs. (c): $t(33) = -8.70$, $p < .001$).
These results demonstrate that the lexical-semantic features of incoming words strongly contribute to disambiguate the locally ambiguous comparative construction of Korean.
Keywords: *ambiguity, disambiguation, comparative constructions, Korean*

C26 Two-stage operation of multi-level chunking in reading.

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The chunking process in language comprehension refers to partitioning continuous linguistic input into smaller pieces. Effective chunking during reading facilitates disambiguation and enhances efficiency for comprehension. However, the mechanisms of chunking remain elusive, especially in reading given that information arrives simultaneously yet the written systems may not have explicit cues for labeling boundaries such as Chinese. What is the mechanism of chunking that mediates reading of text that contains multiple levels of hierarchical information? We investigated this question by manipulating the lexical status of chunks at distinct levels of grain-size in four-character Chinese strings and recording the electroencephalography (EEG). The behavioral results showed that the lexical decision of lexicalized two-character local chunks was influenced by the lexical status of four-character global chunk, but not vice versa, which indicated that the judgement of global chunks possessed priority over the local chunks. EEG results revealed that nested chunks were detected simultaneously at both levels and further processed in different temporal order -- the onset of lexical access for the global chunks was earlier than that of local chunks. These behavioral and EEG results suggest that chunking in reading occurs at multiple levels via a two-stage operation of simultaneous detection and global-first recognition.
Keywords: *hierarchy, segmentation, lexical access*

C27 Understanding lexicality mechanisms via trial-and-error word learning: MEG study.

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A stable association between words and objects or events underlies human speech. Today it is rather challenging for neuroscience to describe how lexicality is established in the human brain, and how phonological word representations relate to lexicality. The current study aimed to use trial-and-error learning paradigm to establish new associations between pseudowords and actions. We addressed two questions: when and where processes associated with lexicality take place in the human brain, and how newly formed associations influence phonological processing of pseudowords. Participants were presented with eight pseudowords; during learning blocks, four of them were assigned to specific body part movements through commencing actions by one of participant's left or right extremities and receiving a feedback. The other pseudowords did not require actions and were used as controls. Magnetoencephalogram was recorded during passive listening to the pseudowords before and after learning blocks. The cortical sources of the magnetic evoked responses were reconstructed using distributed source modeling. Phase-locked neural response selectively increased for pseudowords that acquired association compared with control pseudowords. Using data-driven approach, we localized significant differential activation into the left hemisphere, including insula, Broca's complex, intraparietal sulcus and anterior STS-MTG. Differential activation started 150 ms after the uniqueness point. These areas can be viewed as both low-tier (STS), and higher-tier (intraparietal sulcus, temporal pole) structures involved in speech processing. Our results evidence active involvement of a phonological loop in semantic access during initial world learning, which agrees with Lieberman's motor theory of speech perception.
Keywords: *action words, lexicality, word meaning, associative learning*
Acknowledgements: *Supported by RFBR grant 17-29-02168.*

C28 Processing Strategies in Language Acquisition.

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It has been consistently shown that object relative clauses (ORCs, Where is the cat that the hedgehog is feeding?) are delayed in the process of language acquisition and cause greater comprehension difficulty with pre-school children, as compared to their subject-extracted counterparts (SRCs, Where is the cat that is feeding the hedgehog?) across a number of languages. However, numerous studies demonstrate that structural factors that might facilitate

ORC processing (grammatical gender/number of the verb) are underexploited up to a particular age. The present contribution assumes that SRCs and ORCs are operated by two different processing strategies. Russian and German children were exposed to instances of a SRC and an ORC in a character selection paradigm. Eye movements of German children were tracked on the visual display while they were listening to the target stimulus. For Russian, word order variations (V-NP; NP-V) additionally were contrasted. Both Russian and German children performed significantly worse on ORCs than SRCs. The second most common error type was the so-called embedded NP error («hedgehog») that showed up on deterministic response measures for Russian and eye-tracking patterns for German. Apparently, children are more skillful at applying a pre-stored empty structure for more frequent and well-entrenched SRCs than assembling a structure for ORCs, which requires additional low-level computation. Critically, embedded NP error was more common for ORCs than for SRCs. It can be seen as a developmental stage for the ORC processing strategy to emerge, which is grounded in the maturation of inflectional morphology.

Keywords: *relative clauses; syntax processing; language acquisition*

C29 Case form processing in sentential context: evidence from Russian.

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Many studies of case processing in morphologically rich languages investigated differences between noun forms presented in isolation. Frequency, syncretism and other factors were found to affect reaction times, but it is not clear whether the same factors are relevant in the sentential context. In our self-paced reading study (96 participants, Latin square design) Russian sentences with prepositions requiring different cases (Gen, Dat, Acc, Ins) were used in four conditions, with correct and incorrect case forms: e.g. Desert iz malinyGEN/ *malineDAT/ *malinuACC/ *malinojINS soderzhit mnogo vitaminov 'Dessert of raspberries contains many vitamins'. All target nouns were feminine singular of the same inflectional class. All errors were read longer than correct case forms. Among incorrect forms, Genitive forms after prepositions requiring Accusative and Accusative forms after Dative prepositions were processed significantly faster than other errors. This can be explained by syncretism of case affixes among different inflection types: the Gen.Sg.Fem affix coincides with Acc.Pl.Fem and Acc.Pl.Masc ones; the AccSgFem affix coincides with Dat.Sg.Masc one. Our data show that after a preposition the reader not only predicts a particular form (hence correct forms are always processed faster independently from their relative frequency and place in the case hierarchy, which are usually called upon to explain RTs to isolated forms), but also expects a particular set of endings, which are associated with the relevant case in one or the other inflectional class. The second finding is novel and provides evidence for morphological decomposition and an independent representation of inflectional affixes in the mental lexicon.

Keywords: *case processing, morphological decomposition, mental lexicon, sentence processing*

C30 Dysfunctional profiles of angular gyrus and supramarginal gyrus in stroke survivors: Testing region-specific correlations with aphasic symptoms using predictive modelling.

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The present study follows a recent investigation on predictive models (Ferrante, et al., 2019) based on a large dataset of stroke survivors; the study was set up as a comparison of the prognostic power achievable using data produced by two different automatic lesion-identification algorithms, namely ALI (Seghier et al, 2008) and LINDA (Pustina et al, 2016). Besides demographic data, predictive models were trained with structural data produced by the segmentations performed by the algorithms over the whole left hemisphere of each subject; lesion distributions were encoded in each model in the form of lesion loads and total lesion volume. The overall goal was not only to measure the predictive advantage generated by these two segmentation procedures, but also to question the employment of manual segmentation as the general standard of comparison for automatic segmentation systems. Using an extended version of the dataset employed in (Ferrante et al, 2019), the present research has a twofold motivation: it constitutes an exploratory analysis concerning two posterior parietal regions whose functional contribution in language processing is mostly debated at present: namely, the angular gyrus and the supramarginal gyrus of the left hemisphere. Predictive models are trained and statistically compared looking for significative associations between damage in one or both of said areas and the manifestation of aphasic symptoms. Secondarily, the study answers a methodological question in that an attempt is made to sketch a pipeline to perform lesion-symptom mapping with limited interest to few target regions as opposed to whole-brain predictions; observations are provided about the feasibility, limitations of such approach and its applicability.

Keywords: *predictive modelling, angular gyrus, supramarginal gyrus*

C31 Complement Coercion in Mandarin Chinese: A Corpus-based Analysis.

