10th INTERNATIONAL SYMPOSIUM OF PSYCHOLINGUISTICS

APRIL 13TH – APRIL 16TH, 2011

DONOSTIA – SAN SEBASTIÁN

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WELCOME TO THE 10th Symposium of Psycholinguistics

The first Symposium of Psycholinguistics was held in Tenerife in 1993, where the goal was to bring together researchers (Spanish or Spanish-speaking, or those located in Spain) who were presenting work at international conferences and publishing abroad. At the time, there was a need to convene and build a community of researchers with an international focus and promote an interest in experimental work on language in Spain. The first “Simposio de Psicolingüística” was the starting point. Not only did we form a community of language researchers, but we also managed to edit a book showing the state of the art of psycholinguistics in Spain: Carreiras, M., García-Albea, J.E & Sebastián-Gallés, N (1996). Language processing in Spanish. Lawrence Erlbaum.

This research community has changed dramatically over the past years, and thus, there was a feeling that the symposium needed to evolve as well. The evolution of the Symposium was a topic of discussion at the last meeting and now we are moving forward in that process. While Spanish was the language used in previous symposia, there was a consensus that this made it difficult to truly engage the invited speakers during discussions. Consequently, we felt as though we were missing out on valuable input from the speakers that could have enriched our projects or promote collaborations. Furthermore, we all publish in English (the current lingua franca of science) and we all push our students to publish in the best journals, which are also in English. So we changed the official language of the Symposium to English in the “10th International Symposium of Psycholinguistics”.

This is an important change that will open the Symposium to a wider community; however, the idea is not to turn it into a different symposium or workshop entirely. Our symposium will not lose its identity. Research in Romance languages (Spanish, Catalan, Galician, Portuguese, French, Italian, etc.) as first or as second languages, and also research using Basque is underrepresented, and this symposium could fill this gap by enhancing their visibility. As we all know, there is a clear and enduring bias to build models of language processing based on data collected in English alone. In this respect, the Symposium will aim to contribute to the growing amount of psycholinguistic data collected in other languages, with the larger goal of moving toward a comprehensive theory of language processing that is built on data from as many languages as possible.

I hope you find this new format appealing, that you greatly enjoy the conference and your stay in Donostia-San Sebastian as well.

Manuel Carreiras

BCBL Director
WELCOME

ORGANIZING COMMITTEE

Manuel Carreiras, Antonio Ibañez, Simona Mancini, Pedro Paz-Alonso, Elena Salillas & Pawel Kuszelewski

ACKNOWLEDGMENTS

- We wish to thank the following sponsors for their support:
  - Spanish Ministry of Science and Innovation
  - Government of the Basque Country
  - Sepex: Spanish Society of Experimental Psychology.

- We would like to thank all the researchers that have submitted their abstracts to the conference. We received 163 abstracts in all.
- We are also grateful to the organizers of previous Psycholinguistics symposiums for their valuable advice.
- Finally, we thank the Miramar Palace for their help and generosity in helping us host the conference.
8:00 - 8:50 Registration & Welcome coffee

8:50 - 9:00 Welcome by Manuel Carreiras, BCBL Director

9:00 - 10:00 Keynote lecture 1 [KL-1] Riitta Salmelin. Low temperature lab. Helsinki, Finland.

Title: Cortical dynamics of language knowledge and language learning

10:00 - 11:00 Oral Session 1

10:00 - 10:20 [OS-1.1] Infant word recognition: New interpretations from TRACE simulations. Julien Mayor & Kim Plunkett

10:20 - 10:40 [OS-1.2] Computational simulations of surface and phonological dyslexia. Yannick Marchand & Robert Damper

10:40 - 11:00 [OS-1.3] There is no mirror effect in LDT. Implications for lexical decision models. Pablo Gómez, Manuel Perea, Robert Zimmerman & Brian Biancardi

11:00 - 11:30 Coffee break

11:30 - 13:30 Oral Session 2


11:50 - 12:10 [OS-2.2] ERP markers of syllable frequency and syllabic neighbourhood in French. Fabienne Chetail, Cécile Colin & Alain Content

12:30 - 12:50 [OS-2.4] On the processing of emotional words in a second language. Sara Rodríguez Cuadrado, David Vinson, Albert Costa Martínez & Gabriella Vigliocco


13:30 - 15:00 Lunch

15:00 - 17:00 Oral Session 3

15:00 - 15:20 [OS-3.1] Exploring the role of language exposure and maturation on the perceptual reorganization of vowels in the first year of life. Laura Bosch, Jorgina Solé, Martí Iriondo, Thais Agut & Francesc Botet


15:40 - 16:00 [OS-3.3] When consonants are the chosen ones: Evidence from French infants' performances. Jane Jöhr & Pascal Zesiger

16:00 - 16:20 [OS-3.4] Universal phonological restrictions and language-specific repairs: Evidence from Spanish. Iris Berent, Monica Rosselli & Tracy Lennertz


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| 18:00 - 19:00| Keynote Lecture 2 [KL-2]. CONFERENCIA SEPEX. David Poeppel. New York University, USA.  
|              | Title: The architecture of speech processing: A brain’s-eye-view |
| 19:15 - 20:30| Social program               |
CONFERENCE PROGRAM – FRIDAY, APRIL 15TH

09:00 - 10:00  Keynote Lecture 3 [KL-3]. Jamie I.D. Campbell. University of Saskatchewan. Saskatoon, Canada.

Title: Language, bilingualism and numerical skills

10:00 - 11:00  Oral Session 4

10:00 - 10:20 [OS-4.1]: Language of learning math and number semantics. A bilingual ERP study. Elena Salillas & Manuel Carreiras

10:20 - 10:40 [OS-4.2]: Exploring the role of operands' magnitude representation in multiplication solving: evidence from the size congruity effect. Alejandro J. Estudillo & Javier García-Orza

10:40 - 11:00 [OS-4.3]: Semantic and world knowledge integration in bilingual L2 readers: Evidences from ERPs. Xavier Garcia, Clara Martin, Audrey Breton, Guillermo García & Albert Costa

11:00 - 11:30  Coffee break

11:30 - 13:30  Oral Session 5

11:30 - 11:50 [OS-5.1] Which bilinguals are faster in conflict processing?: The role of linguistic (dis)similarity. Sonja Froitzheim, Bettina Braun & Baris Kabak


12:10 - 12:30 [OS-5.3] Speaker change in word recognition. Abeba Roessler, Beatriz Gil López de Liaño & Núria Sebastián Gallés

12:30 - 12:50 [OS-5.4] Please, Catalan or Spanish, but not both! Are bilinguals fully in control of their language selection during word production? Clara Martin, Charlotte Vanden Bulcke, Jordi Navarra, Sofie Schoonbaert, Robert Hartsuiker & Albert Costa


13:30 - 15:00 Lunch

15:00 - 16:20 Oral Session 6

15:00 - 15:20 [OS-6.1] Sentence production across languages: From visual attention to structural selection. Andriy Myachykov, Simon Garrod & Christoph Scheepers


15:40 - 16:00 [OS-6.3] ERP investigation on the time course of word encoding in fast and slow speakers. Marina Laganaro, Andrea Valente & Cyril Perret

16:00 - 16:20 [OS-6.4] Handwriting processes involving phonology in the Alzheimer disease: a study using on-line measures. Carlos J. Álvarez & Silvia Baquero

16:20 - 17:30 Posters Session 2 & Coffee

20:30 - Conference dinner
10:00 - 11:40  Oral Session 7


10:40 - 11:00 [OS-7.3] Are grammatical constraints immune to retrieval interference? Umesh Patil, Shravan Vasishth & Richard Lewis


11:20 - 11:40 [OS-7.5] Against semantic attraction: Electrophysiological evidence from subject-verb agreement in Italian. Laura Maffongelli, Alexander Droege, Matthias Schlesewsky & Ina Bornkessel-Schlesewsky

11:40 - 12:10  Coffee Break

12:10 - 12:50  Oral Session 8


12:30 - 12:50 [OS-8.2] Complex dynamics of semantic memory access in reading. Giosuè Baggio & André Fonseca


Title: The role of Broca's area in language production and comprehension

13:50 - 14:20  Conference closing
[PS-1.1] Second Language Acquisition of Motion Events: Thinking for Speaking in Spanish L2 by German, Italian and French speakers. *Alberto Hijazo-Gascón*

[PS-1.2] Same genes different phenotypes: the environmental influences in speech perception. *Anna Basora, Yu Jin, Ignacio Martin & Núria Sebastián*

[PS-1.3] Linguistic stress tunes the speed of auditory automatic attentional shifting: Evidence from Welsh-English bilingualism. *Marie Lallier, Guillaume Thierry, Manuel Carreiras & Marie-Josephe Tainturier*

[PS-1.4] The role of orthographic and phonological overlap in bilingual word recognition and naming. *Joana Acha, Itziar Laka & Manuel Carreiras*

[PS-1.5] Effects of different polarity: Syllable-frequency effects in Spanish and Basque. *Joana Cholin, Ansgar Hantsch, Philip J. Monahan & Manuel Carreiras*

[PS-1.6] Event-related fields in response to spoken words during Spanish-Basque lexical learning. *D. J. Davidson, David Carcedo & Manuel Carreiras*

[PS-1.7] Does L2 proficiency modulate non-cognate masked translation priming effects? *Maria Dimitropoulou, Jon Andoni Duñabeitia & Manuel Carreiras*

[PS-1.8] Effect of language proficiency on bilingual lexical activation: Evidence from eye tracking. *Niharika Singh & Ramesh Mishra*

[PS-1.9] Comparing French and English listeners’ on-line perception of assimilated speech. *Meghan Clayards, Gareth Gaskell & Oliver Niebuhr*

[PS-1.10] Planned production, self-paced reading and relative clause attachment. *Nino Grillo, Andrea Santi, Yosef Grodzinsky & Michael Wagner*
[PS-1.11] An experiencer is just as good as an agent: The neural underpinnings of linguistic actorhood. Sabine Frenzel, Matthias Schlesewsky, Beatrice Primus & Ina Bornkessel-Schlesewsky

[PS-1.12] Exploring the influence of thematic role and case marking in structural priming: A Basque study. Mikel Santesteban, Martin Pickering, Holly Branigan & Iztiar Laka

[PS-1.13] Comparing on-line pronoun resolution to final interpretation patterns – A cross-linguistic study in German and Dutch. Miriam Ellert, Juhani Järviikivi & Leah Roberts

[PS-1.14] Processing the causative alternation in European an Brazilian Portuguese. Armanda Costa & Marcus Maia

[PS-1.15] Are we poor or not rich after the crisis? Looking at negation in context. Isabel Orenes, Linda Moxey, Christoph Scheepers & Carlos Santamaria


[PS-1.17] From lips to lexicon: Does visual speech activate lexical representations? Mathilde Fort, Sonia Kandel, Justine Chipot, Christophe Savariaux, Lionel Granjon & Elsa Spinelli

[PS-1.18] Does orthographic and phonological similarity influence cognate word processing? An ERP priming study. Montserrat Comesaña, Ana Paula Soares, Sofia Frade, Rosa Sánchez-Casas, Andreia Rauber, Ana P. Pinheiro & Isabel Fraga

[PS-1.19] The role of prosodic features in communication failure and repair: a study of native and non-native speakers of Japanese and German. Yuki Asano

[PS-1.20] Attentive and non-attentive perception of familiar and unfamiliar vowels. Chizuru Deguchi, Mireille Besson, Magali Boureux, Michela Sarlo & Lucia Colombo
[PS-1.21] Reading time is a critical variable for parafoveal word processing during sentence reading. P. Javier López-Peréz, Maartje van der Meij, Samara Muñoz & Horacio A. Barber

[PS-1.22] Cultural flexibility in the spatial representation of linguistic content: The role of reading and writing direction. Antonio Román, Abderrahman El Fathi & Julio Santiago


[PS-1.25] Linguistic knowledge modulates the recognition of statistically-coherent word candidates. Juan Manuel Toro, Ferran Pons, Ricardo Bion & Núria Sebastián-Gallés

[PS-1.26] Orthographic effects in spoken word recognition: data from auditory priming paradigm. Laetitia Perre, Katherine J. Midgley & Johannes C. Ziegler

[PS-1.27] TypingSuite: a Java-based software package for psycholinguistic and computational studies of typing data. Erin Mazerolle & Yannick Marchand

[PS-1.28] Seeing for speaking: gaze movement and language production when talking about events. Monique Flecken, Martin Andermann & Christiane Stutterheim

[PS-1.29] Production of one word vs two word noun phrases: how much is phonologically encoded before articulation? Violaine Michel Lange & Marina Laganaro


[PS-1.31] Meaning enrichment and weak definites in Dutch. Maartje Schulpen & Ana Aguilar-Guevara
[PS-1.32] Task effects in event related potentials for semantics and gender in French. Alex Gascon, Véronique Lebel, Phaedra Royle, John E. Drury & Karsten Steinhauer


[PS-1.34] An investigation of the neural correlates of forming novel semantic relations. Nira Mashal & Karuna Subramaniam

[PS-1.35] False recognition in 24 DRM lists with three critical words: A normative study. Sara Cadavid & M. Soledad Beato

[PS-1.36] Couch potatoes don’t learn languages. Foreign language acquisition as an embodied experience. Claudia Helena Sánchez Gutiérrez

[PS-1.37] Predictors of literacy skills and developmental dyslexia in an epidemiological Spanish sample. Luque Juan L., Bordoy Soraya, Carrillo Marisol, Alegría Jesús, López-Zamora Miguel, Rosales Victoria & Giménez Almudena

[PS-1.38] Strong inhibitory effect of positional syllable frequency (PSF) in dyslexic Spanish children. Luque Juan L., López-Zamora M, Álvarez Carlos, Giménez Almudena & Varona Sergio


[PS-1.40] Structural architecture of language and acquired language disorders. Verb processing in agrammatism: Basque and French data. Marie Pourquie

[PS-1.41] Unaccusativeness in agrammatic Broca’s aphasia: evidence from Spanish. Silvia Martinez-Ferreiro, Sara Sánchez Alonso & Bachrach, A.
[PS-1.42] Ambiguous relative clauses... here we go again: Bringing to light the genuine effect of emotional valence. Ana Piñeiro, Antía Ledo, Marcos Díaz, Javier García Orza & Isabel Fraga

[PS-1.43] Recursion in the syntax of language and music: A comparative study. Sergio Mota & José Manuel Igoa

[PS-1.44] The acquisition of culturally dependent scripts by Russian learners of Spanish as a second language. Georgy Nuzhdin & José Manuel Igoa

[PS-1.45] The contribution of the abstract-concrete distinction to the study of novel metaphors. Edgar Cavanas & José Manuel Igoa
[PS-2.1] The influence of native language on lexical access revisited: Ruling out a cognate effect. Shannon Barrios

[PS-2.2] Conceptual transfer in Basque L2 language acquisition. Iraide Ibarretxe-Antuñano & Alberto Hijazo-Gascón


[PS-2.4] Investigating the control mechanisms underlying speakers’ choice of register. Alissa Melinger


[PS-2.6] Linguistic distance and second language processing: electrophysiological evidence from Spanish/Basque bilinguals. Adam Zawiszewski, Kepa Erdocia & Itziar Laka

[PS-2.7] Effects of order of acquisition of words in a natural context of L2 acquisition. Miguel Á. Pérez & Leonor Sáez

[PS-2.8] Stress typology of the L1 matters in the lexical encoding of novel tonal contrasts. Tobias Gaitz, Bettina Braun & Baris Kabak

[PS-2.9] An event-related FMRI study on number and ergative case processing in native and proficient nonnative Basque speakers. Mante Nieuwland, Andrea Martin & Manuel Carreiras

[PS-2.10] When the real world is irrelevant, so to speak: An event-related potential study on counterfactual comprehension. Mante Nieuwland & Andrea Martin


[PS-2.14] Occurrence of closure positive shift depends on boundary position: An ERP study on the perception of prosodic information in short coordinate structures. Julia Holzgrefe, Caterina Petrone, Caroline Schröder, Barbara Höhle, Hubert Truckenbrodt & Isabell Wartenburger

[PS-2.15] Order of mention and syntactic information in pronoun resolution: a visual world study. Paula Luegi, Armanda Costa & Marcus Maia

[PS-2.16] Agree to disagree: Processing default agreement in dative subject constructions in Tamil. R. Muralikrishnan & Ina Bornkessel-Schlesewsky


[PS-2.18] Number and gender integration in sentence processing: data from European Portuguese. Maria do Carmo Lourenço-Gomes, Maria Armanda Costa & Marcus Maia


[PS-2.20] Revisiting the effect of sentence context on lexical ambiguity resolution: An eye tracking study in Hindi. Siddharth Singh & Ramesh Kumar Mishra


[PS-2.22] Reading comprehension and resistance of interference. Antonio Ibáñez, Carlos Gómez-Ariza & Manuel Carreiras
CONFERENCE PROGRAM – POSTER SESSION 2


[PS-2.24] Reading Difficulties in Albanian. Rrezarta Avdyli & Fernando Cuetos


[PS-2.27] The contribution of implicit learning mechanisms to spelling acquisition. Luciana Nigro Natale, Gracia Jiménez Fernández, Ian Simpson & Sylvia Defior Citoler

[PS-2.28] Effects of word order of acquisition in lexical access: New approach from a specialized corpus (Psylex). Javier Marín, Miguel Angel Pérez, Ascensión Pagán, Hans Stadthagen & Cristina Izura


[PS-2.31] Sentence processing in 19-month-olds: the role of abstract word order representations. Julie Franck, Romy Lassotta, Akira Omaki & Luigi Rizzi


[PS-2.33] Assessing oral reading fluency and comprehension. Armanda Costa, Isabel Falé, Isabel Hub Faria & Teresa Condelipes
[PS-2.34] Non conventional utterances in French as second language. Dominika Jagielska

[PS-2.35] Interaction between emotional valence and arousal during lexical processing: Neural evidence for an integrated approach-withdrawal framework. Francesco M.M. Citron, Marcus A. Gray, Hugo D. Critchley, Brendan S. Weekes & Evelyn C. Ferstl

[PS-2.36] Neural precursors of memory illusions for early and late acquired words. Emiliano Díez, Ángel Fernández, María Angeles Alonso & Alejandro Marín

[PS-2.37] Searching for cultural influences on the “right is good” conceptual mapping. Juan Manuel de la Fuente, Daniel Casasanto, Antonio Román, Abderrahman El Fathi & Julio Santiago


[PS-2.44] Is there automatic access to numbers representations? The case of Indian numerals. Reem Abu Mallouh, Javier García-Orza, Manuel Perea & Manuel Carreiras
[PS-2.45] Automatism in subtraction depends on problem size. *Alejandro J. Estudillo, Nerea Casado & Estefanía Bermudo*

[PS-2.46] Linguistic competitions during the comprehension of speech in multi-linguistic babbles. *Aurore Gautreau, Michel Hoen & Fanny Meunier*


[PS-2.49] Development of visual word recognition in poor readers. *Edurne Goikoetxea, Marta Ferrero & Gema Pascual*
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Cortical dynamics of language knowledge and language learning

Riitta Salmelin

Brain Research Unit, Low Temperature Laboratory, Aalto University, School of Science and Technology, Finland.

The combination of excellent temporal and good spatial accuracy of magnetoencephalography (MEG) allows real-time tracking of cortical dynamics. The talk will begin with an overview of time-resolved brain imaging of language perception (written and spoken word processing) and production (picture naming) in adults and then touch upon language development, in form of studies on language perception in school-aged children. Building on this knowledge, the talk will then address cortical dynamics of language learning in adults. The presentation will close with consideration of the relationship between electrophysiological (MEG) and haemodynamic (functional magnetic resonance imaging, fMRI) markers of language perception and production.
The architecture of speech processing: A brain’s-eye-view

David Poeppel

New York University, USA.

Three neurobiological concepts are discussed. First, the functional anatomy underlying speech sound processing is a distributed cortical system that includes regions along at least two processing streams. This anatomic fractionation supports models that posit a componential architecture for speech. Second, to facilitate the processing along these different pathways, sound is analyzed in temporal ‘chunks’ that permit the appropriate computations in these pathways. Neurobiological studies suggest that there exist privileged time scales that lie at the basis of temporally organizing the input signals. Third, processing along the different pathways and over the distinct time scales incorporates a predictive component in the context of feedforward and feedback processing. Most (useful) attributes we know about speech derive from psychological studies. These three cognitive neuroscience ideas provide a (maybe useful) neurobiological perspective to understand the implementation of speech processing in the human brain.
Language, bilingualism and numerical skills

Jamie I. D. Campbell

University of Saskatchewan, Saskatoon, Canada.

I will review current theory on the specific role that language plays in number processing and arithmetic, with a focus on bilingualism. A central question is whether some bilinguals develop language-specific memory representations for arithmetic facts, or is arithmetic memory based on language-independent representations?
The role of Broca's area in language production and comprehension

Sharon Thompson-Schill

University of Pennsylvania, USA.

For over a century, the relationship between left prefrontal cortex and language processing has been accepted, yet the precise characterization of this link remains elusive. Recent advances in both the psycholinguistic study of language processing and the neuroscientific study of frontal lobe function have converged on an intriguing possibility: The demands to resolve competition between incompatible characterizations of a linguistic stimulus may recruit top-down cognitive control processes mediated by prefrontal cortex. Under this account, the brain region traditionally known as “Broca’s area” – one of the principle language centers in classical models of language dysfunction – may be better described in attentional than linguistic terms. This hypothesis draws on a large body of research into the function of prefrontal cortex, and contrasts with other more domain-specific accounts of the function of Broca’s area. I will present both functional neuroimaging data from young, healthy volunteers and lesion-deficit analyses of patients with focal brain damage that jointly provide support for the regulatory hypothesis of left prefrontal cortex involvement in language processing. I will emphasize studies of single word production, but I will also discuss parallel findings beyond the domain of speech. Evidence of shared regulatory mechanisms across domains has implications for the psychological and neural architecture of language and may broadly inform the study of both linguistic and nonlinguistic cognitive processes.
Infant word recognition: New interpretations from TRACE simulations

Mayor, J.¹, & Plunkett, K.²

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia, Spain
² Dept. of Experimental Psychology, University of Oxford, United Kingdom

The TRACE model of speech perception is used to simulate a variety of findings from the recent infant word recognition literature, in an attempt to provide a unified, theoretical framework for interpreting these findings. For example, recent evidence suggests a symmetry in infant sensitivity to vowel and consonant mispronunciations of familiar words from early in the second year of life (Mani & Plunkett, 2007) whereas other researchers argue for a prominence of consonants in lexical processing and language acquisition. Our results, using TRACE, support the claim that both vowels and consonants constrain lexical access to familiar words in the infant lexicon. However, TRACE predicts that infants should become increasingly sensitive to onset mispronunciations (usually consonants in English) of familiar words as vocabulary develops, whereas their sensitivity to non-onset (often vowels) mispronunciations should remain relatively stable during the second year of life, an effect driven purely by changes in the structure and size of the lexicon. We also use TRACE to simulate graded sensitivity to mispronunciations of familiar words as reported by White & Morgan (2008). Our simulations predict that lexical competition must be absent in the mental lexicons of the 19-month-old infants tested experimentally. Finally, we use TRACE to mimic the impact of phonological neighbourhoods on early word learning reported by Swingley & Aslin (2007). We show how TRACE provides an alternative account of these findings such that infant responding can be explained in terms of mispronunciations of lexical items rather than imputing word learning to the infant.
Computational simulations of surface and phonological dyslexia

Marchand, Y.\textsuperscript{1, 2} & Damper, R.\textsuperscript{3}

\textsuperscript{1} Department of Psychology. Dalhousie University. Halifax, Canada.
\textsuperscript{2} Faculty of Computer Science. Dalhousie University. Halifax, Canada.
\textsuperscript{3} School of Electronics and Computer Science. University of Southampton. Southampton, United Kingdom.

The goal of the present study was to determine if Pronunciation by Analogy (PbA), which is a computational method for converting letters to sound in text-to-speech systems, could be used to simulate the core reading deficits found in surface and phonological dyslexia. Surface dyslexia is characterized by the following cardinal symptoms: an ability to read regular words and nonwords but serious difficulty reading irregular words, with a strong tendency to “regularize” them (e.g., “have” read like “gave”). Phonological dyslexia is characterized by ease of reading both regular and irregular words and poor reading of nonwords. A literature review was conducted and case studies from 12 individuals (6 people with surface dyslexia and 6 people with phonological dyslexia) were identified. To reproduce these diverse reading impairments, the methodology consisted of selectively degrading certain component parts of the PbA architecture. PbA exploits the phonological knowledge inherent in a dictionary of words with corresponding pronunciations. The underlying key idea is that a pronunciation for an unknown word is derived by matching substrings of the input to substrings of known words in a lexicon. The PbA model consists of four components: the lexical database, the matcher that compares the target input to all the words in the database, the graph data structure (i.e. a pronunciation lattice) and the decision function that selects the “best” pronunciation among the set of possible ones. It was possible to successfully simulate the reading deficits of these 12 individuals with dyslexia by partially damaging both the segmentation of the matcher and the decision function. Furthermore, phonological and surface dyslexia differentiated from each other by the window size involved in the faulty segmentation procedure. Indeed, a larger size window appeared to be necessary to reproduce the characteristics of individuals with phonological dyslexia compared to surface dyslexia.
There is no mirror effect in LDT. Implications for lexical decision models

Gómez, P.\textsuperscript{1}, Perea, M.\textsuperscript{2}, Zimmerman, R.\textsuperscript{1} & Biancardi, B.\textsuperscript{1}

\textsuperscript{1} DePaul University
\textsuperscript{2} Universitat de Valencia

There is a robust, but rarely reported phenomenon in the lexical decision task: Across participants, there is zero correlation between accuracy for nonwords, and accuracy for words. We have analyzed myriad of data sets from our lab, and also mega-study data sets (e.g., Dutch Lexical Project), and have consistently found that $r = 0$. This is a somewhat unexpected finding given that within word types (e.g., different word frequencies), or within nonword categories (e.g., TL nonwords and substitution nonwords), the accuracies show significant correlations. In addition, the correlations between RTs for words and nonwords are usually larger than .95. This finding is very hard to reconcile with accounts of subject performance inspired in signal detection theory, which would postulate that the difference between good and bad participants reflect differences in $d'$. We discuss the implications for diffusion models, the Bayesian reader, and the MROM models.
Contribution and chronometry of left ventral occipito-temporal cortex and posterior middle temporal gyrus in reading: evidence from transcranial magnetic stimulation

Pattamadilok, C.¹, Bulnes, L. C.¹, Leonard, E.¹, Devlin, J. T.³, Morais, J.¹ & Kolinsky, R.¹,²

¹ Unité de Recherche en Neurosciences Cognitives. Université Libre de Bruxelles. Brussels, Belgium
² Fonds de la Recherche Scientifique-FNRS. Brussels, Belgium
³ Cognitive, Perceptual and Brain Sciences; Institute of Cognitive Neuroscience, University College London. London, UK

The left ventral occipito-temporal cortex (vOTC) and posterior middle temporal gyrus (pMTG) are among the most stable and crucial regions to reading, although presumably at different processing levels. The first area has been shown to play a causal role in written word processing. The second area is strongly involved in semantic processing, although its causal role in reading has yet to be demonstrated. Transcranial magnetic stimulation (TMS) was used to investigate the contribution of these two areas as well as the time course of their activation during regular word, irregular word and pseudoword reading. Paired-pulse TMS delivered at 3 time periods post-stimulus onset (-20/20ms, 40/80ms, 100/140ms) showed that both areas are causally involved in regular and irregular word but not in pseudoword reading. Interestingly, TMS interrupted the function of the left vOTC as early as 40/80ms post-stimulus onset while its effect on the left pMTG became significant only in the later, 100/140ms, time window. Finally, while the TMS effect on the left vOTC was more reliable on regular than irregular words, the opposite tendency was found when the stimulation was applied over the left pMTG. This latter observation suggests a stronger involvement of the left pMTG when the pronunciation of written words cannot be correctly retrieved by using the grapheme-phoneme conversion rules. Together, the present study provides evidence that complements the existing brain imaging data and suggests that the time course of the activation of these areas may be earlier than predicted by ERP literature. The implications of our finding on reading models will be discussed.
Carreiras, Alvarez, and de Vega (1993) reported that written words with a high-frequency first syllable (HFS) were recognized more slowly than words with a low-frequency first syllable (LFS). This syllable frequency effect is generally attributed to lexical competition between syllabic neighbours, and constitutes one major source of evidence that syllables are functional units in visual word recognition. Recently, further evidence has been provided through ERPs both in Spanish (Barber, Vergara, & Carreiras, 2004) and German (Hutzler, Bergmann, Conrad, Kronbichler, Stenneken, & Jacobs, 2004). The first aim of the present research was to test whether the syllable frequency effect on ERPs could be replicated in French, using a design similar to that used in the previous studies. Eighty pairs of words and 80 pairs of pseudowords were selected, each containing one item with a HFS and one with a LFS. Participants performed a lexical decision task while ERPs were recorded using a 32-channel cap. In addition, to try to disentangle the respective influence of syllabic neighbourhood and syllable frequency, we contrasted a subset of pairs in which the number of higher frequency syllabic neighbours covaried with syllable frequency with another subset for which the number of higher frequency neighbours was held constant. Overall, LFS words and nonwords elicited a more positive P200 component than HFS items, and HFS items elicited a more negative N400, which was slightly delayed for pseudowords. In addition, the effects of syllable frequency were modulated by the number of higher frequency syllabic neighbours in both early and late temporal windows. The findings replicate and extend previous ERP reports and lend further support to the hypothesis of complementary facilitatory and inhibitory processes respectively related to syllable frequency and number of competitors.
Semantic and affective priming of concrete and abstract words

Sánchez-Casas, R.¹, Ferré, P.¹, García, T.², Moldovan, C.¹, Fraga, I.³ & Redondo, J.³

¹ CRAMC Universitat Rovira i Virgili (Tarragona, Spain)
² Universidad de Comillas (Madrid, Spain)
³ Universidad de Santiago de Compostela (Santiago de Compostela, Spain)

It is well known that participants respond faster to a target word when it is preceded by a semantically related prime than when the prime is an unrelated word. This is the semantic priming effect. On the other hand, it has repeatedly been shown that when a target word is preceded by a word of a similar affective valence it is judged or pronounced faster than if it is preceded by a word of an opposite valence. This phenomenon is known as affective priming and, according to some authors, it suggests that people can encode automatically the valence of the prime. Concerning affective priming, it has to be taken into account that affective congruent stimuli are likely to be also semantically related, therefore, affective priming might also be reflecting semantic priming. However, there are only a small number of studies in the affective priming literature that have controlled for the semantic relationship between primes and targets (Storbeck & Robinson, 2010). The aim of the present study was to test whether affective priming can be obtained when primes and targets are not semantically related. We conducted a series of experiments in which we manipulated orthogonally the semantic and affective relationship between primes and targets. We also compared the magnitude of semantic and affective priming effects between pairs of concrete and abstract words. Comparisons were made across three types of tasks: a lexical decision, a semantic categorization or an evaluation task. The results showed that semantic priming seems to be a more robust phenomenon than affective priming, as it clearly emerges in all the conditions, whereas affective priming is only observed in more restricted circumstances. These findings are discussed in terms of which is the more obligatory analysis of words at encoding: a semantic analysis or an affective analysis.
On the processing of emotional words in a second language

Rodríguez Cuadrado, S.\(^1\), Vinson, D.\(^2\), Costa, A.\(^1\) & Vigliocco, G.\(^2\)

\(^1\) Departament de Tecnologies de la Informació y les Comunicacions, Universitat Pompeu Fabra, Barcelona, Spain
\(^2\) Cognitive, Perceptual and Brain Sciences Department, University College London, London, United Kingdom

Do late bilinguals process emotional words and sentences in their second language (L2) as monolinguals do? The relation between emotional language and bilingualism has been mainly treated in two ways. The subjective approach, based on interviews and self-questionnaires, seems to indicate that a bilinguals' first language (L1) is more emotional than their L2. The objective approach instead employs experimental tasks to assess consequences of emotional content for automatic language processing. Such studies tend to find similar effects of emotional content, whether comparing a bilinguals' two languages, or monolinguals and bilinguals. However, work of this type has been criticized due to lack of control and effects of emotional variables appear to vary depending on task. In three experiments, we addressed these concerns, employing sets of highly-matched items across three different tasks, to assess processing of emotionally loaded words by English monolingual and late Spanish-English bilingual speakers. Experiment 1 employed lexical decision for negative, positive and neutral words which were controlled for 10 lexical variables. Experiment 2 used the same words in a valence judgement task. Finally, Experiment 3 examined processing words in sentence contexts (sensicality judgement task). We created emotional and neutral sentences from another highly-controlled set of words (also controlling for sentence length, verbal tense and number). In all three experiments we found effects of valence, but which differed depending on the task. Crucially, and in contrast to subjective studies, valence effects for late bilinguals’ results were comparable to those of monolinguals on the three tasks. We will discuss how the use of different tasks can produce very different valence effects and how the relation between emotion and bilingualism varies depending on how this phenomenon is approached.
Traces of lost language

Kreiner, H., & Berman, M.

