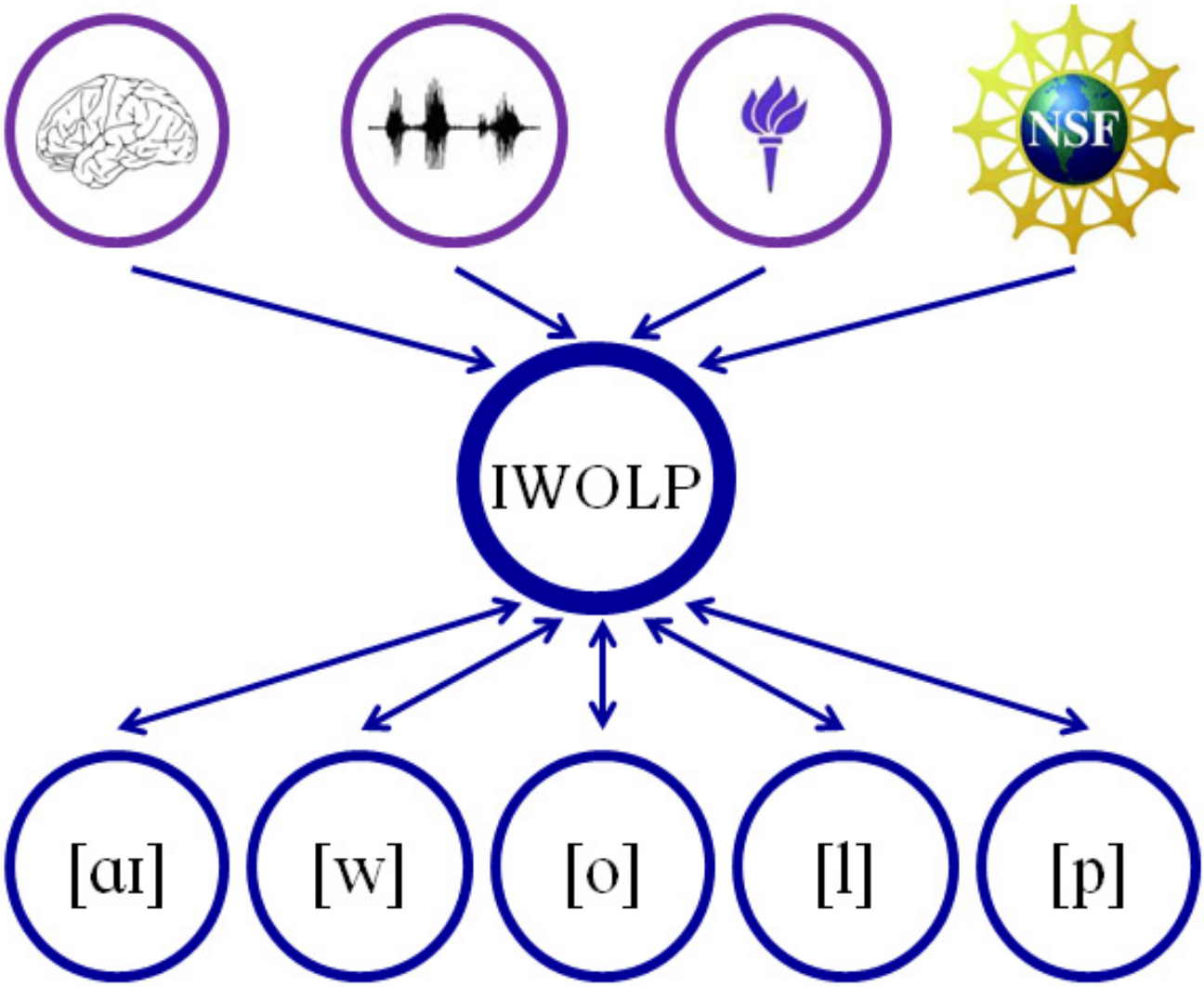
7th International Workshop on Language Production

IWOLP '12

New York University **July 18-20, 2012**



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7th International Workshop on Language Production – IWOLP '12

Wednesday, July 18th

8:00-9:00: Breakfast and Registration

9:00-9:15: Opening remarks

Session I: Mechanisms of lexical access

Chair: Matt Goldrick

9:15-10:15: **Greig de Zubicaray**: *Lexical selection in speech production: evidence from fMRI*

10:15–11:15: **Katharina Spalek**: *Facets of lexical competition*

11:15–11:30: Discussion

11:30 – 12:45: Posters & Coffee A

12:45–2:15: Lunch (on your own)

Session II: Producing sentences and complex words (Pt. 1)

(Chair: Vic Ferreira)

2:15-3:15: **Cindy Thompson**: *Shop, drop, fix, fall: neurocognitive mechanisms of verb and verb argument structure processing*

3:15–4:15: **Lyndsey Nickels**: *Lexical-Syntactic representation and processing: Evidence from aphasia*

4:15–4:30: Discussion

4:30 – 5:45: Posters & Coffee B

Thursday, July 19th

8:15-9:00: Breakfast

Session II (cont.): Producing sentences and complex words (Pt. 2)

(Chair: Alissa Melinger)

9:00-10:00: **Niels Janssen**: *Language production: Words and Rules?*

10:00 – 11:15: Posters & Coffee C

Session III: NSF Session: Constraints on Language Production

(Chair: Albert Costa)

11:15-12:15: **Tim Shallice**: *Is unification in the left ventrolateral prefrontal cortex limited to basic language processes?*

12:15-2:00 Box lunch (provided by the workshop)

2:00-3:00: **Ellen Bialystok**: *Linguistic and Metalinguistic Ability in Bilingual Children*

3:00–4:00: **Susan Goldin-Meadow**: *How our hands help us think*

4:00–4:30: Discussion

4:30–5:45: Posters & Coffee D

6:30-10:00 Dinner banquet at Trattoria Cinque

Friday, July 20th

8:45-9:30: Breakfast

Session IV: NSF Session II: Constraints on Language Production

(Chair: Michele Miozzo)

9:30-10:30: **Don Robin**: *Apraxia of Speech: A Motor Programming Disorder that Affects Speech and Non-Speech Control Systems*

10:30–11:30: **Robert Remez**: *Analogies and disanalogies in the production and perception of speech*

11:30–12:00: Discussion

12:00–12:30: Final discussion and closing remarks

Lexical selection in speech production: evidence from fMRI

Greig de Zubicaray
University of Queensland

Twelve years ago, Indefrey and Levelt published their first meta-analysis linking neuroimaging data to a popular modular architecture for speech production. This systematic mapping of 'processes-to-processors' afforded the possibility of testing alternate hypotheses concerning the different stages of processing at which various experimental effects in spoken word production are proposed to occur. Here I provide functional magnetic resonance imaging (fMRI) evidence for pre-lexical, lexical, *and* post-lexical mechanisms, the relative involvement of which varies according to the nature of the task and stimuli employed.

Time course data as evidence for lexical selection mechanisms: Findings, pitfalls, and avenues for future research

Katharina Spalek
Humboldt Universität

Is lexical selection during speech production a competitive process or not? Semantic interference effects in different experimental paradigms make up an important empirical cornerstone of models which incorporate competitive lexical selection. However, the locus of these effects has been under intense debate for quite some time now. Ideally, we would like to track the exact time-course of the semantic effects and tease apart the moment of lexical access from the moment of response preparation. This is an old question, and many studies have tried to do just this. A variety of methods has been employed: manipulations of the stimulus-onset-asynchrony in picture-word interference paradigms, statistical analyses which aim at the separation of early, automatic and late, strategic processes, or EEG, which allows tracking the speech preparation process millisecond-by-millisecond. Still, no consensus has been reached so far.

In the present talk, I will review the literature on semantic interference, comparing findings from various experimental paradigms and analysis methods. Against this backdrop, I will discuss reaction time and neuroimaging data from our own lab, trying (once again) to pinpoint the moment(s) in time when semantic information has an effect on speech planning.

Shop, drop, fix, fall: neurocognitive mechanisms of verb and verb argument structure processing

Cynthia K. Thompson
Northwestern University

This talk will focus on research examining verb and verb argument structure processing in healthy and agrammatic aphasic speakers. Results of this work show a verb argument structure complexity effect in both participant groups, in offline and online (eyetracking) verb naming and sentence production tasks, and in neuroimaging (fMRI) experiments (in naming and lexical decision tasks). Both the number and type of arguments (or thematic, θ-roles) encoded by the verb affect performance and engender differential neural activation, with the major findings as follows: (a) Verbs with greater argument structure density are more difficult to produce than those with simple argument structure entries (i.e., transitive verbs are more difficult than unergatives intransitives (e.g., *fix* versus *shop*). Transitive *v*erbs also show greater posterior temporoparietal activation when contrasted with unergatives (den Ouden et al., 2009; Thompson et al., 2007, 2010). (b) Verbs without a direct mapping of arguments onto the syntax are more difficult than those with a direct mapping (i.e., unaccusatives verbs which select for a single (theme) argument, which undergoes syntactic NP-movement from object to subject position (Burzio, 1986; Perlmutter, 1978), are more difficult than unergative verbs with a single (agentive) argument and no movement (e.g., *fall* versus *shop*) (M. Lee & Thompson, 2004). Eye movement data also show greater processing cost for unaccusatives compared to unergatives (J. Lee & Thompson, 2011) and fMRI contrasts show greater activation for unaccusatives in both anterior (IFG) and posterior regions (Shuchard et al., 2011). (c) Verbs with alternating transitivity (i.e., transitive-unaccusative or causative-inchoative alternation) are more difficult for agrammatic speakers to produce than unergatives (e.g., *drop* versus *shop*) both as singletons and in sentence contexts. These behavioral differences also show up in frontal and temporoparietal brain regions (Melter-Asscher et al., in press). These findings will be discussed within the context of language production/processing models (e.g., grammatical encoding processes) and associated neural mechanisms.

Lexical-Syntactic representation and processing: Evidence from aphasia

Lyndsey Nickels
Macquarie University

It is well established that lexical representations must comprise not only semantic and phonological information but also lexical-syntactic attributes of lexical items. Even nouns have a variety of lexical- syntactic attributes and in this presentation we will focus on two: number and countability.

Countability refers to whether a noun is mass or count, and is one of the less well understood lexical-syntactic attributes. There has been considerable and ongoing debate regarding the nature of representation of countability. Is it the case that countability is an intrinsic, fixed property of a noun, in the same way that grammatical gender is fixed? Alternatively, is countability an extrinsic, variable feature of a noun which is set by the linguistic and semantic context? In this presentation we will consider these issues using data from a single case study of a man with aphasia, RAP.

Number is an extrinsic, variable lexical-syntactic feature - whether a noun is produced as singular or plural depends on the context. While this aspect of lexical-syntax is uncontested, there is debate regarding the influence of number on word form representation. Is it the case that plurals are represented independently (undecomposed) or decomposed as stems and affixes? Might the nature of representation also vary depending on the relative frequency of singulars and their plurals? We explore this issue using data from aphasia which investigates the impact of plural dominance on word production accuracy.

Language production: Words and Rules?

Niels Jannsen
Universidad de La Laguna

How are complex forms of language such as morphologically complex words and syntactically complex multi-word phrases produced? According to the Words and Rules view, simple forms are stored in a lexicon, and complex forms of language are computed by a grammar. This distinction between storing simple forms and computing complex forms is the predominant view in current models of language production. In this talk, I will report on the results from three studies that have tested the predictions of this view. In all three studies, predictions are evaluated on the basis of manipulations of word frequency. Study 1 examines the presence of word frequency effects in the production of morphologically complex compound words (e.g., doghouse). Study 2 compares compound word processing between picture naming and lexical decision tasks. Finally, Study 3 examines word frequency effects in the production of complex noun phrases (e.g., the red shoe). On the basis of the results obtained in these studies, I will argue that these data challenge the Words and Rules view, and that they are consistent with a Usage-Based view of language processing.

Is unification in the left ventrolateral prefrontal cortex limited to basic language processes?

Tim Shallice
SISSA Trieste and Institute of Cognitive Neuroscience University College London

I will argue using predominantly neuropychological evidence that in addition to its role in online language processes such as in syntactic operations, the left ventrolateral prefrontal cortex is involved in at least three other qualitatively different processes – creating the preverbal message – in Levelt's terminology –holding abstract representations and task-setting. (Task-setting refers to the processes required in moving from novel execution of a task to its routine execution.) In the course I will review work on dynamic aphasia, and impairments of proverb comprehension, semantic memory and task acquisition. I will consider whether Hagoort's conception of unification can be extended to these other processes and so provide a common basic computational building block for these three functions.

Linguistic and Metalinguistic Ability in Bilingual Children

Ellen Bialystok
University of Toronto

Bilingual children develop language skills and use language differently from monolingual children. These differences have implications not only for linguistic ability but also for cognitive ability. Specifically, the interaction of language processing and cognitive processing converges on metalinguistic awareness and literacy, and it is in these domains that bilingual children develop noticeably different from their monolingual peers. I will review evidence for the language and cognitive development in bilingual children and discuss the implications of these differences for cognitive development.

How our hands help us think

Susan Goldin-Meadow
University of Chicago

When people talk, they gesture. We now know that these gestures are associated with learning. They can index moments of cognitive instability and reflect thoughts not yet found in speech. What I hope to do in this talk is raise the possibility that gesture might do more than just reflect learning—it might be involved in the learning process itself. I consider two non-mutually exclusive possibilities: the gestures that we see others produce might be able to change our thoughts; and the gestures that we ourselves produce might be able to change our thoughts. Finally, I explore the mechanisms responsible for gesture's effect on learning—how gesture works to change our minds.

Analogy and Disanalogy in Production and Perception of Speech

Robert E. Remez
Barnard College, Columbia University

A varied psychological vocabulary now describes the social and cognitive conditions of language production, the ultimate result of which is the mechanical action of the vocal musculature in spoken expression. Following the logic of the speech chain, descriptions of production have often exhibited a clear analogy to accounts of perception. This reciprocity is especially evident in explanations that rely on reafference to control production, on articulation to inform perception, and on strict parity between productive and perceptual form to explain invariance in the relation between abstract linguistic objects and observed expression. However, the whole story of production cannot derive solely from this presumed analogy. Despite sharing of abstract linguistic representations, the control functions in production and perception as well as the constraints on their use stand in fundamental disanalogy. This is readily seen in the different adaptive challenges to production — to speak in a single voice — and perception — to resolve familiar linguistic properties in any voice. An acknowledgment that idiolectal variation is psychophysically metathetic sets descriptive and theoretical challenges that break the symmetry of production and perception, and retires the old stalemate between psychoacoustic and motoric accounts in the regulation of production and perception.

Apraxia of Speech: A Motor Programming Disorder that Affects Speech and Non-Speech Control Systems

Donald Robin
University of Texas Health Science Center at San Antonio

This talk will provide an overview of Apraxia of Speech including a historical review which will focus on the issue of phonological versus motoric explanations for speech sound errors in apraxia. Following this, a summary of experimental data obtained over the past 10 years will be presented that make the case that Apraxia of Speech involves motor programming relative to (1) buffering units of actions and (2) difficulty with feed foreword processing.

Wednesday, July 18th Poster session A & B
A=odd, B=even

1. *WITHDRAWN*
2. *WITHDRAWN*
3. **Is the Proximate Unit in Chinese Word Production an Intrinsic or Accidental Property of the Production System?** *(Jenn-Yeu Chen, Train-Min Chen)*
4. **Syllabic Pseudohomophone Priming in Tip-Of-the-Tongue States Resolution: The Role of Syllabic Position and Number of Syllables** *(Rita Pureza, Ana Paula Soares, Montserrat Comesaña)*
5. **Commonalities of bilingual and monolingual lexical selection** *(Alexandra S. Dylman, Christopher Barry)*
6. **Producing speech with a newly learned grammar and vocabulary: an MEG study** *(Annika Hultén, Leena Karvonen, Matti Laine, Riitta Salmelin)*
7. **The effect of sound similarity and word position on spoken word production** *(Megan Reilly, Sheila Blumstein)*
8. **The impact of neighbour acquisition on phonological retrieval** *(Nicolas Dumay, Markus Damian, Jeff Bowers)*
9. **Native Language Tip-of-the-Tongue States in Low- and High-Proficiency Second Language Learners** *(Katy Borodkin, Miriam Faust)*
10. **Distractor-frequency effects in the picture-word interference paradigm: An effect of neighborhood?** *(Joana Cholin, Joana Acha, Ansgar Hantsch)*
11. **Cortical dynamics of spreading activation and lexical competition during naming investigated with MEG** *(Vitória Piai, Ardi Roelofs, Ole Jensen, Mathilde Bonnefond)*
12. **Comparing Types of Perseveration in Spoken Production** *(Simon Fischer-Baum, Gary Dell)*
13. **Boys and girls are friends: Associative priming in the picture-word interference task in children with and without language impairments** *(Patricia J. Brooks, Liat Seiger-Gardner, Olidia Valencia)*
14. **Interpreting bilingual language switch costs across proficiency groups: Different control mechanisms or resource limitations?** *(Angela Fink, Matthew Goldrick)*
15. **Examining syllabic inventories derived from spoken word forms - a quantitative contribution to the 'mental syllabary' theory** *(Daniil Umanski, Niels O. Schiller)*
16. **Individual differences in perception and production of novel non-native phoneme contrasts** *(Vera Kempe, John C. Thoresen, Patricia J. Brooks)*
17. **What do eyes tell us about bilingual language production: Increased second language (L2) proficiency and inhibitory capacity help bilinguals resolve competition during bilingual speech planning** *(Irina Pivneva, Abigail Free, Debra Titone)*
18. *WITHDRAWN*
19. **When is there no dog in hotdog? Form preparation of nominal compounds** *(Cassandra Jacobs, Gary Dell)*
20. **Internal verbal self-monitoring: speech perception or forward models?** *(Hanna Gauvin, Robert Hartsuiker)*
21. **The neural network of morphological processing in word production** *(Michele Miozzo, Katie McMahon, Kori Johnson, Greig de Zubicaray)*
22. **Evidence for a domain-specific lexical resource in speech production** *(Madlen Paucke, Frank Oppermann, Jörg D. Jescheniak)*
23. **Slips of the tongue in bilingual Spanish-English speakers** *(Solaman J. Cooperson, Zenzi M. Griffin)*
24. **Ways of looking ahead: Incrementality in language production** *(Eun-Kyung Lee, Sarah Brown-Schmidt, Duane G. Watson)*
25. **Dynamical model of the perception-production link and the timecourse of phonological planning** *(Kevin Roon, Adamantios Gafos)*
26. **Fluency of Speech Depends on Executive Abilities Evidence for Two Levels of Conflict in Speech Production** *(Nazbanou Nozari, Myrna F. Schwartz)*

27. **Individual differences in verbal working memory predict co-speech gesture** *(Maureen Gillespie, Kara D. Federmeier, Duane G. Watson)*
28. **Semantic Distance Effects in Picture Word Interference: Investigating the Role of Shared Features** *(Harrison Vieth, Katie McMahon, Greig de Zubicaray)*
29. **Plural dominance effects in picture naming for unimpaired speakers of English** *(Britta Biedermann, Elisabeth Beyersmann, and Lyndsey Nickels)*
30. **Individual strategies in speech production: is rhythm property of a language or an individual?** *(Anastassia Loukina, Burton Rosner, Greg Kochanski)*
31. **The impact of grammatical features and notional number on agreement** *(Heidi Lorimor, Carrie Jackson, Janet van Hell)*
32. **There are no mental firewalls: fMRI evidence for global inhibition of the native language in bilingual speech** *(Rossi, E., Newman, S., Diaz, M., Kroll, J. F.)*
33. **Variation in cognitive demands across turn-taking** *(Matthias J. Sjerps, Antje S. Meyer)*
34. **The truth about chickens and bats: Ambiguity avoidance distinguishes homophony from polysemy** *(Hugh Rabagliati, Jesse Snedeker)*
35. **The role of production variable in perceptual learning** *(Melissa Baese-Berk)*
36. **Audience Design through Attenuation of Information on Native and Non-Native dialogues** *(Sara Rodríguez Cuadrado, Albert Costa Martínez)*
37. **Does Phrase Structure Priming Exist?** *(Alexandra K. Frazer, Padraig G. O'Seaghdha)*
38. **Polynomial Modeling of Distance-Mediated Variation in Lexical Tone Production** *(J. Scott Hajek, Chilin Shih)*
39. **The electrophysiology of self-monitoring: prevention of taboo errors** *(Elisah D'Hooge, Wouter De Baene, Els Severens, Robert J. Hartsuiker)*
40. **Reading words in sentence context in the first or second language: Effects of semantic constraint and cross-language ambiguity** *(Caitlin Ting, Madelon van den Boer, Janet van Hell, Paola Dussias, Judith Kroll)*
41. **The mechanism underlying lexical selection: Evidence from the picture-picture interference paradigm** *(Jingyi Geng, Megan Kirchgessner, Tatiana Schnur)*
42. **The Relation between Executive Control Skills and Verbal Fluency in Monolinguals: Simulating the Bilingual Advantage** *(Khan, K. S., Kroll, J. F., Gerfen, C.)*
43. **Individual differences in bilingual picture naming** *(Kaitlyn A. Litcofsky, Janet G. van Hell)*
44. **The effect of interpretation on children's use of disambiguating prosody** *(Wook Kyung Choe, Melissa Redford)*
45. **Does semantic information affect subject-verb agreement in good and poor readers?** *(Katharine Donnelly Adams, Janet G. van Hell)*
46. **Calling neighbors near and far: Effects of recent phonological neighbor mention on vowel articulation** *(Jordana Heller, Matt Goldrick)*
47. **Immediate transfer of learning from speech perception to speech production** *(Audrey Kittredge, Gary Dell)*
48. **Long-term learning and immediate demands affect sentence production** *(Jessica L. Montag, Maryellen C. MacDonald)*
49. **Speech motor planning in the face of distraction: Evidence from apraxia of speech** *(Marja-Liisa Mailend, Edwin Maas)*
50. *WITHDRAWN*
51. *WITHDRAWN*
52. **Lexical Tone Perception and Production by English Vocalists and Instrumentalists** *(Shuang Lu, Joe Kirkham, Ratree Wayland, Edith Kaan)*

Thursday, July 19th Poster sessions C and D
(C=odd, D=even)

