UNIVERSITEIT GENT

PiF 2018

Psycholinguistics in Flanders

Het Pand, Ghent

4th – 5th June 2018

European Commission

Research Foundation Flanders
Opening new horizons

Table of content

Programme	3
Welcome to Ghent!	8
About PiF 2018	10
Ghent University	11
The venue	12
Useful information	13
Keynote addresses	14
Oral presentations	17
Talk session 1 – Reading	18
Talk session 2 – Word processing	24
Talk session 3 – Communication	30
Talk session 4 – Language production	35
Talk session 5 – Bilingualism and L2 processing	40
Poster presentations	46
Poster session 1	47
Poster session 2	67

Programme

Monday, 4th June 2018		
8.10	**Registration**	
9.00	**Conference opening**	
9.10	**Talk session 1: Reading**	
	[T1.1]	*You that read wrong again! A transposed-word effect in grammaticality judgments* Jonathan Mirault, Joshua Snell & Jonathan Grainger
	[T1.2]	*Syntactic prediction as active number maintenance in subject-verb agreement* Bojana Ristic, Simona Mancini & Nicola Molinaro
	[T1.3]	*How well do reading measures correlate? Effects of language context and repeated presentations* Nicolas Dirix, Marc Brysbaert & Wouter Duyck
	[T1.4]	*Binocular coordination during reading: Disconjugacy and a division of labour between the right and left eye in reading English and Chinese* Ruomeng Zhu, Richard Shillcock & Mateo Obregón
	[T1.5]	*BA tool for extracting phonetically balanced and phonetically rich texts from corpora* George Christodoulides
10.50	**Coffee break**	
11.10	**Talk session 2: Word processing**	
	[T2.1]	*What am I reading? Investigating the impact of features on model fit in word reading* Stéphan Tulkens, Dominiek Sandra & Walter Daelemans
	[T2.2]	*Orthographic neighbor co-activation in a letter search task: The role of the lexical representation* Gabriela Meade, Jonathan Grainger & Phillip J. Holcomb
	[T2.3]	*Incidental learning of English in children: how do word-related variables influence receptive vocabulary learning?* Vanessa De Wilde, Marc Brysbaert & June Eyckmans
	[T2.4]	*Pupil dilation reflects increased processing load for salient variables* Vincent Boswijk, Hanneke Loerts, Matt Coler & Nanna Haug Hilton
	[T2.5]	*Can prediction-based distributional semantic models predict typicality?* Tom Heyman & Geert Heyman
12.50	**Lunch at Het Pand**	
13.50	**Talk session 3: Communication**	
	[T3.1]	*Referential gaze in spoken language comprehension: Human speaker vs. virtual agent listener gaze* Eva Maria Nunnemann, Kirsten Bergmann, Helene Kreysa & Pia Knoeferle
	[T3.2]	*Do effects of habitual speech rate normalization on perception extend to self?* Merel Maslowski, Antje S. Meyer & Hans Rutger Bosker

	[T3.3]	*Does reading ability predict individual differences in the syntactic processing of spoken language?* Saoradh Favier, Antje Meyer & Falk Huettig
	[T3.4]	*The effects of accented speech on knowledge acquisition* Teresa L. Turco, Elise W.M. Hopman & Maryellen C. MacDonald
15.10	**Coffee & Poster session 1**	
	[P1.1]	*Immediate feedback is critical for learning from your own productions* Elise Hopman & Martin Zettersten
	[P1.2]	*How does learning to read shape the neural representation of spoken and written language?* Adam Jowett, Joanne Taylor, Angelika Lingnau & Kathy Rastle
	[P1.3]	*The Parametrisation of language in L1 acquisition and the cross-modal development of pre-school children* Mihaela Moreno, Nico Blanco, Mihaela Marchis Moreno & Thorben Neitzke
	[P1.4]	*Analysing the individual spelling performance of multilingual pupils in French and its development after an intervention training* Natalia Bilici, Sonja Ugen, Michel Fayol & Constanze Weth
	[P1.5]	*Does reformed words enhance meaning-form correlation?* Hana Jee & Richard Shillcock
	[P1.6]	*Mind-wandering states during bilingual reading* Natalia Dubinkina, Edwige Sijyeniyo, Wouter Broos, Matthias Franken, Alice Foucart & Robert Hartsuiker
	[P1.7]	*Competing vowels facilitate the recognition of unfamiliar L2 targets in bilinguals: The role of phonetic experience* Bartosz Brzoza
	[P1.8]	*The effect of bilingualism on reading. Gradual cognate effects in Frisian-Dutch bilingual children, an eye-tracking study* Naomi Nota & Evelyn Bosma
	[P1.9]	*Impact of bilingualism in lexical processing among children with specific language impairment.* Florian Salomé, Montserrat Comesaña Vila & Séverine Casalis
	[P1.10]	*Performance monitoring in the first and second language* Wouter Broos, Wouter Duyck & Robert J. Hartsuiker
	[P1.11]	*Order restrictions of attributive adjectives in slovenian: A self-paced reading study* Vesna Plesničar
	[P1.12]	*Lexical and phonological precision for word and pseudoword recognition in skilled readers* Mahmoud Elsherif, Linda R. Wheeldon & Steven Frisson
	[P1.13]	*From lexical categories to acceptable lexical choices: A discriminative learning approach* *Giovanni Cassani, Robert Grimm, Harald Baayen, Walter Daelemans & Steven Gillis*
	[P1.14]	*Cognitive reading mechanisms and associated abilities in deaf Lebanese children* Mirna Mattar & Jacqueline Leybaert

	[P1.15]	*Preschool language profile as a predictor of reading disabilities among children with language impairment* Camille Cornut & Séverine Casalis
	[P1.16]	*The neurocognitive profile of dyslexia and dyscalculia in children: A behavioral and DTI tractography study* Jolijn Vanderauwera, Astrid De Vos, Stephanie J Forkel, Marco Catani, Jan Wouters, Maaike Vandermosten & Pol Ghesquière
	[P1.17]	*How students with dyslexia can optimize reading* Liset Rouweler, Wim Tops & Ben Maassen
	[P1.18]	*Gender and number agreement processing in Dutch adults with developmental dyslexia: an ERP study* Aida Salčić, Srđan Popov, Wim Tops & Roelien Bastiaanse
	[P1.19]	*Subject production and interpretation in Greek and Spanish: evidence from monolingualism and bilingualism* Aretousa Giannakou
16.30	**Keynote 1: Falk Huettig** The culturally co-opted mind and brain	
19.30	**Conference dinner**	

Tuesday, 5th June 2018		
9.30	**Talk session 4: Language production**	
	[T4.1.]	*Effects of phonological, lexical, and semantic overlap on the production of sentence structure* Chi Zhang, Sarah Bernolet & Robert J. Hartsuiker
	[T4.2]	*Opposing and following responses in sensorimotor speech control: Why responses go both ways* Matthias Franken, Daniel J. Acheson, James M. McQueen, Peter Hagoort & Frank Eisner
	[T4.3]	*Linguistic statistical associations predict category member production* Briony Banks, Cai Wingfield & Louise Connell
	[T4.4]	*Do speech registers also rely on language representations? Evidence from switching between formal and informal language* Mathieu Declerck, Iva Ivanova, Jonathan Grainger & Jon Andoni Duñabeitia
10.50	**Coffee break**	
11.10	**Talk session 5: Bilingualism and L2 processing**	
	[T5.1]	*Memory for texts in a non-native language: disentangling the recall cost* Heleen Vander Beken & Marc Brysbaert
	[T5.2]	*The perceptual span of L2 English speakers with different L1 alphabetic systems* Mariia Naumovets, Leigh Fernandez & Shanley Allen
	[T5.3]	*How I learned L2 words influences how I process them: the effect of learning method on connections between L2 words and conceptual system* Gary Boddaert, Yann Coello & Séverine Casalis

	[T5.4]	*Prediction of semantics during L2 and L1 listening: effects of a cognitive load* Aster Dijkgraaf, Robert Hartsuiker & Wouter Duyck
	[T5.5]	*The central processing bottleneck during word production: Comparing simultaneous interpreters, bilinguals and monolinguals* Longjiao Caroline Sui, Haidee Kruger & Helen Slatyer
12.50	**Lunch at Het Pand**	
13.50	**Keynote 2: Sarah Bernolet** The interplay of implicit and explicit memory effects in sentence production: Evidence from syntactic priming within and between languages	
14.50	**Coffee & Poster session 2**	
	[P2.1]	*Measuring the knowledge and usage of the grammatical information encoded in stem-vowel alternations in German strong verbs during real-time sentence comprehension* Eva Koch , Aline Godfroid & Alex Housen
	[P2.2]	*Complex noun phrases: The influence of length and type on processing time* Alice Johnson , Anna Grün, Shanley Allen & Leigh Fernandez
	[P2.3]	*The role of linguistic and sensorimotor information in the basic-level advantage* Rens van Hoef , Louise Connell & Dermot Lynott
	[P2.4]	*Moses or Noah? A case of 'potato-potahto' when using a foreign language* Sara Dhaene, Nicolas Dirix & Evy Woumans
	[P2.5]	*Distributional nuggets for lexical categories: Finding the useful information in co-occurrence patterns* Giovanni Cassani, Robert Grimm, Steven Gillis & Walter Daelemans
	[P2.6]	*How to count stuff: Conceptual shifts in German noun countability* Natalja S. Beckmann & Peter Indefrey
	[P2.7]	*The role of lexical access in working memory for concepts* Agata Dymarska & Louise Connell
	[P2.8]	*The influence of L1 reading direction on the L2 perceptual span size* Ricarda Bothe, Kristina Kolesova, Linda Laryea, Ricarda Bothe & Leigh Fernandez
	[P2.9]	*Saving five people or two: The foreign language effect persists* Evy Woumans, Sofie Ameloot & Wouter Duyck
	[P2.10]	*Anticipatory eye movements while processing WH-dependencies in a second language* Sonja Sudimac, Tawhida Jahan & Leigh Fernandez
	[P2.11]	*Planning scope in a second language* Felicity F. Frinsel & Robert J. Hartsuiker
	[P2.12]	*Semantic interference in the brain: An fNIRS study* Toru Hitomi & Robert J. Hartsuiker
	[P2.13]	*Development of shared syntactic representations in second language learning: Evidence from syntactic priming* Merel Muylle, Sarah Bernolet & Robert J. Hartsuiker
	[P2.14]	*Are children from a low SES sensitive to morphological units?* Alicia Rassel & Séverine Casalis

	[P2.15]	*Representation of morphologically complex words in the mental lexicon: An ERP study* Flavia De Simone, Rosa Storzillo & Simona Collina
	[P2.16]	*A multiple threshold model of categorization* Steven Verheyen & Paul Egré
	[P2.17]	*Can affordable equipment produce good results?* Eva Matthias, Tori Larsen , Per Olav Folgerø & Christer Johansson
16.10	**Marie Curie session**	
17.10	**Closing remarks**	

Welcome to Ghent!

The city of Ghent first saw the light of day in 630, when the missionary bishop St Amand chose the confluence of the rivers Scheldt and Lys to found St Bavo's Abbey (the older name of Ghent, Ganda, is derived from the Celtic word for 'confluence').

In the Middle Ages, Ghent grew into one of the most important cities in Western Europe. Thanks to the wool trade, Ghent grew so much that it was second in size only to Paris.

Nearly 1400 years of history are still palpable in the city today. Some places to see or visit are:

St. Bavo's Cathedral: The oldest parish church in Ghent was built on the site of a previous church dating back to 942. The chapel was then expanded in the Romanesque style in 1038. The Romanesque church is still visible in the cript. In the 15th century, it was decided to replace the Romanesque structure with a larger Gothic church, which was completed in 1559. In 1540, the church became the seat of St Bavo's chapter and St Bavo immediately became its patron saint. In 1559, the diocese of Ghent was founded and the church became its cathedral.

Belfry: Through the centuries, the belfry served not only as a bell tower to announce the time and various warnings, but also as a fortified watchtower and the place where the documents evidencing the municipal privileges were kept. The bells in the belfry originally only served a religious purpose. Gradually the bells got a secular role by regulating daily life in the growing medieval city. Construction on the Belfry began around 1313 and reached completion in 1380. Ghent's Belfry (a UNESCO World Heritage Site) symbolises the city's independence and proudly holds aloft the alarm bell, which served to protect its citizens.

St. Nicholas' church: Next to the Belfry and Saint Bavo Cathedral, the third medieval tower that overlooks the city of Gent. Erection began in the early 13th century as a replacement for an earlier Romanesque church. Construction continued through the rest of the century in the local Scheldt Gothic style (named after the nearby river). Typical of this style is the use of blue-grey stone from the Tournai area, the single large tower above the crossing, and the slender turrets at the building's corners. St Nicholas is the protector of merchants and sailors, who raised the money to build this impressive example of the Scheldt Gothic style.

St. Michael's bridge: The most photographed and arguably the most scenographic spot in the city. From St. Michael bridge you can admire Graslei and Korenlei with the Old Fish Market and the Castle of the Counts (Gravensteen) in the distance, St Michael's Church, the rear of the building Pand and of course the famous row of towers, which you can only capture neatly lined up in a row from this one spot.

Gravensteen: The Castle of the Counts is about the only remaining medieval fortress in Flanders with its defence system still virtually intact.

Take a walk in the city centre, and if you want more information, head to Visit Gent Information Centre, Sint-Veerleplein 5, just across from the Gravesteen, or visit www.visitgent.be.

HISTORICAL CITY CENTRE
HISTORICAL CITY CENTRE
1 ST BAVO'S CATHEDRAL
2 GHENT ALTARPIECE
3 NTGENT
4 ACHTERSIKKEL
5 BELFRY
6 ROELAND BELL
7 DE MALAGO (HEAVEN) BY MICHAËL BORREMANS
8 CITY PAVILION
9 TOWN HALL
10 GRAFFITI STREET
11 MASONS' GUILD HALL
12 ST NICHOLAS' CHURCH
13 ITS VIEW OF THE 3 TOWERS
14 ST MICHAEL'S CHURCH
15 GRASLEI & KORENLEI
16 HET PAND
17 DESIGN MUSEUM GENT
18 CASTLE OF THE COUNTS
19 LIEVEKAAI & ST-ANTONIUSKAAI
20 PRINSENHOF
21 DR. GUISLAIN MUSEUM
22 GREAT BUTCHERS' HALL
23 OLD FISH MARKET
24 THE HOUSE OF ALIJN
25 PATERSHOL
26 CAERMERSKLOOSTER
27 MIAT
28 VRIJDAGMARKT
29 PORTUS GANDA
30 ST BAVO'S ABBEY
31 CASTLE OF GERALD THE DEVIL
32 MUSEUM ARNOLD VANDER HAEGHEN
33 HOTEL D'HANE-STEENHUYSE
34 SMALL BEGUINAGE OUR
35 LADY TER HOYEN
36 GREAT ST ELIZABETH BEGUINAGE
37 OLD ST ELIZABETH BEGUINAGE
38 OLD LAW COURTS
39 OPERA GENT
40 THE WORLD OF KINA: THE GARDEN
41
42
43
HOP ON HOP OFF WATERTRAM
DE BOOTJES VAN GENT-REDERIJ DEWAELE & BOAT IN GENT
SAT + SUN FROM 1/4 > 1/11
STOPS
DEPARTURE TIMES
CASTLE OF THE COUNTS 11.00 • 12.30 • 14.00 • 15.30 • 17.00 • 18.30
GRASLEI-KORENLEI 11.10 • 12.40 • 14.10 • 15.40 • 17.10
MUSEUM SITE 11.30 • 13.00 • 14.30 • 16.00 • 17.30
ST PETER'S ABBEY 11.50 • 13.20 • 14.50 • 16.20 • 17.50
ST BAVO'S CATHEDRAL 12.05 • 13.35 • 15.05 • 16.35 • 18.05
SHOPPING VELDSTRAAT 12.15 • 13.45 • 15.15 • 16.45 • 18.15
TOURIST OFFICE
BICYCLE RENTAL
RAILWAY STATION
TRAM
WWW.DELIJN.BE
TRAM 1
GENT FLANDERS EXPO – EVERGEM/WONDELGEM
TRAM 4
GENT UZ – MOSCOU
CITY WALK HISTORICAL CENTRE
DAMPOORT STATION
TAKE BUS Nº5
TAKE TRAM Nº1
OUDE HOUTLEI
ONDERBERGEN
AJUINLEI
PREDIKHERENLEI
VELDSTRAAT
KORTE MEER
ZONNESTRAAT
KORENLEI
LEIE
GRASLEI
KORENMARKT
GROENTEN MARKT
VOLDERSTRAAT
HENEGOUWENSTR
DAM
VLAANDERENSTRAAT
LANGE BOOMGAARDSTR
BISDOMKAAI
REEP
NEDERPOLDER
KWAADHAM
ST-JACOBSNIEUWSTRAAT
NIEUWPOORT
STEENDAM
BAUDELOPARK
BAUDELOSTRAAT
BAUDELOKAAI
OTTOGRACHT
GELDMUNT
LANGEMUNT
ONDERSTRAAT
HOOGPOORT
BELFORTSTRAAT
VRIJDAGMARKT
KRAANLEI
OUDBURG
BURGSTRAAT
DRABSTRAAT
POEL
RAMEN
INGELANDGAT
STRUIFSTR
POSTEERNESTR
GEBR. VANDEVELDESTR
LIEVEKAAI
PRINSENHOF
REGATTENLAAN
VOORHOUTKAAI
SCHOOLKAAI
HAGELANDKAAI
NIEUWBRUGKAAI
VEERKAAI
KELDERSTEEG
GEBR. VAN EYCKSTR
P. DE KEYSERESTR
SINT-MACHARTUSSTRAAT
SPANJAARDSTRAAT
GANDASTRAAT
KASTEELPOORT
KAZEMATTENSTRAAT
SPAANSE KASTEEL PLEIN
ST-MICHIELSBRUG
ST-MICHIELSKERK
ST-MICHIELS PLEIN
ST-NIKLAASKERK
ST-NIKLAASPAROCHIEKERK
ST-BAAFSKATHEDRAAL
ST-BAAFS PLEIN
ST-JACOBSKERK
VLAS MARKT
BELGACOMTOREN
OUDE BELFORTMARKT
STADHUIS
STADSHAL
BRAUN PLEIN
KOOPMANDELS PLEIN
VEERMAN PLEIN
EDWARD ANSELE PLEIN
GRAVENSTEEN
ST-JANSDREEF
KALVERMARKT
ZILVERBERG
BOTERMARKT
HOOGSTRAAT
WERREGARENSTRAAT
KAMMERSTR
FEYNTENTENSTRAAT
GOUDSTRAAT
GELUKSTRAAT
BOETOERENKAAI
LUCAS MUNICHSTRAAT
BUITENHOF
PROOSTSTRAAT
SCHELDE
LEIE

About PiF 2018

History of Psycholinguistics in Flanders

Psycholinguistics in Flanders (PiF) is a long-standing tradition in Flanders and it involves psycholinguists working in Europe and around the world. It started in 2002 when a group of psycholinguists decided to organize an annual workshop for postgraduates and young postdoctoral researchers in psychology of language. Since then it has been a central conference for psycholinguists in Belgium and it has quickly gained relevance in Europe thanks to the growing participation of international presenters and attendants. The conference has been organized yearly, involving major universities in Belgium and the Netherlands. This makes the current conference the seventeenth edition of the gathering.