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Verbs like begin require a complement that denotes an event, as in 'began the meeting'. When the verb is followed by an entity NP, as in 'began the book', a reader should recover an event-sense (e.g. began reading the book) by a type-shifting operation called 'coercion'. Existing work on complement coercion has focused on English, but it remains controversial regarding whether complement coercion exists in Chinese. This study addresses whether and how complement coercion works in Mandarin Chinese, using Chinese Media Language Corpus (over 2

billion words). We extracted 3,794 sentences of 19 event-selecting verbs (e.g. ting2zhi3 ‘stop’) with aspect markers (e.g. -zhe, -le, -guo), and found 267 (7%) sentences of 16 event-selecting verbs with an instance of coercion. We further created a coercion profile for each verb, tagging part-of-speech (POS) of each word in extracted sentences using Stanford CoreNLP and counting the number of words and POS types between each verb and their coerced nouns.
Then we conducted a cluster analysis based on the coercion profiles, yielding two results: 1) The optimal clusters for these verbs were estimated to be four, and there was a close relationship between the semantic and syntactic information among these verbs. 2) Aspectual verbs behave differently from psychological verbs in their potentials to undergo coercion.
The results demonstrate that Chinese has complement coercion operation, although it seems rare. Moreover, our findings suggest we should take verb type into consideration in the study of complement coercion processing.
Keywords: *complement coercion; Mandarin Chinese; corpus study*

C32 Effects of coherence relations on the interpretation of Korean null pronouns.

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We tested whether Korean null pronoun interpretation is guided by a structurally-based heuristic approach based on subjecthood and/or structural parallelism (Option A) or a discourse-based, coherence-relation approach (Option B, Hobbs, 1979; Kehler, 2002). While work on overt-pronoun interpretation has considered both Option A and B, work on null pronouns has focused largely on Option A (e.g. Carminati, 2002); coherence relations have received little attention. We report two experiments on subject- and object-position Korean null pronouns. In two-clause sequences, we manipulated three semantic/discourse factors that contribute to coherence-relations: (i) connective (kuliko 'and,' waynyahamyen 'because'), (ii) presence/absence of additive -to 'also'; (iii) presence/absence of the topic marker -(n)un. Additive -to makes grammatical roles of nulls ambiguous (Sbj/Obj-position pro). Option A predicts pronouns to be insensitive to these factors. Option B predicts that shifts in coherence relations triggered by these factors yield different pronoun-resolution patterns. 72 native Korean speakers completed a picture-based completion task (24 targets, 36 fillers) with nonce verbs (eliminating verb-semantics); images indicated transitivity. Our results (Figure 1) support Option B (coherence-relation approach): With resemblance relations signaled by ‘and’ OR 'also', both subject and object-position null pronouns prefer antecedents in parallel position. Crucially, this parallelism bias strengthens when resemblance is signaled by BOTH 'and' and 'also.'
No preference for either subject or object antecedents exists with 'because'; against Option A, and supporting coherence-based findings that explanation relations can involve subject OR object antecedents. We provide new evidence that subject-/object-position null pronouns are sensitive to not only structural but also discourse-level factors.
Keywords: *null pronouns, reference resolution, coherence relations*

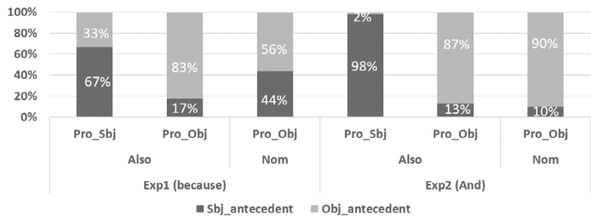

Figure 1. *% trials where pro refers to preceding subject/object (Sbj/Obj_antecedent), as a function of whether the pro itself is interpreted as being in subject/object position (Pro_Sbj/Pro_Obj) in Exp1&2.*

C33 Effects of continuous simultaneous oral reproduction practice on L2 overall proficiency improvement: Perspectives from the Cognitive Load Theory.

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In terms of the Cognitive Load Theory (Sweller 1988) claiming that highly cognitive load tasks hinder learners’ language processing due to working memory limitation, simultaneous L2 oral reproduction tasks, which require learners to decode auditory input, understand message and orally reproduce sounds with appropriate prosodic planning concurrently, are highly cognitively demanding and not appropriate for L2 language acquisition. However, in L2 classrooms these tasks are expected to increase listening and speaking skills, accelerate language processing and improve L2 overall proficiency. Significantly high correlation between simultaneous L2 oral reproduction performances and overall proficiency has also been reported. This study attempted to clarify effects of simultaneous oral reproduction practice on overall proficiency and verify the Cognitive Load Theory. A total of 44 L2 learners of English were involved in three-month continuous practice, where they simultaneously orally reproduced a variety of 200- to 300-word passages five times per week. Before and after this practice, the participants took the standardized proficiency test TOEIC and recorded their simultaneous oral reproduction utterances of the same test passages. Their utterances were assessed by the cutting-edge speech technology named DNN-GOP. Experimental results revealed significant improvement between pre- and post-TOEIC scores ($t(43) = 4.19$, $p < .001$, $d = .63$, 95% CI[0.31, 0.95]) as well as between pre- and post-DNN-GOP scores ($t(43) = 3.40$, $p = .001$ $d = .51$, 95% CI[0.01, 0.05]). These results show that not all highly cognitive load tasks hinder learners’ language acquisition. If the tasks are continuously provided with their cognitive load levels well-controlled, the tasks can improve L2 overall proficiency as well as oral reproduction performances.
Keywords: *oral reproduction, proficiency, cognitive load*

C34 Grammatical Factors in Morphological Processing: Evidence from Allomorphy.

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This study examines whether sensitivity to allomorphy, a grammatical factor, impacts processing. English exhibits two kinds of allomorphy: rule-based (e.g. pluralization of cat/s/~dog/z/~walrus/əz/) and suppletive, conditioned by grammatical function (e.g. good~better~best). Paradigm allomorphy was coded as a predictor based on this distinction with the addition of no-allomorphy paradigms. Trials from the BLP lexical-decision dataset (Keuleers et al. 2012) were annotated for allomorphy type along the cline suppletion>rule>none, with every paradigm assigned only its highest complexity value for Experiment 1. Mixed-effects regression models were fit to the by-trial dataset with standard predictors, with z-transformed RTs and accuracy ratings modeled as the dependent variables. Frequency, paradigm allomorphy and their interaction were all significant predictors (all $p < 0.001$) for RTs, while only frequency showed significance for accuracy, prompting a deeper investigation. Additional predictors for stems with allomorphy (HasAllos) and for the allomorphs themselves (IsAllo) were introduced for Experiment 2 and used instead of paradigms. HasAllos yielded suppletion>rule>none for both dependent variables, inverted for frequency interactions (all $p < 0.001$). For IsAllo, allomorphy type exhibited rule>none>suppletion (all $p < 0.05$), while frequency interactions showed only partial significance. These findings indicate that not all information relevant to processing is distributional (cf. Baayen et al. 2011 and Marantz 2013), and sensitivity to allomorphy has to be addressed in processing models. Additionally, we have found that findings for whole paradigms can be decomposed into individual forms. Further investigation of allomorphic variables is needed, particularly crosslinguistic replication and establishing an explicit lookup model in the mental lexicon.

Keywords: *lexical processing, morphology, allomorphy*

C35 The expectation effect on sarcasm processing in reading.

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Theories make different predictions with respect to the context ability to facilitate the reading of statements which meaning is not conveyed directly, particularly, sarcastic expressions (Grice 1975, Gibbs 1979, Giora 1997, Pexman 2008, etc.). Previous experimental studies have shown very contradictive results. Thus, the question concerning the influence of readers' expectations on the processing of sarcastic utterances remains open. To address the issue, we developed 30 dialogical texts. Each of them was presented in three condition: (a) items, in which a sarcastic remark was highly expected due to the strongly supportive previous context, (b) items, that do not anticipate sarcasm, (c) neutral items requiring literal interpretation. In the eye-tracking experiment based on the Russian language material 30 participants had to read texts at a comfortable pace and answer comprehension questions following each text. The results showed, that the gaze duration on the target phrase was significantly longer in condition (b), comparing to (a) and (c) ($p < 0.05$), while the latter (a,c) did not reveal any difference in the processing. Moreover, the word following the target phrase was processed significantly faster in the condition (a), i.e. expected sarcasm, than in conditions (b) and (c), i.e. unexpected sarcasm and literal interpretation respectively ($p < 0.001$). These findings suggest that readers' expectations do have an influence both on lexical access of a sarcastic utterance and its integration into the context.

