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| TIME | EVENT | AUTHORS | TITLE | ABSTRACT |
| 9:00-9:30 | Registration |  |  |  |
| 9:30-10:30 | Invited talk 1 | Jubin Abutalebi (University Vita-Salute San Raffaele) | Neuroanatomical perspectives on bilingualism and language experience | In the last two decades there has been an upsurge of research on the bilingual mind and brain. Although the world is multilingual, only recently have cognitive and language scientists come to see that the use of two or more languages provides a unique lens to examine the neural plasticity engaged by language experience. But how? Bilinguals proficient in two languages appear to speak with ease in each language and often switch between the two languages, sometimes in the middle of a sentence. This uniquely bilingual ability necessitates efficient control resources in order to avoid unwanted interferences from the unrequested language. During my talk, I will first outline the neural bases of control that enable individuals to speak each of their two or more languages and will then focus on the consequences that these control mechanisms might hold more generally upon the brain. Evidences for structural and functional changes in the brains of young and older subjects who use two or more languages across their entire lives will be considered. I will also show how eventually individual neuroanatomical differences between subjects ma be responsible for behavioral and cognitive differences. Finally, I will assess the broader implications for what bilingualism tells us about life experience and brain plasticity in general. |
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| 10:30-10:50 |  | Lihua Xia (University of Edinburgh), Thomas H. Bak (University of Edinburgh), Antonella Sorace (University of Edinburgh), Mariana Vega-Mendoza (2Umeå University, Umeå, Sweden) | Bilingualism and Cognitive Functions | There is a debate on whether bilinguals outperform monolinguals on a variety of tasks involving cognitive functioning. This study aims at examining potential differences in young adults through three well-established non-verbal cognitive tasks: Attention Network Task (ANT), Number Stroop task, and The Test of Everyday Attention (TEA). Given that language learning involves multiple domains, i.e. visual (reading and writing) and auditory (speaking and listening), the tasks employed in our study are based on the measurement of different components. Overall, bilinguals outperformed monolinguals on both visual and auditory attention tasks, but in a selective way. Specifically, in the visual domain, bilinguals displayed a smaller switching cost and faster disengagement of attention (SCE; sequential congruency effect) on the ANT, and a smaller conflict effect on the Stroop task compared to monolinguals. No group differences were found on the other aspects of ANT (Alerting, Orienting, and Conflict) and Stroop (Switching cost and SCE). The latter observation suggests that individuals’ performance on the attention tasks might be modulated by the characteristics of the tasks (i.e. complexity level and stimulus interval time). In the auditory domain (TEA), both groups showed similar performance on selective attention but bilinguals performed better in the attentional switching subtask, which suggests that the differences between monolinguals and bilinguals are specific. In sum, our results demonstrate that bilingual experience could have some selective positive effects on cognitive functions even in young adults who are supposed to be at the peak of their cognitive capacities. |
| 10:50-11:10 |  | Mikhail Ordin (BCBL), Leona Polyanskaya (BCBL), David Soto (BCBL) | Metacognitive processing in statistical learning is modulated by bilingualism | In multiple experiments, we assessed the effect of bilingualism on metacognitive processing in language tasks. Following a study phase in which participants were exposed to the artificial language, segmentation performance was assessed by means of a dual forced-choice recognition test followed by confidence judgments. We used a signal detection approach to estimate type-1 performance (i.e., the participants’ ability to discriminate statistical words vs. foils constructed from the same syllables), and type-2 metacognitive performance (i.e. the ability to discriminate the correctness of the type-1 decisions by confidence ratings). The material in the first two experiments varied in the difficulty level to segment the language. The results showed that bilinguals and monolinguals do not differ in type-1 recognition performance, but across the two experiments metacognitive performance was higher in bilinguals compared to monolinguals. The results also show that bilingualism improves metacognitive evaluation of performance in linguistic domains. We suggest that the improvement in metacognitive performance stems from bilinguals’ enhanced error monitoring abilities in the language domain, evidenced by lower confidence rating assigned to incorrect trials by bilinguals compared to monolinguals. In the last set of experiments, we looked at different aspects of bilingualism that could modulate individual metacognitive performance in statistical learning tasks. Although the experiments are still running, the results so far indicate that individual differences in flexibility and use of language-control processes play a more important role in modulating metacognition in language tasks than linguistic proficiency in multiple languages. |