Organisers

This year, the Faculty of Psychology and Educational Sciences at Ghent University is organising Psycholinguistics in Flanders. The organization of PiF is partially supported by the **Research Foundation of Flanders (FWO)** and by the **European Union's Horizon 2020 Research and Innovation Programme** (under the Marie Sklodowska-Curie grant agreement No 705046).

Members of the organising committee: Alice Foucart, Simona Amenta, Marc Brysbaert, Robert Hartsuiker, Wouter Duyck

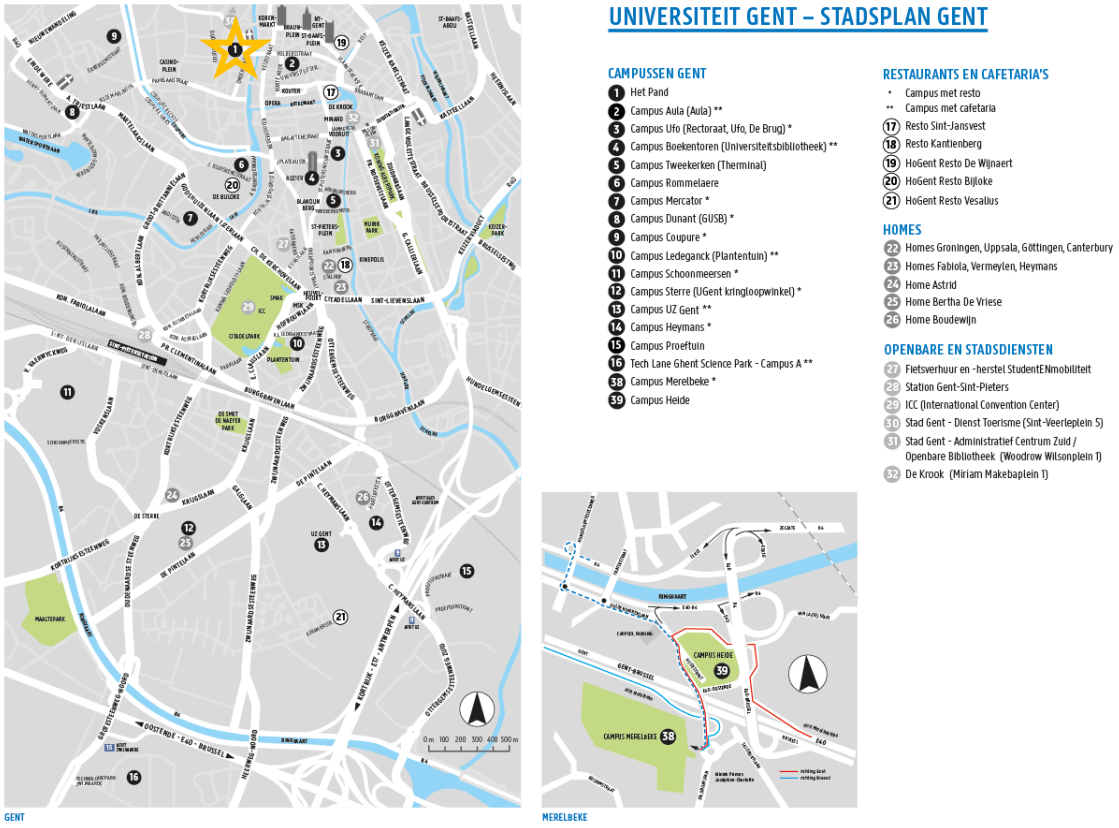
Members of the scientific committee: Alice Foucart (UGent), Simona Amenta (UGent), Marc Brysbaert (UGent), Robert Hartsuiker (UGent), Wouter Duyck (UGent), Dominiek Sandra (Antwerp University), Sarah Bernolet (Antwerp University), Gert Storm (KU Leuven), Tom Heyman (KU Leuven), Arnaud Szmalec (UC Louvain), Fabienne Chetail (ULB)

Ghent University

The Rijksuniversiteit Gent (State University of Ghent) was officially opened under the rule of King William I on 9 October 1817, which means celebrated its 200 anniversary last year. The first rector was the physician Jean-Charles Van Rotterdam and the official language of tuition was Latin. In 1930, the university became the first institution in Belgium to teach in Dutch and in 1991, the name Rijksuniversiteit Gent was officially changed to Universiteit Gent (Ghent University).

Ghent University is not a campus university. Over the years, the university's sites and buildings were set up scattered across the city, and today the university has seamlessly fused with the city. Geographically speaking, the university is spread out over and around the city centre. Most of the university buildings are located on the north-south axis, stretching from the historical city centre (including the Aula and Het Pand) to the buildings on the Sterre and the Ghent University Hospital. In terms of origin and style, the university's patrimony is also characterised by its enormous diversity; from the thirteenth century monastery Het Pand, to the classical façades of the Aula Academica, the Plateaustraat and the Rommelaere Institute, and the famous Book Tower of Henry van de Velde.

Ghent University has 117 departments across 11 faculties, offering high-quality research-based educational programmes in virtually every scientific discipline. It is the Faculty of Psychology and Educational Sciences that is organising this edition of Psycholinguistics in Flanders.



The conference venue: Het Pand

Het Pand is an old Dominican monastery located in the heart of the city on the banks of the river Leie, near the medieval port with the guildhalls as its remnants. In 1201 a hospital was established next to Saint Michael's Chapel by Canon Utenhove. By 1225 the institute had become too small, and it was decided to construct a new one close to the Bijloke. By that time the first Dominicans had arrived in Ghent. By the agency of the then counts of Flanders, Ferdinand of Portugal and Johanna of Constantinople, the Dominicans were allocated the old hospital to serve as their new settlement.

The year 1228 is considered to be the official date of establishment of the monastery in Ghent.

From 1963 onward, the building has belonged to Ghent University. It was decided to arrange 'Het Pand' as the cultural center of the university, and the Direction of the Buildings was entrusted with its renovation and restoration. Works were started in 1971 and accomplished in 1991.

The building is located just behind St Michael's church, at Onderbergen 1.

Reaching the venue is very easy.

By public transport:

From station Gent St-Pieters:
tram 1 (every 6 minutes) or tram 24 (every 20 minutes). Exit at Korenmarkt.

From Gent Zuid:
tram 4 (every 6 minutes), tram 24 (every 20 minutes) or bus 17 (every 30 minutes). Exit at Korenmarkt.

By car:

Follow the parking signage to parking P7 Sint-Michiels. The parking is located at 50 meter from Het Pand. Take the exit Onderbergen and you come out in the Wilderoosstraat, opposite Het Pand.

An alternative parking is P8 Ramen. From here it's about 5 minutes on foot to Het Pand.

If you are driving in Gent be aware of the new circulation plan! More information here: https://visit.gent.be/en/good-know/good-know/how-get-ghent/car

Useful information

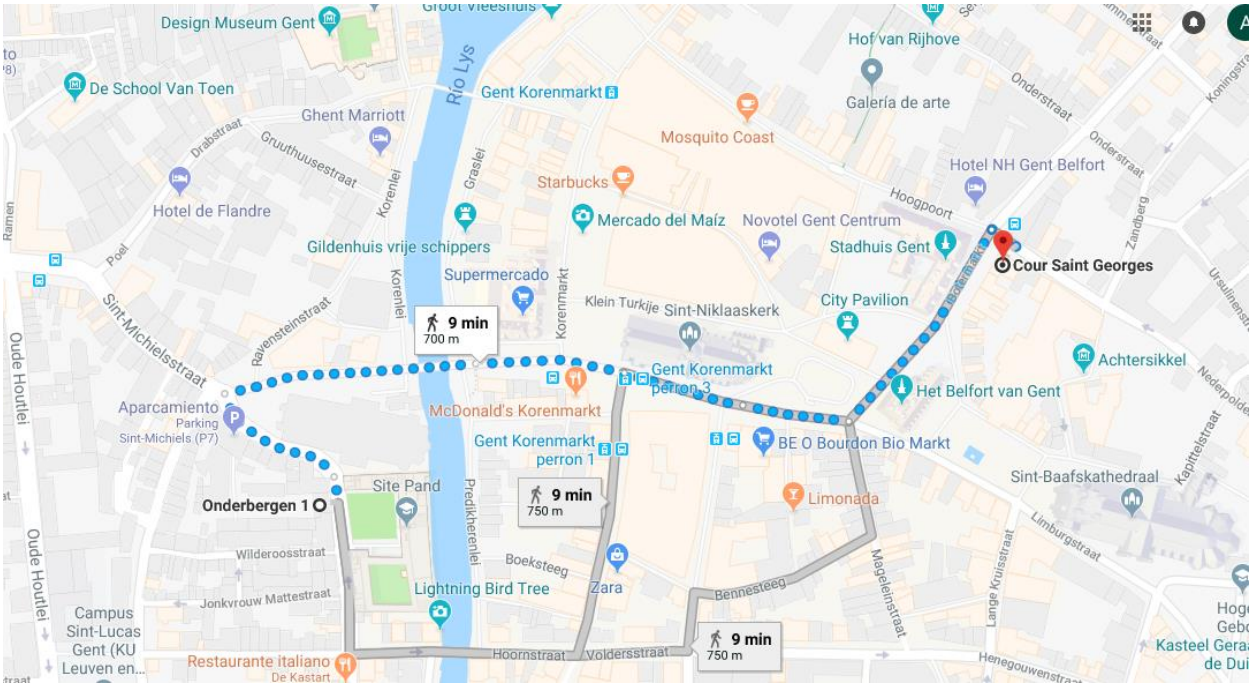
WIFI is available at Het Pand

Login: guestPif201
Password: up4bUvkF

Conference dinner

The conference dinner will be held on Monday evening 4th June 2018 at 19.30 at the Cours St. Georges, a traditional brasserie in Ghent.

Cours St. Georges - Botermarkt 2 - 9000 Gent - T +32 491 378 725



Keynote Addresses

Monday, 4th June, 16.30

The culturally co-opted mind and brain

Falk Huettig
Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

Reading as a recent cultural invention has not been shaped by evolutionary processes and thus must make use of cognitive systems and brain networks which are either domain-general or have evolved for other purposes. Research on the effect of literacy thus is a powerful tool to investigate how cultural inventions impact on cognition and brain functioning.
During my talk, will draw on evidence from both behavioural experiments and neurobiological studies. In the first half of the talk, I will present the results of a series of visual world eye-tracking studies in which we found that illiterates, less proficient young readers, and adults with dyslexia show similar delays in language-mediated anticipatory eye movements. I will discuss potential primary influences of reading that may underlie these effects of literacy on 'speech prediction'. In the second part of the talk, I will present the results of a longitudinal study with completely illiterate participants in India, in which we measured brain responses to speech, text, and other categories of visual stimuli with fMRI (as well as resting state activity and structural brain differences) before and after a group of illiterate participants in India completed a literacy training program in which they learned to read and write Devanagari script. A literate and an illiterate no-training control group were matched to the training group in terms of socioeconomic background and were recruited from the same societal community in two villages of a rural area near Lucknow, India. This design permitted investigating effects of literacy cross-sectionally across groups before training (N=86) as well as longitudinally (training group N=25).
Our findings crucially complement current neurobiological concepts of normal and impaired literacy acquisition and highlight the need for the inclusion of diverse participant populations in psychological and neurobiological research.

Tuesday, 5th June, 13.50

The interplay of implicit and explicit memory effects in sentence production: Evidence from syntactic priming within and between languages

Sarah Bernolet
Universiteit Antwerpen, Antwerpen, België

In the last 30 years, research using syntactic priming has provided valuable insights in the process of sentence production and comprehension, and the different memory representations that are involved. The use of cross-linguistic syntactic priming has broadened the range of questions that could be answered, but it also raised additional questions and concerns. Between-language priming appears to be modulated by second-language proficiency, and response tendencies may be more heavily influenced by participants' strategies and memory limitations during L2 syntactic production than during production in the L1. In order to be able to tell how much between-language priming data can tell us about the syntactic representations that are accessed during L2 production, we need an explicit theory on the development of syntactic representations during L2 learning.
Recently, Rob Hartsuiker and I put forward a theoretical account of late second language syntactic acquisition. We assume that structural priming effects in L2 (and between L1 and L2) depend on the structure of this developing network but also on explicit memory processes, and we speculate that these memory processes might aid the formation of new representations. In this talk, I will present the account and its predictions and focus on the way in which explicit memory processes might influence priming results in L2, but also in L1.

Oral Presentations

Talk Session 1:

Reading

Monday, 4th June

[T1.1] *Monday 4th June, 9.10*

You that read wrong again! A transposed-word effect in grammaticality judgments

Jonathan Mirault, Joshua Snell, Jonathan Grainger
Laboratoire de Psychologie Cognitive, Centre National de la Recherche Scientifique,
UMR 7290, Aix-Marseille Université, Marseille, France

We report a novel transposed-word effect in grammaticality judgments made to sequences of five simultaneously presented words. The critical agrammatical test sequences were formed by transposing two adjacent words from either a grammatical base sequence (The black was dog big) or from an agrammatical base sequence (The black was dog slowly). These were intermixed with an equal number of grammatically correct sentences, and participants had to decide as quickly and as accurately as possible if the sequence formed a grammatically correct sentence. We found that agrammatical decisions were harder to make when the base sequence was grammatically correct.

This provides the first demonstration that the encoding of word order, like letter order, retains a certain amount of uncertainty. Crucially, in the same way that transposed-letter effects reflect parallel processing of letters, we argue that the novel transposed-word effect reflects parallel processing of words during written sentence comprehension.

[T1.2] *Monday 4th June, 9.30*

Syntactic prediction as active number maintenance in subject-verb agreement

Bojana Ristić[1], Simona Mancini[1], Nicola Molinaro[1,2]
[1]BCBL
[2]Ikerbasque

The majority of psycholinguistic literature suggests that subject-verb agreement processing relies on information recovering: the subject is processed, stored in memory, and then retrieved at the verb. Alternatively, when establishing nonadjacent dependencies, an element's properties could be actively maintained throughout the sentence until the dependency is completed. Previous work has shown evidence for information maintenance in nonadjacent dependencies such as *wh*-movement (Wagers & Phillips, 2014), proposing that some features of an element can be predictively maintained.

The current study investigates subject-verb agreement to see if morphosyntactic features of nonadjacent elements can be predictively maintained in Basque. We created sentences in which matrix subjects (MS) and matrix verbs are separated by embedded clauses. The clauses contained temporarily number-ambiguous nouns (singular/plural), later disambiguated by the auxiliary verb. We manipulated the number inflection of the MS (singular/plural), to see if it can be maintained and thus bias the number-ambiguous noun towards singular or plural interpretation, before its disambiguation (singular MS: *Nere ahizpa[SG], **mutilak** maite duena[SG]/dituena[PL], desagertu egin zen,* "My sister, whom **the boy** loves/ who loves **the boys**, disappeared"; plural MS: *Nere ahizpek[PL], **mutilak** maite dituenak[SG]/dituztenak[PL], kotxe bat erosi zuten,* "My sisters, whom **the boy** loves/who love **the boys**, bought a car"). In a visual world paradigm, 28 native Basque speakers listened to 60 sentences, while looking at the images of both singular and plural versions of the number-ambiguous nouns. We fitted LMEMs to analyze the proportion of looks towards singular or plural images as a function of MS number, in the moment of hearing the ambiguous word.

A general looking preference towards plural images (plural: 52%, singular: 27% out of total looks) emerged, and a significant interaction of the image and the MS number (Intercept=.42, Estimate=.08, SE=.04, *t*=2.06, *p*=.03). This suggests that the subject's number is actively maintained over the course of the sentence in order to establish number agreement with the upcoming verb. In line with the growing body of research on prediction in sentence processing (and contrary to subject retrieval accounts), we propose that predictive maintenance is involved in subject-verb agreement, as agreement is one of the core syntactic operations and its establishment must be ensured.

Wagers, M.W., & Phillips, C. (2014). Going the distance: Memory and decision making in active dependency construction. *Quarterly Journal of Experimental Psychology,67*,1274–1304.

[T1.3] *Monday 4th June, 9.50*

How well do reading measures correlate? Effects of language context and repeated presentations

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The present study assessed to what extent different reading time measures converge, using large databases of lexical decision times and eye tracking measures. We observed a low amount of shared variance between these measures, which limits the validity of lexical decision times for real-life reading. We also further investigated and compared the role of word frequency and length, two important predictors of word processing latencies in these paradigms, and found that these influenced the measures to a different extent. We analyzed both first and second language datasets, which led to similar results.
A second analysis of two different eye tracking corpora compared eye tracking reading times of short paragraphs with reading of an entire book.

Our results reveal that accordance between eye tracking reading times of identical words in two different corpora is low, suggesting that the higher-order language context in which words are presented also plays a crucial role. Finally, our findings indicate that lexical decision times better resemble the average processing time of an increasing number of multiple presentations of the same word, across different language contexts.

[T1.4] *Monday 4th June, 10.10*

Binocular coordination during reading: Disconjugacy and a division of labour between the right and left eye in reading English and Chinese

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We discuss the binocular coordination of English and Chinese readers in terms of binocular fixation onsets and offsets (i.e. temporal disconjugacy, the unyoking of the two eyes' fixations in time). We present a comprehensive typology of nine different disconjugacy types. We first present a descriptive analysis of the two groups of readers. They show striking similarities in our disconjugacy typology across the two languages. In both sets of readers, the two eyes move in tandem, overall, but with disconjugacy being introduced during fixation and during saccades, with temporal (abducting) saccades being faster than nasal (adducting) saccades, as expected. Our data show that saccade launching is the point at which the coordination is consistently reasserted; over 80% of our binocular saccades began simultaneously. In addition, the distribution (across the screen) of types of disconjugacy further suggests the universality of eye movement behaviors during reading in English and Chinese.