53. **Animacy is mediated by topicality in the production of word order in Yucatec Maya and Spanish** *(Lindsay Kay Butler, T. Florian Jaeger, Jürgen Bohnemeyer)*
54. **Facilitation and interference in the semantic blocking task: Electrophysiological evidence and a new computational model** *(Niels Janssen, Horacio A. Barber)*
55. **The role of language context and language dominance in the development of bilingual infant babbling** *(Monika Molnar, Melissa Baese-Berk)*
56. **Semantic interference and gender congruency in multiple-picture naming: ERP evidence** (*Sabrina Aristei, Pienie Zwitserlood, Rasha Abdel Rahman)*
57. **Semantic inhibition: not semantic, but lexical competition** *(David Howard, Lyndsey Nickels, Sandra Hanne)*
58. **How our brain represents the other's intention to speak: an ERP study on joint action during speech production** *(Cristina Baus, Vânia de la Fuente-Núñez, Francesca Branzi, Clara Martin, Albert Costa)*
59. **Are Errors Learned? Investigations of Word-Retrieval Difficulty in Aphasia** *(Erica L. Middleton, Myrna F. Schwartz)*
60. **The Role of the Language Production System in Extraction Asymmetries** *(Dana McDaniel, Cecile McKee, Wayne Cowart, Merrill F. Garrett)*
61. **Phonological neighborhoods in speech production revisited** *(Jasmin Sadat, Clara Martin, Albert Costa, F.-Xavier Alario)*
62. **The Relative Contributions of Root and Word Representations to Post-Lexical Processing of Suffixed Words** *(Naomi K. Berlove, Ariel M. Cohen-Goldberg)*
63. **Processing pressure on word order: Long-before-short preference in Basque** *(Idoia Ros, Itziar Laka,Kumiko Fukumura, Mikel Santesteban)*
64. **Lexical Retrieval in Illiterate and Low-Educated Adults: Age but not Education/Bilingualism Matters** *(Sameer Ashaie, Maeirah Ashaie, Loraine K Obler)*
65. **Semantic context effects in word production: An electrophysiological investigation** *(Llorens, A., Trébuchon-Da Fonseca, A., Riès, S., Alario F.-X., Liègeois-Chauvel, C.)*
66. **Semantic interference during naming: Will it stay or will it go?** *(Tatiana Schnur)*
67. **Accessibility and Competition: The Role of Animacy in Mandarin Relative Clause Production** *(Yaling Hsiao, Maryellen MacDonald)*
68. **Semantic Category Interference Effects in the First and Second Languages: Behavioral and Electrophysiological Evidence** *(Peiyao Chen, Robert J. Marker, Eleonora Rossi, Judith F. Kroll)*
69. **Testing the longevity of associate interference effects** *(Alissa Melinger)*
70. **Response Conflict in Language Production: Electrophysiological and Behavioral Evidence from Cognate Naming** *(Daniel J. Acheson, Lesya Y. Ganushchak, Mirjam Broersma, Diana M. Carter, Ingrid K. Christoffels, Peter Hagoort)*
71. **Letter activation influences lexical selection: Evidence from Acquired Dysgraphia** *(Carolyn Falconer, Adam Buchwald)*
72. **Subject anaphoric strategies in written narratives in Portuguese** *(Armanda Costa, Gabriela Matos)*
73. **Notional number, semantic coherence, and attraction in subject-verb number agreement** *(Laurel Brehm, Kathryn Bock)*
74. **Verbs' Argument Structure Restrictions and Syntactic Priming** *(Kyounghee Lee, Masaya Yoshida)*
75. *WITHDRAWN*
76. **Fronto-Posterior interactions underlie the semantic context effect in the semantic blocking paradigm: A neuropsychological and EEG study** *(Ries, S., Dronkers, N.F., Knight, R.T.)*
77. **Simple composition during language production in MEG** *(Douglas K. Bemis, Liina Pylkkänen)*
78. **Task-effects and Speech Disruptions in High-Functioning Autism** *(Anna Eva Hallin, Christina Reuterskiöld)*

79. **Internal estimation during speech production** *(Xing Tian, David Poeppel)*
80. **Monitoring speech models: Connectionist and Serial Approaches** *(Francisco Abelardo Robles Aguirre, Wendy F. Lara Galindo)*
81. **What slows down rapid naming?** *(Elisabet Service, Kendall Kolne, Sainica Premananth)*
82. **Do speakers pick up on how novel verbs are used in sentences?** *(Victor Ferreira, Jill Warker, Liane Wardlow Lane)*
83. **Semantic Diversity Affects Accessibility in Sentence Production** *(April D. Murphy, Maryellen C. MacDonald, Timothy T. Rogers)*
84. **Eye movements and grammatical planning in Spanish sentence production** *(Yamila Sevilla, Diego E. Shalóm, Mora Maldonado)*
85. **Lexical retrieval abilities in discourse in healthy older adults** *(Avanthi Paplikar, Jung Moon Hyun, Loraine Obler)*
86. **On the lexical status of filled pauses: Seeing 'uh' and 'um' as words** *(Ralph Rose)*
87. **Context and constructions: cross-linguistic influence in bilingual preschoolers** *(Lisa Hsin, Akira Omaki)*
88. **Characterizing Covert Articulation in Apraxic Speech Using Real-time MRI** *(Christina Hagedorn, Michael Proctor, Louis Goldstein, Maria Luisa Gorno Tempini, Shrikanth S. Narayanan)*
89. **The role of phonology on learning multiple names for the same face** *(Jordan Davison, Zenzi Griffin)*
90. **An ERP investigation of semantic processing in forward and backward translation** *(Rhonda McClain, Judith F. Kroll)*
91. **Reduction of coarticulation across word-internal morpheme boundaries** *(Ariel M. Cohen-Goldberg)*
92. **Different syntax for different contexts: People show consistent mapping between syntactic structures and depicted events** *(Nick Gruberg, Victor Ferreira)*
93. **Hearing "palm tree" can hamper the naming of an "umbrella" – Interference from distractor words denoting visually similar objects in the picture-word interference task** *(Frank Oppermann, Jörg D. Jescheniak)*
94. *WITHDRAWN*
95. **Word confusability and word durations** *(Esteban Buz, T. Florian Jaeger)*
96. **Speakers are sensitive to prediction mismatches between two cues to grammatical category in spontaneous speech** *(Esteban Buz, Thomas Farmer, T. Florian Jaeger)*
97. **Syntactic and Semantic Effects on the Production of Ordering Errors** *(Amy DiBattista, Neal Pearlmutter)*
98. **Cumulative semantic interference without decay** *(Gary M. Oppenheim)*
99. **The working memory basis of normal and pathological speech dysfluencies** *(Arnaud Szmalec, Lize Van der Linden, Caroline Moerenhout, Gert Reunes, Robert Hartsuiker)*
100. **Speaking words in sentences: When the language of production does not guide lexical access** *(Jason W. Gullifer, Paola Dussias, Judith Kroll)*
101. **Does Bilingualism Incur a Cost to Language Production in a Language-Blocked Design?** *(Cari A. Bogulski, Judith F. Kroll)*
102. **Conceptual and grammatical factors in the production of subject-verb agreement** *(Alma Veenstra, Dan Acheson, Kathryn Bock, Antje S. Meyer)*
103. **Cluster-dependent repair strategies in an acquired speech deficit** *(Ian Coffman, Brenda Rapp)*
104. **Inhibitory Control and Lexical Retrieval Performance in Elders** *(Amy V. Vogel, Yael Neumann-Werth, Dalia Cahana-Amitay, Martin L. Albert, Loraine K. Obler)*

1 & 2: WITHDRAWN

3. Is the Proximate Unit in Chinese Word Production an Intrinsic or Accidental Property of the Production System?

Jenn-Yeu Chen[1,2], Train-Min Chen[1]
[1]National Cheng Kung University, [2]National Taiwan Normal University

Previous word production research employing the implicit priming paradigm has shown that speakers can benefit from the advanced knowledge of the initial word form of the word to be produced. In Dutch and English, a single onset segment is sufficient to produce the benefit, but a complete syllable (less the tone) is required in Mandarin Chinese. The absence of an onset effect in Mandarin Chinese might have to do with the orthographic characteristics of the prompts, which are syllable-based and could have motivated the production system to place more emphasis on the syllable than on the segment. Two experiments employing an auditory version (Experiment 1) and a picture version (Experiment 2) of the implicit priming task were conducted to test this hypothesis. The implicit primes were the segmental syllables (i.e., syllable less the tone) or the onset segments. Auditory prompts are less likely to encourage orthographically induced syllable bias. Picture naming involves no prompts, leaving no room for the syllable bias induced by the prompts. In both experiments, there was a syllable effect but not a segment effect. The findings suggest that the proximate unit in Mandarin word production is an intrinsic property of the production system, and not an accidental, task-dependent artifact.

4. Syllabic Pseudohomophone Priming in Tip-Of-the-Tongue States Resolution: The Role of Syllabic Position and Number of Syllables

Rita Pureza, Ana Paula Soares and Montserrat Comesaña
University of Minho

The Tip-Of-the-Tongue (TOT) state is a common experience, usually coupled with a frustrating feeling caused by the incapability of retrieving a familiar word. It is thought that TOTs occur when the semantic and syntactic information of the word is retrieved but not its phonology (e.g., Burke, Mackay, Worthley, & Wade, 1991; Dell, Chang, & Griffin, 1999; Levelt, Roelofs, & Meyer, 1999). This study aims to further understand the role of phonology in TOT resolution. Specifically, using a syllabic pseudohomophone priming paradigm, we aim to analyze the role of the phonological syllabic position (first *vs*. last), and number of syllables (two, three and four syllable long words), in TOT states resolution. TOT was elicited by a picture naming task, after which a lexical decision task was presented. Here, first, last or none of the phonological syllables of the target word were embedded in pseudohomophone primes. Results showed a significant syllabic pseudohomophone priming effect facilitating TOT resolution. The effect was stronger for four-syllable long words, especially when the last syllable was used as prime. These results seem to reinforce the importance of phonology in TOT states resolution, particularly the role of the syllable as an important sublexical unit in speech processing

5. Commonalities of bilingual and monolingual lexical selection

Alexandra S. Dylman, Christopher Barry
University of Essex

We report two studies using the picture-word task to examine lexical selection in bilinguals and monolinguals. In Experiment 1, bilinguals named objects using their L1 or L2. In Experiment 2, monolinguals named objects using common names (e.g., DOG = “dog”) or, in a novel experimental manipulation, using synonym names (e.g., DOG = “hound”, GLASSES = “spectacles”). The two experiments produced a strikingly similar pattern of results. When the bilinguals named in L1, and when monolinguals produced common names, there was facilitation when the distractor word was identical to the target response (e.g., PERRO+perro and DOG+dog), but no reliable effect when the distractor was a translation (e.g., PERRO+dog) or a synonym (e.g, DOG+hound). When the bilinguals named in L2, and when monolinguals named with synonyms, there was facilitation both when the distractor word was identical to the target (e.g., HOUND+hound) and when it was a translation (e.g., DOG+perro) or a synonym (e.g., HOUND+dog, SPECTACLES+glasses). Synonyms in monolinguals simulate the pattern of results found from translations in bilinguals in the picture-word task, which suggests that there are commonalities in monolingual and bilingual lexical selection.

6. Producing speech with a newly learned grammar and vocabulary: an MEG study

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We present a new paradigm to probe the cortical correlates of both morphosyntactic and word retrieval processes in sentence production, using the native tongue and a newly learned miniature language. During a few days' training period, our participants had learnt a novel artificial language (Anigram). In the experiment, they used either Anigram or their native language to verbally describe a pictured event or entity. We tracked the cortical dynamics with magnetoencephalography (MEG) and compared the neural sequence of speech production in the two languages. The first part comprised the preparation phase where the participants were exposed to a cartoon image with two animals. They were prompted to plan either the corresponding simple sentence (e.g., 'the bear hits the lion') or a grammar-free list of the two nouns ('the bear, the lion'). For Anigram, preparation phase induced stronger left angular and inferior parietal activations than for the native language, likely reflecting more taxing lexical retrieval and short-term memory storage. The second part was a cloze task where the initial words of the sentence or word sequence were sequentially displayed overlaid on the picture for silent reading. Finally, the participants were to produce the last word (first covertly and then overtly). In both languages, production of the sentence-final word required retrieval of rule-based inflectional morphology and was accompanied by activation increases in the left middle superior temporal cortex that did not differ between the two languages. Activation of the right temporal cortex during both the preparation phase and the cloze task suggested a role for this area in combinatorial semantics. The present results suggest that after just a few days of exposure, newly learned language uses much of the same neural resources for production as the native tongue. Moreover, the results highlight an integrative role for the right hemisphere in language processing.

7. The effect of sound similarity and word position on spoken word production

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Models of spoken word production agree on the existence of at least two stages of processing: a lexical-semantic stage during which lexical items are mapped onto an abstract representation; and a phonological stage during which the sound form of a word is retrieved. Psycholinguistics research continues to debate the types of information which become available at each stage. Evidence from tip-of-the-tongue research suggests that exposure to phonologically related primes preceding the definition of a target word increases the likelihood of that target's retrieval, suggesting that phonological information has some impact on lexical retrieval (James & Burke, 2000; Meyer & Bock, 1992). No research in spoken word production has identified which properties of phonological information modulate this effect, for example, the position of the phonemes in a target word or the phonetic realizations of those phonemes.

Subjects were visually presented with the definitions of target words preceded by lists of distracter words in one of three conditions: Control (distracters phonologically unrelated to the target); Match (distracters contained one phonological syllable in the target in matched position and acoustic realization, e.g., 'balustrade' 'reconcile' 'villany' à 'balcony'); and Mismatch (distracters contained one target syllable not matched for position, e.g., 'unbalanced' 'contagion' 'cranium' à 'balcony'). Subjects were asked to produce each distracter aloud and then identify the target word given its definition. Subjects produced the primed target word significantly more often in the Match and Mismatch conditions than in the Control condition, indicating that phonological information influences lexical selection regardless of the word position or articulatory realization of the phonemes.

These results support models of spoken word production which include a context-free phonological representation and feedback between lexical and phonological levels. Current research aims to isolate the effects of word position and acoustic realization, and to investigate the neural basis of these effects.

James, L. E., & Burke, D. M. (2000). Phonological priming effects on word retrieval and tip-of-the-tongue experiences in young and older adults. Journal of Experimental Psychology: Learning, Memory and Cognition, 26(6), 1378-1391.
Meyer, A. S., & Bock, K. The tip-of-the-tongue phenomenon: Blocking or partial activation? Memory & Cognition, 20(6), 715-726.

8. The impact of neighbour acquisition on phonological retrieval

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This study used a word learning paradigm to explore whether the spoken production of single word forms entails coactivation of so-called 'phonological neighbours'. Hermit words of English ('carousel') had their empty neighborhood artificially populated by teaching participants fictitious items, either cohort or rhyme neighbours of their target hermit ('carousem' vs. 'barousel'), together with their meaning. Engagement of the new neighbours in lexical activity was assessed by tracking the emergence of inhibition in speech perception (cf. Gaskell & Dumay 2003). As lexical engagement requires a consolidation period with sleep (Clay et al. 2007; Dumay & Gaskell 2007, 2012; Tamminen et al. 2010), participants were tested immediately and a week after exposure. Influence of the new neighbour on speech production was examined using picture naming (of the initially hermit word: 'carousel'); its influence on speech perception was examined using pause detection ('carouse_l'; Mattys & Clark, 2002). Inhibition of pause detection latencies emerged after a week in the cohort (+28 ms), but not in the rhyme condition (-1 ms), and only after a recognition test had reactivated the consolidated, but possibly sleepy neighbour. In contrast, at the very same time point, picture naming showed facilitation from the rhyme neighbour (-26 ms), but only a weak trend in the same direction from the cohort neighbour (-6 ms). These findings seem best accounted for by an interactive architecture, in which feedback from the segmental to the lexical level enables phonological neighbours to support encoding of the segments they have in common with the target (Dell & Gordon 2003; Rapp & Goldrick 2000). However, the reduced -if not absent- facilitation for cohort (compared to rhyme) neighbours indicates that when mismatching segments are yet to come, the target's new best friend quickly becomes its worst enemy (cf. Vitevitch et al. 2004).

9. Native Language Tip-of-the-Tongue States in Low- and High-Proficiency Second Language Learners

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Previous research demonstrated that low-proficiency second language (L2) learners experience more tip-of the tongue (TOT) states than high-proficiency L2 learners while naming in native language. In older adults and bilingual individuals, greater frequency of TOT states was explained by weakened links between phonological and semantic representations (Burke, MacKay, Worthley, & Wade, 1991; Gollan & Silverberg, 2001). This study was designed to examine the applicability of the weakened links account in low-proficiency L2 learners. For this purpose, we studied the effects of phonological priming on TOT resolution in low- and high-proficiency L2 learners. Participants named pictures of rare objects and, following TOT and "don't know" responses, read aloud a list of pseudowords, which sometimes contained a phonologically related prime. This kind of priming strengthens links between phonological and semantic representations of words and thus facilitates retrieval. Resolution of "don't know" responses was not related to priming in both groups. In contrast, phonologically related primes increased TOT resolution in high-proficiency L2 learners, but not in low-proficiency L2 learners. This lack of facilitation effect implies that unlike older adults and bilinguals, low-proficiency L2 learners experience difficulties in native language naming for reasons other than weakened associations between semantic and phonological representations.

Burke, D. M., MacKay, D. G., Worthley, J. S., & Wade, E. (1991). On the tip of the tongue: What causes word finding failures in young and older adults? Journal of Memory and Language, 30(5), 542-579.

Gollan, T. H., & Silverberg, N. B. (2001). Tip-of-the-tongue states in Hebrew-English bilinguals. Bilingualism: Language and Cognition, 4(1), 63-83.

10. Distractor-frequency effects in the picture-word interference paradigm: An effect of neighborhood?

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The picture-word interference paradigm (i.e., picture naming while ignoring a co-occurring distractor word) has been used extensively in speech production research. The semantic interference effect (i.e., longer naming latencies for same-category distractors) has been interpreted as evidence in support of lexical selection as a competitive process. Miozzo and Caramazza (2003) argued against lexical competition by demonstrating an inverse distractor-frequency effect (i.e., pictures are named faster with high-frequency distractors than with low-frequency distractors). There, however, lexical frequency is confounded with the number/frequency of the distractors' neighbors.

In two picture-word-interference experiments, we examined whether observed interference effects are driven by the frequency of the distractor or by the number and frequency of neighbors of the distractor. We used unrelated high- and low-frequency distractors from three different phonological neighborhood conditions: (i) distractors with no neighbors, (ii) distractors with no high-frequency neighbors, and (iii) distractors with high-frequency neighbors. Both experiments replicated the inverse distractor-frequency effect (i.e., faster naming latencies for pictures with high-frequency distractors) irrespective of the distractor's phonological neighborhood. These findings indicate that it is, indeed, the lexical frequency of distractor words and not their neighborhood that modulates naming latencies in the picture-word-interference paradigm.

Miozzo, M., & Caramazza, A. (2003). When More Is Less: A Counterintuitive Effect of Distractor Frequency in the Picture–Word Interference Paradigm. Journal of Experimental Psychology: General, 132, 228-252.

11. Cortical dynamics of spreading activation and lexical competition during naming investigated with MEG

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In order to investigate selection processes in spoken word production, we conducted an MEG study employing the picture-word interference task, in which participants name pictures while ignoring superimposed distractor words. The distractors were either the name of the picture (congruent condition, pictured leg, distractor 'leg'), from the same semantic category (related condition, distractor 'arm'), or unrelated to the picture (unrelated condition, distractor 'desk'). Response times (RTs), event-related fields (ERFs), and time-frequency representations (TFRs) were analysed for the semantic effect (related vs. unrelated conditions) and for the Stroop-like effect (related vs. congruent conditions). RTs showed the expected semantic interference (RTs related condition > RTs unrelated condition), and Stroop-like interference (RTs related condition > RTs congruent condition). The ordering of the RTs was related > unrelated > congruent. The ERFs showed a peak around 400 ms, with the ordering of peak amplitude unrelated > related > congruent, different from the ordering in RTs. The TFRs showed power increase between 400-650 ms in a frequency band of 6-10 Hz, with the ordering related > unrelated > congruent, in line with the ordering in RTs. Importantly, the power effects could not be characterised by phase locking. Finally, the power effects were localised to the left inferior frontal gyrus (LIFG), known to be involved in top-down control of selection processes. We argue that the effects in the ERFs reflect the semantic priming of the distractor by the picture, giving rise to semantic interference. The more semantically distant the distractor is from the picture, the larger the ERF amplitude. The oscillations, localised to the LIFG, reflect top-down controlled selection of linguistic information, which is needed in picture-word interference. We conclude that, by combining the analyses of phase-locked and non-phase locked brain activity, we tap into two different mechanisms involved in performance in the picture-word interference task.

12. Comparing Types of Perseveration in Spoken Production

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Perseverations, the inappropriate repetition of previous responses in the place of the current target, are common in aphasia. These errors take many different forms – from the perseveration of semantically related words (e.g. fork → "spoon" after naming a spoon), unrelated words (e.g. cat → "table" after naming a table), or even word-parts (e.g. star →"stale" after naming a nail). In this study, we investigated the relationship between these different types of errors using data from more than 200 aphasic individuals in a picture-naming task (Mirman et al., 2010). To what extent are these different types of perseveration caused by similar deficits? We addressed this question in two ways. First, we evaluated whether similar factors predicted which items were going to perseverate. Second, we investigated the factors that predicted the rate of these different types of perseverations across aphasic individual.

Clear similarities were found in the factors that predicted different types of perseveration. First, we found that the source of the perseveration is what the individual actually produced on a prior trial rather than the previous target. Second, all types of perseveration showed an effect of lag, with perseverations being more likely across shorter distances. No relationship was observed between an individual's tendency to produce different types of perseveration. Instead, the clearest predictor of the rate at which an individual produced perseverations of a given type was how many non-perseverative errors of that type (e.g. non-perseverative semantic errors, non-perseverative unrelated word errors or non-perseverative phoneme intrusions) that individual produced. Taken together, these results suggest (1) that impairments at different levels of the spoken production system lead to different types of perseveration and (2) that there are some general processing principles at these different levels that constrain the pattern of perseveration.