Keywords: *eye-tracking, sarcasm, readers' expectations, figurative language*
Acknowledgements: *Supported by the grant from SPBU #37592373.*

C36 L2 processing of case in Russian.

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In the light of recent interest to L2 online language processing, we report two experiments with Spanish-speaking learners of Russian using a self-paced reading task followed by grammaticality judgment. We created stimuli based on the most frequent noun case errors in written texts by Spanish learners of Russian. We hypothesize that such errors would be more difficult to detect in comprehension compared to other case errors. Firstly, L2ers often mix accusative and locative denoting direction and place. In Exp1 (24 A2 level participants), we used target sentences with prepositions requiring locative, accusative and instrumental (used as a control). Every sentence appeared in three conditions (Latin square design): one grammatically correct and two with case errors. Reading time results did not demonstrate significant differences (presumably, sentence-level processing mechanisms are still forming), but significantly more judgment errors were made in the sentences were Loc appeared instead of Acc compared to other conditions. Secondly, L2ers often choose the right case, but a wrong inflection: an ending from a different declension or an ending normally used for a different stem type. In Exp2 (25 B1 level participants), we compared these two error types to the control condition with a wrong ending from a different case. Significant differences were found both online and offline (errors in the control condition were easier to detect), similar to natives. This supports the view that L1 and L2 processing mechanisms are fundamentally similar, but the level of proficiency plays a role.

Keywords: *L2 processing, Russian morphology, case errors*

C37 Structural Priming in a Structurally Biased Language: Investigating Abstract Representations in Bilingual Children Compared to Monolingual Children over Development.

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Structural priming research on ditransitive structures (double object construction (DO) vs. a prepositional object construction (PO) have mainly focused on monolingual English speaking children, where both constructions are more or less balanced in use. This study investigates abstract representations of bilingual L2 German speaking children and adults over development compared to German monolingual controls by focusing on a structurally biased language, where the PO construction is strongly dispreferred. Crucially, priming effects are particularly strong with rare structures. We primed all groups with either a PO or DO structure presented in the different verb (DV) or same verb (SV) condition in prime and target in order to test for the lexical boost effect (enhanced priming effects). Additionally, we incorporated a baseline condition containing intransitive primes in order to assess the PO/DO production when not influenced by ditransitives. Relative to the intransitive baseline, bilingual participants showed a significant priming effect, similar to the monolinguals. However, the bilingual groups produced more POs across all conditions, showing initially stronger representations for the PO. Within the DV condition, however, the bilinguals showed no clear priming effects although the monolinguals did. When comparing priming effects in the SV condition to the DV condition, the adults showed a lexical boost effect while the children did not, suggesting that the connections between verbs and syntax gradually emerge with age. We conclude that bilinguals have similarly strong representations on the two structures, but are less sensitive to the structural bias in German

Keywords: *structural priming, bilingual L2 children and adults, structural bias*

C38 Incremental processing of temporal quantification – evidence from self-paced reading and ERPs.

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Quantification is one of the most extensively-studied topics in formal-semantic and pragmatic theory. Accordingly, a growing number of empirical studies have investigated the on-line processing of different properties associated with quantifiers. However, as most studies focus on nominal quantifiers like all, some, most, etc., relatively little is known about the quantification over more abstract entities like tenses. Our studies examined the online-processing of adverbial temporal quantification using picture-sentence verification in a self-paced reading task and an ERP study. As evidenced by an absent N400 for false vs. true sentences, studies on nominal quantification sometimes observed delayed processing-effects when sentences were not contextually-supported. Therefore, we examined whether temporal information incrementally contributes to the truth-evaluation process when facing ambiguous and unambiguous contextual cues. Contexts involved one (unambiguous, B,C) or two (locally-ambiguous, A,D) activities in the past. Sentences could be evaluated against the contextually-established meaning at the infinitive and the clause-final noun. Processing difficulties were expected to evoke increased reading times and an N400 whenever the temporal information was incompatible with the incoming word. Our results revealed discrepancies between behavioral and ERP studies: Whereas false vs. true sentences did not differ in reading times, they elicited an immediate N400 in our ERP study whenever unambiguous context information supported an immediate truth-evaluation, suggesting that ERPs are suitable to uncover cognitive conflicts during the on-line processing of temporal information. Our results highlight parallels between the processing of quantification in different domains. We will discuss the implications of these findings for semantic processing theories.

Keywords: *semantic processing, ERPs, N400, adverbial temporal quantification, incremental processing*

C39 Processes involved in emotional regulation through Reformulation language: An ERP study.

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The words we use when telling stories are causally involved in how emotional experience is understood, interpreted and represented. Using semantically related verbs has proven to alter the reconstruction of events, appearing more or less serious (Loftus & Palmer, 1974). Reformulation is a technic of conflict management in which the conflict situation is retold to evoke changes of attitudes in the persons involved. In this study we aim to elicit changes in the emotional experience by retelling the story using verbs with different emotional impact. We implemented the experiment using Event Related Potentials (ERP). Participants read short narratives in which we first presented a character (e.g., «Allan is a close friend») and a description of a conflict situation («… He hit you.») (Formulation). Next, the conflict situation is retold by replacing the main verb to another semantically related with low or high arousal («... that´s to say, Allan pushed you.») (Reformulation). In ERPs time-locked to the last word in the Reformulation condition, we hypothesize an enhancement in Early Posterior Negativity (EPN) which is associated to pleasant stimuli compared to those neutral and unpleasant, a decrease in N400 associated with less semantic incongruence, and an enhancement in Late Positive Potential (LPP), a robust measure of the reprocessing of emotional stimulation (Luck & Kappenman, 2011). We aim to implement this study with facial Electromyography.

Keywords: *emotion, language, reformulation, mediation, ERP*

C40 Olfactory meaning in love discourse.

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The paper tackles the question of smell semantics and semiotics in the context of lovers' communication. The author analyzes the linguistic representation of smell and identifies specific features of single lexemes' use for the transmission of olfactory sensations. Analysis shows that

the main ways of describing smell are hedonic odor assessment, naming the smell-reference and metaphorical transfer. These language devices are used with approximately equal frequency and depend on individual olfactory preferences and on being included in a certain context. The main olfactory area in in the lovers' communication is the nomination of a physiological impact on a partner who feels the existential necessity of perceiving the smell of the beloved person and desire for physical affinity. This effect is verbalized by metaphors which represent smell as an omnipresent peremptory aggressor pursuing the lover, penetrating into his/her consciousness, manipulating his/her biological essence. The smell is also often perceived as a poisonous substance that stupefies and intoxicates, acts on the invisible "front" as a hidden saboteur. An important means of describing smell in love discourse is the sensory-emotional synesthesia that represents the smell as a thirst quencher or a veil enveloping the beloved person with an invisible cloud. For instance the smell of a beloved woman is delicious and sweet, gentle and sensual; its assessment takes the entire positive scale from "good" to "divine". In conclusion a textual representation of the cognitive model of the beloved person's smell is given, which connects all linguistic facts into a single logically connected scenario.

Keywords: *smell, metaphor, synaesthesia, olfactory aggression, odorous, discourse of intimate communication*

C41 hen the prominent patient meets the eye: Perceptual priming in context.

