

KEYNOTE SPEAKERS

VISUAL WORD RECOGNITION IN L1 AND L2, AN UPDATE

Marc Brysbaert

Ghent University

Kroll and Stewart's (1994) revised hierarchical model is still the most frequently cited model of word recognition in L1 and L2, even though research has shown its limits. In this talk I will review our research outlining the various changes that seem to be required, and give an indication of how the model can be adapted.

**“CRITERIA FOR IDENTIFYING ‘BEST FIT’ BETWEEN DATA
AND COMPETING THEORIES OF BILINGUAL COMMUNICATION”**

Margaret Deuchar

ESRC Centre for Research on Bilingualism in Theory and Practice, Bangor University, Wales

In striving for the best possible theory of language contact in bilingual speakers, linguists rarely pause to consider how to evaluate their progress in reaching this goal. This paper, however, will report on how a group of linguists specialising in bilingualism have grappled with this issue and have formulated provisional criteria to be used in testing competing theories. It will include a discussion of the nature of the problem to be accounted for, which is how bilingual speakers manage to use material from two languages with different structures in the same clause (‘code-switching’), and of the appropriate data to be analysed in resolving the problem. Our proposed criteria for evaluating competing theories will then be outlined, and will be discussed in the light of previous work by philosophers of science on issues such as ‘incommensurability’ and the ‘theory-ladenness’ (cf. Okasha 2002) of data. Finally, they will be illustrated by work in progress on the analysis of mixed nominal constructions from Welsh-English and Spanish-English data in which we evaluate two competing models of code-switching, the Matrix Language Frame (MLF) approach and a Minimalist approach.

Okasha, S. (2002). *Philosophy of Science: A very short introduction*. Oxford: Oxford University Press.

USING REPETITION PRIMING TO STUDY BILINGUAL VOCABULARY ACCESS

Wendy Francis

University of Texas at El Paso, USA

Words in receptive and productive vocabulary are comprehended and produced more efficiently with language experience as the words are encountered and used in natural language contexts. Repetition priming is a phenomenon in which experimental repetitions of words elicit faster comprehension and production. The argument is developed that the underlying mechanisms are one and the same, and that repetition-priming experiments can be used to capture and systematically study the learning mechanisms underlying vocabulary acquisition. First, using bilingual manipulations, the processes of comprehension or production can be isolated to estimate repetition-based learning. Second, the learning that occurs follows a typical learning curve. Third, learning in both comprehension and production lasts over time, and the retention/forgetting rates for these two processes differ. Fourth, comprehension exposures in a language increase the probability that later production will be successful and speed word retrieval. Finally, although previous research suggested that words encoded in context would lead to little if any repetition priming, new data show substantial priming based on words encoded in context, and this priming occurs in both comprehension and production.

TITLE

Phillip Holcomb

Tufts University, USA

abstract

LEXICON AS A DYNAMICAL SYSTEM: COMPUTATIONAL AND NEURAL MECHANISMS

Ping Li^{1,2}

¹*Department of Psychology and Center for Language Science*

²*Pennsylvania State University, University Park, PA 16802, USA*

How does a child rapidly acquire and develop a structured mental organization for the vast number of words in the first years of life? How does a bilingual individual deal with the even more complicated task of learning and organizing two lexicons? It is only until recently have we started to examine the lexicon as a dynamical system with regard to its acquisition, representation, and organization. In this talk, I outline a proposal based on our research that takes the dynamical approach to the lexicon, and discuss how this proposal can be applied to account for lexical organization, structural representation, and competition within and between languages. In particular, I provide computational evidence based on our DevLex model, a self-organizing neural network model, and neuroimaging evidence based on fMRI studies, to illustrate how children and adults learn and represent the lexicon in their first and second languages. In the computational research, our goal has been to identify, through linguistically and developmentally realistic models, detailed cognitive mechanisms underlying the dynamic self-organizing processes in monolingual and bilingual lexical development; in the neuroimaging research, our goal has been to identify the neural substrates that subserve lexical organization and competition in the monolingual and the bilingual brain. In both cases, our research allows for a better understanding of the interactive dynamics involved in the acquisition and representation of one or multiple languages.

**BILINGUAL CHILDREN'S INTERPRETATION OF INTERFACE STRUCTURES:
CROSS-LINGUISTIC EFFECTS VS. PROCESSING COSTS**

Antonella Sorace

University of Edinburgh

Some of the interfaces between syntax and other cognitive systems have been shown to be unstable and seemingly open to cross-linguistic influence in different areas of bilingual language development, including bilingual first language acquisition, adult second language acquisition, and native language attrition. But which interfaces are most unstable, and why? I will focus on recent comprehension evidence from school-age simultaneous Italian-English and Italian-Spanish bilingual children living in Italy and the UK to propose a developmental differentiation between “internal” and “external” interfaces. Syntax-semantics interface structures, such as determiners with specific vs. generic NPs, are sensitive to both qualitative and quantitative input factors: Italian-English bilingual children unidirectionally overgeneralize null determiners to generic noun phrases in Italian (*In genere fragole sono rosse ‘Generally strawberries are red’), whereas Italian-Spanish children do not, and bilingual children in the UK do so significantly more often than bilingual children in Italy. In contrast, syntax-discourse interface phenomena, such as subject pronoun antecedent assignment, are not affected by language combination: both Italian-English and Italian-Spanish bilinguals unidirectionally overgeneralize overt subject pronouns to null subject pronoun contexts (Paperinoi ha detto che lui è caduto ‘Donald Ducki said that he fell’), although there is still some interaction with language environment. Such a contrast points to different explanations for these effects. Internal interface effects are due to computational operations at the level of representations, which favor the influence from the language that has the most economic option (i.e. English in the case of determiners, since it has the most economical setting of the Nominal Mapping Parameter – see Chierchia 1998). External interface effects result from processing costs in integrating the multiple types of information involved in the appropriate selection of a particular pronominal form, which favor the use of a ‘default’ option (i.e. the overt pronoun in Italian; see Sorace & Filiaci 2006). Such a default is also found, to a significantly lesser extent, in younger monolingual Italian child and adult speakers; in contrast, both native control groups perform at ceiling with respect to determiners. These patterns suggest that bilingual performance is subject to different types of constraints and that we need a strongly interdisciplinary approach to unravel their interaction.

**READING, LISTENING TO AND PRODUCING ENGLISH WORDS PROMPTS UNCONSCIOUS ACCESS
TO CHINESE TRANSLATION EQUIVALENTS IN CHINESE-ENGLISH BILINGUALS.**

Guillaume Thierry, & Yan Jing Wu

Bangor University, Wales

Whether or not the native language of bilingual individuals is active during second language comprehension and production remains the subject of a lively debate because studies of bilingualism have often used a mix of first and second language words, thereby creating an artificial "dual-language" context. I will present a series of experiments which target implicit access to the first language when bilinguals read, listen to, or retrieve words exclusively in their second language. In two experiments, Chinese-English bilinguals were required to decide whether or not English words presented in pairs are related in meaning; they were unaware of the fact that half of the words concealed a phonological and/or orthographic repetition when translated into Chinese. The hidden factor generally failed to affect behavioural performance, but it significantly modulated the N400 wave of brain potentials showing that English words are automatically and unconsciously translated into Chinese. Furthermore, it is the phonological form of the Chinese equivalent which is activated, not its orthographic form. A third experiment tested repetition priming in Chinese character in the context of a production task. Chinese-English bilinguals were asked to judge whether or not the English names of two visually presented pictures rhymed. In this context again, significant repetition priming indexed by the N400 ERP component indicated that the Chinese translation equivalents of the words had been activated. These findings demonstrate that native language activation is an unconscious correlate of second language comprehension and production.

WHAT SEMI-SPONTANEOUS SPEECH FROM BILINGUALS, L2 LEARNERS AND MONOLINGUALS CAN TELL US ABOUT BILINGUAL COMPETENCE

Jeanine Treffers-Daller

University of the West of England, Bristol, UK

In this paper I hope to give a clearer picture of the nature of and variation in bilingual competence, as it emerges from naturalistic data from French-Dutch bilinguals. Understanding bilingual competence – and in particular the variability in bilingual competence – is important because language proficiency and relative language dominance affect the processes engaged during the planning of spoken utterances (Kroll et al 2006). In a recent paper, Bialystok, Craik and Luk (2007) show that vocabulary size is an important factor that modulates performance in verbal fluency and naming tasks and that bilinguals whose lexical knowledge is matched to that of monolinguals outperform monolinguals on a task of letter fluency and word naming.