Although this disconjugacy reflects physical constraints (the asymmetry of muscular control of each eye) the resulting fixation offsets may still be 'adaptive' in the sense that the rest of the system has had to adapt to these constraints. These (typically very small) fixation offsets and onsets, in which one eye has landed before the other or one eye has taken off before the other, effectively represent very brief periods of 'monocular fixation'.

We present further analyses of the data using linear mixed-effect models, demonstrating the left-right differences across the screen of text during reading and cross-linguistic differences in binocular eyemovements in reading.

In particular, we report a potential division of labour between the right eye and the left eye, which each made longer fixations on the right and left sides of the text, respectively. These differences were similar across languages and have implications for ocular prevalence (cf. Kommerell et al., 2003) and ocular dominance (cf. Khan & Crawford, 2001).

Kommerell, G., Schmitt, C., Kromeier, M., & Bach, M. (2003). Ocular prevalence versus ocular dominance. Vision Research, 43, 1397–1403.

Khan, A. Z., & Crawford, J. D. (2001). Ocular dominance reverses as a function of horizontal gaze angle. Vision Research, 41, 1743-1748.

[T1.5] *Monday 4th June, 10.30*

A Tool for Extracting Phonetically Balanced and Phonetically Rich Texts from Corpora

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Researchers in speech production and perception often need to use stimuli with specific phonetic properties. While standard phonetically-balanced texts have long been in use for English (e.g. "The North Wind and the Sun", cf. Deterding, 2006), the inventory for French is more limited (e.g. Harmegnies, 1988 for a review). Furthermore, a distinction must be made between phonetically-balanced texts, where the distribution of phonemes (or diphones, triphones, syllable types etc.) is as close as possible to a reference distribution; and phonetically rich texts, where the objective is to maximise the occurrences of different phonemic contexts. Different types of distributions are appropriate depending on the research question (Mairano & Zovato 2018).

We present a software tool to help researchers in creating a phonetically balanced or a phonetically dense collection of stimuli. Initially, the tool can process a reference corpus along with one of the phonetic dictionaries of the CMU Sphinx automatic speech recogniser, and produce a frequency distribution for phonemes, diphones and triphones for the given language and corpus. It can subsequently be used in three modes: sentence extraction, passage extraction and editor. In the sentence extraction and passage extraction mode, the tool searches an input corpus (which may be the same as the reference corpus or another one) for a compilation of sentences or passages that satisfy given criteria for phonetic balance or phonetic richness; these compilations may be further refined by the user to create a list of sentences or a passage for use in a speech production experiment. To further assist in this process, a text editor is provided that continuously calculates the phonetic characteristics of the text edited, with respect to the distributions found in the reference corpus. A demonstration for French will be given, using the corpus of the Phonologie du Français Contemporain project (Durand et al. 2009).

Durand, J., Laks, B. & Lyche, C. (eds). (2009). Phonologie, variation et accents du français. Paris: Hermes.
Deterding, D. (2006). The North Wind versus a Wolf: short texts for the description and measurement of English pronunciation. JIPA, 36(2), 187-196.

Harmegnies, B. (1988) Contribution à la caractérisation de la qualité vocale. Analyses plurielles de spectres moyens à long terme de parole. Thèse de doctorat. Université de Mons, pp. 145-157.

Mairano, P. & Zovato, E. (2018) Phonetically-balanced vs phonetically-rich: clarifying common misunderstandings and evaluating Italian texts. Proc. 14th AISV Conference, 25-27 January, Bolzano.

Talk session 2:
Word Processing
Monday, 4th June

[T2.1] *Monday 4th June, 11.10*

What am I reading? Investigating the impact of features on model fit in word reading

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In recent research on word reading, there has been a shift in focus. While earlier models focused on the "back end" of word reading, i.e., how words are accessed in our mental lexicon, recent research has the tendency to focus on the "front end", that is, which properties of the input are used during reading.

Adopting a machine learning perspective, this shift can be characterized as a move from focusing on *model architectures* towards (also) focusing on extracted properties of the input data, which we call *features*. In the machine learning literature, *features* and *architectures* are conceptually distinct; a model is always a combination of a feature set and model architecture. In psycholinguistics, on the other hand, models are regarded as either necessarily having a certain feature set, or being equal to their feature set, which makes it difficult to estimate the relative contribution of features and models.

In the current work, we attempt to provide such an estimate. We analyze 8 different orthographic feature sets, including slot-based, transposition-based and sub-symbolic feature sets. For these feature sets, we calculate the mean cosine distance to the 20 closest neighbors, analogous to how the OLD20 score (Yarkoni et al., 2008) uses the mean Levenshtein distance. We analyze these features on a French (N=26325), English (N=27389), and Dutch (N=19243) lexical database, and correlate the mean cosine distance to RT values from the Dutch, French, and British lexicon projects.

The contribution of our work is threefold. First, we show that using different features leads to significantly differing correlations with RT scores. Using this, we argue that the choice of features has a greater impact on model fit than previously assumed, and that model architectures therefore should be analyzed separately from the features on which they operate. Second, we show that letter transposition effects are less important than previously assumed. Third, we compare the various feature sets to OLD20 in correlation with RT scores, and show that the mean cosine score can be used as a measure of neighborhood size, which points towards a method for unifying the front-end and back-end of word reading.

Yarkoni, T., Balota, D., & Yap, M. (2008). Moving beyond Coltheart's N: A new measure of orthographic similarity. *Psychonomic Bulletin & Review*, *15*(5), 971-979.

[T2.2] *Monday 4th June, 11.30*

Orthographic neighbor co-activation in a letter search task: The role of the lexical representation

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[2]Laboratoire de Psychologie Cognitive, CNRS & Aix-Marseille Université
[3]Department of Psychology, San Diego State University

Orthographic neighbors (e.g., *care*, *lake*) are words that visually resemble the target stimulus (e.g., *cake*). A number of studies have shown that words and pseudowords with many orthographic neighbors elicit larger amplitude N400s (i.e., more lexicosemantic processing) than those with fewer orthographic neighbors. This effect is typically interpreted to suggest that neighbors are co-activated during word processing. However, these studies have only used tasks that require lexicosemantic processing (e.g., lexical decision, semantic categorization). Here, we investigated the automaticity of neighbor co-activation by using a letter search task, which only requires superficial form-based processing.

We found an N400 effect of neighborhood size for words, but not for pseudowords. In a control lexical decision task with the same stimuli, we found the standard N400 effects of neighborhood for both words and pseudowords. This pattern suggests that lexical-level representations (which only exist for words) might be a catalyst for automatic co-activation of neighbors. We are currently testing this hypothesis in a word learning experiment. Participants are tested in the letter search task before and after learning the meanings of the same set of pseudowords.

The data from this study suggest that the N400 neighborhood effect begins to emerge after learning, once lexical representations have been established for the pseudowords. Together, these results support the hypothesis that the lexical representation plays a critical role in the automatic processes that underlie the N400 neighborhood effect. They further suggest that the N400 neighborhood effects seen for pseudowords in lexical decision and semantic categorization might be driven by top-down, task-specific processes.

[T2.3] *Monday 4th June, 11.50*

Incidental learning of English in children: How do word-related variables influence receptive vocabulary learning?

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The international status of English and its prevalence in contemporary media has led to a situation in some European countries in which children are exposed to English long before they start their formal L2 English instruction. Several studies have shown that this media exposure leads to a kind of incidental language acquisition (Lefever, 2010, Lindgren & Muñoz, 2013).

In a study targeting Flemish eleven-year-olds, 780 children were tested in the last year of primary school (before receiving formal English instruction) in order to measure their knowledge of English and the factors that might have influenced their incidental acquisition of English. The results of the study show large incidental language gains for a substantial number of children but also point to a broad range in obtained test scores.

In this paper we will examine the results the children obtained on a receptive vocabulary test (the first 120 items of the Peabody Picture Vocabulary Test 4, form A) in light of a number of word-related variables: frequency, age of acquisition, concreteness and part of speech, cognateness (orthographic and phonological similarity were identified by means of normalized Levenshtein distance).

By means of regression analyses the explanatory value of the different word-related variables will be discussed in order to shed more light on what makes a word easier or harder to learn in an incidental language learning context. Preliminary results show that learning is mainly affected by cognateness and frequency.

Dunn, L., & Dunn, L. (2007). Peabody picture vocabulary test (4th ed.). Circle Pines, MN: American Guidance Service.

Lefever, S. (2010) English skills of young learners in Iceland. Paper presented at Menntakvika Conference, Reykjavik.

Lindgren, E., & Muñoz, C. (2013). The influence of exposure, parents, and linguistic distance on young European learners' foreign language comprehension. International Journal of Multilingualism, 10(1), 105-129.

[T2.4] *Monday 4th June, 12.10*

Pupil Dilation Reflects Increased Processing Load for Salient Variables

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[2]CLCG, University of Groningen

In linguistics, salience is used to point towards features that are e.g. more prominent or occur with more regularity. An exact and univocal definition of the concept of salience is currently lacking, but some have proposed that we might look into the possible relationship there might be with processing load (cf. Ellis, 2016). Technical advances in the fields of psycho and neurolinguistics provide us with opportunities for exploring this potential relationship between salience and cognition. While these techniques cannot provide us with an answer to the question of what salience is, the possibility of having a quantitative measure of salience can bring us closer to measuring its relationship with linguistic and social factors. One particularly useful technique in this respect is eye-tracking. Auditory salience may be related to dilation in pupil size, which in turn reflects cognitive load or mental effort (cf. Blumenthal-Dramé et al., 2017; Ellis, 2016). The present study therefore examines participants' pupil sizes while listening to stimuli in which various linguistic categories are manipulated to contain salient and non-salient equivalent variants (e.g. high intensity recordings vs. low intensity recordings, recordings with high-frequency words vs. low-frequency words).

Using Generalized Additive Modeling (GAM), we found that pupil size significantly increased for three of the categories we hypothesized to be salient: Acoustic Prominence, Gender and Loudness. This points towards an increase in processing effort for these categories.

Blumenthal-Dramé, A., Hanulíková, A., & Kortmann, B. (2017). Editorial: Perceptual Linguistic Salience: Modeling Causes and Consequences. Frontiers in Psychology, 8.

Ellis, N. C. (2016). Salience, Cognition, Language Complexity, and Complex Adaptive Systems. Studies in Second Language Acquisition, 38(02), 341–351.

[T2.5] *Monday 4th June, 12.30*

Can prediction-based distributional semantic models predict typicality?

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University of Leuven

Recent advances in the field of computational linguistics have led to the development of various prediction-based models of semantics. These models seek to infer word representations from large text collections by predicting target words from neighboring words (or vice versa). The resulting representations are vectors in a continuous space, collectively called word embeddings. Although psychological plausibility was not a primary concern for the developers of predictive models, it has been the topic of several recent studies in the field of psycholinguistics. That is, word embeddings have been linked to similarity ratings, word associations, semantic priming, word recognition latencies, etcetera.

In the present study, we build on this work by investigating category structure. More specifically, we first obtained a prototype for a number of common categories (e.g., *birds*, *fruit*, *vehicles*,...) either by averaging across exemplar vectors (e.g., *robin*, *dove*, *sparrow*,...) or by relying on the representation of the label itself (e.g., *bird*). Then, we correlated the cosine similarity between an exemplar and its prototype with human typicality judgments. The resulting correlations turned out to be disappointingly low, especially given the enthusiasm surrounding predictive models. So, it is possible that these models' representations simply do not mimic human semantic memory. A more nuanced (and plausible) alternative explanation is that predictive models do capture category structure, but that only certain dimensions or components encode this information.

One can find the data, the analysis code, and a pre-print via the project's Open Science Framework page (https://osf.io/nkfjy/).

Talk Session 3:
Communication
Monday, 4th June

[T3.1] *Monday 4th June, 13.50*

Referential Gaze in Spoken Language Comprehension: Human Speaker vs. Virtual Agent Listener Gaze

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[2]Friedrich Schiller University Jena, Germany
[3]Humboldt-Universität zu Berlin, Germany

Exploiting human gaze facilitates language comprehension in face-to-face communication (e.g. Staudte et al., 2014; Kreysa & Knoeferle, 2011). Virtual agent gaze can also be helpful in interactions (Martinez et al., 2010). In two studies we contrasted human speaker gaze and virtual agent listener gaze and then measured their effects on reaction times, accuracy and eye movements. We manipulated three factors: speaker presence, agent presence and match of video scene and a subsequent template.

Participants watched videos in which a screen with a static scene depicting three characters was shown. To the sides of this screen an agent listener and a human speaker were visible. In experiment 1 the speaker uttered German subject-verb-object sentences describing an interaction between two characters, e.g. 'Der Kellner beglückwünscht den Millionär', while in experiment 2 the NP2 was made unintelligible (participants had to rely on the gaze cues to detect the NP2 referent). After each trial a template appeared on screen, schematically representing the characters and their interaction from the video. Participants verified whether the sentence and the template matched. Participants in both experiments responded faster for matches than mismatches. In both studies they were slower when the agent was present compared to all other conditions. In accordance with previous findings (Kreysa & Knoeferle, 2011), eye movement results from both experiments suggest that participants look more to the NP2 referent throughout the NP2 region in those conditions where speaker gaze was visible. Results for the second experiment show that participants do not rely on virtual agent listener gaze – even in the condition with agent gaze as the only cue for detecting the correct referent of the non-audible NP2.

Kreysa, H., & Knoeferle, P. (2011). Effects of speaker gaze on spoken language comprehension: Task matters. In L. Carlson, C. Hoelscher, & T. Shipley (Eds.), Proceedings of the 33rd Annual Meeting of the Cognitive Science Society.

Martinez, S., Sloan, R. S., Szymkowiak, A., & Scott-Brown, K. (2010). Using virtual agents to cue observer attention. In Content 2010 : The second international conference on creative content technologies.

Staudte, M., Crocker, M. W., Heloir, A., & Kipp, M. (2014). The influence of speaker gaze on listener comprehension: Contrasting visual versus intentional accounts. Cognition, 133(1), 317-328.

[T3.2] *Monday 4th June, 14.10*

Do effects of habitual speech rate normalization on perception extend to self?

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[2]International Max Planck Research School for Language Sciences, Nijmegen, The Netherlands
[3]Donders Institute for Brain, Cognition and Behaviour, Radboud University, Nijmegen, The Netherlands

Listeners are known to use contextual speech rate in processing temporally ambiguous speech sounds. For instance, a fast adjacent speech context makes a vowel sound relatively long, whereas a slow context makes it sound relatively short (Reinisch & Sjerps, 2013). Besides the local contextual speech rate, listeners also track talker-specific habitual speech rates (Reinisch, 2016; Maslowski et al., in press). However, effects of one's *own* speech rate on the perception of another talker's speech are yet unexplored. Such effects are potentially important, given that, in dialogue, a listener's own speech often constitutes the context for the interlocutor's speech. Three experiments tested the contribution of self-produced speech on perception of the habitual speech rate of another talker. In Experiment 1, one group of participants was instructed to speak fast (high rate group), whereas another group had to speak slowly (low-rate group; 16 participants per group). The two groups were compared on their perception of ambiguous Dutch /A/-/a:/ vowels embedded in neutral rate speech from another talker. In Experiment 2, the same participants listened to playback of their own speech, whilst evaluating target vowels in neutral rate speech as before. Neither of these experiments provided support for the involvement of self-produced speech in perception of another talker's speech rate. Experiment 3 repeated Experiment 2 with a new participant sample, who did not know the participants from the previous two experiments. Here, a group effect was found on perception of the neutral rate talker. This result replicates the finding of Maslowski et al. that habitual speech rates are perceived relative to each other (i.e., neutral rate sounds fast in the presence of a slower talker and vice versa), with naturally produced speech. Taken together, the findings show that self-produced speech is processed differently from speech produced by others. They carry implications for our understanding of the perceptual and cognitive mechanisms involved in rate-dependent speech perception and the link between production and perception in dialogue settings.

Maslowski, M., Meyer, A. S., & Bosker, H. R. (in press). How the tracking of habitual rate influences speech perception. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.

Reinisch, E. (2016). Speaker-specific processing and local context information: The case of speaking rate. *Applied Psycholinguistics, 37*(6), 1397–1415.

Reinisch, E., & Sjerps, M. J. (2013). The uptake of spectral and temporal cues in vowel perception is rapidly influenced by context. *Journal of Phonetics, 41*(2), 101–116.

[T3.3] *Monday 4th June, 14.30*

Does reading ability predict individual differences in the syntactic processing of spoken language?

Saoradh Favier, Antje Meyer, Falk Huettig
Max Planck Institute for Psycholinguistics

The influence of reading on syntactic processing in spoken language constitutes a gap in our understanding of the cognitive impact of literacy - a recent cultural invention in the timeline of human evolution. As a first step towards addressing this, we conducted a large-scale correlational study to investigate the relationship between online and offline measures of syntactic processing and literacy skills in native Dutch speakers (aged 18-35) from diverse educational backgrounds. Using a comprehension-to-production priming paradigm with auditory presentation, we asked whether reading ability predicts individual differences in structural priming behaviour when working memory, processing speed and non-verbal IQ are controlled. The syntactic structure of interest was the dative alternation, which has previously yielded reliable priming effects in Dutch (e.g. Hartsuiker et al 2008). We presented pre-recorded sentence stems (e.g. "Hij geeft…") with pictures of themes and recipients in order to elicit dative constructions. Participants also completed an auditory grammaticality judgment task, designed to assess knowledge of four grammatical norms that are commonly violated in contemporary spoken Dutch.

After 138 of 161 pre-registered participants, results suggest a strong positive correlation between vocabulary and metalinguistic syntactic abilities, as indexed by grammaticality judgments. Literacy-related skills correlate moderately with the frequency of prepositional dative responses in the structural priming experiment. Specifically, participants with higher vocabulary and word reading scores tend to produce more prepositional datives, both at baseline and when primed. However, when baseline preferences are taken into account, there appears to be no systematic relationship between structural priming and literacy. We believe this null finding to be robust, given the statistical power associated with larger sample sizes.