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Perceptual priming of the patient - via implicit visual cueing in eye tracking studies - influences syntactic choices, with English speakers using passive structures to promote the patient. In flexible word order languages (e.g. Finnish, Korean) however, this manipulation does not discourage speakers from using default SO active structures. Moreover, contextual salience of the patient over the agent again elicits passives in English and other languages. I investigate structural choices by combining perceptual and contextual prominence. German with its various structural options offers an important test case of patient prominence in production. In each trial, participants read contexts introducing the agent and patient of the subsequent picture to be described, promoting the patient by providing more information for it than for the agent. After that, either a general (What happens?) or patient-promoting (What happens to him?) question appears. An implicit cue then appears at the agent or patient position, immediately followed by the picture depicting agent and patient. Structural choices of 40 speakers show no influence of perceptual cueing for the general context question. Active SO sentences prevail, but passives are also produced, probably because contexts were always patient promoting. With patient-promotion questions on the other hand, passive productions prevail over actives in both cueing conditions. In German, lining up with other flexible languages, structural choices are influenced by contextual prominence, but not significantly by implicit perceptual priming.

Keywords: *perceptual priming, derived accessibility, structural choice*

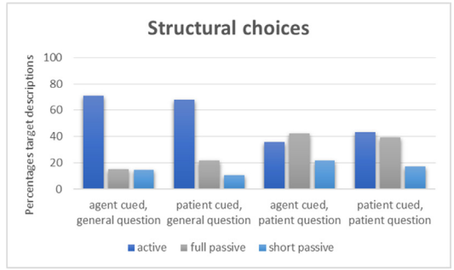

Figure 1. *Percentages of active, full passive, and short passive target responses (picture descriptions) in the four different conditions. 'Others' excluded.*

C42 Multiple-informant literacy evaluation of rural pupils at risk of developmental language disorder.

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Language difficulties may often go undetected. However, reading and writing difficulties, that commonly occur with language disorders (Snowling et al., 2016), are more likely detected during school activities. Therefore, teachers' concerns are important for referral for special services (Bishop et al., 2013). The present study addresses the relationship between teachers' and students' judgments and students' performance on standardized tests on spelling and reading in the population in the Russian north with an atypically high prevalence of developmental language disorder (DLD; Rakhlin et al., 2013). Twenty-eight children (age: 13 — 18 years, M (SD) = 15.66 (1.45); 14 females) were recruited from one rural school. Measures used: teacher and student reports — Language subscale of ACES (DiPerna & Elliott, 2000); standardized measures of literacy — Spelling and Reading Comprehension subtests of ARFA-RUS language test (Kornilov et al., 2018). The regression analysis revealed a difference in student and teacher ratings with former attaching greater values than the latter ($B = 8.59$, $SD = 1.91$, $t = 4.49$, $p < .001$, Fig.1). Standardized measures accounted for 48% of the variance in the teachers' responses (agjR2 = 0.483), suggesting a strong relationship between teachers' but not students' judgments (adjR2 = 0.085) of academic competence and students' actual achievement. The relationship between teachers ratings and Spelling scores ($B = 5.91$, $SD = 1.53$, $t = 3.86$, $p < .01$) rather than Reading scores ($p > .05$) possibly indicates, that teachers base their judgments on consistently assessed behavior, whereas reading performance being not so directly observable, speculatively, due to unsettled practice of reading assessments and absence of evaluative tools.

Keywords: *developmental language disorder, literacy, multiple-informants, school students*
Acknowledgements: *This research was supported by the grant № 18-18-00451 of Russian Science Foundation (PI: Grigorenko E.L.)*

C43 The «swinging» effects of morphemic ambiguity in lexical processing: Evidence from Korean.

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Our study investigates the structure of the Korean mental lexicon, exploring its representation of the interaction between semantic transparency and morphemic ambiguity. Korean words of Chinese origin are created from morphemes (Hangul) with multiple meanings derived from the Chinese characters (Hanja) that share that morpheme's pronunciation. The number of meanings varies between morphemes. We undertook three lexical decision tasks with semantic priming (one visual intramodal, two cross-modal): visually unrelated primes were semantically either (i) directly related to a Hanja within the target, (ii) indirectly related via a Hanja homophonous with a syllable in the target, or (iii) unrelated. We found that lexical processing of Sino-Korean words relies on the active semantic processing of their constituent Hanja. Depending on the specific Sino-Korean morpheme, semantic access is predicated on having either one strong semantic link or numerous, more tenuous links. Our findings suggest that cohorts, which have traditionally been used for phonemes (Marslen-Wilson, 1987), can also be defined semantically, varying according to the degree of relatedness and relative strength of semantic links. Our results are broadly consistent with the swinging lexical network model (Abdel Rahman & Melinger, 2009), which accounts for cohort-induced competition at the sub-lexical level, doubly interacting with the «swinging» effects of the semantics of the Hanja characters at the conceptual level. The precise contribution of Hanja to the Korean mental lexicon has yet to be properly understood; based on the assumption that native and Sino-Korean words are processed differently, our results offer evidence for a distinct representation of Hanja.
Keywords: *Morphemic ambiguity, semantic cohorts, Korean*

C44 Structural priming is determined by global syntax rather than internal phrase structure: Evidence from young and older adults.

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Structural priming provides evidence that speakers recruit abstract representations of syntactic structures during language processing. We investigated the extent to which structural priming persists with age and whether it depends upon highly abstract syntactic representations that only encompass the global sentence structure. In Experiment 1, 40 young and 40 older adults described transitive verb targets that contained the plural morphology of the patient role («The horse is chasing the frogs/ The frogs are being chased by the horse»). While maintaining the conceptual and global syntactic structure of the prime, we manipulated the internal phrasal structure of the patient role to either match (plural; «The king is punching the builders/ The builders are being punched by the king») or mismatch (coordinate noun phrase; «The king is punching the pirate and the builder/ The pirate and the builder are being punched by the king») the target. In both age groups, we observed robust structural priming effects – participants produced more passive targets following passive primes – which critically did not vary dependent on whether the internal phrasal structure matched or mismatched between the prime and target. In Experiment 2 (N = 40 young, N = 40 old), we repeated the task, but manipulated the noun phrase structure relating to the agent role (plural vs. coordinate): we again found that structural priming was unaffected by age or prime phrase type. This demonstrates that global, not internal, syntactic structure determines syntactic choices in young and older adults, as predicted by residual activation and implicit learning models of structural priming.
Keywords: *structural priming, sentence production, syntactic representations*

C45 Background noise modifies moral decision making in an auditory setting.

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An important aspect of social competence in humans is moral decision making. Previous research has shown that it can be influenced by the amount of emotion involved (e.g. Cushman et al., 2006; Haidt, 2001). In that prior work, participants always had to read moral dilemmas. The present study is the first in which participants are asked to listen to moral dilemmas, while noise is presented in the background. Hundred-thirteen Dutch adult participants were presented with personal dilemmas, which are emotionally aversive and involve direct contact with the victim, and impersonal moral dilemmas. The dilemmas were played at 65 dB SPL. The participants were randomly assigned to a clear condition (N = 56) or a noise condition (N = 57). The background noise consisted of harsh and dissonant sounds, which was supposed to trigger irritation in participants. The noise was played at 40 dB SPL such that it interfered, but that the dilemmas were still intelligible. Participants' task was to judge whether they found the proposed action in the dilemma appropriate or not. A mixed-effects logistic regression analysis demonstrated a main effect of Dilemma Type (estimate = .37, se = 0.17, z-value = -2.26, p = .02) and a significant interaction between Condition and Dilemma Type (estimate = -0.74, se = 0.33, z-value = -2.61, p = .02). The interaction indicates that the odds of making a deontological, emotional decision on personal dilemmas are significantly higher in noise compared to clear. No such effect was found for the impersonal dilemmas. These findings aid in understanding the role of emotion and cognition in moral decision making.
Keywords: *moral decision making; emotion; noise*

C46 Comprehension of subject- and object-relative clauses in Russian and German mono- and bilinguals.