In this paper I hope to show that variability in bilingual competence is particularly visible in the lexicon, more than in grammatical variables. As studies of processing generally focus on lexical variables (lexical decision tasks e.g.) it is important to understand how lexical competence varies in bilinguals. More specifically, I hope to show that bilinguals' productive use of vocabulary (as measured with different measures of lexical richness) is significantly different from that of speakers who have grown up with one language only, but that their command of grammar is similar. L2 learners, on the other hand, differ significantly from monolinguals and bilinguals on both lexical and grammatical variables.

The informants in this study are 25 French-Dutch bilinguals, 25 Flemish L2 learners of French and 19 French students from a business school in Paris, who grew up with French only.

POSTERS

SEMANTIC CONVERGENCE IN THE BILINGUAL LEXICON

Eef Ameel, Barbara Malt, & Gert Storms

Catholic University of Leuven, Belgium

Two studies investigated how convergence between linguistic representations in Dutch-French bilinguals affects the centers and boundaries of lexical categories for common household objects. In Study 1, correlations between typicality ratings for roughly corresponding categories were higher for bilinguals in their two languages than for monolinguals in each language, indicating that bilingual prototypes converge. In Study 2, fewer dimensions were needed to linearly separate bilingual than monolingual categories, and bilinguals showed fewer violations of similarity-based naming. Implications for theories of the bilingual lexicon are discussed.

TRANSLATION VERIFICATION OF AMBIGUOUS IDIOMATIC PHRASES IN BILINGUALS:

AN ERP STUDY

Elena Andonova, Armina Janyan, & Ivo Popivanov

New Bulgarian University, Bulgaria

Recent studies on idiom processing have produced inconsistent results, some pointing to the exclusive participation of the right hemisphere, others indicating a bilateral neural network underlying figurative comprehension. One potential distinction derives from the degree of literality of ambiguous strings, as ambiguity is enhanced in idioms which also afford a highly literal reading. In a study of advanced Bulgarian-English bilinguals, ambiguous strings allowing both a literal and a figurative reading and their translations were presented for verification to 18 participants while their EEG was recorded. The task involved judgments of Bulgarian (L1) phrases as translation equivalents of the figurative meaning of the English (L2) phrases that were either high or low on literality ratings (Titone & Connine, 1994) and controlled for frequency, decomposability, and length. Grand average ERPs were analysed on mean amplitude in two time windows—early (180-450 ms) and late (450-700 ms) during presentation of the English (L2) strings and an early time window (120-300 ms) during presentation of the candidate translation in Bulgarian (L1). The analyses show selective involvement of the right hemisphere during both L2 and L1 processing stages, and an effect of string literality (hence, the degree of its ambiguity between an idiomatic and a possible literal reading) overall in the early time interval in both L2 and L1. Processing highly literal (hence, ambiguous) strings was associated with increased activity in the right but not the left brain regions during L2 processing whereas the same literality effect was found across hemispheres in L1 processing. These results support partially claims made by the Graded Salience Hypothesis (Giora, 2003) concerning greater RH involvement in the processing of less salient meanings and are also consistent with findings on the role of the RH in processing ambiguity generally.

DIFFERENCES IN PERFORMANCE ON AUDITORY ATTENTION TASKS BETWEEN BILINGUALS AND MONOLINGUALS

Thomas H Bak, Simon Everington, Sarah J Garvin, & Antonella Sorace

University of Edinburgh, Scotland

One of the most interesting aspects of the current research on bilingualism is its possible impact on cognitive functions other than language. An area in which bilinguals have been reported to perform better than monolinguals is visual attention, in particular tasks, which require inhibition of irrelevant stimuli. Although auditory attention seems to be more closely related to the bilingual experience of language switching, it has been less explored. Moreover, the majority of studies apply a strict definition of bilingualism, in which both languages have to be acquired within the first years of life. It is not known to what extent the previous findings can also be applied to the individuals who acquired their second language later in their life. The present study aims to address these issues by examining 60 students from the University of Edinburgh, aged 19-34 (mean 22.2 years). The subjects were divided into monolinguals (n=19) and bilinguals (n=41). The bilingual group was further subdivided into those who acquired both languages before the age of 3 years (n=22) and those who acquired it between the age of 4 and 15 years (n=19). All subjects completed three tests of auditory attention adapted from the Test of Everyday Attention (TEA): counting simple tones (sustained attention), counting specific tones (selective attention) and a counting reversal task (attentional switching). While all three groups were at ceiling in the sustained attention task, bilinguals performed significantly better than monolinguals on the other two subtests. When both bilingual groups were investigated separately no significant difference emerged between the early and the late bilinguals. The results of the study not only confirm a bilingual advantage on an auditory attention tasks, but also suggest that this advantage can be observed also in individuals who acquired their second language after the critical period of the first three years.

WHICH SYNTACTIC AND PRE-SYNTACTIC REPRESENTATIONS CAN BE SHARED BETWEEN LANGUAGES?

Sarah Bernolet¹, Robert Hartsuiker¹, & Martin Pickering²

¹Ghent University, Belgium

²University of Edinburgh, Scotland

In the last few years, several studies showing cross-linguistic syntactic priming in bilinguals yielded evidence for the hypothesis that processes used in sentence production can be shared between both languages of a bilingual (Hartsuiker & Pickering, in press). The current study investigates at which levels of representation information can be shared. Bernolet, Hartsuiker and Pickering (2007) and Salamoura and Williams (2007) already showed that between-language priming does not occur between structures with a different word order that have identical hierarchical relations between their constituents, thereby excluding the existence of shared syntactic representations that are not yet specified for word order. In a series of three cross-linguistic syntactic priming experiments with Dutch-English bilinguals we investigated whether pre-syntactic representations can be shared between languages as well. In all three experiments we primed between Dutch (L1) and English (L2) transitive sentences. In Experiment 1, we showed that pre-syntactic representations can indeed be primed between languages: Despite differences in word order significant priming was obtained between Dutch verb-final passives (De zwemmer wordt door de non achtervolgd) and English verb-medial passives (The swimmer is chased by the nun). Stronger passive priming was obtained when both passives had an identical word order, indicating that pre-syntactic priming effects and effects of word order priming are additive. In Experiment 2 we replicated these results and we showed that the number of English passives that is produced after Dutch verb-final passives is significantly higher than in a baseline condition in which complex noun phrases had to be produced. In a third experiment, we are currently investigating whether the obtained priming effects are conceptual or functional in nature by including Dutch shifted passives (Door de non wordt de zwemmer achtervolgd), in which the agent of the action is mentioned first. If the effects obtained in Experiments 1 and 2 are functional in nature, rather than conceptual, between-language priming between these shifted passives and English passives should still occur, despite the mismatch in conceptual structure.

**CONSTRAINTS IN SECOND LANGUAGE LEARNING:
EVIDENCE ON GRAMMATICAL GENDER AND COMPOUNDING IN GERMAN**

Susan C. Bobb, & Judith F. Kroll

The Pennsylvania State University, USA

While current literature suggests that the cognitive architecture underlying second language (L2) acquisition is remarkably adaptive to accommodate acquisition of a new language, it has also documented limitations which seem difficult to overcome. The current study examines German compound nouns and grammatical gender to investigate these ideas and further define the learning trajectory of second language acquisition of gender. German compound nouns take their gender from the final noun so that while "wine" is masculine ("der Wein") and "glass" is neuter (das Glas), the compound noun "Weinglas" is neuter (das Weinglas). Previous ERP research has shown that native speakers of German are sensitive to compound nouns that show an incongruence in the genders of their constituents such as in the example of "Weinglas," leading to the conclusion that at least for native speakers, compound nouns are processed as decomposed units (Koester et al., 2004). The question can then be raised as to whether L2 learners of German show this same sensitivity to gender incongruence and whether their level of proficiency modulates their sensitivity to gender. In the current study, native English speakers with intermediate to advanced L2 proficiency in German and native German speakers performed a translation-recognition task. They were presented with an article + noun first in English and then in German and had to judge the accuracy of the translation. Initial results suggest a differential pattern of processing for gender congruent and gender incongruent compounds for both native and L2 speakers of German, but not in the predicted direction. Results of the current study are discussed in terms of current debates about the degree to which second language learners can acquire and process grammatical aspects of the non-native language.