Ruppin Academic Center

Many studies of bilingualism document the acquisition of L2 and subsequent loss of dominance and even attrition of L1. However, little research investigated the long-term effects of L1 attrition. The present study explored traces of childhood Language that hasn’t been used in long time. Individuals having undergone such L1 attrition claim to have no conscious memory of their L1. Hence we used Ebbinghaus’ (1885) relearning procedure shown to be sensitive to subtle and unconscious memory traces. Ebbinghaus demonstrated that relearning was faster than new learning and proposed that the relearning effect reflects memory traces that cannot be measured in direct memory tests. Thirty Hebrew speaking participants aged 25 on average were recruited: The experimental group included 15 participants who were cared for by a native Russian speaker before they were 5 years old, and didn't use Russian ever since; the control group included 15 participants who had no knowledge of Russian. All participants learned a list of 30 word-pairs composed of a Russian word and its translation to Hebrew. In an immediate recall-relearning procedure that repeated 4 times, the experimenter presented each Russian word and then either the participant successfully recalled the corresponding Hebrew word or the Russian-Hebrew word-pair was presented again. The learning curves recorded show a very small and slow increase in learning for the control group, and a much steeper increase for the Russian-exposed group. Item analyses reveal interesting differences in the learning curves that may be informative about factors that affect memory traces such as frequency and age of acquisition. The findings clearly demonstrate that the relearning procedure can reveal unconscious traces of a lost language. The potential of this procedure as a tool for investigating the nature of these traces and exploring the relationship between acquisition and attrition of language will be discussed.
Basque object relative clause advantage in proficient non-native bilinguals

Laka, I. ¹, Erdocia, K. ¹, Duñabeitia, J. A. ², Molinaro, N. ² & Carreiras, M. ¹, ², ³

¹ Euskal Herriko Unibertsitatea (UPV/EHU)
² Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
³ IKERBASQUE, Basque foundation for Science. Bilbao, Spain

Despite the classical Subject Relative clauses (SR) processing ease found in most languages, Carreiras et al. (2010) report that in Basque Object Relatives (ORs) are easier to process than SRs. We report a study on Basque relative clause processing by proficient bilinguals whose L1 is Spanish (a language showing SR advantage). We explored whether non-natives transfer a SR advantage from Spanish (L1), or whether they show the same OR advantage as natives. Experiment 1 used a self-paced reading task; ERPs were recorded in Experiment 2. As in Carreiras et al. (2010), materials were ambiguous between OR or SR until the penultimate word. Experiment 1 revealed longer reading times for SR than OR after the critical disambiguating region. Experiment 2 showed larger amplitudes for SR than OR in the N400 component after reading the critical disambiguating word. These results show that the OR advantage previously reported in Basque holds for proficient nonnatives, even if their L1 yields the opposite processing-pattern. Hence, proficient speakers do not seem to transfer syntactic structures and processing strategies from L1 into L2 (McLaughlin et al. 2010), and they are not restricted to non-native-like processing preferences, as argued for by Clahsen and Felser (2006). However, a significant difference in the ERP pattern was observed compared to the P600 effect found by Carreiras et al. 2010: nonnative proficient bilinguals showed a N400 effect, rather than a P600 effect. Similar contrasts are found by Osterhout et al. (2010) and Maclaughing et al. (2010) for language learners at initial stages, indicating that L2 learners rely more on item-based schemas. In contrast to theories suggesting that at high proficiency non-native processing becomes native-like (Steinhauer et al. 2009), our findings suggest that, at least in tasks involving syntactic dependencies and ambiguity resolution, proficient nonnatives rely more on lexical strategies than natives.
Exploring the role of language exposure and maturation on the perceptual reorganization of vowels in the first year of life

Bosch, L.¹,², Solé, J.¹, Iriondo, M.³, Agut, T.³ & Botet, F.⁴

¹ Basic Psychology Department, University of Barcelona
² Institut for Brain, Cognition and Behavior (IR3C), University of Barcelona
³ Neonatology Unit, Hospital Sant Joan de Déu (Barcelona)
⁴ Neonatology Unit, Maternitat-Hospital Clinic (Barcelona)

Perceptual reorganization processes relative to changes in phonetic discrimination abilities take place in the first year of life. These changes are the result of language experience. Fine-tuning to the sound categories of the native language usually involves a decrease in sensitivity for phonetic contrasts that are not present in the ambient language. The present research is aimed at further exploring the contribution of language exposure and brain maturation onto infants’ sensitivity changes for native and non-native vowels. By comparing two different populations (full terms and “healthy” pre-terms) at 4 and 8 months of age (corrected for gestation in the preterm group), the early effect of linguistic experience on the developing brain can be assessed. A similar behavior in both groups can be predicted if, in spite of differences in listening experience, maturation is critical for these perceptual changes to appear. However, if language exposure is the critical factor, a decline in non-native vowel discrimination might already be observed in the pre-term population at the younger age tested (4 months, corrected for gestation). Two groups of pre-terms (≤32 gestation weeks; ≤1.500g birth weight, with no congenital, physical or severe neurological anomalies) and two groups of full term infants were followed longitudinally and tested on the native /do/-/du/ and the non-native /do/-/dò/ contrasts, respectively. At the younger age, results showed a similar discrimination pattern in both groups for the native contrast, but critically, not for the non-native contrast: discrimination could only be gathered in the full term group. When tested at 8 months of age, full terms showed the expected decrease in sensitivity for the non-native contrast and pre-terms replicated their previous results at the younger age. Taken together, data suggest that language experience is determinant for the perceptual reorganization processes to take place, even in the presence of maturational constraints.
Contribution of different speech cues to Basque-Spanish discrimination: Infant and adult data

Ramon-Casas, M.¹, Santesteban, M.³, Bosch, L.¹-² & Sebastián-Gallés, N.⁴

¹ Basic Psychology Department, University of Barcelona, Barcelona, Spain
² Institute for Brain, Cognition and Behavior (IR3C), University of Barcelona, Barcelona, Spain
³ Psycholinguistics Laboratory, University of the Basque Country, Vitoria-Gasteiz, Basque Country, Spain
⁴ Brain and Cognition Unit, Universitat Pompeu Fabra, Barcelona, Spain

In bilingual language acquisition, an early ability to differentiate between the ambient languages is crucial for successfully building separate linguistic systems. Languages that belong to a different rhythmic category can be easily differentiated from an early age on the basis of rhythm information alone, but within-class language discrimination probably requires access to cues other than rhythm. A later differentiation is predicted in this case and it was confirmed for Catalan-Spanish and English-Dutch languages. In this research we explore the ability to discriminate Spanish and Basque, two languages that have been described as rhythmically different, so an early and easy differentiation was expected. Data from infant and adult discrimination studies will be offered. Three independent groups of infant participants (n=12 in each group), from monolingual Spanish environments, were tested at 4, 6 and 8 months of age using the familiarization-preference procedure. Only the older group succeeded in the task, suggesting that cues other than rhythm were required for discrimination. To explore the contribution of different cues (syllabic rhythm, global intonation and broad phonotactic cues) onto Spanish-Basque discrimination, groups of adults (L1 Spanish, n=20 in each condition) were tested using the utterances from the infant studies with different types of re-synthesis (sasasa, saltanaj with pitch and saltanaj flat). The discrimination procedure involved familiarization with a set of Spanish re-synthesized utterances followed by a yes-no recognition test for novel utterances in both languages. Results revealed that adults were able to discriminate the languages only when phonotactic information was present. Our data suggest that syllabic rhythm differences between the target languages do not provide sufficient information for an early and easy differentiation to take place. The role of several factors, such as the nature of the material in our experiments (bilingual speaker, infant-directed speech) and the participants’ native language, will be discussed.
When consonants are the chosen ones: Evidence from French infants' performances

Jöhr, J. & Zesiger, P.

Faculty of Psychology and Educational Science. University of Geneva, Switzerland

Representations of the sounds of words are keys to access the lexicon, yet consonants appear to play the leading role in adults’ word recognition (Cutler et al, 2000). When it comes to infants’ word processing, mixed findings suggest that the consonant advantage develops late. Studies in Germanic languages with 12- to 24-month-olds report either a consonant-vowel symmetry (Swingley & Aslin, 2002; Mani & Plunkett, 2007), or a more accurate vocalic perception (Fikkert, 2010). In contrast, word learning experiments in French with 16- to 22-month-olds (Nazzi, 2009) suggest a consonantal bias. These contrastive results could reflect differences in language type (English/Dutch vs. French), but also in task complexity (word learning vs recognition), age range, and stimuli. The present study in French provides a systematic control of these factors using the same Intermodal Preferential Looking (IPL) task as most of the previous Germanic studies, and aims at unveiling the origins of these discrepancies. Our two IPL experiments presented 14-, 18- and 23-month-olds (N=176) with two pictures of familiar objects (e.g. ball, car) along with a correct or incorrect pronunciation of the target. Mispronunciations of disyllabic words were created by manipulating phoneme class (Consonant/Vowel), position (1st/2nd syllable) and feature category (place/nasality/voicing). If toddlers are sensitive to mispronunciations (e.g. [malõ], [bẽlõ]), we expected longer and/or faster looks to the picture whose name was correctly pronounced ([balõ]). All age groups demonstrated a robust sensitivity to consonantal modifications (p<.05), with a stronger effect for the second syllable’s onset. In the vowel condition, no main pronunciation effect was observed. The overall outcomes indicate that an early lexical discrepancy between these phonetic categories does exist, yet in regard to the language structure itself. We will discuss how the difference in sound distribution between French and Germanic languages could give rise to different developmental paths.
Many studies show that speakers are sensitive to the sound-structure of their native language. Linguistic analyses, however, suggest that grammars also include broad, perhaps universal restrictions on language structure. To test this proposal, we investigate whether speakers possess phonological preferences concerning structures that are unattested in their language. Our case study concerns the restrictions on onset clusters (e.g., bl in block). Across languages, certain onset clusters are universally dispreferred (e.g., under-represented): Onsets like bn are preferred to bd, which, in turn, are preferred to lb. Previous research has further demonstrated that English speakers extend such preferences to onsets that are unattested in their language. Our question here is whether similar preferences might obtain for speakers of Spanish—a language whose repertoire of onset clusters is even smaller. We examined this question in three experiments, eliciting syllable count (e.g., does lbif include one syllable or two?) and AX discrimination (e.g., is lbif=lebif?; is lbif=elbif?). We reasoned that ill-formed monosyllables should be systematically repaired as better-formed disyllables (e.g., lbif—>lebif or elbif), and consequently, these monosyllables should be misidentified as disyllabic (in a syllable count task) and harder to discriminate from those disyllables (in AX tasks). Results showed that, like English speakers, Spanish speakers tend to misperceive universally dispreferred onsets as disyllabic, suggesting that ill-formed onsets are repaired by inserting a vowel. Unlike English speakers, however, Spanish-English bilinguals often repair ill-formed onsets by prothesis (e.g., lbif—>elbif), rather than epenthesis (e.g., lbif—>lebif). Moreover, the choice of repair is modulated by language-dominance: Strongly-dominant Spanish speakers (acquiring English after the age of ten) favor prothetic repair, whereas their weaker-dominant counterpart opt for epenthesis, the repair favored by English participants. Results suggest that speakers might possess universal linguistic restrictions on onset structure, but their effect in perception is modulated by their linguistic experience.
Abstract lexical-stress knowledge used in recognizing new Italian words

Sulpizio, S.¹, & McQueen, J.²,³,⁴

¹ Department of Cognitive and Education Sciences, University of Trento, Trento, Italy
² Donders Institute for Brain, Cognition, and Behaviour, Center for Cognition, Radboud University Nijmegen, Nijmegen, The Netherlands
³ Behavioural Science Institute, Radboud University Nijmegen, Nijmegen, The Netherlands
⁴ Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

During spoken-word recognition, we match the acoustic information in the signal with stored word knowledge. A current debate is on what knowledge is stored and how abstract it is. We ask whether listeners have abstract knowledge about lexical stress and whether they can use it during recognition of newly-learned words. Italian three-syllable words offer an interesting case, because of their asymmetrical stress-pattern distribution: 80% bear stress on the penultimate syllable. Do Italians know which acoustic cues determine stress, and do they exploit this asymmetrical distribution during word recognition? Italian participants learned to associate non-objects to non-words. Non-object’s names formed minimal pairs that were segmentally identical but differed in stress location (e.g., TOlaco-toLaco). In the learning phase, participants heard acoustically-manipulated versions of the non-words, in which we had neutralized two stress cues (amplitude and duration). In the test phase, participants heard both manipulated and natural versions of the non-words. During the test, four non-objects were displayed (the minimal pair plus a distractor pair). Participants heard a non-object’s name and had to identify it. Eye-movements were recorded. Fixations proportions on targets (e.g.,TOlaco), competitors (toLaco) and distractors during the first two syllables were analyzed. Stress pattern (penultimate-antepenultimate) and acoustic version of the target (manipulated-natural) were factors. Listeners looked more frequently at the penultimate-stress targets (i.e., those with the most common stress pattern) than at the antepenultimate-stress targets. Moreover, they looked more at targets, but only those with antepenultimate stress, when they heard (novel) natural (all-cue) versions than when they heard (familiar) manipulated versions. Italian listeners appear to have abstract knowledge about lexical stress (the amplitude and duration patterns of antepenultimate-stress words) and to be able to use this suprasegmental knowledge during spoken-word recognition. They also know about the asymmetrical distribution of stress in Italian; they appear to recognize penultimate-stress words by default.
Phonemic restoration in Spanish-English bilinguals: An assessment of automaticity in speech processing

Samuel, A.¹, ², ³ & Dance, C.³, ⁴

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
² IKERBASQUE, Basque foundation for Science. Bilbao, Spain
³ Stony Brook University. Stony Brook, USA
⁴ UC San Diego. La Jolla, USA

When part of a spoken word is removed and replaced by noise, listeners usually still hear the speech as intact. This illusion of intact speech has been called phonemic restoration, and it appears to reflect the top-down use if knowledge (e.g., lexical information) to fill in the missing phonemic material. Previous work on restoration has focused on monolingual English speakers, and has been used to argue for automatic top-down processing. The question examined in the current study is whether such automaticity is also characteristic of speech perception in a bilingual’s second language (L2). Spanish-English bilinguals living in the US were tested to determine the strength of restoration in both their native (Spanish) and second (English) language; monolingual controls were also tested. The bilingual participants reported the age at which they learned English, which allowed us to determine if age of L2 acquisition affects the strength of phonemic restoration, and by inference, automaticity of speech processing. Bilinguals who learned English after the age of 7 restored missing speech in English words significantly less than English monolinguals. Those who learned English at an earlier age showed a restoration rate that fell in between those of native English speakers, and the late learners. Overall, the results suggest that there is less automatic support for speech perception for non-native speakers than for native speakers, with age of L2 acquisition affecting the degree of automaticity that can be achieved.
Language of learning math and number semantics. A bilingual ERP study

Salillas, E.¹ & Carreiras, M.¹,²

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain.
² IKERBASQUE, Basque foundation for Science. Bilbao, Spain

There is a lively debate on the role of language in the development of mathematical concepts. The present study takes the chance of Spanish-Basque bilinguals’ different verbal structures for number words. In Spanish the decimal system is used for the verbal form of two digit numbers, while the twenty system is used in Basque (56 is “cincuenta y seis”= 50 and 6 in Spanish; and “berrogeita hamasei” 40 and 16 in Basque). We studied the impact of this verbal code on the access to number semantics, that is, on the proposed innate analogue magnitude representation as reflected by the so called distance effect (Moyer and Landauer, 1967). ERPs were measured while balanced bilinguals performed a number comparison task between pairs of digits that entailed a Basque word relationship (BA pairs) versus numbers that entailed a Spanish word-decimal system relationship (SPABA pairs). We manipulated the distance between numbers (eg. close BA: 56-40 / far BA: 56-6). Crucially, we selected two groups of otherwise equally balanced bilinguals: 7 learned math in Spanish and 7 learned math in Basque. ERP results showed that the P2 distance effect was not present for BA pairs in the group who learned math in Spanish, regardless of their fluency in Basque. The fourth bin of delayed reaction times reflected this pair x distance x group interaction with an absence of the distance effect in the BA pair for the group that learned math in Spanish. This group, however, showed a later P3 distance effect. These results strongly suggest that the language of learning math is preferentially activated when using digits and that number semantics is permeable to language.
Exploring the role of operands’ magnitude representation in multiplication solving: evidence from the size congruity effect

Estudillo, A. J.¹, & García-Orza, J.²

¹ University of Edinburgh
² Universidad de Málaga

According to some models, operands’ magnitude representations play a central role on multiplication solving (e.g., McCloskey, 1992). On the contrary, other models suggest multiplications are retrieved using verbal representations, claiming that operands’ magnitude representations, in the best case, would play a role in the process of re-coding the presented problem into a more familiar representation before accessing the corresponding verbal form (i.e.: 2x9 can be re-coded as 9x2, that is a more familiar representation) (Dehaene, 1992). This study explores whether operands’ magnitude representations are activated in multiplication problems and whether they are involved in their resolution. To accomplish this we present two experiments that manipulate the size congruity effect. The physical and numerical magnitude of the operands within each problem could be congruent (the operand with bigger numerical magnitude appears in bigger size), incongruent (the operand with lower numerical magnitude appears in bigger size) or neutral (both operands appears in the same physical size). Problem-size and the order of the operands (big x low vs. low x big) were also manipulated. In Experiment 1, thirty eight undergraduates participated in a verification (e.g.: are the following problems correct? 2x3=6; 2x3=7). In Experiment 2, twenty one undergraduates students participated in a production task (e.g.: say the result of the following problems 2x3=; 4x3=). Results showed longer response times in the incongruent condition than in the congruent conditions in both experiments. Although main effects of problem-size were also found, no interactions were observed between size congruity and the rest of variables. It is concluded that operands’ magnitude representations are automatically activated even in the context of multiplication problems, however, as suggested by the lack of interaction effects, we argue that this activation is not related to the multiplication solving process.
Semantic and world knowledge integration in bilingual L2 readers: Evidences from ERPs

Garcia, X., Martin, C., Breton, A., García, G. & Costa, A.

1 Departament Tecnologies de la Informació i la Comunicació, University Pompeu Fabra, Barcelona, Spain
2 Institució Catalana de Recerques i Estudis Avançats, Universitat Pompeu Fabra, Barcelona, Spain
3 Institut des Sciences Cognitives, CNRS-Université de Lyon

The main goal of the present study was to investigate difficulties in sentence reading in a second (L2) compared to a first language. Sentences that we hear or read can be meaningful or not (e.g., Mozart composed classical/orange music) and can also be true or false (e.g., Mozart composed classical/jazz music). Hagoort and colleagues (2004) tested the temporality of meaning and truth integration during sentence comprehension. They recorded Event-related Potential data from participants who had to read silently correct sentences (e.g., Mozart composed classical music), sentences with semantic violations (e.g., Mozart composed orange music) and sentences with world knowledge violations (e.g., Mozart composed jazz music). ERP data revealed that integration of both semantic and world knowledge during sentence reading happens in parallel (both violation effects observed 400 ms after the critical word presentation; N400 effect).

In the present study, we investigated semantic and world knowledge violations during reading in a second language (L2). We hypothesized that difficulties in reading in L2 might be due to difficulties in world knowledge integration: It might be that detecting meaningless sentences is as easy in L2 as in L1 while detecting false sentences is harder in L2 than in L1. While recording electroencephalographic data, we presented Spanish-English late bilinguals with correct sentences, sentences with semantic violations and sentences with world knowledge violations. Participants had to read sentences silently. Semantic violations induced a N400 effect, as previously observed in monolinguals (Hagoort et al., 2004). While world knowledge also produced a N400 effect in monolinguals, the effect was delayed in bilinguals (P600 effect). We concluded that L2 readers integrate semantic as monolinguals do, but integrate world knowledge later on in the processing stream. This delay in world knowledge integration might be one of the reasons why reading is more laborious in L2 than in L1.
Which bilinguals are faster in conflict processing?: The role of linguistic (dis)similarity

Froitzheim, S., Braun, B. & Kabak, B.

University of Konstanz

There is a growing body of evidence on the positive impact of bilingualism on cognitive processes although the precise origins of this effect remain unclear. Recently bilinguals have been shown to be overall faster than monolinguals exclusively in experimental blocks that mix trials of different types (Costa et al. 2009). Accordingly, the bilingual effect is not merely due to more efficient conflict resolution processes by bilinguals than monolinguals. Rather, it stems from bilinguals’ need to continuously monitor the appropriate language in bilingual settings. However, we hypothesize that the monitoring process may still be modulated by the magnitude of selective activation of the non-target language. Lexical and grammatical similarity requires better separation so that bilinguals with similar languages should exhibit both conflict effects and more efficient monitoring than those with distinct languages. We tested 3 groups of participants, 10 bilinguals with two closely related languages (SwissGerman-German), 10 bilinguals with two distinct languages (Turkish-German) – controlled for age of acquisition, age, gender and education) – and a German monolingual group. Using a version of the flanker task with high monitoring demands, we asked participants to indicate whether a central arrow in a row of 5 arrows points to the right or left (2 blocks with 67% congruent trials, 2 blocks with 33% incongruent trials, counterbalanced). Results showed a significantly larger conflict effect (difference in RT between incongruent and congruent trials) for SwissGerman-German bilinguals than for Turkish-German bilinguals or German controls (78ms vs. 61 and 62ms respectively, p < 0.05). We suggest that linguistic similarities between the languages of a bilingual are more likely to maximize the recruitment of monitoring processes than linguistic differences. Hence, the bilingual advantage stems not only from selecting the right language-schema, but by the extent to which the two systems can be separately activated.
Influence of long-term language training in simultaneous interpreters on non-verbal executive processes

Yudes Gomez, C., Bajo Molina, T. & Macizo Soria, P.

Department of Experimental Psychology. University of Granada, Spain.

In two experiments, we examined non-verbal executive processes of simultaneous interpreters, untrained bilinguals and monolingual speakers. Numerous studies with untrained bilinguals have shown superior performance of the bilinguals relative to the monolinguals in tasks that require conflict resolution such as the Simon or flanker tasks. The idea is that because bilingual speakers need in their daily life to exert executive control to select the appropriate language in the presence of interference from the other language, they develop more efficient executive processes that help them. This reasoning can also be applied to the professional language interpreters. Language interpretation is an extreme example of language control since the interpreter has to maintain the two language systems active in order to understand the source message in one language and to produce it in another language. Interestingly whereas most bilingual situation require selection of one language (and suppression of the other), interpreting requires strong coordination and flexibility to keep the two languages active and to switch from one language to the other. In consequence, we predicted that bilinguals would show advantages at inhibiting irrelevant information while professional interpreters would have superior cognitive flexibility in tasks requiring “shifting”. To test this hypothesis, we used the Wisconsin Card Sorting (WCST) and the Simon tasks to assess shifting and inhibitory control processes respectively. Consistent with our expectations, results in the WCST showed that interpreters were able to update task-relevant information more efficiently (fewer number of attempts to infer the rule, and smaller number of previous category perseverations) than the monolinguals and the bilinguals. However, interpreters and bilinguals did not differ in avoiding conflict information in the Simon task. The pattern of results is discussed in terms of the consequences of speaking two languages and the practice in simultaneous information for the functioning of cognitive processes.
Speaker change in word recognition

Roessler, A. ¹, Gil López de Liaño, B. ² & Sebastián Gallés, N. ¹

¹ Brain and Cognition Unit. Universitat Pompeu Fabra
² Facultad de Psicología. Universidad Autónoma de Madrid

The auditory speech signal is highly variable and mechanisms to extract meaningful information are complex and not yet fully understood. Indexical information (speaker’s accent, emotional state) represents a source of information as well as variability. Recent literature has shown that fine-grained details of the auditory signal are retained in memory. In bilingual societies as in Barcelona, people are constantly exposed to two languages and importantly to slight (foreign-accented) mispronunciations. Furthermore, in bilingual contexts, speaker information correlates with language of communication. Therefore, comparing monolinguals with bilinguals might help to gather valuable insights into the role of variability in speech perception by investigating possible strategy-differences between mono- and bilinguals. We conducted a series of auditory recognition memory experiments testing monolinguals (Madrid) and bilinguals (Barcelona). Participants were presented with a list of words of which half were repeated by either the same speaker or a different speaker. In a continuous design participants had to make an “old”-“new” judgement, while ignoring the speaker dimension. In experiments 1 and 2 the number of speakers was two. In experiments 3 and 4 the number of speakers was eight. The analyses of the reaction times showed significant repetition effects in all four experiments, but no traces of speaker effects. The analyses of the error rates (by means of d-prime scores) revealed an interesting pattern of results indicating different sensitivities to indexical cues in bilingual participants when compared to monolingual ones. These differences were more pronounced when multiple speakers were used (experiments 3 and 4). The results indicate that bilingual recognition memory is less hindered by a change in speaker suggesting that indexical speaker information is not encoded as strongly as in monolinguals or alternatively, that bilinguals not be bothered by indexical information not relevant to the task.
Please, Catalan or Spanish, but not both! Are bilinguals fully in control of their language selection during word production?