| 11:10-11:30 |  | Ramesh Mishra (Center for Neural and Cognitive Sciences, University of Hyderabad), Manasa Padmanabhuni (Center for Neural and Cognitive Sciences, University of Hyderabad), Pratik Bhandari (Center on Cognition, Brain and Language, Sebastian, Spain), Shiji Viswambharan (IISER Thiruvananthapuram), Seema Prasad (Center for Neural and Cognitive Sciences, University of Hyderabad) | Second language proficiency and executive control in ageing bilinguals : Now we see and now we don’t | The idea that a cognitive skill like using two or more languages should lead to noticeable neuroplasticity in adults or children has become controversial in the last few decades. Although a range of behavioural and neural data indicate that bilinguals perform better on cognitive control tasks, the lack of diversity in the population studied has led to unclarity on the advantage claim. Reports from India based on hospital records (eg., Alladi et al., 2013) of patients have shown “cognitive reserve” - the late onset of neurodegenerative diseases - in bilinguals. If this is true, the older individuals who practise bilingualism should outperform monolinguals on cognitive control tasks. To test this, we examined older Telugu -English bilinguals (age range: 50 - 65 years) in Hyderabad on a range of executive control tasks (ANT, stop-signal, numerical Stroop, DCCS). Following previous observations, we tested whether enhanced second language (L2) proficiency leads to better performance on executive control tasks. Interestingly, there was no such evidence which was also confirmed by Bayesian null hypothesis testing and parameter estimation. This result can be attributed to the fact that the participants in this sample had retired from their jobs, were mostly at home and not practising bilingualism anymore. In contrast, previous studies from our lab with young, university-going, adult bilinguals have repeatedly shown better executive control in bilinguals as a function of L2 proficiency (eg., Singh & Mishra, 2012, 2013). This suggests that cognitive reserve arising out of bilingualism in older adults might be an outcome of constant practise of bilingualism. This first report shows experimental outcomes in ageing bilinguals in India and can add meaningfully to data from studies that have considered hospital records of patients with neurodegenerative diseases. |
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| 11:30-12:00 | Coffee break |  |  |  |
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| 12:00-13:00 | Invited talk 2 | Viorica Marian (Northwestern University) | How Bilingualism Changes Linguistic, Cognitive, and Neural Processing | The majority of the world population is bilingual or multilingual. In this talk, I will discuss how learning another language changes the human linguistic, cognitive and neural architectures. I will show that a bilingual's two languages constantly interact and influence each other. Bilinguals’ experience managing two languages sculpts the brain and translates to changes not only in the domain of language (such as language learning and processing), but also in other domains (such as executive function, visual search, and audio-visual integration). Using eye-tracking, mouse-tracking, EEG, and fMRI data, I will show that the highly interactive and dynamic nature of bilingual language processing results in profound changes to cognition and the brain. |
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| 13:00-13:20 |  | Sergio Pereira Soares (University of Konstanz), Vince DeLuca (University of Birmingham), Toms Voits (University of Reading), Ellen Bialystok (York University), Anastasia Christakou (University of Reading), Christos Pliatsikas (University of Reading, Universidad Nebrija), Jason Rothman (UiT the Arctic University of Norway, Universidad Nebrija) | Beyond Structure: Investigating neurochemical bases for bilingualism-induced neural plasticity | Neurobiological and neurochemical processes that underlie degree of brain adaptation to specific (bilingual) language experiences are understudied. The concentrations of certain metabolites, such as choline and creatine, have been found to relate to the degree of plasticity in regions of the brain (Chiu et al., 2014). In consideration of the literature that documents bilingual neuroanatomical adaptions (see Pliatsikas, 2019), it is fair to expect metabolite differences as well. To date, however, virtually no studies have examined effects of bilingualism on metabolite concentrations. Weekes et al. (2018) is the only Magnetic Resonance Spectroscopy (MRS) study—a method that collects metabolite concentration during MRI scanning. They, however, examined the anterior cingulate cortex (ACC) and in older (ageing) bilinguals. We employ MRS to identify potential neurochemical basis for bilingual-induced brain adaptations in the left caudate nucleus (LCN). The LCN is an area of the brain implicated in both language processing and control networks that shows effects of potential amelioration from bilingualism (Abutalebi & Green, 2016). We specifically assess whether metabolite concentrations are a) distinct between monolinguals and bilinguals, b), if so, predicted by specific language use factors within the bilingual experience, and c) whether there is a modularity connection to adaptations seen in the MRI scanning. 75 participants (42 bilingual and 33 monolingual) were scanned. Participants also completed a language background questionnaire (LSBQ, Luk & Bialystok, 2013) from which we derive regressors of bilingual language experience. Preliminary results show correlations between length of bilingual language use and concentrations of specific metabolites, specifically glutamine and glutamate, indicating a modulatory role of language experience on neurochemical concentrations. |
| 13:20-13:40 |  | Nur Basak Karatas (University of Maryland), Kira Gor (University of Maryland), Ellen Lau (University of Maryland) and Mehmet Aygunes (Istanbul University) | L1 and L2 Morphological and Morphosyntactic Processing of Case: ERP Evidence from Turkish | In languages with overt case-marking, different case forms may drive differential processing costs for both native (L1) and non-native (L2) speakers, but it can be difficult to determine whether these costs reflect morphological processing at the lexical level or syntactic processing at the sentence level. This study compares L1 and L2 behavioral and neural responses for the same case-inflected nouns in reading, both in a lexical decision task (LDT) and in sentence comprehension with a grammaticality judgment task (GJT). The study explores responses to nominative, accusative, dative, genitive marked nouns in L1 speakers (n=37) and advanced L2 learners (n=26) of Turkish, an agglutinative head-final language. We also examined responses to violations of the object case selected by the verb (accusative vs. dative). LDT results indicate that both groups showed sensitivity to the morphological structure of different case-inflected nouns, modulated by the case form and its status within the inflectional paradigm (see Gor, Chrabaszcz, & Cook, 2017). RTs were increased for genitive-marked nouns, and ERPs showed increased negativities for this condition; in L1 this ERP pattern also appeared to extend to sentence contexts. Case violations detectable at the verb produced distinct neural patterns in L1 and L2 processing. In L1, ungrammaticality was indexed by a larger negativity between 300-500ms and a larger late positivity, whereas in L2, the early negativity was primarily modulated by grammaticality for the accusative case only, and no late positivity was observed. These results indicate poor integration of morphosyntactic features in sentence comprehension by L2 learners. |