13. Boys and girls are friends: Associative priming in the picture-word interference task in children with and without language impairments

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Children with Specific Language Impairment (SLI) have been reported to show weaker associative priming in lexical access relative to typical children (Brooks, Seiger-Gardner & Sailor, in press; Hennessey, Leitão & Mucciarone, 2010; Seiger-Gardner, Brooks, & Cadavid, 2007; Velez & Schwartz, 2010). Using a cross-modal picture-word interference task with (thematic) associates (e.g., 'carrot' paired with a picture of a rabbit) and coordinates ('mouse' paired with rabbit), Brooks et al. (in press) reported significant associative priming of RTs in typical children and adults, but not in children with SLI. (Error rates, however, were lower for pictures paired with associates even in the SLI group.) To further explore whether association might facilitate spoken-word production in children with SLI, we used pairs of strongly associated coordinates (e.g., boy-girl, spoon-fork, dog-cat), with each member serving as target picture and interfering word (IW) across trials. We predicted associative priming to occur at early SOAs (-550, -400, -250), and semantic interference to occur at SOAs near 0 (-100, +50, and possibly +200). Thirty children (7;2-10;6, mean 8;10) were tested, half with SLI and half age-matched controls. At each SOA, each picture was paired with four different IWs, for example, for a picture of a boy: Associate ('girl'), Unrelated ('spoon'), Identical ('boy'), and Baseline ('go'). Surprisingly, there was no semantic interference effect: Typical children showed associative priming at all SOAs, and children with SLI showed priming at all except -400 and -250. These results strongly demonstrate that children with SLI benefit from associative primes under some circumstances. Group differences were more evident for the identical condition, which was faster than baseline for typical children at early SOAs (-550 to -250) but only at +200 in children with SLI. Thus, children with SLI appeared less inclined to anticipate a matching picture than their peers.

14. Interpreting bilingual language switch costs across proficiency groups: Different control mechanisms or resource limitations?

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How do bilingual speakers control which representations are utilized during speech production? Costa, Santesteban, and Ivanova (2006) propose that this differs across proficiency levels. Upon activating distinct lexical and/or phonological forms in their languages (e.g., "*dos*" vs. "two"), low proficiency bilinguals inhibit non-target representations to produce the intended target. In contrast, high proficiency bilinguals engage a language-specific selection mechanism which considers only target language forms.

These distinct mechanisms predict different patterns of language switching performance across proficiency groups. Low proficiency bilinguals should show asymmetric costs across languages. Because stronger languages require more inhibition, switching into the stronger language should be more costly than switching into the weaker language. In contrast, high proficiency bilinguals should show symmetric costs across languages, because selection consistently limits competitors. Crucially, this proposal predicts that due to inhibition, low proficiency bilinguals should *always* exhibit asymmetric switch costs. However, Verhoef, Roelofs, and Chwilla (2009) report results contradicting this prediction; after preparing to make a switch, low proficiency bilinguals show symmetric switch costs.

We extend that finding by examining whether both patterns can occur *within* unbalanced bilinguals. We examine how the switching performance of L2 English speakers (of varying L1s) and English (L1)-Spanish bilinguals varies with vs. without preparation. If our low proficiency groups demonstrate both asymmetric and symmetric switch costs, this strengthens evidence against proficiency-dependent switch mechanisms. Switch costs may instead reflect the availability of resources necessary to engage control mechanisms common among bilinguals.

Costa, A., Santesteban, M., & Ivanova, I. (2006). How do highly proficient bilinguals control their lexicalization process? Inhibitory and language-specific selection mechanisms are both functional. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 32*, 1057-1074.

Verhoef, K., Roelofs, A., & Chwilla, D.J. (2009). Role of inhibition in language switching: Evidence from event-related brain potentials in overt picture naming. *Cognition, 110*, 84-99.

15. Examining syllabic inventories derived from spoken word forms - a quantitative contribution to the 'mental syllabary' theory

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The goal of our study was to obtain the spoken syllabic inventories of Dutch by means of automatic syllabification of the spoken word forms, i.e., the actual phonetic realizations of words, as they are uttered by speakers, and to analyse the obtained data set in respect to the canonical syllabification of words. We have tested two automatic syllabification methods, the first based on an n-gram model defined over sequences of phonemes, and the second based on sequences of syllabic units. The syllabic inventories have been compiled by syllabifying the set of words for which the two methods agree.

The obtained syllabic data reveal that the frequency distribution for both single syllables, as well as bi-syllabic tokens, exhibits a Zipf curve, confirming previous psycholinguistic evidence for the reliance of speakers on a relatively small set of high frequency syllabic tokens (Schiller et al., 1996). In addition, by comparing the set of syllabic tokens derived from syllabification of spoken word forms, with the tokens derived from a canonical syllabification of the same words, we have uncovered considerable divergence between the two sets. For example, nearly half of the single syllable tokens were unique to the spoken syllabary, and nearly a third of all bi-syllabic tokens were were unique to the canonical inventory.

Spoken syllabic inventories may be used to seek further insights about the internal organization of the mental syllabary, and the role of syllables in speech production (Cholin et al., 2004). Furthermore, since the phonetic realizations of word forms represent the way people produce speech more faithfully than canonical forms, spoken word forms may constitute a more natural material in the context of speech training.

Schiller, N.O., A.S. Meyer, R.H. Baayen, and W.J.M. Levelt. A comparison of lexeme and speech syllables in Dutch. Journal of Quantitative Linguistics, 3(1):8–28, 1996.

Cholin, J., N.O. Schiller, and W.J.M. Levelt. The preparation of syllables in speech production. Journal of Memory and Language, 50(1):47–61, 2004.

16. Individual differences in perception and production of novel non-native phoneme contrasts

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Only a few studies have so far examined production of L2 speech sounds in adults (for an overview see Flege, 2003). These studies commonly find that learners' ability to produce non-native sounds is strongly constrained by their ability to discriminate them. However, these studies examined adults after considerable degree of exposure to the L2. The current study seeks to expand this research in two directions: We investigate the link between perception and production of non-native speech sounds in total novices, and we try to predict which cognitive and linguistic pre-requisites may influence adults' ability to perceive and produce non-native speech sounds.

Sixty-four native English speakers (37 women) discriminated between minimal pairs encompassing Norwegian tonal contrasts and Russian consonant palatalization contrasts using a 'same-different' task. Measures of non-verbal intelligence, working memory capacity, musical ability, prior exposure to other L2s, age, need for cognition and handedness strength were obtained as predictors. Participants were also asked to reproduce the Norwegian and Russian words. Production accuracy of Norwegian tonemes was established through acoustical analyses of the pitch difference between the first and second syllable. Production accuracy for Russian consonant palatalization was assessed through expert judgment.

The results showed a positive link between perception and production accuracy within each language. Moreover, there was also positive link between Russian and Norwegian perception, but not between Russian and Norwegian production accuracy. Multiple regression analysis revealed that perception in both languages was positively correlated with non-verbal intelligence. These findings underscore the importance of phoneme perception for phoneme production right at the outset of L2-learning but also show that cognitive abilities that are predictive of perception are not necessarily predictive of production. Future studies should examine whether measures of fine-motor ability and oral mimicry have an independent effect on L2-phoneme production over and above effects of perception.

17. What do eyes tell us about bilingual language production: Increased second language (L2) proficiency and inhibitory capacity help bilinguals resolve competition during bilingual speech planning

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Successful bilingual language production requires that speakers optimally balance knowledge of multiple language systems when they produce speech, a cognitive process that requires inhibitory control.

Indeed, bilinguals are thought to enjoy global advantages in non-linguistic cognitive control because of their greater need, vs. monolinguals, to reduce cross-language interference. We recently provided evidence that spontaneous monologue and dialogue speech is more effortful for bilinguals who have reduced inhibitory capacity, controlling for second language (L2) ability. We now extend this work to the more tightly controlled domain of semi-spontaneous multiple picture naming, which uses eye movement measures of production effort. In this task, 24 French-English and 24 English-French bilinguals produced sentences in response to picture arrays (e.g., "The hose and the stove are above the bridge"), where the second picture varied in the number of possible labels (e.g., sofa/couch vs. bowl). There were three experimental blocks, consisting of an L1-, L2-only, and L1-L2 mixed block. Gaze-contingent methods blocked any parafoveal preview prior to picture fixation, and filler trials contained other arrangements of pictures to naturally vary the syntactic form of what was produced. To assess speech-planning effort, we measured gaze-speech latency, which is how long people fixate a picture before they begin to name it (Spieler & Griffin, 2006). As expected, gaze-speech latencies were longer for L2 vs. L1 production, and for pictures with many vs. fewer possible labels, and these effects were generally mirrored in terms of production accuracy. More interestingly, both increased L2 proficiency and inhibitory capacity significantly predicted L2 vs. L1 costs in gaze-speech latency and accuracy for pictures across language-pure and language-mixed blocks.

These findings suggest a tight coupling between success at bilingual language production and increased inhibitory control capacity, which is the presumed mechanism of bilingual advantages in non-linguistic cognitive control.

18. **WITHDRAWN**

19. When is there no dog in hotdog? Form preparation of nominal compounds

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Research in language production has shown that form preparation proceeds in sequence, with initial sounds and morphemes being planned before later ones. In the *implicit priming paradigm*, speakers are faster to produce words from a set that all start with the same units compared to word sets that do not [1]. In phonological planning, sharing the word's consonant onset is sufficient to create priming, provided the language treats segments as production units. Work within this paradigm has demonstrated that advance knowledge of the final morpheme in a compound does not result in facilitated planning, though knowledge of a prefix does. If the shared phonological/morphological material is a response-initial production unit for that language, implicit priming occurs.

We decomposed disyllabic words (e.g. "bandit") into separate syllables, with the first constituting the written cue and the second the response component of a priming trial (e.g. cue=BAN, response= "dit"). Blocks of responses sharing initial consonants (e.g. /d/) were contrasted to blocks with varying onsets. In two separate experiments, we found no facilitation in shared-onset blocks. This occurred even when the cue-response pairs formed nominal compounds (cue=SAW, response="dust"). When the cues for the second morphemes from the compounds were only semantically related (cue=SWEEP, response="dust"), there was a reliable priming effect, similar in size to other studies testing form preparation in English.

This study demonstrates that sharing a response-initial production unit is not enough for priming. The shared unit must also be what we call a "startable unit", a point in an utterance that functions as a potential starting or restarting point. Although the /d/ is a starting point in "dust", it is not in "bandit", and somewhat surprisingly, not in "sawdust", either. This suggests that form preparation of nominal compounds is more similar to the production of single words, where word-medial units cannot be planned in advance.

[1] Meyer, A. S. (1990). The time course of phonological encoding in language production: The encoding of successive syllables of a word. *Journal of Memory and Language*, **29**, 524-545.

20. Internal verbal self-monitoring: speech perception or forward models?

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Our language production mechanism contains is a monitor that controls potential output. This is demonstrated by our ability to correct mistakes during, and sometimes before production (Levelt, 1989). Corrections are even made when overt speech is masked (Postma & Noordanus, 1996), or when the speech is internal (Oppenheim & Dell, 2008). Several monitoring mechanisms have been proposed, of which we will contrast two. The Perceptual Loop Theory (Levelt, 1983, 1989) assumes a monitoring mechanism that processes internal speech similar to speech produced by others. The contrasting view assumes a forward model of language processing.

By testing several variations of the visual world paradigm we wish to differentiate between the two models of internal monitoring. If our results show similar behavior in the processing of self-produced speech compared to speech produced by others, this is taken as evidence in favor of the perceptual loop theory. If we find different behavioral results in self-produced speech compared to speech produced by others, this is taken as evidence in favor of a forward model for speech production.

In the visual world paradigm a display with 4 words is presented. One of the words, the target, is also presented auditory (perception condition) or needs to be spoken by the participant (production condition). One of the words, the competitor, is phonologically related (phonological condition), semantically related (semantic condition) or unrelated (control condition). The two other words on the screen are unrelated to the target. In a previous experiment Huettig and Hartsuiker (2010) demonstrated similar eye-movement patterns in self-produced speech and speech produced by others. We replicate the experiment with a few variations: with delayed auditory feedback, with masking of the produced speech, with mouthing and with silent speech. Eye-movements are recorded and analyzed. The results of these experiments will give insight into under what conditions the speech is monitored internally, and what monitory strategy is most likely applied when speech is monitored internal.

21. The neural network of morphological processing in word production

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Columbia University

In this fMRI study, the production of English inflected verbs was investigated showing sentence fragments (*Today, he_____* or *Yesterday, he_____*) that were immediately followed by pictures depicting a male character performing specific actions (e.g., *pulling*). Sentences were read silently while pictures were named orally using the verb and the tense (present vs. past) fitting the sentence context (*pulls* or *pulled*). A sparse event-related fMRI design was employed. We tested regular verbs and irregular verbs that are irregularly inflected in the past tense (*drunk, cut*). Verbs varying for tense and regularity were equivalent syntactically and in terms of lexical demands. In fact, stem retrieval was required for all types of verbs. A major difference involved stem+inflection combinations, which apply to all present tense verbs but only to regular past-tense verbs. Therefore we expected activation differences related to tense (present vs. past) to appear in brain regions implicated in the assembly of word morphemes. Greater activation for present compared to past tense was found in left hemisphere areas associated with lexical processing (middle temporal gyrus; MTG) and articulation (primary motor cortex; M1). Our results confirm the left middle-superior temporal cortex as an area supporting the processing of lexical information that serves as input to speech articulation, although they further reveal that this area plays a key role in morphological processing. Results from diffusion tension imaging (DTI) tractography demonstrated connections between frontal motor areas and temporal 'lexical' areas that were specifically activated with verbs bearing stem+inflection combinations via a dorsal pathway involving the arcuate and superior longitudinal fascicles, thus suggesting activation flow through different stages of word production (lexical processing vs. articulation).

22. Evidence for a domain-specific lexical resource in speech production

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Using a novel dual-task paradigm we investigated whether the retrieval of words during speech production requires only central or also domain-specific cognitive resources. Participants viewed two objects presented side-by-side and named the left object (task 1) while deciding on a property of the right object (task 2). The decision in task 2 was either a conceptual one (natural size, Experiment 1a) or a phonological one (phonemic onset, Experiment 1b). Thus, the overlap in lexical processing of task 1 and 2 differed between experiments: there was no overlap in lexical processing in Experiment 1a but there was overlap in lexical processing in Experiment 1b. Additionally, we manipulated the lexical processing demand of the to-be-named object in task 1 by varying the frequency of its name (while controlling for the ease of object recognition). In Experiment 1a, the propagation of the frequency effect onto the conceptual decision in task 2 was similarly sized as the frequency effect in naming in task 1. In Experiment 1b, however, the propagation of the frequency effect onto the phonological decision in task 2 was larger than the frequency effect in naming in task 1. This pattern was also obtained with a psychological-refractory-period paradigm at short SOAs (Experiment 2a and 2b). In all, the results are compatible with the view that lexical processing in speech production requires domain-specific lexical resources.

23. Slips of the tongue in bilingual Spanish-English speakers

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Slips of the tongue vary with prosodic differences between languages (see Berg, 1998). For example, slips in English and German tend to occur in different prosodic positions than slips in Spanish do (Berg, 1991; Pérez, Santiago, Palma, & O'Seaghdha, 2007). Research on slip patterns in bilingual individuals is limited: Poulisse (1999) found that Dutch learners of English produced more errors in their L2 than in their L1 and that the frequency of errors in L2 decreased with greater L2 proficiency.

Participants in the present study were 20 monolingual English-speaking adults and 17 bilingual Spanish- and English-speaking adults who were native Spanish speakers and acquired English before the age of five. Participants completed a language history questionnaire. The study investigated 1) how well different aspects of language experience predict the frequency of slips of the tongue in English and 2) whether knowledge of Spanish alters the frequency of English sound-exchange errors in word-initial vs. medial position and stressed vs. unstressed syllable position. The study used the SLIP technique (Motley & Baars, 1976), in which participants read and recalled pairs of words (e.g., "aSSigned aLert") after being primed to exchange sounds in particular word positions (e.g., to produce "aLigned aSSert").

Results of a mixed logistic regression showed that Spanish-English bilinguals did not produce partial exchanges significantly more frequently than English monolinguals (22 vs. 39 total errors). Overall, neither stress nor word position influenced exchange frequency. Among bilinguals, the amount of current exposure to Spanish was the only language experience variable that predicted the number of exchange errors. Although current Spanish exposure affected the stress position in which English slips were most likely to occur, the pattern did not reflect the predicted cross-linguistic influence. Results have implications for understanding of bilingual processing as well as the short- and long-term effects of language experience.

24. Ways of looking ahead: Incrementality in language production

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In three experiments, we examined whether constituents are planned sequentially in the order in which they appear in an utterance or hierarchically, with elements in a syntactically-dependent relationship planned together. In Experiment 1, participants produced ambiguous relative clause sentences (*Click on the N1 of the N2 (that's) above the N3)* to describe visual scenes. The scenes determined the hierarchical structure of the sentence (e.g., High attachment (HA)=*N1* is above *N3;* Low attachment (LA)=*N2* is above *N3*), with the head to which the relative clause attaches appearing earlier in an utterance in HA (*N1*) than in LA (*N2*).

The hierarchical account predicts that modifiers (N3) should be planned earlier in HA than in LA while the linear account predicts no difference between the two structures because the linear of words is identical. We assessed planning cost based on speech initiation time and word duration. The results from Experiment 1 showed greater planning difficulty in the HA structures, with the N1 duration longer when HA structures were produced compared to LA structures. In order to determine whether the effect reflected differences in the timing of planning modifiers or the difficulty of producing dispreferred HA structures, we manipulated the codability of the N3 in both Experiments 2-3 (Exp.2-3 were identical except that Exp2. had a 5-second preview and a preamble phrase). If the timing of planning modifiers differs across attachment conditions, a reliable interaction between attachment and codability is expected at N1 while the linear account predicts no difference. Consistent with the linear account, we found a main effect of codability at the N1, independent of the hierarchical structure, in both Experiments. However, inconsistent with the radical incrementality view, earlier codability effects at the N1 suggest that there was some lookahead planning in both structures.

25. Dynamical model of the perception-production link and the timecourse of phonological planning

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Our study presents a computational model of the timecourse of phonological parameter setting in speech production. We model a task in which speakers hear various distractors as they are preparing to produce utterances. We focus on how a perceived distractor interacts with and contributes to the ongoing planning of a response. Compatible parameter values between inputs result in excitation, while incompatible inputs contribute inhibition. Our model predicts that response times in this task should be sensitive to independent manipulation of articulator and voicing (in)compatibility, with incrementally slower response times corresponding to the number of mismatching parameter values. Despite such effects—most notably effects of articulator—being elusive in the literature to date (Gordon & Meyer, 1984; Mitterer & Ernestus, 2008; Galantucci et al., 2009), we present results from two new experiments that confirm these predictions. In experiment 1, distractors never matched responses in articulator but either matched (congruent) or mismatched (incongruent) in voicing. In experiment 2, distractors never matched responses in voicing, but either matched or mismatched in articulator. The prediction of our model was borne out in both experiments. Response times on congruent trials were significantly faster than on incongruent trials. Our study provides the first clear experimental evidence of independent perceptuo-motor effects of articulator and of voicing. These response time modulations arise in the model by formalizing the perception-production link as the parameter values of a perceived distractor obligatorily serving as input to the process of setting the production parameters of a response.

Models of speech production disagree on the role played by phonological parameters. The model of Dell (1986) assigns an explicit role for features, while the WEAVER model (Roelofs, 1997) does not.The present results add evidence in favor of production models that include a level of processing based on phonological features.

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26.Fluency of Speech Depends on Executive Abilities Evidence for Two Levels of Conflict in Speech Production

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For speech to flow smoothly, the past must be inhibited, the present must result in successful selection, and the future must be timely configured. We suggest that executive abilities play a crucial role in speech fluency by mediating these functions. We present data from three anomic patients with left-hemisphere lesions, matched for their single-word production and comprehension abilities, who differ in fluency level (measured by the Western Aphasia Battery and words/minute), and a control group. Using a task-switching paradigm, in which participants make simple decisions about size or naturalness of pictured objects, we show that the non-fluent patients (NF1,NF2) – but not the fluent patient– exhibit exaggerated switching costs (defined as the difference in RTs between switch and repeat trials in switch blocks). None, however, show exaggerated mixing costs (defined as the difference in RTs between repeat trials in single and switch blocks), compatible with fMRI findings localizing the latter to the (intact) right hemisphere. We further show that our results are invariant with regard to block order, practice, list familiarity and fatigue.

We also show a strikingly different error pattern in the two non-fluent patients in a spoken-response variant of the paradigm. NF1's errors are almost entirely within-task errors (e.g. "small" for "large"), while a large proportion of NF2's errors are between-task errors (e.g. "natural" for "large"), despite an auditory cue priming the task-relevant responses on every trial.

The different error patterns in the non-fluent patients, points to two levels of conflict: task and response levels. In language production this may translate into conflict during sequencing (inhibiting the past, activating the present, priming the future), and during word selection. We propose that fluent speech is contingent on successful conflict-resolution at both levels, and that underlying the non-fluency of NF1 and NF2 is poorly resolved conflict due to impaired executive abilities.

27. Individual differences in verbal working memory predict co-speech gesture

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Speakers gesture even in the absence of an audience; thus, researchers have proposed that gesture may be an intrinsic part of the language production process. There are at least two ways that gesture may aid production. First, gesturing may lighten the verbal working memory (VWM) load, as speakers are better able to remember verbal items when they gesture during intervening speech than when they do not [1-2].
Second, gesturing may ease lexical access, as speakers become more disfluent when not allowed to gesture [3]. It is clear that speakers differ in the degree to which they gesture during spontaneous speech, yet individual variation in gesture production has rarely been examined; however, experimental results suggest that speakers with lower VWM or reduced lexical access should produce more gestures.

In the current study, 47 speakers (15 male) completed an individual differences battery that included measures of VWM and lexical access (vocabulary and verbal fluency (VF)). To elicit gesture, each speaker described five short cartoon clips immediately after viewing, and descriptions were video recorded. The number of gestures produced in each description was counted by two coders ($r = .97$). Gender and composite scores of VWM, vocabulary, and VF were included as predictors in a mixed-effect Poisson regression predicting the number of gestures produced per description (random-effects: speaker and video clip intercepts). Decreased VWM was associated with more gestures ($p < .01$). Vocabulary, VF, and gender did not predict gesture counts ($ps > .41$).

These results support the hypothesis that gesture serves to lighten the load on VWM [1-2], as speakers with lower VWM gestured more often. Thus, gesturing may free up VWM resources that are recruited during speaking by helping speakers organize their thoughts for speech, or by shifting the load to other cognitive systems [1].

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[2] Ping, R. & Goldin-Meadow (2010). Gesturing saves cognitive resources when talking about non-present objects. Cognitive Science, 34, 602-619.
[3] Krauss, R.M. (1998). Why do we gesture when we speak? Current Directions in Psychological Science, 7, 54-60.