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One of the most complex structures for syntactic processing is a sentence containing a relative clause (Heim & Kratzer, 1998). Moreover, the asymmetry in processing between subject- and object-extracted sentences was also found to cause processing difficulties. Previous research on the subject of syntactic processing of object- versus subject-initial clauses in adults divided linguists into two opposing lagers: those who revealed additional processing costs in the object-initial, non-canonical condition (Schlesewsky et al. 1999; Frisch, Schlesewsky, Saddy, & Alpermann 2002), and those who have not found such evidence (Bornkessel, Schlesewsky, & Friederici, 2002a; Frisch et al., 2002). The processing of relative clauses and subject vs. object-initial sentences, and especially, subject- and object-extracted relative clauses has become a rich source of empirical results of syntactic complexity and one of the most studied cases. In the current study we compare the comprehension of relative clauses in Russian and German languages, which have different preferred, canonical word orders. Within a sentence-picture-matching experiment, we intend to observe a canonicity effect between preferred/dispreferred constructions in Russian and German monolinguals and reveal the processing difficulty in the less frequent/dispreferred constructions. We also expect to find syntactic interference in bilingual speakers, which would be represented in the lower reaction times and accuracy of these constructions, comparing to Russian monolinguals.
Keywords: *bilingualism, relative clauses, sentence comprehension, syntactic ambiguity resolution, sentence processing*

C47 Cross-linguistic influence in parafoveal semantic processing: A study investigating L1 English monolinguals and late L2-English/ L1-German bilinguals.

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Native speakers can parafoveally process orthographic, phonological, morphological, and (potentially) semantic information1. Research with bilingual speakers is sparse but mixed. Research with Korean-Chinese bilinguals showed a reading benefit in Chinese when a Korean cognate word was presented parafoveally, suggesting an L2 semantic benefit2. However, no such benefit was seen with English-Spanish bilinguals3. In the current study we test both orthographic and semantic parafoveal processing with L1 (n = 51) and L2 speakers of English (L1-German, n = 51). Using a Gaze Contingent Boundary Paradigm4, we test 6 mask types: identical form (skin), English orthographic (first three letters shared, skix), English non-word (matched in ascending and descending letters, nhte), German translation equivalent (haut), German orthographic (haui), and German non-word (losi). The mask was previewed and changed to the identical form upon making a saccade across an invisible boundary (*). First fixation (FFD), gaze, and total duration on the critical word was greater with nhte, haut, and losi masks relative to skin for both groups. Additionally, there was an interaction between language and haut, with L2 speakers having a greater FFD than L1 speakers (Figure 1). Sliding contrasts revealed an interaction between language and haui-haut, with only L2 speakers showing a decrease in FD from haut to haui.

Both groups show increased reading times the less word-like the mask becomes, with L2 speakers being most impacted by German masks. This suggests that our L2 group showed little semantic benefit, but interestingly seems to show a L2 semantic benefit in the orthographic condition.
Keywords: *parafoveal processing, cross-linguistic influence, semantic N+1 preview effect*

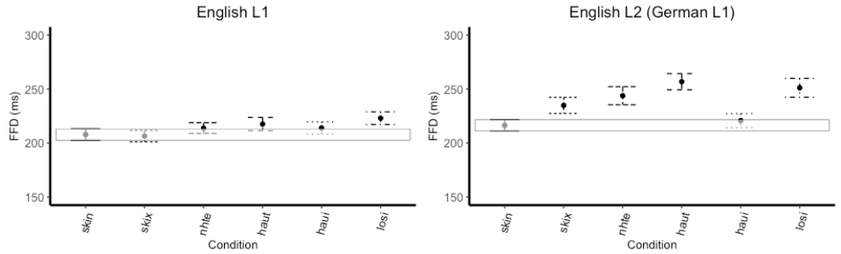

Figure 1. *First fixation duration across parafoveal mask types (error bars indicate 95% confidence intervals; box encompasses the confidence interval of the identical condition).*

C48 Does the experience of different language scripts influence performance in non-verbal cognitive tasks?

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There is much evidence that writing systems could affect mental representations. Alphabetic systems (e.g. English) tend to rely on auditory information and are represented in the mind primarily in a phonological code, while logographic systems (e.g. Chinese) tend to rely on visual information and are represented primarily in a visual code (Tavassoli, 2002). Logographic Chinese and alphabetic English have been studied over a range of domains, including brain networks activated in language processing and cognitive perception (e.g. colour, time, spatial perception), where the characteristics of the language scripts have been found to result in measurable differences. We set out to explore whether similar differences could be found in other cognitive domains. The current study compared Chinese monolinguals and English monolinguals on five well-established non-linguistic cognitive tasks. We found that Chinese speakers performed better on visual attention tasks (orienting in the Attention Network Task, and facilitation in the Number Stroop task), and mental rotation (Corsi Tapping task), while English speakers showed superior performance on auditory attention task (attentional switching in the Test of Everyday Attention). No group differences were found in the other sub-components of cognitive functions measured by these tasks. The results suggest that the experience of different language scripts might affect cognitive performance, although the interaction with other factors such as cultural differences and education systems remain to be studied.

C49 Multiword repetition disfluencies arise from cue competition.

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Repetition disfluencies (e.g., "I work for the… for the speech group") are ubiquitous in all preposing languages. We show that they are not unintentional perseveration errors but something one learns to do when the future is inaccessible but expected to be predictable from the present. A computational model of repetition explains why 1) repetitions occur only in preposing languages; 2) speakers repeat more than one word only when the past is highly probable given the present but has relatively low probability in other following contexts; and 3) they tend to restart speech from words that are particularly frequent in the utterance-initial position, controlling for syntax. We propose that, in executing a speech plan, words cue each other so that each word cues the words it commonly precedes. In addition, words are cued by top-down input. Each word is inhibited after execution. However, when the future is inaccessible, inhibition of the past is suppressed and the present is used as a cue to retrieve the past. The present and the retrieved past are then used to cue the future, which is only helpful when the future is predictable from what has been said (1). How well the present can cue the past depends on predictability of the past given the present and its base rate (2). Finally, words that tend to be preceded by other words are poor initiation points because they come to rely on their predecessors for activation, and are difficult to activate without preceding context (3).
Keywords: *language production, repetition, disfluency, planning, retrieval, associative learning, cue competition*

C50 The role of prosodic emphasis in speaker's communicative intention and in listeners' word prediction during spoken-language comprehension.

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Understanding the message of spoken sentences requires the processing of sounds into meaning. Prosodic emphasis can arise in ecological conversations when the speaker's intention is to highlight the content of message and to convince the interlocutor. To gain better understanding of the role of prosodic emphasis for the semantic analysis of discourse, we investigated whether emphasising a sentential context induces a better identification of speaker's communicative intention and more predictions on upcoming words by listeners. We hypothesized that prosodic emphasis contributes to the identification of speaker's communicative intention and guides the on-line word predictions. The participants' judgments on the speaker's communicative intention were better when the sentences were produced with prosodic emphasis compared to sentences produced without prosodic emphasis. When measuring event-related potentials on gender-marked French articles during the listening of semantically constraining spoken sentences, differences in ERP amplitudes between prediction-consistent versus inconsistent articles preceding the expected but omitted noun were found. These prediction effects occurred earlier over the N200 and persisted later after 600 ms when sentence were produced with emphasis. Hence, prosodic emphasis contributes to the identification of speaker's communicative intention and shapes the on-line word predictions. This interpretation supports the view that prediction is a key mechanism for insuring the successful communication between speakers and listeners.
Keywords: *prosodic emphasis, communicative intentions, prediction*

A. Hit responses on speaker's communicative intention

Unexpected gender-with prosodic emphasis	Expected gender-with prosodic emphasis	Unexpected gender-without prosodic emphasis	Expected gender-without prosodic emphasis
87.7	86.7	72.9	72.5

B. ERP time-locked to gender-marked French articles over Cz

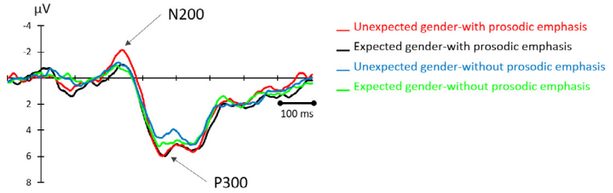

Figure 1. *(A) Hit responses on speaker's communicative intention. (B) ERP time-locked to gender-marked French articles over Cz.*

C51 Adults are not always faster than children. An eye-tracking study on the online comprehension of Indirect Scalar Implicatures.