| 13:40-14:00 |  | Wilhelmiina Toivo (University of Glasgow), Christoph Scheepers (University of Glasgow) | Comparing cognitive and physiological measurements of reduced emotional resonance in bilinguals' L2 | Reduced emotional resonance of second language (L2) is often studied using cognitive behavioural paradigms such as lexical decision task (LDT). These findings are inconclusive, while physiological measurements seem to detect reduced emotional resonance consistently. The aim of our experiment was to compare physiological measurement (pupillometry) and an LDT using a well-controlled stimuli set to see which method is more reliable. 30 German-English bilinguals completed a pupillometry task and an LDT in English (L2) and in German (L1). 30 English monolinguals completed both tasks in English. We selected 40 neutral valence/low arousal, 40 positive valence/high arousal, and 40 negative valence/high arousal words, matched on length, lexical frequency and concreteness across conditions and languages. In the pupillometry task, participants’ pupillary response to the words were measured. In the LDT, reaction times (RTs) were measured as participants decided whether each stimulus was a word or not. LDT data, analysed with Mixed Effect Models, showed no change of cross-condition effects (difference between neutral vs. the other two conditions) dependent on test language (model comparison with language:condition interaction included and excluded: X2(2)=0.88, p=0.64). Thus, the LDT failed to detect reduced emotional resonance in L2. The pupil data are still being analysed; based on previous findings we expect reduced effects of arousal in L2. If found, this would suggest that detectability of reduced emotional resonance is task-dependent. |
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| 14:00-15:30 | Lunch&Poster session |  |  |  |
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| 15:30-16:30 | Invited talk 3 | Gigi Luk (McGill University) | Beyond Group Comparisons: Understanding Bilingualism And Its Role In Development And Learning | Research on bilingualism and cognition has adopted group comparisons between bilingual and monolingual individuals. This knowledge has contributed to identifying behavioral differences in language and cognition. While group comparisons are elegant and efficient, it is not sufficient to understand the experiential complexity involved in bilingualism and how this developmental process shapes learning. Given bilingualism is becoming a prevalent global phenomenon, innovative approaches are needed to evaluate the developmental and learning outcomes of bilingualism, an interactive experience between an individual and her language environment. Examining bilingualism as an interactional experience poses an opportunity to conduct translational research that informs learning and educational practices. The study of bilingualism will benefit from transdisciplinary efforts and connection to real life implications. In this talk, I will share a research program that is designed to address an educational challenge by examining the neural and cognitive mechanisms supporting learning through spoken language in adolescents. |
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| 16:30-16:50 |  | Cristy Sotomayor (San Diego State University and University of California San Diego), Alyson Abel (San Diego State University), Mandy Maguire (University of Texas at Dallas) | Do Bilingual and Monolingual School-Aged Children Use Different Neural Mechanisms During Word Learning? |  |
| 16:50-17:10 |  | Gabriel Ong (University of Melbourne), Meredith McKague (University of Melbourne), Brendan Weekes (University of Melbourne) and David Sewell (University of Queensland) | Diffusing the Bilingual Lexicon | Bilingualism has been shown to facilitate word learning in adults [1, 2]. However, whether this same word learning difference is present in school-aged bilingual children is not certain. In the present study, we used behavioral and electroencephalography (EEG) methods to investigate whether language experience (i.e., maintaining one language versus two languages) is associated with different neural mechanisms during word learning in monolingual and bilingual school-aged children. For this study, 21 (10 bilingual, 11 monolingual) children, matched on age, socioeconomic status (SES), and language proficiency, completed standardized language and cognitive assessments and a word learning task during which their EEG was recorded. During the word learning task, children read grouped sentences that introduced a novel word and were asked to identify the meaning of the new word. The behavioral analysis found that bilinguals performed comparably to monolinguals t(19)=-1.10, p=.29, suggesting that any differences in neural mechanisms or ERPs cannot be explained by differences in behavioral outcomes.. The EEG analysis focused on the N400 component, which is sensitive to word learning in adolescents [3]. When collapsed across groups, the N400 amplitude attenuated during word learning, F(2,48)=13.04, p<.001. A group comparison identified that the overall N400 amplitude was larger for bilinguals than for monolinguals, F(1,48)=7.63, p=.008. These findings suggest word learning in bilingual children is more effortful than in monolingual children. Taken together, these results show that different language experience results in differential engagement of neural mechanisms during vocabulary acquisition in school-aged children. |
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| 17:10-17:30 | Coffee break |  |  |  |