Martin, C.¹, Vanden Bulcke, C.², Navarra, J.³, Schoonbaert, S.², Hartsuiker, R.² & Costa, A.¹, ⁴

¹ Departament de Tecnologies de la Informació i les Comunicacions. Universitat Pompeu Fabra. Barcelona, Spain
² Department of Experimental Psychology. University of Ghent. Ghent, Belgium
³ Fundació Sant Joan de Déu. Barcelona, Spain
⁴ ICREA. Barcelona, Spain

When we are used to speak one language with someone, we usually feel uncomfortable speaking with him/her in another language. This leads bilingual speakers to have singular conversations in which they switch the language continuously (as, for example, three bilingual speakers: speaker A speaking one language with speaker B and the other one with speaker C). These surprising conversations happen regularly in bilingual communities even if switching between languages has certain cognitive costs. We hypothesise that these singular conversations might be due to strong bottom-up effects originating from the stimulus-response binding between familiar faces and their associated language. Overriding this learnt link (that is, speaking with someone in another language than the usual one) might, according to our hypothesis, require costly top-down effects. To test this hypothesis, we performed a language production task primed by familiar faces. Spanish-Catalan bilinguals were familiarised by means of interactions with twelve actors, six Catalan- and six Spanish-speakers. In the test phase, participants were presented with an actor producing a noun and were instructed to produce a semantically related verb, in the same language as the one used by the actor. Crucially for our purposes, actors were producing the nouns in the language they used during the habituation phase (congruent) or in the other language (incongruent). Considering only trials without language switch, participants were significantly slower to produce language in the incongruent condition, suggesting that incongruity in the face-language binding carries some cognitive costs. This observation might have important implications for language control in bilingualism: Bilinguals might not fully control their language production as language selection is highly driven by bottom-up information coming from external cues such as familiar faces.
The effects of non-linguistic cues on bilingual language use

Molnar, M., Ibañez, A. & Carreiras, M.

Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain

Proficient bilingual language users adjust to the ongoing language context without difficulty; however, what underlies such efficiency is hardly understood. It has been shown that linguistic cues (i.e., phonological priming) aid bilingual users with this process, although the contribution of non-language related contextual cues, such as familiarity with the other speaker, is rather unclear. In order to investigate to what extent non-linguistic cues affect the activation of languages, we tested simultaneous bilingual users of Spanish and Basque using a lexical decision paradigm. First, in a familiarization phase, participants implicitly learnt to associate six individuals with Basque, Spanish, or bilingual language contexts (two individuals with each of the contexts). Then, in a subsequent test phase, the participants were presented with a series of short video segments showing the individuals from the familiarization phase saying words or non-words. About 75% of the time, the individuals spoke in the same language as they did during the familiarization phase (congruent trials); however, in the rest of the trials there was a mismatch between the language they spoke during familiarization and the language of the auditory stimuli during the test phase (incongruent trials). Reaction times triggered by the lexical decision task in response to the congruent and incongruent trials were compared for both words and non-words across the different language contexts. Our overall findings clearly demonstrated that non-linguistic cues (familiarity with another person’s language background) play a significant role in bilingual language selection. This implies that bilingual language activation is not only biased by the actual language of interaction per se, but by anticipation based on previous experience as well.
Grammatical gender effect in bilingual spoken-word recognition

Morales, L.¹, Paolieri, D.¹, Bajo, T.¹, Valdés, J.², Gerfen, C.² & Dussias, P. E.²

¹ University of Granada
² Pennsylvania State University

Bilinguals are slower in naming pictures that are incongruent in gender between their two languages (camaFEM in Spanish, lettoMAS in Italian, bed) than gender-congruent pictures (bufandaFEM in Spanish, sciarpaFEM in Italian, scarf, Paolieri et al., 2010). Few studies have examined the presence of this effect during bilingual spoken-word recognition (Dahan et al., 2000). We test for the gender-congruency effect in spoken language comprehension using the visual world paradigm (Allopenna et al., 1998). The eye-movements of 32 proficient Italian-Spanish bilinguals were monitored while viewing two objects on a screen. Participants listened to instructions in Spanish (Encuentra laFEM bufandaFEM; Find the scarf) and were asked to click on the picture of the named object. Grammatical gender of the object names was manipulated, so that one object name was gender-congruent between the two languages (e.g., bufanda) while the other was incongruent (cama). If bilinguals access gender information from their L1, they should orient their eyes to the L2 target object (bufanda) sooner in incongruent trials (when bufandaFEM is presented with camaFEM) than in congruent trials (when bufandaFEM is presented with ventanaFEM, in Italian finestraFEM, window), because the information provided by the Spanish feminine article la should preempt looks to the object with incongruent gender in Italian. This is precisely what we found. The results indicate that during spoken-word recognition in L2 bilinguals access L1 gender information, as predicted by models of non-selective activation (Kroll & Stewart, 1994).
Sentence production across languages: From visual attention to structural selection

Myachykov, A., Garrod, S. & Scheepers, C.

University of Glasgow

The choice of syntactic structure during sentence production partially depends on the distribution of the speaker’s visual attention across the elements of the described event. For example, English speakers are more likely to produce a passive voice sentence when their attention is on the patient (Tomlin, 1995). Although this perceptual priming effect on structural choice is well-established in English; its mechanism, its relative strength, and its cross-linguistic validity are unclear. For example, it is uncertain whether the focused referent maps directly onto the Subject thus directly triggering structural choice (grammatical role assignment) or it affects linear ordering of the constituents via the assignment of the starting point (positional assignment). In English these two hypotheses are difficult to test independently because the Subject typically corresponds to the starting point. Scrambling languages allow for such a test. Four new studies investigated perceptual priming effect on structural choice during sentence production in one language with constrained word order (English) and two scrambling languages (Russian and Finnish). Experiments 1 and 2 used explicit (constantly visible) visual cueing to capture attention of English and Russian speakers as they described visual-world transitive events. Experiments 3 and 4 used implicit (70 msec duration) cueing and compared English and Finnish speakers. Explicit cueing influenced active/passive voice choice in English but linear ordering in Russian. Importantly, perceptual priming was stronger in English while Russian speakers’ sentence onset latencies were slower. Implicit cueing also triggered active/passive voice choice in English but it had no effect on structural choice in Finnish. We propose a dual-pathway perceptual priming mechanism where both grammatical-role and positional assignment routes are available with stronger reliance on the grammatical-role selection. In languages where the latter mechanism is weaker, positional selection is used to accommodate perceptual priming resulting in generally weaker priming effect and slower sentence onsets.
Electrophysiological evidence for a common lexical locus of semantic and Stroop-like interference effects in overt naming performance

Piai, V. 1, 2, & Roelofs, A. 1

1 Donders Institute for Brain, Cognition and Behaviour. Radboud University Nijmegen. Nijmegen, Netherlands.

Picture-word interference is a widely employed experimental paradigm to investigate naming performance: Speakers name pictures while trying to ignore superimposed distractor words. The distractor can be congruent to the picture (pictured cat, word cat), categorically related (pictured cat, word dog), or unrelated (pictured cat, word pen). Categorically related distractors slow down picture naming relative to unrelated distractors, an effect called semantic interference. Furthermore, categorically related distractors slow down picture naming relative to congruent distractors. This finding is analogous to findings in the colour-word Stroop task, in which colour-naming responses in the categorically related condition (blue printed in red ink) are slower relative to the congruent condition (blue printed in blue ink).

The locus of semantic interference and Stroop-like effects in naming performance has recently become a topic of much debate. Whereas some researchers argue for a pre-lexical locus of semantic interference and a lexical locus of Stroop-like effects (e.g., Dell’Acqua et al., 2007), others localize both effects at the lexical selection stage (e.g., Roelofs, 2003). We investigated the time course of semantic and Stroop-like interference effects in overt picture naming by means of event-related potentials (ERP) and time-frequency analyses. Moreover, we employed cluster-based permutation tests for the statistical analyses (Maris & Oostenveld, 2007).

Naming latencies showed the expected semantic and Stroop-like interference effects. The ERP waveforms for congruent stimuli started diverging statistically from categorically related stimuli around 250 ms. Deflections for the categorically related condition were more negative-going than for the congruent condition (the Stroop-like effect). The time-frequency analysis revealed power increase in the beta band (12-30 Hz) for categorically related relative to unrelated stimuli roughly between 250 and 370 ms (the semantic effect). The common time window and absolute timing of these effects suggests that both semantic interference and Stroop-like effects emerged during lexical selection.
**ERP investigation on the time course of word encoding in fast and slow speakers**

Laganaro, M.\(^1\), Valente, A.\(^1\) & Perret, C.\(^2\)

\(^1\) University of Geneva, FAPSE  
\(^2\) University of Paris XIII

Single word production has been intensively investigated with neuroimaging techniques allowing high temporal resolution, leading to good estimation of the time course of the underlying processes. The identified time-windows represent an average across speakers, who often display very variable mean reaction times. The question then is which time-windows vary according to the speed of response (production latencies, RTs) across speakers. To answer this question we take advantage of the manipulation of a linguistic variable known to affect picture naming times (word age of acquisition, AoA) and of the combination of waveform and spatio-temporal analysis on stimulus- and response-aligned ERPs (Laganaro and Perret, 2010) in order to cover the entire planning period. High density EEG recordings were carried out during a picture naming task of 60 early-acquired and 60 late-acquired words, matched on main psycholinguistic variables. The 36 subjects were split in two subgroups according to their mean RTs (fast subjects, RTs = 738ms; slow subjects, RTs = 903ms). Behavioral analysis showed a significant effect of AoA in both subgroups. Converging results from waveform analysis and spatio-temporal segmentation indicate differences between fast and slow subjects starting around 200 ms after picture onset. The stable topography (functional microstate, Lehman, 1987; Michel et al., 2009) starting around 200 ms lasts 40 ms longer in slow subjects. The next period of stable topography (starting between 240-270 ms) lasts 80 ms longer in the slow group, with no further differences across groups. Only the duration of the stable topography starting between 240-270ms correlates with RTs. In conclusion, between-subjects variability seems to be distributed in time-windows associated with lexical selection and phonological encoding processes (Indefrey and Levelt, 2004), with higher contribution of phonological encoding to RTs variability.
Handwriting processes involving phonology in the Alzheimer disease: a study using on-line measures

Álvarez, C. J. & Baquero, S.

1 Universidad de La Laguna, Tenerife, Spain
2 Universidad Nacional de Colombia

Individuals with Alzheimer disease (AD) tend to show impairments in several linguistic domains including both oral and written language skills. Phonological abilities have been traditionally found to remain relatively well preserved during the evolution of the disease with the exception of the severe stages. However, important handwriting difficulties have been reported, with differences depending on the concrete process under study (e.g. spelling and central processes vs. peripheral and motor stages). In the case of central-linguistic processes related to spelling and programming, the disparity among results as well as the lack of effects could be due to the methodologies used. In general, the analyses of errors has been virtually the exclusive measure. In this study, we employed on-line measures using digitilizing tablet, which allow to investigate the writing processes instead of just the outcome (i.e. analysis of errors), with the goal of studying possible subtle differences between normal participants and patients with AD. AD individuals were compared with a matched control group in a writing task. Letter durations and inter-letter intervals were measured. First, a difference between the evolution of the movement execution of the whole word was found between AD and normal participants. Second, the magnitude of the syllabic effect (previously obtained with normal adults) is different in the AD group in comparison with the control group. The results suggest that the phonological component of the graphemic buffer is damaged in individuals with AD, an outcome that it has not been previosly found using off-line measures.
The early left-anterior negativity (ELAN) in ERPs: Facts and myths

Steinhauer, K.¹,² & Drury, J. E.¹,³

¹ Centre for Research on Language, Mind and Brain. McGill University. Montreal, Canada
² School of Communication Sciences and Disorders. McGill University. Montreal, Canada
³ Department of Linguistics. Stony Brook University. Stony Brook, USA.

Within the framework of an extremely influential serial syntax-first model of sentence processing proposed by Friederici (1995, 2002), the early left-anterior negativity (ELAN) in ERPs has been taken as an important marker of very early automatic parsing processes. Here we attempt to systematically evaluate both the empirical support for the model and some methodological issues of the experimental paradigms used to study phrase structure (PS) violations. For example, we will show that asymmetrical designs in PS violation studies (especially those manipulating the pre-target word context while keeping the target word constant) may result in ERP spill-over effects and DC offset artifacts (baseline problems). Other questions include the following: (1) Are ELAN findings in reading studies comparable to those in auditory studies? (2) Do ELANs elicited in phase 1 of Friederici’s model really occur earlier than LANs elicited in phase 2? (3) Do ELANs reliably reflect ‘outright violations’ of phrase structure? (4) Do PS violations block subsequent processes in phase 2 of the model, such that ELANs never co-occur with LANs or N400s? (5) Are the processes reflected by ELAN components independent of strategies? (6) Do ELAN latencies shift depending on the point in time when word category information becomes available? (7) Are local ELANs (100-300 ms) and (subsequent) sustained frontal negativities (300-1500+ ms) independent effects? - We will discuss empirical evidence as to why, in our view, the answer to all of these above questions is ‘no’. In addition, we will present a fully balanced (symmetrical) PS violation paradigm in English avoiding confounds of previous studies. ERP data illustrate that context effects are real and can be misinterpreted as early violation effects. Implications for Friederici’s model and for future ERP research on syntactic online processing will be discussed.
Strategies for dealing with attachment ambiguities in Spanish

von der Malsburg, T. & Vasishth, S.

Department of Linguistics. University of Potsdam. Potsdam, Germany.

Over the last decades there have been several proposals about how the language system repairs an analysis of a sentence when material is encountered that is incompatible with the interpretation of the sentence maintained so far. In reading, this repair process is often accompanied by multi-fixation backwards movements of the eyes (regression scanpaths). The evidence from two studies that analyzed these scanpaths is inconclusive: Meseguer, Carreiras, Clifton (Mem&Cog, 2002) found support for an intelligent and targeted repair mechanism (c.f. Frazier, Rayner, CogPsych, 1982), but Mitchell, Shen, Green, Hodgson (JML, 2008) also found evidence for an influence of low-level visual factors on regressive eye movements, indicating that the parser is not in full control of eye movements during syntactic reanalysis. Meseguer et al. used Spanish sentences with a temporary attachment ambiguity where an adverbial phrase could attach high or low. We ran a Spanish follow-up study (n=70) that extended their design to include (among other things) an unambiguous baseline condition. Instead of analyzing local measures like fixation durations and transition probabilities we used a new method that directly quantifies spatio-temporal differences in the full fixation patterns (von der Malsburg, Vasishth, CUNY, 2010). Our results show that, contrary to what was believed previously, there is not just one reanalysis mechanism. Instead, readers use one of three different strategies when they encounter the disambiguating material: (i) diagnosing the problem by rechecking the disambiguating word, presumably followed by covert reanalysis, (ii) searching for cues, reflected by erratic fixation sequences, (iii) rereading of the sentence. Readers differ markedly in how they orchestrate these strategies. We hypothesize that each strategy corresponds to a different degree of confusion of the parsing system. In general, these results show that the scanpath approach is capable of uncovering processing strategies where traditional methods have failed to do so.
Phillips, Wagers & Lau (2009) have claimed that reflexives in English are immune to interference from structurally inaccessible antecedents because antecedents are retrieved using only structural cues without considering the person, gender and number features. The support for this claim is derived from studies (eg. Nicol & Swinney 1989, Sturt 2003 and Xiang, Dillon, & Phillips 2009) which found either no effect of interference or a late effect. However, the absence of effect in these studies can be attributed to different factors like lack of statistical power, absence of a critical condition and lack of temporal resolution in the methodology. We present a computational model based on the principles of the cue-based retrieval theory (Lewis & Vasishth, 2005) which predicts an interference effect in reflexive binding. We also report an eye-tracking study that confirms the predictions. The simulations predict the interference effect in terms of: (i) processing time at the reflexive, which includes antecedent retrieval time and (ii) percentage of errors in the retrieval of the grammatical antecedent for the reflexive. Prediction (ii) matches the error rates in Sturt (2003) and our web-based replication of the same study. In the eye-tracking study (n=40) we found an early effect of interference from the inaccessible antecedent in terms of first-pass regression probability-- a gender match between the reflexive and the inaccessible NP induced a significantly higher (p=0.04) number of first-pass regressions from the reflexive in the sentence. The effect of a gender match with the grammatical antecedent was observed only in late eye-tracking measures. In sum, this work (i) challenges the claim that the antecedent of a reflexive is accessed using only structural cues, and shows that the interference induced by the intervening noun occurs very early during dependency resolution, and (ii) presents an implemented computational model that predicts the interference effect.
Number attraction effects on object-clitic agreement in Spanish: Behavioral and Electrophysiological evidence.

Santesteban, M., Zawiszewski, A., Erdocia, K. & Laka, I.

UPV-EHU University of the Basque Country

Number attraction phenomenon in subject-verb agreement relations has been widely studied in language production and comprehension (e.g., Vigliocco, & Hartsuiker, 2002). However, only two studies have explored the neurophysiological mechanisms underlying these effects, and they have reported N400 and P600 components associated to the number attraction effects in subject-verb agreement (Kaan, 2002; Severens & Hartsuiker, 2008). Here we explored the electrophysiological responses of number attraction effects on object-clitic pronouns in Spanish. In a grammaticality judgment task, 46 Spanish native speakers were presented (word-by-word) with sentences containing a singular object-NP with a local noun that matched or mismatched in number with the head noun. Sentences were either grammatical or ungrammatical, depending of whether they contained an object-clitic pronoun that agreed or disagreed in number with the preceding object-NP (e.g., La pastora dijo que la casa de la(s) montaña(s) la/*las visitó en invierno [The shepherdess said that the house in the mountain(s), she visited it/*them in winter]). Number attraction effects were revealed at the critical word position (la vs. *las): different ERP patterns related to grammaticality effects for number match (a fronto-central N400 followed by a P600) and mismatch (only a P600) conditions. The absence of N400 components in number mismatch conditions indicates that number attraction effects have a deep impact on early (considered automatic) stages of agreement computation, whereas later comprehension processes seem to remain unaffected.
Against semantic attraction: Electrophysiological evidence from subject-verb agreement in Italian

Maffongelli, L.¹, Droege, A.¹, Schlesewsky, M.² & Bornkessel-Schlesewsky, I.¹

¹ University of Marburg
² Johannes Gutenberg-University Mainz

A prominent debate in the recent psycholinguistic literature concerns the claim that the language processing system constructs the most plausible combination of the words it encounters independently of grammatical constraints ("semantic attraction"). This proposal was based on the finding of P600 rather than N400 effects for "reversal anomalies" in English/Dutch (e.g. "The hearty meals were devouring ..."; Kim & Osterhout, 2005). The present ERP study used a novel manipulation in Italian to examine the predictions of semantic attraction. Italian has richer agreement and a more flexible word order than English and subject-verb agreement is the most salient cue to Agent-choice (MacWhinney et al., 1984). We crossed the factors animacy and agreement (literal translations; number counterbalanced across full materials): [a] the artist(SG) paints(SG) ...; [b] the picture(SG) paints(SG) ...; [c] the artist(SG) paint(PL) ...; [d] the picture(SG) paint(PL) ...). At the position of the verb, both non-agreeing condition [c]/[d] engendered an identical N400-P600 response in comparison to control condition [a] (see Haupt et al., 2008, for N400-P600 correlates of word order reanalysis). The agreeing condition with an animacy mismatch [b] showed only a P600. These findings are incompatible with a semantic attraction-based account: if NP1 and the verb were first combined in the most plausible way, the agreement mismatch should be processed differently depending on whether semantic attraction yields an Agent [c] or Theme [d] reading for NP1 (only subjects agree with the verb). This was not the case. We thus conclude that the P600 effect for sentences such as [b] should not be viewed as evidence for a semantic attraction-based conflict, but rather as reflecting ill-formedness categorisation (Bornkessel-Schlesewsky et al., in press), with the absence of an N400 likely due to lexical priming (Lau et al., 2008).
Tactile embodiment of personality concepts

Santiago, J.\(^1\), Márquez, J.\(^1\) & Valenzuela, J.\(^2\)

\(^1\) Dept. De Psicología Experimental y Fisiología del Comportamiento, Universidad de Granada, Spain.
\(^2\) Dept. de Filología Inglesa, Universidad de Murcia, Spain.

When we talk about people, we often resource to tactile words. A person may be “tender”, “rough”, “warm” or “pressing”. Are these just dead metaphors, or do we actually activate tactile concepts when processing person concepts? In the present work, we focus on the mappings between the tactile perceptions of “tough” versus “tender”, on one hand, and “rough” versus “smooth”, on the other hand, and their corresponding personality concepts. Participants were shown a set of pictures of candidates to be included in a trial jury. In one condition, the jury was going to judge a bad person who had harmed a relative of the participant. In another condition, the person being judged was the participant himself/herself. The task was to accept or reject each candidate by closing a pair of pliers (in one experiment) or moving a joystick (in another experiment). In the first experiment, the pliers required greater physical effort to be closed (tough condition) or very little effort (tender condition). In the second experiment, the joystick was covered with sand paper (rough condition) or with a very smooth hairy cloth (smooth condition). The results showed that an irrelevant tactile sensation is able to influence acceptance rates of jury members. Both the tough and rough conditions led to a lower acceptance rate when the jury members were to judge oneself and a greater rate when they were to judge the bad person. Tender or smooth sensations induced an opposite pattern. These results show that it is not just the acceptance response which is associated to tactile sensations, but that touch influences social impressions. Aspects of the results also suggest that the sex of the jury member and the participant are important modulating factors.
Understanding a word in context relies on a cascade of perceptual and conceptual processes, starting with modality-specific input decoding, and leading to the unification of the word's meaning into a sentence model. One critical cognitive event, turning a sensory stimulus into a meaningful linguistic sign, is the access of a semantic representation from memory. Considerable progress has been made in mapping semantic memory access in brain space and time, but little has been concluded from this body of work as to the changes that activating a word's meaning brings about in cortical dynamics. We recorded the EEG while participants read sentences that could contain a semantic violation, such as 'In July it is very cold outside'. We reconstructed the system's trajectories in phase space from individual EEG time series, and we applied three non-linear measures of predictability and complexity at either side of the semantic access boundary, defined as the onset of the N400 effect evoked by critical words (e.g. 'cold'). Semantic violations are associated with less predictable non-stationary signals preceding the N400 onset. This is not reflected in either ERP amplitude differences or EEG power modulations. Crucially, accessing the meaning of a semantically deviant word produces a phase transition to lower entropy states, in which cortical processing becomes more predictable and more regular, and in which information is generated at lower rates. Our study is a first step towards a quantitative complex systems approach to information flow through interfaces between sensory-motor and memory systems involved in language processing.
Second Language Acquisition of Motion Events: Thinking for Speaking in Spanish L2 by German, Italian and French speakers

Hijazo-Gascón, A.

University of Zaragoza

The distinction between Verb-framed and Satellite-Framed languages relies on the different way languages codify the semantic components involved in motion events (Talmy, 2000). Stemming from this typology, Slobin’s (1996) Thinking for speaking considers that the linguistic resources available in one’s language direct our attention to some aspects of motion. The application of Thinking for Speaking to Second Language Acquisition points out that speakers tend to transfer linguistic patterns of their first language into the second language (Brown & Gullberg, 2008, 2010, Cadierno & Ruiz 2006, Filipović & Vidaković 2010). However, most of these studies focus on the intertypological differences, comparing the acquisition of an S-language by V-language speakers, or the other way round. There are several studies that point out differences among languages within the V-Language group, either with respect to the Manner component (i.e. Basque: Ibarretxe-Antuñano, 2009a; Japanese: Sujiyama, 2005) or in relation to the Path component (Basque: Ibarretxe-Antuñano, 2009b). Furthermore, some satellite-like patterns have been found in different Romance languages (i.e. Romansch: Berthele 2004; Aragonese: Hijazo-Gascón & Ibarretxe-Antuñano, in press; Italian: Iacobini, 2009, Schwarze, 1985). This paper deals with the acquisition of Motion Events in Spanish as a Second Language by students whose first language is either Italian, French or German (12 speakers per group). Data are elicited using the Frog story methodology (Berman and Slobin, 1994). It is argued that there will be differences in their performance in the target language due to crosslinguistic influence (Jarvis & Pavlenko, 2008). The analysis shows that there are intertypological differences between the German and the Romance groups with respect to Manner of motion but, interestingly enough, there are also intratypological differences with regard to the Path of motion among the Romance groups. Italian speakers’ performance is not so ‘Romance-like’ as expected.
Same genes different phenotypes: the environmental influences in speech perception

Basora, A.¹, Jin, Y.¹, Martin, I.² & Sebastián, N.¹

¹ Cognition and Brain Research Unit, UPF
² Cancer Epigenetics and Biology Program, IDIBELL

It is known that humans differ in their ability to master a second language (L2). Previous studies showed that the age of acquisition, the amount of experience and the motivation are important factors in second language learning. However, individual differences in language learning ability are usually understood in terms of “aptitude”, which is related to genetic differences. It is unclear what is the determinant factor in mastering a L2: environment or genes? In this study, first, we aimed at finding a new index to estimate similarities in twins’ speech perception ability and, second, we also wanted to find the relevance of the environmental factors in L2 perception. In order to do that, we recorded event-related potentials (ERPs) from both monozygotic (MZ) and dizygotic (DZ) twins. They performed a task related to speech and acoustic change detection, specifically, native (/o/-/e/) and non-native (/o/-/ö/) phonetic contrasts. Two different analyses (Peak and Wavelet) were carried out to compare the brain activity from each pair of twins. For Wavelet analysis two indexes were created: the Similarity Distance Index and the Within Population Rate. The results showed that (1) the Similarity Distance Index could be a good measure to estimate similarities in twins’ speech perception ability and (2) MZ twins were more similar than DZ twins in phoneme perception.
Linguistic stress tunes the speed of auditory automatic attentional shifting: Evidence from Welsh-English bilingualism

Lallier, M.¹, Thierry, G.², Carreiras, M.¹ & Tainturier, M.²

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
² School of Psychology, Bangor University, Wales, UK

During speech acquisition, specific acoustic features act as cues helping to segment and access the lexical forms embedded in speech streams. Therefore, the speed at which auditory automatic attentional focus engages and disengages may adapt depending on those acoustic cues present in the language acquired. The auditory stream segregation threshold is a measure of the shortest stimulus onset asynchrony (SOA) for which automatic attention can disengage and reengage between two successive different stimuli. Since such measure reflects automatic attention abilities underlying speech perception (Lallier et al., 2010), it may vary between different linguistic groups. The present study aimed at showing that early Welsh-English bilinguals show different auditory attentional shifting speed compared to English monolinguals. We showed that 14 Welsh-English bilingual adults started to perceive two distinct segregated high- and low-pitch streams (instead of one-stream composed of high- and low-pitched sounds) at significantly slower SOAs (auditory segregation threshold = 136 ms) than 14 English monolingual adults (105 ms) matched one by one for age, non verbal IQ, and vocabulary skills. Interestingly, this significant effect was observed in absence of any group difference in a similar visual task, and regardless of lexical access speed of participants. This study demonstrates that Welsh-English bilinguals may perceive auditory stimulus sequences differently from English monolinguals because of different auditory automatic attentional shifting speeds. We attribute such effects to variations regarding lexical stress distribution between Welsh (penultimate syllable) and English (initial syllable). These results suggest that perceptual and attentional mechanisms employed during auditory scene analysis are influenced by the language acquired. Linguistic specifics should therefore be taken into account for oral language impairments’ diagnostic and remediation.
The role of orthographic and phonological overlap in bilingual word recognition and naming

Acha, J.¹, Laka, I.² & Carreiras, M.¹

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
² University of the basque Country

One of the major challenges for researchers in visual word recognition is to understand how word representations are organized and retrieved in the bilingual mental lexicon. Using a single presentation lexical decision and a word naming task, we examined how Spanish-Basque bilinguals identified Basque and Spanish cognates (equal form and meaning) and false friends (equal form and different meaning), compared to their respective controls (translation words that had a different form for cognates and words differing in meaning and form for false friends). For each word type, we manipulated the orthographic and phonological overlap. Thus, a Spanish word could be spelled the same as a Basque word (total overlap: bata-bata), could be phonologically equal but orthographically different (phonological overlap condition: coma-koma), or orthographically equal but phonologically different (orthographic overlap condition: plaza-plaza). In both tasks cognates were easier to process than false friends compared to their controls, and words with total overlap were processed faster that words in the phonological or orthographic overlap condition, showing a facilitative effect of cross-linguistic orthographic and semantic similarity. However, in the lexical decision task, the phonological overlap condition led to larger latencies and higher number or errors than in the other two conditions. In the naming task, this pattern was observed in the orthographic overlap condition. This was particularly so when words where identified or named in Basque (participant’s L2). Our results show that, beyond the key role played by semantics and language dominance, orthographic and phonological properties of words exert a different influence on bilingual word recognition depending on the task demand (lexical access or phonological articulation). We interpret these findings in the framework of the bilingual interactive activation plus model of word recognition.
Effects of different polarity: Syllable-frequency effects in Spanish and Basque

Cholin, J., Hantsch, A., Monahan, P. J. & Carreiras, M.