LIGHTENING THE COGNITIVE LOAD OF BILINGUALS: THE ROLE OF MANUAL GESTURE

Matthew T. Carlson, & Susan Goldin-Meadow

University of Chicago, USA

Bilingualism makes unique demands on language users. Speakers of multiple languages must select from a larger repertoire of words and structures, and there is evidence that both languages are constantly active and may interact to some degree during processing, potentially increasing the cognitive load of communication. In response to this, bilinguals may over time become more efficient at managing cognitive load, but while this hypothesis has received some empirical support, the findings are yet unclear. Recent findings among monolinguals suggest that examining bilinguals' use of gesture may shed light on this issue. Alongside its obvious communicative function, gesture also serves cognitive functions, for instance in discourse planning and organization. Importantly, research on monolinguals (Wagner et al. 2004) has shown that gesturing facilitates performance on a secondary memory task during a primary communicative task, suggesting that gesture may play a role in managing multiple task demands and types of information. In this study we extend this work to examine proficient bilinguals, investigating whether bilinguals differ from monolinguals in their use of gesture to mediate cognitive load. Spanish-English and English-Spanish bilinguals completed a dual-task paradigm in both languages. After solving a math problem participants were given a visual array for later recall. During the pivotal portion of the task they explained their solution to the math problem, having been instructed to either gesture or keep their hands still. Following this, they were prompted to recall the visual stimulus. This procedure allowed us to compare the bilingual groups with a control group of monolingual English speakers based on their performance on the memory task, controlling for their performance on a separate measure of working memory. Of central importance here, it also allowed us to measure the relative impact of gesturing on the performance of bilinguals (in both of their languages) vs. monolinguals.

**WHEN *CAT* COMPETES WITH *DOG* BUT NOT WITH *PERRO*:
EVIDENCE FROM THE SEMANTIC COMPETITOR PARADIGM**

Yolanda Garcia Castro¹, Kristof Strijkers¹, Albert Costa¹, & Xavier Alario²

¹Universidad de Barcelona, Spain

²Université de Provence, France

Bilinguals are quite efficient in keeping their two languages separate during speech. This raises the question whether words between the two languages compete for selection or whether only words in the target language are considered for production. In the present study we investigated this issue making use of an interesting and new paradigm, the semantic competitor paradigm. With this paradigm it is found that subjects' naming latencies are slowed down (25 ms) every time they name a picture which belongs to the same semantic category as a previously named picture (Howard, 2006). In experiments 1 and 2 high-proficient Spanish-Catalan bilinguals performed a picture naming task in their L1 (experiment 1) and L2 (experiment 2) making use of this semantic competitor paradigm. The results replicate prior data of semantic accumulation, and show that lexical interference is of similar magnitude in L1 and L2. For experiments 3 and 4 we combined this semantic competitor paradigm with a predictable switch task, in which target items (items of the same semantic category) alternated between L1 responses and L2 responses. Results seem to indicate the presence of the semantic competition effect within each language, but not between languages. Implications of these experiments are discussed in light of different bilingual language control models.

EMOTIONAL WORD PROCESSING
IN FINNISH-ENGLISH BILINGUALS AND NATIVE ENGLISH SPEAKERS

Tiina M. Eilola¹, & Jelena Havelka²

¹University of Kent, United Kingdom

²University of Leeds, United Kingdom

Bilinguals frequently report greater emotionality associated with their first (L1) than second language (L2). Yet, this has not always been replicated in studies using single word stimuli (e.g. Eilola, Havelka & Sharma, 2007). The aim of the present study was to investigate emotional word processing in L1 and L2 using the lexical decision task. Finnish-English bilinguals and English monolinguals were presented with neutral, positive, negative and taboo words. The bilingual participants responded to both Finnish (L1) and English (L2) words, while native English speakers only responded to English words. Faster RTs were found in both groups of participants and in both languages to positive when compared to neutral words. Bilinguals' RTs to negative words differed between L1 and L2; they were significantly faster when responding to L1 (Finnish) negative words, while this was not found in L2 (English). No difference between negative and neutral words was found in native English speakers. Our study extends previous findings of faster RTs to positive words (e.g. Kanske & Kotz, 2007) by showing that this effect is replicable across languages and present in both L1 and L2. However, the impact of negative valence on word processing is less clear.

Eilola, T.M., Havelka, J., & Sharma, D. (2007). Emotional activation in the first and second language. *Cognition & Emotion*, 21, 1064-1076.

Kanske, P., & Kotz, S.A. (2007). Concreteness in emotional words: ERP evidence from a hemifield study. *Brain Research*, 1148, 138-148.

**LEXICAL ACTIVATION IN BILINGUAL SENTENCE PROCESSING:
EVIDENCE FROM EYE-TRACKING**

Caroline Engstler, Matthew Goldrick, & Viorica Marian

Northwestern University, USA

Research shows that in auditory processing of single words, bilinguals co-activate both languages in parallel. We examined whether this phenomenon generalizes to auditory sentence comprehension. Using the visual-world paradigm, eye movements were recorded while German-English bilinguals listened to high- and low-constraint sentences. The results revealed activation of the non-target language. When processing target words (e.g., pills) in English sentences, bilinguals looked more often at competitor pictures whose German name overlapped phonologically with the target (e.g., mushroom/German: Pilz) than at phonologically and semantically unrelated pictures. The degree of non-target language activation was modulated by whether the target occurred within a predictable or unpredictable sentence context and by the lexical status of the target (cognate vs. noncognate). Findings suggest that bilinguals show bottom-up co-activation of both languages through phonological overlap of target and competitor, while sentence context constrains co-activation in a top-down manner through the level of predictability of the target.

DEVELOPING LEXICAL COMPETITION RESOLUTION MECHANISMS THROUGH READING EXPERIENCES

Ana B. Arêas da Luz Fontes, & Ana I. Schwartz

University of Texas at El Paso, USA

This study investigated whether lexical competition resolution mechanisms are improved throughout a student's college years. More specifically, I examined whether Spanish-English bilinguals improve their ability to select the appropriate meaning of ambiguous words in the L2 English with increased reading experiences in the L2. For this purpose, I recruited two groups of bilingual participants: beginner college students (less experienced readers) (n= 66) and advanced college students (more experienced readers) (n= 64). Participants were presented with sentences that ended in an ambiguous word (e.g., novel, fast) and that the previous context biased the less frequent, or subordinate meaning (e.g., novel: something new; fast: to not eat). The ambiguous word was either a Spanish-English cognate (e.g., novel/novela) or a noncognate control (e.g., fast). These sentences were followed by target words that, on critical trials, were related to the contextually-irrelevant, dominant meaning (e.g., BOOK, SPEED). The participants' task was to decide whether the target word is related to the sentence (thus requiring a "no" response on critical trials). I predicted that performance on this task would reflect interference from the competing, dominant meaning. Based on recent findings from our lab, I further predicted that the magnitude of this interference would be greatest when the ambiguous word was also a cognate with the native language. I examined whether this magnitude is modulated by relative reading skill by comparing beginner and more advanced students. Therefore, I predicted that students with more reading experience would be better at resolving lexical ambiguity and would show more native-like patterns of reading performance. The results did not support my original hypothesis. In fact, I found the opposite pattern of results that I had predicted. The beginner students showed more native-like performances (no effects of cognate status) while the advanced students showed more cross-language activation or more interference from Spanish.