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| 17:30-18:30 | Invited talk 4 | Robert Hartsuiker (Ghent University) | Development of shared syntax: results from artificial language learning | When bilinguals process a sentence in one language, they tend to reuse the same sentence structure when producing another sentence in their other language. Such cross-linguistic structural priming is larger in more proficient bilinguals (Bernolet et al., 2013), suggesting a developmental trajectory from specific syntactic representations for each language to more abstract representations that are shared across languages (Hartsuiker & Bernolet, 2017). We report a series of studies that tested this account. In these experiments, participants learn an artificial language (AL) in the lab, allowing us to exert full control over the characteristics of that language, the participants' prior knowledge of the language, and the characteristics of the learning situation. A first study, using an AL with similar syntax to Dutch, demonstrated that participants can quickly learn to formulate and comprehend a number of sentences in the artificial language (i.e., within one testing session), and that they show structural priming within the artificial language and between a natural language (Dutch) and the artificial language from the first day of testing onwards. Cross-linguistic structural priming emerged earlier for transitives than for ditransitives. Study 2 varied AL syntax: one version resembled Dutch (SVO order in the main clause, no case marking), one version had a different word order (SOV), and one had case marking. There was cross-linguistic priming between Dutch and each AL, suggesting that syntactic sharing involves representations that are abstract across important variations in form. Study 3, currently in progress, tests whether the presence of AL syntactic alternatives that are more (SVO) and less (SOV) similar to Dutch, prevents syntactic sharing (and hence cross-linguistic priming) between the less similar structure and Dutch. I will discuss the implications of these findings for our developmental account and if time permits sketch a new research line that investigates second-language syntactic development under ecological valid circumstances (i.e., in recently arrived immigrants). |
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| POSTERS: |  |  |  |  |
|  | 1 | Zhenguang Cai (The Chinese University of Hong Kong), Nan Zhao (University of Essex) | The sound of gender: Inferring the gender of names in a foreign language | Much research on sound symbolism has shown that some aspects of word meaning are linked to phonology. For instance, people tend perceive a name as a female one if it is longer, has stress on a later syllable, or ends with a vowel rather than a consonant. It is yet unclear whether people also use sound-symbolic cues to infer name gender from phonology in a foreign language they don’t speak. In three experiments, native speakers of English and German listened to real personal names in Min, a south China language that our participants had not been exposed to, and rated to what extent a name sounded male/female. Compared to real female names, real male names were rated more male-sounding by both English and German speakers in a consistent way. Further exploratory analysis showed that male names in Min, compared to female names, are more likely to have consonant-ending syllables and English- and German-speaking participants happened to make use of this sound-symbolic cue in gender judgement. These results show that people are able to make use of sound-symbolic cues to infer the gender of personal names even in a language they don’t speak. |
|  | 2 | Haoruo Zhang (University of York), Norbert Vanek (University of York) | From ‘No, she does’ to ‘Yes, she does’: Conceptual changes in Chinese-English bilinguals reflected in the processing of negation in negative yes-no questions | In response to negative yes-no questions (Doesn’t she like cats?), typical English answers (->Yes, she does/No, she doesn’t) peculiarly vary from those in Chinese (->No, she does/Yes, she doesn’t). The English system is known as polarity-based and the Chinese as truth-based [1]. If these two systems vary in processing difficulty [2], language-specific patterns are predicted to arise when English and Chinese speakers process negative questions. This could extend to a comparable nonverbal analogue [3]. And if English and Chinese speakers process negation differently, to what extent do processing routines change in Chinese-English sequential bilinguals? Chinese-English bilinguals, English and Chinese monolinguals (N=40/group) were tested in a verbal experiment (Expt.1). The task was to answer positive/negative questions with time-measured yes/no button presses. The same participants were first tested in a nonverbal experiment (Expt.2), agreeing (press “↑”) or disagreeing (“↓”) with positive/negative equations using “=”/“≠” symbols (e.g. ▲≠■). For between-experiment comparability we converted yes-no questions into two geometric shapes and positive/negative polarity into ‘=’/‘≠’ symbols. In Expt.1, bilinguals, like English monolinguals, were slowed down significantly less than Chinese monolinguals (β=-917.11, p<.001) by negative questions compared to positive questions. These results suggest approximation of bilinguals to English-like processing of negation in negative questions. In Expt.2 too, bilinguals and English monolinguals were slowed down significantly less than Chinese monolinguals (β=194.98, p=.001) by negative equations compared to positive equations. These results are interpreted as evidence for earlier observed high level of flexibility in conceptual organization in the bilingual mind [4], which also extends to negation processing. |
|  | 3 | Keerthi Ramanujan (University of Hong Kong), Jubin Abutalebi (University Vita Salute San Raffaele) | Language Distance & Bilingual Language Control | The experience of being bilingual is not uniform or identical. Bilinguals differ from each another in the age of bilingualism-onset, relative language proficiency, exposure, immersion etc. Such heterogeneity among bilinguals is important because variation in these experiential dimensions generates different language control needs. This can in turn give rise to different functional and/or structural adaptations in the neural network affording language control. |