28. Semantic Distance Effects in Picture Word Interference: Investigating the Role of Shared Features

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The picture-word interference paradigm (PWI) involves participants naming a target picture while ignoring a superimposed distractor word. Naming speed varies according to the relationship between picture and distractor. Typically, categorically related distractors slow naming more than unrelated distractors – the semantic interference (SI) effect. Recently, Mahon et al (2007) examined categorical relationships in terms of 'semantic distance': a continuous variable operationalized as the number of features shared between a distractor and target, first implemented in the PWI paradigm by Vigliocco, Garret and Vinson (2004). However, Mahon et al (2007, Exp 7) demonstrated an effect of semantic distance opposite to Vigliocco et al (2004, Exp 3), with semantically close distractors speeding picture naming compared to semantically far distractors. In two experiments with balanced designs, the present study investigated the role of shared features in both binary (semantically close vs. far; a full replication of Mahon et al.'s Exp 7) and graded (closest-close-far-farthest) distractor-target manipulations using PWI. In both experiments semantically close distractors produced the greatest SI (cf. Mahon et al., 2007), however, we failed to find evidence of a graded effect (cf. Vigliocco et al., 2004). Our results indicate that SI is likely to be evoked only when feature sharing between distractor and target picture concepts is maximal.

29. Plural dominance effects in picture naming for unimpaired speakers of English

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This study explores the effects of relative frequency between singular and plural pairs on plural processing. Plural-dominant plural forms (e.g. ‘arms’, ‘ants’) are higher in frequency compared to their singular forms (‘arm’, ‘ant’), whereas singular-dominant plural forms (e.g. ‘bags’, ‘cats’) are lower in frequency compared to their singular forms (‘bag’, ‘cat’). Plural dominance effects have been found in comprehension tasks (such as lexical decision) in healthy speakers (e.g., Baayen et al, 1998). However, only one psycholinguistic study in Dutch uses a production task (Baayen et al 2008). In contrast, two neuropsychological studies used production tasks with speakers with aphasia (Luzzatti et al, 2001, for reading aloud; Biedermann, 2012, for picture naming). Interestingly, the psycholinguistic findings revealed a different pattern of results compared to the neuropsychological findings: where the latter found a plural disadvantage only for the singular-dominant group, the psycholinguistic findings revealed an overall disadvantage for plural-dominant items regardless if plural or singular. Because of this inconsistency across studies, we collected further evidence from healthy English speakers.

38 healthy English speakers named sets of pictures corresponding to plural-dominant and singular-dominant nouns, matched for frequency, name agreement, and age of acquisition. 60 healthy English speakers participated in a word-picture verification task which served as a control task. The results obtained reveal two key findings. First, in the singular-dominant group, singulars were responded to faster than plurals. Second, in the plural-dominant group, plurals and singulars were responded to equally fast. This is in accordance with pattern of results found for speakers with aphasia (Biedermann et al, 2012; Luzzatti, 2001), but contradicts Baayen et al (2008) findings of healthy Dutch speakers when performing picture naming.

The outcome will be related to current theories of morphological processing (full-listing, decompositional and dual-route processing).

30. Individual strategies in speech production: is rhythm property of a language or an individual?

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University of Oxford

Oral communication relies on correct timing of various acoustic or articulatory events which can be determined by many factors. For example, segment durations depend not only on intrinsic properties and phonetic context but also lexical frequency and predictability. At the same time it is often believed that perceived rhythmic differences between languages can be explained by differences in phonology. Thus influential phonological account of speech rhythm claims that patterns of variation in the duration of consonantal and vocalic intervals directly reflect differences in syllable structure and stress patterns.

In this poster we present the results of an analysis of quantitative relationships between rhythm measures (RMs) derived from the durational properties of the speech signal and phonological properties of the underlying text. The analysis is based on a large corpus of recordings from five languages (approximately 371,000 syllables). For each text, we computed eleven ``text phonological measures'' that were intended to quantify aspects of its phonology. We then used multi-level models to assess how well these TPMs predicted the values of RMs derived from readings of the texts using multi-level models which accounted for random effects of text and speaker.

On the scale of a paragraph, transcribed text accounted on average for a quarter of variation in the acoustically based rhythm measures. Instead we found a substantial effect of speaker on the values of RMs. Different speakers seem to use different strategies for mapping between text and acoustics. Patterns of variation in duration in speech depends more on individual timing strategies than on the phonological structure of a language. Therefore models of durational variability should not assume uniform mapping between phonological properties and phonetic implementation across all speakers.

31. The impact of grammatical features and notional number on agreement

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In subject-verb agreement, a (head) noun that is specified as singular or plural usually determines the form of the verb (Eberhard et al., 2005), at least in complex noun phrases (NPs), which have generated most of the attention in agreement research. Less understood are conjoined NPs, which have multiple subject nouns, and undergo a process of "resolution" (Badecker, 2007) to determine grammatical features of the conjoined NP as a whole.

Lorimor (2007) demonstrated that when both conjoined nouns are singular, singular agreement is common, and that subject-verb agreement largely reflects the notional properties of conjoined NPs: Notionally singular NPs often take singular agreement. However, an open question is whether the resolution process also reflects the grammatical properties of the conjoined nouns.

Using a sentence completion task in Dutch, we manipulated notional number of the NP and grammatical gender of the conjoined nouns (see below), to evaluate the relative weight of notional and grammatical contributions to the resolution process.

		Less notionally singular	More notionally singular
Same gender	De-de	De tafel en de stoel "the table and the chair"	De thee en de koffie "the tea and the coffee"
	Het-het	Het hoofd en het hart "the head and the heart"	Het koper en het ijzer "the copper and the iron"
Different gender	De-het	De vork en het mes "the fork and the knife"	De salami en het spek "the salami and the bacon"
	Het-de	Het meer en de rivier "the lake and the river"	Het brood en de boter "The bread and the butter"

Preliminary mixed logit models show that both notionality and grammatical gender impact agreement. Conjoined NPs rated as more notionally plural and conjoined nouns with different grammatical gender were more likely to be produced with plural agreement, providing evidence that grammatical features of nouns "resolve" at the NP level.

32. There are no mental firewalls: fMRI evidence for global inhibition of the native language in bilingual speech

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Past research demonstrates that bilinguals activate both languages in speech production even when they intend to speak one language alone (e.g., Kroll et al., 2006). This observation suggests that bilinguals possess a mechanism of cognitive control that allows them to negotiate potential competition across the two languages. A critical question is how that competition is resolved to allow fluent speech. One hypothesis is that that the more dominant of the two languages is inhibited to enable speech planning in the less dominant language (e.g., Green, 1998). Recent studies have provided support for the inhibitory hypothesis (e.g., Guo et al., 2011; Linck et al., 2009). However, the scope and time course of the observed inhibitory effects have not been examined. The goal of the present study was to investigate those two factors by in a functional magnetic resonance imaging (fMRI) paradigm using a blocked picture naming task with late English (L1), late Spanish (L2) bilinguals. Participants first named pictures in L1 from three semantic categories. They then they named pictures in L2 from three different categories. Finally, in six subsequent blocks they named pictures in L1 that included old items from the first two blocks, new items from the previously named categories, and entirely new items from categories not previously seen. Results provide evidence for significant inhibition in naming in L1 after an intervening block of L2 naming, as revealed by decreased accuracy and longer naming latencies. Moreover, there was significant activation in the brain areas involved in general cognitive control (Anterior Cingulate Cortex and pre-supramarginal gyrus) in all contrasts. Taken together, these results provide important evidence that suggests that the scope of inhibition during bilingual speech extends more globally beyond the word level and that its time course is relative long.

33. Variation in cognitive demands across turn-taking.

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When engaged in dialogue, and especially at turn-taking, participants must dynamically allocate cognitive resources to listening and preparing their own utterance. Inter-turn intervals can be short (200 ms on average in a study by Stivers et al., 2009. "Universals and cultural variation in turn-taking in conversation". Proceedings of the National Academy of Sciences, 106 , 10587) suggesting that listening and utterance planning may overlap in time. It is unclear, however, when interlocutors start to prepare their turns, and how much concurrent speech planning affects their ability to carry out other cognitive tasks, including understanding what is being said. To begin to investigate these issues, we used a dual-task paradigm, involving finger tapping in a turn-taking situation. In one condition, participants overheard two prerecorded speakers, each describing two of four displays on the screen (saying, for instance, "put the candle above the dog and put the flower under the roof"). Participants evaluated the correctness of the descriptions. In the second condition, the participants first listened to a prerecorded speaker describing two of the displays and then described the remaining two displays themselves. In both conditions, participants continuously tapped a complex pattern. The tapping rate was used as an indicator of mental load. The third condition was identical to the second but did not involve any tapping. We tested 36 adult native speakers of Dutch, on 30 display per condition each. We found faster speech onsets and more fluent utterances in the speech-only than in the speech+tapping condition. The comparison of the listen+tap and the listen+speak+tap condition showed a strong drop in tapping rate around one second before turn-onset. This shows that speakers already begin to plan their utterances while listening to the interlocutor and that this planning process imposes a substantial cognitive load.

34. The truth about chickens and bats: Ambiguity avoidance distinguishes homophony from polysemy

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While the concepts we use to think about the world are unambiguous, the words we use to express them are clearly not. A critical task, then, is to align the two: What mediates between unambiguous concepts and ambiguous words?

For homophones like *bat*, theories typically assume a single phonological form associated with separate lexical entries. But the relevant representations are more controversial for polysemous words. One possibility is that a word's senses are linked to sound through a single underspecified core meaning (Frisson, 2009; Nunberg, 1979). Alternately, polysemy may be better characterized as a mixture of representations (Murphy, 2007; Rabagliati et al., 2011). Senses drawn from predictable patterns (regular polysemes, e.g., animal-meat: *noisy/tasty chicken/lamb/penguin*) can be generated from a base meaning. But unpredictable senses (irregular polysemes, e.g., *shirt/push button*) have to be learned and listed separately, like homophones.

We evaluated these theories by measuring ambiguity avoidance in a speeded picture-naming paradigm. Ferreira et al (2005) demonstrated that participants avoid referentially ambiguous names when a distracter depicts the same thing (e.g., two flying bats), but not when the distracter is homophonous (flying/baseball bat). If all polysemes use underspecified meanings, ambiguity-avoidance should be simple across-the-board. But under the mixture model, regular polysemes should permit ambiguity avoidance, while separately-listed irregulars should behave like homophones.

Replicating Ferreira and colleagues, participants (n = 52) reliably avoided ambiguous names for same-meaning items, and not for homophones. Critically, the patterns for irregular and regular polysemes diverged. Participants failed to notice ambiguity for irregular polysemes. But regular polysemes patterned like unambiguous words, showing a reliable effect of ambiguity avoidance.

These data are inconsistent with core meaning accounts of lexical representation, and instead support a distinction between irregular and regular polysemy. Irregular polysemes map to concepts via conventionalized, separately specified senses, while regular polysemes are generated from base meanings.

35. The role of production variable in perceptual learning

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Much is known about category formation in both first and second languages. For example, researchers have demonstrated that listeners are able to form novel perceptual categories after a short period of exposure in the laboratory (e.g., Maye & Gerken, 2000, 2001). However, most previous research on novel category formation has focused on perceptual learning, and on the influence of perceptual exposure on learning.

Recent work has demonstrated that the relationship between perception and production when learning novel categories is complex. Baese-Berk (2010) demonstrated that learners who are trained in perception alone demonstrate robust perceptual learning. However, participants who are trained in a combination of perception and production do not learn novel perceptual categories. This finding is made more complicated by the fact that there is substantial individual variation in performance for participants trained in perception and production. The current study investigates the causes of the differences between learners and non-learners from the perception and production training group.

Participants in the study were trained on a novel phonological contrast. The training consisted of either perceptual exposures alone or of a combination of perceptual and production practice. Before and after training, participants were tested on discrimination and repetition of the contrast. Based on performance on the discrimination post-test, participants in the perception and production training group were categorized as either learners or non-learners. Preliminary evidence suggests that while overall production accuracy during training does not differ between learners and non-learners, the two groups do differ in terms of the variability of their productions during training. Specifically, participants are who are more variable in their productions during training do not learn to perceive the new contrast, regardless of their average production accuracy. These findings will shed insight into how variability in production may influence perceptual learning, as well as phonological learning more broadly.

36. Audience Design through Attenuation of Information on Native and Non-Native dialogues.

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Universitat Pompeu Fabra

Speakers adapt to each other during conversation, being this fact known as Audience Design. One situation in which adaptation might be crucial is on Native/Non-Native dialogues.

We looked into this type of dialogue through a low-level measure called Attenuation of Information, meaning that, when a word is repeated, it gets shortened in its mean duration, intensity, pitch, pitch range and pitch excursion. This effect is reported to occur without awareness and leads to an intelligibility loss, which might jeopardize communication with non-natives.

We designed a task in which dyads (one participant and one confederate) completed several maps in which the participant uttered several words twice.

Three experiments were conducted. In Experiment 1 (Spanish participant and Spanish confederate), repeated words were shortened in duration, intensity, pitch, pitch range and pitch excursion. In Experiment 2 (English-Spanish bilingual participant, Spanish Confederate), although speakers took longer to produce words in a non-native language, they reduced them across duration, intensity, pitch, pitch range and pitch excursion to the same extent as natives did. In Experiment 3 (Spanish participant and English-Spanish bilingual addressee), participants took longer to utter words than when talking to a native, and, although they reduced across duration, intensity, pitch, pitch range and pitch excursion, reduction was smaller compared to when they talked to a native speaker.

Overally, these results add knowledge to the extended fields of Audience Design and Attenuation of Information, providing novel insights on the relationship between them.

37. Does Phrase Structure Priming Exist?

Alexandra K. Frazer, Padraig G. O'Seaghdha
Lehigh University

Structural priming, the tendency for recently used syntactic options to reassert themselves independently of content, and over substantial distances, is a well-documented phenomenon at the functional level of grammatical encoding. Perhaps because of its robustness, it has been assumed that it generalizes to other structural levels (Pickering & Ferreira, 2008), though few studies have provided evidence for priming at the level of phrase structure. In one such study, Smith & Wheeldon (2001) discovered an initiation latency benefit of initial noun phrase structure repetition in a picture movement description task. However, the effect did not persist beyond one sentence (Wheeldon & Smith, 2003), suggesting that it may be different in kind than the long-lasting functional level effect. Also, the verb MOVE was always repeated between primes and targets, raising the possibility that the effect is not purely structural. In our experiments, we elicited sentences beginning with simple or complex NPs through descriptions of the relative spatial locations of words previously presented on screen. In Experiment 1 where the verb phrase was never repeated between sentences, we found no benefit for initial noun phrase structure repetition. In Experiment 2, where we manipulated both verb and structure repetition, we found a reconfiguration cost when the verb was repeated but the structure was not, and no clear evidence of a structural benefit (Frazer & O'Seaghdha, 2011). Because reconfiguration costs may be linked to task difficulty, we simplified the task in Experiment 3. This eliminated the reconfiguration cost but still did not yield any structural benefits. On this evidence, reconfiguration costs may account for some previous phrase structure priming findings, and purely structural phrase priming may not exist.

Frazer, A.K. & O'Seaghdha, P.G. (2011). Phrase structure priming across sentences: Facilitation or reconfiguration? In L. Carlson, C. Hölscher, & T. Shipley (Eds.), Proceedings of the 33rd Annual Conference of the Cognitive Science Society (pp. 1140-1145). Austin, TX: Cognitive Science Society.

Pickering, M.J. & Ferreira, V.S. (2008). Structural priming: A critical review. Psychological Bulletin, 134, 427-459.

Smith, M., & Wheeldon, L. (2001). Syntactic priming in spoken sentence production – an online study. Cognition, 78, 123-164.

Wheeldon, L. & Smith, M. (2003). Phrase structure priming: A short-lived effect. Language and Cognitive Processes, 18, 431-442.

38.Polynomial Modeling of Distance-Mediated Variation in Lexical Tone Production

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This study demonstrates that polynomial modeling can both distinguish categories of lexical tone within Mandarin and Thai and characterize the variation in production caused by changes in physical distance between interlocutors. Previous work by Shih et al. (2010) examined the effect of interlocutor distance on the production of lexical tone in Mandarin. Acoustic analyses from this previous study demonstrated that a greater distance between interlocutors caused greater durations of word production as well as higher fundamental frequency (F0) maxima and lower F0 minima. Additionally, perception of tonal categories varied depending on the distance. While native speakers demonstrated near-perfect accuracy and agreement in categorizing the tones produced, learners of Mandarin performed with more variability. Learners improved most when they started training with items produced at further distances and were adaptively exposed to tones produced at shorter distances. Shih et al.'s interpretation is that the acoustic properties of the tokens produced for a more distant interlocutor make identification of tone category easier for learners.

If interlocutor distance is just a heuristic for eliciting acoustic profiles that are variably difficult for listeners, an acoustic model is needed that can capture these subtle differences. In Green Mong, a language with highly complex tonal categories, Andruski & Costello (2004) found that quadratic regression could accurately distinguish the tones while simple linear regression could not. A polynomial model could also be used to characterize the variability within tonal categories to investigate the influence of audience design. Specifically, how does the speaker's knowledge of the distance that separates them from their listener affect their production of lexical tone? Analysis of recordings made with Mandarin and Thai speakers is offered to support the hypothesis that a polynomial model both characterizes categories of lexical tone and describes the variation in its production caused by manipulation of physical interlocutor distance.

Andruski, J.E., & Costello, J. (2004). Using polynomial equations to model pitch contour shape in lexical tones: an example from Green Mong. *Journal of the International Phonetic Association 34*(2), 125-140.

Shih, Chilin, Lu, Hsin-Yi Dora, Sun, Lu, Huang, Jui-Ting, & Packard, Jerry (2010). An Adaptive Training Program for Tone Acquisition. In Proceedings of Speech Prosody 2010, 100981:1-4, Chicago, USA.

39. The electrophysiology of self-monitoring: prevention of taboo errors

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In theories of language production, the verbal self-monitor is seen as a device intercepting and correcting errors. The goal of this experiment was to establish whether monitoring can result in the reconfiguration of the speech production system depending on the context of speech. This was done by means of a picture-word interference task in which participants named pictures with taboo and neutral distractors. Previous research showed that naming latencies increase with a taboo compared to a neutral distractor, and that in a speeded version of the task, taboo distractor naming errors were less frequent than neutral errors (Dhooge & Hartsuiker, 2011). The authors assumed two underlying processes. First, the monitor catches taboo distractors faster than neutral distractors, reflecting its monitoring bias. Second, after detection, the monitor checks the name of the picture. This checking process will be more stringent in the context of taboo distractors, as participants want to avoid naming the taboo distractor given its embarrassing nature. Thus, there will be a different reconfiguration of the speech production system after detection of a taboo versus neutral distractor. Replicating Dhooge and Hartsuiker (2011), naming latencies were longer with taboo than neutral distractors. This was accompanied by two ERP effects. First, an N200 was found, with smaller amplitudes for taboo than neutral distractors. Second, a more positive late positive potential was found for taboo than neutral trials. The first effect was interpreted as a reflection of conflict monitoring, indicating easier conflict detection with taboo distractors. The second effect was interpreted as a reconfiguration of the speech production system in the context of taboo distractors in order to avoid naming the taboo word. In sum, operations of the monitor can result in an adjustment of the speech production system in order to comply with the current demands of the context of speech.

Dhooge, E., & Hartsuiker, R. J. (2011). How do speakers resist distraction? Evidence from a taboo picture-word interference paradigm. *Psychological Science, 22,* 855-859.

40. Reading words in sentence context in the first or second language: Effects of semantic constraint and cross-language ambiguity

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Understanding the processes involved in handling multiple languages in activities, such as reading, within one brain has received increased attention. Research on bilingualism has concluded that lexical access in bilinguals is non-selective. Bilinguals cannot choose to turn 'off' one of their languages. Instead, bilinguals process incoming information with both of their languages activated, even when processing words from one language. Which cues, then, do bilinguals use to ultimately restrict lexical activation to one language only, and constrain activation of lexical alternatives in the non-target language?

Spanish-English and Dutch-English bilingual and English monolingual speakers named words or pictures embedded in low and high constraint sentence contexts (e.g., 'The young girl was nervous, because she would take the *train* all by herself today' vs. 'While we were running to platform five to catch the *train*, I dropped my bag', respectively). Words were either Spanish-English or Dutch-English cognates (e.g., words that shares form and meaning, like *train*) or non-cognates.

Results indicate that only bilinguals showed a cognate facilitation effect in low, but not high constraint sentences for word naming. Semantic constraint did not modulate the cognate effect in picture naming. These results indicate that word and picture naming rely on different underlying processes and that a semantically constraining sentence context might limit lexical selection to the target language in word naming, but not in picture naming. Implications of these results with respect to bilingual language production, as well as theories on bilingual lexical processing in context will be discussed.

41. The mechanism underlying lexical selection: Evidence from the picture-picture interference paradigm

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During speech, we select the syntactic form of words either based on the words' appropriateness (activation) in comparison to other active words (e.g., Abdel Rahman & Melinger, 2009; Swinging Lexical Network (SLN)) or alternatively we select words using a non-competitive process (e.g., Mahon, Costa, Peterson, Vargas, & Caramazza, 2007; Response Exclusion Hypothesis (REH)). In two experiments using the picture-picture and picture-word interference paradigms, we compared predictions from these two hypotheses to determine whether the process of word selection is competitive. Consistent with both hypotheses we found faster picture naming times when distractor pictures were associatively related vs. unrelated as a result of a spread of activation at the conceptual level with little (SLN) or no (REH) contribution from lexical competition. Although both hypotheses predict interference during naming in the picture-word interference paradigm from categorically related vs. unrelated distractor words (caused by either lexical competition (SLN) or words' privileged relationship to articulation (REH)), when the distractors are pictures the predictions diverge. The REH predicts faster naming times (facilitation) when pictures are categorically related vs. unrelated in the picture-picture paradigm due to priming at the conceptual level. In contrast, SLN does not predict semantic facilitation as both lexical competition and conceptual facilitation are predicted to co-occur. We found that the magnitude of the semantic interference effect as established in the picture-word interference paradigm significantly decreased, but was not facilitatory, when distractors were pictures (in the picture-picture interference paradigm). The results are inconsistent with REH (which predicts facilitation), but consistent with SLN (which predicts either interference or an attenuation of the effect), suggesting that the process to select a word is a competitive one.

42. The Relation between Executive Control Skills and Verbal Fluency in Monolinguals: Simulating the Bilingual Advantage

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The unique ability of verbal fluency tasks to contrast the contributions of executive control functioning (evident by rates of decline in generating exemplars over time) and language representation (indexed by number of items produced) in an online production context have been exploited by researchers interested in how these factors vary across bilingual and monolingual populations (Sandoval et al., 2010; Luo et al., 2010). This research has shown that while there is a general disadvantage for bilinguals early in the fluency trials across both category fluency and letter fluency tasks, bilinguals who are matched with monolinguals on vocabulary size outperform their counterparts on letter fluency performance. The letter fluency task has been claimed to be especially susceptible to executive control differences, and this has been used to account for the selective bilingual advantage on letter but not category fluency tasks. The current study exploited the presence of individual differences in executive control abilities (including working memory and inhibitory control) in monolingual English speakers to simulate this selective bilingual advantage for letter fluency compared with category fluency performance.