The lack of association in our data between any literacy-related measure and priming magnitude does not fit easily with prevailing theoretical accounts of structural priming. If the effect is driven by error-based learning, as proposed by Chang and colleagues (2006), we would expect to see a negative correlation between priming magnitude and literacy (assumed to be a proxy for language experience). This prediction is not borne out in our data, raising further questions about the mechanisms that underlie structural priming effects.

Chang, F., Dell, G. S., & Bock, K. (2006). Becoming syntactic. *Psychological review*, *113*(2), 234.

Hartsuiker, R. J., Bernolet, S., Schoonbaert, S., Speybroeck, S., & Vanderelst, D. (2008). Syntactic priming persists while the lexical boost decays: Evidence from written and spoken dialogue. *Journal of Memory and Language*, *58*(2), 214-238.

[T3.4] *Monday 4th June, 14.50*

The Effects of Accented Speech on Knowledge Acquisition

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Research on perception of accented speech has found both that listeners readily adapt to speech spoken in an unfamiliar accent (Bradlow & Bent, 2008), but that they also process this speech differently (Hanulikova, Alphen, van Goch, & Weber, 2012). Thus, even though there is some accent adaptation, listeners may still find unfamiliar accents challenging to comprehend. We investigated whether accented speech impairs understanding and retention of spoken input. 58 native American English speakers and 55 native Mandarin Chinese speakers listened to 10 classroom-style spoken passages (1-2 min each) about animal behavior (Figure 1). After each passage, participants answered 6 multiple-choice questions with 4 choices (chance performance is 25%). The passages were recorded in English by two speakers, one a native American English speaker and the other native speaker of Mandarin Chinese who had a detectable Mandarin accent. The speech was controlled for grammatical errors, disfluencies, and sound quality. Participants heard the half the passages in each accent, alternating between American and Mandarin accents, with passage accent and order counterbalanced across subjects. A mixed effects logistic regression analysis on question answering accuracy showed significant effects ($p < 0.05$) for both Listener Native Language and Spoken Passage Accent (Fig. 2). Overall, native American listeners were more accurate than native Mandarin listeners and all participants were more accurate on American than Mandarin accented passages. While numerically it is true that the accuracy difference between questions about American and Mandarin accented passages is smaller for Mandarin listeners than American listeners, this interaction did not reach significance. Our results suggest that speech with less familiar accents may impair knowledge acquisition, even for listeners who speak with that accent themselves. We will discuss implications for accent adaptation research.

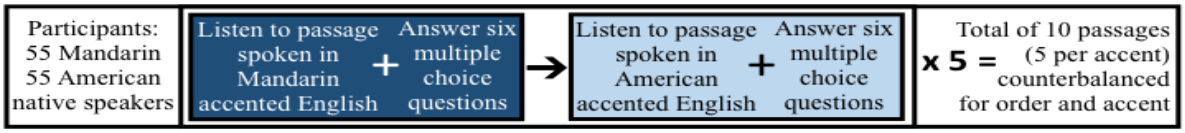

Figure 1. Overview of experimental design.

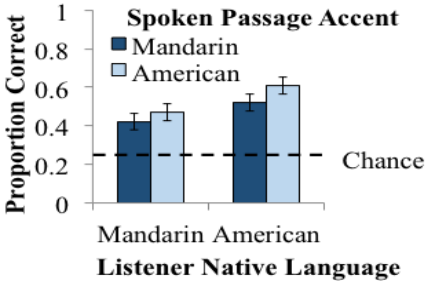

Figure 2. Average proportion of questions answered correctly in all conditions. Error bars represent Standard Errors.

Bradlow, A. R., Bent, T. (2008) Perceptual adaptation to non-native speech. *Cognition 106*. 707-729.

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

Talk Session 4:
Language Production
Tuesday, 5th June

[T4.1]*Tuesday 5th June, 9.30*

Effects of phonological, lexical, and semantic overlap on the production of sentence structure

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

Many structural priming studies demonstrated interplay between lexical and syntactic processing. Specifically, the tendency for speakers to reuse previously experienced syntactic structure is significantly enhanced by lexical overlap between prime and target (e.g., Pickering & Branigan, 1998). This *lexical boost* effect might come about from the retrieval of sentence structures from explicit memory (e.g., Hartsuiker et. al., 2008). Some authors argue that the overlap of other linguistic levels (e.g., phonological and semantic level) should also boost structural priming (Pickering & Garrod, 2004). However, studies investigating the effect of phonological overlap have shown mixed results. Additionally, it is not clear whether any phonological or semantic boosts depend on memory retrieval. Thus, the purpose of this study is to use structural priming in Mandarin to pinpoint the exact level(s) of the lexical boost effect and examine whether such effect is comparable to a memory effect.

Participants (native Mandarin speakers; n = 80) were paired with a scripted confederate to take turns to describe pictures (priming experiment), or performed in a corresponding memory experiment. The Mandarin active transitive (e.g., *Nanren tuo-le di [The man mop-LE the floor]*) and ba transitive (e.g., *Nanren ba di tuo-le [The man BA the floor mop-LE*]) were employed as prime structures. The overlap condition (full/semantic/phonological/no overlap) was also manipulated. Significant priming effects were found in both priming and memory experiments, whereas the lexical boost only occurred in the priming experiment. No semantic boost effect was found in either experiment. The priming effect was inhibited in the phonological overlap condition in the priming experiment, and the inhibitory effect was larger when the segment (but not the tone) was shared. The results suggest that lexical access mediates syntactic encoding. We also demonstrate a rather variable pattern of overlap effects at single linguistic layers on structural repetition, which calls for further elucidation of possible factors that modulate the interaction between linguistic levels.

Hartsuiker, R. J., Bernolet, S., Schoonbaert, S., Speybroeck, S., & Vanderelst, D. (2008). Syntactic priming persists while the lexical boost decays: Evidence from written and spoken dialogue. *Journal of Memory and Language*, 58(2), 214-238.

Pickering, M. J., & Branigan, H. P. (1998). The representation of verbs: Evidence from syntactic priming in language production. *Journal of Memory and language*, 39(4), 633-651.

Pickering, M. J., & Garrod, S. (2004). Toward a mechanistic psychology of dialogue. *Behavioral and brain sciences*, 27(2), 169-190.

[T4.2] *Tuesday 5th June, 9.50*

Opposing and following responses in sensorimotor speech control: Why responses go both ways

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When talking, speakers continuously monitor and use the auditory feedback of their own voice to control and inform speech production processes. Auditory feedback processing has been studied using perturbed auditory feedback. When speakers are provided with auditory feedback that is perturbed in real time, most of them compensate for this by opposing the feedback perturbation. For example, when speakers hear themselves at a higher pitch than intended, they would compensate by lowering their pitch. However, sometimes speakers follow the perturbation instead (i.e., raising their pitch in response to higher-than-expected pitch). Although most past studies observe some following responses, current theoretical frameworks cannot account for following responses. In addition, recent experimental work has suggested that following responses may be more common than has been assumed to date.

In the current study, we performed two experiments (N = 39 and N = 24) to investigate whether the state of the speech production system at perturbation onset may determine what type of response (opposing or following) is given. Participants vocalized while they tried to match a target pitch level. Meanwhile, the pitch in their auditory feedback was briefly (500 ms) perturbed in half of the vocalizations, increasing or decreasing pitch by 25 cents. None of the participants were aware of these manipulations. Subsequently, we analyzed the pitch contour of the participants' vocalizations.

The results suggest that whether a perturbation-related response is opposing or following unexpected feedback depends on ongoing fluctuations of the production system: It initially responds by doing the opposite of what it was doing. In addition, the results show that all speakers show both following and opposing responses, although the distribution of response types varies across individuals.

Both the interaction with ongoing fluctuations of the speech system and the non-trivial proportion of following responses suggest that current production models are inadequate: They need to account for why responses to unexpected sensory feedback depend on the production-system's state at the time of perturbation. More generally, the current study indicates that looking beyond the average response can lead to a more complete view on the nature of feedback processing in motor control. Future work should explore whether the direction of feedback-based control in domains outside of speech production will also be conditional on the state of the motor system at the time of the perturbation.

[T4.3] *Tuesday 5th June, 10.10*

Linguistic statistical associations predict category member production

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The human conceptual system comprises linguistic and simulated (sensorimotor) information, but the importance of each in conceptual processing is debated (e.g. Barsalou et al, 2008; Louwerse, 2011). We hypothesised that accessing semantic categorical structures during a category production task would rely more on computationally cheaper linguistic associations than simulated sensorimotor representations; that is, linguistic associations may provide a linguistic shortcut to the conceptual system. The aim of the present study was to test the extent to which category production performance relies on linguistic statistical associations compared to sensorimotor information.

In a pre-registered study, we collected responses to 117 categories (including concrete and abstract, living and non-living, artefact and natural, animate and inanimate concepts), divided into three lists and counterbalanced across participants. 60 native speakers of English named as many concepts as possible belonging to each category, within 60 seconds. For each category-member pair of words (e.g. Fruit -> Apple), we created two critical predictors: sensorimotor proximity (a similarity measure of grounded representation across 11 dimensions of sensorimotor strength), and linguistic distributional proximity (a high-dimensional measure of word co-occurrence derived from a large corpus of BBC subtitles). We then extracted three common behavioural measures of category member production from the dataset: 1) category production frequency (how often each concept was named per category); 2) mean rank (mean ordinal position per concept and category), and 3) first rank frequency (how often each concept was named first per category). Using Bayesian hierarchical linear regression, we tested whether each behavioural measure was better predicted by linguistic or sensorimotor information, above and beyond a null model of word frequency.

As expected, both sensorimotor and linguistic information contributed independently to category member production. That is, when asked to name members of the category 'Fruit', people's responses were based on both the similarity of sensorimotor experience (i.e., the sensorimotor profile of 'apple' is similar to that of 'fruit'), and how often the words co-occurred in similar linguistic contexts (i.e., 'apple' tends to appear in similar linguistic contexts to 'fruit'). Critically, all three behavioural measures were better predicted when linguistic distributional proximity was included in the model, compared to sensorimotor proximity alone. These findings suggest that linguistic statistical associations are particularly important in accessing semantic concepts during category production.

[T4.4] *Tuesday 5th June, 10.30*

Do speech registers also rely on language representations? Evidence from switching between formal and informal language

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[2]Psychology department, University of Texas at El Paso, El Paso, USA
[3]Facultad de Lenguas y Educación; Universidad Nebrija, Madrid, Spain

In the bilingual research domain several lines of research have provided evidence for the existence of language representations, which are mental representations of each language that are assumed to affect lexical representations. A similar claim has been made for dialects. However, a dialect could be considered a specific language, different from the standard language that it is associated with. In the current study, we wanted to investigate whether such language representations would exist within a language by looking into speech registers. To this end, we let French participants switch between formal and informal language, and found speech register switch costs across three experiments, similar to those observed between languages. However, a comparison of speech register switch costs and language switch costs showed a difference. The results indicate that speech registers also rely on language nodes, but that the control processes might be different.

Talk Session 5:
Bilingualism and L2 Processing
Tuesday, 5th June

[T5.1] *Tuesday 5th June, 11.10*

Memory for texts in a non-native language: disentangling the recall cost

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With academic internationalisation at full speed, English is increasingly used as a medium of instruction in higher education. The question arises whether unbalanced bilinguals remember study materials in a second language (L2) as well as in a first language (L1).

In previous studies, we found a disadvantage for students recalling short, expository texts in L2 compared to L1, but no such disadvantage for a true/false recognition test (Vander Beken & Brysbaert, in press). In a follow-up study, we replicated the finding that there is no difference between languages in recognition memory even on delayed tests after a day, a week, or a month (Vander Beken, Woumans, & Brysbaert, in press). Since the quality of the memory trace seems to be equally strong in both languages, based on the results from the recognition cost, the recall cost might be caused by a lack of production skill in L2.

To test this hypothesis, we conducted a small series of experiments in cross-lingual conditions, with tests ranging from open questions to multiple choice-questions. Most importantly, we reran the recall condition of the initial experiment to disentangle the effects of L2 comprehension and L2 production. To investigate the effect of L2 comprehension, we compared how well participants could recall an L1 text and an L2 text, writing their recall protocol in L1 in both cases (N = 60). To investigate the effect of L2 production, participants recalled two L2 texts, writing one protocol in their native language and the other one in L2 (N = 60). Results from this study will shed light on the mechanisms behind memory for information learnt from texts. In addition, they will increase our understanding of the challenges that students face when a foreign language is used as a medium of instruction in higher education.

Vander Beken, H., & Brysbaert, M. (in press). Studying texts in a second language: the importance of test type. Bilingualism: Language and Cognition.

Vander Beken, H., Woumans, E., & Brysbaert, M. (in press). Studying texts in a second language: No disadvantage in long-term recognition memory. Bilingualism: Language.

[T5.2] *Tuesday 5th June, 11.30*

The perceptual span of L2 English speakers with different L1 alphabetic systems

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During reading, the eye takes in useful information not only from the characters one fixates on but also from all characters in the 'perceptual span' (i.e. the characters outside the center of the fixation). In English, for example, the perceptual span is approximately 14-15 characters to the right and 3-4 characters to the left of the fixated character (Rayner, 1998).

Surprisingly, few studies have assessed the perceptual span of L2 speakers (e.g., Leung et al., 2014). These studies suggest that the perceptual span for L2 readers of English is about 3-4 characters to the left of the fixated character but only 6-8 characters to the right. However, reading skills in one alphabetic system may not transfer directly to reading skills in another system. Therefore, the question arises whether the difference between perceptual span sizes of L1 and L2 speakers can be explained by differences in the alphabetic systems across the L1 and L2.

In this study, we explored this question by comparing the L2 English perceptual span of L1 German speakers (which has a Latin alphabet similar to English) with that of L1 Russian speakers (which has a Cyrillic script). We used the gaze-contingent moving window paradigm, in which a window of text moves together with the participants' fixations on the screen while the text outside of a window is masked (McConkie et al., 1975). The window sizes varied between 6, 8, 10, 12, 14 characters to the right of the fixation and a "no window" condition.

Our data showed that both Russian and German speakers had a perceptual span of around 10 characters to the right of the fixation, although overall reading times of German participants were higher than those of Russians. This is consistent with previously reported L2 perceptual spans. There was a significant effect of spelling skills, but no effect of English proficiency. This suggests that the alphabetic system does not affect the perceptual span, but the size of it is probably limited by the cognitive difficulty of reading in L2.

Leung, C.., et al. (2014). The perceptual span in second language reading: An eye-tracking study using a gaze-contingent moving window paradigm. Open Journal of Modern Linguistics, 4(05), 585.

McConkie, G., & et al. (1975). The span of the effective stimulus during a fixation in reading. Attention, Perception, & Psychophysics, 17(6), 578-586.

Rayner, K. (1998). Eye movements in reading and information processing: 20 years of research. Psychological bulletin, 124(3), 372.

[T5.3] *Tuesday 5th June, 11.50*

How I learned L2 words influences how I process them: the effect of learning method on semantic connections between L2 words and conceptual system

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The RHM (Kroll & Stewart, 1994) and the BIA-d (Grainger, Midgley, & Holcomb, 2010) postulate that, L2-words in novice learners have access to the conceptual system (CS) via L1, while, in proficient learners L2-words have directly access to the CS. However, several results challenged this premise, highlighting that a L2 could be both conceptually and lexically processed by novice learners (Brysbaert & Duyck, 2010). We assume proficiency is not the better variable to explain this pattern. Previous researches suggested the role of learning method (e.g., Comesaña, Soares, SánchezCasas, & Lima, 2012). Unfortunately, this role is still confused, notably because of the method used. Indeed, while conceptual and lexical links are considered as different in their nature, they are almost always investigated in the same way, through associations between words (e.g. translation recognition task, Comesaña et al). We assume that since these representations are different, stimuli used to investigate them have to be different. The use of translation equivalent for analyzing lexical links seems optimal since they link translation equivalent. However, it is not ideal for conceptual links as they connect concept and L2-words. We argue that a direct investigation of these links through priming picture should provide a direct evidence. The first objective is to investigate the influence of learning methods on the strength of conceptual connections created in the first steps of L2-word learning in adulthood. More specifically, we expect that learning new words through associations between visual representations of concepts (videoclips) and L2-words would reinforce conceptual links more than by association between L1 and L2 words. The second objective is to investigate whether an impact of learning method is observed whatever the kind of prime used. We expect the direct investigation to be more likely to produce semantic effects. In order to meet the objectives, a word-recognition task with two kinds of prime (pictures/words) was carried out. Results: Picture prime: As expected, there was an interaction effect between learning method and relatedness of the prime. Further analyses revealed that the effect of the priming condition was only present in the visual experience group (91 milliseconds). Word prime: absence of any significant effect. The results highlighted that learning new words through interaction with concepts allows a creation of conceptual links. They suggest that the effect of learning method is underestimate in the bilingual memory model. This experiment also highlighted that a direct investigation of conceptual links should be preferred.

Brysbaert, M., & Duyck, W. (2010). Is it time to leave behind the Revised Hierarchical Model of bilingual language processing after fifteen years of service? Bilingualism: Language and Cognition, 13(03), 359- 371.

Comesaña, M., Soares, A. P., Sánchez-Casas, R., & Lima, C. (2012). Lexical and semantic representations in the acquisition of L2 cognate and non-cognate words: evidence from two learning methods in children. British Journal of Psychology, 103(3), 378- 392.

Grainger, J., Midgley, K., & Holcomb, P. J. (2010). Chapter 14. Re-thinking the bilingual interactiveactivation model from a developmental perspective (BIA-d). In M. Kail & M. Hickmann (Éd.), Language Acquisition and Language Disorders (Vol. 52, p. 267- 283). Amsterdam: John Benjamins Publishing Company.

[T5.4] *Tuesday 5th June, 12.10*

Prediction of semantics during L2 and L1 listening: effects of a cognitive load

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Ghent University

Non-native listeners predict upcoming linguistic information under some circumstances, but not always as efficiently as native speakers. Few studies have looked at the role of factors mediating prediction, such as working memory capacity (Huettig & Janse, 2016), in native versus non-native listening. Non-native language processing taxes working memory more than native language processing (e.g., Francis & Gutiérrez, 2012), and therefore predictive processing may be more strongly reduced by a cognitive load during listening in the second language (L2) than in the first language (L1).