DETERMINER CONGRUENCY EFFECT IN FRENCH AS A FIRST AND SECOND LANGUAGE

Alice Foucart, Holly Branigan, & E.G. Bard

University of Edinburgh, Scotland

This study used the picture-word interference paradigm to investigate gender processing in language production in L1 and L2. In this paradigm participants are asked to name a picture displayed on the screen while ignoring a distracter word either congruent or incongruent in gender with the picture. The presence of an incongruent distracter usually provokes longer naming latencies than when picture-word pairs are congruent in gender. This effect, the 'determiner congruency effect', is considered to be the result of competition for selection of the determiner form of the picture and that of the distracter word. Since competition occurs at determiner form selection it implies that the determiner form of the distracter word is also activated even if the distracter is not to be produced. In a first experiment we investigated the determiner congruency effect in French native speakers. Participants had to name pictures using simple NPs. Results showed longer naming latencies when picture-word pairs were incongruent in gender than when they were congruent, suggesting competition for determiner form selection. The same effect was observed for post-posed adjectives but not for pre-posed adjectives, implying that determiner selection is delayed by the presence of a pre-posed adjective. The same experiments were conducted with English- and Spanish-French late bilinguals. Results revealed a determiner congruency effect for both types of complex NPs but not for simple NPs. These results suggest that determiner selection is similar in L1 and L2, however, slightly delayed. Furthermore, we also investigated the influence of L1 on L2. The stimuli used either shared the same gender in French and Spanish or did not. This factor was not significant. Also, no difference emerged between the performance of English and Spanish speakers which suggests that late bilinguals can process gender in their L2 even if it is not present in their L1.

**DOES LANGUAGE SHAPE THE WAY WE THINK? A STUDY ON NUMERICAL COGNITION
OF DUTCH-ENGLISH AND DUTCH-FRENCH BILINGUAL SPEAKERS**

Hedy J. E. Greydanus¹, Tom G. E. Damen¹, & Janet G. van Hell^{1,2}

¹*Radboud University Nijmegen, The Netherlands*

²*The Pennsylvania State University, USA*

In two experiments, we studied linguistic relativity and the Whorfian hypothesis in relation to numerical cognition by testing multilingual speakers of languages with different number systems. In the Dutch number system, units are named before the tens (e.g., 24 is pronounced as ‘four-and-twenty’). In contrast, in English and in French the tens precede the units. Furthermore, the French number system incorporates multiplying properties (e.g., 88 is pronounced as ‘quatre-vingt-huit’, or $4 \times 20 + 8$). Using a procedure based on Brysbaert, Fias, and Noël (1998, Cognition), Dutch-English bilinguals (Experiment 1) and Dutch-French bilinguals (Experiment 2) named the solution of mathematical problems in each of their two languages. We manipulated the order of the operands. In Experiment 1, the operand order was congruent with English number naming (e.g., $20 + 4 = \dots$) or with Dutch number naming (e.g., $4 + 20 = \dots$). In Experiment 2, the operand order did either map onto French number naming (e.g., $4 \times 20 + 8 = \dots$) or not (e.g., $20 \times 4 + 8 = \dots$). In Experiment 1, we also manipulated presentation modality by presenting the mathematical problems in standard Arabic numbers, or in a novel and newly learned abstract visual numerical system. Preliminary results revealed no interaction between number naming system and operand order. However, in Experiment 1 we found an interaction between language and presentation modality. Answering additions presented in the abstract visual numerical system took less time in English (the participants’ L2) than in Dutch (their L1). The results will be discussed in light of the linguistic relativity hypothesis.

NExp1 = 43

NExp2 = 15

**WORD ORDER INTERFERENCE EFFECTS IN BILINGUAL SPEECH PRODUCTION:
EVIDENCE FROM TIME TELLING**

Anna Hatzidaki

University of Aberdeen, Scotland

Time telling requires not only conceptual preparation but also appropriate syntactic representations (Meeuwissen et al., 2004). A Greek speaker viewing a digital clock that reads 10.05 will express the time in a way that translates into English as “ten past five”; but if the speaker were a bilingual and were required to tell the time in English, she would have to transform the perceptual information into a linguistic expression that would be in accordance with the word order of English time telling; that is, “five past ten” (Bock et al., 2003; Korvorst et al., 2007). In the current study we examined how syntactic operations (word order) and conceptual operations (utterance referent and distance from referent) are reflected in bilinguals’ response latencies during time telling when word order differs between the languages of a bilingual. We manipulated Greek-English proficient bilinguals’ language context (monolingual mode, with time telling produced entirely in bilinguals’ L2 vs. bilingual mode, with time telling alternating between the L1 and L2), time format (analog clock vs. digital clock) and utterance referent (minutes referring to the first half hour vs. minutes referring to the second half hour). Preliminary results show that (i) cognitive transformations from visual to verbal information are affected by the non-response language in the monolingual mode, and even more so in the bilingual mode of speech; (ii) response latencies are shorter for digital than analog clocks and (iii) shorter for clock times with a smaller than with a greater distance from the referent. We discuss our findings in terms of current theories of bilingual speech representation and production where influences of the non-response language are also considered.

ELECTROPHYSIOLOGICAL CORRELATES OF TRANSLATION PRIMING:

IS THERE A SINGLE LOCUS OF TRANSLATION PRIMING?

Noriko Hoshino¹, Katherine J. Midgley^{1,2}, Phillip J. Holcomb¹, & Jonathan Grainger²

¹Tufts University, USA

²Université de Provence, France

Past research suggests that there is resonance among the lexical codes across two languages even when only one language is required for processing. Some of these studies have exploited translation priming to examine cross-language interactions. A typical finding of behavioral translation priming studies is that the L1-L2 priming is greater than the L2-L1 priming. However, there is a disagreement with respect to the locus of translation priming (e.g., Brysbaert et al., 1999; Finkbeiner et al., 2004; Gollan et al., 1997; Grainger & Frenck-Mestre, 1998; Perea et al., 2008). The goal of the present study was to investigate the locus of translation priming by using a masked priming paradigm with event-related potentials (ERPs) that are sensitive to the time course of processes in word recognition. Japanese-English bilinguals were presented a series of target words preceded by a related (the same word) or unrelated prime in the same or different language. Similar to previous behavioral bilingual studies on masked priming, the bilinguals showed within-language repetition priming in both languages but cross-language repetition priming in the L1-L2 direction only. The L1-L2 translation priming was reflected in the two ERP components: N250 (sensitive to sublexical and lexical processing) and N400 (sensitive to semantic processing). These results suggest that translation priming occurs at both lexical and conceptual levels and that there is not a single locus of translation priming. Furthermore, time course analyses on within-language and cross-language translation priming showed that the onset of the N250 effect was earlier for within-language priming than for cross-language priming, suggesting that the N250 component reflects not only lexical processing but also sublexical processing. Implications for models of bilingual word recognition will be discussed.

BILINGUAL ADVANTAGE INHIBITED?

FACTORS AFFECTING THE RELATION BETWEEN BILINGUALISM AND EXECUTIVE CONTROL

Sandra Inurritegui, & Géry d'Ydewalle

Catholic University of Leuven, Belgium

Bialystok and collaborators provided evidence in favour of a bilingual processing superiority in both linguistic and non-linguistic domain. It was assumed that bilingualism enhances executive functions that contribute to managing two activated languages, namely selective attention, inhibition, and switching. The hypothesized bilingual advantage on executive control was tested by assessing monolingual and bilingual children using a grammaticality judgment task and executive functions tasks (inhibition and switching): Inhibitory control was evaluated using the go/no-go paradigm (response suppression) and the Flanker paradigm (interference control); task-set reconfiguration processes were assessed by means of a task-switching procedure. Results provided partial support to the claim that bilingualism facilitates linguistic processing control. Ignoring distracting meaning in order to judge grammaticality was a greater challenge to monolingual than to bilingual children. The difference only emerged with bilinguals who acquired both languages simultaneously. The expected bilingual advantage on the executive functioning tasks was not obtained. It is argued that both the way of acquiring 2 languages (simultaneously or consecutively) as well as the relative proficiency in both languages (balanced, unbalanced) are factors that might affect the relation between bilingualism and cognitive control. Results from a study taking these factors into account are currently being analyzed and will be further discussed.