1 Basque Center on Cognition, Brain and Language (BCBL). Donostia, Spain
2 IKERBASQUE, Basque foundation for Science. Bilbao, Spain
3 Department of Basque Philology, Universidad de País Vasco, Spain

The ability to produce language so effortlessly has motivated the assumption that we store syllable-sized motor programs that are accessed during online production. High-frequency (HF) syllables are produced more quickly than low-frequency (LF) syllables, results taken to support the existence of a mental syllabary (e.g., Carreiras & Perea, 2004; Cholin et al., in press; Cholin et al., 2006; Cholin & Levelt, 2009; Laganaro & Alario, 2006). The literature thus far, however, has almost exclusively used monolingual participants, leaving open the question of the nature of such representations in a bilingual system. Testing French-Spanish bilinguals, Alario, et al. (2010) presented evidence that suggests independent syllabaries for early bilinguals and shared syllabic representations for late bilinguals. Using a syllable-association learning task (Cholin et al., 2006), we first measured monolingual Spanish speakers’ production times to HF and LF Spanish syllables. Consistent with previous findings, HF syllables were produced more quickly than LF syllables. Subsequently, we tested Spanish-Basque bilinguals on the same materials, but surprisingly found that LF syllables were produced more quickly. Considering the Basque frequencies of the syllables shared between Spanish and Basque in our materials, a post-hoc correlational analysis suggests that the Basque frequencies significantly contribute to the directionality of the response times.
Event-related fields in response to spoken words during Spanish-Basque lexical learning

Davidson, D. J.¹, Carcedo, D.¹ & Carreiras, M.¹,²

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia, Spain
² IKERBASQUE, Basque foundation for Science. Bilbao, Spain

Previous studies of lexical learning using magnetoencephalography (MEG) have investigated the learning of new words within a first language (L1). However, it is less clear whether similar responses will be obtained for learners of a second language (L2) in early stages of lexical learning. This study examined the evoked fields in response to Spanish and Basque word pairs presented as speech in a paired-associate study-test memory paradigm in Spanish learners of Basque. The hypothesis was that learners would treat Basque words as non-words or pseudowords compared to already-known Spanish words. This hypothesis predicts that the amplitude of the evoked field to the Basque words would be greater than that of the Spanish words within a late component (0.3 to 0.6 s) evoked time window. The Spanish-native participants (n=13) heard six Basque-Spanish noun pairs presented as a list, and then recalled the Basque (Spanish) target words in response to the Spanish (Basque) cue words (study-recall repeated four times). In total, eight different lists of six words were presented. The spatial topography of the evoked fields was largely similar for the L1 and L2 responses. However, averaged over all repetitions, the amplitude of the evoked field for the gradiometer response was larger to the Spanish words compared to the Basque words in a late 0.5 to 0.6 s time window, in contrast to the predicted response. These results suggest that during initial phase of learning of a new L2 spoken word, participants do not treat the to-be-learned lexical item as a non-word or a pseudoword, but rather as a new lexical item, weakly-linked to the already-existing native L1 word or concept.
Does L2 proficiency modulate non-cognate masked translation priming effects?

Dimitropoulou, M.\textsuperscript{1,2}, Duñabeitia, J. A.\textsuperscript{1} & Carreiras, M.\textsuperscript{1,3,4}

\textsuperscript{1} Basque Center on Cognition, Brain and Language (BCBL). Donostia, Spain
\textsuperscript{2} Universidad de La Laguna, Tenerife, Spain
\textsuperscript{3} IKERBASQUE, Basque foundation for Science. Bilbao, Spain
\textsuperscript{4} Departamento de Filolog\'ia Vasca, University of the Basque Country UPV/EHU, Bilbao, Spain

Non-cognate masked translation priming studies with unbalanced bilinguals performing lexical decisions show larger effects in the dominant (L1) to non-dominant (L2) translation direction, than vice versa. Importantly, this asymmetry is eliminated with balanced native-like bilinguals, suggesting that L2 proficiency may play a critical role in the pattern of the obtained effects. The present study addressed this issue by testing three groups of unbalanced Greek-English bilinguals with different levels of L2 proficiency. Participants performed lexical decisions on the same set of English and Greek targets primed by their non-cognate translations. Even though participants’ performance improved as a function of increased L2 proficiency, the pattern of masked translation priming effects remained identical across the three levels of proficiency, always replicating the previously established asymmetry. The overall pattern of findings is discussed in relationship with current models of bilingual word recognition and processing.
Effect of language proficiency on bilingual lexical activation: Evidence from eye tracking

Singh, N. & Mishra, R.

Centre of Behavioural and Cognitive Sciences. Allahabad University. Allahabad. UP. India

We tested Hindi-English bilinguals differing in their L2 (English) proficiency on a lexical access task. In a visual world eye tracking study, subjects listened to sentences containing a target word and saw four line drawings on the computer screen. One of the words was either a cohort or a rhyme competitor of the translational equivalent of the spoken word. We presented sentences in both L1-L2 as well as L2-L1 direction. Proportion of fixations to the translation equivalent in the other language showed that bilinguals with higher L2 proficiency quickly oriented their attention to the target in the L1-L2 condition for cohorts but not for rhymes. Bilinguals with low L2 proficiency however did not activate translation equivalents in any condition. We discuss the results following the predictions of the revised RHM model of bilingual lexical representation. Further we discuss the implication of such research in the Indian scenario where everyone is either a bilingual or multilingual.
Comparing French and English listeners’ on-line perception of assimilated speech

Clayards, M.\textsuperscript{1,2,3}, Gaskell, G.\textsuperscript{4} & Niebuhr, O.\textsuperscript{5}

\textsuperscript{1} Department of Linguistics. McGill University. Montreal, Canada
\textsuperscript{2} School of Communication Sciences and Disorders. McGill University. Montreal, Canada
\textsuperscript{3} Centre for Research on Language Mind and Brain. McGill University, Montreal, Canada
\textsuperscript{4} Department of Psychology. York University. York, UK
\textsuperscript{5} Institute of Phonetics and Digital Speech Processing. Christian-Albrechts-University. Kiel, Germany

Spoken language contains many types of contextual changes in pronunciation such as assimilation across word boundaries. Languages differ in the degree and type of assimilatory changes that are allowed. For example, both French and English exhibit some assimilation of sibilants in sibilant sequences (e.g., /s/ becomes like /sh/ in “dress shop”), but they differ in the strength and directionality of these shifts. Listeners are able to compensate for these changes when hearing speech and models of spoken-word recognition differ on whether compensation for assimilatory changes are language-specific or language general. To explore this issue we compared French and English listeners on very similar tasks and stimuli. We taught English and French participants the same set of novel words that began or ended with /s/ or /sh/ (e.g. “samal”, “tamash”). After training, participants were presented with the novel words embedded in sentences that could engender assimilation. Sentences were uttered by both a French and an English speaker and both groups of listeners heard both. Target words contained a sibilant from a 7 step continuum of sibilant sounds varying between /s/ and /sh/ representing a range of possible assimilation strengths. Listeners’ perceptions of the potential assimilations were examined using a visual-world eyetracking paradigm in which the listener clicked on a picture matching the novel word. Both French and English participants were able to compensate for assimilation in these sentences but they only showed compensation for the most extreme assimilations in situations where extreme assimilations are likely to occur in their language. These results suggest that compensation for assimilation develops in response to experience with the statistics of assimilation in the listener’s native language. Patterns of compensation consistent with a more auditory based mechanism were also evident in situations where strong assimilatory patterns are unlikely to occur in the listener’s experience.
This paper investigates relative clause attachment comparing Self-Paced Reading (SPR) with Planned Production (PR), and provides evidence that they show comparable duration effects. The PR data suggests a new perspective on some previous SPR results. In PR, participants read sentences silently until they are ready to produce them. We segmented the sentences into zones parallel to SPR-data and extracted duration and other acoustic measures. This method leads to richer data (various acoustic measures, distinction between lengthening and pause), and reduces some extraneous factors (ie, plausibility effects). We used PR to look at subject- and object modifying relative clauses (SRC and ORC), crossed with subject- vs. object extraction inside the RC. A mixed model regression showed a difference across extraction site and RC location for relative clause duration (ps<.002) that replicated previous results. Additionally, there was a significant effect at the matrix verb (p<.01): longer for the SRC than the ORC condition. Furthermore, the matrix clause excluding the RC was significantly longer in the SRC than in the ORC condition (p<.001), but no significant difference was found over the entire sentence. These results challenge a previous conclusion that ORC are more difficult than SRC. We propose that the ‘speed-up’ on the RC in the SRC structure may not be due to a lower complexity of SRC, as previously claimed, but rather a reflection of the parser trying to minimize the temporal distance in the dependency relation between subject and predicate. Thus, we claim that not all durational differences directly reflect complexity. The results reported here are based on durational measures, to mirror SPR results. In the presentation we will discuss differential effects of duration due to lengthening and pause duration, and other acoustic variables, exploring the richness of the PR data.
An experiencer is just as good as an agent: The neural underpinnings of linguistic actorhood

Frenzel, S.¹, Schlesewsky, M.², Primus, B.³ & Bornkessel-Schlesewsky, I.¹

¹ Philipps-Universität Marburg
² Johannes Gutenberg-Universität Mainz
³ Universität zu Köln

The present fMRI study investigated the linguistic actor features volition and sentience and their neural underpinnings in social cognition. In contrast to the traditional notion of Agent, which is based on volition, more recent approaches to generalized semantic roles have also included sentience as a proto-agent property (Dowty, 1991; Primus, 1999). Primus (2010) explicitly links this assumption to neuroscientific research on the self-regulation of emotions (e.g. Ochsner & Gross, 2005). Here, we aimed to examine whether volition and sentience indeed show comparable neural correlates during sentence comprehension. Stimulus materials comprised German sentences that described a volitional event [+volition] (Ich / Er zerbrach die Vase. ‘I / He broke the vase.’), an anti-causative event [-volition] (Mir / Ihm zerbrach die Vase. ‘~The vase broke on me/him.’) or an event describing a psychological state [+sentience] (Mir / Ihm gefiel die Vase. ‘I / He found the vase pleasing.’). In accordance with our hypotheses, our results revealed a network of regions within which +volition and +sentience clustered against -volition. Specifically, -volition sentences showed increased activation in comparison to +volition/+sentience in the left superior temporal gyrus (STG) extending to the left insula. For sentences with a first person subject / actor, a similar activation pattern was also observable in the posterior right STG / temporo-parietal junction and in bilateral middle frontal gyri. These results are consistent with previous findings of a fronto-temporo-parietal network that is sensitive to causal attributions and internal vs. external causation (e.g. Seidel et al., 2010). We conclude that there is indeed compelling neural evidence for +sentience as an actor feature and that the similar status of +sentience and +volition is grounded within a network of cortical regions that is known to engage in causal attributions in social situations.
Exploring the influence of thematic role and case marking in structural priming: A Basque study

Santesteban, M.¹,², Pickering, M.², Branigan, H.² & Laka, I.¹

¹ UPV-EHU University of the Basque Country  
² The University of Edinburgh

Priming effects have been found between unaccusative and passive syntactic structures in a nominative/accusative language such as English (Melinger, 2006), plausibly due to syntactic structure similarity. In an ergative language such as Basque, where unergative and unaccusative subjects receive different cases, we investigated whether (a) there is a priming effect from intransitive (unergative and unaccusative) to transitive structures; and (b) case-marking boosts syntactic priming. Due to the absence of passive in Basque, we employed a transitive vs. intransitive structure alternation only found in psychological-verbs (psych-V). We predicted that due to syntactic structure similarities, unaccusatives should prime intransitive-psych-V structures more than unergatives (and actives). Additionally, if case marking played a role in structural priming, larger priming differences were expected between unaccusatives and unergatives in Basque than in English. Basque native speakers described pictures representing change of psychological state actions. In Experiment 1 (n=16), descriptions were primed with transitive or intransitive-psych-V structures containing the same or a different psych-V than the target. We replicated effects of structural priming and lexical boost with more intransitive-psych-V structures produced after intransitive than transitive-psych-V primes, and larger priming effects following verb repetition. In Experiment 2 (n=24), descriptions were primed with unergative, unaccusative and transitive- or intransitive-psych-V structures containing different psych-Vs from the target. We replicated the priming effects of Experiment 1, but unaccusatives did not prime intransitive-psych-V structures more than unergatives. In Experiment 3, 24 English native speakers replicated Experiment 2’s results while performing the task in English (active vs. passive alternation). In sum, we showed evidence of structural priming and lexical boost effects in a new type of syntactic alternation: transitive/intransitive use of psychological-verbs in Basque. However, unaccusative or unergative structures did not prime the use of intransitive (or transitive) psychological-verb structures. Results suggest that case similarity is not enough to trigger syntactic priming.
Comparing on-line pronoun resolution to final interpretation patterns – A cross-linguistic study in German and Dutch

Ellert, M.¹, Järvikivi, J.² & Roberts, L.³

¹ German Linguistics Department University of Göttingen
² Institute of Behavioural Sciences, Speech Sciences University of Helsinki
³ Max Planck Institute for Psycholinguistics Nijmegen

Coherent discourse entails repeated reference to the same discourse entity. This is often achieved by the use of personal pronouns such as “he” in English (Peter in [1]). In German and Dutch, however, in addition to personal pronouns (German “er”, Dutch “hij”), an alternative set can be used, namely d-pronouns (German “der”, Dutch “die”). The question becomes what is the difference in referential functions and processing between personal and d-pronouns.[1] Peter wanted to play tennis. But he was sick. Peter wollte Tennis spielen. Doch er/der war krank. Peter wilde gaan tennissen. Maar hij/die was ziek.[2] The doctor is friendlier than the cook. He (personal/d-pronoun)... We studied this in spoken German and Dutch using visual world eye tracking and referent assignment. We presented two potential antecedents followed by an ambiguous pronoun that was either a personal or a d-pronoun [2]. The results showed an asymmetric resolution pattern: German and Dutch personal pronouns were resolved towards the topical and d-pronouns towards the non-topical entity. This pattern of results emerged both on-line during eye-tracking (p<0.5 for both effects) and also offline in final interpretation preferences. However, offline the non-topical preference for the d-pronoun was only marginally significant (personal: p<0.001, d-pronoun: p=0.6). When we included the participants’ final choice as a predictor in mixed-effects modelling, we found cross-linguistic differences regarding the referential functionality of the pronouns. Whereas in Dutch there was a correlation between on- and off-line resolution preferences for the d-pronoun, the Germans always showed a clear and early on-line-preference to the non-topic for the d-pronoun regardless of their final interpretation preferences. This pattern of results suggests that, unlike in Dutch, the German d-pronoun is marked for non-topical co-reference; a result only to be observed via the on-line task.
Processing the causative alternation in European and Brazilian Portuguese

Costa, A. & Maia, M.  
1 Faculdade de Letras da Universidade de Lisboa  
2 Universidade Federal do Rio de Janeiro

The present research aims to evaluate the processing costs’ of unaccusative constructions like (2) against typical transitive ones as (1) by Portuguese and Brazilian Portuguese speakers. These sentences illustrate the causative alternation that has been studied in the linguistic field (Keyser & Roeper 1984, Burzio 1986, Levin & Rappaport-Hovart 1995, Di Sciullo 2005). In terms of processing, we assume that (2) entails more cognitive effort than (1) because it is a derived structure whose verbal internal argument moves to the subject position. (1) The cooker melted the butter. (2) The butter melted. In Portuguese, the causative alternation is encoded morphologically by means of an ergative clitic –SE, as in (5). However it is possible to have no morphological marking, as in (6), what is frequent in BP, and occasional in EP. In this study, through a self-paced reading task, we collected temporal data that allows us to evaluate the reading times of typical transitive constructions like (3), the baseline condition, against less typical ones, as in (4) given the non-animate subject, and unaccusative conditions, with and without the reflexive clitic, (5) and (6). (3) Num dia de Verão |a cozinheira derreteu a manteiga | e depois juntou a farinha. In a summer day the cooker melted the butter and after she added the flour. (4) |o calor derreteu a manteiga |e esta estragou-se the heat melted the butter and it blew up. 5) |a manteiga derreteu-se | the butter melted –clitic SE (6) |a manteiga derreteu | The reading time of the critical segment, the second one, will allow us to infer about processing costs. Taking into account the results of Di Sciullo et al. 2007; Maia et al. 2009, we predict that the syntactic complexity of the unaccusative constructions will request more reading time, and more when there is no morphological marking.
Are we poor or not rich after the crisis? Looking at negation in context

Orenes, I. ¹, Moxey, L. ², Scheepers, C. ² & Santamaria, C. ¹

¹ Department of Psychology. University of La Laguna. Tenerife, Spain
² Department of Psychology. University of Glasgow. Glasgow, Escocia, UK

It is assumed negative sentences are processed in two stages. For example, to understand “her dad was not rich”, people first represent the negated state of affairs “her dad was rich” and then integrate negation to represent the actual state of affairs “her dad was not rich” or even “her dad was poor” (Kaup et al. 2006). The goal of this study was to discover how this shift of attention from the negated concept (rich) toward the actual state of affairs (poor) might be modulated in everyday life. Often people use negation to correct expectations (e.g. when for some reason someone is expected to be rich we can suitably state that she is not rich; Wason, 1965). Thus, it is likely that people focus on the mentioned word longer and change their attention later when negation is used in contexts involving correction of expectations. To test this hypothesis, we presented affirmative (Her dad was poor) or negative sentences (Her dad was not rich) after two different contexts: consistent with expectation (Her dad was an unemployed person) and inconsistent with expectation (Her dad owned an important company). A total of 42 participants took part in this experiment, listening to 42 stories while two pictures appeared on the screen (in this example, a rich and a poor man). At the same time, their eye movements were recorded, and the results showed that the proportion of fixations to the picture which relates to the word explicitly mentioned in the sentence, was higher and longer for inconsistent that consistent expectation. We conclude that certain contexts can induce to maintain negated concepts in mind.
Modulation of cerebral activity by grapheme-to-phoneme conversion and by gender. An fMRI study in French

Perrone-Bertolotti, M.\textsuperscript{1,2}, Cousin, E.\textsuperscript{1,2,3}, Yvert, G.\textsuperscript{1,2}, Pichat, C.\textsuperscript{1,2} & Baciu, M.\textsuperscript{1,2}

\textsuperscript{1} Laboratoire de Psychologie et Neurocognition, UMR CNRS 5105, Université Pierre Mendès-France, Grenoble, France
\textsuperscript{2} SFR « Santé et Société », Université Pierre Mendès-France, Grenoble, France
\textsuperscript{3} SFR « RMN Biomédicale et Neurosciences », Unité IRM 3T, Université Joseph Fourier, Grenoble, France

This fMRI study explores how the cerebral activity for phonological processing is modulated by the difficulty level of grapheme-to-phoneme conversion (GPC; transparent vs. non-transparent) and the gender of participants (male vs. female). Transparent (T) GPC indicates low level while non-transparent (NT) GPC indicates high level of difficulty. Twenty two right handed French native speakers (11 male) participated to experiment. They performed visually a phoneme detection (Language, L) and a visuo-attentional (Control, C) tasks. According to GPC difficulty level, the L stimuli were built as T and NT. A 3T MR scanner was used for acquisition. Using SPM5, the L vs. C contrast was calculated first at individual level (GLM analysis) and then to group-level (random-effect analysis). Several regions of Interest (ROI) were defined and the MR signal intensity variation (% MR, parameter estimates) was extracted from each of them. Based on the parameter estimates values, ANOVA analysis determined if the GPC and the gender showed significant effect on cerebral activity. Our results showed that behavioural performances were modulated by GPC with more accurate phoneme detection when the items were T with respect to NT. At the cerebral level, the left-hemisphere activity induced by phoneme detection was modulated by GPC difficulty level: T modulated the superior posterior temporal and NT modulated the inferior temporal gyrus activity. T modulation suggested automatic activation of phonological representations while NT modulation suggested verification and conversion of sub-lexical orthographic units toward phonological codes. Significant interaction between GPC and gender was observed: females showed higher accuracy of detection when the items were T and it was associated with greater activation of the lingual gyrus. Overall, our results suggest that cognitive mechanisms and cerebral correlates of phonological processing may depend on intrinsic and extrinsic variables, such as GPC and gender.
From lips to lexicon: Does visual speech activate lexical representations?

Fort, M.1, Kandel, S.1,3,2, Chipot, J.1, Savariaux, C.3, Granjon, L.3 & Spinelli, E.1,4,2

1 Laboratoire de Psychologie et NeuroCognition. University of Grenoble. Grenoble, France.
2 Institut Universitaire de France. Paris, France
4 University of California. Berkeley, California, USA.

Seeing the speaker’s articulatory gestures enhances phoneme perception, especially in noisy environments. Previous studies provide evidence that visual speech may also contribute to lexical access. To address this issue, we used a fragment priming procedure paired with a lexical decision task, in which the primes were syllables that either shared or not the initial syllable with an auditory word or pseudo-word. In Experiment 1, primes were displayed in audiovisual (AV), audio only (AO) or visual only (VO) conditions. The analyses on words revealed priming effects for the AV, AO but also for VO primes. The latter indicates that visual speech facilitates the subsequent processing of an auditory word. In Experiment 2, we compared the priming effect in the VO condition with words of high and low-frequency. The results showed that the effect is stronger with low-frequency words, indicating that the locus of this facilitation was lexical rather than pre-lexical. This provides evidence that visual information mediates word recognition processes essentially when a lexical unit requires a large amount of activation to be recognized (e.g., a low frequency word). These experiments demonstrate that the visual perception of the initial phonemes is enough information to activate lexical candidates. Seeing the articulatory gestures of a speaker facilitates the early phases of spoken word recognition.
Does orthographic and phonological similarity influence cognate word processing? An ERP priming study

Comesaña, M.¹, Soares, A. P.¹, Frade, S.¹, Sánchez-Casas, R.¹,², Rauber, A.¹,³, Pinheiro, A. P.¹ & Fraga, I.¹,⁴

¹ University of Minho, Braga (Portugal)
² University Rovira i Virgili, Tarragona (Spain)
³ Catholic University of Pelotas (Brazil)
⁴ University of Santiago de Compostela (Spain)

In bilingualism research, the study of why cognate words are processed differently from non-cognate words has been intriguing psycholinguistic researchers for decades. Two major positions have been proposed: a) a lexical-morphological hypothesis (Davis et al., 2010) according to which the differential processing observed to cognate words is due to their special morphological representation in bilingual memory that is not present in non cognate words; and b) a symbolic, localist connectionist framework (Dijkstra, Miwa, Brummelhuis, Sappelli, & Baayen, 2010) that emphasizes the cross-linguistic similarity of cognate words, rather than a different lexical status, as the cause of their particular processing. The aim of this study was to examine how the phonological and orthographic similarity of cognate words affects bilingual word recognition and whether the results are modulated by SOA exposure. We recorded Event-Related Potentials (ERP) data in a masked translation priming paradigm in order to explore the time course of form and meaning activation during silent reading in a second language. One-hundred and ninety-two words were selected: 96 cognate words attending to their orthographic -O- and phonological -P- overlap (24 O+P+; 24 O+P−; 24 O−P+; 24 O−P−) vs. 96 non-cognate words. Cognate and non-cognate words were matched on frequency, length, grammatical category, thematic structure, and orthographic and phonological neighbors. Besides, in cognate words, the experimental conditions (O+P+, O+P−, O−P+ and O−P−) did not statistically differ in these variables. Forty-eight proficient bilinguals of European Portuguese (L1)-English (L2) were randomly distributed into two groups as a function of SOA (47 ms vs. 147 ms) and prime duration was kept constant (47ms). The results showed that the processing of cognate words was modulated by phonological and orthographic overlap, which motivates the discussion of these findings in the context of the two aforementioned theoretical positions.
The role of prosodic features in communication failure and repair: a study of native and non-native speakers of Japanese and German

Asano, Y.

University of Konstanz, Germany

The present study examines how suprasegmental features and patterns are used and modified by L2 speakers to reinforce their speech acts. Using a role-play situation we explore speakers’ repair strategies when their utterances did not fulfill a communication goal: Participants (10 Japanese learners of German and 10 German learners of Japanese) were asked to imagine themselves being in Japanese and German restaurants and to try and get the attention of a waitress (author) saying "Excuse me" to order a drink. The waitress, however, did not immediately react to their request. Thus they had to make repeated attempts to get her attention until they succeeded. German is classified as a so-called stress-accent language whereas Japanese is known to be a non-stress-accent language and is the classic example of a "pitch-accent language". While German pitch contours signal postlexical or paralinguistic contrasts, different pitch patterns in Japanese can contribute to lexical contrasts. The findings show that German and Japanese native speakers have different repair strategies to achieve their communicative goals. Japanese native speakers, both in their mother tongue and in German, increased the duration of the word, especially the duration of the most prominent vowel to repair their utterance. They also used more energy to produce these vowels. In contrast, German native speakers changed their intonational patterns to achieve their goal. The reason for avoiding the use of different pitch contours as a repair by Japanese native speakers can be explained by the fact, which is mentioned above, that pitch accents in Japanese and in German have different functions. The empirical data of the present study revealed the different pragmatic functions and use of suprasegmentals between languages, which lead to negative transfers in L2 learning.
Attentive and non-attentive perception of familiar and unfamiliar vowels

Deguchi, C.¹, Besson, M.², Boureux, M.¹, Sarlo, M.¹ & Colombo, L.¹

¹ Dipartimento di Psicologia Generale, Padova University, Padova, Italy
² Institut de Neurosciences Cognitives de la Méditerranée, CNRS, Marseille, France

We investigated attentive and non-attentive auditory processing of familiar and unfamiliar vowels in Italian native speakers using the Event-related potentials (ERPs). An auditory odd-ball sequence including 4 vowels (/u/ as standard, and /o/, /y/ and /ø/ as deviants), each spoken by different speakers, was presented, while participants watched a silent movie (Passive condition) and discriminated deviant vowels (Active condition). Importantly, /u/ and /o/ belong to the phonemic inventory of Italian, and are phonologically distinctive, while /y/ and /ø/ exist only as dialectal allophones. In the F1-F2 acoustic space, the deviant vowels differed from the standard in different dimensions; F1 for /o/, F2 for /y/ and both F1/F2 for /ø/. Previous studies showed that the mismatch negativity (MMN) indexes pre-attentive categorization of vowels based on long-term memory traces for the native phonemes (Näätänen et al., 1997; Deguchi et al., 2010). We were interested in investigating if the patterns of components elicited by familiar and unfamiliar vowels, in the passive condition, or under attentional focus in the active discrimination task, differ, and how (Sussman et al., 2004). Results showed no clear MMN, but in the Passive condition the P3a and RON were elicited by unfamiliar vowels (/y/ and /ø/) reflecting involuntary attention switch (Escera et al., 2000). In the Active condition, discrimination accuracy was higher for /ø/ than the other deviants showing contribution of both acoustic dimensions (F1 and F2). The N2, P3 and N4 components differed in amplitude and latency between vowels reflecting complex interactions between the native phonemic inventory and perceptual discriminability of speech sounds. Overall results suggest that the sequence of familiar and unfamiliar vowels including acoustically variable tokens did not induce automatic linguistic-mode categorization, but unfamiliar vowels evoked novelty effect requiring additional resources and different cognitive processes compared with familiar vowels.
Reading time is a critical variable for parafoveal word processing during sentence reading

López-Peréz, P. J., van der Meij, M., Muñoz, S. & Barber, H. A.

Department of Cognitive Psychology, University of La Laguna, Spain

Parafoveal perception plays an important role in reading, but the exact extension and type of word processing in the parafovea is still a matter of discussion. In two ERP experiments we looked at two important variables that could constrain parafoveal word processing: the sentential context and the reading time. A modification of the standard RSVP procedure was used to study parafoveal perception during sentence reading in absence of eye movements. In experiment 1, volunteers read Spanish sentences presented word-by-word at fixation (SOA= 450 ms). Each of these words was flanked 2 degrees bilaterally by two different words: the next word in the sentence to its right, and the previous word in the sentence to its left. In some of the sentences, target words were replaced by a word that was semantically incongruous with the overall sentence context. This happened when the target word was presented at fixation (foveal manipulation), and/or in the right flanker of the previous word (parafoveal manipulation). Parafoveal and foveal manipulations resulted in qualitatively similar N400 effects, and these effects were observed for target words with high and low cloze probability. Although parafoveal N400 effects with high cloze probability words could be explained by the use of formal features (or just initial letters) to confirm contextually anticipated items, the same effect with low cloze probability words supports the claim that under these circumstances words identified in the parafovea were fully processed. In experiment 2, the same sentences were presented at a faster presentation rate, close to that of normal reading (4/s; SOA=250 ms). In this case, the parafoveal N400 effect was observed only for words with high cloze probability. These results suggest that time can constrain parafoveal perception during sentence reading.
Cultural flexibility in the spatial representation of linguistic content: The role of reading and writing direction

Román, A.¹, El Fathi, A.² & Santiago, J.¹

¹ Dept. de Psicología Experimental y Fisiología del Comportamiento, Universidad de Granada, Spain.
² Faculté des Lettres et des Sciences Humaines, Université Abdelmalek Essaadi, Morocco.