The goal of the present study was to test whether bilinguals predict upcoming semantic information to the same extent in L1 and L2, and whether an additional cognitive load differentially affected prediction in L1 and L2. Dutch-English unbalanced bilinguals listened to sentences with variable cloze probability. Before the onset of the target word in the sentence, participants were shown a four-picture display while their eye-movements were measured. The display contained either a picture of the target object or of a semantic competitor, and three unrelated objects. During half of the trials in each language, participants were asked to remember 9 syllables matched for frequency in English and Dutch.

There were more fixations on the target and competitor pictures relative to the unrelated pictures in both languages, before hearing the target word could affect fixations. The fixation bias towards target and competitor pictures was larger in L1 than in L2. A cognitive load reduced predictive eye-movements to targets in both languages, but the effect was larger in L1. The fixation bias towards competitors was not affected by cognitive load in either language. The results confirm that the availability of cognitive resources plays a role in language-modulated predictive eye-movements, but the lack of an effect of load on predictive looking at competitors suggests that cognitive resources are not so much implicated in spreading semantic activation. The results are consistent with the view that the mechanisms underlying prediction in L1 and L2 are the same.

Francis, W. S., & Gutiérrez, M. (2012). Bilingual recognition memory: Stronger performance but weaker levels-of-processing effects in the less fluent language. *Memory & Cognition*, *40*(3), 496–503.

Huettig, F., & Janse, E. (2016). Individual differences in working memory and processing speed predict anticipatory spoken language processing in the visual world. *Language, Cognition and Neuroscience*, *31*(1), 80–93.

[T5.5] *Tuesday 5th June, 12.30*

The central processing bottleneck during word production: Comparing simultaneous interpreters, bilinguals and monolinguals

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[1]Macquarie University
[2]North-West University

Simultaneous interpreting (SI) is a type of work that requires interpreters to conduct multi-tasks, such as listening, comprehension, memorizing, and production, etc. in real time. A popular explanation account for SI performance indicates that professional interpreters can conduct multi-tasks at the same time by dividing their limited cognitive resource (Gile, 2009). However, some studies have shown that people cannot conduct another task concurrently with word production, since its lemma, phonological word-form, and phoneme selections are subject to the central processing bottleneck (Ferreira & Pashler, 2002). Therefore, this study explored whether professional simultaneous interpreters are subject to the central processing bottleneck during word production, or whether they can perform multi-tasks at the same time thanks to their SI experience.

A dual task (see Fig. 1) was conducted in this study, exploring the performance of professional simultaneous interpreters (with at least 5-year SI experience), highly proficient bilinguals, and English monolinguals in word production bottleneck. Task 1 was a picture naming task in sentence context (e.g. the medium constraint-sentence "She poured water on the…" followed by a high frequency picture PLANT). Sentence constraint (medium & low; example of low constraint-sentence "The drawing was of a…") and word frequency (high & low; example of low frequency word PURSE) were manipulated in Task 1, in order to explore the performance of lemma and phonological word-form selections, respectively. Task 2 was a pitch tone discrimination task (e.g. press Red color key for the low pitch tone) which was separated by three stimulus onset asynchronies (SOA; 50, 150 and 900 ms) from Task 1.

The results show that the reaction times to Task 2 was postponed at the shortest SOA when comparing to the performance at the longest SOA for the three groups. Furthermore, the manipulations of sentence constraint and word frequency in Task 1 was postponed to Task 2, suggesting that interpreters, bilinguals and monolinguals are subject to the central processing bottleneck during word production (see Fig. 2).

Gile, D. (2009). Basic concepts and models for interpreter and translator training. Amsterdam: John Benjamins.

Ferreira, V. S., & Pashler, H. (2002). Central bottleneck influences on the processing stages of word production. Journal of Experimental Psychology: Learning, Memory, and Cognition, 28(6), 1187–1199.

Poster Presentations

Poster Session 1
Monday, 4th June

[P1.1]

Immediate feedback is critical for learning from your own productions

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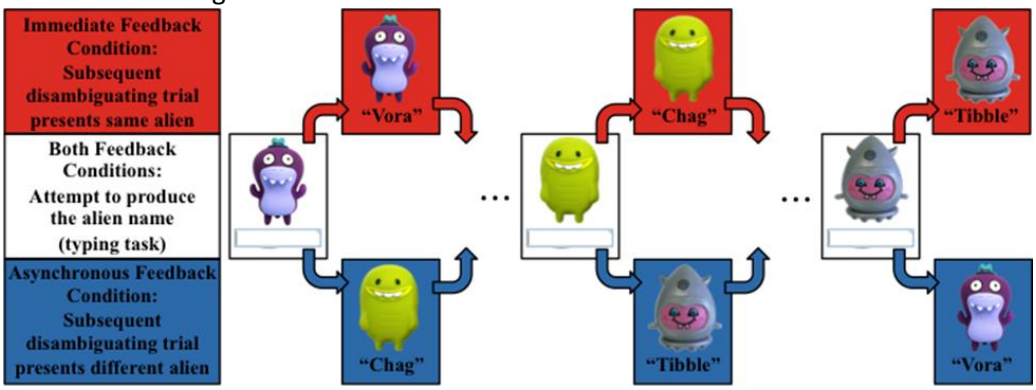
While producing language is helpful for language learning (Hopman & MacDonald, in press), the role of feedback in learning from your own productions is unclear. Research on non-language materials suggests that feedback is particularly useful when provided immediately after participants produce their responses (Kang, McDermott & Roediger, 2007). To test the role of feedback in how people learn from their language productions, we ran an experiment in which participants (n = 88) learned names for novel 'alien' creatures. Participants received passive exposure to the aliens and their names in three rounds of cross-situational word learning trials. They also completed one production learning trial for each alien, in which they had to type the name. Each production trial was followed by a feedback trial in which an alien and its name were presented together. For the 44 participants in the *immediate feedback condition*, this was the alien from the production trial immediately preceding it (Fig. 1). For the 44 participants in the *asynchronous feedback condition*, the feedback trials were randomly scrambled, meaning that the disambiguating feedback trial provided the name of a different alien than the one participants had just attempted to produce. After learning, participants were tested in a three-alternative forced-choice task for each name. In a generalized linear mixed effects model predicting test accuracy, we found a significant interaction between the Levenshtein distance of the production attempt – a measure of how close the word produced was to the correct word - and feedback condition (Fig. 2). In the asynchronous feedback condition, the accuracy of the production attempt is predictive of performance at test, whereas in the immediate feedback condition, test accuracy is uniformly high, even for words participants struggled to produce. Our results suggest that receiving immediate feedback when attempting to produce novel language supports successful learning.



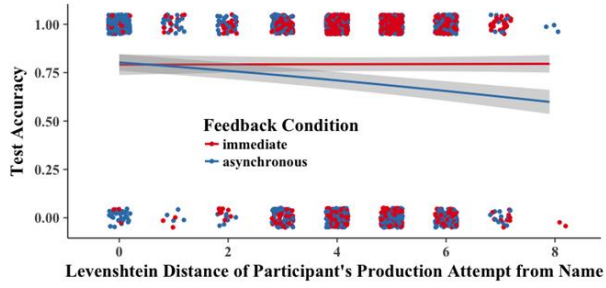


Fig. 2. Model predictions for accuracy on test item as a function of feedback condition and Levenshtein distance of production attempt on that item during training. Error margin represents standard error.

[P1.2]

How does learning to read shape the neural representation of spoken and written language?

Adam Jowett[1], Joanne Taylor[2], Angelika Lingnau[1], & Kathy Rastle[1]
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Learning to read requires acquiring mappings from orthography onto existing phonological and semantic representations. Languages vary in the way that writing expresses the sounds and meanings of spoken language. Alphabetic languages (e.g. English) contain information about phonological structure within the orthography due to regular systematic relations between graphemes and phonemes. Logographic languages (e.g. Chinese) encode less fine-grained information about phonological structure via more arbitrary mappings between characters and syllables. Thus, alphabetic writing systems exhibit higher orthographic transparency. Such differences in orthographic structure impacts on the nature of reading acquisition, as well as wider impacts on existing spoken language systems (e.g. Rastle et al., 2011).

In this project, we are using artificial orthography methods to study how the nature of the writing system impacts on reading acquisition, and on the spoken language representations that underpin reading. 24 participants were trained over 10 days on two artificial languages with alphabetic and logographic writing systems. Each language contained 24 words, and each word was denoted by visual, spoken, and semantic components. Learning was measured using computerised training tasks (search and response tasks with feedback) and assessed with behavioural tests including picture naming, reading aloud, saying the meaning, auditory shadowing, phoneme reversal, and auditory and visual lexical decision. Following training, participants were also asked to monitor the meanings of trained spoken and written stimuli while neural responses were recorded using fMRI. Initial fMRI analyses and behavioural testing data will be presented, which suggest that different strategies are used to learn alphabetic and logographic languages.

Subsequent analysis plans will also be presented. These include use of representational similarity analysis to investigate whether the neural representations of spoken trained words are more phonemically structured when associated with alphabetic compared to logographic writing systems. Neural representations of written trained words will also be examined to investigate whether there are differences in orthographic structure (e.g. representation of letter identity and position) for alphabetic compared to logographic systems. Prediction matrices will be constructed based on shared features of spoken or written words within each language. These will be correlated with corresponding neural dissimilarity matrices, within regions processing spoken and written language. Findings will reveal whether phonological and orthographic representations are shaped by the nature of the writing system.

Rastle, K., McCormick, S. F., Bayliss, L., & Davis, C. J. (2011). Orthography Influences the Perception and Production of Speech. *J Exp Psychol Learn Mem Cogn, 37*(6), 1588–94.

[P1.3]

The Parametrisation of language in L1 acquisition and the cross-modal development of pre-school children

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[2]University of Lisbon

This paper deals with the question whether cognitive processes und first language acquisition depend on the cross-modal development of pre-school children as assumed by Motor-Theory in the 60s. We base our empirical findings on this theory which claims the same procedures necessary for our motoric system participate also in the procedures and techniques specialised for language speech – an assumption that leads to the hypothesis that human language competence could only develop through a progressive development of cross-modal and transfunctional synapses and a cerebral reorganisation of several brain areas that were meant to have other functions (Liebmann 1963, Allot 2001).

The main goal of our research is to demonstrate experimentally that there is a strong connection between language and the motor-system. In our experiment we verified this hypothesis in a kindergarten, where we tested 15 children between 4 and 6 years old how they command different cross-modal physical exercises and a cognitive play regarding endocentric compounds in German. The domain of endocentric compounds in German is highly productive and belongs to the core grammar of German native speakers, which means that its acquisition should be completed by the age of 4 (Clahsen, 1982, Clahsen & Muysken 1986). The German children acquire unconsciously the head final parameter of their mother language and intuitively know that a *Michkuh* is a cow that produces milk while *Kuhmilch* cow milk that is milk produced by a cow. After the first results we could make some interesting observations regarding the interdependence between the productivity of endocentric compounding (mainly the building of fantasy endocentric compounds) and not only the cross-modal development of children but rather whether they were left-handed, right-handed or trained left-handed (left-handed trained to use their right hand) – results which attested our hypothesis and brought to a light an unexpected result, namely that trained left-handed children systematically use the wrong head parameter in German endocentric compounds.

[P1.4]

Analysing the individual spelling performance of multilingual pupils in French and its development after an intervention training.

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[2] Université Clermont Auvergne, France

The present paper investigates the spelling development of pupils acquiring French as a second written language. It analyses, more precisely, the spelling of plural markers represented in written language but not in speech. In our contribution, we will present the re-analysis of an intervention study that makes visible the spelling patterns before and after the training, and thus pupils' individual spelling trajectories. The spelling data of 228 fifth graders with two years instruction in French was used for this investigation. In a first step, we conducted an intervention study. The intervention group (n=137) followed an explicit training aiming to foster morphosyntactic processing and improve thus the spelling of plural morphology. The control group (n=91) trained their listening comprehension. The pupils' spellings were analysed on three grammatical categories (nouns, verbs, adjectives) as well as for the position of adjectives (pre- vs. post-nominal). The findings revealed the existence of specific difficulty patterns related to the plural marking and a strong effect of the training on pupils' spelling performance. These analyses focused on the mean performance with the grammatical categories within the experimental groups.

In a second step, we looked at the spelling performance on the intra-individual level. To do this, we deducted individual spelling patterns based on pupils' performance with nouns, verbs, pre- and post-nominal adjectives in the pre-test. From the association of all failure/achievement possibilities of marking plural, sixteen possible combinations resulted. The distribution of pupils was found to be highest in six of them. Additionally, based on the individual scores of all children in the pre- and post-test, we documented the trajectory of the individual learners. Our talk will focus on this second part of the study.

The re-analysis of the pre-test data of both groups revealed six main spelling patterns of correctly applying French plurals of different grammatical categories, while other patterns were not existent. As for the learning trajectories of the participants, they were similar: both groups resulted into the spelling patterns established in the pre-test only and almost no other combinations emerged in the post-test, suggesting that the learning of the French plural morphology occurs in a very structured way.

[P1.5]

Does reformed words enhance meaning-form correlation?

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Based on the recent studies that found small but significant correlations between English monosyllabic spoken words and meanings (Monaghan, Shillcock, Christiansen & Kirby, 2014) as well as English written words and meanings (Dautriche, Mahowald, Gibson & Piantadosi, 2017), our goal is to see how the reformed words are correlated with their meanings. Considering that spelling reform aims for more transparent presentation of English sounds, we hypothesized that the correlation between reformed words and their meanings falls somewhere between the results of the two studies above.

The most frequent 5000 English words were grouped according to word length, and within each group, the orthographic distance between two words was measured by edit distance whereas semantic distance was measured by Latent Semantic Analysis.

In Experiment 1 where we replicated Dautriche, et al. (2017), orthography-meaning correlation was the greatest among the 3-letter words, which coincides with the sound-meaning correlation found among monosyllabic words (Monaghan, et al., 2014). This may be partly due to the fact that short words tend to have more regular letter-sound correspondence than longer words.

In Experiment 2, we changed the spellings according to SAYPU, the foremost current scheme for English spelling reform, and regrouped the sample according to the length. Unlike our hypothesis, reformed words did not enhance the meaning-form correlation. In fact, they reduced the regularity in those words, making the meaning-form relation even more arbitrary. Monosyllabic words (or 3-letter words) still showed statistically significant meaning-form correlations in the reformed spellings. This group of words typically have no consonant clusters and are composed of CV, VC or CVC syllabic structures. Monaghan, et al. (2014) found that early acquired words tend to have high meaning-form relation. Our study demonstrated that quantitative psycholinguistic methodology can be brought to the issue of spelling-reform.

Monaghan, P., Shillcock, R. C., Christiansen, M. H., & Kirby, S. (2014). How arbitrary is language?. Phil. Trans. R. Soc. B, 369(1651), 20130299.

Dautriche, I., Mahowald, K., Gibson, E., & Piantadosi, S. T. (2017). Wordform similarity increases with semantic similarity: An analysis of 100 languages. Cognitive science, 41(8), 2149-2169.

[P1.6]

Mind-wandering states during bilingual reading

Natalia Dubinkina[1,2], Edwige Sijyeniyo[3], Wouter Broos[2], Matthias Franken[1], Alice Foucart[1], Robert Hartsuiker[1]
[1]Radboud University
[2]Ghent University
[3]University of Groningen

This project aims to investigate the neural underpinnings of mind-wandering episodes (attentional de-coupling states) during bilingual reading. According to the mindless reading model (Smallwood, 2011) the interaction between top-down regulation and sensory input processing is impaired during off-task thoughts. We hypothesized that mindless reading will result in a greater amount of zoning-out episodes while reading in a second language compared to reading in a first language.

We therefore compared temporal inattention states while processing text in two languages, L1 (Dutch) and L2(English), with both behavioral and electrophysiological methods. As behavioral measures, we use frequency of these states, comprehension questions scores, and reading time. To contrast different brain activity patterns during bilingual reading, we analyze changes in EEG spectral power activity, time-locked to meta-consciousness events (button presses). More precisely, we expect to see fluctuations in attentional state that are reflected in spontaneous EEG alpha power (James, 2011).

Participants were asked to read two chapters of the novel 'Accordion Crimes' by Annie Proulx, one of them in Dutch and another one in English, presented in counterbalanced order. To track mind-wandering states, two types of experience sampling were applied. We asked subjects to press a button whenever they became unaware of the text content or when so called 'drift checks' appear on the computer screen asking the question 'Are you mind-wandering right now?'.

In our behavioral pilot (n = 52), absolute measures of spontaneous button presses for L2 were significantly more frequent than during reading in L1. However, we did not find a language difference with respect to "drift checks" that appeared on the screen. This suggests that self-generated introspective reports of mind-wandering can reflect the variability in cognitive resources, required for L1 and L2 reading, and this could be also seen in electrophysiological data. We plan to consider an interval of 30 sec that proceed the button press and perform time-frequency analysis to compare spontaneous probes and "drift checks" with a baseline activity ("no" answers interval).

Smallwood, J. (2011). Mind-wandering While Reading: Attentional Decoupling , Mindless Reading and the Cascade Model of Inattention, *2*, 63–77.

James, S. P. (2011). Trial-by-trial variations in subjective attentional state are reflected in ongoing prestimulus EEG alpha oscillations, *2*, 1–16.

[P1.7]

Competing vowels facilitate the recognition of unfamiliar L2 targets in bilinguals: The role of phonetic experience

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Initial activation of multiple lexical forms and subsequent competition between them is present in both native (e.g. Gaskell & Marslen-Wilson, 1997) and non-native (e.g. Weber & Cutler, 2004; Blumenfeld & Marian, 2007) spoken-word recognition. This activation is particularly powerful in bilinguals, who, while listening to L2, need to inhibit a partially activated L1, as posited within language non-selective lexical access hypothesis. Additionally, phonological differences across languages may constitute another source of problems with L2 auditory processing. Such differences may result in increased competitor effects and hamper L2 understanding.

The current study investigates how two groups of speakers with varying degrees of phonetic experience (native speakers and non-native speakers) deal with competition in a cross-modal priming lexical decision task. Its aim is to establish how primed participants are by words with competing vowels. Primes' and targets' CVC word onsets overlapped phonologically with regard to consonants but a vowel differed. The auditory primes in English contained vowel /e/ or /ʌ/, given the visual target with /æ/ (problematic distinction) and /iː/ or /ɪ/, given the /ɒ/ targets (unproblematic dissimilar distinction). Polish lacks /æ/ category in its inventory, which is confused by learners with Polish /ɛ/ or /a/, hence the hypothesised competition effect from similar /e/ and /ʌ/ in Polish-English bilinguals. The unproblematic vowels differ markedly and words with these are unlikely to induce competition.