Sixty-four monolingual undergraduate students completed a battery of tasks including category fluency and letter fluency tasks, an Operation span (working memory) task, and a Flanker (attentional/ inhibitory control) task. The verbal fluency tasks required participants to generate as many exemplars as possible belonging to a particular semantic category (e.g., fruits) or beginning with a certain letter (e.g. "S") in a 30 s interval. Preliminary results indicated that O-span scores differentiated category but not letter fluency performance. In contrast, flanker performance differentiated letter but not category fluency performance. These results support the claim that letter fluency tasks may reflect those executive control processes that distinguish bilingual and monolingual performance.

43. Individual differences in bilingual picture naming

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Bilinguals tend to name pictures more slowly and less accurately in their second language than in their first language. This difference across the two languages is typically ascribed to differences in proficiency in each language. However, it is still unclear whether and how more fine-grained measures of language proficiency, language use, and language learning history as well as cognitive skills and executive functioning affect the relative accuracy and speed of picture naming in each of a bilingual's two languages. The current study tested highly proficient Spanish-English bilinguals who are living in an L2 environment on a picture-naming task. Participants performed the task in both their L1 and L2, with the order of the languages counterbalanced. In addition, language history, use, and proficiency were assessed using an extensive language history questionnaire (probing exposure, use, self-reported proficiency, and measures of codeswitching) and a lexical decision task in both L1 and L2 (again, order counterbalanced). Aspects of cognitive functioning were measured in three ways: cognitive control via the Simon task, inhibition and interference suppression via the Flanker task, and working memory via the operation span task. Analyses will focus on regression models including reaction times and accuracy on the picture naming in both L1 and L2 and the various language proficiency and cognitive measures. Implications of these results will be discussed in light of current models of bilingual language production in addition to recent evidence suggesting cognitive advantages that are associated with bilingualism.

44. The effect of interpretation on children's use of disambiguating prosody

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Studies on the acquisition of prosody indicate that children acquire disambiguating prosody late in middle childhood, if at all (Wells, Peppé, & Goulandris, 2004; Katz, Beach, Jenouri, & Verma, 1996). Of course, the adult literature on disambiguating prosody also suggests that its use may be limited to cases where ambiguity is clearly understood (Trueswell & Snedecker, 2003). The current study investigated whether elementary school-aged children were better able to successfully prosodically disambiguate different types of syntactically ambiguous sentences after alternative meanings were made available. We presented children (and adult controls) with different prosodic renditions of ambiguous sentences, pre-tested for saliency, and asked them to repeat the sentence they heard. After the first repetition, children were asked to identify the intended sentence meaning and then were given alternate meanings to choose from. Children next listened again to the sentence, repeated it, and identified the intended meaning. The first experiment on 29 children between 8 and 9 years old indicated no effect of disambiguating prosody on meaning interpretation (by contrast adults did quite well). Rather, 8- and 9-year-olds defaulted to a single interpretation of all sentences, which was the same as adults' default interpretation of the sentence (Choe & Redford, submitted). Follow up study with the same children a year later indicated increased attention and successful use of disambiguating prosody in the comprehension task. Preliminary results from acoustic analyses of 8 children's speech indicated disambiguation of scope ambiguities even on first production. In addition, children with high comprehension accuracy successfully disambiguated sentences with word attachment ambiguities once presented with alternative meanings. Overall, the results contribute to the understanding of disambiguating prosody and its acquisition. In particular, the results underscore effects of structure and interpretation on disambiguating prosody.

45. Does semantic information affect subject-verb agreement in good and poor readers?

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Children with reading disabilities (RD) often have difficulty with morphology and spelling, and we asked if these concerns would be highlighted in issues related to subject-verb agreement (SVA), using an experimental paradigm from Bock and Miller (1991). In sentences such as "The baby on the blankets were sleepy," the speaker inflects the verb on the basis of the plural local noun,*blankets*, rather than the head noun, *baby*. In these cases, the local noun "attracts" the plural form of the verb. The substitution of the plural verbal form is called an *attraction error*. Previous work with adults indicates that both semantic and syntactic information are active in SVA construction, but research with children has only looked at the role of syntactic information. We consider how the sentential subject's grammatical number (singular or plural) and notional number (a semantically plural subject, such as *the label on the bottles*, may be considered singular) interact in agreement attraction for typically developing and children with RD. Three groups of Dutch children completed the written sentence production experiment: 15 RD (*M* age: 134.3 months), 15 age-matched controls (*M* age: 133.0 months); 15 reading-matched controls (*M* age = 109.7 months). Participants were given phrases such as "The label on the bottles" and asked to write the sentence to completion by adding a verb and an adjective. All groups showed sensitivity to the semantic manipulation. There was an interaction for the errors in grammatical (syntactic) and notional (semantic) number, indicating that both semantic and syntactic information were active during sentence production regardless of age or reading level.

46. Calling neighbors near and far: Effects of recent phonological neighbor mention on vowel articulation

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Phonological neighborhood density (the number of words differing from a given word by a single segment) can affect vowel production: vowels in words with relatively many neighbors are produced with more extreme phonetic properties (e.g., expanded F1-F2 vowel spaces; Wright, 2004). Baese-Berk and Goldrick (2009) provide evidence that concurrent processing of a neighbor strengthens these effects. When a neighbor is visually presented next to the target, effects of neighborhood density are strengthened. We report the results of an experiment that more closely investigates the scope of such contextual effects by examining the influence of neighbors a speaker has recently processed.

We will review recent experimental and corpus results suggesting that the vowel space expansion related to neighborhood density may not be reliably triggered in contexts in which a phonological neighbor is not present in the nearby context. The current list-reading experiment was designed to test this explicitly using a larger set of stimuli than previous investigations (28 matched pairs of low and high density words). Twenty-four participants either produced targets that were preceded closely (by 1-2 words) or distantly (by ~10 words) by a neighbor. If phonetic extremity is related to the recency of neighbor processing, productions will be more extreme when targets are preceded closely by a neighbor. However, it is possible that context is evaluated very locally (i.e., such that only concurrent processing of a neighbor influences production) such that both conditions will yield similar results. Outcomes will inform context-dependent models of speech production.

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47. Immediate transfer of learning from speech perception to speech production

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Adults can rapidly learn new linguistic patterns in laboratory settings: phonotactic constraints acquired through listening experience affect later perception (Onishi et al., 2002), and speech production errors reflect constraints present in recently spoken syllables (Dell et al., 2000). There is little evidence, however, that such phonotactic learning can transfer between perception and production (Warker et al., 2009). In two experiments, we provide further evidence that perception-based learning can immediately influence speech production, and probe the mechanisms of transfer.

Participants alternately heard and spoke sequences of syllables featuring novel phonotactic constraints (e.g. /f/ is always a syllable onset, /s/ is always a syllable coda). Listening trials involved checking a target sequence against a previously heard reference sequence and reporting any deviations. Speaking trials required saying sequences in time to a metronome. Participants' speech errors reflected weaker learning of constraints present in the spoken sequences (e.g. /f/ must be an onset) when they heard sequences with inverse constraints (e.g. /f/ must be a coda), suggesting that constraints experienced in perception were integrated with those experienced in production. However, there was little or no transfer when participants monitored heard sequences for the critical phonemes /f/ and /s/, suggesting that heightened attention during perception is not sufficient for transfer. These results support models of language processing with separate input and output phonologies (Dell et al., 2007), and suggest that only difficult perceptual tasks may lead to transfer by recruiting the production system (Hickok et al., 2011). For example, predicting upcoming syllables and learning from the mismatch between prediction and perception may cause transfer. Alternatively, merely generating inner speech during perception could result in transfer. Follow-up studies are under way to distinguish between these mechanisms.

48. Long-term learning and immediate demands affect sentence production

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Production choices are driven by many factors: experience with language statistics, task-or message-specific factors and constraints on human cognition. Understanding how these constraints operate together is crucial for understanding sentence production.

Previous studies show strong effects of animacy in sentence production, including in relative clause sentences. Participants tend to use more passive relative than active object relative utterances to describe animate rather than inanimate entities (Gennari & MacDonald, 2009). This tendency is true across languages, and seems to mirror language-specific active/passive preferences in main clauses (Montag & MacDonald, 2010). This suggests a role for learning, in which a speaker's lifetime of experience with their language, including structure alternatives afforded by each language, affects production choices.

In addition to long-term learning, more immediate demands also affect production choices. English speakers described human and inanimate target objects (baby/vase) in scenes showing human agents acting on these target entities. The task elicited relative clauses to contrast targets entities from competitors (e.g. "The baby/vase that the woman is carrying/that is being carried by the woman"). Targets varied in visual salience, which affected utterance form: Less visually salient inanimate targets were described with more passive relatives (like the human entities). This is consistent with a task-depended account of visual salience. Human entities, by nature of being human, must be distinguished from other human entities (e.g., participants avoid the ambiguous "the man" when describing two men), promoting, passive relatives in this task. The longer visual search to identify less salient inanimate entities brings attention to-- or causes participants to notice its competitors (non-target "vase"). The contrastive element of the task becomes more central to the speaker's message, yielding more passive relatives. Speakers seem to select structures based on even minute aspects of the intended message. Immediate and long-term learning motivations for these effects will be discussed.

49. Speech motor planning in the face of distraction: Evidence from apraxia of speech

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Purpose: This study examines speech motor planning in younger and older neurologically healthy speakers and in individuals with acquired apraxia of speech (AOS). The study is grounded on two premises. First, we use a delayed naming task to investigate speech motor planning and minimize influences of earlier processes (e.g., word retrieval, phonological planning). Second, we include participants with AOS under the assumption that AOS damages speech motor planning and therefore provides a window into this process.

Method: The experiment uses a delayed version of the picture-word interference paradigm in which participants can prepare their response beforehand, and auditory distracters are presented simultaneously with the go-signal. There were four distracter conditions: *Consonant-overlap*, (target: bed – distracter: bill); *Consonant-Vowel-overlap* (bed-bell); *Unrelated* (bed-car); and a *Baseline*condition without distracter (bed-Ø). To date, participants include two speakers with AOS, four age-matched control speakers (AMCON) and eight young control speakers (YCON) (Data from additional participants will be available at the workshop). The dependent variable was reaction time (RT).

Results: Control groups show no effect of the type or presence of distracters on RT. In contrast, both speakers with AOS have longer RTs in distracter conditions compared to baseline condition.

Conclusion: These preliminary data suggest, first, that this task taps into the later stage of motor planning rather than phonological planning because the typical phonological priming effect was absent and speakers with AOS were susceptible to disruption from distracters. The absence of an interference effect in control speakers further suggests that speech planning involves a mechanism that prevents or minimizes the activation of the distracter once an utterance is preprogrammed and ready for production. Longer RTs for speakers with AOS in trials with distracters suggests that this mechanism may be damageable, requiring either additional time to overcome the competing activation or reprogramming of the target motor plan.

50. WITHDRAWN
51.WITHDRAWN

52. Lexical Tone Perception and Production by English Vocalists and Instrumentalists

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Lexical tones are used in many languages (e.g., Mandarin and Thai) to distinguish word meaning. Previous research has shown that speakers of non-tonal languages have difficulties in discriminating and producing lexical tones (e.g. Gandour, 1983). Musical training has been found to positively affect non-native lexical tone perception and production (e.g. Wong et al., 2007). While there are comprehensive studies on trained instrumental musicians, relatively little is known about formally trained *vocal* musicians. The present study compares English vocalists and instrumentalists to see which type of musical training is more advantageous to lexical tone perception and production.

Stimuli consisted of six syllables ([thi], [li], [mi], [tho], [lo], [mo]) associated with four Mandarin tones (high-level, high-rising, low dipping, and high falling). Native Mandarin non-musicians, native English non-musicians, vocalists, and instrumentalists (n=15 per group) were tested in (1) a same/different discrimination task, in which they decided whether the two syllables they heard had a same or different tone; and (2) a production task, in which they heard a tone and imitated immediately.

In the discrimination task, the English vocalists [d'=3.12] performed significantly better than the English non-musicians [d'=2.41; p= .04]. The vocalists also numerically outperformed the instrumentalists [d'=2.84], who in turn outperformed the English non-musicians. Analyses on the accuracy of the "different" tone-pairs showed that the vocalists [M=93.61%] and the instrumentalists [M=92.73%] performed almost as accurately as the native Mandarin speakers [M=96.57%], and that both musician groups outperformed the English non-musicians [M=77.78%; both ps= .00]. For the "same" pairs, the advantage of vocalists over instrumentalists showed a trend toward significance for T2-T2 pair type only [p= .067]. In the imitation task, the three English groups did not differ in how their productions were evaluated by the native Mandarin judges. Our results showed some indication that vocalists are better at discriminating lexical tones than instrumentalists.

53. Animacy is mediated by topicality in the production of word order in Yucatec Maya and Spanish

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Conceptual accessibility (or ease of lexical retrieval (Bock & Warren 1985)), influences word order choices across languages (e.g. English (Bock 1986), Greek (Branigan & Feleki 1999), Japanese (Ferreira & Yoshita 2003, Tanaka et al. 2011), Odawa (Christianson & Ferreira 2005) and Spanish (Prat-Sala & Branigan 2000)). Animacy (an inherent form of accessibility) and givenness (a discourse-derived form of accessibility) increase the likelihood of early mention (Prat-Sala & Branigan 2000). Two questions are still unanswered with regard to accessibility: 1) what is the relationship between inherent and derived accessibility? and 2) does accessibility have a direct effect on positional processing, or is it mediated by functional processing (i.e. the Principle of First Mention (Ferreira & Dell 2000) vs. an alignment account (Aissen 2003)? To address these questions, we conducted a 2x3 video description experiment in Spanish and Yucatec Maya that manipulated the animacy of the undergoer (human vs. inanimate) and the topicality (agent vs. undergoer vs. general topics). Linear mixed effects models with random effects for subjects and items revealed significant main effects of animacy and topicality on word order for Yucatec ($ps<.001$), but only the topicality effect held for Spanish ($p<.001$) (contra the findings of Prat-Sala and Branigan). We found no interaction of animacy and topicality in the Yucatec data. This is consistent with the account of Yucatec constituent order in which topicality outranks animacy (Bohnemeyer 2009). Our results suggest that the relationship between inherent and derived accessibility is cumulative and that languages vary in the degree to which subjecthood or topicality is preferred and in the degree to which animacy affects constituent order choices. If one considers topic assignment in topic-prominent languages to be functionally equivalent to subject assignment in subject-prominent languages, then our findings are consistent with the view that conceptual accessibility always influences functional processing indirectly.

54. Facilitation and interference in the semantic blocking task: Electrophysiological evidence and a new computational model

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The standard finding in the semantic blocking task is that a set of pictures from the same semantic category is named slower than a set of pictures from mixed semantic categories (e.g., Kroll & Stewart, 1994). In a typical study using the semantic blocking task, the items in a set are named successively and are repeated a number of times. Recent studies have revealed a complex relationship between repetition and the effect of semantic context (e.g., Abdel Rahman & Melinger 2007; Belke, Meyer, & Damian, 2005; Navarrete, del Prato, & Mahon, 2012). Specifically, when the items in a set are named for the first time, the effect of semantic context is facilitatory, and the overall inhibitory effect only emerges after the first repetition of the items in a set. We present behavioral and electrophysiological evidence that suggests that performance in the task reflects the operation of two distinct cognitive mechanisms: An early mechanism that operates between 200 - 500 ms (N400) which we associate with the facilitatory effect, and a later mechanism that operates around 600 ms which we link to the inhibitory effect. These data challenge existing models that assume that performance in the task reflects the operation of a single selection mechanism (Belke et al., 2005; Oppenheim, Dell & Schwartz, 2010). Instead, we suggest that the data are compatible with the proposal that the inhibitory effect reflects a mechanism that is only invoked when selection difficulties arise (e.g., Schnur, Lee, Coslett, Schwartz, Thompson-Schill, 2006). We implement these assumptions in a new computational model that accounts for the results.

55. The role of language context and language dominance in the development of bilingual infant babbling

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Cross-linguistic studies have illustrated that babbling of monolingual infants varies as a function of the native language background by the end of the first year (i.e., Boysson-Bardies et al., 1992). These findings have been interpreted within the babbling drift hypothesis, which theory proposes that monolingual infant babble progressively resembles the phonetic and prosodic characteristics of the linguistic environment. However, the development of babbling in bilingual infants, who have two native languages, is unclear. At the perceptual level, bilingual-to-be infants have been shown to differentiate two rhythmically similar native languages by 4-months of age (Spanish and Basque: Molnar et al., 2011; Spanish and Catalan: Bosch and Sebastian-Galles, 2001); still, it remains controversial whether preverbal bilingual infants develop differentiated language systems in their productions during the babbling period (Poulin-Dubois and Goodz, 2001). In order to investigate the developmental characteristics of bilingual babbling, in the current study, we recorded babbling samples from bilingual and monolingual infants of Basque and Spanish at 10-, 12-, and 14-months of age. Bilingual infants (Basque-dominant and Spanish-dominant) were recruited from one-parent-one-language families, and their babbling samples were recorded in two separate sessions corresponding to the two linguistic contexts (Basque and Spanish). Linguistic context of each session was induced by the language-appropriate caregiver interacting with the infant. Acoustic analysis of adult native productions of Spanish and Basque have indicated that the two languages differ in terms of the articulation of fricatives and affricates (Hualde, 1991), as well in terms of the overall temporal distributions of vowels and consonants (Molnar et al., 2011). Based on these acoustic/phonetic features, differences across monolingual and bilingual (by language context and language dominance) infant productions will be discussed.

56. Semantic interference and gender congruency in multiple-picture naming: ERP evidence

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With event-related potentials recorded during a multiple-picture naming experiment and overt articulation, we investigated the temporal dynamics of picture-induced semantic interference and gender-congruency effects in language production. In two tasks, German participants produced novel noun-noun compounds with or without determiner in response to two simultaneously presented and horizontally arranged objects (e.g. pictures: apple and pear; response with determiner: /die apfelbirne/). Categorical relatedness and gender congruency of the constituents were manipulated orthogonally. We observed semantic interference, with slower compound naming for related relative to unrelated pictures, also evident in an ERP modulation starting at about 200 ms. Gender-congruency effects were found only in the task requiring compound naming with determiner (e.g. /die apfelbirne/), with faster naming for pictures with same-gender names than for gender-incongruent pictures. Gender congruency was reflected in an ERP modulation starting around 150 ms post-stimulus, 50 ms earlier than the relatedness effects. These results demonstrate the close temporal relation between lexical-semantic and syntactic processes. Implications are discussed for current models of speech production.

57. Semantic inhibition: not semantic, but lexical competition.

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Howard et al (2006) and others have shown that when pictures of items from a category are named, naming is progressively slower as a linear function of the number of items from the category already named: the effect is cumulative and lag-independent. Some authors have suggested that the effect may be due to competition at a semantic level. Howard et al (2006) developed a competition model, where activated post-semantic representations compete. Oppenheim et al (2010) locate the effects in changes of weights in the semantic-lexical mapping as determined by a learning rule. As Oppenheim et al show, either of these models can accommodate the existing data.

Experiment 1: Written word-picture verification. If competition is at a semantic level, it should occur in all tasks involving access to semantics. This was essentially a replication of the Howard et al (2006) study; all target items were 'yes' trials; the fillers were pictures with close semantic distractors. Latencies were reduced after the first presentation of an item from a category. The effect was not cumulative (hockey stick) and lag independent. The data are fit well by short-term facilitation at a semantic level.

Experiment 2: Transfer from spoken word-picture verification to naming. There were two conditions in this experiment. For half the categories, there were four spoken word-picture verification trials followed by a naming trial for the fifth item. The other 12 categories had all five items presented for naming. The Howard et al account predicts that word-picture verification should slow naming, while the Oppenheim et al account does not. Naming of the fifth item from the categories where there had been four verification trials was significantly slower than the first item from categories presented only for naming, and not significantly different from the fifth item.

We conclude that the Howard et al account can easily accommodate these data; the Oppenheim et al theory will need radical revision to cope with these findings.

58. How our brain represents the other's intention to speak: an ERP study on joint action during speech production

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Communication represents one of the best forms of joint action. Interlocutors coordinate their own actions to one another, what the speaker wants to say and what the listener understands, with the final goal of communicating successfully (Clark, 1996). As for any other joint activity, linguistic communication depends on the ability to share mental representations and to predict and integrate our and the other's actions (Sebanz, 2006). However, relative to the bulk of evidence on the role of joint action on perception-action planning and performance, little is known on how our verbal activities are coordinated during a joint activity (Garrod& Pickering, 2009). The aim of the present work was to evaluate whether lexical selection processes during speech production are affected by considering the other's intention to speak. To explore that, we registered the electrophysiological activity of a group of participants while performing a joint-picture-naming task with another person (confederate) in the same room. Pictures appeared in one of three colors, black, red or blue, indicating that the participant should name the picture (GO me), the confederate should name the picture (GO other) or none of them had to name it (NO GO). As an index of lexical processing, we manipulated the lexical frequency of the words (50% high and 50% low frequency words). Results on the ERPs locked to the onset of the picture presentation showed that No-Go waveforms differed from the Go-conditions very early on (around 150 ms) and lexical effects were not observed in the NO GO condition. In contrast, the lexical processing was similar for the two GO conditions in the P2 time-window; pictures with low-frequency words elicited more positive amplitudes than high-frequency words around 200 milliseconds (Strijkers, 2009; 2011).

This work provides evidence that our brain engages in the same processes both when the other or we are intended to speak. Thus, sharing the lexical representations when people are engaged in a joint action seems to be crucial for successful communication.

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59. Are Errors Learned? Investigations of Word-Retrieval Difficulty in Aphasia

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Background. Recent work with neurologically-intact speakers suggests that lexical retrieval failures such as tip-of-the-tongue states (e.g., "I know it but I can't say it") may be learned (i.e., errors in speech are self-reinforcing). The goal of the present study was to investigate the psychological reality of error learning in speakers with aphasia with controlled experimentation. Whether error learning may be mediated by type of retrieval strategy was also investigated.
Methods. Eight participants with aphasia with phonological naming impairments and ten healthy controls named a large set of familiar unique entities (e.g., celebrities). When experiencing retrieval failure, participants were instructed to adopt a self-cueing strategy (i.e., semantic, "What movies/shows was this person in?" or phonological, "What is the first letter/sound?"). Retrieval failures were also randomly assigned to a short or long condition, where participants were encouraged to continue to try to retrieve the name a short time (15 seconds) or a long time (60 seconds). The key dependent measure was likelihood of a recurrent retrieval failure on the same items retested after a 48-hour delay.
Results. Participants with aphasia tended to show the error learning effect in the phonological self-cueing condition (more recurrent error states in the long versus short condition), and an opposite effect in the semantic self-cueing condition (fewer recurrent error states in the long versus short condition) [$F(1, 7) = 6.2$, $p<.05$]. A reliable three-way interaction indicated that relative to people with aphasia, neurologically-intact controls show the opposite pattern with respects to error learning and self-cueing strategy [$F(1, 16) = 13.67$, $p<.05$].
Conclusions. This work provides support for the role of error learning in people with aphasia with damaged phonological systems. However, its action may be limited to self-cueing retrieval strategies that target such systems.