|  | 4 | Alena Nemtinova (Lomonosov Moscow State University, The Institute of Asian and African Studies) | Study of the characteristics of the oculomotor activity at the stage of internal speech of bilinguals in the translation process from Chinese | The paper deals with issues related to the study of the characteristics of the oculomotor activity at the stage of internal speech when interpreting the written text of bilinguals who speak Russian as a natural language and Chinese as acquired. The ability of subjects to identify the grammatical structure in sentences in Chinese with unfamiliar and familiar vocabulary when reading in the period from the moment text appears on the monitor screen until the beginning of a speech utterance (interpretation) in Russian had been studied. When reading texts in Chinese of varying complexity, the subjects recorded an oculomotor activity using a contactless remote-controlled infrared camera. (SMI –SensoMotoricInstruments iViewX™REDRemote). Experimental data were analyzed, including quantitative indicators of oculomotor activity, trajectory of gaze movement and interpretation protocols. The paper shows the dependence of the parameters of oculomotor activity on the level of grammatical and lexical complexity of the text. The subjects with a full understanding of the read text quantitative indicators of oculomotor activity are significantly higher compared with the subjects with a partial understanding of the text. The inclusion of unfamiliar vocabulary in sentences in the subjects with a full understanding of the text does not affect the ability to identify the grammatical structure of sentences, which is confirmed by the analysis of the trajectories of gaze movement. Subjects with a partial understanding of the text with the inclusion of unfamiliar vocabulary showed a tendency for omissions of the principal parts of the sentence, function words, and an increase in the time of fixations on familiar words and returns to them. |
|  | 5 | Toms Voits (University of Reading), Holly Robson (University of Reading), Jason Rothman (UiT the Arctic University of Norway, Universidad Nebrija), Christos Pliatsikas (University of Reading, Universidad Nebrija) | Bilingualism as a source of brain structure variability in ageing: an MRI study | Bilingualism has emerged as a contributing factor to changes in brain structure and function. The act of mental control over two (or more) languages leads to dynamic restructuring of brain areas responsible for bilingual language control and domain-general cognitive control (see Pliatsikas, 2019 for review). In addition, recent research has shown gains in revealing what aspects of bilingualism (e.g., patterns of language use, years of immersion in L2 environment, etc.) matter most for brain/mind adaptations by treating bilingualism as the dynamic, fluid variable it is (DeLuca et al., 2019). To date, however, there is no research examining individual differences in older bilinguals. The present study fills this gap by evaluating the effects of individual bilingualism factors on brain structure in advanced aged/ageing populations. We tested 41 older (age range 49-84) participants (18 monolingual and 23 bilingual). The participants provided measures of language experience by completing the Language and Social Background Questionnaire (LSBQ; Anderson et al., 2018), completed a cognitive testing battery tapping into various executive functions, and underwent MRI scanning of their brains. Data is currently being analysed. We employ various language background factors as continuous variables and predictors of cortical and subcortical grey matter structural changes in ageing. In line with the neural reserve hypothesis (Perani & Abutalebi, 2015), preliminary analyses suggest higher levels of bilingualism predict differences in cortical grey matter and subcortical structures implicated in bilingualism. |
|  | 6 | Laurie Beth Feldman (The University at Albany, State University of New York), Vidhushini Srinivasan (Quantcast Bellevue, WA), Fermin Moscoso del Prado Martin (Alpha Barcelona, SP), Samira Shaikh (UNC Charlotte) | Lexical Diversity in Monolinguals and Bilinguals: A New Perspective on Cognitive Processes from Social Media Data | Online communication provides an under-investigated context in which to examine communication among bilinguals. We use information-theoretic measures to explore patterns of vocabulary richness based on language diversity and emoji use in monolinguals and bilinguals when they communicate online. We analyze large-scale corpora collected from social media, in the context of two different crisis events of global significance. We report that Tweets from Spanish-English bilinguals show reduced lexical diversity relative to tweets from English or Spanish monolinguals. We also demonstrate that while monolinguals exhibit greater vocabulary richness than bilinguals, emoji use affects lexical variation in monolinguals and bilinguals comparably. Finally, we compare the general pattern for diversity with that of phrasal verb combinations (e.g., LOOK INTO, LOOK AFTER, LOOK FOR) in bilinguals as compared to monolinguals. |
|  | 7 | Carmela Chateau Smith (University of Burgundy) | Down Syndrome, Deafness, and Bilingualism | A case study of bilingualism in a young woman with Down Syndrome. Providing access to both languages is a coherent choice for parents with different language backgrounds (here, the father is French, the mother is English and the family lives in France). The eldest child (a boy) began speaking in both English and French at the age of 12 months. A frequent question was "What is it?". The second child (also a boy) did not speak until the age of 2, after the birth of the third child (a girl with Down Syndrome). Both sons are fluent in both English and French, and both became English teachers in France. The daughter's language development was slow, and the speech therapist blamed bilingualism (mainly the use of English by the mother) for the delay. Later analyses showed that a bilateral hearing deficiency, at a frequency of 2000 Hz, was the main cause of the daughter's language difficulties, notably with relation to the perception of consonants in French. As most tests of intelligence are language-based, it was difficult to assess the daughter's cognitive development adequately. The problem was further compounded by an unrelated medical condition, congenital hypothyroidism (dysgenesis), which may also lead to cognitive impairment without proper treatment by levothyroxine. Fortunately, the child was able to learn to read and write, which has compensated to some extent for the speech problems. |