The analysis concerns accuracy rates and response latencies to prime-target pairs. Preliminary results show that in the non-native group /e/ and /ʌ/ competitors indeed facilitate the recognition of targets with /æ/, while there is reduced facilitation in /iː/, /ɪ/ - /ɒ/ pairs. In the native group, the effects of priming are diminished, exhibiting the impact of phonetic experience. The results contribute to the understanding of how phonetic experience ensures the success in supressing competition in spoken-word recognition.

Blumenfeld, H. K., & Marian, V. 2007. Constraints on parallel activation in bilingual spoken language processing: Examining proficiency and lexical status using eye-tracking. *Language and Cognitive Processes*, 22(5): 633–660.

Gaskell, G., & Marslen-Wilson, W.D. 1997. Integrating form and meaning: A distributed model of speech perception. *Language and Cognitive Processes*, 12, 613–656.

Weber, A., & Cutler, A. 2004. Lexical competition in non-native spoken-word recognition. *Journal of Memory and Language*, 50, 1–25.

[P1.8]

The effect of bilingualism on reading. Gradual cognate effects in Frisian-Dutch bilingual children, an eye-tracking study

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Bilingual adults are faster at reading cognates than non-cognates in both their first (L1) (Duyck et al., 2007) and second language (L2) (Van Assche et al., 2009). This cognate effect has been shown to be gradual in the L1: recognition was facilitated when words had higher degrees of cross-linguistic similarity (Van Assche et al., 2009). Many studies on bilingual language processing have used this effect to indicate a co-activation of lexical representations in two languages. Recent research has shown that the gradual cognate facilitation effect can also be found in bilingual children's receptive vocabulary (Bosma et al., 2016). However, it is still unknown to what extent it can be found in bilingual children's reading. The aim of the present study is to investigate whether cognate facilitation can also be observed in bilingual children's reading, and whether this effect is gradual. Frisian-Dutch bilinguals will perform a cognate reading task in both of their languages while their eye-movements are recorded. Cognates with varying degrees of form-overlap between their Frisian and Dutch counterparts will be presented (form-identical cognates: boek-boek 'book', form-similar cognates: beam-boom 'tree') and compared to non-cognates (beppe-oma 'grandmother'). Reading times are hypothesized to be influenced by cognate facilitation. This facilitation is expected to be a function of cross-linguistic similarity between cognate pairs.

Bosma, E., Blom, E., Hoekstra, E., & Versloot, A. (2016). A longitudinal study on the gradual cognate facilitation effect in bilingual children's Frisian receptive vocabulary. International Journal of Bilingual Education and Bilingualism, 1-15.

Duyck, W., Van Assche, E., Drieghe, D., & Hartsuiker, R. J. (2007). Visual word recognition by bilinguals in a sentence context: evidence for nonselective lexical access. Journal of Experimental Psychology: Learning, Memory, and Cognition, 33(4), 663.

Van Assche, E., Duyck, W., Hartsuiker, R. J., & Diependaele, K. (2009). Does bilingualism change native-language reading? Cognate effects in a sentence context. Psychological science, 20(8), 923-927.

[P1.9]

Impact of bilingualism in lexical processing among children with specific language impairment

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Specific language impairment (SLI), defined by Leonard (1998) as a delay and/or a disorder in the acquisition of language with no added cognitive, neurological or emotional disorder, is a discussed diagnosis. Particular linguistic difficulties are associated with SLI, i.e. phonological (Bishop & Snowling, 2004), morphosyntaxic (Pizziolo & Schelstraete, 2008) and lexical difficulties (Dockrell, Messer & George, 2001). Furthermore, an atypical receptive expressive gap has been highlighted in SLI children compared to children with typical linguistic development for vocabulary processing (Edwards & Lahey, 1996). Interestingly, this atypical REG is retrieved in TD bilingual children (Gibson, Oller, Jarmulowicz & Ethington, 2012). An extended receptive expressive gap was also hypothesized for the other linguistic processing, i.e. phonological and morphological processing.

Besides, a reduced lexical access found in TD bilingual children, compared to monolingual peers (Shook, Goldrick, Engstler & Marian, 2015), might be confused with specific language impairment, due to the lack of clinical testing standardized on second language. A worsening effect of bilingualism on morphosyntaxic difficulties was questioned in bilingual children with SLI (Orgassa & Werman, 2008). These results are contrasted with the protective effect of bilingualism on executive functioning (Engel et al., 2014). The aim of the present research was to investigate the impact of bilingualism in lexical processing in children with SLI. Receptive and expressive linguistic tasks were administrated on four groups of participants (TD-monolinguals, TD-bilinguals, SLI-monolinguals, SLI-bilinguals).

Results have shown higher linguistic performances in SLI bilinguals compared to SLI monolinguals, suggesting a potential protective effect of bilingualism on linguistic processing in SLI children. No particular receptive expressive gap was highlighted. Individual performances between SLI bilinguals and SLI monolinguals revealed inter- and intra-individual differences not only regarding the nature of the linguistic disabilities, but also the severity of these linguistic impairments. Potential diagnostic bias was suspected in SLI bilinguals, reinforcing the requirement of battery standardized on bilingual children.

[P1.10]

Performance Monitoring in the First and Second Language

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Previous research has shown that students need more time to read and understand a text that is written in their second language (L2) as opposed to their first language (L1). Yet, when students are asked to answer true/false statements about the text, no language differences are seen between test scores (Vander Beken & Brysbaert, 2017). Here we ask whether students are better at monitoring their own performance after reading a text in either their L1 or their L2. This question is related to metacomprehension, which involves thinking about or monitoring one's own comprehension. In particular, we asked whether performance monitoring is different in L1 or L2 by asking 72 Dutch-English bilinguals to read a text in both Dutch (L1) and English (L2). The topics of these texts were related to natural sciences and provided information about the sun and sea otters. After participants read the text, they were presented with a question that asked the participants to judge how well they think they were able to answer questions about the text they just read. This question therefore established an estimate of their performance. When this question was answered, participants were asked to answer 20 true/false statement about the text. This process was repeated for the second text. The difference between the estimate and their actual performance therefore captures how well they were able to monitor their own performance (Anderson & Thiede, 2008). Test scores and estimated scores were transformed to a scale ranging from 1 to 10. Participants were equally good at estimating their performance for the English text and the Dutch text (the language difference regarding the absolute difference between estimated score and test score was 0.08). At the same time, they were more likely to underestimate themselves in both L1 and L2. Significant language differences were found regarding their actual performance (where the mean language difference amounted to 0.17 in favour of their L1). Hence, performance in L2 is worse whereas performance monitoring appears to be equivalent between L1 and L2.

Anderson, M. C., & Thiede, K. W. (2008). Why do delayed summaries improve metacomprehension accuracy?. *Acta psychologica, 128*(1), 110-118.

Vander Beken, H., & Brysbaert, M. (2017). Studying texts in a second language: The importance of test type. *Bilingualism: Language and Cognition*, 1-13.

[P1.11]

Order Restrictions of Attributive Adjectives in Slovenian: A Self-paced Reading Study

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Cross-linguistic systematicity of ordering preferences in multiple-adjective strings has been recently used as an argument for the cartographic approach to the internal NP structure. This fully syntactic account advances the idea that the relatively strict order of adjectives is a result of hierarchically ordered adjectival functional projections (e.g. Cinque, 1994, 2010, Scott 2002). The unmarked order in strings such as big red ball is therefore assumed to be a consequence of Universal Grammar, and strings like *red big ball are excluded as ungrammatical or are at least labeled as marked/non-neutral; when such strings do surface, their syntactic derivation is assumed to involve additional movements. In this study we take a different approach by investigating the psycholinguistic reality of adjective order restrictions (AORs), testing Slovenian language. We assume that if AORs are psychologically real, they should be detectable at the level of comprehension. Consequently, structures built according to these operative structural restrictions should be processed without extra difficulties, while structures that violate AORs pose a challenge to the processor, which needs to perform additional steps in order to derive the appropriate interpretation for such structures. The main goal is to test if the universal ordering restrictions are detectable while the syntactic processor is parsing complex NP structures in on-line manner. We will report the results of a first study, in which we used the PsychoPy experimental application and a self-paced reading method (13 subjects; 108 stimuli, of which 72 fillers)) to compare the reaction time that participants spend reading marked and unmarked adjective strings composed out of adjectives for SIZE, SHAPE and COLOR positioned at the beginning of the frame sentence, exemplified in (1).

(1) a. Drobne zelene kreme prodajajo v trgovini. (unmarked)
tiny green creams are-sold in store
b. Rumene velike sveče hranijo na podstrešju. (marked)
yellow large candles are-kept in attic

The analysis revealed no significant difference in reaction time between marked and unmarked constructions – speakers apparently equally well process complex NP structures regardless of adjective orderings. This suggests that in Slovenian AORs do not introduce any additional computational complexity for the parser in the process of on-line complex NP comprehension, contrary to what may be expected under the cartographic theoretical account (e.g. Cinque 1994, 2010, Scott 2002). We are currently preparing a follow-up study with refined stimuli and a bigger subject sample.

[P1.12]

Lexical and phonological precision for word and pseudoword recognition in skilled readers

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The Lexical Quality Hypothesis (LQH; Perfetti, 2007) posits that people with more precise lexical representations recognise words faster and more accurately than people with poorer quality lexical representations because more precise representations enhance the discrimination between words. One measure to investigate the LQH is neighbourhood density (NHD; i.e. the number of words that differ by one sound/letter from a given word). Better spellers (spelling is one measure to assess lexical quality) show inhibitory form priming for dense orthographic neighbourhoods and facilitatory priming for sparse orthographic neighbourhoods, while poorer spellers show the converse in a lexical decision task (Andrews & Hersch, 2010). This advantage is attributed to spelling, which is primarily perceived as an orthographic behaviour (Burt & Tate, 2002), but orthographic and phonological abilities tend to be confounded. Furthermore, research that investigates the LQH rarely, if ever, includes measures of phonological processing, which makes it problematic to assign the cause of skilled reading, solely to orthographic processing skill. The present study used a masked form priming lexical decision task in which the primes and targets differed by the final letter and sound. In addition, we collected a large battery of individual difference measures and used principal component analysis to combine and extract correlated features. Replicating Andrews and Hersch's findings, the overall results for word targets showed that there was a facilitatory neighbourhood priming for words with sparse neighbourhood. For word targets, the size of priming effects increased with the principal component of phonological precision. The opposite was found for word targets with dense neighbourhood. For pseudoword targets with sparse neighbourhood, the size of the priming effects increased with the component of print exposure. The opposite was found for pseudowords with dense neighbourhood. The findings support the LQH and highlight the importance of phonology in the processing of visually presented letter strings.

Andrews, S., & Hersch, J. (2010). Lexical precision in skilled readers: Individual differences in masked neighbor priming. *Journal of Experimental Psychology: General, 139*(2), 299-318.

Burt, J. S., & Tate, H. (2002). Does a reading lexicon provide orthographic representations for spelling?. *Journal of Memory and Language, 46*(3), 518-543.

Perfetti, C. (2007). Reading ability: Lexical quality to comprehension. *Scientific studies of reading, 11*(4), 357-383.

[P1.13]

From lexical categories to acceptable lexical choices: A discriminative learning approach

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Using a psychologically plausible error-driven learning mechanism (Rescorla & Wagner, 1972), we aim to model lexical category acquisition from phonetic and distributional information. The learning algorithm is trained using phonetically transcribed utterances of child directed speech and learns to discriminate the phonetic cues that best predict the different lexical items (Baayen, Shaoul, Willits, & Ramscar, 2015). The research question concerns whether this training reflects in words from a same lexical category being activated by similar cues, giving rise to a categorical organization of the word space even though the model is never trained to predict lexical categories.

A first set of simulations investigates whether purely symbolic sequences of phonemes meaningfully correlate with lexical categories, following the phonetic bootstrapping hypothesis (Fitneva, Christiansen, & Monaghan, 2009) according to which, e.g., nouns tend to *sound* like nouns. The model learns to discriminate which phonetic sequences correlate with lexical categories and relies on them to infer the categorical restrictions of new words, even without assuming that children possess subtle phonetic knowledge. A second set of simulations, trained on full utterances instead of isolated words, aims to evaluate how phonetic information interacts with distributional information in giving rise to categorical restrictions. Results show that learning is effective, suggesting that phonetic cues and sequences thereof can give rise to categorical behavior even when lexical categories are left out of the learning process.
In conclusion, these simulations show that it is not necessary to assume lexical categories exist for categorical restrictions to arise. Categorically restricted behavior shown by children arise because certain distributional and phonetic cues co-activate words that share certain features, making them acceptable choices in a given context. This study shows that these co-activations follow linguistically motivated category restrictions, such as nouns and verbs.

Baayen, H. R., Shaoul, C., Willits, J., & Ramscar, M. (2015). Comprehension without segmentation: A proof of concept with naive discriminative learning. *Language, Cognition and Neuroscience, 31*(1), 106-128.

Fitneva, S. A., Christiansen, M. H., & Monaghan, P. (2009). From sound to syntax: phonological constraints on children's lexical categorization of new words. *Journal of Child Language, 36*(5), 967-997.

Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current research and theory* (pp. 497). New York, NY: Appleton-Century-Crofts.

[P1.14]

Cognitive reading mechanisms and associated abilities in deaf Lebanese children

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Many studies aimed at reading abilities in deaf children were conducted in English and French languages. However, no published study is conducted at this level in modern standard Arabic till present.

Our study aims to reveal the strategies of word reading taking into account psycholinguistic variables (i.e. word length and word frequency as well as lexicality) and to examine the cognitive abilities related to reading in native Lebanese deaf children.

Forty eight deaf children, with cochlear implant or hearing aids, were recruited in specialized institutions from grades 4 to 6. Participants had been benefiting from at least 5 years of speech and language intervention. They were administered a newly designed battery of tests evaluating both reading and cognitive abilities. The reading abilities evaluation consists of written words and pseudowords identification tasks and comprehension of written sentences task. The cognitive abilities evaluation involves syllabic and phonemic awareness (judgment, identification and suppression of syllables and phonemes), lip reading of sentences, working memory, visual memory for serial order, and auditory identification of words.

Results show the effects of length and frequency in reading of disyllabic and trisyllabic words, and the effects of lexicality and length when reading pseudowords. Correlational approach reveals significant correlation between cognitive abilities and reading performance except for visual memory for serial order. A control group of hearing children is currently under test for the same cognitive and reading skills.

[P1.15]

Preschool language profile as a predictor of reading disabilities among children with language impairment

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Specific Language Impairment (SLI) affects around 3 to 10% of children (Tomblin, Records, Buckwalter, Zhang, Smith & O'Brien, 1997). In France, 6 to 8% of children have significant difficulties in learning to read (Inserm, 2007). Numerous studies have shown a link between SLI and subsequent development of reading difficulties (Catts, Fey, Tomblin & Zhang, 2002; McArthur et al., 2000; Nathan, Stackhouse, Goulandris & Snowling, 2004; Leonard, 1998). Three models have been developed to account for this link: severity model (Kamhi & Catts, 1986; Tallal, Allard, Miller & Curtiss, 1997), dual deficit model (Ramus, Marshall, Rosen & Van Der Lely, 2013), and adventitious comorbidity model (Caron & Rutter, 1991; Catts, Adlof, Hogan & Weismer, 2005). This study aims to examine the presence of a link – and to characterize it if appropriate - between a child's performance in tasks assessing his/her language skills in pre-school age and his/her subsequent reading performances. Data of 106 children who consulted the Neuropediatry department of the Saint Vincent de Paul Hospital in Lille were collected. These 106 children were divided into four groups, identified by the combination of presence or absence of both SLI and reading disabilities. Group comparisons failed to show any difference in terms of language skills in preschool age between children with and without reading disabilities, except that children who developed subsequent reading disabilities displayed poor phonological reception skills, whatever they have language impairment or not. We also performed multiple linear regressions in order to determine which oral language skill in preschool age is the best predictor of the subsequent reading performances. Those analyses failed to highlight a specific predictor of reading skills. Overall, the different analyses of the linguistic profiles of these children points to the hypothesis of an adventitious comorbidity between these two language disorders.

[P1.16]

The neurocognitive profile of dyslexia and dyscalculia in children: A behavioral and DTI tractography study

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Insight in the developmental trajectory of the neuroanatomical reading correlates is important to understand related cognitive processes and disorders. In adults, a dual pathway model has been suggested encompassing a dorsal phonological and a ventral orthographic white matter system. This dichotomy seems not present in pre-readers, and the specific role of ventral white matter in reading remains unclear. Therefore, the present longitudinal study investigated the relation between ventral white matter and cognitive processes underlying reading in children with a broad range of reading skills (n = 61). Ventral pathways of the reading network were manually traced using diffusion tractography: the inferior fronto-occipital fasciculus (IFOF), inferior longitudinal fasciculus (ILF) and uncinate fasciculus (UF). Pathways were examined pre-reading (5-6 years) and after two years of reading acquisition (7-8 years). Dimension reduction for the cognitive measures resulted in one component for pre-reading cognitive measures and a separate phonological and orthographic component for the early reading measures. Regression analyses revealed a relation between the pre-reading cognitive component and bilateral IFOF and left ILF. Interestingly, exclusively the left IFOF was related to the orthographic component, whereas none of the pathways was related to the phonological component. Hence, the left IFOF seems to serve as the lexical reading route, already in the earliest reading stages.

[P1.17]

How students with dyslexia can optimize reading

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The last decade more and more students with dyslexia enter higher education (Callens, Tops, & Brysbaert, 2012). However, not much is known about the success factors for these students. An important skill related to academic success is reading comprehension (Cook, 2006; Kök, 2010). Faggella-Luby and Deshler (2008) have created a model for reading comprehension. This model shows that three factors specifically contribute to good reading comprehension skills: (1) word decoding skills, (2) language proficiency skills, and (3) cognitive functions.

Based on the model of Faggella-Luby and Deshler (2008) we ran a large-scale study. This study aims to find differences between students with and without dyslexia on reading comprehension. Also, we are interested in how these students can optimize their reading comprehension skills.