EVIDENCE OF NON-SELECTIVE LEXICAL ACCESS IN A NON-LINGUISTIC TASK: AN ERP STUDY

Armina Janyan, Ivo D. Popivanov, Marina Hristova, Galina Gradinarova

New Bulgarian University, Bulgaria

Previous research has shown language-independent lexical access in bilinguals using linguistic tasks such as picture naming and lexical decision. We tested whether the cognate facilitation effect would survive a non-linguistic task that requires bilinguals to focus on perceptual characteristics of pictures and words in their dominant L1. 11 Bulgarian-English young bilinguals were engaged in a go/no go task pressing a button when a picture frame and printed word font style did not match (i.e., thick picture frame and a word in regular font style, or thin picture frame and word printed in bold). The target pairs of stimuli were set for a go response (and no button press) – with matched frame and word style (i.e., thick frame and bold style or thin frame and regular style). The sequence of presentation of pictures and their printed names (60 cognates and 60 non-cognates) was varied: picture-then-word or word-then-picture. Grand average ERPs were analyzed during both picture and word processing. Repeated-measures ANOVAs on mean amplitude revealed cognate effect in words and pictures in both presentation conditions. The earliest and strongest cognate effect was observed during word processing in picture-word sequence starting from 60 ms after the word onset. Analyses of picture processing in the same condition showed cognate effect starting from 200 ms and in the word-picture condition - starting from 230 ms after the picture onset. The latest cognate effect was observed during word processing in word-picture sequence starting from 270 ms after the word onset. The findings demonstrated that the time course and magnitude of the cognate effect is modulated by stimulus type and presentation sequence and, more importantly, that the second language is activated even during a perceptual non-linguistic task not involving L2.

TRANSLATION TAKES PLACE BEFORE UTTERANCE IN A READING FOR TRANSLATION TASK:

EVIDENCE FROM TWO SELF-PACED READING STUDIES

Ya-Shyuan Jin, Robert H. Logie, & Martin Corley

University of Edinburgh, Scotland

Do translators start to reformulate a sentence in a target language only when they have completely comprehended a sentence? Horizontal translation theory argues that translators engage in partial reformulation in a TL during text comprehension, whereas vertical translation maintains that reformulation only starts after comprehension is completed (de Groot, 1997). Recently, Ruiz, Paredes, Macizo and Bajo (in press) found that translators' reading times were longer in read-to-translate but not in read-to-repeat conditions when the word orders were incongruent between SL and TL. This interaction between reading purposes and word order congruency was taken as an evidence for horizontal translation. They also suggested that horizontal translation consumes working memory resources which are required to activate both languages and search for syntactic matches. In two experiments, we report evidence for horizontal translation in Chinese-English late bilinguals but we did not establish a relation between working memory and reading time in a dual-task paradigm.

ON-LINE GRAMMATICALITY JUDGMENTS IN PORTUGUESE-FRENCH BILINGUALS:

INTEGRATION OF MORPHOLOGICAL AND SYNTACTIC CUES

Michele Kail¹, Armanda Costa², & Isabel, H. Faria²

¹CNRS, Paris V, France

²Universidade de Lisboa, Portugal

This study presents results on on-line sentence processing in Portuguese/French monolingual and simultaneous bilinguals (6;6, 8;6; 10;6 and 10 adults); Portuguese is their dominant language. Within the framework of the Competition Model (Bates and MacWhinney 1989), this study takes part of a crosslinguistic research and examines the processing of sentences containing grammatical violations. Three factors were studied: linguistic type of violation: agreement vs. word order violations; the target type of violation: intra vs. interphrasal; and the locus of the violation in the sentence: early vs. late position. Subjects listened to 80 sentences and were asked to decide whether each sentence was correct or incorrect. Their grammatical judgments and detection times were analyzed, taking into account the linguistic properties of the two romance languages and the effect of the dominant language. Comparing the results between Portuguese and French monolinguals and bilinguals (Kail, 2004, 2005), we verify that both French monolinguals adults and children at age 10;6 detect violations more rapidly than both Portuguese monolingual and bilinguals, when examined on either Portuguese or French items. The intraphrasal violation is detected more rapidly in French monolinguals, which is consistent with results from other languages. Unpredictably, Portuguese monolinguals are slower in detection of the intraphrasal violation, this being clearer in the results of bilinguals, when examined either on French or Portuguese items. We interpret this as a possible effect of some phonetic properties of the Portuguese language that could affect the speech perception. In fact, although the high validity of either the article position or its morphological features in the two languages within the NP we used a definite article to create morphological or syntactic violations - in Portuguese the phonetic form of the article is less detectable for auditory perception than in French.

**PRIMING BILINGUAL BRAIN WITH CORRECT AND INCONGRUENT TRANSLATIONS
OF TRUE AND FALSE COGNATES IN ENGLISH-GERMAN DURING A TRANSLATION TASK:
AN EEG AND EYE- TRACKING STUDY**

**Alexander Gerganov¹, Vera Kaiser², Verena Braunstein³, Ivo Popivanov¹, Clemens Brunner², Christa
Neuper³, & Maxim Stamenov¹**

¹*New Bulgarian University, Sofia, Bulgaria*

²*Graz University of Technology, Austria*

³*Graz University, Austria*

We study the effects of meaning competition in written word translation task. Proficient Austrian bilinguals had to translate English words into German. The stimuli were 60 false and 60 true cognates. 250 ms after the appearance of the target word on the screen, a priming word (prompt) in German appeared above the target at distance of 6 degrees of visual angle. The prompt was either a correct translation of the target or a semantically incongruent one. Three data streams (EEG, keystroke logging and eye tracking) were recorded. The results of ERP showed a late negativity (600-800 msec) after the target word onset with larger amplitude in false cognate trials, with a more significant effect over the right than over the left hemisphere. The results of event-related (de)synchronization (ERD/ERS) analyses showed that in the theta band and the lower alpha band false cognates are followed by an ERS shortly after the prompt; in true cognates we have an ERD in the theta and the alpha band; an ERD emerged also after the presentation of false cognates but later and weaker as compared to true cognates. The eye tracking results showed main effect of the type of cognate in the first pass and in total viewing time on the target; there was also a main effect of the type of prompting: when the prompt was incongruent the total viewing time for the target region was longer. Both EEG and eye tracking analyses were instrumental in showing that the false friends main effect was to be found in the later stages of processing and due to delayed meaning competition during translation selection. The chosen dependent variables were sensitive to different aspects of performance during the task and thus proved to be of complementary value in studying bilingual processing during translation.

ATTENTION SWITCHING IN MONOLINGUAL AND BILINGUAL INFANTS

Agnes M. Kovacs¹, & Jacques Mehler²

¹*Hungarian Academy of Science, Budapest*

²*SISSA, Italy*

A fundamental task of young children is to extract different regularities from their environment. Children growing up in bilingual families, for instance, will end up speaking two languages. Mastering two languages from an early age, however, may modify various non-linguistic abilities. Previous research established that bilingual preschool-aged children and adults have enhanced control abilities, attributed to their extensive practice in inhibiting one language when speaking the other. Here we propose that bilingualism may boost executive attention before children start producing words due to an active monitoring and segregation of the ambiguous linguistic input. To test this conjecture, we explored the performance of bilingual and monolingual 7-month-olds with an eye-tracker in three attention-switching studies employing structured or random linguistic cues or visual cues. After exposure to one regularity (e.g., look left after a cue), infants had to learn a second, conflicting regularity (e.g., look right after a cue). While both groups showed fast learning for the first regularity in the three studies, only bilinguals succeeded in learning the second regularity. Monolinguals, in contrast, perseverated to the first regularity. Bilinguals are thus more efficient in overcoming a previously valid response and in redirecting their attention to the new task. Having to deal with multiple linguistic input may lead to a domain-general enhancement of executive attention from a very young age. These results also imply that the executive system is at least partially functional and can be trained already in preverbal infants.