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Indirect scalar implicatures (ISI) occur upon negating universally quantified statements ('not all boys left' → 'some boys left'). To investigate ISI computation, elementary schoolers and adults saw stories featuring two pirate groups, after which a sentence like (1) was played:
(1) The captain did not dance with all the mermaids.
The task was to reward the group best following the sentence, or reject both. Each group could display one of three scenarios: NALL (ISI support); NONE (violation), and false; giving rise to three conditions: Conds1/2 with ISI support/violation (NALL/NONE) vs. false. Cond3 tested the preference between NALL and NONE. Recordings lacked intonational bias to test unaided ISI derivation. Participants showed high accuracy with ISI support, and accepted violations; with a preference for supporting scenarios, which increases with age. Eye movements show faster disambiguation in Cond1 over Cond2. Shortly after negation, children fixated the target more steadily given ISI support. Adults display this effect late. The improved reference resolution in

supporting scenarios suggests fast and robust ISI computation. To investigate the adults' lag, we replicated Exp1 with adults and biasing intonation: offline choices reveal less violation tolerance and increased preference for ISI support. Participants' fixations consistently increase towards the correct scenario only in the supporting condition. In Cond2, decreasing target looks index uncertainty. Participants steadily fixated the violating scenario late, suggesting ISI computation and cancellation when not supported. The results indicate frequent and rapid ISIs in children and, given prosodic support, adults.
Keywords: *processing, indirect implicatures, scalar implicatures, acquisition of implicatures*

C52 The effects of frequency of gender, declension and number on the acquisition of Accusative case in Russian-speaking children.

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It has been shown that grammatical morphemes tend to be acquired in a particular order, and some of them take longer to master than others (Brown, 1973). However, many aspects of morpheme acquisition in languages with rich morphology like Russian remain not fully understood. Specifically, although many attempts have been made to explore the order and age of acquisition of case markings in Russian (Voeikova, 201; Voeikova, & Gagarina, 2002; Gagarina, & Voeikova, 2009; Ceytlin, 2006; Jean Berko, 1958), it is still not clear how the various linguistic factors influence this process. In particular, how the frequency of gender, declension and number and their interactions influences the ability of Russian-speaking children to generalize case markers to nonce words. This talk investigates this problem, using a wug-test (Ceytlin, 2006) with 16 nonce words, imitating high vs. low frequency declension stems, and paired with images of male and female animate creatures. Thus, we used 4 high frequency feminine, 4 high frequency masculine, 4 low frequency feminine and 4 low frequency masculine stems, each used in the singular and plural forms of Accusative. The participants were 35 typically developing monolingual children aged 3–6 years (M = 5.9, SD = 8.1, age is indicated in decimals): 13 boys; and a control group of 18 monolingual adults (M = 36.8, SD = 14.7). Our results demonstrate that children participants find it problematic to generalize morphological patterns for Accusative case markers to nonce words. In addition, our findings suggest that interactions between type of declension, gender and number have a significant effect on children's language acquisition and grammatical development.
Keywords: *acquisition, accusative case, frequency factors*

C53 Can computers understand word meanings like the human brain does? Assessing the correlation between EEG responses and NLP-generated word similarity.

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Semantic representation, a crucial window into human cognition, has been studied mostly independently in several disciplines. Within cognitive neuroscience, semantic relatedness can elicit N400 priming effects: target words in unrelated word pairs (e.g., apple-moon) elicit larger responses than those in related word pairs (e.g., star-moon) around 400 ms after target onset. Within computer science, it has been assumed that semantically similar words tend to appear in a similar context, and thus semantic similarity can be computed via co-occurrence frequency. Recently, with deep learning methods, natural language processing (NLP) models can learn semantic similarity from a large corpus. Can the representational formats established independently in two complex systems – our brain and computers – be related? More specifically, to what extent can NLP models predict humans' N400 priming effects? Do distinct NLP models differ in their predictability? To address these questions, we implemented a two-word priming paradigm with EEG recordings and tested which one of several representative NLP models was the best predictor for the EEG responses. We collected 32-channel EEG data from 25 participants and found significant correlations between word similarity generated from GloVe (a model based on word co-occurrence within both global and local context) and EEG signals elicited between 200 to 300 ms after target onset in the posterior EEG sensors. Our findings revealed specific time courses of semantic processing, linked semantic representation in the human brain and NLP models, and provided an objective and reliable evaluation for NLP models.
Keywords: *semantic priming, work embedding models, electroencephalography*
Acknowledgements: *This research was funded by the Science and Technology Commission of Shanghai Municipality, Grant no. 17JC1404101 (to Z.Z.) and Grant no. 17JC1404104 (to X.T.), as well as by the Program for Shanghai Eastern Young Scholar at Shanghai Institutions of Higher Learning (to L.Z.).*

C54 How we know factive verbs are islands for movement: experimental evidence.

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We show that factive predicates can block long distance dependencies for both arguments (Ross, 1967; contra Liu et al. 2019) and adjuncts (Cattell, 1978; Szabolcsi and Zwarts 1993), and that ellipsis does not repair factive island violations, unlike other types of islands (Ross, 1969; Merchant, 2001; Potter, 2017). Experiment 1 (Figure 1) found a small but reliable factive island effect: greater differences in acceptability between factive and non-factive verbs with long-distance argument dependencies (1) than with short-distance argument dependencies (2) (Sprouse, 2007). Experiment 2 found island effects for both arguments and adjuncts (1, 3).

Experiment 3 (Figure 2) found island effects for both arguments and adjuncts and, further, that this effect is not ameliorated by ellipsis (using stripping responses like Yeah, Emma/early next Friday in place of (1) and (3), respectively).

1 It was Emma who Alex resented/suspected that Kelsey had met with __.
2 It was Alex who __ resented/suspected that Kelsey had met with Emma.
3 It is early next Friday that Alex resented/suspected that Kelsey will meet with Emma __.

These results are problematic for discourse (Ambridge & Goldberg, 2008) and processing (Kluender & Gieselman, 2013) approaches to islands and for non-structural approaches to elliptical insensitivity (Culicover & Jackendoff, 2005). Instead, these results point either to derivational syntactic (Haegeman & Ürögdi, 2010) or semantic/pragmatic (Schwarz & Simonenko, 2018) explanations. This variability in elliptical amelioration across islands types suggests that ellipsis sites contain syntax, where the violation of some, but not all, types of islands are repaired (Merchant, 2001).

Keywords: *islands, factive predicates, ellipsis*

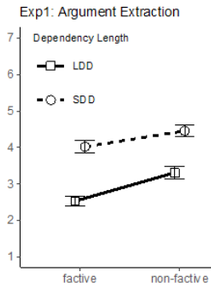

Figure 1. *Experiment 1*

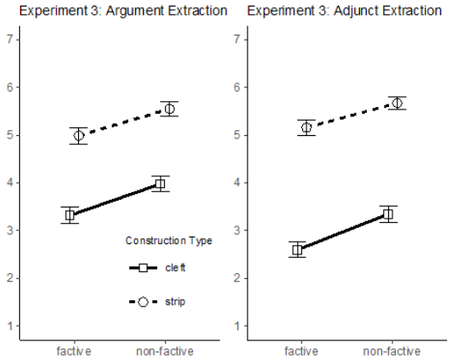

Figure 1. *Experiment 3*

Acknowledgments: *Research support by NICHD 2R15HD072713-02, NIH 5P20GM103436-13*

C55 Interference in presupposition resolution.