How does reading and writing direction affects mental model construction from linguistic input? Sentences describing static scenes (e.g., “the table is between the lamp and the TV”) were auditorily presented, and the participant was to draw the scene. Both drawing order and object location were measured. In Experiment 1 there were three groups of participants: monolingual native Spanish, Arabs living in Spain with a long immersion in Spanish culture, and Arabs living in Morocco. The first two groups listened to the sentences in Spanish, and the third group in the local Arabic dialect (Dariya). Replicating prior results by Jahn et al. (2007), Spanish participants tended to arrange the objects from left to right along a horizontal line, whereas the Moroccans placed objects from right to left. The Arabs living in Spain showed a left-to-right pattern, but milder than the Spanish group. Order of object drawing followed object location. In Experiment 2 a new group of Moroccans listened to sentences in Dariya, in one condition, and either Spanish or French (their preferred second language), in another condition. Results showed an interesting within-subject dissociation between object location and drawing order. Whereas the location of objects did not vary, following always the typical Arabic right-to-left pattern, order of drawing depended on the language of sentences: Dariya sentences induced a right-to-left drawing order, but Spanish or French sentences reversed the direction of drawing. Present results demonstrate that the processes involved in the order of drawing (production) and the spatial representation (mental model) can be dissociated. People draw in the same direction as they would write the language they are hearing (short term flexibility), but the spatial representation of sentence meaning is affected only after a long period of immersion in a different culture (long term flexibility).
MMN responses to native and non-native language properties in Chinese-speaking children

Chen, Y.¹, Lien, Y.², Chen, Y.² & Lee, J. R.²

¹ Department of Special Education. National Taiwan Normal University. Taipei, Taiwan
² Department of Educational Psychology and Counseling. National Taiwan Normal University. Taipei, Taiwan

We recorded MMN response for 22 second-graders (average age= 7y11m) to Chinese and Finnish speech sound contrasts. There were two deviants in each language which differ in perceptual difficulty based on their acoustic features. Within each language, the number of standard and the two deviants were 1013:125:125. The Chinese speech sounds were synthetic nonword syllable /fau/ with different tones, varying in their vowel fundamental frequency. In Finnish, duration is the phonemic cue we used in the experiment since sound duration alone could determine the quantity of a Finnish but not a Chinese phoneme. The /t/ in the Finnish nonword /ata/ stimuli was a voiceless stop with a silent period in the middle of the sound, and the silent period was 74 ms for the standard stimuli, 116 ms and 210 ms for the two deviants. The results showed that Chinese-speaking children demonstrated significant MMN to the property in their own native language. Their brain response pattern was similar to their adult counterparts (data from our previous study), but with a longer latency. For the Finnish speech sound condition, both children and adult showed the MMN responses within the same time window (293~433 ms). Our results showed that there is a developmental trend in the brain response of Chinese speakers to the important language property of their native language, which might be shaped by language experience. However, when these Chinese speakers encounter a non-native language property which is not salient in their own language, they might process it by the acoustic/physical feature and therefore the MMNs reflected were the same in children and adults. The relationship between these MMN responses and the reading abilities of the normal and dyslexic children are still under exploration in an on-going study.
Syllabic structure and lexical stress assignment in Spanish

Shelton, M.¹, Gerfen, H. J.² & Gutiérrez-Palma, N.³

¹ Occidental College, Department of Spanish and French Studies
² The Penn State University, Department of Spanish, Italian and Portuguesse
³ University of Jaen, Department of Psychology

Quantity sensitivity (QS) in Spanish stress has long been polemical. For some, diphthongs are bimoraic, attract stress and reduce the 3-syllable stress window. But diphthongs themselves are problematic. Though Spanish lacks proparoxytones (antepenultimate stress) with either rising (RD) or falling (FD) diphthongs in the penult, (e.g. *[fá.tja.no] *[fá.taj.no]), these diphthong-types do not always pattern together with respect to putative weight equivalence. For example, final RDs regularly fail to attract stress ([fa.mi.lja]), while final FDs systematically pattern as “heavy,” attracting stress ([ka.ráj]). We focus on the role of penultimate RDs versus FDs in affecting stress placement. Specifically, we employed a pseudoword naming task to provoke errors in monolingual Spanish speakers. If diphthongs do attract stress, then proparoxytones with penult diphthongs (dóvaina) should induce more naming errors than licit controls with monophthongs in the penult (lótaga). More interestingly, if speakers are sensitive to the ambiguous behavior of RDs, we should find fine-grained differences between diphthong types. RDs should pattern as “lighter” than FDs, and thus speakers should make fewer errors naming proparoxytones with penult RDs (pátiaga) than FDs (pátaiga). Our result confirmed these hypotheses. Proparoxytones with penult diphthongs induced more errors (70%) than monophthong proparoxytones (38%). Moreover, RDs induced significantly fewer errors (62%) than FDs (77%). Therefore, traditional binary weight distinction seems to be insufficient to characterize the effect of diphthongs on Spanish stress placement. An explanation based on the internal structure of syllables may be more appropriate.
Linguistic knowledge modulates the recognition of statistically-coherent word candidates

Toro, J. M., Pons, F., Bion, R. & Sebastián-Gallés, N.

1 Brain and Cognition Unit, Universitat Pompeu Fabra, Barcelona, Spain
2 Departament de Psicologia Bàsica, Universitat de Barcelona, Barcelona, Spain
3 Department of Psychology, Stanford University, Stanford, United States

The computation of statistical regularities among syllables has been claimed to be important for various linguistic processes, including the segmentation of speech. Importantly, several aspects of the linguistic signal, including prosodic and phonotactic cues, have been shown to modulate the extraction of such regularities. In order to investigate at what level are those cues affecting the extraction of statistical dependencies, we run a series of experiments in which background linguistic knowledge conflicted with distributional information. We presented participants with an auditory speech stream composed by nonsense words violating a word-forming constraint in their native language (vowel reduction in Catalan). Results showed participants did not prefer the words from foils with smaller statistical coherence in an auditory recognition task (Experiment 1). Nevertheless, participants recognized the words when they were pitted against foils that had not appear in the stream (Experiment 2), or when the test was performed in the visual modality (Experiment 3). These results suggest background linguistic knowledge is not preventing altogether the computation of statistical regularities from the speech stream. Rather, they suggest such knowledge is filtering the recognition of statistically-coherent items during subsequent recognition.
Orthographic effects in spoken word recognition: data from auditory priming paradigm

Perre, L.1,3, Midgley, K. J.2,3 & Ziegler, J. C.3

1 Unité de Recherche en Sciences Cognitives et Affectives, Université Nord de France, France
2 Neurocognition Lab, Tufts University, Medford, MA, USA
3 Laboratoire de Psychologie Cognitive, CNRS and Aix-Marseille Université, France

The present experiment examined the contribution of orthography in spoken word processing using a primed auditory lexical decision task. In a first condition, primes and targets only shared onset phonology but not orthography (e.g., DEBT-DEAF). In a second condition, primes and targets shared both onset phonology and orthography (e.g., DEAD-DEAF). In a third condition, primes and targets were unrelated. Behavioural data showed two distinct response patterns among participants. For one group of participants, the phonological overlap between primes and targets lead to RT facilitation without any effects of orthography. For the other group, phonological overlap between primes and targets lead to RT inhibition in combination with a facilitatory effect of orthographic overlap. In line with the phonological priming literature, the phonological inhibition found when primes and targets share the onset is interpreted to reflect competition between lexical candidates during the recognition process. In this context, orthography facilitation is taken to reflect the involvement of orthographic information to reduce the cohort of lexical candidates. In sum, these results show that orthography could be involved in auditory word recognition and could help the recognition process.
TypingSuite: a Java-based software package for psycholinguistic and computational studies of typing data

Mazerolle, E. ¹ & Marchand, Y. ¹, ²

¹ Department of Psychology. Dalhousie University. Halifax, Canada.
² Faculty of Computer Science. Dalhousie University. Halifax, Canada.

Research into typing patterns has broad applications in both psycholinguistics and biometrics (i.e., improving password security via each user’s unique typing patterns). We present a new software package, TypingSuite, which can be used for presenting visual and auditory stimuli, collecting typing data, and summarizing and analyzing the data. TypingSuite is an easy to use Java-based software package that is platform-independent and open-source. To validate TypingSuite as a beneficial tool for researchers interested in keystroke dynamics, we conducted a two-fold study with ten participants. First, a behavioral experiment based on single word typing replicated two well-known findings in typing research, namely the lexicality and the frequency effects. Our results confirmed indeed that TypingSuite could be used to demonstrate that words are typed faster than pseudowords, and that high frequency words are typed faster than low frequency words. The second aspect of the study focused to biometrics and showed that it is possible, using an existing computational approach based on creating user profiles using a pattern classification algorithm on trigraph latency data (i.e., duration of three keystrokes) to distinguish individual typing patterns. Finally, TypingSuite allows quickly implementing an experiment and collecting and analyzing data within a single software package. Due to its simplicity and practicality, we believe that it could also be an excellent choice as an educational tool (e.g., for undergraduate courses in experimental methods).
Seeing for speaking: gaze movement and language production when talking about events

Flecken, M.¹, Andermann, M.² & Stutterheim, C.¹

¹ Seminar für Deutsch als Fremdsprachenphilologie. University of Heidelberg. Heidelberg. Germany
² Department of neurology. University of Heidelberg. Heidelberg. Germany

This study deals with the interrelation between patterns in gaze movement when watching dynamic video clips and what is mentioned at what point, when talking about events. Studies on this interrelation, and the factors that drive it, have centred on the production of single words when relating to events in still pictures, showing that speakers tend to fixate the entity to which they are relating (Meyer & Dobel, 2003). There are few studies, however, on gaze movement and patterns of mention in relation to the production of full length event descriptions, based on dynamic stimuli (e.g. Papafragou et al, 2008). This interrelation was investigated in the present study with respect to dynamic, live-recorded video clips, depicting everyday causative events, in which an agent is in the process of making a specific object (e.g. knitting a scarf). Speakers of Dutch, English and German were asked to view the clips and tell what is happening. Subjects’ gaze movement patterns were recorded before and during verbalization, and attention distribution to different aspects of the clips was measured, time-locked to speech onset, in two identified areas of interest: the area where the agent is located and the area in which the entity acted upon is located. Contrary to studies on the production of single words, or clauses relating to pictures, gaze movement to the areas of interest and the time at which they are mentioned are not directly linked, given real time presentations. Factors that drive attention and mention over time cross-linguistically will be presented. Findings show how language-specific factors involving grammatical determinants, such as aspectual morphology and the temporal concepts encoded (event viewed aspectually as ‘in progression’ or not), lead to different patterns of attention/mention over time.
Production of one word vs two word noun phrases: how much is phonologically encoded before articulation?

Michel Lange, V. & Laganaro, M.

University of Geneva

How much of the sentence to be produced is encoded phonologically before one starts articulation? Some authors (Levelt, 1989) assume that one phonological word is the unit of encoding. Others argue that one can encode more than one phonological word before articulating (Schnur et al, 2006, Oppermann et al, 2010). In this study, we compared the production of single words (W1) to two word (2W) noun-phrases. If speakers encode 1W at a time, one should expect similar production latencies (RTs) for 1W vs 2W noun phrases (NPs). Furthermore, we investigated whether syntax modulates this issue. If so, two different word order in 2W NPs should lead to different RTs. Experiment 1 was a picture naming task with three conditions: Noun, Adjective+Noun, Noun+Adjective with same nouns in all conditions. The frequency of the sequences was matched across 2W conditions. RTs were shorter for A+N than N+A, both being longer than N. Experiment 2 used the same stimuli in a reading task and showed similar results thus ruling out the hypothesis that shorter RTs for A+N was due to mapping from visual to lexical-semantic levels. As the difference between A+N and N+A may be linked to higher lexical frequency of the adjectives in A+N vs N+A, we ran two new experiments (Experiment 3: picture naming and 4: reading) in which adjectives’ frequency was also matched across conditions. We replicated the results for both experiments (N<A+N< N+A). Overall, these results show that encoding 1W differs from encoding 2W suggesting that more than 1W is encoded when producing a 2W NP. Crucially, longer RTS for N+A vs A+N suggest that speed of encoding processes is not independent of syntax. As same results were observed in picture naming and reading, we suggest that these results are accounted for by the level of phonological encoding.
On the flexibility of speech planning: Effects of working memory on fundamental frequency production

Petrone, C., Fuchs, S. & Krivokapic, J.
Zentrum für Allgemeine Sprachwissenschaft, Berlin, GE; Yale University, New Haven, USA

A controversial issue in psycholinguistic research is how far ahead do speakers plan the upcoming sentence. Evidence from different kind of studies has shown indication of various levels of planning, ranging from prosodic word to the phrasal level. Since these works have offered mixed results, it has been hypothesized that the size of the planning unit is flexible, depending on both cognitive constraints and on the demands of the speaking situation. Moreover, phonetic studies discuss fundamental frequency (f0) as a potential parameter for planning, since some speakers start with higher f0 when the utterance is longer. This suggests that the f0 contour can be planned at a global level and that f0 planning is an optional mechanism. In this study, we tested whether differences in utterance-initial f0 values depend on individual differences in working memory (WM) capacities. A prediction would be that the scope of planning is narrower in speakers with low WM span than in speakers with high WM span. As a consequence, speakers with higher WM span will start higher when producing longer utterances, since they are able to plan larger prosodic constituents. A read speech corpus from 24 German speakers was recorded at ZAS, in Berlin. The corpus consisted of Subject-Verb-Object sentences in which the length of the constituents was modified. The target sentence was preceded by a context sentence, so that the speakers were induced to produce a pause between them. Speakers also performed a WM span task. Preliminary results show that longer Subject constituents led to a significant rising of the utterance initial f0 values. Moreover, f0 rising appears to be positively correlated with individual working memory capacities. This reconciles the contradictory results reported in the literature, the presence vs. absence of f0 rising depending on speaker-specific differences in the size of the planning unit.
Meaning enrichment and weak definites in Dutch

Schulpen, M. & Aguilar-Guevara, A.

UiL-OTS, Utrecht University, The Netherlands

Sentences containing weak definites typically carry more information than what is conveyed by the straightforward composition of their constituents (e.g. Mary went to the store = Mary went to a store + Mary did some shopping). We show that this meaning enrichment is part of the asserted meaning of sentences rather than an implicature or a presupposition. We support this claim with the findings of a series of studies. Experiment1 tests sloppy readings for weak and regular definites and their modified counterparts in VP-ellipsis constructions in order to find the most contrasting set of weak and regular definites in Dutch and the adjectives that best block weak readings of definites. Experiment2 and Experiment3 identify the most prototypical activities that speakers associate with the nouns used in Experiment 1, which refer to locations, and with another set of nouns that refer to agents. Experiment4 tests the participants’ interpretation of sentences describing an agent going to a location referred to by a weak definite (1), a regular definite (2) or their modified counterparts: (1) De postbode ging naar de (grote) supermarkt. (The mailman went to the (big) supermarket). (2) De postbode ging naar het (grote) kasteel. (The mailman went to the (big) castle). Participants choose from two pictures the one best matching their interpretation of the corresponding sentence and grade how confident they are on their answer. One of the pictures depicts an ‘agent reason’ for going to the location (e.g. to deliver a package), whereas the other shows a ‘location reason’ (e.g. to do some shopping). We predict that if meaning enrichment is part of the asserted meaning of sentences with weak definites, these will trigger more preference for the latter kind of picture than sentences with regular and modified definites.
Task effects in event related potentials for semantics and gender in French

Gascon, A.¹, Lebel, V.¹, Royle, P.¹,², Drury, J. E.³ & Steinhauser, K.²,⁴

¹ Université de Montréal
² Centre for Research on Language Mind and Brain
³ Stony Brook, NYU
⁴ McGill University

We present a study using event-related potentials (ERPs) for gender, and semantic processing in French. We created mismatches between spoken sentences and picture stimuli (1) to elicit ERPs. A number of components were expected in the different conditions. Picture: White fish in box 1.a “Il y a un CRAYON blanc dans la boîte” ‘there is a white crayon in the box’; Mismatch: Semantic; Expected ERP: N400. 1.b Sentence: “… UN poisson blanc …” ‘… a.f fish white.m’; Mismatch: Determiner gender; Expected ERPs: AN + P600. 1.c “… un poisson BLANCHE …” ‘a.m fish white.f’; Mismatch: Adjective gender; Expected ERPs: AN + P600. In preparation of a study with children, we investigated whether these ERPs arise in adults contrasting Task (grammaticality judgment) versus No-Task conditions. We expected task effects to modulate ERP components in different ways. Earlier components (e.g., Anterior Negativities, AN) were not expected to vary, while later, presumably less automatic, signatures (N400, P600) were expected to vary according to Task. Thirteen right-handed adult French-speakers with no history of neurological impairment took part in the study. Six performed the task. Results: Expected components were elicited in all conditions (see 2). The semantic N400 and the adjective violation AN were not modulated by Task, while the P600s were consistently larger in the Task group for all agreement errors. In addition, the negativity preceding the P600 in the determiner agreement condition varied in scalp distribution. This shows that these designs can be used in studies where no task can be deployed (e.g. children) since expected components arise in the No-Task condition. 2.a Semantic: Task: N400; No-Task: N400; no Task effect. 2.b Determiner gender: Task: Negativity + P600; No-Task: AN + P600; Task effects: Negativity topography + P600 amplitude. 2.c Adjective gender: Task: AN + P600; No-Task: AN + P600; Task effect: P600 amplitude.
Semantic integration of oxymora and pleonasms: Evidence from ERPs

Molinaro, N.¹, Carreiras, M.¹, ² & Duñabeitia, J. A.¹

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
² IKERBASQUE, Basque foundation for Science. Bilbao, Spain

Oxymora are figures of speech in which two words whose meaning is paradoxical are merged. The most common form of oxymoron involves adjective-noun combinations (e.g. cold fire or real dream). While oxymora are literally paradoxical, pleonasms are noun-adjective pairs in which similar meanings are redundantly expressed (burning fire). In this study we evaluate novel meanings comprehension processes focusing on the electrophysiological correlates of noun-adjective on-line semantic integration. In a first ERP experiment 20 participants were visually presented with word by word Spanish sentences containing noun-adjectives Oxymora (Estaba completamente confusa por el sueño real de la noche anterior. - I was completely confused by the real dream from last night), compared to literally Neuter sentences (funny dream) and semantic Violations (!expert dream). The Violation condition elicited an enhanced N400 compared to the other two conditions, that did not differ between them around 400 ms. The Oxymoron condition elicited a larger frontal positive effect (500-900 ms) compared to the other conditions. In a second experiment 20 Spanish speakers read sentences containing Pleonasms (unreal dream; plus Neuter and Violation). While Pleonasms and Neuter sentences did not differ around 400 ms the Violation caused a N400 effect. The Pleonasm elicited a short-living (500-650 ms) increased frontal positive component compared to the other conditions. The two experiments suggest that understanding oxymora requires more than the simple activation and combination of semantic features (mirrored in the N400). Only after this initial semantic analysis, related concepts are integrated in activating novel meanings: while pleonasms trigger short-living late positivities, oxymora trigger long-lasting positivities.
An investigation of the neural correlates of forming novel semantic relations

Mashal, N.¹ & Subramaniam, K.²

¹ School of Education. Bar-Ilan University. Ramat-Gan, Israel
² Department of Psychiatry. University of California. San Francisco, USA

Previous studies have shown that understanding novel and conventional metaphoric expressions relies on dissociable brain mechanisms. This is not surprising given that the cognitive processes associated with comprehending novel and conventional metaphors are distinct: understanding conventional metaphors requires meaning retrieval whereas understanding novel metaphors require the formation of distant semantic relations between the words. A well-established way to study the distinct cognitive processes is to repeatedly present the same stimulus. The repeated exposure to a stimulus has been found to be associated with a reduced neural response, called repetition suppression. However, recent findings have also shown that presenting the same stimulus induces enhanced activation in other brain regions called repetition/semantic enhancement. The aim of the current study is to compare the neural correlates associated with the formation of novel semantic meanings with those observed during meaning retrieval of repeated stimuli in order to investigate which brain regions show repetition suppression. In an fMRI study, 11 subjects read novel and conventional two-word metaphoric expressions and decided whether the expression is meaningful or meaningless. Prior to the study, participants were presented with half of the conventional and half of the novel metaphoric expressions. We found repetition enhancement (for both novel and conventional metaphoric expressions) in the precuneus, left middle temporal gyrus, and left middle frontal gyrus, indicating that these regions were associated with recognition of the previously presented items. More importantly, we found that repeated exposure to novel metaphoric expressions resulted in enhanced brain activation in right supramarginal gyrus and, at the same time, this region demonstrated reduced brain activation for repeatedly presented conventional metaphors. These findings suggest that the right supramarginal area is involved in the formation and the storage of novel semantic relations. This study is important to develop theoretical accounts of the formation of novel conceptual knowledge.
False recognition in 24 DRM lists with three critical words: A normative study

Cadavid, S. & Beato, M. S.

Departamento de Psicología Básica, Psicobiología y Metodología. Universidad de Salamanca. Salamanca, España.

A normative study was conducted using the Deese-Roediger-McDermott paradigm (DRM) to obtain false recognition for twenty-four 6-word lists in Spanish, designed with an original methodology. Lists included words (e.g., regiment, legion, battalion, officer, march, navy) simultaneously associated with 3 non-presented items, called critical words (e.g., ARMY, MILITARY, SOLDIER). Since previous research has shown that Backward Association Strength (BAS) seems to be closely related to the production of false memories, the lists were drawn up based on the BAS values between the words on the list and the critical words. In the present study, the associative strength of the lists were considered as the sum of BAS values for the three critical words. In particular, BAS values ranged between 0.561 and 1.595. Results showed, first, that all lists produced false recognition. And second, the 24 lists presented a high variability in producing the phenomenon. Specifically, the high false recognition rate found in some lists is an aspect of special interest for DRM experiments that record brain electrical activity. This type of lists will enable to raise the Signal-to-Noise ratio (S/N) in false recognition event-related potential (ERP) studies as they increase the number of critical trials per list, and will be especially useful for the design of future research. The results are discussed in terms of the activation/monitoring framework, which derives from spreading activation models. According to this framework, on the one hand, presentation of the word lists may arouse an implicit associative response of critical words. Thus, spreading activation through associative-semantic networks may be responsible, in part, for the false memory effect. On the other hand, monitoring processes allow us to determine whether each word that comes to mind was actually studied. When monitoring effectiveness is poor and a source-monitoring error occurs, there is a greater probability of false memories increasing.
Couch potatoes don’t learn languages. Foreign language acquisition as an embodied experience

Sánchez Gutiérrez, C. H.

Universidad de Salamanca

It is generally accepted that learning a language in context is the most similar process to the acquisition of the mother tongue. From a memory viewpoint, the embodiment theory is getting more and more accepted, suggesting that the meaning we give to the objects and realities that surround us is not based on arbitrary linguistic conventions but on our body experience with those. Assembling both assumptions, the question is to know what part of the immersion experience is the one that favors L2 students in order to develop native-like strategies in a second language. In a lexical decision task we presented a series of Spanish low-frequency words to Spanish subjects who were living in New York by the time of the experiment. We also designed a questionnaire on the linguistic habits of the participants in both Spanish (L1) and English (L2 in context). The results of a correlation analysis showed that the best predictor of response latencies was the number of daily hours he or she had spent actively speaking English, as opposed to the number of hours he or she had been passively exposed to the language (radio, television, etc.) or the number of years the subject had spent in the US. This result points to an understanding of foreign language acquisition that is not based on formal learning but on the physical and emotional interaction we have with the surrounding context the language refers to.
Predictors of literacy skills and developmental dyslexia in an epidemiological Spanish sample

Juan L., L.¹, Soraya, B.¹, Marisol, C.², Jesús, A.³, Miguel, L.¹, Victoria, R.¹ & Almudena, G.¹

¹ Facultad de Psicología, Universidad de Málaga; Málaga, Spain
² Facultad de Educación, Universidad de Murcia, Murcia, Spain
³ Universidad Libre de Bruselas

Phonological processing deficits have been pointed out as the main cause of developmental dyslexia (Snowling, 2000). This deficit affects three basic components: phonological awareness, verbal short-term memory and rapid naming (Wagner and Torgesen, 1987). There are some cross-linguistics differences depending on the degree of consistency of orthographic systems (Ramus et al., In press, Ziegler et al., 2010). Such differences have important implications for the diagnosis of dyslexia in a specific language. This study investigates the relationship between phoneme awareness, rapid naming, verbal short-term memory and literacy skills in control and dyslexic Spanish children. From an epidemiological sample of 1186 students belonging to 14 schools of the Málaga province, a representative sample was selected. A group of 102 dyslexics were identified and a control group of 109 normoreaders, from two schools levels (7 & 9 yrs). Analysis of variance was applied to assess differences between dyslexics and control readers in the skills assessed, and regression analysis to establish the diagnostic value of the three phonological processes. The dyslexics shown difficulties in the three phonological processes evaluated. The phonological awareness tasks were shown as the most predictive, followed by short-term verbal memory and finally the naming speed measures. The latter have shown a stronger relationship with measures of speed than the accuracy ones. Moreover, the predictive capacity of the phonological tests decreases with the increase of the school year in dyslexics, being also lower than the prediction of reading ability differences between normally achieving readers. Although with some specific language differences, the findings are largely consistent with the literature on predictors of dyslexia and literacy skills, so the applied set of tests could be useful tools to the diagnosis of dyslexia.
Strong inhibitory effect of positional syllable frequency (PSF) in dyslexic Spanish children

Juan L., L.1, M, L.1, Carlos, A.2, Almudena, G.1 & Sergio, V.1

1 Facultad de Psicología, Universidad de Málaga; Málaga, Spain
2 Universidad de La Laguna

The deficit of the dyslexic reader is shown unambiguously in error and times measures during the reading of pseudowords. Thus, it is an implicit assumption that deficit is basically located at decoding phase. However, the inhibitory effect of PSF might show up a complementary view. This effect consists on words composed of frequent syllables produce longer reaction times and more errors than words with less frequent syllables (Carreiras, Álvarez, & de Vega, 1993). The high-frequency syllables are shared by more words so extra-time is needed to deactivate the lexical neighbors. Therefore, a lexical decision task containing a classical FSP paradigm implies two processes at least, the activation (decoding phase) and the inhibition of lexical candidates. If this is true, then dyslexic readers must show a stronger inhibitory effect than normal readers because they are slower decoders but they could also be slower inhibitors. Dyslexics and control readers from two reading levels (7 & 9 yrs) received a lexical decision task, containing a classical FSP paradigm (high/low lexical frequency words by high/low syllable frequency words). First, the interaction between lexical frequency and syllable frequency factors were significant, and on low-frequency words condition a strong inhibitory effect was found. This result is common in adult samples but it has been never reported for these school levels. More interesting, while the third order interaction between lexical frequency by syllable frequency by reading level did not reach the significance, these two factors by group factor (dyslexics/controls) was statistically significant. The inhibitory effect showed that dyslexics deficits are no restricted to the grapheme-phoneme conversion phase, but it is a wider phonological deficit as current theories have pointed out.
Exploring categorical perception deficit in Spanish dyslexics children

Juan L., L.¹, Willy, S.², Miguel, L.¹, Soraya, B.¹, Almudena, G.¹, Victoria, R.¹
& Sergio, V.¹

¹ Facultad de Psicología, Universidad de Málaga; Málaga, Spain
² Universidad René Descartes, París, Francia

Previous studies have shown that children suffering from developmental dyslexia have a deficit in categorical perception of speech sounds (Maassen et al., 2001; Serniclaes et al., 2001; Serniclaes et al., 2004; Werker & Tees, 1987). However, the potential theoretical value of the CP deficit only became apparent much more recently when it was shown that dyslexics not only have weaker discrimination between categories but also better discrimination within categories (Serniclaes, Sprenger-Charolles, Carré, & Démonet, 2001). The CP deficit would thus reveal an allophonic mode of speech perception, characterized by the use of allophones rather than phonemes. This type of perception could get straightforward consequences during the establishment of grapheme – phoneme correspondences. In this study we explored the categorical perception deficit in a Spanish sample (102 dyslexics and a control group of 109 from two schools levels, 7 & 9 yrs). Children identified and discriminated /ba–pa/, /de–te/ and /di–ti/ syllables, along a voice onset time (VOT) continuum. Several kind of categorical perception indexes were calculated. Main results were the following. All the continua showed the classical perception deficit, however the magnitude of the effect was stronger on the the /de-te/ stimuli. In general, Spanish children with dyslexia discriminated among phonemically contrastive pairs less accurately than did chronological age and reading level controls and also showed higher sensitivity in the discrimination of allophonic contrasts, but the latter not reached significant differences. These results are consistent with other studies, suggesting that children with dyslexia perceive speech in a less categorical way.
We present and interpret some results obtained from a cross-linguistic case study of agrammatism in Basque and French. From such database, we assess the validity of current hypotheses developed in the context of aphasiology on the nature of agrammatism and verb processing in particular. Like Thompson (2003) in the “Argument Structure Complexity Hypothesis”, we document in agrammatic verb processing, the existence of an influence of argument structure complexity according to the number of arguments of the verb (Basque data are particularly clear on this point). However, we do not observe an increasing specific difficulty in lexical verb production but rather in morphosyntactic implementation only. Functional parts (or projections) of the verb appear specifically impaired and inflectional errors seem to increase according to the verb argument structure complexity. What kind of underlying deficit might be put forward: a structural and/or a procedural one? A deficit in verb class access or a deficit in verb processing? In order to answer this question, we claim that whether we consider that words are inflected where they are stored or not is crucial to locating and determining the nature of the underlying problem. We treat this question from a neuropsycholinguistic (interdisciplinary) point of view, that is, by confronting studies at the crossroads of linguistics and psycholinguistics, within the context of a hopefully coherent model of language structure and processing. In summary, the structural and functional architecture of language is essential in order to determine the nature of language breakdowns; likewise, the study of aphasia and of agrammatism, in this particular case, is liable to provide “external evidence” for theoretical models of language.
Unaccusativity in agrammatic Broca’s aphasia: evidence from Spanish

Martínez-Ferreiro, S. 1, Sánchez Alonso, S. 2 & Bachrach, A. 3

1 Universitat Pompeu Fabra, Barcelona, Spain
2 University of Groningen, Groningen, The Netherlands
3 umr 7023, CNRS

The present contribution provides evidence for the complexity of unaccusative verb argument structure in Spanish agrammaticism by means of two experimental tasks: elicited production of verbs with alternating transitivity (Sánchez Alonso 2010) and a battery of unaccusative production and comprehension measures (adapted from McCallister 2007). The aim is twofold: a) to deepen our understanding of the source of difficulties and b) to determine the role of the clitic pronoun se in unaccusative constructions.