60. The Role of the Language Production System in Extraction Asymmetries

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The poster will explore an extension of the proposal that grammars are in part shaped by processing systems. Hawkins (2010) and other proponents of this proposal emphasize parsing. By contrast, we focus on production planning via an exploration of a phenomenon that we term the Mirror Asymmetry, a subject/object extraction asymmetry that runs in opposite directions for within-clause and embedded (long-distance) extraction. There is a preference for subject extraction in the former (e.g. *the girl that __ saw the boy* vs. *the girl that the boy saw __*), and for object extraction in the latter (e.g. *the girl that I wonder when __ saw the boy* vs. *the girl that I wonder when the boy saw __*).

We review several types of evidence for the Mirror Asymmetry, including typological findings, production and parsing research, and child language research. Stated informally, we argue that the speaker finds it easiest to plan for a gap that is close to its filler, while a gap in an embedded clause creates a major planning challenge if it relates syntactically to an element in a different planning unit (the higher clause). Beginning a planning unit with a complex structure is hard, since there may be insufficient time. Therefore, beginning an embedded clause with a (subject) gap is harder than planning an object gap in an embedded clause.

Our account involves the following assumptions about production planning:

- Planning proceeds in clausal units.
- A salient antecedent facilitates the construction of a dependency relation.
- Choice of clause type reflects degree of advance planning.
- Phrases are presented in order of increasing weight (Wasow, 2002).

We argue that these assumptions account for the Mirror Asymmetry and, more generally, that constraints deriving from sentence planning have played a role in the formation of grammars.

Hawkins, J. A. (2010). Processing efficiency and complexity in typological patterns. In J. J. Song (Ed.), *The Oxford handbook of linguistic typology*. Oxford: Oxford University Press.
Wasow, T. (2002). *Postverbal behavior*. Stanford, CA: CSLI.

61. Phonological neighborhoods in speech production revisited

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Phonological neighborhood density refers to the number of words that differ from a given word by a single phoneme. Previous studies on phonological neighborhood density in speech production have reported contrastive results (inhibition and facilitation), notably within and across languages. It is of importance to clarify the role of phonological similarity in speaking and to establish how form similarity influences access to the lexical network. To this aim, we conducted a large-scale picture naming experiment in Spanish. In two sessions, 30 participants were asked to name 533 object pictures as fast and as accurately as possible. The data (N = 31 980) were analyzed using mixed linear regression models performed at the single trial level. To control for possible confounds, several variables known to affect naming performance were included in the analysis (e.g., age of acquisition, name agreement, onset density, first syllable frequency, etc.). Our results showed that increasing phonological neighborhood density had a detrimental effect on naming latencies. In addition, several reanalyses of independent data sets provided further evidence on such inhibitory effects on naming latencies. By reviewing the literature we highlight that the effects of phonological neighborhood density surface differently depending on the task and performance measure at hand. We argue that when naming speed is tested, latencies are influenced by competitive processes involving similar sounding words. On the contrary, in accuracy tasks phonological similarity plays a facilitative and protective role. We conclude that the lexical network underlying speech production should not be described solely on the basis of static representational properties such as phonological similarity. The dynamics of the retrieval process have an influential impact on how these properties surface in speech performance.

62.The Relative Contributions of Root and Word Representations to Post-Lexical Processing of Suffixed Words

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It is currently unknown how post-lexical phonological processing occurs for multimorphemic words. Full-storage and dual-route theories of morphology propose that whole-word representations are stored for many and possibly all multimorphemic words, including words with highly productive morphology (e.g. Baayen & Schreuder, 1999; Seidenberg & Gonnerman, 2000). We would expect that if whole-word representations are active during phonological processing, the lexical properties of the surface form should contribute to the word's final phonetic form.

It has been demonstrated that vowel distribution in F1/F2 space is modulated by word frequency and neighborhood density (Munson & Solomon, 2004). We examined the relative contributions of word and root representations to phonological processing by investigating whether the vowel space of English suffixed words (e.g., *paced*) is best accounted for by the lexical properties of the root (*pace*) or the surface form (*paced*). Analyses revealed that the vowel space is determined primarily by the lexical properties of the root, not the whole word. Results were similar in a follow-up study of words with a greater surface frequency than root frequency (e.g., *folks* > *folk*) despite the suggestion that these words are likely processed as wholes (Hay, 2003).

To rule out the possibility that final phonemes (suffix or otherwise) simply do not contribute to vowel space, monomorphemic embedded word pairs (*bald* and *ball*) were tested. The vowel space of the carrier words differed from those of the embedded words, suggesting that the results of the first two studies are in fact due to morphological structure.

Our results indicate that the post-lexical processing of English multimorphemic words is primarily influenced by the lexical properties of the root rather than surface form, even in words that are most likely to be processed as wholes (Hay, 2003). Morphological structure appears to influence even the final stages of post-lexical processing.

Baayen, H., & Schreuder, R. (1999). War and Peace: Morphemes and Full Forms in a Noninteractive Activation Parallel Dual-Route Model. *Brain and language, 68*(1-2), 27-32.

Hay, J. (2003). *Causes and consequences of word structure*. New York and London: Routledge.

Munson, B., & Solomon, N. (2004). The effect of phonological neighborhood density on vowel articulation. *Journal of Speech, Language, and Hearing Research, 47*(5), 1048.

Seidenberg, M. S., & Gonnerman, L. M. (2000). Explaining derivational morphology as the convergence of codes. *Trends in Cognitive Science, 4*(9), 353-361.

63. Processing pressure on word order: Long-before-short preference in Basque

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This study explores how word order is affected by processing constraints; particularly, how phrases are sequentially arranged relative to their phonological length. Hawkins (1994) argues that speakers try to minimize the average distance between the verb and its constituents, so that VO languages will prefer short-before-long constituent sequences, while OV languages will prefer long-before-short sequences. These preferences have been shown to hold both in VO languages [1-4] and OV languages like Japanese [5] and Korean [6]. No prediction is made for languages like Basque (OV) with greater word order freedom than Japanese and Korean, where constituents in the verb-phrase agree with the verb and can be either preverbal or postverbal. Using the same paradigm as Yamashita and Chang (2001), we explored the sequencing preferences for long and short constituents in Basque. 24 Basque native speakers were presented a series of phrases, and were asked to arrange them in sentences. The length of subject-NPs vs. direct-object-NPs of transitive sentences (Experiment 1: S vs. DO) and of direct-object-NPs and indirect-object-NPs of ditransitive sentences (Experiment 2: DO vs. IO) was manipulated. Speakers showed a strong preference to place long constituents before short ones (see table), following the long-before-short effect predicted by Hawkins. Interestingly, this long-before-short preference was also obtained in sequences where V intervenes between the long and short phrase (Experiment 1: DO-V-S; Experiment 2: DO-V-IO), contrary to Hawkins's predictions for the specific case of postverbal constituents**.** However, we argue that these results conform to Hawkins's predictions *once* verbal agreement is taken into account as an argument marking device that identifies a postverbal constituent. In summary, results reveal that similar language production strategies are used by speakers of different types of OV languages, following general principles to speed up phrase identification. We discuss these results in the light of processing demands favoring shorter over longer dependencies

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[3] Arnold, J., Wasow, T., Lonsongco, A. & Grinstrom, R. (2000). Heaviness vs. newness: The effects of structural complexity and discourse status on constituent ordering. *Language*, 76, 28-55.
[4] Stallings, L.M., & MacDonald, M.C. (2011). It's not just the "Heavy NP": relative phrase length modulates the production of heavy-NP Shift. *Journal of Psycholinguistics Research*, 40, 177-187.
[5] Yamashita, H., & Chang, F. (2001). ''Long before short'' preference in the production of a head-final language. *Cognition, 81*, B45–B55.
[6] Choi, S. (2007). Beyond grammatical weight: A corpus study of information structure effect on dative-accusative order in Korean. *Discourse and Cognition 15.3*, 127-152.
[7] Hawkins, J. A. (2004). *Efficiency and complexity in grammars*. Oxford: Oxford University Press.

64. Lexical Retrieval in Illiterate and Low-Educated Adults: Age but not Education/Bilingualism Matters

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Performance on tests of lexical retrieval declines with advancing age. Some studies show attenuation of this decline in better-educated older adults, a phenomenon attributed to the cognitive reserve that more education may give. However reports on possible effects of education on tests of lexical retrieval have been inconsistent. Some find correlations between tests of lexical retrieval and education (e.g., Manly et al., 1999), while other studies report none (e.g., Ganguli et al., 1991). Furthermore, the education range for most studies investigating effects of education on lexical retrieval is heavily skewed toward individuals with high-school education and above.

The second major factor that has been associated with cognitive reserve is bilingualism. Though bilingualism has been found to attenuate age-related decline on some cognitive tasks (e.g., Simon task, Bialystok, 2004), it has been found to adversely affect lexical retrieval in adults (e.g., Gollan et al., 2005). We investigated the effects of age, education, and bilingualism on lexical retrieval by using a culturally appropriate confrontation-naming test with pictures of 60 objects. We recruited 48 cognitively normal participants in rural areas of Kashmir whose ages ranged from 18-28 and 60-85. Three education groups describe the population: one-third each with 0 years of education (illiterates), 1-5 years of education, and 6-10 years of education. The educated were Kashmiri-Urdu bilinguals.

Regression analysis showed that younger adults performed better than older ones ($p < .01$), but bilingualism/education did not contribute further (ns). Our study, while confirming lexical-retrieval decline with advancing age, does not provide evidence for cognitive reserve that should have been evident from education and bilingualism in our population. Either the effects of cognitive reserve are small enough to not be evident in this sample, or cognitive reserve may only be evident after a certain level of education and/or degree of bilingual proficiency.

65. Semantic context effects in word production: An electrophysiological investigation

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Semantic context effects are a major tool for investigating word retrieval. For example, in the "Sequence task", participants name lists of unrepeated pictures while the positions of items within semantic categories are manipulated; in the "Block task", a few items are repeatedly presented in Blocks comprising semantically related or unrelated items. Irrespective of methodological variations, semantic interference and word retrieval processes have been argued to operate through the same mechanisms in these tasks.

We investigated the spatiotemporal dynamics of such semantic context effects by comparing the Sequence and Block tasks within participants (healthy native speakers). Behavioral and electro-physiological (EEG) data were recorded and analyzed. A source localization on ERPs was conducted (sLORETA).

A semantic interference effect was found in behavioral data for both tasks. However, no electro-physiological marker of this effect was apparent, in contrast with previous reports.

More remarkably, the inter-task comparison yielded strong and reliable effects. The electro-physiological difference could be decomposed into two time windows.

An early [250-500ms] involved the Left Inferior Frontal Gyrus in the Sequence task. This could be a signature of conflict solving between related candidate words. In contrast, the Block task showed a more parietal activation bilaterally, which could be linked to verbal short-term memory.

Later [600-800ms], a prototypical bitemporo-parietal P600 effect was observed in the Block task only. This is attributed to the reduced novelty of items in the Block task (where the items are repeated: "old vs. new" effect).

In short, we were unable to replicate previous findings of a semantic context effect on electro-physiological activity, but we clearly observed that the word retrieval mechanism may differ between tasks usually thought to engage the same processes.

66. Semantic interference during naming: Will it stay or will it go?

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Naming semantically related pictures (e.g., "goat" "cow" "mouse") becomes increasingly slower when repeatedly naming from a semantic category even when several unrelated trials intervene (e.g., Howard, Nickels, Coltheart, & Cole-Virtue, 2006). The aim of this study was to test whether semantic interference is independent of time and trials between naming occurrences as a result of changes in connection strength from semantic features (e.g., "four legs" "fur") to the target by previous naming from the same semantic category (a learning mechanism as instantiated in "the dark side model"; Oppenheim, Dell, & Schwartz, 2010). Consistent with the "dark side", the change in naming RTs when naming five pictures from the same semantic category did not differ when the response stimulus interval (RSI) between trials was 750ms or 5s, and interference increased over naming trials whether 2, 4, 6, or 8 unrelated trials (lags) intervened. However, when many unrelated trials occurred (lags 20, 30, 40, and 50) between semantically related trials, the interference effect disappeared. Further, even modest numbers of intervening unrelated trials eliminated the semantic interference effect (lags 8, 10, 12, and 14), except when a short lag occurred (2) in the sequence (lags 2, 8, 10, and 12). The interference effect was more consistent if the short lag occurred in beginning positions of a sequence of categorically related items (e.g., lags 2, 8, 10, and 12), then at end positions of a sequence (e.g., lags 8, 10, 12, and 2). These results suggest that models of semantic interference in naming should incorporate a connection-weight decay mechanism to account for the decrease of interference over longer time intervals. Further, that semantic interference is a result of relatively closely spaced trials and is amplified when trials are closer together suggests that the effect is not as automatic as previously assumed.

67. Accessibility and Competition: The Role of Animacy in Mandarin Relative Clause Production

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Conceptual accessibility affects word order and sentence structure; e.g., passive sentences (The boy/ball was kicked.) are more common with more accessible animate than inanimate patients. A second effect on structure may be competition between similar sentence elements: when the agent and patient are conceptually similar (e.g. girl/boy) in a relative clause (RC) picture description task, agentless passives are produced more often, e.g. "The boy who was kicked," omitting "by the girl," than when agents/patients are dissimilar (e.g. girl/ball), which yield both more full passives (...kicked by the girl) and object relatives (the ball that the girl kicked) [1]. These various RC options differ in both structure and word order, so it is difficult to evaluate the claim in [1] that competition-based agent-omission is a motivation for structure choice. RCs in Mandarin offer a key test, because both object and passive relatives have identical word order (save for the passive marker BEI; see examples). We investigated animacy-induced accessibility/competition in Mandarin RC production. An effect of accessibility should yield more passives in RCs describing animate than inanimate patients, and an effect of competition should yield more agent-omission for animate than inanimate patients.

Participants (N=32) performed an RC-eliciting picture description task, similar to [1]. RC productions were passive more often describing animates (98%) than inanimates (75%). With the light verb, passives resemble subject RC structure, where animate heads may have been promoted to the RC subject position due to their salient topichood. Agent omission rate was also significantly higher in animate-headed passive relatives (40%) than with inanimate-headed relatives (31%) due to similarity-based competition. These results suggest that animacy and competition both affect structure choice even without word order differences. Other evidence, e.g. production of optional classifiers, and inanimate agent replacement, will be also discussed.

Animate-headed RCs	Inanimate-headed RCs
(1a) Passive: 被 (女孩) 踢 的 男孩	(1b) Passive: 被 (女孩) 踢 的 皮球
BEI (girl) kick DE boy	BEI (girl) kick DE ball
the boy that is being kicked (by the girl)	the ball being kicked (by the girl)
(2a) Object: 女孩 踢 的 男孩	(2b) Object: 女孩 踢 的 皮球
girl kick DE boy	girl kick DE ball
the boy that the girl kicked	the ball that the girl kicked

[1] Gennari, Mirkovic & MacDonald (in press), Animacy and competiton in relative clause production: A cross-linguistic investigation, Cognitive Psychology

68. Semantic Category Interference Effects in the First and Second Languages: Behavioral and Electrophysiological Evidence

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Previous studies have shown that monolingual speakers are slower and less accurate to name pictures from the same category than pictures drawn from different categories (Damian et al., 2001; Kroll & Stewart, 1994). The interference that results from naming pictures within the same semantic category in a blocked fashion has been attributed to increased lexical competition among semantic alternatives. These effects have been demonstrated behaviorally and recently in event related potential (ERP) studies (e.g., Janssen et al., 2011). In the present study, using both behavioral measures of response time and accuracy and also ERPs, we asked whether semantic category interference would be greater for bilingual speakers in their second language (L2) because of the potential contribution of within and between language lexical competition. English monolinguals and Chinese-English bilinguals named pictures either in a categorized or mixed lists in English, the first language (L1) for the monolinguals but the L2 for the bilinguals. Behavioral results replicated previous results in showing a semantic interference effect in the categorized naming condition. The bilingual speakers were overall slower than the monolingual speakers, but they critically demonstrated a similar semantic interference effect. Moreover, ERPs results confirmed the behavioral results: the mixed condition elicited larger negative-going waves than the categorized condition for both monolingual and bilingual groups. Critically, both speaker groups, the semantic interference effect was only significant for those who named pictures in the categorized condition first but not for those who named in the mixed condition first. We discuss the implications for the interpretation of the semantic blocking effect and for the consequences of cross-language activation for lexical selection in production.

69. Testing the longevity of associate interference effects

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The development of lexical selection models has been greatly influenced by semantic context effects, especially categorical contexts. Non-categorical relations have garnered less interest, in part because they may arise at the phonological level of processing rather than at the lexico-semantic level (e.g., Cutting & Ferreira, 1999). Recent demonstrations of non-categorical interference, however, challenge this notion. The present study aims to determine whether categorical and non-categorical, associative, interference arise from the same processing mechanism and at the same processing level. Using the cyclic naming paradigm, picture naming latencies were compared in three different blocking conditions: categorically homogenous (items from the same semantic category), associatively homogenous (items from a common context but various semantic categories) and heterogeneous (items neither categorically nor associatively related). Experiment 1 established that interference was obtained for both homogenous conditions with this set of materials. In Experiment 2, unrelated filler trials were interleaved into each of the three blocking conditions (cf. Damian & Als, 2005). The semantic interference effect was unaffected by the interleaved filler trials in both the categorically and associatively homogenous conditions, demonstrating that both types of interference can be long-lasting. This result is consistent with the claim that a common mechanism underlies associative and categorical interference in the cyclic blocking paradigm. Such a finding challenges the notion that associative effects arise at the phonological level.

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Damian, M. F., & Als, L. C. (2005). Long-lasting semantic context effects in the spoken production of object names. *Journal of Experimental Psychology: Learning, Memory and Cognition, 31*(6), 1372-1384.

70.Response Conflict in Language Production: Electrophysiological and Behavioral Evidence from Cognate Naming

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Both models of language production and non-linguistic action planning have suggested that response conflict, the simultaneous activation of two competing responses, may signal the need for monitoring and control. Such conflict has electrophysiological and behavioral consequences. Electrophysiologically, increases in response conflict are associated with larger negative-going ERPs in the form of the N200 (response-locked) and the error-related negativity (ERN; stimulus locked).Behaviorally, response conflict is evident both in reaction time slowdowns when there is high conflict, and also in the Gratton effect, in which response times either slowdown or show smaller differences between conflicting and non-conflicting stimuli following a high conflict trial.We investigated whether these signatures of response conflict are present in language production by examining a situation in which two phonological forms are simultaneously activated: the bilingual naming of cognates. In an EEG study, German-Dutch bilinguals named randomly presented cognate and non-cognate pictures in both their first and second languages. Despite cognates being faster to name (i.e., the cognate facilitation effect), response conflict was evident both in the form an increased ERN for cognates relative to non-cognates, and in a reduction in the cognate facilitation effect following the naming of cognates. In a second behavioral study, Welsh-English bilinguals named pictures organized as triplets in which the cognate status of the middle word was manipulated. Although no cognate facilitation was observed, a Gratton-like effect emerged as subjects were consistently slower to name pictures following cognates relative to non-cognates. The results across these two experiments thus show that when more than one response is simultaneously active in language production, reliable signatures of response conflict are present. The current results, in turn, lend
credence to models in which response conflict serves as a cue to both monitoring and the need for control in language production.

71. Letter activation influences lexical selection: Evidence from acquired dysgraphia

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The cognitive system responsible for spelling words in a writing-to-dictation task includes both word-level and letter-level processes. Recent findings suggest activation cascades from word-level to letter-level processes in writing (Falconer, Miner, Velez & Buchwald,2011), but there is little direct evidence for feedback from letter-level to word-level processes in written spelling. In spoken production, phonemic overlap has been shown to affect lexical selection (Rapp and Goldrick, 2000), as semantic errors have more form overlap than would be expected by chance. In this paper, we investigate feedback between these levels in written spelling by examining semantic errors produced by an individual with aphasia subsequent to stroke. Using an orthographic overlap index (OOI; % of shared letters), we report a higher OOI in these errors than would be predicted by chance, indicating an influence of letter-level processing on lexical selection.

RMI, 36, made frequent errors in writing-to-dictation tasks (39.7% correct, N=1428) including 15.7% lexical-semantic errors (*chipmunk* →SQUIRREL). To determine chance, we used the OOI between the target word and the word associations present on the University of South Florida (USF) Free Association Norms (Nelson, McEvoy & Schreiber, 1998) (N=64), and a Monte Carlo procedure was used to generate 10,000 random datasets from these associates. The mean OOI between the target words and RMI's semantic errors (38.8%) was higher than expected by the chance selection of common associates (mean OOI=29.1%; range: 17.8%-41.3%). Only three simulated datasets exceeded RMI's mean OOI, indicating that an OOI as high as his would be expected to occur only three times out of 10,000 by chance alone (p=.0003). In contrast, if he had chosen the most frequent associate, the resulting OOI (30.3%) would have been within the chance distribution (p=.3862). These results suggest the presence of feedback from letter-level processes to lexical selection in written language production.

Falconer, C., Miner, T., Velez, D. & Buchwald, A. (2011). Interaction between word-level and letter-level processing in written language: Evidence from acquired dysgraphia. *Procedia – Social and Behavioral Sciences*, 23, 238-239.

Nelson, D. L., McEvoy, C. L., & Schreiber, T. A. (1998). The University of South Florida word association, rhyme, and word fragment norms. http://www.usf.edu/FreeAssociation/.

Rapp, B.& Goldrick, M. (2000). Discreteness and interactivity in spoken word production. *Psychological Review*, 107, 460-503.