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Presuppositions indicate that a part of the information communicated in a sentence was already established earlier in the discourse. We investigated to what extent the retrieval process in presupposition resolution is subject to interference by inaccessible antecedents. We manipulated both the discourse structure and the availability of the antecedent. In (1), for instance, the antecedent that is closest to the presupposition trigger too (the proposition Sue had lifted the box) matches the verb used in the presupposition, lifting. However, it is in the scope of a negation and is therefore inaccessible. The other antecedent, Mary moved the box, is accessible, but it only partially matches the meaning of lifting (it must be assumed that Mary's moving of the box was a case of lifting it). (1) Mary moved the box, even though I don't think that Sue had lifted the box. Jane lifted the box too. In an acceptability judgement task and inference task we found that partial match is more acceptable for presupposition resolution than complete mismatch, and that the inaccessible referent is almost never interpreted as the referent of the presupposition. Even when the inaccessible element matches the verb while the accessible element forms a mismatch, participants use the accessible element for presupposition resolution. This shows that, ultimately, an inaccessible antecedent does not interfere in presupposition resolution. To further study the online process of search and hierarchical structure in presupposition resolution, we are currently carrying out an eye-tracking experiment with the same stimuli.

Keywords: *presupposition resolution, accessibility, discourse structure*

C56 Breaking down breaking down: automatic decomposition revisited with MEG evidence from visual processing of circumfixes, infixes, and reduplication in Tagalog.

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Morphological structure affects early processing of written words, leading to automatic decomposition of affixes (teacher/teach, Rastle et al. 2004), pseudoaffixes (brother/broth, Lewis et al. 2011) and morphosyntactically-coerced affixes (excursion, Gwilliam & Marantz, 2018). However, processes beyond prefixation and suffixation remain at the margins of understanding. This study investigates decomposition in circumfixation, infixation, and reduplication in the visual word form area (VWFA; anterior fusiform gyrus) in Tagalog. Participants (n = 20) performed a visual lexical decision task with the following: (1)circumfixed (2)infixed (3)pseudo-infixed (4)reduplicated (5) pseudo-reduplicated words which phonologically imitate reduplicated words [+i] (6)pseudo-reduplicated words which are not phonological imitates [-i] (7)morphologically simple. Magneto-encephalography was recorded concurrently, and VWFA activity corresponding to M170 was correlated with transitional probability (TP) between affix/reduplicant and base. LMEM results show that TP modulation is positive for reduplicated words, comparable to English and Greek suffixes (Neophytou et al. 2018). However, circumfixation and infixation exhibit a negative effect of TP: words with lower TP elicited more activity. [+i] pseudoreduplicates are also automatically decomposed in contrast with their [-i] counterparts; pseudoinfixed items are not. This study suggests several implications about neural correlates of morphological decomposition. Reduplication is comparable to prefixation/suffixation in that it is automatically parsed by the visual system during word recognition. Phono-orthographic cues aid this process; [+i] pseudoreduplicates are also automatically decomposed. VFMA activity elicited by circumfixation and infixation is also affected by TP. Finally, pseudoinfixed words are not automatically decomposed. These results suggest that decomposition depends on word/base relation and on base position with a word.

Keywords: *morphology, neurolinguistics, visual*

C57 Code-switching from first to second language could reduce emotional reactivity to taboo words.

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Bilinguals regularly engage in code-switching (CS), yet psycholinguistic studies show that code-switching, at least when cued, is costly (e.g., Meuter & Allport, 1999). Why do bilinguals switch despite the purported costs? One sociopragmatic motivation for first (L1) to second language (L2) CS is discussing taboo topics (e.g. Tomic, 2015). Nevertheless, reduced emotionality in L2 may not be the primary motivation for switching to L2, as contemporary studies show similar reactivity to emotional words, e.g. «death», in balanced bilinguals' languages (Ponari et al., 2015). A single study linking emotionality and CS indirectly showed that emotional reactivity is reduced due to CS, and not L2 per se (Oganian et al., 2016). This study aims to experimentally test the reduction of emotionality as a potential benefit of code-switching, by using eye-tracking-while-reading to compare emotional reactivity to taboo vs. neutral words in Spanish (L1), English (L2), and L1-L2 code-switched sentences. Eye-tracking studies show faster reading times for emotional words in both early and late eye-tracking measures (Knickerbocker et al., 2015). Gaze-duration pilot-data by 2 balanced bilinguals suggests strong emotionality in L1, with taboo words read faster than neutral words. In L2, the emotional reactivity to neutral and taboo words is equalized, whereas in CS we see an apparent reversal of emotionality, with taboo words read slower than neutral words. The full study (target N = 40) will widen the path for the necessary inclusion of sociopragmatic CS motivations into psycholinguistic research and could suggest a potential link between control mechanisms supporting CS processing and emotion regulation.
Keywords: *emotionality, code-switching, bilingualism*

C58 Competition between local priming and global outcome in processing of negatives.

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Processing negative sentences is more effortful than processing affirmatives. This was accounted via a 2-stage architecture whereby negatives are processed as a denial of an embedded affirmative: Robin is not a bird is processed as «NOT (robin is a bird)» (Fischler et al., 1983). The account, however, conflicts with the notion of incrementality of language processing. Darley et al. (2019, submitted) propose an alternative: locally 'robin' leads to activations such as 'bird' that must be globally inhibited after 'not' appears, i.e. difficulty with negatives is ascribed to a mismatch between local activation vs. global processing. Unlike for the 2-stage account, for the local-global account, the manipulation of NEG-marker position is essential: if the NEG-marker occurs early («This time there ISN'T in the bottom row…») the local activations can be suppressed more efficiently than when the NEG-marker occurs late («This time in the bottom row there ISN'T…»). This prediction was borne out in a mousetracking study in Russian in which participants memorised episodic scenarios (objects located within a 2x3 shelf, see Figure 1 for a sample trial) and completed affirmative or negative sentences about them. The results show that despite affirmative and negative sentences being equally pragmatically felicitous, negatives were more taxing than affirmatives. This was regardless of whether the NEG-marker was positioned early or late in the sentence. Repercussions for full incremental semantics are discussed.
Keywords: *negation, mouse-tracking, sentence processing*

Figure 1. *A sample trial. The target response is the basket, the lamp is the foil.*

C59 No effect of negation in counterfactuals: Evidence from the visual world paradigm.

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It is well known that negative assertions are more difficult to understand than affirmative ones. In the present study we found an exception with counterfactual conditionals. In Experiment 1, we presented people with affirmative counterfactuals, e.g., "if she had arrived early, she would have bought roses» and negative ones, e.g., "if she had not arrived early, she would not have bought roses» and tracked their eye movements when they were presented with an image of roses and an image of carnations. For the affirmative counterfactual, people looked at the image of carnations, whereas for the negative counterfactual they looked at the image of roses. Experiment 2 replicated the results with affirmative counterfactuals in a binary context (e.g., He did not know whether buying roses or carnations) or a multiple context (e.g., He did not know whether buying roses or carnations or tulips or daisies). People looked at the image of carnations in the binary context whereas they looked at the image of roses in the multiple contexts. Experiment 3 replicated the results with negative counterfactuals. The three experiments compared counterfactuals to causal assertions, e.g., "because she arrived early, she bought roses» and found different effects for them. We discuss how the processing of negation is facilitated in counterfactuals.
Keywords: *counterfactual; conditional; negation; contexts; visual world paradigm*

C60 A Cross-Cultural Distributional Comparison of Food Words.