Cross-linguistic research on language pathologies has shown that the production of unaccusative verbs is problematic for agrammatic subjects (Bastiaanse & Van Zonneveld 2005; McCallister 2007; Dragoy & Bastiaanse 2010; a.o.). The difficulty that unaccusative verbs pose for this population has been explained by the number and type of arguments associated with the verb (ASCH - Thompson 2003) and by the role played by syntactic movement in determining patterns of impaired production and comprehension (DOP-H - Bastiaanse and van Zonneveld 2005; McCallister 2007). Our results show that moved constituents play a crucial role in patients’ performance. Additionally, Spanish data present one critical difference with respect to already documented languages: the use of se, a morphological marker of unaccusativity. Difficulties with clitic production have been widely documented in the literature from agrammatism (Avrutin 1999; Stavrakaki and Kouvava 2003; Chinellatto 2004; a.o.). Consequently, data may also enlighten the comprehension of these deficits. Since dissociation among clitic types have been attested in the results from different tests (Rossi 2007; Martínez-Ferreiro 2010), reflexives and transitive sentences with DO clitics are also analyzed in the first task. The present data supported the previous dissociation among clitics and raised questions about the role of the pronoun se in the processing of unaccusative sentences. These tasks constitute the first effort towards a characterization of the degree of impairment of argument structure in Spanish agrammaticism.
Ambiguous relative clauses... here we go again: Bringing to light the genuine effect of emotional valence

Piñeiro, A.¹, Ledo, A.¹, Díaz, M.¹, García Orza, J.² & Fraga, I.¹

¹ Universidade de Santiago de Compostela
² Universidad de Málaga

Previous studies have shown that arousal plays a clear role in Spanish when participants have to complete ambiguous sentences with the structure ‘NP-de-NP + RC...’ (e.g., Los vecinos intentaron detener la guerra de la calle que...), if one of the two antecedents is an emotional word (Fraga, Piñeiro, Redondo & Acuña-Fariña, 2008). In short, high arousal nouns tend to attract the RC significantly wherever they are (NP1 vs. NP2). The main aims of this piece of research were, firstly, to clarify to what extent affective valence influences the process of disambiguation in the sentence completion task when such words are neutral in terms of arousal, and secondly, to determine whether there are any differences between positive and negative high arousal words in their ability to attract the RC which participants have to complete. Two sentence completion studies were carried out. In the first one, there were five experimental conditions, two of them being of special interest for our goals, since they included a NP1 that was either positive or negative and a NP2 with a non emotional noun (i.e, neutral in terms of both valence and arousal). In the second study there were three experimental conditions in all of which the arousal level of the words was kept constant (neutral). Results showed that, although both pleasant and unpleasant words in NP1 attracted the RC, participants preferred to complete sentences following the high-attachment strategy when faced with pleasant nouns significantly more than when they were faced with unpleasant ones. Furthermore, in the absence of high arousal words, pleasant nouns in comparison to neutral ones were preferred as subjects of the RC independently of their being either in the NP1 or in the NP2. That is, when NP2 contains a positive word participants change their preference towards a late closure strategy.
Recursion in the syntax of language and music: A comparative study

Mota, S. & Igoa, J. M.

Universidad Autónoma de Madrid

Recursion is a highly relevant combinatorial property exhibited by a number of sign systems, such as language and music, which also share another outstanding combinatorial property, namely discrete infinity. Given the close relationship between language and music as cognitive faculties (cf. Igoa, 2010), the aim of this work is to discuss how recursion is used and understood in these two domains of inquiry, and more specifically how it is applied to the structure of language and music. To this end, we first distinguish different notions of recursion, as originating in the formal sciences (mathematical logic), and later applied to the study of language and other domains within biology and psychology, and emphasize the difference between recursion as a property of the structural description of formal objects, and recursion as a kind of formal operation (and eventually a computational process of the human mind). Next, we report a series of syntactic analyses of linguistic and musical materials: a sample of well-formed sentences, whose analysis was based on Chomsky’s (1955/1975, 1965) generative grammar formalisms, and a selected sample of musical excerpts, whose analysis was inspired on Lerdahl and Jackendoff’s (1983) generative theory of tonal music. Our analyses yielded a number of structural commonalities as well as some differences stemming from combinatorial properties particular to each domain. As regards the commonalities, both language and music were found to share a similar form of grammar and syntactic structure that is deployed in the time dimension. In addition to this “horizontal”, time dimension recursion, music also shows recursion in a “vertical”, harmonic dimension.
The acquisition of culturally dependent scripts by Russian learners of Spanish as a second language

Nuzhdin, G. \(^1\) & Igoa, J. M. \(^2\)

\(^1\) Moscow State University, Russia  
\(^2\) Universidad Autónoma de Madrid, Spain

We have studied the acquisition of emotion words by adult native Russian learners of Spanish. In a series of free and semi-directed production experiments, we show that learners can easily acquire the emotion words that are shared across L1 and L2, which they overgeneralize, but despite many years of studying Spanish as L2, they cannot handle correctly certain L2 emotion words that are absent in Russian. Moreover, the same situations are interpreted in a different fashion by native Spanish speakers and Russian learners of Spanish. This leads us to think of emotion words in terms of elements issuing from emotion scripts: when a learner acquires an emotion word, he or she usually transfers a whole script from L1 to L2. In a series of semantic and associative priming experiments with emotion words we show that, for both native speakers and Russian learners of Spanish, there is a facilitation effect for associated words in two SOA conditions (60 and 150 msec.). However, in the SOA=150 msec. condition, there is a huge semantic inhibition in the groups of Russian learners of Spanish. We argue that these results reflect the learners’ search for scripts, a process which recruits additional neural resources.
The contribution of the abstract-concrete distinction to the study of novel metaphors

Cavanas, E. & Igoa, J. M.

Universidad Autónoma de Madrid, Spain

The purpose of this study was to investigate the role of abstract and concrete metaphor topics and vehicles in the interpretation of novel nominal metaphors of the form A is B. The study was designed with three major aims in mind: (1) to find out whether the abstract or concrete nature of the concepts is per se a critical variable in the interpretation of novel metaphors; (2) to test whether metaphors are generally understood by virtue of a single mechanism or procedure, be it structural alignment or categorization, as contemporary models of metaphor processing claim; and (3) to examine the effects of the symmetry between topic and vehicle of metaphors, in terms of their abstractness or concreteness, on the interpretation of metaphorical statements. We report the results of two offline questionnaire studies and one online cross-modal priming experiment designed to shed some light on these issues. The same set of materials was used in all three experiments: a list of 72 novel metaphors created by combining an abstract or concrete topic with an abstract or concrete vehicle, thereby yielding four experimental conditions. In the first questionnaire study, participants were asked to provide paraphrases of the metaphors, which were subsequently rated by two independent judges. In the second questionnaire study, participants independently rated the likelihood of two interpretations for each metaphor: a structural alignment, and a class-inclusion reading. Finally, in the cross-modal priming experiment, they performed a lexical decision task to words related to either of the two interpretations of each metaphor. The results suggest that concreteness does not play a crucial role in the interpretation of novel metaphors, and more importantly, that the prevalence of structural alignment or class-inclusion in the interpretation of metaphorical statements is sensitive to the symmetry of topic and vehicle in terms of abstractness or concreteness.
The influence of native language on lexical access revisited: Ruling out a cognate effect

Barrios, S.

Cognitive Neuroscience of Language Laboratory/Dept of Linguistics, University of Maryland, College Park, USA

Pallier et al (2001) demonstrated that Spanish-dominant bilinguals, unlike Catalan-dominant bilinguals, process minimal pairs containing Catalan-specific contrasts (e.g. /netə/ vs. /netə/) as homophones. They argue that [1] the conflation of phonological categories causes the lack of sensitivity reported in previous phonetic perception experiments (Pallier et al, 1997), as well as homophonous L2 lexical representations. However, there is an alternative explanation for their findings. [2] Due to similarities in rhythmic class and the prevalence of cognates, Catalan input may strongly activate Spanish lexical representations. Thus, Catalan candidates will rarely be selected over native Spanish ones. We report the results of two experiments testing hypothesis [1] while controlling for [2]. Experiment 1 was an AX discrimination task examining the phonetic discrimination abilities of 28 English monolinguals and 28 Spanish-dominant bilinguals, to minimal pairs containing common (i.e. /o-u/) and English-specific (i.e. /ææ/ and /i-i/) vowel contrasts. Experiment 2 employed Pallier et al’s repetition priming paradigm to investigate word recognition processes in the same participants, and using the same stimuli set. Experiment 1 showed significant effects of Group and Condition (p<.05), as well as a Group x Condition interaction (p<.05), suggesting Spanish-dominant bilinguals lack sensitivity to difficult English-specific vowel contrasts. In Experiment 2, the effects of Group and Condition were also significant (p<.05). Planned comparisons revealed no difference in the facilitation effects observed for English-specific minimal pair repetitions when compared to exact repetitions for Spanish-dominant bilinguals only, suggesting Spanish-dominant bilinguals have shared lexical representations for word pairs distinguished by English-specific contrasts. These results replicate previous reports that bilinguals lack sensitivity to non-native contrasts and that bilinguals represent minimal pairs containing difficult non-native contrasts as homophones. Furthermore, by replicating these findings with bilinguals whose L1 and L2 are more distinct, we can be confident that the results reported by Pallier et al are not due to difficulty bilinguals’ may experience as a result of spurious activation of L1 lexical items.
Conceptual transfer in Basque L2 language acquisition

Ibarretxe-Antuñano, I. & Hijazo-Gascón, A.

Dept. of General and Hispanic Linguistics. University of Zaragoza. Zaragoza. Spain

The relationship between L1 and L2 languages and how the L1 can have an influence on the L2 is one of the most studied phenomena in L2 acquisition. Traditionally, transfers (Ellis 1994, Kellerman 1995, Odlin 1989) were mainly analysed in relation to lexis and grammar. More recently, L2 researchers are studying conceptual transfer (Jarvis/Pavlenko 2008) in cases where, although there are no grammatical errors per se, the L1 influence onto the L2 is clear, for example, the rhetorical style, that is, the typical and characteristic linguistic constructions used in the native speakers’ discourse narration. A great deal of this work has been carried out in the domain of motion events (Brown/Gullberg 2008, 2010; Cadierno 2004, 2010; Filipović/Vidaković 2010). Stemming from Talmy’s distinction between satellite-framed (English run-out) and verb-framed languages (French sortir-en-courant), researchers have shown that L2 speakers, regardless of their proficiency level, transfer to some degree the rhetorical style of their L1 onto the L2. This paper picks up this topic and discusses how proficient Basque L2 speakers whose L1 is Spanish talk about motion in Basque. Both Spanish and Basque are verb-framed languages, but they behave differently with respect to the characterisation of trajectories (Path). Basque speakers tend to elaborate Path in much more detail than Spanish speakers do (Ibarretxe-Antuñano 2004). They usually add to the main motion verb several extra pieces of information (e.g. amildegitik-behera-erori zian-ibai-batera (cliff.abl.loc below.all fall aux river one.all)). The main hypothesis is that Basque L2 speakers lack this complex and rich description of the Path component, and that these differences between native and L2 speakers directly affect the rhetorical style of these narratives. Data—elicited using the Frog Story methodology (Berman and Slobin 1994, Strömqvist and Verhoeven 2004)—come from three groups of 12 adult speakers each (L2 Basque—C1/ALTE5, L1 Basque, L1 Spanish).
The influence of first language on the processing of wh-movement in L2 English: Evidence from Spanish-English late bilinguals

Cele, F.¹,²

¹ Bogaziçi University
² Kadir Has University

The effects of first language (L1) transfer have been extensively examined in offline second language (L2) research (e.g., Schwartz & Sprouse, 1996; White, 2003; Lardiere, 2007) and, to a lesser extent in online L2 research (e.g., Juffs, 2005). This study examines L1 influence in the online processing of wh-movement in English by native (n=30) and two L2 groups (L1 Turkish; n=30; L1 Spanish; n=25). Spanish and English have overt wh-movement in wh-questions and obey the subjacency principle, but they differ with respect to the that-trace effect in subject extraction from embedded clauses. In Spanish, it is possible to extract a subject from an embedded clause when there is a trace in the subject position, whereas English does not allow a wh-trace in the same position to follow an overt complementizer. Unlike Spanish and English, Turkish is a wh-in-situ language, where the that-trace effect is not observed. Participants were tested on an online grammaticality judgment task, involving grammatical and ungrammatical wh-extractions presented in full-sentence and moving window conditions. Results show that Spanish speakers are significantly less accurate \( F(2, 82) = 30.22; p<.01 \), \( F(4, 328) = 122.27; p<.01 \) and slower \( F(2, 76) = 14.80; p<.01 \), \( F(4, 304) = 35.03; p<.01 \) than the native English speakers and Turkish speakers on wh-questions with that-trace violations. The self-paced reading times reveal that the locus of the processing difficulty in this type is the embedded verb following the complementizer. Moreover, analyses of RTs from the error data indicate that the Spanish participants who incorrectly accept this type were faster on the embedded verb than those who correctly accept them. These findings suggest, unlike Turkish speakers, Spanish speakers’ failure in rejecting ungrammatical wh-extractions with that-trace violations can be due to L1 influence of Spanish which allows subject extractions from embedded clauses in the presence of the complementizer.
Investigating the control mechanisms underlying speakers’ choice of register

Melinger, A.

School of Psychology, University of Dundee, Dundee, UK

Bilinguals face the extraordinary challenge of keeping their two languages separate when speaking. Another population that likewise needs to control lexical selection processes across two lexica are speakers of distinct regional dialects. Recent research has identified initial similarities in how bilinguals and bi-dialectal speakers control the selection of the appropriate language/dialect. Here, we investigate the scope of these parallels. Studies using the language switching paradigm to investigate language control mechanisms find that less proficient bilinguals produce asymmetric switching costs, i.e., switching into their L1 incurs greater costs than switching into their L2, whereas highly proficient bilinguals produce symmetrical switching costs, even when switching into a third, less proficient language (e.g., Meuter & Allport, 1999; Costa & Santesteban, 2004). While asymmetrical switching costs can be explained by inhibiting the non-target lexicon proportional to its level of activation, the symmetrical switching costs displayed by bilinguals implicate a wholly different control mechanism. In past work, bi-dialectal Scottish participants also displayed symmetrical switching costs when switching between their 2 dialects while mono-dialectal English participants who learned the Scottish words displayed asymmetrical switching costs (Melinger & Kalucka, 2009). Here, we test whether this initial result is best explained by a proportional inhibition account or by language-general differences in the control mechanism. We conducted two register switching experiments using Scottish (Exp 1) and English (Exp 2) participants. Speakers named pictures alternatively in either a formal register or an informal register, e.g., pound - quid, toilet - loo, cigarette - fag. Results revealed that Scottish speakers produced symmetrical switching costs while English speakers produced asymmetrical switching costs despite both groups having similar familiarity with the two registers. This result is inconsistent with a proportional inhibition account and suggests that bi-dialectal Scots may develop a unique mechanism to control the selection of the appropriate lexical subsection.
Dominance of translation and semantic relatedness effects in translation priming

Boada, R.\textsuperscript{1,2}, Sánchez-Casas, R.\textsuperscript{1,2}, Ferré, P.\textsuperscript{1,2}, Guasch, M.\textsuperscript{1,2} & García-Albea, J. E.\textsuperscript{1,2}

\textsuperscript{1} Departament de Psicologia. Universitat Rovira i Virgili. Tarragona, Spain.
\textsuperscript{2} CRAMC. Tarragona, Spain.

Word ambiguity across languages (i.e., multiple translations) has been found to slow down response times and to reduce accuracy in translation tasks (Boada et al., 2010; Laxén & Lavaur, 2010; Sánchez-Casas et al., 1992; Tokowicz & Kroll, 2007). Multiple translation words usually have a dominant translation (the one mainly given by participants when asked) and many subordinate translations. Previous findings on translation dominance using a translation recognition task found that participants were more error-prone when recognizing subordinate translations, but the results differ across studies regarding response times. Moreover, there is recent evidence that suggests the semantic relation between dominant and subordinate translations can influence the translation performance (Laxén & Lavaur, 2010). The aim of the present study was to further examine how translation dominance and semantic relatedness between the possible translations of a word affected bilingual word recognition. Two sets of Catalan and Spanish words with multiple translations into the other language were selected. For a given word, translation dominance was established on the basis of three measures obtained through different questionnaires. These measures provided information regarding: a) possible word translations; b) translation recognition; and c) an estimation of how frequent each translation was used. Additionally, ratings concerning the semantic relatedness between the dominant and the subordinate translations were collected. The multiple translation words from the two sets (Spanish-Catalan and Catalan-Spanish translation pairs) were used as targets in a lexical decision task. They were presented to the same group of highly proficient bilinguals, using a priming paradigm so that each word could be preceded by both their dominant and subordinate translations. The relevant analyses compared priming effects as a function of translation dominance and semantic relatedness between the translation word pairs. The results are discussed within the framework of the Distributed Conceptual Representation Model (de Groot, 1992).
Linguistic distance and second language processing: electrophysiological evidence from Spanish/Basque bilinguals

Zawiszewski, A., Erdocia, K. & Laka, I.

University of the Basque Country

Several Event-Related Potentials (ERPs) studies on native versus non-native language processing argue that native/non-native differences result either from language proficiency, age of acquisition (AoA) or transfer from L1, but the relative impact of these and other factors in bilingual language representation and processing are still not well understood (Kotz 2009). In order to investigate these issues, we conducted a series of experiments in Basque language with native Basque speakers and highly proficient Spanish/Basque bilinguals (AoA=3). The experimental conditions were (i) linearization (verb-before-object (VO) in Spanish and object-before-verb (OV) in Basque), (ii) verb agreement (only with subject in Spanish, with subject and object in Basque) and (iii) argument alignment (accusative in Spanish versus ergative in Basque). Our results show that both groups behaved differently with regard to (iii) ergative case, but similarly when dealing with (i) different linearizations (OV/VO) and with (ii) subject and object verb agreement violations. Spanish/Basque bilinguals displayed a smaller P600 component, and more errors in the grammaticality judgment task for ergative case compared to Basque/Spanish bilinguals. A similar ERP pattern and comparable behavioral measures obtained for non-canonical word-orders (frontal negativities+P600) and verb agreement violations (N400-P600) in both groups. These results indicate that some aspects of language-variation have a deeper impact in bilingual processing even at high proficiency and early AoA, than others. Our findings suggest that not all cross-linguistic differences are equivalent regarding bilingual processing (McLaughlin et al. 2010), an issue that is relevant to fully understand the neural underpinnings of linguistic structure.
Effects of order of acquisition of words in a natural context of L2 acquisition

Pérez, M. & Sáez, L.

University of Murcia, Murcia, Spain

Lexicon is governed by the order at which words are learnt so that words that are learned early are accessed and retrieved faster than words acquired later in life. This is called the age of acquisition (AoA) or, as it is preferred nowadays, the order of acquisition (OoA) effect and it has been observed and well established across a wide range of tasks and population samples. The main aim of the present work is to assess whether or not an OoA effect appears when people learn a limited set of words in a natural setting. The manipulation consisted in including a number of words in different moments of a German course for Spanish students. Twenty words were trained from the beginning of the course (henceforth, early words). Four weeks later a new set of words were trained (henceforth, late words), and the early words were also rehearsed. Word length, bigram frequency, neighbourhood density (in Spanish) and lexical frequency in German were matched among sets. All words were object names. At the end of training, each early word was trained 17 across 13 sessions, and each late word was trained 17 times across 11 sessions. Training exercises covered phonology, orthography and semantics of words (e.g., filling the gaps, word spelling, and spoken word – picture association) OoA effects were tested by using picture naming and visual lexical decision tasks at 7 days after the last training session. A main OoA effect was found in each task. However, the magnitude of the effect varied across tasks. The results extend OoA effects found in lab tasks to a more natural L2 acquisition context. Moreover, since meanings of trained words were previously known by participants, the results support mainly mapping hypothesis, which claims that OoA effects reside in the connections between word-forms and meanings.
Stress typology of the L1 matters in the lexical encoding of novel tonal contrasts

Galts, T., Braun, B. & Kabak, B.
Department of Linguistics, University of Konstanz, Germany

This paper investigates the influence of existing native language (L1) suprasegmental contrasts on the lexical encoding of novel contrasts. While previous studies mostly focused on novel segmental contrasts (Hayes-Harb & Masuda, 2008), here we expand this line of research to the L2 acquisition of suprasegmentals and explore the extent to which the stress typology of the L1 may lead to differences in the lexical encoding of novel tonal contrasts. In a cross-modal perception study, native speakers of Russian, German (languages with lexical stress), French (with no lexical stress) and Mandarin Chinese controls (n=32 total), were tested on their ability to lexically encode four Mandarin tones on segmentally distinct sets of disyllabic non-words. The participants were asked to decide if a given auditory word learned in a previous training phase matches the visual stimulus in three different conditions: CompleteMatch, SegmentalMatch-TonalMismatch, and TonalMatch-SegmentalMismatch. While in the CompleteMatch condition, we found no differences among the groups, there was a main effect of language in both accuracy and RTs for the other two conditions. In particular, Russian and German participants were equally able to distinguish tonal minimal pairs with higher accuracy than the French (French: 1.3% vs. Russian: 18.8%, German: 30.5%, p<0.001). All three groups were however significantly worse than the Mandarin controls (86.7%, p<0.001). Surprisingly, Mandarin Chinese controls did significantly worse than other groups in the TonalMatch-SegmentalMismatch condition (p<0.01 for all comparisons), suggesting the primacy of tonal information over segmental information in tone languages (cf. Ye and Connine, 1999; Lee, 2007; Braun and Johnson, 2010). Overall, we argue that learners with lexical stress in their L1 are more efficient in lexicalizing other types of suprasegmental information, i.e., lexical tones, than those with no lexical stress.
An event-related FMRI study on number and ergative case processing in native and proficient nonnative Basque speakers

Nieuwland, M., Martin, A. & Carreiras, M.

Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain

Quantitative and qualitative differences in native and nonnative syntactic processing might surface especially around syntactic parameters that are not shared between L1 and L2. This could mean that even between proficient native Spanish speakers of Basque and native Basque speakers, quantitative and/or qualitative differences exist in processing related to the ergative case system, which has no equivalent in Spanish, but not in processing related to the syntactic number agreement system which does have a Spanish equivalent. In an event-related FMRI experiment, we tested this hypothesis by examining the cortical networks involved in Basque sentence processing in native Basque speakers and highly proficient native Spanish speakers of Basque. Participants read sentences containing ergative case violations or number violations and correct sentences while performing an acceptability judgment task. Preliminary results (6 nonnative and 18 native speakers) suggest that whereas participants were more accurate for ergative case violations than for number violations or correct sentences overall, the two groups did not show any behavioral differences. In native speakers, ergative case violations elicited relative activation increases compared to correct sentences in the inferior parietal lobules, the posterior cingulate and in the precuneus, while number violations elicited additional activation increases in left middle and inferior frontal cortex consistent with reports for morphosyntactic agreement errors. The nonnative speakers showed roughly similar activation patterns but with additional effects in medial prefrontal cortex. While more data for nonnative speakers is needed, the current patterns of results suggest that they achieve the same behavioral outcome via differential neural recruitment.
When the real world is irrelevant, so to speak: An event-related potential study on counterfactual comprehension

Nieuwland, M. & Martin, A.

Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain

Counterfactual statements describe imaginary consequences of hypothetical events. Counterfactual comprehension provides an interesting test-case for studying the interaction between real-world knowledge and discourse context because counterfactuals may require keeping in mind what is true and what is false (Byrne, 2002). Recent event-related potential (ERP) and eye-tracking results suggest that real-world knowledge briefly interferes with counterfactual comprehension (Ferguson & Sanford, 2008; Ferguson, Sanford & Leuthold, 2008), consistent with two-stage accounts of discourse comprehension. Yet, the validity of these results stands or falls with the provision of a sufficiently constraining discourse. In an ERP experiment, we tested whether real-world interference upholds in the face of a strong counterfactual context. Participants read Spanish counterfactually true/false statements (approximate translation: “If N.A.S.A. had not developed its Apollo Project, the first country to land on the moon would be Russia/America”) and real-world true/false statements (“Because N.A.S.A. developed its Apollo Project, the first country to land on the moon has been America/Russia”) that were matched for critical word expectancy and for rated truth-value. Our hypothesis involved N400 amplitude, which indexes early semantic processing costs and is sensitive to subtle variations in discourse-semantic fit (Kutas, Van Petten & Kluender, 2006). If real-world knowledge interferes, if only briefly, with counterfactual comprehension despite this strong context, critical words in counterfactually true statements should evoke larger N400s compared to counterfactually false statements and real-world true statements. In contrast, if incoming words are mapped onto the most relevant interpretive context without delay and without initial regard to pre-stored real-world knowledge, false statements elicit an N400 effect compared to true statements, for counterfactual and real-world statements alike. Our ERP results are consistent with this latter prediction, and argue against automatic interference from pre-stored real-world knowledge during counterfactual comprehension. Instead, incoming words in counterfactual statements are evaluated foremost in terms of their contextual relevance.
Licensing of negative polarity items in basque: An erp study

Pablos, L. ¹, Shirley, E. ², Erdozia, K. ³, Laka, I. ³, Williams, N. ² & Saddy, J. D. ²

¹ Leiden University Centre for Linguistics. Leiden University. Leiden, The Netherlands.
² School of Psychology and Clinical Language Sciences. University of Reading. Reading, UK.
³ Dept. of Linguistics and Basque Studies. University of the Basque Country, UPV/EHU. Vitoria-Gasteiz, Spain.