**THE DEVELOPMENT OF SEMANTIC ASSOCIATIONS IN THE MONOLINGUAL
AND BILINGUAL INFANT BRAIN: AN ERP STUDY.**

J. R. Kuipers, M. M. Vihman, & G. Thierry

ESRC Centre for Research on Bilingualism, Bangor University, Wales

We report an experiment that focuses on the development of semantic associations in monolingual English and English-Welsh bilingual babies. We presented pictures of highly familiar objects on a screen, quickly followed by a spoken word that either matched the object (Match), was semantically related to the object (Related), or was unrelated to the object (Unrelated). Event-Related Potentials were recorded in monolingual English adults as well as in 14- and 16-month-old monolingual English children. Surprisingly, preliminary results indicate that 16-month-old monolingual English babies already show the same overall pattern seen in adults: The N400 component, known to index the degree of semantic relatedness between word and context, was significantly reduced in the match and related conditions compared to the unrelated condition. In contrast, the amplitude of the N400 in the 14-month-old babies was the same for semantically related and unrelated words. We interpret these results as supporting the notion that at 14 months, word-concept associations are rigid, since, for instance, the image of a cat primes the word cat but fails to prime the word dog. However, as early as 16 months, these associations become more finely graded. We are currently testing 14-month-old English-Welsh bilingual babies using the same paradigm. We hypothesise that the N400 pattern in these infants will reflect an earlier maturation of semantic associations, because everyday objects naturally have at least two words associated with them rather than one.

DO GERMAN FROGS TURN INTO 'PRINZE' OR 'PRINZEN'?

PLURAL FORMATION IN DUTCH-GERMAN BILINGUALS

Kristin Lemhöfer, Pienie Zwitserlood, & Herbert Schriefers

Radboud University Nijmegen, The Netherlands

When speaking or reading in their second language (L2), bilinguals are influenced by their native language (L1) in many ways. For instance, we have shown that when processing Dutch word gender, German-Dutch bilinguals are strongly influenced by their L1 (Lemhöfer, Spalek, & Schriefers, under revision). In that study, Dutch words with a German translation of ‘compatible’ gender were processed faster and more accurately than ‘gender-incompatible’ ones, especially in the case of cognates, i.e., words with highly form-similar translations. In the present study, we investigated whether similar cross-language compatibility effects hold for the processing of plural forms. The German plural system is complex and comprises six different plural suffixes, including the two main Dutch plural suffixes -en and -s. As a consequence, German-Dutch translation pairs can have ‘compatible’ (e.g., *prinsen_D* - *Prinzen_G*) or ‘incompatible’ (e.g., *velden_D* - *Felder_G*) plurals. We manipulated the plural compatibility variable as well as cognate status in a plural production experiment, where German singular determiner-noun phrases (e.g., *der Prinz*) were presented to proficient Dutch-German bilinguals, who subsequently verbally produced the plural form (e.g., *die Prinzen*). A native German control group was also included. Results show a cognate effect for the bilinguals (faster and more accurate responses for cognates), but unexpectedly, cross-language plural compatibility did not have an effect. An exception are compatible -s plurals for foreign words and loanwords (e.g., *Radios*), which occur similarly in both Dutch and German, and which were produced more accurately than other compatible plurals. These results suggest that the influence of L1 on L2 syntactic and morphological processing might be restricted to instances where such an influence is beneficial. This applies also to Dutch word gender as mentioned above, for which German gender is in many cases a reliable cue.

CROSS-LANGUAGE EFFECTS OF ORTHOGRAPHIC NEIGHBORHOOD:

AN ERP INVESTIGATION

Katherine J. Midgley^{1,2}, Phillip J. Holcomb¹, Walter J. B. Van Heuven³, & Jonathan Grainger²

¹Tufts University, USA

²Université de Provence, France

³University of Nottingham, United Kingdom

The non-selective access hypothesis is a central hypothesis of the Bilingual Interactive-Activation model (Grainger & Dijkstra, 1992; van Heuven, Dijkstra, & Grainger, 1998), and its successor the BIA+ model (Dijkstra & van Heuven, 2002). According to these models word representations from both languages are activated and they compete with each other due to lateral inhibition at the word level. Therefore the model predicts not only within-language interference but also cross-language interference effects. To test this non-selective hypothesis, two experiments were conducted. In Experiment 1 ERPs were recorded while proficient French-English bilinguals read pure language lists of French and English words that, while the number of same-language neighbors was held constant, differed in terms of the number of orthographic neighbors they had in the other language. That is, the number of French neighbors for English target words was varied (few or many) and the number of English neighbors for French target words was varied (few or many). These participants showed effects of cross-language neighborhood size in the N400 ERP component that arose earlier and were more widely distributed for English (L2) target words than French (L1) targets. In a control experiment that served to demonstrate that these effects were not due to any other uncontrolled for item effects, monolingual L1 English participants read only the list of English targets that varied in the number of neighbors in French (an unknown L). These subjects showed a very different pattern of effects for cross-language neighbors. These results provide further crucial evidence showing cross-language permeability in bilingual word recognition, a phenomena that was predicted and correctly simulated by the bilingual interactive-activation model.

PHONOLOGICAL PARAPHASIAS IN BILINGUAL ANOMIA

Amaia Munarriz Ibarrola & Maria José Ezeizabarrena Seguro

UPV-EHU, Spain

Theories that describe phonological encoding discuss whether phonological information, e.g. metrical and segmental, is retrieved serially or in parallel. The goal of this study is to analyse the phonological paraphasias produced by an adult Spanish-Basque bilingual with anomia in the two languages, in order to examine what kind of information, metrical or segmental, is better preserved during the retrieval of phonological information. Two aspects are considered: fluency and phonological information. As far as fluency is concerned, the spontaneous speech is revealed to be more fluent in Spanish than in Basque. With regard to phonological information, metrical and segmental information is not equally accessible in phonological paraphasias. Metrical information (stress pattern and number of syllables) is preserved, but segmental information is altered (cf. Biran & Friedman, 2005), in both languages. Different phonological processes are attested where there is a clear preference for substitutions and regressive processes (cf. Buckingham, 1991). Furthermore, syllable structure is not always maintained; in addition the onset position is the principal source position of the displaced segment, whereas the target position of the displaced segment is mostly the coda position. Thus, the maintenance of the position within the syllable seems not to apply universally, contrary to suggested by Shattuck-Hufnagel (1992). The preservation of the metrical information and the modification/alteration of the CV structure and segmental information observed in this study reinforce the following assumptions: 1) syllable structure and metrical information are distinct within prosodic information and 2) metrical and segmental information is processed independently during lexical retrieval processes (Levelt et al., 1999). Moreover, the phonological paraphasias follow the same pattern in Spanish and Basque, despite the participant's different degree of fluency in both languages. This result is compatible with the assumption of the unique phonological production model in bilinguals.

**LANGUAGE REPRESENTATION AND PROCESSING IN FLUENT BILINGUALS:
ELECTROPHYSIOLOGICAL SUPPORT FOR ASYMMETRIC MAPPING IN BILINGUAL MEMORY**

Shekeila Palmer¹, Jelena Havelka², & Hannie van Hooff¹

¹University of Kent, United Kingdom

²University of Leeds, United Kingdom

The purpose of this investigation was to test the assumption of asymmetric mapping between words and concepts in bilingual memory, as proposed by the Revised Hierarchical Model (RHM, Kroll & Stuart, 1994). Twenty six Spanish-English bilinguals were presented with pairs of words, one in English and one in Spanish, and asked to indicate whether or not the words had the same meaning. In half the trials the Spanish word preceded the English word (Forward translation), and in the other half the English word preceded the Spanish word (Backward translation). In each condition, half of the words had the same meaning. Event-related potentials (ERPs) were used to examine lexical-semantic activation during word translation. In support of the RHM, a direction dependent translation asymmetry was observed in the magnitude of the N400 repetition effect. Specifically, the N400 effect was larger during backward translation than during forward translation, due to a larger reduction in N400 amplitude when an L2 word was preceded by its L1 translation equivalent. This difference extended beyond the typical N400 time window and remained evident at 500-1000 post stimulus. Results are discussed in terms of the differential speed of lexical and conceptual access during forward and backward translation.

Kroll, J. F. & Stewart. E. (1994). Category Interference in Translation and Picture Naming: Evidence for Asymmetric Connections between Bilingual Memory Representations. *Journal of Memory and Language*, 33, 149-174.