|  | 8 | Sara D. Beck (University of Tübingen), Andrea Weber (University of Tübingen), Michael Erb (University of Tübingen), and Alexander M. Rapp (University of Tübingen) | Native and Non-native Idiom Comprehension: An fMRI Study | Idioms, multi-word units with figurative meanings, challenge theories of language processing for native (L1) and non-native (L2) speakers. Unclear is whether meaning activation is more similar to literal composition or word-like meaning retrieval, and even less clear is whether this process is the same for L1 and L2 speakers. While some authors propose differences in L1 and L2 idiom comprehension (e.g., Cieślicka, 2006), with L2 processing following a more literal, compositional strategy, others have not found such differences (e.g., Beck & Weber, 2016a). Current L1 functional magnetic resonance imaging (fMRI) data indicates that there may be different neurophysiological activation in literal and figurative phrases, including hemispheric differences (e.g., Rapp, 2019), but there is not yet comparable L2 data. If L1 and L2 processes differ, we also expect language-based differences in brain activation. Using fMRI, we investigated these assumptions by comparing meaning activation between literal and idiomatic meaning in and between L1 and L2 speakers. Imaging data were collected using a 3 Tesla Siemens Tim Trio scanner and analysed using SPM 12 software. Thirty healthy, right-handed native English (13) and highly proficient non-native German (17) participants were presented with short, non-biasing sentences containing English idioms or equivalent literal phrases (e.g., She just went to pieces/London.) in two stimuli blocks. A total of 40 idioms were used as stimuli, all highly familiar to L1 and L2 speakers of English (Beck & Weber, 2016b). Preliminary results suggest differences between conditions and groups, and final data will be discussed within L1 and L2 processing frameworks. |
|  | 9 | Opangienla Kechu (Indian Institute of Technology, Guwahati), Bidisha Som (Indian Institute of Technology, Guwahati) | When differences are part of life, you don't see them: Is adaptive control aided by diversity? | The heterogeneity of the bilingual experience in terms of proficiency, language dominance, age of acquisition, interlocutor, etc. typically point towards a facilitating or inhibiting impact of these variables on the behaviors of the bilingual person. The current study investigates a less studied domain of bilingual processing: the non–WEIRD population, with similar proficiency/dominance living in mixed socio-cultural fabric. We report the findings of a translation recognition task carried out on two indigenous bilingual groups, namely Sangtam [L1=Sangtam, L2=Ao] and Ao [L1=Ao, L2=Sangtam] from India’s northeast. The participants were presented with a stimulus pair and asked to respond if the second word was a translation of the first one. The task was carried out in both single language and mixed blocks and in both language directions. The crucial manipulation was the insertion of a culturally significant image between the two stimuli: a dress belonging to either Sangtam or Ao tribe, resulting three types of conditions: congruent [dress matched target language], incongruent [mismatch between image and target language’s word] and neutral [trees, river etc]. The findings failed to show any significant difference in reaction time, in terms of conditions, language direction or group type. The result point to the possibility that bicultural-bilingual experience can result in higher inhibitory control as they adapt their language control network according to the demands placed on them. This suggests that different interactional context may show/shape adaptive response, in this case, constant switch between languages/participants perhaps leads to limited interference of salient feature like the culture cues. |
|  | 10 | Gustavo Lopez Estivalet (Federal University of Paraiba, Brazil), Fanny Meunier (Centra National de la Recherche Scientifique, University of Nice Sophia Antipolis, France) | Bilingual word recognition through morphology: lexicon organization and structure processing | Word recognition and morphological processing have been broader researched subjects in psycholinguistics and bilingualism. Dual-mechanisms models with full-entry representations and rule-based processing routes are frequently suggested to explain the behavior in late bilinguals, accounting for the differences between declarative and procedural memories. Nevertheless, the combinations between stems and inflectional suffixes in the verbal systems from different Romance languages present great consistency and regularity among them. Therefore, bilinguals with the same Romance verbal system in both languages might recycle their L1 mechanisms for L2 processing. The objectives of the present study were: i. verify the sensibility of the verbal frequency norms for L2 speakers, and ii. evaluate their morphological processing on pseudoverbs. We investigated L2 French speakers who have Brazilian Portuguese as their L1 by using two experiments with visual lexical decision tasks, one with surface and cumulative frequency effects, and another with morphological violations in verbal structures. Experiment 1 showed that advanced L2 speakers were sensitive to the surface and cumulative frequency norms, while beginner speakers were not. Experiment 2 indicated that late L2 speakers have a similar behavior than native speakers when processing pseudoverbs. Our results presented significant differences between beginner and advanced L2 speakers regarding their lexicon organization and declarative memory. However, no differences were found when considering verbal stricture processing through the procedural memory for word recognition. Overall, our results speak in the direction of a rule-based single-mechanism model for morphological processing in speakers with L1 and L2 from the same verbal systems. |