Event-Related Potential (ERP) studies of Negative Polarity Items (NPIs) have focused primarily on the licensing of NPIs in two contexts where the NPI could not be licensed because of (i) the lack of a licensor in the preceding context and (ii) the (inaccessible) structural position of negation in the sentence. Unlicensed NPIs in previous ERP studies have elicited different ERP component patterns depending on the language tested and the specific semantic manipulation employed: N400 followed by a P600 in German, a P600 in English and Italian and a P600 followed by a L-LAN in English for a different semantic manipulation. The present study tested the on-line licensing of object NPIs such as ‘ezer’ (anything) in Basque in three semantically illicit contexts. The context in (i) which contained a preceding positive particle (‘ba-’). The context in (ii) which had an inaccessible licensor and which differed with respect to previous studies in that its ungrammaticality is detected one word before the NPI. And a third context (iii), which contained a scope violation. ERP results (n=25, L1Basque) showed that unlicensed object NPIs in context (ii) evoked an early (right) negativity in the time window 100-200 ms. followed by a N400 at 200-500 ms. in comparison to licensed ‘ezer’ in the control. However, no significant differences at ‘ezer’ were found for context (i) or (iii) relative to the control. We suggest the early negativity in (ii) is connected to early effects of lexical and semantic integration (Pulvemüller 1995) and of word class category (Neville et al 1992), whereas the subsequent N400 reflects the semantic anomaly of having an unlicensed NPI. Finally, we propose the lack of a P600 is connected to the ungrammaticality in (ii) being detected one word before the NPI, which generated an early positivity at 100-300 ms at this word.
Language comprehension requires retrieval of recently-processed representations from memory. How is missing information recovered during online sentence comprehension and what factors affect its retrieval? During ellipsis (the interpretation of unpronounced material), retrieval cues at the ellipsis site may make direct contact with the antecedent in memory. Under this mechanism, processing complexity is determined by representational factors, such as the retrieval cues’ diagnosticity or match to the target item or items in memory. Tracking the online processing of ellipsis in Castilian Spanish allowed us to tap into these mechanisms as a function of the relevant representations’ diagnosticity. We recorded event-related potentials from 22 participants while they read 120 sentences containing elided noun phrases in one of 4 conditions (“Marta se compró la camiseta que estaba al lado de la falda/el vestido y Miren cogió otra/*otro igual para salir de fiesta.”). The determiner ('otra’/’otro’) correctly or incorrectly cued the retrieval of the antecedent ('la camiseta’), and occurred in the context of a matching or mismatching local agreement attractor ('la falda’/’el vestido’) of similar lexical frequency. We predicted that if gender morphology serves as a retrieval cue, then incorrect gender would elicit a LAN/P600 effect compared to correct gender. Moreover, if retrieval is vulnerable to interference from locally matching representations, this ERP effect would be reduced in the context of a matching local agreement attractor. No P600 effect was observed. Instead, incorrect determiners evoked a sustained, anterior negativity compared to correct ones from 300ms onwards. This negativity was reduced in the context of a matching local agreement attractor, especially at central and posterior electrodes. Consonant with results regarding referential ambiguity, we take this anterior negativity to reflect the degree of cue diagnosticity to relevant linguistic representations during retrieval and interpretation of ellipsis.
An event-related potentials (ERP) study of co-reference resolution with demonstrative pronouns

Silva-Pereyra, J. F. 1, Prieto-Corona, B. 1, Reynoso, V. 1, Gutierrez-Sigut, E. 2 & Carreiras, M. 3, 4, 5

1 Proyecto de Neurociencias, FES Iztacala UNAM, México
2 University of California, Davies, USA
3 Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
4 IKERBASQUE, Basque foundation for Science. Bilbao, Spain
5 Departamento de Filología Vasca, Universidad del País Vasco (UPV-EHU), Spain

Demonstrative pronouns refer to things that have been mentioned previously in the text and thus mentally represented in a discourse model. It has been shown that different components of event related potentials (ERP) are sensitive to pronominal reference resolution processes depending on the type of information considered during the bonding process. Some findings have suggested independence of syntactic and semantic information (N400/P600 taking semantic information first) or the interaction between them (only P600). This paper investigates whether demonstratives follow similar mechanisms to those involved in the comprehension of personal pronouns. Thirty young Spanish speakers were presented two clause Spanish sentences in three different experimental conditions: “La renuncia fue aceptada pero esto no molestó al gerente” (*The resignation was accepted but thisi did not surprise the manager); “La renuncia fue aceptada pero ésta no molestó al gerente” (*The resignation was accepted but iti did not surprise the manager); “La renuncia fue aceptada pero éste no molestó al gerente” (*The resignation was accepted but itj did not surprise the manager). Different ERP patterns were found for different pronouns. The ERPs to ESTO (refers to the whole first clause) with respect to ESTA (refers only to the subject of the first clause) was an anterior negativity peaking around 400 ms. This negativity could reflect a high working memory load in a first automatic state during bonding process (no N400 was observed). Because gender is incompatible with the only possible antecedent for ESTE, the sentences becomes ungrammatical. This condition elicits a larger P600 than the grammatical condition. Results are discussed in terms of the current theories of anaphoric processing.
Occurrence of closure positive shift depends on boundary position: An ERP study on the perception of prosodic information in short coordinate structures

Holzgrefe, J.¹, Petrone, C.², Schröder, C.¹, Höhle, B.¹, Truckenbrodt, H.² & Wartenburger, I.¹

¹ Department of Linguistics. University of Potsdam. Potsdam, Germany
² Centre for General Linguistics, Berlin, Germany

Listeners’ comprehension of spoken language is guided by prosodic information provided in the uttered speech stream. Prosodic cues such as pauses, pitch changes, and durational properties mark prosodic phrase boundaries, which are used to structure an utterance, for instance to resolve syntactic ambiguities. Due to this immediate interplay with other linguistic domains, prosody got in the focus of attention of online investigations such as the Event Related Potential (ERP) technique. Indicating the perception of intonational phrase boundaries (IPBs), the closure positive shift (CPS) has been established as a neuro-physiological correlate of prosody processing. We report data of 18 monolingual speakers of German, who took part in an ERP experiment with auditory presented stimuli. In contrast to previous studies, we examined the perception of IPBs using short coordinate structures that contained three differently grouped names. In condition A, the IPB appeared after the first name (e.g., [Lola] # [oder Lena und Manu]), whereas in condition B, the boundary occurred later in the stimulus trial, namely after the second name (e.g., [Lola oder Lena] # [und Manu]). Comparing these two types of prosodic grouping, a CPS was elicited, but only coinciding with the late boundary (condition B); although acoustic analyses revealed that the relevant boundary cues were present in both conditions. Our results indicate that a CPS is not necessarily elicited when the relevant acoustic cues are present. Instead, the boundary position seems to play a crucial role, presumably because the relative strength of acoustic cues marking a prosodic boundary increases with the amount of speech material previously processed. This finding has to be taken into account for experimental designs focusing on boundary cue processing, but also strengthens the view of the CPS as a truly prosodic component that is not tied to mere acoustic properties of the stimulus material.
Order of mention and syntactic information in pronoun resolution: a visual world study

Luegi, P.¹, Costa, A.¹ & Maia, M.²

¹ Universidade de Lisboa
² Universidade Federal do Rio de Janeiro

Ariel (1996) proposes that the form of an anaphoric expression signals the accessibility of its antecedent and so the more salient an antecedent is, the less marked will be the anaphoric expression referring to it. Many authors (for instance, Costa et al., 1998, and Costa et al., 2004, for EP; Corrêa, 1998, and Melo & Maia, 2005, for BP; Carminatti, 2002, for Italian, Alonso-Ovalle et al., 2002, for Spanish) have already demonstrated that, in pro-Drop languages, the null pronoun is preferred to refer to Subject entities. However, in all these studies, the Subject was always the first referred entity. Accordingly to Gernsbacher (1998) first mentioned entities are very salient, regardless its syntactic status. So, in the referred studies, it is not clear if this preference may be attributed only to syntactic factors or if it was due to the combination of syntactic and order of mention information. In this study we contrast the impact of syntactic function (Subject versus OBL, prepositional verb adjunct) and order of mention in pronoun resolution (see (1)-(2)). We used complex sentences where the second clause is an adverbial temporal one whose Subject is a pronoun (covert/overt) that must be identified by an antecedent in the previous clause. In order to verify the preference in the identification of the ambiguous pronoun, we used the Visual World Paradigm. Eye movements of participants when viewing a picture (with two characters and the scenery of the action) are registered while listening to sentences like (1) and (2): (1) O mecânico trabalhou com o engenheiro na oficina quando Ø/he remodelou... The technique [SUBJ] worked for the engineer [OBL] in the garage when Ø/he remodeled... (2) Com o engenheiro trabalhou o mecânico na oficina quando Ø/he remodelou... For the engineer [OBL] worked the technique [SUBJ] in the garage when Ø/he remodeled...
Agree to disagree: Processing default agreement in dative subject constructions in Tamil

Muralikrishnan, R. & Bornkessel-Schlesewsky, I.

University of Marburg

It has been proposed that the language processing mechanism strives to keep the arguments of the verb distinct and that it uses several cross-linguistically motivated cues with language-specific weightings to accomplish this (Bornkessel-Schlesewsky & Schlesewsky, 2009). Mechanisms to distinguish the arguments, such as case-marking, may indicate several roles for the argument depending upon the verb. For instance, a Tamil dative noun can signify an indirect object, a subject or a destination. Dative subjects occur with dative-stative verbs, which show no person/number/gender agreement with the dative subject but only default-agreement (3rd-sg-neuter). Crucially, these verbs also have an alternative literal meaning if the subject is nominative, with no dative noun in the sentence. We investigated the processing differences between ditransitive (DI) and dative-stative verbs (DS) in an ERP study on Tamil in which identical auditory stimuli (DI vs. DS) were presented in four contexts: CQ: Correct; question priming the target verb; NQ: Neutral; no verb-specific information; VQ: Verb mismatch; same verb-class; WQ: Verb mismatch; wrong verb-class. We found an early positivity in CQ and a later positivity in VQ and WQ in both sentence types, which is in line with previous findings of early and late P300 effects when stimuli are categorised as meeting or violating expectations (Roehm et al., 2007). An additional P600 was observed for dative-statives regardless of context. We argue that this effect stems from a bottom-up agreement mechanism by which the processing system seeks to identify an agreeing argument. Since there is no potential agreeing nominative, however, the stative meaning is derived via an enrichment process (see Burkhardt, 2006, for enrichment-based P600 effects). These findings thus provide an initial indication of how default agreement is processed in sentences with non-nominative subjects.
The processing of gender agreement errors in Spanish: An event-related potential investigation of pre/postnominal distinction

Bartlett, L.¹, González-Vilbazo, K.¹ & Morgan-Short, K.¹,²

¹ Department of Hispanic and Italian Studies, University of Illinois at Chicago. Chicago, USA
² Department of Psychology, University of Illinois at Chicago. Chicago, USA

Morphosyntactic agreement plays a significant role in language comprehension, particularly in languages such as Spanish, which has a rich inflectional structure. How is morphosyntax processed? How important is an agreeing element’s position in the syntactic structure? The analysis of morphosyntactic gender processing by native speakers (NS) as measured by event-related potentials (ERPs) has provided insight into these questions. The primary finding has been that gender agreement violations on determiners and adjectives generally elicit a LAN and/or P600 pattern (Barber and Carreiras, 2005; Davidson and Indefrey, 2009; Sabourin and Haverkort, 2003). However, agreement studies are often limited to having adjectives in one position, e.g., either pre- or postnominal; further, there can be confounds between form and position, e.g., prenominal determiners and postnominal adjectives. In order to gauge the contribution of syntax to morphosyntactic processing, it is important to observe the effects of agreement on one word category in different syntactic positions. The present study aims to fill this gap by investigating gender agreement processing on both pre- and postnominal adjectives, as well as on determiners, in Spanish. Participants, who were NS of Mexican Spanish, were asked to judge the acceptability of three-word phrases in Spanish involving determiner-adjective-noun order (prenominal – la simpática vaca ‘the nice cow’) and determiner-noun-adjective order (postnominal – la vaca simpática ‘the cow nice’). Gender agreement violations were made either prenominally – on determiners or prenominal adjectives – or postnominally – on postnominal adjectives. Preliminary analyses of the ERP results indicate processing differences between the two syntactic positions, regardless of whether agreement was between nouns and adjectives or between nouns and determiners. Prenominal modifiers lead to an N400 for gender agreement violations, whereas postnominal modifiers show an N400/P600. These findings imply that gender agreement processing may be dependent upon the syntactic configuration of the phrase, regardless of word category.
Number and gender integration in sentence processing: data from European Portuguese

Lourenço-Gomes, M. d. C.\textsuperscript{1}, Costa, M. A.\textsuperscript{1} & Maia, M.\textsuperscript{2}

\textsuperscript{1}University of Lisbon
\textsuperscript{2}Federal University of Rio de Janeiro

The attachment of ambiguous relative clauses (RCs) to complex nouns phrases, in which two hosts are candidates to the RCs' attachment, still occupies a prominent position in the field of sentence processing investigations, although it has been thoroughly scrutinized in diverse languages. The attention given to this structure is due to the fact that speakers/hearers of some languages exhibit the preference of attaching the RC to N1, while in others to N2, challenging the existence of a universal parser (Frazier, 1979). However, in this study we use the structure to examine more specifically integration of gender and number cues in European Portuguese, and to evaluate the role of this type of morphological information in two self-paced reading experiments. Twenty-four experimental items were manipulated in order to undo the ambiguity in a full paradigm of number (Experiment 1) and gender agreement (Experiment 2), as exemplified below. The sentences were presented to the subjects word by word in a computer screen. At the end of each sentence subjects should choose between two alternate interpretations – e.g. (1). Forty-eight native speakers of European Portuguese, graduate students from University of Lisbon, participated in the study. Results are discussed based on differences observed in previous works between European and Brazilian Portuguese when number agreement is involved (Maia et al., 2007), and in evidence that Brazilian speakers/listeners incur in less errors in the questions when the ambiguity is undone through gender agreement than when it is undone through number agreement (Lourenço-Gomes, 2008).

(B) O criado[-sing/+sing] estava[-sing/+sing] implicado[-sing/+sing]
(2) O detective procurou o vizinho[-male/+ male] do criado que estava implicado[-male/+ male] em vários casos. (The detective searched for the neighbor of the servant who was implicated in many issues)
Prediction in sentence comprehension: An ERP study on sentence reading in Polish

Szewczyk, J.¹ & Schriefers, H.²

¹ Jagiellonian University, Cracow, Poland
² Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour, The Netherlands

Recently several ERP studies demonstrated that the human language comprehension system anticipates specific words that are highly likely continuations of a given text. These studies used agreement relations that allow testing whether the noun’s lexical features are available before the noun is actually presented. However, it remains an open issue whether the language comprehension system can also make predictions that go beyond a specific word. We presented 120 short stories in Polish. Each story’s final sentence had a direct object that consisted of a prenominal adjective, and a masculine noun. The stories were constructed such that for half of them an animate direct object noun in the story’s final sentence was highly expected, and for the other half an inanimate DO noun. The critical DO noun was either semantically congruent with the preceding context, or incongruent (which was realized by using nouns with an animacy value opposite to the expected). In Polish, there is an interdependency between the semantic category of animacy (animate versus inanimate) and gender marking on prenominal DO adjectives. Since the prenominal adjective agreed in gender with the noun, adjective’s inflectional suffix reflected the animacy value of the noun, and thus the potential incongruity of the noun was visible already at the adjective. In order to ascertain that the prediction truly concerned a broad semantically defined class of nouns, we additionally manipulated stories’ constraint strength (defined as the best DO noun completion CP). In half of the items stories were (1) highly constraining, while in the other half (2) weakly constraining (fully crossed with Congruity). Adjectives with prediction-inconsistent suffixes elicited an N400 effect, relative to the same adjectives with prediction-consistent suffixes. Importantly, this effect was not modulated by context constraint strength. These findings are evidence that readers truly predict broad semantically defined classes of words.
Revisiting the effect of sentence context on lexical ambiguity resolution: An eye tracking study in Hindi

Singh, S. & Mishra, R. K.

Center of Behavioral and Cognitive Sciences, University of Allahabad, India

This study explores the role of context in lexical ambiguity resolution in a lesser studied and typologically different language Hindi, on the basis of views put forward by selective access model (Kellas; 1994) and reordered access model (Duffy, Rayner et al; 2001), which claim the context selective activation and simultaneous activation of lexical items respectively. Some studies show the primacy of context over lexical input while other claim that lexical items are activated independent of context. This study explores the issues put forward by Huettig and Altmann(2005), which support the simultaneous meaning activation of homophones independent of context, by making assumptions based on Embodied cognition. In a set of two eye tracking studies employing visual-world paradigm, where auditory input included the neutral sentences and sentences biased towards the dominant meaning of homophones, the visual images included homophone referent (shape and semantic competitor of subordinate meaning) along with three distracters. Experiment 1 included the presentation of a shape competitor of the subordinate meaning of the homophone in both neutral and biased conditions, while we presented semantic competitors of the subordinate meaning of the homophone in the second experiment. The eye movement data obtained in both the experiment provide strong evidence that participants can quickly activate the subordinate meanings and also their competitors on several dimensions both in neutral as well as biased sentential contexts. Overall these data from Hindi provide further support to those models of lexical access that assume a parallel activation of both the meanings of an ambiguous word. We further argue for a model of lexical access where sentence context plays little role in lexical access during online spoken sentence processing.
A modeling framework for the verbal transformation effect

Basirat, A.¹,² & Schwartz, J.¹

¹ GIPSA-Lab, Speech and Cognition Department, UMR 5216 CNRS – Grenoble University, France
² CEA, DSV/I2BM, NeuroSpin Center, Gif sur Yvette, France

The verbal transformation effect refers to perceptual switches while listening to a speech form repeated rapidly and continuously. It is a specific case of perceptual multistability phenomena, which provide rich paradigms to study the processes underlying the perceptual organization of sensory scenes. The present work aims at integrating the verbal transformation effect into a computational psycholinguistic model of speech perception, while taking into account the recent findings on the role of the multisensory interactions in the emergence and the stability of verbal transformations. It is important to note that psycholinguistic models are not able to explain the verbal transformation effect in their present form. An extension of the TRACE model of speech perception, able to produce verbal transformations in a multisensory framework is presented. Two major behavioral data are considered: firstly, evidence that the speech reading penetrates the verbal transformation effect, secondly, evidence for a possible role of the onset of the visible opening gesture of the jaw and lips. These results are observed with French speaking participants. Three components are added to the TRACE model: a satiation-like mechanism, a temporal binding window and an articulatory bias. The simulation results show the model’s ability to explain the experimental data obtained previously. This work suggests that the psycholinguistic models could take into account, at least partly, the multistable perception of speech. It raises questions about the interactions between the perceptual organization of speech and psycholinguistic processes for lexical access and speech understanding.
Many studies have shown that inhibition in memory is crucial for reading comprehension (e.g., Pimpertom, 2010). Friedman and Miyake (2004) revealed two additional factors, resistance of interference and inhibition of response. The focus of the current study is to investigate the relationship between language comprehension and resistance to interference. This type of inhibition is defined as the capacity to extract relevant information from a given stimulus or event, and suppress the features that are not important for processing. These features can be part of the stimulus itself or surrounding properties of the context, in which the stimulus is immersed. In our study, we compared good and poor readers in their ability to suppress irrelevant information in a visual word presentation task. Lexical, phonological, and semantic features of target words in successive trials were manipulated in a letter case identification task. Participants had to decide the type of letter case in which the stimuli were presented (e.g., caballo vs. CABALLO). For example, we compared the decision on a word (e.g., caballo), based on the previous presentation of orthographic neighbors (e.g., cabello), rhyming related (e.g., lacayo), semantically related (e.g., jinete) or an unrelated control words (e.g., maceta). Results showed that good and poor comprehenders differed in their capacity to resist interference that derived from lexical and semantic information. We discuss these results from a perspective of suppression of irrelevant information mechanisms needed for reading comprehension.
Masked repetition priming with handwritten primes

Gil-López, C.¹, Perea, M.², Moret-Tatay, C.²,³ & Carreiras, M.¹

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia, Spain
² Universitat de València, Valencia, Spain
³ Universidad Católica de Valencia, Valencia, Spain

The goal of the present study is to shed some light on how the word-processing system initially process handwritten words. Despite its ecological validity, research on the intricacies of handwriting word-recognition is quite scarce. Here we conducted a lexical decision experiment to examine which factors modulate the magnitude of masked repetition priming with handwritten words. A printed, target word could be preceded by a handwritten prime or a printed prime. The stimulus-onset asynchrony (SOA) was either 33 or 50 ms. Word length was also manipulated, the reason being that the segmentation process in handwritten words might be affected by the number of joined letters. Results showed a robust masked repetition priming effect for both printed primes and for handwritten primes—similar in size for short and long words, and for printed primes and handwritten primes. Not surprisingly, these effects were greater at the 50 than at the 33 ms SOA. Thus, handwritten primes (at least when they are easily legible, as in the present experiment) behave just like printed primes.
Several cross-linguistic studies have suggested different reading strategies are used by children who present reading difficulties across different orthographies. Albanian is an Indo-European language with a shallow orthography, in which there is an absolute correspondence between graphemes and phonemes. It is widely known that in transparent orthography it is easier to learn reading than in opaque orthographies. We aimed to know reading strategies used by Albanian disabled children during word and nonword reading. A pool of 114 Kosovar children diagnosed with reading difficulties matched with 220 normal readers, aged 6 to 11 years old were tested. They had to read 120 stimuli varied in lexicality, frequency and length. The results in terms of reading accuracy shows that children with reading difficulties are more accurate in words than nonwords, just as in short than long stimuli. Reading times were affected only by word length being faster on short than long stimuli. We also found a number of significant interaction effects. The effect of length was significantly modulated by school year, being greater in early grades and later diminishes. Analyses of the error patterns showed that phonological errors, when the letter replacement leading to new nonwords, is the most common error type. The fact that this kind of error is more frequent in children with reading difficulties compared with normal group reveals that the first group uses more the indirect route than normal readers. However, visual errors in words, and lexicalization in nonwords shows that even Kosovar disabled readers use both routes (lexical and sublexical) from the beginning of reading. These data suggests that despite of the completely regularity of Albanian, lexical route it is used as in opaque orthographies from the beginning of reading.
Masked transposition effects for simple vs. complex non-alphanumeric objects

Estudillo, A. J.¹, García-Orza, J.² & Perea, M.³

¹ University of Edinburgh
² Universidad de Málaga
³ Universitat de València

The mechanisms involved in letter position coding have been the focus of an intense research in the last decade. Recent evidence have shown that when two letters/digits/symbols are switched in a string (e.g., jugde-judge; 1492-1942; *?$&-*$?&), the resulting strings are perceptually similar to each other, and produce a sizeable masked priming effect with the masked priming same-different task. However, a parallel effect does not occur for strings of pseudoletters (García-Orza, Perea, & Muñoz, 2010). These data suggest that the position coding mechanism involved in letter position coding is imprecise and is not specific to letters (at least would be involved in the processing of strings composed of other alphanumeric stimuli). In the present study, we examined whether masked transposition effects are specific to alphanumeric stimuli or, alternatively, whether masked transposition effects can also occur with strings composed of other “objects”, namely, line drawings of common objects (Experiment 1), and geometrical shapes (Experiment 2). Results showed a significant masked transposition priming effects for geometrical shapes, but not for line-drawings of common objects. These findings suggest that the mechanism involved in coding position in masked priming only works with perceptually simple, familiar “objects” (i.e., letters, numbers, symbols, or geometrical shapes), once their identities have been well attained.
Letter knowledge, phonological awareness and naming speed as predictors of reading fluency in Spanish

Onochie Quintanilla, E., Simpson, I. & Defior Citoler, S.

Departamento de Psicología Evolutiva y de la Educación, Universidad de Granada

Letter knowledge (LK), phonological awareness (PA) and naming speed are important predictors of reading skill with perhaps phonological awareness being the most important (Adams, 1990; Kirby, Parrila & Pfeiffer, 2003; Lundberg, 1991; Stanovich, 1991; Torgesen et al., 1999). It has been argued that naming speed might be more important, and that Phonological Awareness might lose predictive power, in transparent writing systems compared to opaque languages. Few studies exploring this issue have been carried out in Spanish, a highly transparent writing system. The aim of this study was to determine whether naming speed is an important predictor of reading fluency in Spanish, in comparison to PA and LK. In this longitudinal study 190 native Spanish speakers from Granada were monitored for two years. Phonological awareness, letter knowledge, naming speed and IQ were assessed in the last year of kindergarten (mean age 5;8, range 5;3-6;2), the beginning of first grade (mean age 6;5, range 5;11-6;10) and the beginning of second grade (mean age 7;5, range 6;11-7;10). Results revealed that all three were significant predictors of reading fluency at the beginning of first grade. However the predictive power of PA decreased at the beginning of second grade. In contrast, naming speed uniquely explained a larger amount of variance at the beginning of second grade than it did at the beginning of first grade, while LK roughly maintained its predictive power. These results agree with findings obtained in studies carried out in other transparent languages. PA looses predictive power in writing systems with more regular grapheme-to-phoneme correspondence. In contrast naming speed becomes more effective in predicting individual differences in reading fluency, compared to PA, over a 2 year period.
The contribution of implicit learning mechanisms to spelling acquisition

Nigro Natale, L., Jiménez Fernández, G., Simpson, I. & Defior Citoler, S.

Department of Developmental and Educational Psychology, Universidad de Granada. Granada, Spain.

Our study aims to explore the contribution of implicit learning (i.e. the ability to learn from a structured material without intention) to spelling acquisition. We studied the ability of Spanish children (8 and 9 years-old) to implicitly learn artificial spelling rules. A learning experiment with an exposure and a test phase was designed and administered to 25 3rd grade students. During the exposure phase participants were shown a set of 108 stimuli which complied with a series of positional rules; these stimuli consisted of CVCV pseudowords where only three consonants could be used in the first syllable and other three in the second syllable. After this exposure, the occurrence of implicit learning was assessed during the test phase, in which participants were presented with pairs of pseudowords (one of them being consistent with the positional rules and the other being inconsistent) and were asked to choose which of them was consistent with the artificial rules. The results showed that children were able to learn the positional rules after a brief exposure. Participants were also assessed with reading and spelling tests of real words and pseudowords. A correlation analyses also showed a significant relation between the ability to learn artificial rules and the spelling ability of the students, though this link was not found with reading ability. These results suggest that implicit learning mechanisms play an important role in spelling acquisition.
Effects of word order of acquisition in lexical access: New approach from a specialized corpus (Psylex)

Marín, J.¹, Pérez, M. A.¹, Págán, A.², Stadthagen, H.³ & Izura, C.⁴

¹ University of Murcia. Murcia. Spain
² Laboratoire CeRCA, Université de Poitiers - CNRS, France
³ ESRC Centre, University of Bangor, Bangor, UK
⁴ Swansea University, Swansea, UK

Words that are acquired earlier are processed quicker or more accurately than words that are acquired later (Carroll & White, 1973). This Age of Acquisition (AoA) effect has been the topic of various debates about its independence of frequency effect, and its locus, nature, and singularity. There are also metrical and methodological problems to precise the time at what a word is acquired and the isolation of AoA effect from the effect of other factors with it is highly correlated. Isolation of effects usually requires laboratory control techniques but this stratagem faces the problem that the natural learning process (which requires massive and long periods of practice) is not properly reflected. On the other hand, correlational designs can afford the natural phenomenon but here we have the inconvenient of multiple colinearity. We present a new approach in which we approximate the typical controls of experimental design but keeping the word learning process as it happens in normal life. First, we have developed a corpus with all words in the texts that students of psychology use to prepare the subjects and exams. With this corpus (Psylex) we have selected words that have a frequency in Lexesp lower than 0.72 per million, but that have a high/moderate PsyLex frequency. The list of selected words has been further selected to obtain three lists of 24 words that don't differ in Lexesp frequency, length, PsyLex frequency and N. Each list has words that appear mainly in the first, second or third course. These words have been used to generate a paired list of pseudowords by changing two letters. With this material we tested 4th grade psychology students with a lexical decision task. Obtained results confirm the order of acquisition effect observed in previous research.
Morphological masked priming using primes with altered and unaltered stem in Polish

Witkowski, M.\textsuperscript{1}, Szewczyk, J.\textsuperscript{1}, Taft, M.\textsuperscript{2} & Wodniecka, Z.\textsuperscript{1}

\textsuperscript{1}Jagiellonian University, Cracow, Poland
\textsuperscript{2}The University of New South Wales, Australia

The present study aimed at replicating facilitation effects typically observed in morphological priming experiment. In addition, we asked whether facilitation is still observed for semantically related primes that contain an altered stem (stem alternations frequently occur in noun inflection in Polish). 36 native speakers of Polish performed a lexical decision task, in which they were shown a set of 45 target words (plural or singular nominative nouns) and 45 orthographically legal non-words, preceded by masked primes. Each prime belonged to one of three conditions, depending on its relationship to the target word (e.g. “psa”): unrelated prime (e.g. “owcy”), morphological prime with unchanged stem (e.g. “psu”) and morphological prime with a changed stem (e.g. “pies”). Morphological primes were derived from target words by inflecting the target noun, changing its case and/or number, such that the stem was changed or unchanged, depending on the condition. All inflectional suffix changes, and stem alternations in non-words were fully matched on those in words. As expected, we observed a significant facilitation effect for all morphological primes, both for primes with an unchanged stem and to primes with a changed stem. For non-words, no priming effects were observed. These results replicate the well-known morphological priming effect in Polish. In addition they suggest, that the unaltered- and altered-stem inflectional variants of a word share the same lemma.
Training reading fluency in Spanish with repeated and accelerated reading approaches

Serrano, F., Defior, S. & Hernandez, C. M.