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The aim of our study is to explore similarities and differences in the use of food words (e.g., «banana», «rice») in different cultures. We focus on the United States, France, and China. In order to remove the effects of cross-lingual differences (of typology or conventionalization), we compare three subcorpora of the English 1.7B-token Gigaword newspaper collection, namely New York Times (USA, 900M tokens), Agence France Presse (France, 171M tokens), and Xinhua News Agency (China, 132M tokens). Our hypothesis is that the differences between the texts produced by these agencies are clear enough to reflect differences in cultural practice. We build three semantic spaces for these corpora with the skip-gram algorithm. We started with a list of 200 food words classified according to their food-type (vegetable, meat, fish, …) and selected 100 items that occurred at least 100 times in each subcorpus to ensure robustness of representations. We performed three analyses for each sub-corpus. 1) We looked at the distribution of food words in the semantic spaces and identified clusters of similar food words. 2) We computed cosine similarity between each food pair and compared it by correlation across languages. 3) We extracted the 10 most similar words of each target, performed a by-item analysis and calculated the average neighborhood density for the different food types. Overall, this study shows a general common behavior of food words in the three different cultures when looking at their distributional properties that, however, vary significantly when looking at the item level.

Keywords: *distributional semantics, multicultural, food words*

C60 Pupil size reflects the time course of lexical access during production.

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Speaking relies on extremely fast retrieval and processing of linguistic information from long-term memory. The time course of lexical access during speech production has traditionally been deduced from speech onset latencies and – to a limited extent – ERPs (see Indefrey & Levelt, 2004). As an end-product of the planning chain, response times however are a function of all processes involved in the production process, making it difficult to isolate the contribution of separate processing stages. Instead, this study reports on how pupil dilation measurements provide an online record of the retrieval stages involved in word production. Pupil dilation of native Dutch speakers was measured during a Word Naming Task (words and pseudowords) followed by a Picture Naming Task. A GAMM analysis (Wood, 2017) of the pupil size data revealed early differences between word and picture naming – which may be attributed to conceptualization and lemma retrieval – and later differences between word and pseudoword naming – which may reflect differences in the need for grapheme to phoneme conversion. Also, we find clear effects of word frequency, in line with findings by Papesh and Goldinger (2012). Based on a deconvolution method (cf. Wierda et al, 2012), we reconstruct the temporal record of events that triggered the dilation. This method and the combination of tasks allow for a detailed analysis of the time course of cognitive processing during word production. We will discuss how the phases of increased cognitive effort relate to the stages in the production process.

Keywords: *pupil dilation, speech production*

C62 The word's sex: cognitive processing of grammatical gender by Russian monolinguals and Turkic-Russian bilinguals.

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Men and women's cognitive processing of words with the different grammatical gender is different. The effect may be caused by several factors: the characteristics of the perception of grammatical markers. The evidence on the «word masculinity or femininity» has been shown on masculine and feminine grammatical genders. We research the cognitive processing of words with masculine, feminine and neutral grammatical markers by Russian monolinguals (L1) and Russian-Turkic bilinguals (L2). In preliminary study people distributed the words between the male and female «scope of use». For each of the scope the most characteristic words of all grammatical markers were found. In this study the method of behavioral experiment was used. We included three main groups of independent factors: 1. grammatical markers: male (стол_ - table), female (книг_а - book), neutral (пол_е - field). 2. reference to the respondent's sex by picture priming (male or female) 3. sphere of usage: masculine or feminine. We measures reaction times in lexical decision task. Unlike bilinguals, monolinguals processed masculine grammatical gender faster. For bilinguals (Russian L2) factor of grammatical marker is not significant. There is no correlation with picture priming or sphere of usage for Russian L1. However, for bilinguals it is a significant factor (3-way interaction). Inhibitory effect of the sphere of usage and picture priming in the categorization of the words of masculine and neutral grammatical gender was found. Hypothesis that Turkic mother tongue impact the processing was proved.

Keywords: *bilingualism, grammatical gender, gender processing, Russian-Turkic bilinguals, social gender*

C63 'Nonetheless' can reverse predictions immediately: evidence from ERPs.

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Concessive connectives such as 'nonetheless' serve to signal that the upcoming proposition will be at odds with the current discourse. Past event-related potential (ERP) research has shown that comprehenders can use concessive connectives to update their predictions. Meanwhile, however,

some have suggested that related linguistic devices such as negation may not be processed fully incrementally. Further, as recent work suggested that some predictive computations may take longer than others (e.g., using argument roles in verb prediction), questions remain as to how quickly concessive connectives can reverse comprehenders' predictions in real time. We set out to ask how quickly comprehenders can use the concessive connective 'nonetheless' to reverse their predictions using ERPs. We manipulated (i) the coherence (and cloze probability) of the critical word by changing the prior context, and (ii) the distance between 'nonetheless' and the critical word by placing 'nonetheless' either at the beginning of the target sentence or immediately prior to the critical word, resulting in a 2 (coherent vs. incoherent) x 2 (long vs. short distance) design. Results (n = 27) revealed qualitatively similar effects across the short- and long-distance conditions, with coherence eliciting a clear N400 effect followed by a P600 effect in both cases. Additionally, we replicated these results in a follow-up experiment where 'therefore' appeared equally likely as 'nonetheless', showing that comprehenders' immediate sensitivity to 'nonetheless' is not simply due to its frequent occurrence. We take these findings to suggest that comprehenders can immediately reverse their predictions upon encountering a concessive connective.
Keywords: *ERP, prediction, timing, concessive connectives*

C64 Incidental learning of irrelevant information during reading acquisition.

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In this study we investigated if the way in which the alphabet was acquired during childhood determines orthographic processing during adulthood. A series of experiments were conducted with a group of native Spanish young adults who learned the alphabet in a linear fashion (namely, from A to Z), and with a group of native English young adults who learned it via the ABC song. All participants performed a series of letter searching operations requiring highly demanding orthographic/alphabetic processes (e.g., which letter comes 2 positions before the letter P?). The first relevant finding corresponded to the seemingly sequential manner in which the letters are stored in memory, from A to Z, leading to a predictable linear increase in the reaction times and error rates associated with operations performed on the letters as a function of their position in the alphabet. More strikingly, the second effect that we found was a clear-cut mapping between participants' behavior and the manner in which the alphabet had been acquired during childhood. While Spanish participants' responses were correctly accounted for by the position of the letters in the alphabet, English participants' behavior was better accounted for by a distribution of letters in blocks corresponding to the rhythmic bars of the ABC song. These experiments highlight the long-lasting effects of being introduced to the alphabet using specific music during childhood, demonstrating that the method of acquisition of the alphabet leads to different mental representations of the letters and the alphabet which persist during adulthood.
Keywords: *reading; orthography; alphabet*

C65 Biliteracy advantage: Learning novel written word-forms in native and second language scripts.

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The acquisition of new orthographic representations is a very fast and automatic process [1], although still poorly understood in biliterate population. Since the overlap between orthographic scripts in native and second languages (L1/L2) leads to phonetic ambiguities [2], the process of novel word learning might also be influenced by the ambiguity of the script. To test this hypothesis, reading latencies were collected from a group of Russian native speakers literate in both Cyrillic and Roman scripts - through a reading-aloud task in which 12 familiar and 12 novel words were repeated across 10 blocks. A third of stimuli was constructed in L1 Cyrillic script (i.e.: шаг, шаз), another third in non-native Roman script (i.e.: vet, vaz) and another third in ambiguous script (i.e.: cop, pex). A significant three-way interaction was registered showing a larger decrease of RTs in novel than in familiar words as a consequence of the training, more expressed for L2, and particularly for ambiguous scripts, in comparison to those presented in L1 script. Indeed, differences between familiar and novel words across each script were eliminated at end of the training, although remained significant for stimuli in ambiguous script. Furthermore, post-training tests showed better recall for ambiguous stimuli (in a recall test) and suggested the integration of both L2 and ambiguous novel words into the reader's lexicon (in a lexical decision task). Overall, our results indicate that the knowledge of two orthographic systems may contribute to the better learning and recall of the novel word-forms in ambiguous script.
Keywords: *second language learning, biliteracy, reading aloud*


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