CROSS-LINGUISTIC INFLUENCES AND COGNITIVE CONTROL
IN BILINGUAL AND MULTILINGUAL CHILDREN

Gregory J. Poarch¹, & Janet G. van Hell^{1,2}

¹*Radboud University Nijmegen, The Netherlands*

²*The Pennsylvania State University, USA*

This study focuses on cross-language interaction in bilingual and multilingual children and builds empirically on the emerging data on cross-language interaction during lexical access in adult bilinguals (e.g., Costa et al., 2006; Festman, 2004; Kroll et al., 2005). Specifically, we examined lexical retrieval in word production in bilingual and multilingual children to address the question whether non-target language knowledge is co-activated during word production, and whether this process is different for bilinguals (only one potentially interfering nontarget language) and multilinguals (two potentially interfering nontarget languages). Second, we asked whether the control mechanism that allows speakers to successfully access and produce the target language is the same for these two groups, with the assumed mechanism for such language control being Green's inhibitory control model (1998). To address these questions, bilingual and multilingual children (and monolingual controls) aged 5-8 named pictures in target languages German and English. The pictures were cognates and noncognates, of high, middle, or low frequency. Of particular interest was whether the cognate manipulation shows its effects equally in both groups (assuming a cognate effect to be an indicator of non-target language activation), and whether the participants' number of additional languages is reflected in naming latencies and accuracy. Participants also performed a Simon Task, aimed at tapping into the children's executive functions and speed of processing when overriding a specific response in order to perform the target response. Preliminary results of the error data suggest a cognate facilitation effect for the English condition whereas no such effect is evident in the German condition. By the time the poster is due, reaction times data will have been analyzed and both the error analysis and RT data results will be discussed in detail.

ARTIFICIAL LANGUAGE STUDY OF LEXICAL AND GRAMMATICAL LEARNING

Tünde Éva Polonyi¹, Matti Laine², & Anastasia Leikas²

¹*Debrecen University, Hungary*

²*University of Turku, Finland*

For experimental studies on language learning, we created a set of digitized cartoon drawings of 20 animals performing 10 different picturable actions in dyadic pairs. These can be combined to create a large number of scenes corresponding to independent clauses in the to-be-learned language. The stimulus set was employed in an artificial language learning study where both lexicon and grammar were learned simultaneously. Twenty Finnish-speaking university students participated in 3-day unsupervised training with 80 picture-sentence pairs, where they were to learn the names of the animals and the actions in a novel language, plus two grammatical rules. One of the rules exists in Finnish (object-marking) while the other one does not (gender marking). Results showed that lexical learning surpassed grammatical learning in the passive task, but not in the active task. A similar pattern was observed for the two grammatical markers with more difficulties for the non-Finnish rule in the passive, but not in the active task. The results indicated learning of the grammatical marker options without knowing their correct slots. The study also showed that it is easier to learn a native-like than a non-native-like morphosyntactic rule.

ON POSSIBLE RELATIONSHIP BETWEEN LINGUISTIC EXPERTISE AND GAMMA BAND PHASE SYNCHRONIZATION AS REVEALED BY EEG: AN EXPLORATORY STUDY

Susanne Reiterer¹, Ernesto Pereda², & Joydeep Bhattacharya^{3,4}

¹*University of Tuebingen, Germany*

²*University of La Laguna, Tenerife, Spain*

³*University of London, United Kingdom*

⁴*Austrian Academy of Sciences, Austria*

Background: Numerous research evidence have shown that extensive training in and exposure to a second language can modify the language organization in the brain and result in structural and functional changes. However it is not yet known how these changes are manifested by the dynamic brain oscillations and synchronization pattern subserving the language network.

Methodology/Principal Findings: In search for synchronization correlates of proficiency and expertise in second language acquisition, multivariate EEG signals were recorded from high and low proficiency bilinguals during natural text processing in first language and second language. Gamma band (30-50 Hz) phase synchronization was calculated by two methods: mean phase coherence (measuring the degree of phase coherence between a pair of electrodes) and synchronization cluster analysis (showing the degree of phase synchronisation between one electrode and all other electrodes). On comparing second versus first language processing, mean phase coherence analysis indicated that the low proficiency group showed stronger and broader network pattern with interconnectivities between right posterior-central-midfrontal regions, whereas the high proficiency group showed smaller and local network pattern with only left fronto-temporal connectivity. Synchronization cluster analysis also indicated that the network activity on global scale was stronger in low proficiency group during processing second language.

Conclusion/Significance: In summary, these results showed that high and low proficiency bilinguals with different degrees of linguistic expertise in the second language could be differentiated by functional brain network operating at gamma band oscillation during processing an acquired language, and such differences are discussed in the context of cortical efficiency theory.

**ENCODING NUMBER AGREEMENT IN L2:
EVIDENCE FROM SUBJECT-VERB AND OBJECT-VERB AGREEMENT IN BASQUE (L2)**

Mikel Santesteban¹, Martin Pickering¹, Holly Branigan¹, & Itziar Laka²

¹University of Edinburgh, Scotland

²University of the Basque Country

We investigate how L1 affects bilinguals' L2 syntax production by addressing the way grammatical agreement is computed in L2. Agreement is a paradigmatic example of the processing of abstract syntactic structures. Experimental research has revealed that the number of a noun included in a modifier to the subject head or in the object can interfere with the agreement process resulting in the production of subject-verb number agreement errors (Hartsuiker, et al., 2001; Franck, et al., 2006). Cross-linguistic agreement studies have revealed that the same factors affecting L1 subject-verb agreement also affect L2 agreement (Nicol and Greth, 2003), suggesting that L1 syntax affects the way L2 is processed. But, how do L2-speakers process agreement relations not present in their L1? Here we investigate the extent to which presence or absence of similar agreement relations in bilinguals' L1 affects agreement encoding in the L2. Do early bilinguals encode agreement like native speakers do? Do they have more difficulties encoding agreement relations not present in the L1 than agreement relations present in the L1? Basque native speakers and early Spanish-Basque bilinguals completed Basque sentence preambles that contained number matching and mismatching subjects and objects with verb forms agreeing with the subject and the object. Data revealed that both native- and L2-speakers produced more subject- and object-verb agreement errors in subject-object number mismatched than matched sentences. L2-speakers produced more errors than native-speakers both in subject-verb (present in Spanish) and object-verb (not present in Spanish) agreement relations. However, neither native speakers nor L2-speakers produced more object-verb than subject-verb errors. All in all, these results show that, although agreement encoding by L2-speakers seems to be more sensitive to number attraction errors than agreement encoding by native speakers, it is so regardless the existence (subject-verb) or absence (object-verb) of those agreement relations in their L1.

LANGUAGE CONTROL IN BILINGUAL SPEECH PRODUCTION: A BLOCKED NAMING STUDY

Kristof Strijkers, & Albert Costa

Universidad de Barcelona, Spain

An important question in bilingualism is how bilingual speakers are able to control for intrusions from one language while speaking in the other language. In this study we investigated how bilinguals are able to control their language production by looking at the impact of naming a picture in one language which previously (previous block) has been named in the other language. In experiment 1 22 high-proficient Spanish-Catalan bilinguals first named pictures in their L1 and afterwards named pictures in their L2 (blocked naming). Crucially when participants changed to blocked naming in L2, half of the pictures were the same and half of the pictures were different than the blocked naming part in L1. In experiment 2 22 high-proficient Spanish-Catalan bilinguals performed the same experiment as in experiment 1, but started with naming in L2. In both experiments an interaction between old-new (previously named picture or not) and cognate status was found: For non-cognates old pictures were named slower than new ones. For cognates the opposite result was found: New pictures were named slower than old ones. Results are discussed in function of distinct bilingual production models.

LEARNING TO LOOK: EYEGAZE DURING ASL VERB PRODUCTION BY NON-NATIVE SIGNERS

Robin L. Thompson¹, Karen Emmorey², & Robert Kluender³

¹University College London, United Kingdom

²San Diego State University, USA

³University of California, San Diego, USA

In American Sign Language (ASL), native signers use eye gaze to mark agreement (Thompson, Emmorey & Kluender, 2006). Such agreement is unique (it is articulated with the eyes) and complex (it occurs with only two out of three verb types, and marks verbal arguments according to a noun-phrase accessibility hierarchy). In a language production experiment using head-mounted eye-tracking, we investigated the extent to which eye gaze agreement can be mastered by late second-language learners. The data showed that proficient late learners (with an average of 18.8 years signing experience) mastered a cross-linguistically prevalent pattern (NP-accessibility) within the eye gaze agreement system but ignored an idiosyncratic feature (marking agreement on only a subset of verbs). Proficient signers produced a divergent grammar for eye gaze agreement that differed from that of native signers, but was more consistent with language universals. A second experiment examined the eye gaze patterns of novice signers with less than two years of ASL exposure and of English-speaking non-signers. The results provided further evidence that the pattern of acquisition found for proficient L2 learners is directly related to language learning, and does not stem from more general cognitive processes for eye gaze outside the realm of language.