72. Subject anaphoric strategies in written narratives in Portuguese

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In order to determine the preferential use of subject anaphoric strategies by speakers of European and Brazilian Portuguese (=EP, BP), respectively assumed in the literature as a consistent and a partial pro-drop language, we analyzed written narratives produced by 40 native speakers of both varieties of Portuguese, in 4th and 6th grades. Participants were asked to produce a written text induced by the visualization of a cartoon (the cat story, Hickmann1995). This procedure and the formal properties of the stimulus favor the use of coreference in complex sentences and across sentence boundaries. Taking into account the grammatical properties that distinguish the two varieties of Portuguese, namely concerning the nominal agreement morphology of T(ense) and its correlation with null vs. overt pronominal subjects, we focused on the referential expressions that introduce and retrieve the characters in the story. We raised the hypothesis that EP speakers preferably recover a previously mentioned entity by using a pronominal subject instead of a repeated nominal expression and favor null subjects over overt pronominal in complex sentences, while BP speakers prefer repeated nominal expressions and overt pronominal.

The results showed a great diversity of coreferential chains and confirmed that BP speakers in 4th and 6th grades use overt coreference expressions (both repeated nominal expressions and overt pronouns) more often than EP speakers. EP speakers exhibited an increasing use of null subjects from 4th to 6th grades, which may be interpreted in correlation with the development of their knowledge of textual cohesion. Additionally, the results support the hypothesis of a change in the grammar of BP with respect to the Null Subject parameter.

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73. Notional number, semantic coherence, and attraction in subject-verb number agreement

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Variations in English number agreement reveal important characteristics of syntactic processes in language production. One type of agreement variation that is influential in shaping psycholinguistic theories of production is attraction. In typical instances of attraction, verbs appear to agree in number with an intervening local noun, an attractor, rather than the head of a subject noun phrase, as in "The blanket on the babies *were* soft" [1]. The present experiment assessed contributions to verb number of three hypothesized factors in attraction: Notional number (construed numerosity of a subject's referent in speakers' mental models [2]), semantic integration (linkage between lexical concepts for heads and attractors [3,4]), and plausibility of predication (plausibility of the relationship between predicates and attractors [5]). The question was how semantic and grammatical-number properties of attractors interact with notional number to yield verb number. We tested competing predictions about the effects of these factors with an agreement elicitation task in which participants saw a predicate adjective (ROTTEN), heard a preamble (a sentence subject like "The apple with the brown spot"), saw a response cue (!), and then produced a preamble completion with the predicate adjective, spontaneously using a number-inflected verb (e.g. "was rotten"). The preambles were semantically integrated or unintegrated (*The apple with the brown spot/s* vs. *The apple with the fresh peach/es*) and accompanied by predicate adjectives that were more plausible with the head than the attractor (e.g. *green* apple) or with the attractor than the head (e.g. *rotten* spot*, soft* peach).

The verb-number variations speakers produced pointed to coherence in the mental models underlying messages as the major semantic source of fluctuation in number agreement. The semantic properties of attractors, alone or in relation to properties of predicates or head nouns, added little to their grammatical-number properties in instigating attraction.

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74. Verbs' Argument Structure Restrictions and Syntactic Priming

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One of the important questions regarding syntactic priming research is whether priming effects are restricted by grammatical constraints or just sensitive to the linear order of the constituents. The current study further investigates this issue by using the properties of locative alternation in English. Following the conclusion by [1], we argue that argument structure restrictions of verbs play a crucial role in the elicitation of syntactic priming effects. The locative alternation constructions encode the relationship between the moving element (the "figure (F)") and goal (the "Ground (G)") [2]. In English, not all locative verbs allow the alternation [3]; "fill"-type verbs only allow G-F alternant ("Ground verbs"), and "pour"-type verbs F-G alternant only ("Figure verbs"). This observation was supported by an acceptability rating experiment where the "fill"-type verbs presented with F-G order yielded significantly lower acceptability than the ones with G-F order ($P<.01$). However, both of the alternants were equally acceptable for the alternating verbs. In the priming experiment we manipulated Argument Order and Alternation Possibility as independent factors to examine whether syntactic priming is sensitive to such argument structure restrictions of locative verbs. Participants were presented with prime ((1), (2)) and target ((3), (4)) pairs and asked to complete the targets using the two nouns [4]. The results showed that the targets containing non-alternating Ground verbs were completed with G-F order in 95% of trials regardless of the prime types. However, the targets with alternating verbs were completed with more G-F order when followed by the G-F prime or completed with more F-G order when followed by the F-G prime ($P<.01$). The results indicate that syntactic priming does not occur when the previously encountered structure is incompatible with the argument structure of the newly seen verbs. Therefore, this suggests that linear ordering alone is not enough to gain priming effects.

(1) Jack painted the primer onto the ceiling. (F-G Prime)
(2) Jack painted the ceiling with the primer. (G-F Prime)
(3) Jacob filled…… juice, bottle (Target with non-alternating Ground verb)
(4) Nicole packed…… money, bag (Target with alternating Figure verb)

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75. **WITHDRAWN**

76.Fronto-Posterior interactions underlie the semantic context effect in the semantic blocking paradigm: A neuropsychological and EEG study

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The semantic blocking paradigm has been used in many brain imaging studies to assess the effects of semantic context in lexical selection. When participants name pictures belonging to the same semantic category, they are slower and less accurate than when naming pictures that do not share the same semantic context. On one hand, neuropsychological and functional imaging studies implicate the left inferior frontal gyrus (LIFG) in resolving the resolution of the competition for lexical selection. On the other hand, electrophysiological studies suggest lexical selection, beginning at 200 msecs post-stimulus onset, is associated with many brain regions distributed across frontal and posterior regions. Recently, Janssen and collaborators challenged this last interpretation by arguing that the electrophysiological semantic context effect does not reflect word selection but, rather, stems from earlier stages of processing. We investigated the contribution of frontal and posterior cortex in the semantic context effect using EEG in stroke patients with lesions in either the left or the right prefrontal cortex (PFC, n=8) and in neurologically-normal controls. Left PFC patients had a larger behavioral semantic interference effect compared to controls, as previously reported, but also compared to right PFC patients. EEG analysis revealed a semantic interference effect on the left posterior visual-evoked potentials starting at 200 ms post-stimulus in controls which was also present in right frontal patients. Critically, this effect was absent in left PFC patients. Our results suggest this left posterior brain activity, possibly reflecting perceptual/semantic integration, is modulated by top-down regulation from the left PFC in the semantic blocking task. Our data do not support an isolated early perceptual/semantic locus of the semantic context effect in the semantic blocking task. Rather, we suggest interaction between lexical selection and earlier stages of processing is enhanced when lexical selection becomes more difficult.

77. Simple composition during language production in MEG

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In functional neuroimaging and electrophysiology, the neural basis of language production has been understudied relative to comprehension, due to difficulties inherent both in controlling the nature of the produced utterances and in measuring the associated brain responses. Nowhere is this disparity greater than in the study of combinatorial linguistic processing. While several recent studies have investigated the spatial dimension of neural processing associated with complex combinatorial productions such as sentences and narratives, the present study provides the first investigation into the temporal dynamics of basic combinatorial neural mechanisms that subserve language production. Using magnetoencephalography, we find that the production of simple adjective-noun phrases (‘red tree’) elicits increased neural activity that localizes to the ventromedial prefrontal cortex (vmPFC) and left anterior temporal lobe (LATL) relative to matched list controls (‘red, blue’), while the left inferior frontal gyrus (LIFG) is implicated in the reverse contrast. A previous MEG investigation (Bemis and Pylkkänen, 2011) also identified increased activity localized to both the LATL and vmPFC during the comprehension of these same minimal linguistic phrases, and further, the order of these effects was reversed in the two studies, with combinatorial vmPFC activity preceding LATL activity in the present study. Thus our results not only suggest that the vmPFC and LATL play an integral role in basic composition during linguistic production, but also provide the first direct support that comprehension and production recruit a shared set of combinatorial neural mechanisms, operating in reverse order.

78. Task-effects and Speech Disruptions in High-Functioning Autism

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Task-effects on language production have not been extensively studied in verbal children with autism. Conversational and expository language samples from children ages 7-9 with high-functioning autism (HFA, N=6) and typical development (TD, N=8) were compared in terms of grammatical complexity and accuracy, as well as speech disruptions. Groups were matched on age, NVIQ and language scores. Language samples were analyzed with the SALT program. To explore the pragmatic role of filled and silent pauses in conversation, a correlation between these and pragmatic ability as measured by the CCC-2 (N=12) was computed.

Results indicated that task-related effects were similar across groups with significantly higher grammatical complexity and number of speech disruptions in expository samples compared with conversational samples. Children with ASD demonstrated less complex language than children with TD in conversation, but not in the expository task. There was a positive correlation between pragmatic scores and filled pauses ($r=0.747$, $p=0.005$), but not between pragmatic scores and silent pauses in conversation. The results support the notion of filled pauses serving a pragmatic function in conversation.

79. Internal estimation during speech production

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New York University

Optimal control of speech production requires a process of internal estimation to predict the auditory consequences of planned action/articulation. We present three MEG studies - using mental imagery of speech as a model - to demonstrate the computational architecture of internal estimation during speech production. Our findings suggest that internal estimation during speech production is a sequential cascaded process, in which, initiated by a motor plan (reflected in pre-motor and parietal activation patterns), an initial somatosensory estimation (parietal activation) is followed by the auditory estimate of a target (temporal activation) (Exp. 1, Tian & Poeppel 2010). We show that common neural substrates in auditory regions underlie both auditory estimation and perception; and we demonstrate that the auditory estimation derived from the internal simulation of articulation increases the sensitivity of auditory responses to subsequent perception (Exp. 2; Tian & Poeppel, under review). The results of the comparison between auditory estimation and feedback are expressed as changes in the magnitude of early auditory responses, and such comparisons are constrained by the differences in spatial and temporal features (Exp. 3, Tian & Poeppel, in preparation). In summary, internal estimation and internal-external interactions provide the neurocomputational foundations for the temporally precise monitoring and finely graded online control of speech production.

80. Monitoring speech models: Connectionist and Serial Approaches

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The enormous evidence from studies of errors and repairs during speech has made evident the need for an explanation of the required processes involved in self-monitoring and other-monitoring speech. On this line of research there has been different proposals based upon, on one hand, the serial processing approach, and on the other, the connectionist principles. All these models had to deal with multiple theoretical difficulties. The most recognized of these difficulties has been the removal of informational reduplication in a single module editor in charge of the language production supervision (in this case, at each level of processing there would be a duplication of the monitored information for the editor to be able to correct). Some of the first proposals, like Levelt (1995) and McKay (1987), where able, from different perspectives, to get rid of the duplication phenomenon. For example, McKay (1987) proposed a hierarchical structure of semantic nodes connected in a multilayer network. In the other line of thinking, Levelt (1995) has hypothesized that the same other-speech editor is used in self-monitoring tasks. More recent connectionist models, like Chang, Dell and Bock (2006) or Oppenheim, Dell and Scwartz (2010), have suggested that monitoring in language production may contain some duplication of information as working memory is needed to complete sentences, but that there are other mechanisms generated by feedback connections between different kind of layers that may help to moderate the amount of duplicated information. All these theoretical boundaries are the topics the present work will try to discuss in the poster presentation.

81.What slows down rapid naming?

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McMaster University

Since Denckla and Rudel (1974) showed that poor readers are also slow at serial picture and symbol naming, researchers have tried to understand the connection between rapid naming and reading fluency. Rapid naming tasks predict reading skills in both deep and transparent orthographies as well as ideographic languages, suggesting that they measure a fundamental component of serial word activation. We investigated the effect of phonological variables on rapid naming time. In Experiment 1, typically reading university students named 36-cell object grids with two- and three-syllable names compared to a standard grid with mostly monosyllabic objects. They also named grids with rhyming objects and shared consonant-vowel onsets. Longer names and phonological overlap, particularly of the name onsets, slowed down performance. In Experiment 2, learning disabled highschool students performed the same task. Overall naming times were longer, but the effects were qualitatively similar although more accentuated. In Experiment 3, a new sample of university students named object or word grids with two- and three-syllable words stressed on the first, the second or variably on either the first or the second syllables. Naming both three-syllable objects and words took longer than two-syllable ones. Moreover, both two-syllable and three-syllable objects with the atypical second-syllable stress, slowed down naming. The same effect was seen for two-syllable printed words but not three-syllable words. Finally, naming speed on grids with mixed stress depended on both name length and task. Taken together, the results suggest that multiple processing stages make contributions to rapid naming speed. The strong alliteration effects point to competition in name activation. The pattern of stress effects suggest stress may affect separately a word form activation stage and articulatory planning.

82. Do speakers pick up on how novel verbs are used in sentences?

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In everyday life, adults encounter words they've never heard before. Here, we use syntactic priming to investigate whether hearing novel (never before heard) verbs in particular structures causes speakers to encode and tie those structures to those verbs. In three experiments, speakers heard novel (and sometimes known) verbs in prime sentences that were either prepositional dative or double object structures. Then speakers saw target pictures, which they described with dative sentences using a provided verb. Of interest is whether speakers' target descriptions used the same structure as they heard used with the novel verb in the prime, and whether any such tendency was tied specifically to the novel verb.

Experiment 1 compared prime sentences containing novel versus known verbs. Targets were described using known verbs that were different from those heard in primes. Novel and known verbs primed about equally. Thus, sentences with novel verbs do cause syntactic priming. However, this priming may have been independent of the verbs, if instead the rest of the sentence caused priming.

Experiment 2 determined whether novel verbs in primes cause a 'lexical boost.' They do: More priming was observed when primes and targets shared a novel verb than when the verbs differed. Furthermore, Experiment 3 showed this lexical boost happens only when primes used novel forms as verbs; when novel forms were the subjects of primes, no lexical boost was observed. That novel verbs caused a lexical boost (and only when heard as verbs) shows that syntactic priming effect is tied to specific verbs. Thus, speakers encode the structures they hear used with novel verbs and tie those structures to those verbs. These experiments suggest a starting point for learning about the structural preferences of novel verbs more generally, and highlight syntactic priming as a tool for testing that process.

83. Semantic Diversity Affects Accessibility in Sentence Production

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Lexical ambiguity is known to influence language comprehension, but effects on production seem minimal. Recently, finer-grained measures using latent semantic analysis have provided a metric of diversity of a word's usage across a variety of contexts {1-2}. This semantic diversity measure (SemD) was found to be a more powerful predictor of several comprehension behaviors than traditional ambiguity metrics. Because SemD is essentially a measure of the variety of environments in which a word is produced, we investigated the relationship between this measure and utterance planning. Specifically, we explored whether words with divergent SemD scores vary in conceptual/lexical accessibility {3}, affecting their ordering relative to other words in a sentence.

Twenty sentences, each containing a noun conjunction with one high and one low SemD noun (e.g. …the nail and the rug…), were matched on word frequency, animacy,
imageability, and syllable length. Additionally, 20 filler sentences contained noun conjunctions (as in {3}) manipulating known accessibility factors, animacy and length. The order of nouns in the conjunctions was counterbalanced across subjects. Subjects (n=30) listened to a single sentence, performed a distraction task of repeating three single-syllable nonwords for 10 seconds, and were then asked to produce the sentence to the best of their ability.

The animacy/length items replicated {3}: when speakers made errors in the noun conjunction, they recalled sentences with the more accessible noun first (23.9% reversals) while reversals fronting the less accessible noun were more rare (10.6%). Results in the SemD items showed that higher SemD words were more accessible: subjects reversed noun conjunctions to produce the high SemD word first more often (28.0%) than to produce the low SemD word first (17.8%) These results suggest that words that appear in more diverse contexts are also more accessible in within-sentence utterance planning.

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84. Eye movements and grammatical planning in Spanish sentence production

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Griffin & Bock (2000) monitored speakers' eye movement as they described simple events and found that they gazed at a certain object immediately before mentioning it, irrespective of its conceptual role, thus suggesting that utterances are prepared and produced in a radically incremental way, i.e. word by word. However, current experimental evidence offers contradictory results regarding the size and nature of the grammatical planning units, or the stage (Bock & Levelt, 1994) in sentence production to which they apply. As it has been noticed (Allum & Wheeldon, 2007; Jaegger & Norcliffe, 2009), one of the reasons for the lack of clarity may be that most of the available evidence comes from languages with a fairly rigid word order, where grammatical function and word order are highly correlated.

Drawing on the relative flexibility of Spanish regarding word order, we designed an experiment aimed at distinguishing conceptual roles from grammatical functions (agent vs. subject in the active-passive contrast), and grammatical function from linear order (first mentioned DP vs. subject in the active-topicalized sentence contrast) in production. Speech latencies and eye movement were recorded as participants described simple transitive scenes using different syntactic structures, including active, passive and object dislocated (clitic left dislocated) sentences, where the object is placed at the beginning of the sentence.

As in Griffin & Bock, eye-movement trajectories anticipated the order of mention despite differences in sentence structure, indicating that eye movement is tightly related to lexical access. Nevertheless, three different patterns emerge for active, passive and object dislocated sentences when temporal coordination between gaze and speech is taken into account. Our findings suggest that gaze behavior may be reflecting not only linear order processes but also function assignment processes, which can be interpreted as indicating that functional and positional levels of grammatical encoding may not be easy to separate.

85. Lexical retrieval abilities in discourse in healthy older adults

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Word-retrieval performance as measured by confrontation naming tasks declines with aging (e.g., Goral et al., 2007), however, less is known about lexical retrieval during discourse. We asked whether: (1) noun and verb retrieval in discourse decline with aging; (2) noun and verb retrieval in discourse correlate with confrontation-naming tasks; (3) discourse features (e.g., No-response and uh-ah-ums) predict noun and verb retrieval in discourse.

Method: Data from the Boston Naming Test (BNT), the Action Naming Test (ANT) and a discourse task were collected from 138 participants age-range = 55-89; mean = 72.97 years). Participants were asked to narrate the story of the "Frog, where are you" picture book (Mayer, 2003) after looking it over, mentioning all circled objects: (31 nouns) and actions (15 verbs). A group of raters (N=30) matched for age and education rated the acceptability of the recorded and transcribed responses using a 7-point scale.

Results: A Pearson's correlation test co-varied for education showed that (1) Acceptability of nouns in discourse was negatively correlated with age ($r = -0.215$, $p = 0.021$) but that of verbs was not. (2) Acceptability for both nouns and verbs in discourse correlated with BNT ($r = 0.270$, $p = 0.004$) and ANT ($r = 0.199$, $p = 0.033$) scores respectively. (3) No-responses were negatively related to acceptability of nouns ($r = -0.378$, $p = 0.00$) and verbs ($r = -0.387$, $p = 0.00$) in discourse and uh-ah-ums, ($r = -0.192$, $p = 0.037$) were linked to acceptability of nouns in discourse but not verbs.

Conclusion: It appears that even in discourse, noun retrieval becomes difficult with aging, but verb retrieval does not. However, retrieval ability for both word classes in discourse is linked to participants' performance on their counterpart confrontation-naming tasks and to certain discourse markers of lexical-retrieval difficulty.

86. On the lexical status of filled pauses: Seeing 'uh' and 'um' as words

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Filled pauses (FPs: e.g., English 'uh(m)', Japanese 'e-(to)') occur frequently in everyday communication. However, the exact linguistic status of FPs has been the subject of some debate. Some researchers have argued that FPs are words, with the same lexical status as such interjections as 'well or 'oh' (Clark and Fox Tree 2002), or at least word-like in that they can be used in a controlled fashion (Villa et al 2012). However, others have argued that the evidence is inconclusive and that FPs can be regarded as resulting automatically from cognitive processes (Corley and Stewart 2008).

In this poster presentation, I will review the evidence for and against the hypothesis that FPs are words in a traditional sense. I will make the argument that the hypothesis is correct based on facts showing the systematic and distinctive use of FPs in speech corpora (Kjellmer, 2003), and particularly in a corpus of blog writings (Rose 2011). Evidence from these corpora show that FPs are used, among other ways, to highlight unexpected or unusual words and phrases (e.g., "Jan Wenner's famous pub has gone, um, gaga for [Lady] Gaga."). Here, FPs play a meta-linguistic role that is similar to that played by well-recognized lexical items (e.g., "if you will", "dare I say"): Although the main propositional content is not changed by their presence or absence, their presence communicates a different attitude on the part of the speaker towards that propositional content.

The presentation will conclude with concrete proposals for how further evidence may be obtained to evaluate the lexical status of FPs.

87. Context and constructions: cross-linguistic influence in bilingual preschoolers

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Bilingual children's spontaneous productions contain infrequent yet systematic errors in the syntactic domain that distinguish them from their monolingual peers. While several proposals in linguistics exist to explain these findings (e.g. Hulk & Müller, 2000; Sorace & Serratrice, 2009), insights from psycholinguistics (e.g. Hartsuiker, Pickering, & Veltkamp, 2004) regarding shared activation in language production could be usefully incorporated. Drawing from both approaches, this study, currently underway, explores several factors that contribute to the appearance of 'cross-linguistic interference' in Spanish/English bilingual preschoolers. The first task is a partial replication of Nicoladis (2006), who reports that French/English bilingual preschoolers are likelier to reverse adjective-noun strings in the elicited productions of both languages than are monolinguals, even in a monolingual context. Instead of comparing bilinguals' productions to monolinguals', however, here we investigate how bilinguals' own productions are affected upon entering into a bilingual discourse context. This manipulation allows us to test (1) whether being in 'bilingual mode' (Grosjean, 1989) increases children's tendency to produce these reversals, due to broad cross-language activation, and (2) whether exposure to a particular constituent order in one language primes that order in subsequent productions in the other language, in spite of its 'unacceptability'. Participants engaged in a bilingual picture-naming task in which two blocks of English-language auditory stimuli were presented, one using a predicative construction ('That hat was green') and the other a DP ('It was a green hat'). Participants then responded in Spanish using an adjective and a noun. Preliminary analyses suggest that, relative to a monolingual context, a bilingual context boosts the frequency with which children produce reversals, and that the 'unacceptable' DP prime increases this frequency further. Theoretical implications of the gradient occurrence of reversals are discussed in light of current proposals for cross-linguistic influence in bilingual grammatical knowledge and language production.

88. Characterizing Covert Articulation in Apraxic Speech Using Real-time MRI

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Using real-time magnetic resonance imaging (rtMRI) [1-2] and an analytical method of estimating constriction kinematics based on pixel intensity [3], we find that rtMRI can shed light on some aspects of apraxic speech articulation that are not evident from acoustic studies alone.

Our pilot data reveal that covert (silent) gestural intrusion errors are made more frequently during a word repetition task by an apraxic subject than by fluent speakers [4-5] despite there being no audible difference in error frequency in the acoustic recordings of each. Articulatory analysis of apraxic speech in these trials reveals that these are not simple substitution errors, (e.g. tongue tip gesture for /t/ replaced by a tongue dorsum gesture for /k/). Rather, they are true intrusion errors, whereby both gestures are coarticulated, with neither being reduced in amplitude. Covert intrusion errors are also found and quantified in non-repetitious apraxic speech.