Sixty students with dyslexia and sixty matched students without dyslexia were included in the study. Reading comprehension skills were covered with a short, advanced reading comprehension task and a more academic reading comprehension task (Van der Beken & Brysbaert, 2017). Different answering modes are added as well as text-to-speech software as a compensatory method. For word decoding we included a word reading task, a non-word reading task and two phonological awareness tasks. Proficiency tests for both languages (Dutch and English) were included as well as a fluid IQ estimate using two subtests of the SON-R. Finally, working memory and inhibition were tested.

As data collection is still taking place, we will present preliminary results and pilot study results. We expect to find differences on reading comprehension between students with dyslexia and students without dyslexia in both L1 and L2, because students with dyslexia focus more on decoding processes than on reading comprehension processes. Moreover, for the contributing factors, we expect students with dyslexia to perform worse on word decoding skills, language proficiency, and on working memory and inhibition.

[P1.18]

Gender and number agreement processing in Dutch adults with developmental dyslexia: an ERP study

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Developmental dyslexia is an impairment in reading and/or writing, characterized by difficulties in word recognition (low accuracy and/or speed), as well as by poor decoding and/or poor spelling skills (APA, 2013). In addition to frequently occurring phonological problems, a considerable number of individuals with dyslexia exhibit non-phonological impairments, including morphosyntactic difficulties (Callens et al., 2012). In adults, these morphosyntactic impairments are usually subtle and often only visible on online rather than on behavioral tasks (Rispens et al., 2006). In order to investigate morphosyntactic processing (i.e., gender and number agreement processing) in dyslexia, we are conducting an event-related potentials (ERP) study on Dutch adults with and without dyslexia.

In the experiment, participants read grammatical and ungrammatical sentences in Dutch in front of a computer while a continuous electroencephalogram (EEG) is being recorded. Ungrammatical sentences contain either a gender or a number violation.

Data collection for adults with dyslexia is still ongoing, however, data collection for adults without dyslexia has been completed. Results show a difference in the ERP elicitation between the gender and number conditions (Popov & Bastiaanse, 2018). In the gender condition, there is a P600 (ERP component associated with morphosyntactic reanalysis and repair, leading to increased processing difficulty) starting from 600 ms. For the number condition, the P600 has a broader distribution, starting from 800 ms (Popov & Bastiaanse, 2018). This can be explained by more complex repair processes taking place for number disagreement as opposed to gender disagreement [4]. Preliminary data analysis of the dyslexia group (n=15) indicate the presence of a P600 effect for both conditions. Following the completion of data collection, further analyses will examine the differences between the two groups. In general, for adults with dyslexia, we expect a delay in processing gender and number agreement (i.e., a delay in the onset of the P600) in comparison to the group without dyslexia.

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders (DSM-5). American Psychiatric Publishers. ISBN; 0890425574, 9780890425572.

Callens, M., Tops, W., & Brysbaert. M. (2012). Cognitive profiles of students who enter higher education with an indication of dyslexia. *Plos One, 7(6)*, e38081.

Popov, S., & Bastiaanse, R. (2018). Processes underpinning gender and number disagreement in Dutch: An ERP study, *Journal of Neurolinguistics, 46,* 109-121.

Rispens, J. E., Been, P., & Zwarts, F. (2006). Brain responses to subject-verb agreement violations in spoken language in developmental dyslexia: An ERP study. *Dyslexia*, *12*, 134-149.

[P1.19]

Subject production and interpretation in Greek and Spanish: evidence from monolingualism and bilingualism

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This study aims to capture linguistic variation in the syntax of subjects of Greek and Chilean Spanish (henceforth Spanish) as well as in adult bilingualism involving these two typologically similar null subject languages. The focus is on the distribution of null and overt 3rd-person subjects in topic continuity and topic shift contexts.

Oral production data using two picture story description tasks as well as aural interpretation data on pronominal anaphora resolution were elicited from monolinguals of Greek and Spanish (N=40) as well as from three types of bilinguals: attriters, heritage speakers, and L2 speakers of Greek (N=86). Statistical analyses were used to determine the association of the groups of bilinguals and monolinguals with linguistic and sociolinguistic variables.

Greek and Spanish monolingual data showed that the two languages are not identical regarding subject distribution. In both production and interpretation, there were differences in the use and interpretation of overt subject pronouns in topic shift contexts. In Greek, the pronoun was produced by far less often than in Spanish and in anaphora resolution it was consistently linked to the object antecedent. In Spanish, in both production and interpretation the subject pronoun was more flexible. The difference lies in the fact that the Greek pronoun is more deictic than the Spanish one.

Interestingly, there was no overuse/overacceptance of overt pronouns in any of the bilingual groups, against the predictions of the Interface Hypothesis (Sorace 2011). This may relate to the deictic nature of the Greek pronoun which makes its use more categorical compared to the Spanish pronoun. The groups of bilinguals also produced more cases of ambiguity with null subjects in topic shift, indicating that the null subject was more problematic than the overt pronoun. The Vulnerability Hypothesis (Prada Pérez 2018) predicts that structures that show variable distributions are more vulnerable than those exhibiting categorical distributions. In this study, null subjects were found to be more variable than overt pronouns in Greek, the latter being more categorical. This may explain why null subjects were found to be vulnerable while overt pronouns were not.

Prada Pérez, A. (2018). Theoretical implications of research on bilingual subject production: The Vulnerability Hypothesis. *International Journal of Bilingualism*, 1-25.
Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, 1(1), 1-33.

Poster Session 2
Tuesday, 5th June

[P2.1]

Measuring the knowledge and usage of the grammatical information encoded in stem-vowel alternations in German strong verbs during real-time sentence comprehension. A visual-world eye-tracking study

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In native language comprehension, we constantly integrate lexical, morphosyntactic, pragmatic and contextual information to predict upcoming input (Altmann & Kamide, 1999; Huettig et al., 2011), which facilitates efficient communication. Adult L2 learners, however, manifest difficulties in exploiting grammatical cues to generate such anticipations (Kaan, 2014). Some studies found L2 sentence processing to rely more on lexical-semantic rather than on grammatical information (e.g., Hopp, 2015).

Our study investigates whether advanced L2 learners of German (L1 Dutch) can use the grammatical information encoded in the alternating stem-vowels of German strong verbs in comprehension. In German strong verbs, morphosyntactic information of number and person is not only encoded through affixation but also through stem-allomorphy. As a consequence, the difference between the 3rd p. sg. and the 2nd p. pl. in present tense is marked only through a stem-vowel change. We wish to examine whether L2 learners can use the changed vowels in auditory input as a cue for syntactic number.

We compare data of 20 learners of German to those of 20 native speakers in a visual-world eye-tracking experiment using a sentence-picture matching task. Participants are exposed to two pictures, varying in the number of referents depicted, in combination with auditory sentences in which the vowel of the verb stem represents the first reliable cue for number. Successful exploitation of the morphosyntactic information encoded in the stem-allomorphs is measured as anticipatory eye-movements towards the correct picture.

The findings may have important theoretical and methodological implications. The absence of anticipation in the L2 group would confirm the processing differences between L2 and L1 speakers in sentence comprehension. However, the presence of anticipatory eye-movements would imply that our method could be used as a measure of implicit morphosyntactic knowledge, and be compared to measures of explicit knowledge. Furthermore, the method can be implemented in combination with learning treatments.

Altmann, G. T. M., & Kamide, Y. (1999). Incremental interpretation at verbs: Restricting the domain of subsequent reference. *Cognition*, *73*, 247-264.

Hopp, H. (2015). Semantics and morphosyntax in predictive L2 sentence processing. *International Review of Applied Linguistics*, *53*, 277-306.

Huettig, F., Rommers, R., & Meyer, A. S. (2011). Using the visual world paradigm to study language processing: A review and critical evaluation. *Acta Psychologica*, *137*(2), 151-171.

Kaan, E. (2014). Predictive sentence processing in L2 and L1: What is different? *Linguistic Approaches to Bilingualism*, *4*(2), 257-282.

[P2.2]

Complex Noun Phrases: The Influence of Length and Type on Processing Time

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Multiple studies have been conducted to investigate complex noun phrases processing in English (Geer et al., 1976; Salager-Meyer, 1983; Limaye, 1991; Pastor, 2008). They suggest that noun phrases (NP) such as employee insurance payment reduction are more difficult to process than counterpart prepositional phrases (PP) such as reduction of payment of insurance for employees. The difficulty is caused by multiple constituents with no cues to their semantic connection. However, evidence to date comes only from off-line studies. We investigated the on-line processing of NP and PP counterparts using eye tracking while reading. Participants were 20 speakers of various language backgrounds (mean age 25, 12 female). Twenty-eight sets of experimental sentences were created, as in (1) in 2x2 design: Phrase Type (NP vs. PP construction in critical segment) and Length (3 vs. 4 noun components in critical segment). These items, together with 40 filler sentences, were presented across four lists using a Latin square design.

(1) a. In some cases / the (employee) insurance payment reduction / is approved (ROI 1)/ by the members (ROI 2) / of the labor union.

b. In some cases / the reduction of payment of insurance (for employees) / is (ROI 1)/ by the members (ROI 2)/ of the labor union.

We analyzed First Fixation Duration (FFD) and Total Duration (TD) in the two regions of interest (ROIs 1,2) after the critical region. We hypothesized that reading times would be longer in NP vs. PP sentences, and in sentences with 4 vs. 3 constituents in the critical segment. A 2X2 ANOVA for the FFD showed significant main effects (but no interaction) of both Phrase Type ($p=0.05$) with PP having shorter FFD, and Length ($p=0.04$) with 3 having shorter FFD in the first ROI. No significant main effects or interactions were found for Total Duration. We conclude that on-line processing is indeed more difficult for NP vs. PP structures, and for longer vs. shorter NPs. The absence of effects in ROI 2, as well as for TD, could be explained by the relative simplicity of the items: the initial difficulties were resolved quickly and the TD could then be affected by other, unaccounted, factors. Additional experiments with more complex items are needed to investigate the sustainability of the effect of both Phrase Type and Length.

[P2.3]

The Role of Linguistic and Sensorimotor Information in the Basic-Level Advantage

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Does language play a role in fundamental cognitive processes such as categorisation? The basic-level advantage describes the human preference for categorising objects at their basic level (e.g., dog), over categorising them at their superordinate (e.g., animal) or subordinate (e.g., Labrador) level. While cognitive research on categorisation has repeatedly found evidence for the basic-level advantage, the underlying mechanisms of this effect remain largely unexplained. One possible explanation comes from recent accounts on conceptual processing in humans, which argue that the conceptual system is made up of both sensorimotor and linguistic information. These accounts hold that humans, through their continuous exposure to language, are sensitive to its statistical regularities. It has been shown that these regularities, such as the co-occurrence of words in the same context, may offer a computationally economical linguistic shortcut during conceptual processing, without necessarily activating sensorimotor representations.

In this pre-registered study, we hypothesise that sensorimotor information (i.e., perception-action experience of the world) and linguistic information (i.e., statistical distribution of words in language) both contribute to categorical decision making, and that linguistic information in particular contributes to the basic-level advantage in categorisation.

To test this hypothesis, we will carry out a word-picture categorisation task, in which participants will be shown category labels varying in taxonomic level (i.e., superordinate, basic or subordinate), and judge whether the object shown in the subsequent picture belongs to that category or not. Critically, we used each label-picture pair (e.g., dog-Labrador) to create measures of sensorimotor and linguistic information: sensorimotor proximity (i.e., a similarity measure of grounded representations across 11 dimensions of sensorimotor strength for each word), and linguistic distributional proximity (i.e., a high-dimensional measure of word co-occurrence derived from a large corpus). Response times (in milliseconds) and accuracy will be recorded, and analysed using Bayesian model comparisons to determine (1) whether linguistic information predicts response times above and beyond sensorimotor information, and (2) whether variance in response time and accuracy is best explained by the taxonomic category model (i.e., specifying subordinate-, basic-, and superordinate-level categories), or by the linguistic-sensorimotor model (i.e., containing measures of sensorimotor and linguistic proximity.

[P2.4]

Moses or Noah? A case of 'potato-potahto' when using a foreign language

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Research among unbalanced bilinguals suggests a foreign language (FL) advantage for various tasks requiring a more systematic processing style. For instance, in decision making bilinguals tend to be less prone to heuristic biases when the dilemma is presented in their non-native language. Based on this finding, the present study aimed to determine whether such an FL advantage may also be observed in the detection of semantic anomalies. A semantic illusion occurs when a certain term has been replaced by a semantically related (but incorrect) term, without being noticed by the receiver. In the case of the Moses illusion, for example, many people answer the question "How many animals of each kind did Moses take on his ark?" with "two", the answer that would have been correct if the question comprised "Noah" instead of "Moses". To test whether FL affects susceptibility to such semantic illusions, participants were presented questions with and without anomalies, both in their NL and FL, while their eye movements were recorded. They were required to provide the correct answer to the question, unless they noticed that it comprised an anomaly. For both languages, participants failed to detect the anomaly in more than half of the trials. Crucially, more illusions occurred for questions presented in their second language, suggesting an NL rather than FL advantage in detecting semantic illusions. In addition to the verbal responses, recorded eye movements did not reveal implicit detection of the anomalous terms. These findings suggest that people often overlook erroneous terms and are even more prone to semantic illusions in their non-native language. This is consistent with the idea that use of an FL increases cognitive load, limiting the cognitive resources available for anomaly detection.

[P2.5]

Distributional nuggets for lexical categories: Finding the useful information in co-occurrence patterns

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In this presentation, we provide results from two computational simulations which investigate distributional bootstrapping (Maratsos & Chalkley, 1980), i.e. the hypothesis that children learn lexical categories from distributional co-occurrences.

The first simulation aims to uncover the effect that frequency, lexical diversity, and predictability have on how useful lexically specific distributional contexts are. Usefulness is quantified using Information Gain (Quinlan, 1993), a common feature weighting method in machine learning, and it is then used as the dependent variable in a mixed-effects linear regression model. Results show that useful contexts tend to be more lexically diverse, more frequent, and more predictable given the co-occurring words, with diversity being the most important predictor. In other words, a useful context occurs often, co-occurs with many different words, and is easier to predict given the words it co-occurs with. Computational models of distributional bootstrapping from the literature, however, quantified usefulness only considering frequency (Mintz, 2003; St. Clair, Monaghan, & Christiansen, 2010). If the outcome of the regression analysis is correct, it can be hypothesized that useful contexts as defined combining frequency, diversity, and predictability should yield a better categorization than simply frequent contexts. Using an unsupervised *k* nearest neighbor approach and varying (i) the type of available distributional information and (ii) the set of target words to categorize, we show that the proposed approach to quantify usefulness yields better categorization than previous ones that only rely on frequency. Importantly, improved categorization is not achieved by selecting more distributional contexts, but by selecting more informative ones.

In conclusion, we provide evidence that diversity and predictability are important components of distributional learning in the context of lexical category acquisition and that, together with frequency, they contribute to determine which distributional contexts are more useful to lexical category acquisition.

Maratsos, M. P., & Chalkley, M. A. (1980). The internal language of children syntax: The nature and ontogenesis of syntactic categories. In K. E. Nelson (Ed.), *Children's language* (Vol. 2, pp. 127-213). New York, NY: Gardner Press.

Mintz, T. H. (2003). Frequent frames as a cue for grammatical categories in child directed speech. *Cognition, 90*(1), 91-117.

Quinlan, R. J. (1993). *C4.5: Programs for machine learning*. San Mateo, CA: Morgan Kaufman Publishers, Inc.

St. Clair, M. C., Monaghan, P., & Christiansen, M. H. (2010). Learning grammatical categories from distributional cues: Flexible frames for language acquisition. *Cognition, 116*(3), 341-360.

[P2.6]

How to count stuff: Conceptual Shifts in German Noun Countability

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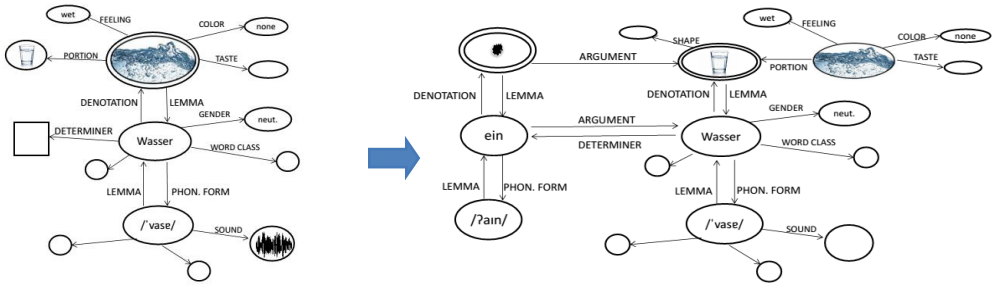
Syntactic countability is thought to be at least partially linked to the conceptual distinction between a bounded entity and an indivisible mass. The presented body of research empirically examines shifts in the countability domain which change exactly this property.

1) a. Count-to-Mass Shift (Grinder)
*There is **much apple** in the cake.*
b. Mass-to-Count Shift (Packager)
*I drank **a beer** yesterday*.

In order to investigate the interplay of syntax and semantics in these shifting processes, a lexical decision experiment was conducted, that used two main classifications as experimental factors: COUNTABILITY (count, dual-count, dual-mass, mass) was determined based on Det-N co-occurrences in corpus results and SHIFTABILITY (often used with shift, not used with shift) is the result of an extensive sentence production study. Additionally, further semantic factors were included that have been hypothesized in linguistic literature to influence shift success (e.g. concreteness, atomicity). The noun stimuli were presented in three conditions: preceded by a congruent determiner, an incongruent determiner or by a length-matched segment of brown noise.

The results showed a significant congruency effect for the count and mass nouns, but not for the two classes of dual nouns. Further, an incongruent determiner delayed responses compared to the neutral condition only for the mass nouns, but not for count nouns (see figure right). Semantic factors, including Shiftability did not yield significant effects. This outcome suggests that syntactic countability (i.e. combinational information about determiners) is stored in a noun's lexical entry but that it's activation is not significantly restricted or influenced by how well the resulting incongruent NP can be interpreted.

We therefore conclude that countability shifts can be analyzed as syntactically driven metonymy. A process effectively formalized in a frame analysis, where syntactic countability is represented as combinatorial restrictions of the lemma and a violation of such restrictions gives rise to a re-mapping of the reference to a non-default conceptual node (see figure "ein Wasser" *'a water'* below).