CROSS-LINGUAL ACTIVATIONS IN HIGH AND LOW-CONSTRAINT SENTENCES

Eva Van Assche, Wouter Duyck, Denis Drieghe, & Robert Hartsuiker

Ghent University, Belgium

This study investigated how a linguistic sentence context and a strong semantic context influence cross-lingual interactions when reading in the second language. In isolated (out-of-context) word recognition, Dijkstra, Grainger and van Heuven (1999) showed that Dutch-English cognates (translation equivalents with full or partial form overlap, e.g., *ship-ship*) were processed faster than noncognates by bilinguals performing a lexical decision task in their second language (L2). In Experiment 1 of the present study, we replicated this cognate facilitation effect. These results show that lexical information of the native language (L1) influences activation of words in the L2 and therefore suggests language-nonspecific activation of words in the bilingual lexicon. In Experiment 2, we investigated how presentation of words in a sentence context, providing a strong language cue for lexical access, and semantic constraint (high vs. low constraint sentences) modulate these cross-lingual activations. Previous studies on this issue only found evidence for cross-lingual interactions in low constraint sentences (e.g., Schwartz & Kroll, 2006; Van Hell, 1998). However, they used experimental tasks (naming, lexical decision) that require an active response. We presented the same set of cognates and control words of Experiment 1 in high and low constraint sentences in an eyetracking paradigm. This technique allowed our Dutch-English bilingual participants to read normally and is probably the closest possible experimental operationalization of natural reading. The results showed evidence of cognate facilitation in early reading time measures such as skipping, first fixation duration and gaze duration. A control experiment with English monolinguals showed no cognate facilitation. This ensured that the effects really originated from the bilingual nature of the participants. The present study is the first study to show evidence of cross-lingual activations in a semantically constraining sentence context. This result proves that the bilingual language system is strongly language-nonspecific.

THE INFLUENCE OF LEARNING-MODALITY ON VOCABULARY LEARNING

Nele Verreyt, & Wouter Duyck

Ghent University, Belgium

The Revised Hierarchical model of Bilingualism (RHM, Kroll & Stewart, 1994) postulates that L2 word forms, unlike L1 words, do not have direct form-to-meaning mappings, but instead access semantic representations through strong lexical links with their L1 translation equivalents. Consequently, the RHM predicts effects of semantic manipulations in forward translation (from L1 to L2) but not in backward translation (from L2 to L1). The present study tested whether such an asymmetric lexicosemantic organization is depending on the availability of semantic information during L2 word learning. Participants learned new L2 words by association with either L1 translations or object pictures, and then performed forward and backward translation on newly learned words. Results showed that only forward translation was facilitated when targets were presented in semantically blocked categories. This was true for both learning modalities. This is consistent with the predictions based on the RHM. Providing semantic information during word learning did not influence lexicosemantic organization of newly learned words.

NEURONAL CORRELATES OF MULTILINGUAL WORD PRODUCTION

Gerda Videsott³, Bärbel Herrnberger¹, Edgar Schilly^{1,2}, Jo Grothe¹, Klaus Hoenig^{1,2},

Werner Wiater³, Manfred Spitzer^{1,2}, & Markus Kiefer¹

¹University of Ulm, Department of Psychiatry, Ulm, Germany

²Transfer Center for Neurosciences and Learning, Ulm, Germany

³Free University of Bozen-Bolzano, Faculty of Education, Italy

The study examines the neuronal correlates of multilingual word production determining and controlling as accurately as possible the influencing variables known to be responsible for different brain activation during language production. The aim to find out possible differences between languages (Ladin, Italian and English). Therefore, a very homogenous group of twenty individuals was tested using fMRI in an object naming task. The word production in different languages was directly compared. Functional imaging revealed a shared neuronal brain activity for word production with only minimal differences between the languages. Different activation was found predominantly in the right hemisphere, in the inferior frontal cortex, middle frontal gyrus, middle temporal gyrus, insula and cerebellum. We hypothesize that the variable activation which occurred during word production ascribed to different languages probably correlates with a further variable, which intrinsically correlates with a given language experience. We assume that the different activation found in this study correlates with processes of memory and with the effective accuracy and fluency of the subject's performance during the fMRI experiment.

**THE EFFECT OF AFFECTIVE PRIMING
ON EMOTIONAL STROOP TASK PERFORMANCE IN BILINGUALS**

Hannah Widman¹, Jelena Havelka², & Tiina Eilola¹

¹University of Kent, United Kingdom

²University of Leeds, United Kingdom

Self-reports of bilinguals often indicate that they perceive their first language (L1) as more emotionally charged compared to their second language (L2). However previous studies investigating emotion word processing in bilinguals with the Emotional Stroop paradigm report no latency differences across languages (Eilola, Havelka, Sharma, 2007). The aim of the present study is to assess the impact of arousal on processing of emotion laden words in L1 and L2. To that end we have used affective priming to modify arousal levels during bilingual Emotional Stroop task. Thirty-one German-English late bilinguals were presented with negative and neutral German and English words preceded by pictures of neutral or angry face expressions in Emotional Stroop task. Negative words elicited significantly slower reaction times than neutral words in both languages and the result pattern did not differ between L1 and L2, which replicates previously reported data. A novel result observed in the present experiment was the interaction between the type of face prime and language. The arousal induced by the angry face as a prime led to further slowing down of responses to negative words in L1 but had no significant effect over response times in L2. This result seems to indicate that the links between word forms and physiological correlates of emotions might be less strong or even absent in L2 compared to L1.

LEXICAL AND CONTEXTUAL FACTORS IN CODESWITCHING.

A BEHAVIORAL AND ELECTROPHYSIOLOGICAL STUDY

Marijt J. Witteman¹, & Janet G. van Hell^{1,2}

¹*Radboud University Nijmegen, The Netherlands*

²*The Pennsylvania State University, USA*

A hallmark of bilingual language processing is codeswitching. Though this switching between two languages seems effortless, behavioral and electrophysiological studies report language switching costs in comprehension and production. Most current (neuro)cognitive studies focus on switching between single words, pictures, or numbers. This study examines codeswitching of words embedded in meaningful sentences and discourse context. We specifically investigated the lexical triggering hypothesis of codeswitching (e.g., Broersma & de Bot, 2006; Clyne, 2003), which claims that cognates can trigger a switch to another language. In a second experiment, we extended the basic lexical triggering hypothesis to see whether language-related information in the context prior to language switching modulates switching costs (socio-contextual triggering). In an ERP study and a behavioral study (a self-paced reading task), Dutch-English bilinguals read Dutch sentences containing a codeswitched word, preceded by a lexical trigger or a socio-contextual trigger. In Experiment 1, the reading of code-switched sentences preceded by a lexical trigger (e.g., ‘supermarket’ is compared with the reading of code-switched sentences preceded by a non-trigger word (e.g., ‘store’ – ‘The well-known supermarket/ store also sells speelgoed to its costumers’ [toys]). In Experiment 2, a socio-contextual trigger (referring to a British/American situation or a Dutch situation) was added before the sentence with the codeswitch, e.g. ‘For your daily groceries you can shop at Wal-Mart/ Albert Heijn. This well-known store also sells speelgoed to its costumers.’ In the behavioral study, we examine whether lexical triggering (Experiment 1) or the socio-contextual triggering (Experiment 2) modulates reading times of the language-switched words and the following phrase. In the ERP study, we examine whether these triggers modulate ERP responses (N2, N400, and LPC) to language-switched words. The data are currently under analysis, but a first visual inspection of the ERP data of the socio-contextual triggering experiment shows a switch-related modulation of the N400.