|  | 11 | Hye-Jin Seo (Dongguk University), Jeong-Ah, Shin (Dongguk University) | How L2 syntactic adaptation and lexical boost are modulated by word levels | This study examined L2 syntactic adaptation (i.e., cumulative structural priming effects) and lexical boost during comprehension by manipulating difficulty levels of the target verb in English reduced relative clauses (e.g., “The girl hugged by the grandparent felt safe and warm.”). 57 Korean learners of English participated in a self-paced reading experiment; they sequentially read two sentences (prime-target pairs) which were temporarily ambiguous sentences with two conditions (same verbs vs. similar verbs—also, the similar verbs were further divided into two levels—difficult vs. easy verbs) and answered a comprehension question for each item. Linear mixed-effects models were used to analyze the accuracy of comprehension questions and RT of the verb region (i.e., “hugged”) and the disambiguation region (i.e., “by the grandparent”). For the accuracy data, significant differences of lexical boost were found between the difficult and easy verbs conditions depending on the participants’ proficiency levels (β = -0.482, SE = 0.210, z = -2.289, p < .05), indicating that the participants with low proficiency showed weaker lexical boost effects for difficult lexical items than easy lexical items. For RT data, there is a marginally significant interaction between word level and proficiency in the verb region (β = -.046, SE = .027, t = -1.690, p = .091) and the disambiguation region (β = -.028, SE = .016, t = -1.787, p = .074). The participants with low proficiency tended to take a longer time to read the target sentences with difficult verbs than those with easy verbs. This study suggests that L2 learners of English were influenced by lexically specific mechanisms like L1 (e.g. MacDonald et al., 1994; Wei et al., 2017), and word levels can play an important role in L2 learners’ comprehension in terms of lexical boost and syntactic adaptation unlike native speakers. |
|  | 12 | Yuko Hijikata (University of Tsukuba) | The use of implicit causality information in L2 reference processing | When we identify what the pronouns refer to in Roy questioned Anthony because he … or Susan praised Diane because she …, our processing is affected by the verbs’ implicit causality information. The verb question makes the pronoun he refer to Roy (NP1-biased), while praise tends to make she refer to Diane (NP2-biased). Such implicit causality verb bias has been examined focusing on native speakers (e.g., Järvikivi, Van Gompel, & Hyönä, 2017), but it has not garnered much attention in second language (L2) processing. Therefore, this study examined the influence of implicit causality information on L2 anaphor resolution. Twenty-seven Japanese university students participated in this study. Their English proficiency ranged from beginner to intermediate. The participants were assigned to one of four conditional groups, and each group was provided with a different set of materials. They read 60 sentences, including NP1-biased verbs and NP2-biased verbs. The experimental sentences were simplified from Stewart et al. (2000) so Japanese learners of English would experience no processing difficulty. Each verb was used twice so it would be possible to compare two versions, congruent and incongruent, with the verb bias. After respondents read each sentence, they answered a comprehension question. The participants’ processing times were recorded in milliseconds using SuperLab 4.5. This study revealed that L2 readers processed congruent sentences significantly faster than incongruent sentences, regardless of pronouns or proper nouns and regardless of NP1 bias or NP2 bias. Therefore, this study supported the integration account. |
|  | 13 | Sarah von Grebmer zu Wolfsthurn (Leiden University), Leticia Pablos Robles (Leiden University), Niels Schiller (Leiden University) | Cross-Linguistic Gender Interference in L2 Learners: The Effects of Cognate Status and Gender Congruency | In early acquisition stages, access and retrieval of L2 representations are strongly linked to the L1 lexicon. A resulting perpetual challenge for L2 learners is the cross-linguistic interference between the two languages due to parallel activation. This study systematically explores cross-linguistic interference effects on L2 processing of gender in German-Spanish learners by combining EEG techniques with behavioural measures to track the temporal unfolding and the effects of interference. L2 gender acquisition poses a persistent challenge to learners. We aim to inspect the facilitating, but also the obstructing processes underlying gender processing and acquisition. More specifically, we examine the role of cognate status and gender-congruency as potential modulators of interference. Presently, no study has directly examined whether both cognate status and gender-congruency regulate gender interference effects, and what the implications are for L2 Spanish gender attainment. Participants were asked to complete a picture-naming task and a syntactic violation paradigm task, while their EEG was recorded. We manipulated cognate status (cognate versus non–cognate) and gender-congruency (congruent versus incongruent across L1 and L2) of Spanish stimuli. For both tasks, we modelled ERP amplitudes (N200 indexing L1 inhibitory mechanisms, P600 indexing semantic and syntactic violations), naming accuracy and latencies. If both cognate status and congruency influenced cross-linguistic interference, we expected an interaction between the cognate facilitation effect and a gender-congruency effect. The results are highly relevant for highlighting L2 processing and gender acquisition mechanisms. They allow us to characterise the driving forces of gender processing and are therefore invaluable to educational practises. |
|  | 14 | Vasundhara Srivastava (Indian Institute of Technology Guwahati, Assam, India), Bidisha Som (Indian Institute of Technology Guwahati, Assam, India) | Stepping ahead or tracing back while language switching: Examining the switch-cost through self-paced reading in Hindi-English bilinguals | Most empirical evidence on switch cost in bilingual sentence comprehension has reported asymmetrical switching costs using languages with same and different scripts. This study investigates two prominent issues in the occurrence of switch costs in bilingual sentence comprehension. First, the presence and the magnitude of cost when languages with different script are used. Second, how absence and presence of switch costs can be modulated by cross-linguistic differences interacting with the age of acquisition and proficiency. A self-paced reading task (N=35) was conducted involving twenty-four passages which were excerpts from movies in order to make the stimuli realistic and natural. The passages were presented in two unilingual and two mixed conditions, the mixed conditions switched between participant’s L1 Hindi and L2 English and vice-versa. Keeping the word count constant throughout the experiment, reading time was calculated for each of these conditions. The switch-costs and composite reading time for mixed condition were calculated by using the method adopted by Macnamara and Kushnir while isolating input switch. The findings reveal the absence of switch-cost in forward and backward direction. Interestingly, task-set inertia for bilingual production was observed in bilingual sentence comprehension. The results were interpreted in terms of the development of an unreactive inhibitory mechanism irrespective of cross-linguistic differences, which is a consequence of high proficiency more than the age of acquisition (most of the participants were late high proficient bilinguals). Theoretically, the obtained pattern of results helps to identify the factors responsible for transformation of high-proficient bilinguals to ambilinguals. |