University of Granada

Fluency in reading is considered a stepping stone in reading development, mainly due to the relationship with reading comprehension. Moreover, reading fluency difficulties are a salient feature in dyslexic and poor readers, especially in transparent orthographies like Spanish. Therefore, the development of reading fluency intervention program in Spanish is enough supported. This work aims to verify the effectiveness of a reading fluency program that combines both repeated reading and accelerated reading approaches. It provides a structured and sequential training at syllable, word and text reading levels. This way the training pretends to improve reading automatization skills, starting at sublexical level (especially salient in Spanish) and so, to facilite a more fluent and efficient word recognition and thereby, fluent text reading. Additionally, it includes phonological skills training. Participants were organized in three groups: 1st group of 15 dyslexic and reading disabled children who were part of the training (training group), a 2nd group of 15 dyslexic and poor readers who did not receive the training (waiting group) and a 3rd group of typically developing children (a reading level-matched design). A pretest-postest design was carried out. Assessment included a wide battery of measures: reading (accuracy and fluency at word, pseudoword and text levels; comprehension); spelling; phonological awareness, orthographic abilities, prosody, vocabulary, and basic cognitive skills (visual perception, memory and intelligence). A clear improvement in fluency measures at word, pseudoword and text levels is shown in pretest-posttest analysis. Results also indicate improvements in reading comprehension. The relevance and practical implications of this intervention program are discussed. The development of intervention measures for improving reading fluency both in typically developing and reading disabled populations is highly relevant. This is especially true in Spanish orthography, in which so far there are not evidence-based programs focused in reading fluency.
Sentence processing in 19-month-olds: the role of abstract word order representations

Franck, J.¹, Lassota, R.¹, Omaki, A.¹ & Rizzi, L.¹,²

¹ University of Geneva
² University of Siena

Children show sophisticated abilities to assign Agent and Patient thematic roles to arguments before age 2 (e.g., Hirsh-Pasek & Golinkoff, 1996). However, it remains unclear whether the successful comprehension is guided by the abstract phrase structure of the target language, or by children’s item-based, verb-driven knowledge (Tomasello, 2003). The present study focuses on word order, and provides novel evidence for abstract, grammatical representations at 19 months. Previous research on the acquisition of word order is amenable to alternative interpretations. Gertner et al. (2006) tested how 21-month-old English-speaking infants interpret grammatical NP1-Verb-NP2 sentences containing pseudo-verbs. Infants demonstrated a preference for videos illustrating Subject-Verb-Object interpretations over those illustrating Object-Verb-Subject interpretations. They concluded that infants already represent the Subject-Verb-Object structure abstractly, independently of verbs. However, this could also be explained by a general preference for Subject-Object order characterizing most languages (Tomlin, 1986). The present eye-tracking study, conducted with French-speaking 19-month-olds (N=17), aims to tease apart the two explanations. Our experiment presented both grammatical (NP1-Verb-NP2) and ungrammatical (NP1-NP2-Verb) sentences with pseudo-verbs, together with two causative action videos in which the same action is performed by two puppets but the Agent-Patient relation is reversed. The inclusion of an ungrammatical condition critically allows contrastive predictions for the two explanations. If comprehension is guided by abstract word order knowledge, infants should show a preference for the video illustrating the correct Subject-Verb-Object interpretation in the grammatical condition, but not in the ungrammatical condition. In contrast, if the universal Subject-Object preference guides interpretation, a preference for that video should emerge in grammatical and ungrammatical conditions alike. In the grammatical condition, infants looked significantly longer at the video illustrating the Subject-Verb-Object interpretation, whereas no preference was observed in the ungrammatical condition. These results suggest that abstract phrase structure representations guide sentence comprehension in children as early as 19 months.
Prosodic sensitivity and the learning of punctuation marks in Spanish

Gutiérrez-Palma, N.¹, Defior, S.² & Calet, N.²

¹ University of Jaen, Department of Psychology
² University of Granada, Department of Developmental and Educational Psychology

This work aims to study the acquisition of punctuation marks, an aspect of the written script closely related to prosody and syntax. In particular, we focus on the role of prosodic sensitivity, i.e., the capacity to detect prosody in the oral language. Prosodic sensitivity is a topic of growing interest in the field of reading acquisition (see 2006 special issue of Journal of Research in Reading); however, his study has been mainly focused on word processing. In this work we investigate whether prosodic sensitivity could also affect phrase processing, through the acquisition of punctuation marks. We used a cross-sectional design, with 4th and 6th grade children. They performed prosodic and control tasks, as well as a comprehension and a punctuation writing task. There were two types of prosodic tasks, at the word and phrase-levels. At the word-level, the task consisted of indicating the syllable that sounded stronger in a three-syllabic pseudoword. At the phrase-level, it consisted of indicating whether two sentences sounded similar (the first sentence was low-pass filtered; and then participants were presented the original sentence or another one with a different metrical pattern). Control measures were working memory, phonological awareness, and non-speech rhythm skills. The comprehension task consisted of a sentence-picture matching task. The punctuation writing task consisted of punctuating unpunctuated sentences according to a particular meaning. Results showed that prosodic sensitivity accounted for a significant and unique variance of the punctuation task. These results are discussed in terms of how prosodic sensitivity may affect the acquisition of the prosodic aspects of reading, as the punctuation marks.
Assessing oral reading fluency and comprehension

Costa, A., Falé, I., Hub Faria, I. & Condelipes, T.

Laboratório de Psicolinguística, Centro de Linguística da Universidade de Lisboa

We aim to present evaluation materials still under construction, in order to design an oral reading fluency test not yet available in European Portuguese. Assuming that reading fluency is strongly influenced by the linguistic properties of reading materials, we are developing a reading fluency test strongly focused on linguistic and discursive aspects. Our goal is to contribute to create tools which account for the establishment between fluency and text comprehension, and for the description of levels of reading development. Three test passages with increasing informational and linguistic complexity are being designed. These texts are controlled for length (number of words and sentences), theme accessibility and familiarity, information structure (theme, topic continuity and topic shift), syntactic structure (sentence constituency; complex syntactic structures), lexical properties (morphological and syllabic structure, word frequency, word length), vocabulary specificity and layout (title, paragraphs, and typographic aspects). Data from reading aloud will be analysed in terms of speech rate (number of syllables per minute), accuracy (average of correct read words) and prosodic organization. For the study of this latter dependent variable we will focus on the prosodic phrasing of the utterances (Selkirk, 1986; Nespor & Vogel, 1986). We assume that the EP prosodic phrasing tends to map the syntactic structure, although it is not isomorphic (Cutler, Dahan, & Donselaar, 1997; Falé, 1995; Frota, 2000; Viana, 1987). We built a prosodic matrix from what we consider to be expected as the pattern of each text oral reading. Exemplifying, where we are supposed to have three intonational phrases, as follows: [Campo de Ourique é um bairro de Lisboa]I [com hábitos extraordinários]I [que parecem ter parado no tempo]I The prosodic matrix will be compared against subjects’ performances. We believe that results from analysis of the three factors considered will definitely contribute for the creation of a reading fluency index.
Non conventional utterances in French as second language

Jagielska, D.

Université de Toulouse-Le Mirail, France

Our aim is to consider two elements linked with verbal lexicon in acquisition of Polish as first language and French as second language. First we want to demonstrate significance of non conventional utterances which are regard as errors or metaphors or over-extensions. We are against status of error of these utterances and we consider that they show a cognitive flexibility at work among speakers in acquisition of their first and second language. Secondly through these utterances we study hierarchical organization of verbs, we want to show the significance of generic verbs in acquisition of a first and a second language. Our subjects are Polish children (three-five years/six-ten years) and adults learning French, they all are in lack of lexicon in French and the young children are also in lack of lexicon in Polish. We want to compare the part of non conventional utterances within all those subjects. They watch a video showing a succession of seventeen daily actions like /to cut (up) bread/ (with a knife). After each action they have to describe it a first time and then to reformulate it with other words. We establish then semantic proximity between waited conventional verbs and verbs given by subjects as answers. We pick up different kind of these utterances. Some of them rest on generic verbs, in that case the use of the verb can be seen as an over-extension like in Elle a cassé le ballon “She broke a balloon”. The other non conventional utterances take on metaphorical appearance as Elle épile l’orange “She removes the hair from orange”. This kind of non conventional utterance is used in particular as palliative strategy by our subjects.
Interaction between emotional valence and arousal during lexical processing: Neural evidence for an integrated approach-withdrawal framework

Citron, F. M.¹, Gray, M. A.²,³, Critchley, H. D.², Weekes, B. S.¹,⁴ & Ferstl, E. C.¹

¹ School of Psychology, University of Sussex, Brighton, UK
² Psychiatry, Brighton & Sussex Medical School, Universities of Brighton and Sussex, Brighton, UK
³ Experimental Neuropsychology Research Unit, School of Psychology and Psychiatry, Monash University, Victoria, Australia
⁴ Faculty of Education, The University of Hong Kong, China

Human emotions can be conceptualized within a two-dimensional model constituted by emotional valence and emotional arousal (intensity). Few neuroimaging studies have manipulated each dimension independently, in contrast to many previous emotion-specific or valence-driven neuroimaging studies. The present study manipulated valence and arousal orthogonally using the attributes of verbal stimuli measured from statistics taken from a large corpus of behavioural ratings (Citron et al., 2009). Lexico-semantic properties known to affect word processing (e.g. word frequency, imageability) were carefully controlled. Written emotion words were presented for identification during an fMRI experiment to examine differences in brain activation associated with known effects of emotional arousal and valence on word recognition. Behaviourally, a recognition advantage for positive words was observed, which replicates previous findings suggesting that positive words are more richly interconnected within the mental lexicon and therefore easier to process. However, we also found that, words eliciting “conflicting” orientations (positive and highly arousing, or negative and low in arousal) elicited greater BOLD signal activation in insula cortices than words eliciting congruent orientations, thus extending earlier behavioural observations. Our findings validate a two-dimensional approach to the study of emotion and word recognition and show the dimensions of valence and arousal interact during word recognition within brain regions that are also implicated in motivational decision-making.
Neural precursors of memory illusions for early and late acquired words

Díez, E., Fernández, A., Alonso, M. A. & Marín, A.

1 Universidad de Salamanca, Salamanca, Spain
2 Universidad de La Laguna, Tenerife, Spain

In our previous work, we have found that words that are acquired early are more likely to be falsely recognized following the study of words that are strongly associated to them. A possible explanation for this Age-of-Acquisition (AoA) false memory effect is that early-acquired words are more accessible than late-acquired words during retrieval operations, due to their higher level of connectivity and their higher likelihood of being indirectly activated within a lexical associative network. To further explore this hypothesis, we conducted a memory experiment in which brain electrical activity was recorded during the study of word lists associated to non-presented critical words that varied in AoA. Using a subsequent memory paradigm, false recognition of these words is analyzed in relation to ERP components that can be taken as indicators of the intensity of semantic and associative processing during the study of the lists (e.g., N170, LPC). The results are discussed in terms of the activation mechanisms partially underlying memory illusions.
Searching for cultural influences on the “right is good” conceptual mapping

de la Fuente, J. M.1, Casasanto, D.2, Román, A.1, El Fathi, A.3 & Santiago, J.1

1 Dept. de Psicología Experimental y Fisiología del Comportamiento, Universidad de Granada, Spain.
2 Max Planck Institute for Psycholinguistics, The Netherlands.
3 Faculté des Lettres et des Sciences Humaines, Université Abdelmalek Essaadi, Morocco.

In linguistic and cultural expressions all over the world, the right hand is conventionally associated with positive emotional valence and the left hand with negative valence (e.g., “my right hand man”). In spite of these conventions, Casasanto (2009) found that left-handers implicitly associate good with left and bad with right, providing evidence that motor experiences can shape mental metaphors linking concrete and abstract concepts. Interestingly, Casasanto (2009) found no traces of linguistic and cultural influences on this association: the good-right association was as strong in right-handers as the left-good association in left-handers. The present study tests whether cultural and linguistic conventions can influence body-specific mental metaphors for emotional valence by looking at a cultural group with much stronger left-hand taboos: Arabs. We first succesfullly replicated Casasanto’s study with Spanish speakers. We then tested a group of Arabs living in Spain and a group of Moroccans living in Morocco. In either group, it was nearly impossible to find left-handers. Moreover, results showed that Arabs have a much more explicit awareness of the “right is good” association. However, even in the face of these cues to a much stronger cultural influence favouring the right hand, Arab right-handers did not show a stronger association than Spanish right-handers. So far, available data suggest that the association between right and left space and the concepts of good and bad is not modulated by language or culture.

Bright students and dimwits: on the relationship between Intelligence and Light-Emission

Valenzuela, J.¹ & Sullivan, K.¹, ²

¹ University of Murcia (Spain)
² University of Brisbane (Australia)

Recent studies have shown that some abstract domains receive embodied grounding through their connection to sensorimotor domains (e.g., Affection/temperature, Morality/Cleanliness, Control/Verticality, to name a few). All these metaphors are based on experiential correlates, such as the simultaneous experience of affection and warmth or upright stance and control. However, in language we often find metaphors which are based on structural correspondences rather than experiential correlates. The current study examines a correspondence without experiential correlates, the one that connects INTELLIGENCE to LIGHT-EMISSION, which is said to underlie expressions such as "bright thinker" and "dim student". In the world, intelligent people do not tend to emit light, so the mapping between INTELLIGENCE and LIGHT-EMISSION is not experientially based. In this study, we showed subjects a series of photographs of faces in which the backgrounds had been digitally lightened or darkened (though the faces themselves remained identical); we then measured how this background influenced their evaluation about the “goodness” and the “intelligence” of the faces. Four stories were supplied, with smart-and-good, smart-and-bad, stupid-and-good and stupid-and-bad protagonists. Subjects had to rate on a 1 to 7 scale the likelihood that the face to be evaluated could be one of the protagonists of the story. As predicted by the INTELLIGENCE AS LIGHT-EMISSION correspondence, subjects rated the intelligence of faces with lightened backgrounds higher than the same faces against darkened backgrounds. The people who appear surrounded by light seem “brighter”, i.e., more intelligent. Interestingly, these results were modulated by both the sex of the participant and of the face to be evaluated. Overall, these results suggest that, as seem to be the case with experientially correlated metaphors, structurally based metaphors are also active in cognition.
Developmental Psycholinguistics in Spanish: Understanding early grammar acquisition using a multi-method approach

Mariscal, S.¹, Rujas, I.², Casla, M.² & Aguado, J.³

¹ Universidad Nacional de Educación a Distancia
² Universidad Autónoma de Madrid
³ Universidad Complutense de Madrid

The process of early grammar acquisition is still far from being understood nowadays in spite of the huge amount of empirical contributions reported during the last decade. Different kind of experimental evidence, both from comprehension and production, is needed especially to examine languages different from English. This work presents a multi-method approach to the study of Spanish plural morphology. 1. Intermodal Preferential Looking Paradigm (IPLP): comprehension of verbal morphology was tested with 36 children (aged 22–30 months). The experiment used frequent verbs and nonce verbs. Different Dependent Variables were used to test children’s performance: proportions of looking times to the matching screen vs. non-matching screen, number of head-turn to target stimuli and longest segments of looking time. 2. Imitation task: repetition of frequent and non-frequent (nonce) verbs in 3rd singular and 3rd plural person was requested to a set of 55 (aged 24–48 months) children. 3. Grammaticality judgements: 32 children (aged 36 months to 6 years) judged sentences with and without agreement errors. Results show clear effects of age, morphological and lexical frequency. Taking these results together, it is possible to confirm that third plural subject agreement is mastered later than third singular, given that plural are less frequent in the input, specially for younger children compared to toddlers and adults. Moreover, children’s difficulties with these morphemes are more evident with less frequent forms and nonce verbs than with more frequent forms. The coherence of results through these various measures and levels of knowledge (implicit in IPL vs. explicit in the judgement task) reinforces the conclusion.
Many children attending French schools in Montreal use another language at home, and are exposed to French only when entering kindergarten. These children are at risk of presenting a language delay and are often misdiagnosed as having a language disorder. Language assessment in the context of second language learning is problematic as the use of standardized tests can under-evaluate children’s real capacities. The proper understanding of bilingual children’s second language acquisition must be based on scientific knowledge of typical second language acquisition, the purpose of our study. Ten children with Spanish as their first language, aged 4 to 6 years, and exposed to French for one year on average participated in elicitation tasks for French noun phrases with masculine or feminine, variable or invariable, color and size adjectives (e.g., La petite maison blanche ‘the little white house’). Results were compared to those of monolingual French children matched on age, sex, and parents’ educational level. Global analyses on scores (presence of all elements, respect of agreement and word order rules) reveal that bilingual children perform below French children on all tasks except color naming. Repeated measures ANOVAs were computed on scores for adjectives with variability (variable and invariable) and gender (masculine and feminine) as within factors, and participant group as the between factor. Variable feminine adjectives were more difficult to produce for bilinguals (31.67%) than for monolinguals (83.33%), while other French adjectives resulted in similar response patterns in both groups. Transfer effects from Spanish to French were found for syntactic but not morphosyntactic structures. These results allow for the identification of normal difficulties in variable adjective agreement and the production of complex French noun phrases in children learning a second language. We contrast these results with those found for children with language impairment presented in previous work.
Letter name and letter sound knowledge in Spanish children

Simpson, I., Onochie-Quintanilla, E. & Defior, S.

Departamento de Psicología Evolutiva y de la Educación, Universidad de Granada, Granada, Spain

Letter names play an important role in early literacy. Many studies have shown that children’s ability to name the letters of the alphabet is one of the best predictors of later reading and spelling performance. Further studies have looked at the types of errors made by English speaking children in letter naming tasks. While similar studies have been published for other languages such as Portuguese and Hebrew, no similar study exists for Spanish. We report the results from a longitudinal study of 190 children from the Andalucía region of Spain (mean age at the start of the study 6;7, range 6;1-7;1, 86 females) who took part in a series of letter naming and letter sound production tasks over a 2 year period. Factors predicting task success included letter frequency and whether the letter appeared in the child’s own name. An analysis of error type revealed that visual and phonological similarity led to letter confusion. While many of these results were similar to published results from English speaking children, this was not always the case. One particularly interesting result concerns acrophonic letters – letters whose name begins with the sound of that letter (e.g. “B” pronounced as /bi/). In English, children generally perform better on acrophonic letter names than they do on other letters (e.g. names that end with their sound of the letter, such as “F” pronounced as /ɛf/). Somewhat surprisingly we found that Spanish children performed worse on acrophonic letters than they did on other letters (e.g. “F” pronounced as /ɛfɛ/). As part of a comprehensive presentation of the study’s findings, we will discuss some of the reasons which may explain the difference between English and Spanish. The efficacy of early letter knowledge as a predictor of later literacy skills in Spanish will also be discussed.
Assimilation processes in late stages of phonological development

Martinez, V.¹ & Diez-Itza, E.²

¹ University of Barcelona, Departament of Basic Psychology
² University of Oviedo, Departament of Psychology

The study of child phonology tends to focus on phenomena of change during the first three years, and there is little evidence of a later age of transition to adult production models. This is the case of the assimilation process, common in child language and sporadic in adult speech, where the features of a phoneme spread to other more or less close phonemes in the spoken chain, in a progressive (lunales = lunares) or regressive manner (cocadillos = bocadillos). Given the early importance of assimilation, this paper investigates its impact on late phonological development in the light of phonological production models for children and adults. Spontaneous speech samples were recorded from 240 Spanish-speaking children divided into six age groups, ranging from 3;0 to 5;11 years (3;0, 3;6, 4;0; 4;6; 5;0 y 5;6), with an equal number of girls and boys. Recordings were transcribed and analysed using the tools provided by the CHILIDES Project (MacWhinney, 2000), designing a system for categorizing the assimilation process that included directionality (progressive/regressive) and distance (contiguous/non-contiguous). The differences between age groups were tested by Analysis of Covariance. The results show that the assimilation processes decrease significantly over three late stages, although their proportion in global terms tends to increase. These results would be well compatible with those of Berg (1992), who concludes that the assimilation processes constitute processing strategies to produce sounds that are difficult for the child, and they remain as general principles of production in the adult. Additionally, in this study, more assimilation processes were observed between consonants than between vowels, as were as a higher incidence of assimilation as a whole. These data suggest also a dependency on the type of language.
Processing of two-digit numbers: evidence of decomposition from a perceptual number matching task

Damas-López, J. & García-Orza, J.

Faculty of Psychology. University of Málaga

In the last decade there has been a great controversy regarding whether two-digit numbers are processed compositionally (i.e., each digit pair being processed separately as a decade digit and a unit digit), holistically (i.e., each digit pair being processed as one number) or both. As the evidence accumulated, the focus of the debate has changed from the initial question to explore the conditions in which the holistic or the decomposed processing occurs. It has been suggested that holistic processing is favoured when, in comparison tasks, a given number has to be compared to a standard presented serially some seconds before. As well, it has been observed that it is easier to find compositional effects when, together with between-decade trials (e.g., 23 56), within-decade trials (e.g., 23 27) are included in the experiments. Here, two experiments using a number matching task (NMT) explored whether two-digit numbers are processed holistically or in a compositional fashion. In the NMT participants are required to decide whether one of the two numbers initially provided (cues) is presented some ms later or not (probe). Probes which have some arithmetic relationship to the cues (e.g., cues: 2 3, probe: 6) are rejected slower than those probes unrelated to its cues (e.g. cues: 2 3, probe: 7) - interference effect-, which is considered as an evidence of the automatic activation of that relationship. In our experiments, participants were presented with two-digit cues and probes which had an arithmetic progression relationship with common difference 1 or -1, only detectable once the numbers were decomposed (Experiment 1: cues: 56 7, probe: 89; Experiment 2: cues: 45 67, probe: 89). Results showed longer response times in these conditions compared to unrelated conditions. Data support a componential processing even when the numbers involved in the task are presented serially.
Is there automatic access to numbers representations? The case of Indian numerals

Abu Mallouh, R.¹, García-Orza, J.², Perea, M.³ & Carreiras, M.¹

¹ Basque Center on Cognition, Brain and Language (BCBL). Donostia. Spain
² Universidad de Málaga
³ Universitat de València

One common assumption in the field of numerical cognition is that integers automatically activate the quantity they represent. One key phenomenon supporting this view is the “distance effect” in perceptual tasks: when comparing two numbers, reaction times are a function of the numerical distance between them. However, in a recent study, D.J. Cohen (2009) reported that: i) that the physical similarity between Arabic numbers and the numerical distance are strongly correlated; and ii) when reaction times are regressed on physical similarity and numerical distance, the former is a better predictor of the distance effect. Cohen concluded that integers do not automatically their quantity representation. The aim of the present study is to shed more light on this issue by exploring Indian numerals and using an empirical measure of similarity. Twenty participants from Pakistan and 20 native speakers of Spanish (with no knowledge of Indian numbers) participated in a same/different Indian number matching task similar to that employed by Cohen (2009). The reaction times from the Spanish participants were employed as a measure of perceptual similarity. Pakistanis participants’ reaction times were regressed on the perceptual similarity and the numerical distance effect. No contribution of quantity representation was found while we found a significant contribution of perceptual similarity. Thus, at least in simple, perceptual tasks numbers are compared according to their perceptual characteristics without accessing to their quantity representation.
Automatism in subtraction depends on problem size

Estudillo, A. J.¹, Casado, N.² & Bermudo, E.²

¹ University of Edinburgh
² Universidad de Málaga

According to Dehaene’s triple code model (1992; Dehaene & Cohen, 1995), subtractions and quotients are solved using an analogue-magnitude code (semantic), which is not precise. On the other hand, simple additions (5+2) and multiplications (4x3) are solved automatically, by memory retrieval using verbal representations. Other models of mathematical cognition (McCloskey, 1992; Cipolotti & Butterworth, 1995) consider that automaticity in different operations will depend on the frequency of solving. In this sense, the more frequent the more automatic. In our daily life, we solve small subtraction quite often, so it reasonable that this kind of subtraction may be solved automatically. We use a verification task (is the next operation correct? 4+2 =6) to shed light on this question. Participants had to determine whether the sum displayed were correct or not. Incorrect sums could be the correct result of a subtraction (interference condition, e.g., 7+3=4) or not (control e.g., 7+3=5). Problem-size was also manipulated, considering small subtraction as single digit subtraction, and large ones as a two digit number in the minuend and one digit in the subtrahend. Results showed longer responses in the incongruent condition in small subtractions but not in large ones. These results showed that small subtractions are solved automatically and they challenge Dehaene’s account about subtraction.
Linguistic competitions during the comprehension of speech in multi-linguistic babbles

Gautreau, A., Hoen, M. & Meunier, F.

Centre de Recherche en Neurosciences de Lyon, CNRS – INSERM- Université Lyon

Our research aims at exploring psycholinguistic processes implicated in a situation favoring information competition: speech-in-speech comprehension. Our studies focus on the nature of interferences observed during speech-in-speech comprehension. Our goal is to identify information levels in which competitions, leading to interferences, can occur. In a first series of experiments, we used cocktail-party signals in different world languages: French, Breton, Irish and Italian. Cocktail-party signals were composed of 4 talkers. Participants had to identify French target-words inserted in a babble noise with a signal-to-noise ratio of 0 or -5dB. Results confirmed that it is more difficult to understand French words with French background noise than in a babble composed of languages unknown to listeners. Results obtained with unknown languages also showed differences in the observed performances depending on the language spoken in the background and demonstrated that some languages interfered more with French than some others. Overall these results suggested that the interference effect is not purely acoustic but also linguistic. To test it more directly, we used fluctuating noises matched to each cocktail-party signals in order to control for acoustic differences between the different language specific babbles such as speech rate and spectrum. Thus in a second experiment, the cocktail-party signals in the different world languages were used again as babble noise and served also to generate language specific fluctuating speech noises. Overall, results revealed a worse identification of the target-words with cocktail-party signals than with matched fluctuating noises of about 20%, showing that part of the interference is linguistic. Finally, a bigger difference between the two types of backgrounds (fluctuating noises - cocktail-party signals) was observed in French compared to all the other languages while no difference between the unknown languages is observed. These results suggested a strong effect of lexical competition in the French-in-French situation.
Different proposals have been made with regard to the syntactic constraints that may regulate a) language choice and b) placement of the linguistic components in mixed utterances. Some models distinguish between the languages available to the bilingual in terms of strong(est)/ weak(est) language, matrix/embedded language or the language that provides /receives functional elements as a possible explanation (prediction) of the source of items contained in mixed utterances. Evidence for that hierarchy has been found in early and late unbalanced bilingualism, speech pathologies etc. In contrast, models which consider mixed utterances as the result of one computational system working with two lexicons predict that it is the head of the phrase what will decide the placement of its complement. The present study analyses mixed utterances containing elements of B(asque) and Sp(anish), two languages which differ with regard to the head directionality parameter —head final (B)/ initial (Sp)— and to the morphology of some functional heads—bound (B) vs. free (Sp). The analysis of longitudinal and cross-sectional corpora of spontaneous or elicited production of mixing by early bilingual children (2L1 and L2) and by language impaired adults revealed the existence of a similar pattern of language mixing across corpora: mixed utterances mostly contain complex full XPs in the other language (B or Sp) as complement or adjunct of Sp or B heads respectively. In addition, head-complement word order in mixed DPs corresponds to the language providing the head, head initial in DetSpNPB phrases and head final in NPSpDetB mixed DPs though no clear preference is observed for any of the combinations, what contrasts with predictions based in the feature specificity of the head. Finally, the overall scarcity of mixed phrases suggest that the morphosyntactic properties of the languages in contact play an important role in the typology of mixed utterances.
Trascranial Magnetic Stimulation in the treatment of aphasia

Andreu Barrachina, L., Muñoz Marrón, E. & Redolar Ripoll, D.

Universitat Oberta de Catalunya

Electrical Stimulation techniques, including Transcranial Magnetic Stimulation (TMS), can be used to temporally facilitate or inhibit neural activity to examine intact systems, examine the presence of residual capacity in an injured system, or to accelerate natural recovery mechanisms. Several studies have showed that low frequency repetitive Transcranial Magnetic Stimulation (rTMS) can be used to produce changes in cortical excitability. When delivered to the same cortical region, slow (≤1Hz) rTMS appears to decrease excitability in the targeted cortical region of interest (ROI) that lasts beyond the duration of the train itself, leading to measurable behavioral effects. Conversely, rapid rTMS (>1Hz) increases cortical excitability. rTMS has been observed to affect language ranging from facilitation of naming to speech arrest depending on rTMS parameters and location of the coil. In this work we present the application of TMS to improve language behavior in stroke patients. These patients have very often speech and language problems, which include hesitant, poorly articulated agrammatic speech with word-findings problems (non-fluent aphasia). Low frequency rTMS has been applied to improve picture naming in aphasia. The application of low frequency rTMS to a specific cortical ROI in the undamaged hemisphere suppress the inhibitory process of that ROI, permitting reactivation of some areas within the damaged hemisphere, promoting some functional recovery. This treatment has been applied either only a single session or several sessions over longer periods of time. Results showed a site-specific effect of TMS for number of pictures named correctly, including a double dissociation within Broca’s area. Moreover, more treatment sessions produce better language recovery. This shows the capacity of TMS to modulate neural language networks and lexical-semantic function in patients with non-fluent aphasia.
Development of visual word recognition in poor readers

Goikoetxea, E., Ferrero, M. & Pascual, G.

Universidad de Deusto

Learning to read is a skill that requires time and practice. Much is known about the pre-reading knowledge that strongly influences learning to read (e.g., letter recognition). However, there has been much less research about the process of acquiring new words, and what differentiates poor readers from normal readers throughout this process. In terms of dual-route cognitive reading models, this would be called the construction of the lexical pathway. It is in this crucial phase of learning to read where there is a lack of well-founded information to guide the teacher’s efforts (National Reading Panel, 2000). In a sample of 40 Spanish-speaking children from third to sixth grades, this study examines 20 poor readers (students in the 10th percentile or less) and 20 normal readers (students in the 50th percentile or more). The study evaluated changes in accuracy and, once a correct reading had been achieved twice, changes in the recognition speed and naming speed of words repeated 15 times throughout three training sessions. The results of a preliminary study show that the changes in reading speed occur one trial later in the poor readers than in the normal readers.
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