To investigate the precise nature of the congruency effect, a phoneme monitoring experiment and an ERP study are conducted at present. We expect the results of the phoneme monitoring experiment to determine whether countability shifts should be considered a lexical or a post-lexical operation by contrasting the resulting effects with the lexical decision results. The ERP study compares countability shifts with classical semantic and syntactic violations.

[P2.7]

The role of lexical access in working memory for concepts

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Recent theories of language comprehension hold that we mentally represent word meaning via simulation of sensorimotor experience, but that linguistic information (i.e., lexical associations between the words that label concepts) also plays a critical role. However, it is currently unknown to what extent our ability to represent conceptual meaning in working memory relies on sensorimotor simulation versus linguistic labels. That is, what will happen to our ability to remember concepts if we take away language and rely only on sensorimotor information?

In the current pre-registered study, participants are asked to memorise a set of pictured objects which form a meaningful sequence, such as a recipe for a cake. They then have to remember the objects by choosing a target image out of an array of 6, including 5 distractors. Critically, participants perform an articulatory suppression task by repeating the word "the" at encoding and/or retrieval phase, which acts to block lexical access to the names of the pictured objects.

Accuracy and response time will be measured and analysed using a mixed effects linear model. We expect that both accuracy and timing of the responses will be affected by access to linguistic information. Specifically, we predict that accuracy will be highest when linguistic labels are available at both encoding and retrieval, and lowest when linguistic labels are available at encoding, but not at retrieval. Additionally, we also predict that response times will be fastest when linguistic labels are available at both encoding and retrieval, and slowest when linguistic labels are available at encoding, but not retrieval.

The research will allow us to identify to what extent language supports core cognitive processes like working memory, which has implications for how we view its role in complex thinking.

[P2.8]

The influence of L1 reading direction on the L2 perceptual span size

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Perceptual span is the visual area available during a fixation to the reader while reading. Research has found that native speakers readers of English have a perceptual scan of about 14 characters to the right of the point of fixation. Research with L2 speakers of English, on the other hand, has shown that L2 perceptual span was about half of the size of L1 speakers; however, this is based on one study that investigated L2 speakers of English with L1 Japanese (Leung et al., 2014). Since Japanese is a language with multiple scripts and reading directions, it has been suggested that L1 reading direction may play a role in L2 perceptual span size. For example, Paterson et al. (2014) found a larger perceptual span in the L1 for readers of Urdu (reading direction right to left) than in L2 English (reading direction left to right). However, they only assessed the same set of bilingual participants in Urdu and English (opposing reading directions), instead of looking at L2 performance across groups with different L1 reading directions.

To test the influence of L1 reading direction on L2 perceptual span, we compared the perceptual span in L2 English (reading direction left to right) between two groups of participants with L1s that are linguistically similar but have different reading directions: native speakers of Urdu (reading direction left to right) and Hindi (reading direction right to left). We hypothesized that Urdu readers would have both a smaller perceptual span and a slower reading rate in L2 English than Hindi readers, given that Hindi and English share the same reading direction while Urdu does not.

L2 perceptual span size in English was determined for native speakers of Hindi (n=15) and Urdu (n=15) via a gaze-contingent moving paradigm using eye-tracking. We found no influence of L1 reading direction on the size of the L2 perceptual span which might be due to a compensatory effect regarding language proficiency given that readers of Urdu scored higher than readers of Hindi on an English proficiency test. We therefore suggest that higher proficiency of Urdu readers masked the potential influence of L1 reading direction on L2 perceptual span, which we plan to further investigate in the future.

[P2.9]

Saving five people or two: The foreign language effect persists

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Recent research into multilingualism and decision-making suggests that people who are presented with a moral dilemma in their foreign language (FL) will more readily opt for the utilitarian response than when presented with the same dilemma in their native language (NL). The dilemma that is classically given is the *Footbridge*, in which a person is standing on top of a bridge over railway tracks and is asked to push a big man standing next to them in order to save five people below from getting hit by a railway trolley. Doing so, the big man will die, but the five people below will live. Deontology dictates you must not sacrifice a life, whereas utilitarianism prescribes you should. The aim of the present study was to see whether the FL effect persists when gains are lower. We thus employed both the original version of the *Footbridge* as well as an adapted one, in which only two people would be killed by the trolley. A total of 227 participants completed one of these two dilemmas, either in their NL or FL. The FL condition was once more split up into a second (L2) and a third (L3) language condition, depending on the FL proficiency of the participant. Results showed an FL effect for both dilemmas. In the original version, the effect was present for both L2 and L3. In the adapted version, percentages of utilitarian responses were generally very low, but the FL effect persisted for L3. We will discuss these findings in the light of the theory suggesting that FL use stunts emotional processing in moral decision-making, impeding considerations of deontological rules and making participants rely more on utilitarian reasoning.

[P2.10]

Anticipatory eye movements while processing WH-dependencies in a second language

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In WH-questions (see Table), WH-element *who* (filler) is associated with a gap after verb, which creates a filler-gap dependency. However, research has been mixed regarding whether L2 speakers are able to process these constructions like native speakers (Marinis et al., 2005; Pliatsikas & Marinis, 2013). The Shallow Structure Hypothesis (Clahsen and Felser, 2006) argues that L2 speakers rely more on non-syntactic information while processing and rather form shallow syntactic representations. L2 speakers are overall slower than native speakers while processing (Dekydtspotter et al., 2006), but this does not imply that they use different mechanisms. To our knowlede, this is the first research to examine the role of the speed of the audtiory input in L2 processing.

If L2 speakers are able to form filler-gap dependency like L1 speakers, we hypothesize more eye movements towards to entity (target) of the gap (ROI 3), while listening to WH-questions. We also expect that lower speech rates will facilitate the anticipation of the target.
19 students, L2 speakers of English, participated in the study. They heard 20 short stories, while looking to a visual array of 4 objects depicted in the story (one of them being target and one competitor). Afterwards, they heard a WH-question related to the story (see Table) while eye movements were recorded. Auditory input was presented at four speeds: 3.5, 4.5. 5.5 and 6 syllables per second. The dependent variable was proportion of eye fixations to target compared to the competitor. Regions of interest were analyzed separately using GLMER.

ROI 1	ROI 2	ROI 3	ROI 4
Who$_i$ did	the duck	peck t_i	in the bay?

Table. Regions of interests in WH-question

As expected, no differences were found in ROI 1 and ROI 2. Suprisingly, no difference was found in critical ROI 3 across all speeds, suggesting that L2 speakers did not differ in fixation proportions between target and competitior at any rate. In ROI 4 participants looked significantly more to the target than to the competitor, meaning that L2 speakers were able to comprehend the instructions.

In conclusion, L2 speakers do not anticipate target at the gap site in WH-dependencies and these results are in line with Shallow Structure Hypothesis.

[P2.11]

Planning scope in a second language

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Speakers do not wait until they have planned the entire sentence before they start pronouncing the first word. Instead, previous studies have provided evidence that, prior to speech onset, access to lexical representations is completed for the first phrase of an utterance and processing is started but not completed for the remaining part of a sentence following the initial phrase (Allum & Wheeldon, 2007; Martin et al., 2010). However, do speakers have a comparable planning scope in a second language (L2)?

To address that question, we tested whether Dutch-English bilinguals (*n* = 52) also show a shorter onset latency for complex sentences compared to simple sentences when speaking in their L2, or whether L2 language processing differs from L1 language processing by showing a smaller planning scope – and thus more incrementally produced sentences. Sentences that have simple (A) or complex (B) onset phrases, similar to those in Smith & Wheeldon (1999), have been used to describe short animations. Additionally, we tested, by counterbalancing the language order, whether previous extensive exposure to one of the languages influence the speech latencies in the other language.

A) Simple – complex: A kite jumps next to a frog and a mirror
Een vlieger springt naast een kikker en een spiegel

B) Complex – simple: A kite and a frog jump next to a mirror
Een vlieger en een kikker springen naast een spiegel

Allum, P. H., & Wheeldon, L. R. (2007). Planning scope in spoken sentence production: the role of grammatical units. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *33*(4), 791.

Martin, R. C., Crowther, J. E., Knight, M., Tamborello II, F. P., & Yang, C. L. (2010). Planning in sentence production: Evidence for the phrase as a default planning scope. *Cognition*, *116*(2), 177-192.

Smith, M., & Wheeldon, L. (1999). High level processing scope in spoken sentence production. *Cognition*, *73*(3), 205-246.

[P2.12]

Semantic interference in the brain: An fNIRS study

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Semantic interference paradigm has been frequently used in speech production research. There is an ongoing debate about the cognitive and neural mechanisms of the effect. Despite the considerable number of behavioral and neuroimaging studies using EEG and fMRI, no study using functional near-infrared spectroscopy (fNIRS) has investigated the semantic interference effect even though fNIRS is known to be robust to motion artifacts. We therefore explored the neural mechanisms underlying the semantic interference effect combining the cross-modal interference paradigm with fNIRS. Thirty-five Belgian Dutch native speakers participated in our experiment, where they were asked to name pictures with categorically-related distractors being presented auditorily. Their brain activities were monitored throughout the experiment with 32 channels covering the frontal and temporal regions bilaterally. Behavioral data replicates the semantic interference effect by demonstrating significantly slower reaction time when categorically-related distractors are presented. Imaging data showed the reduction of the oxy-hemoglobin at the left inferior frontal gyrus (IFG) compared to the unrelated distractor condition, whereas the increase of oxy-hemoglobin was found in the left anterior middle temporal gyrus (MTG). This result seems inconsistent with some of the hypotheses about the source of the semantic interference effect. We interpret this data that the reduction of the oxy-hemoglobin in the left IFG might have been due to the cross-modal paradigm (i.e., visual target stimuli and auditory distractors). In sum, we conclude that the semantic interference effect likely appears by the lexical competition during the lexical selection stage, represented by the increased activity in the MTG, and the corollary reduced responsiveness of the lateral inhibition mechanism, resulting in the reduced activity in the left IFG.

[P2.13]

Development of shared syntactic representations in second language learning: Evidence from syntactic priming

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Two longitudinal studies investigated the development of syntactic representations in late second language (L2) learners by means of syntactic priming in an artificial language paradigm. Several studies found that L2 learners are primed by syntactic structures of one language, when producing in the other language. These findings suggest that L2 learners develop shared syntactic representations between languages. But how are these shared representations established? Hartsuiker and Bernolet's (2017) theory claims that 1) L2 syntactic representations evolve gradually from item- specific to more abstract, 2) over time these representations are increasingly integrated with available L1 presentations, and 3) both in early and late phases of L2 acquisition, L1 influences syntactic processing in L2.

We tested predictions of this theory in artificial language (AL) learning experiments. The AL consisted of intransitive, transitive, and ditransitive sentences. By doing so, we avoided effects of previous exposure to L2, while obtaining full control of linguistic factors. Native Dutch speakers (with English and French as L2) acquired the AL in the lab by means of a battery of tasks, the last of which was sentence priming. Here, participants first evaluated whether a sentence matched an action (depicted in a movie clip), and then produced a new sentence. The syntactic structure of the artificial language was parallel to Dutch syntax. We manipulated syntactic structure of the prime and meaning overlap between the prime and target verbs, which enabled us to investigate whether syntactic priming occurred in conditions with verb or meaning overlap (item-specific) as well as in conditions without overlap (abstract syntactic priming).

In Study 1, target sentences were always in the AL. There was an effect of priming in both item-specific and abstract conditions (though smaller) from Day 1 on. In Study 2, the AL was more difficult, (but still largely following Dutch syntax) and target sentences could be either Dutch or the AL. The results were very similar to those of Study 1. For the ditransitives, however, there was already L1-L2 priming on Day 1, but L2-L1 priming was only present from Day 2 on. This is probably because ditransitive structures in Study 2 were slightly different from their Dutch equivalent. These findings suggest that a) cross-linguistic priming is not necessarily symmetric, in contrast to the model's predictions, and b) at least for structures that are very similar between the languages, both item-specific representations and more abstract representations are established very early during language learning.

[P2.14]

Are children from a low SES sensitive to morphological units?

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Many studies have suggested that morphological knowledge support reading fluency, reading comprehension, vocabulary development and spelling. However, achievement in these domains are also influenced by other factors like socioeconomical status (SES); for example, children from low SES know less words –and therefore, have more difficulty in reading comprehension – than children from middle to high SES. The first aim of the present study is to evaluate how SES impacts morphological processing and interacts with grade level on this measure. Our second aim is to determine the links between morphological knowledge, vocabulary and reading abilities (decoding and comprehension) according to the grade level for French children. Our sample was composed of 200 French children from low and middle SES schooled in second and third grade. Children were assessed on several reading-related and literacy tasks (phonological and morphological awareness, reading comprehension, decoding, fluency, vocabulary and spelling). By comparing morphological knowledge according to children SES, this study will determine whether children from low SES have developed morphological awareness as much as children from a higher SES. Correlational and linear regression analyses show the combined and unique contributions of morphological awareness to reading abilities in children of both SES. These results indicate that a morphological analysis training could limit the risk of developing literacy deficit, according to its relation with other reading and readingrelated skills, as vocabulary development, and will provide direction for teachers and future research on the impact of morphological knowledge in the development of literacy skills.

Fluss, J., Ziegler, J., Ecalle, J., Magnan, A., Warszawski, J., Ducot, B., ... & Billard, C. (2008). Prévalence des troubles d'apprentissages du langage écrit en début de scolarité: l'impact du milieu socioéconomique dans 3 zones d'éducations distinctes. *Archives de pédiatrie, 15*(6), 1049-1057.

Kirby, J. R., Deacon, S. H., Bowers, P. N., Izenberg, L., Wade-Woolley, L., & Parrila, R. (2012). Children's morphological awareness and reading ability. *Reading and Writing, 25*(2), 389-410.

[P2.15]

Representation of Morphologically Complex Words in the Mental Lexicon: an ERP Study

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In literature two hypothesis coexist about the representation in the mental lexicon of suffixed words. According to the "unitary hypothesis" derived words have a unique representation in the mental lexicon including stem and suffix. On the other hand, the "combinatory hypothesis" claims that in the mental lexicon there are different representations for stems and suffixes and they are combined together in the recall phase guided by specific morpho-syntactic rules. This study has been realized to the aim to disentangle between the two hypotheses using the methodology introduced by Hanna and Pulvermüller (2014). The authors used EEG to detect Mismatch Negativity (MMN), an early ERP component to an odd stimulus in a sequence of stimuli. The presentation of a deviant stimulus in a stream of standard stimuli elicits a neural response associated with pre-attentive cognitive processes (Garrido et al., 2009). In the present study we used two standard stimuli and four deviant stimuli. Standard stimuli were the Italian words "facil-e" (easy) and "triste" (sad). Deviant stimuli were obtained with suffixes "-ità" and "-ezza": we obtained two congruent stimuli, the words "facil-ità" (easiness) and "trist-ezza" (sadness) and two incongruent stimuli, the pseudo-words "facil-ezza" and "trist-ità". All the stimuli were temporally controlled with software Audacity: the stems lasted 500 ms and the suffixes were 400 ms long. Participants were seated in front of a computer and equipped with an headset; they were instructed to watch a silent film and to ignore the audio stimuli presented in the headphone. The EEG Enobio 20 wireless system was used for data acquisition. Electrodes were placed on the scalp according to the 10-20 international system. Before registration calibration of the signal and eye blinks detection were performed. EEG tracks were pre-processed with matlab tool EEGLAB. Data were analyzed in term of mean voltage. The results were consistent with previous evidences: derived congruent stimuli ("facil-ità" and "trist-ezza") elicited an higher MMN compared to incongruent stimuli ("facil-ezza" and "trist-ità") in a time window corresponding to the beginning of the word (100-200 ms). This result supports the "unitary hypothesis" and the whole form storage of suffixed words. Furthermore, localization of the effect with LORETA approach highlighted a fronto-temporal prevalence compatible with pre-attentive hypothesis.

[P2.16]

A multiple threshold model of categorization

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Most categories are vague. They admit of borderline items that are neither determinately category members nor determinately not category members. We modelled the processes involved in trivalent categorization tasks where participants can answer with “partial member” in addition to “nonmember” and “full member”. The categorization data from 363 undergraduate students for eight nominal categories were analyzed with IRTree models. We compared a one-dimensional model that assumes the choice for a particular response results from a single consideration (the extent of category membership) with a multidimensional one that assumes a response results from two considerations (one about category membership and one about typicality). We found that the multidimensional model accounted better for the categorization data than the one-dimensional model did, suggesting that membership and typicality are two qualitatively distinct processes involved in categorization. The trivalent categorization process is a sequential one whereby participants decide whether the item belongs to the category (“nonmember” vs. “partial member or full member”) before establishing how representative the item is for the category (“partial member” vs. “full member”).

[P2.17]

Can affordable equipment produce good results?

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Emotive Epoch+ is an affordable system for EEG that provides 14 EEG channels and two reference channels. Additionally we access an EyeTribe Eyetracker that provides information about eye movement, also at an affordable price. We have integrated these two systems with a presentation system running on a MacMini using SuperLab5 and an acquisition system running on a Mac Pro accessing the EEG headset via a Wi-Fi-connection. The acquisition computer receives an optical signal via a Cedrus StimTracker when stimuli change. Our system use an intermediate response pad (Cedrus RB-530) and a programmed Arduino signal translator to allow signals to be sent over USB, and time-lock signals with the visual presentation of stimuli on a high-resolution screen.

The task is a simple word-to-picture priming experiment, where a word ("man" or "woman") is presented before a picture that is from one of three sets of pictures (young men and women selected from either Radboud Faces Database, or the Brazilian FEI database, and a selection of renaissance portraits of Jesus). All pictures were normalized to include the area of the face between the eyebrows to the tip of the nose. Earlier results show effects consistent with priming for the pictures of young men and women, but also an effect of increased cross-gender priming for the portraits of Jesus (Folgerø et al., 2016).

This study aims at investigating a match-mismatch N400 effect for priming stimuli that is incongruent with the target picture. Participants were asked to think of the gender of the picture. EEG-effects were investigated using EEGLAB in Matlab, after the information about priming and the EEG information had been collated and compiled for analysis using an in-lab program.

The poster will demonstrate how a match-mismatch effect can be detected using affordable equipment.

Folgerø, P., Johansson, C. & Andresen, A. 2016. Transgender Priming in Medieval Europe, XXIV. *Conference of the International Association of Empirical Aesthetics*, Vienna, Austria. August 29 – September 1.