Further, we demonstrate that acoustically silent periods observed before the initiation of apraxic speech oftentimes contain completely covert gestures, and that these typically occur before segments requiring more than one superlaryngeal gesture. This suggests that the added complexity of gestural coordination required by multi-gestural segments might present additional challenges in planning, with the result that speakers exhibit false starts, or even explicit articulation as part of the planning process. Covert gestures corresponding to entire words are also observed, whereby the apraxic speaker fully produces all superlaryngeal gestures for entire lexical items, though without phonation.

This study demonstrates that using rtMRI, covert speech gestures in apraxic speech can be observed and quantified. The data suggest that acoustic analysis of apraxic speech alone provides insufficient information about its characteristics, and that important new insights into the nature of this disorder can be obtained from the use of multi-modal phonetic sensing methods, including rtMRI.

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89.The role of phonology on learning multiple names for the same face.

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It is more difficult to learn and retrieve personal names than common nouns. Previous studies show a competition effect when multiple nouns are associated with a single object. This effect is significantly weaker when the nouns are phonologically related (Bates et al, 2003). However, when the same person has two phonologically unrelated names (e.g. actors and their characters) naming latencies don't differ from those for people with a single name (Bredart, 1993). When participants have recently produced both names for a person, competition effects are observed (Valentine, Hollis, & Moore, 1999). Unlike the names of actors and their characters, names used for the same person may be derivationally and phonologically related (e.g., Andrew, Andy). When this is the case for object labels, the competition effect is reduced. Does the same hold for personal names?

We conducted two name learning and production studies to investigate this question. In both studies, English-speaking adults learned two personal names and an occupation for a set of faces. Participants learned phonologically and derivationally related names (e.g. "Andrew" and "Andy") and unrelated names (e.g. "Andrew" and "Tom") in Study One, and phonologically but not derivationally related names (e.g. "Andrew" and "Allen") in Study Two. Participants' recall for names was tested repeatedly with feedback. We analyzed recall accuracy during testing.

Results of a hierarchical linear model showed that participants learned pairs of phonologically related names significantly faster than phonologically unrelated names in both experiments. Results of a two factor ANOVA comparing mean accuracy for names in both experiments indicate that people recalled significantly more names when they were both derivationally and phonologically related. We also replicated a previous finding that semantic information is learned faster than personal names (Johnson & Bruce, 1990). Our preliminary findings suggest that learning and production of multiple personal names is more complex than learning and production of multiple common nouns.

90. An ERP investigation of semantic processing in foward and backward translation

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Relatively proficient bilinguals' ability to access the meaning of second language (L2) words independently of the first language (L1) has been debated (e.g., Brysbaert & Duyck, 2010). Some researchers argue that there are asymmetries in their ability to access meaning directly during spoken translation (e.g., Kroll & Stewart, 1994), whereas others argue that they access meaning directly when translating from both languages (De Brauwer et al., 2008). Event-related potentials (ERPs) have provided results that may elucidate this matter. ERPs have revealed that, if words are presented for long durations, even highly proficient bilinguals activate L1 words when comprehending L2 words (e.g., Guo et al., accepted;Thierry & Wu, 2007). The direct route to meaning might be exploited when processing requires less cognitive resources and can unfold quickly. This outcome may be more apparent in comprehension, where processes transpire rapidly. The indirect route, in which access to meaning relies on word-to-word links, might be exploited when greater cognitive resources are required and processing is prolonged. Spoken production may be one context in which the less automatic L2 is particularly vulnerable to the influence of the L1, hindering direct mediation. It remains unknown whether spoken translation initiated in the L1 or L2 differ partially, whereby the time course of semantic access is affected or comprehensively, whereby the manner in which meaning is accessed. We report a translation production task that investigates whether bilinguals are equally sensitive to meaning when they translate in the forward (L1 to L2) and backward (L2 to L1) directions. Relatively proficient English (L2) speakers who were Chinese dominant(L1) translated words in a meaning-relevant context or in the absence of semantically related information. We ask whether ERPs reveal evidence for asymmetries in translation that reflect time course differences in semantic access or differential reliance on direct meaning across the two languages.

91. Reduction of coarticulation across word-internal morpheme boundaries

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It has been observed that cross-linguistically, words containing productive morphology tend to contain relatively marked phonological sequences (Burzio 2002; Carlson & Gerfen, 2011; Hay & Baayen 2003). Hay and Baayen (2003) proposed that this correlation results from the effects of phonotactics on parsing during comprehension: low probability junctural phonotactics facilitate morphological decomposition, which in turn reinforces each morpheme's lexical representation and bolsters its productivity. In this view, phonological markedness has a causal influence on productivity. This work argues that the reverse chain of causation may be operative in production: productive morphology may weaken the action of certain phonological processes, allowing marked sequences to persist across morpheme boundaries.

In this study, vowel-to-vowel coarticulation was compared within and across morpheme boundaries. Subjects read aloud monomorphemic words ending in /i/ (e.g., lady, sushi, rally) and bimorphemic words containing the suffix –y (e.g., rainy, juicy, grassy). F1/F2 values for these vowels were compared to reference vowels obtained from monosyllabic words matched for frequency and neighborhood density (e.g., trait, flute, grab; Munson & Solomon, 2004). Separate sets of reference words were matched to the monomorphemic and multimorphemic word sets.

The Euclidean distance of each disyllabic word vowel from its corresponding reference vowel was calculated individually for each subject. A linear mixed-effects regression analysis containing predictors for vowel identity and number of morphemes was fit to log F1/F2 distance data. Vowels were significantly farther from their reference vowels in monomorphemic words than in multimorphemic words ($\beta = .1$; s.e. = .04; $t = 2.59$, pMCMC = .005)

These results indicate that vowel-to-vowel coarticulation is reduced across the suffix boundary, suggesting that post-lexical phonological processing applies more weakly across (at least some) morpheme boundaries than within the same morpheme. This finding sheds light on the phonological processing of multimorphemic words and cross-linguistic patterns of phonological underapplication.

92.Different syntax for different contexts: People show consistent mapping between syntactic structures and depicted events

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In conversation, people consistently reuse labels to refer to simpleobjects (Clark and Wilkes-Gibbs, 1986). Complex scenes also require descriptions that combine words into syntactic structures. Because there are often alternative syntactic structures available to describe a scene, we can ask whether people repeat syntactic structures when talking about particular scenes just as they repeat labels for objects.

In Experiment 1, in each of four rounds, subjects heard a confederate describe 12 different scenes. Subjects then described the same 12 scenes back to the confederate. Scenes were divided evenly between depictions of transitive, spray-load, and dative events. We measured how often subjects described each scene using the same syntactic structure as the confederate. Overall subjects were 13% more likely to use the confederate's syntactic structure than the alternative ($p < .0001$).

We wanted to exclude the possibility that subjects in Experiment 1 were explicitly recalling and repeating the descriptions used by the experimenter. Although explicit memory for syntax has been shown to decay very rapidly (Sachs, 1967), we wanted to verify these findings for this procedure. In Experiment 2, subjects experienced an identical prime phase as Experiment 1, and then made same-different judgments to sentences presented with either the same or different syntax as the original description. Subjects correctly accepted same-syntax sentences with 92% accuracy, but when the sentences had different syntax subjects correctly recognized the difference on only 32% of trials ($d' = 1.0$). Subjects thus had very weak memory for the structure used to describe pictures, suggesting that explicit memory did not cause the difference observed in Experiment 1.

Thus, people retain implicit memory for the syntax of scene descriptions, and this memory influences structure choice when
describing the same scenes. Much like simple object labels, people repeat the syntax used to describe events.

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93. Hearing "palm tree" can hamper the naming of an "umbrella" – Interference from distractor words denoting visually similar objects in the picture-word interference task

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Two picture-word interference experiments investigated effects from distractor words denoting objects that were visually similar to the target pictures (e.g., umbrella – palm tree) and effects from distractor words denoting objects that were from the same semantic category (e.g., drum – violin). In Experiment 1, participants were familiarized with pictures of the target objects and pictures of objects corresponding to the distractor words prior to the experiment. In Experiment 2, participants were only familiarized with pictures of the target objects but not with pictures of objects corresponding to the distractor words. The comparison of semantically related distractor words with an unrelated control condition showed a semantic interference effect regardless of whether the distractor words were introduced as pictures (Experiment 1) or not (Experiment 2), replicating earlier findings. By contrast, an interference effect for distractor words denoting visually similar objects was observed only when the distractor words were introduced as pictures in Experiment 1. This finding suggests that visually similarity can result in a significant interference effect in the picture-word interference task when representations of visually similar objects were activated to a sufficient extent. Implications for models of lexical access in speech production are discussed.

94. WITHDRAWN

95.Word confusability and word durations

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Much work in the intelligibility of speech has focused on if and how speakers modify their articulations as a function of phonological confusability [1-2]. Lab-based experiments show that speakers utter words in dense phonological neighborhoods with more phonetic detail and duration [1]. This supports the theory that speakers adjust articulations for intelligibility [1]. Research on conversational speech calls this into question, finding that high-density words are produced with reduced phonetic detail and duration [2]. A recent proposal holds the potential to address the apparent conflict: rational speakers should be sensitive to expected contextual confusability, rather than context neutral confusability as measured by NHD [3]. Consistent with these models, experimental work has found that NHD effects on target words are partly contingent on the presence phonological neighbors of the targets in context [4]. Thus, conversational speech results may conflict with lab results due to not capturing contextual factors. To address this, we conducted a series of analyses on word durations of monosyllabic nouns, verbs, and adjectives in conversational speech. Study 1 replicates [2]. Study 2 adds four contextual measures of confusability to the model: forward and backward bigram weighted NHD (CND), prior neighbor mentions, and distance from last neighbor. We find that greater NHD predicts shorter durations in nouns and verbs confirming prior work [2]. We find that greater forward CND predicts longer durations for all three lexical classes. Further, we find that greater backward CND predicted shorter verb durations and longer adjective durations (all effects, $p < .05$). Mentions and Distance were not significant predictors. These findings are consistent with rational accounts of audience design [cf. the ideal speaker model, 3] though also consistent with competition based accounts [cf. 5].

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96. Speakers are sensitive to prediction mismatches between two cues to grammatical category in spontaneous speech

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Speakers and listeners have a shared goal: trying to successfully communicate. Speakers produce an encoded message and listeners attempt to decode the message. Often, speaker messages are temporarily ambiguous, and listeners use informative cues to generate expectations about the interpretation of ambiguous speech. One cue that comprehenders are able to use is a word's phonological typicality (PT), or, the degree to which the sound properties of an individual word are typical of other words in the same grammatical category [1, 2]. Prior work has demonstrated that PT can influence reaction times to words in a sentential context that is highly predictive of lexical category, and that it can bias the category to which a noun/verb homonym is assigned during on-line comprehension tasks [3, 4]. We ask whether or not speakers are sensitive to PT, and specifically, how speakers behave when the information about lexical category membership that is provided by PT conflicts with that of syntactic probability. In a conversational speech corpus, we investigated the duration of function words (FNs) in sequences of FN NOUN. We find an interaction between the bigram probability of a noun and the phonologically typical ('nouniness') of the NOUN. When a noun was unexpected, the FN was produced with shorter duration as typicality increased. As noun expectedness increased, this negative effect of typicality on FN duration decreased. The results suggest that grammatical information cascades down during the lemma selection, phonological encoding, and articulation processes, consistent with cascading activation models of production [5].

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97. Syntactic and Semantic Effects on the Production of Ordering Errors

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The production of ordering errors is influenced by syntactic and semantic properties. Error rates are affected by semantic integration, the degree of conceptual relatedness between utterance constituents (DiBattista & Pearlmutter, 2011; D&P). Errors typically occur between constituents with the same grammatical class or syntactic role (Garrett, 1975). Extending D&P's and Garrett's research, two experiments investigated the effects of integration, description preference, and syntactic similarity on ordering error production. In Experiment 1, participants described pictures of common objects (e.g., a spot on an apple; a shelf above a sink). The responses varied in integration, preference, and similarity. Integration and preference were determined by prior norming. Similarity was determined by color scheme, which elicited syntactically homogeneous ("the brown spot on the blue apple"; "the spot on the apple") and heterogeneous ("the brown spot on the apple"; "the spot on the blue apple") responses. Ordering errors increased with integration and similarity and decreased with preference. The syntactic similarity manipulated in Experiment 1 was confounded with semantic similarity: It varied based on the presence or absence of an attribute (a color word) in each NP. In Experiment 2, similarity was manipulated by the location of an adjective before the noun, or after the noun in an RC. Participants produced homogeneous ("the brown spot on the blue apple"; "the spot that's brown on the apple that's blue") and heterogeneous ("the spot that's brown on the blue apple"; "the brown spot on the apple that's blue") responses. Errors increased with integration and decreased with preference. The homogeneous condition elicited more errors than the heterogeneous condition, but the effect was nonsignificant. Therefore, Experiment 1's similarity effect may have been semantic, rather than syntactic, in origin. Potential effects of the overall complexity of the responses and the difficulty of the task will also be discussed.

98. Cumulative semantic interference without decay

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Naming a picture of a dog primes the subsequent naming of a picture of a dog (repetition priming) and interferes with the subsequent naming of a picture of a cat (semantic interference). Cumulative semantic interference has been hypothesized to reflect learning, but previous studies have largely concluded that it must dissipate in less time than it takes to boil an egg. New experimental work considers the persistence of cumulative semantic interference and its possible decay. The first experiment uses a variant of the continuous picture-naming paradigm to consider interference and decay as a series of planned contrasts. In the first block (Block A), participants named 24 pictures from 8 semantic categories, in six large cycles. To test for lasting interference, an hour later they named 24 novel pictures (Block B): 12 novel pictures from 4 of the categories represented in Block A, interspersed with 12 novel pictures from 4 novel categories; pictures from the Block A categories took significantly longer to name than pictures from novel categories, showing that some interference persisted over the delay. Finally, to test for decay, participants then named 24 more novel pictures (Block C): 12 from categories from Block A, an hour before, and 12 from categories from Block B, immediately before; surprisingly, naming latencies for the Block B categories were numerically *faster* than those for the Block A categories, suggesting cumulative semantic interference is not affected by time-based decay. A second experiment considers how the persistence of cumulative semantic interference may change our interpretation of data from the blocked cyclic naming paradigm.

99. The working memory basis of normal and pathological speech dysfluencies

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There is still much debate in the literature about the involvement of working memory resources in producing speech dysfluencies. Many dual-task studies report an increase in stuttering behaviors under conditions of divided attention (e.g., Bosshardt, 2002), while other studies rather claim that stuttering is reduced under dual-task demands (e.g., Vasic & Wijnen, 2005). The rationale for the present study is based on recent neuroscientific findings showing that pathological stuttering correlates with higher activity in frontal brain areas associated with executive control functioning (e.g., Loucks et al., 2011). In a first experiment, we investigated whether interfering with working memory control processes during a picture-network description task, reduces the hyper-vigilance of the executive control centra in diagnosed stutterers, and hence decreases the occurrence of dysfluencies. At the same time, we anticipated the opposite effect in persons who do not stutter, namely an increase of speech dysfluencies under executive control interference conditions. In addition, a second experiment was conducted in which both groups were administered an executive control task, a color-matching task involving inhibition and updating, that has been shown to rely on the inferior frontal cortex (IFC; Verbruggen et al. 2010). This brain region is assumed to be responsible for the hyper-vigilance in controlled behavior in pathological stutterers, on the basis of which we predicted better performance in the IFC task for the diagnosed stutterers, compared to the matched controls.

100. Speaking words in sentences: When the language of production does not guide lexical access.

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Bilinguals activate words in both languages despite the intention to use one language alone. Parallel activation occurs in language comprehension [1] and in language production [2]. Neither surrounding linguistic context nor global task requirements (e.g., language of the task) play a large role in mitigating parallel activation [3]. Despite constant activation, there are costs associated with switching languages [4]. Language-switching costs are hypothesized to originate from the recovery from inhibition of the unintended language [5]. However, evidence for switching costs originates from tasks in which words are presented in isolation. What is addressed in the current study is the extent to which switch costs persist during the production of words embedded in informative sentence contexts, and how a switching environment interacts with the degree of language co-activation.

Spanish-English bilinguals were recruited to read and name in both languages. Sentences were presented word-by-word at a rapid rate (RSVP method). All participants named embedded cognate words and lexically-matched noncognate words to assess language co-activation. One group read sentences that were blocked by language. The second group read sentences in a mixed language block of alternating runs. This design allowed for the assessment of switching costs and mixing costs compared to blocked naming. It also allowed for the assessment of language co-activation within each of these contexts.

Results indicate that there is no cost to switching languages for words embedded within a sentence, nor is there cost of mixing languages, suggesting that if inhibition is implicated in language switching then it takes effect locally and its duration is short-lived. Furthermore, there was no evidence that the magnitude of the cognate effect changed as a function of language environment (switching, mixing, or blocked); cognate facilitation occurred in all conditions. The results will be discussed in terms of models of the bilingual lexicon.

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101. Does Bilingualism Incur a Cost to Language Production in a Language-Blocked Design?

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Bilinguals are typically found to produce names for pictures more slowly in their native language (L1) than monolinguals do. Two predominant arguments have been offered to account for this finding. The *frequency-lag hypothesis* (e.g., Gollan et al., 2008; Gollan et al., 2011), which argues that this disadvantage for bilinguals can be attributed to reduced relative frequency of low-frequency lexical items: bilinguals fundamentally use words in their L1 less frequently than do monolinguals, and this is especially apparent for lower frequency L1 words. The *competition for selection* hypothesis (e.g., Kroll et al., 2006) argues instead that an L1 naming cost for bilinguals is due to increased competition, as bilinguals must successfully inhibit competitors during the selection process from two languages. These two hypotheses were tested by comparing picture-naming performance between monolinguals and bilinguals in a blocked naming design. Half of the bilinguals named pictures in their L1 first, followed by naming in their second language (L2), while the other half did the reverse. The typical bilingual disadvantage for naming low-frequency items was replicated; however, bilinguals who named pictures in their L1 after naming pictures in their L2 were slower than those who did the reverse. These results are best explained by the competition for selection account, which predicts global interference of the L1 during L2 naming, and creates slower naming latencies in an L1-naming block following an L2-naming block.

102. Conceptual and grammatical factors in the production of subject-verb agreement

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Agreement processes can be disrupted by both grammatical and conceptual factors. Studies looking at the effects of semantic integration on subject-verb agreement show contradictory results: Some found that tight integration hinders correct agreement because of interference from phrases that are simultaneously active (Solomon & Pearlmutter, 2004). Others found that integration facilitates agreement because integrated preambles are conceived of as singular and singular agreement is easier than plural agreement (Brehm & Bock, submitted).

Using two paradigms, we investigated the effects of semantic integration and local noun number in Dutch. Experiment 1 used a spoken preamble completion task (Bock & Miller, 1991); Experiment 2 used a forced-choice task (Staub, 2009). Both experiments showed an effect of integration: for unintegrated sentences, accuracy was lower and response times were longer than for integrated sentences. This was confirmed by Experiment 3, which combined both paradigms.

In addition to the effect of semantic integration, we also found the classic attraction effect: plural local nouns yielded more agreement errors and longer response times than singular local nouns. Interestingly, the integration effect did not interact with the attraction effect. Thus, the processes have independent influences on agreement production.

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103.Cluster-dependent repair strategies in an acquired speech deficit

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Introduction

Research on the phonological/phonetic errors of individuals with acquired speech deficits has revealed a strong influence of *complexity*, such that more complex structures yield a higher rate of errors (Jakobson, 1941/1968). Here we show that different types of word-initial consonant clusters may consistently give rise to different types of errors.

Methods and Results

VBR is a right-handed 66 year-old woman who suffered a left hemisphere infarct. Her spontaneous speech production is limited and errorful and she has a mild to moderate impairment in articulation (Buchwald, Rapp & Stone, 2007)
VBR was asked to repeat 826 monosyllabic words with singleton onsets and different initial consonant cluster types over 6 testing sessions. VBR's errors involving initial clusters varied depending on the cluster type. One example is the following asymmetry: in the majority of trials, stop + /l/ clusters are pronounced with an epenthetic schwa (p@leI for "play"; (63/87 = 72%), while /s/ + stop clusters never receive an epenthetic vowel (0/92 = 0%), although importantly the /s/ in these clusters is pronounced with a duration significantly longer than her productions of the same segment in singleton onsets (average cluster /s/ duration 518 ms, average singleton duration 400 ms, $t(111) = 3.54$, $p < .001$; [s:pat] for "spot"; cf. [soU] for "sew").

Discussion

The asymmetry reported above is mirrored in the loanword adaptation typology, where one explanation is that speakers attempt to maximize auditory similarity between source and borrowed forms (Kang 2003, Fleischhacker, 2005). We hypothesize that VBR's phonological grammar has interpreted these word-initial consonant clusters as unpronounceable, and has assigned them new representations that allow her to pronounce them while, at the same time, being as faithful as possible to the perceptual characteristics of the target clusters. Preliminary data on perceptual similarity judgments provide support for this interpretation.

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104. Inhibitory Control and Lexical Retrieval Performance in Elders

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Studies of healthy aging have shown that naming accuracy decreases while the time required to name an item increases (e.g., Barresi et al., 2000, Burke & MacKay, 1997; Feyereisen, 1997). As well, a number of studies have shown that advancing age is linked to a decrease in inhibitory functioning (e.g., Earles et al., 1997; Persad, Abeles, Zacks, & Denburg, 2002). In the current study, we asked if older adults experience lingering activation of competing alternatives, and whether better naming among older adults is linked to a better ability to inhibit lexical competitors, as compared with poorer naming. A modified Rapid Automatized Naming (RAN; Denckla & Rudel, 1976) test assessing intrusion effects on lexical production was administered to 204 participants ranging from 55 to 89 years of age (M = 71.9). The RAN was modified in order to manipulate distance of the to-be-inhibited distractor items and to provide an equally difficult task for all participants by individualizing inter-stimulus intervals. In our study, participants were instructed to name pictures presented on a computer screen as quickly as possible. Responses were analyzed for the types of intrusions made and the distance between the intrusions and their prior targets which served as distractors. Our findings indicate that poorer namers produced more distant intrusions than skilled namers, suggesting that reduced inhibition contributes to age-related naming decline. Thus, uninhibited lingering activation can interfere with lexical access among older adults. This finding goes beyond that of Hasher and Zacks (1988) who interpreted older adults' relatively poor performance with recollection of ambiguous stories to result from difficulties inhibiting irrelevant information. Taken together, our findings indicate that reduced inhibitory control in the elderly may contribute importantly to age-related naming decline.