|  | 15 | Ekaterina Stupina (National Research University Higher School of Economics, Moscow), Anna Chrabaszcz (National Research University Higher School of Economics, Moscow; University of Pittsburgh) | The effect of L1 grammatical gender on the acquisition of grammatical gender in a novel language | Although grammatical gender incongruency effects in bilingual speakers have been demonstrated in a variety of tasks (Morales et al. 2016; Paolieri et al., 2010; Salamoura & Williams, 2007), the exact nature of such interference is poorly understood. The present study tests a hypothesis that gender incongruency effects arise after the newly acquired gender information has been integrated with the existing lexico-semantic representations. In the current study native speakers of Russian (which has grammatical gender) learn an artificial language (AL) with a phonologically transparent grammatical gender system. At the training phase, participants learn the grammatical rule for gender assignment in the AL (ending -e indicates feminine gender, -u ‒ masculine) and are introduced to AL words through L1 translations. Half of the words are gender-incongruent. Participants are then tested on the acquisition of AL words immediately after the training and two days later to allow for memory consolidation to happen. Gender incongruency effect is measured using a 2AFC task, in which participants select a previously learnt word out of the two provided. Both words have the same stem, but different endings (gender-congruent or incongruent). We expect participants to make more errors and to be slower in the gender-incongruent condition after a delay but not immediately after the training, which would provide first evidence that gender information of newly acquired words interacts with the existing lexico-semantic representations during memory consolidation. |
|  | 16 | Tomás Goucha (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany), Helyne Adamson (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany), Alfred Anwander (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany), Matthias Schwendemann (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany), Martin Lisanik (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany), Angela D. Friederici (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany) | Early brain changes while learning a second language - Relearning how to listen, read, and learn, from words to sentences | Brain plastic changes in second language acquisition do not show a clear pattern with many brain regions shown inconsistently in different phases of learning. Here, we assessed changes in white matter microstructure along the first three months of learning German as a second language in an immersive context. In this first phase of L2 learning, item-based learning by chunks plays a fundamental role. Participants only acquire more creative skills including the internalisation of productive rules towards the end of this phase, which is rarely observed in immersion. Concurrently, we acquired well-established measures of language aptitude, and executive function, and the participants also took part in an L2 fMRI experiment. We found longitudinal changes in diffusivity measures not only in typical language regions, but also in subcortical grey matter and in the brain stem, with a clear right predominance. We also found the involvement of primary sensory and motor areas. In agreement with these results, the fMRI task also presents less lateralised brain activations. Besides, we found changes in areas responsible for cognitive control, together with areas in the auditory and visual pathways, and dopaminergic regions. Additionally, we observed that fluent sequential bilingualism previous to the study was associated with better word learning skills, being an overall good predictor of success. Skills involved in word learning were shown to be central in this early phase. Measures of proficiency obtained from spontaneous language production of the participants were furthermore the best indicators of brain changes, especially in typical language-related brain regions. |
|  | 17 | Jasmijn Bosch (University of Milano-Bicocca), Francesca Foppolo (University of Milano-Bicocca), Mathilde Chailleux (University of Milano-Bicocca) | Bilingual processing of grammatical gender | People process speech incrementally, anticipating upcoming information on the basis of linguistic cues. One important morphosyntactic cue is grammatical gender, which monolingual children use rapidly in spoken word recognition. However, adult bilinguals appear to process grammatical gender differently, and transfer effects have been reported when there is gender incongruency between two languages. Our study contributes to this debate by focusing on bilingual children. We tested 44 Italian-German bilingual children aged seven to nine (M = 8;5), using a visual world eye-tracking paradigm. Participants were presented with two pictures that either matched or mismatched in gender, accompanied by the sentence Dov’è la/il…? ‘Where is the…?’. The items varied with respect to gender (in)congruency in German and Italian, so as to detect cross-linguistic influence in anticipatory patterns. Hypothesizing that children process speech incrementally, we expected participants to anticipate looks at the target on the basis of the gender of the article. Hypothesizing that there is cross-linguistic influence, we further predicted that anticipation might be delayed when German and Italian translation equivalents have the opposite gender. A significant increase of looks toward the target during the article in the predictable but not in the unpredictable condition indicated anticipation based on gender. This effect was smaller in the gender incongruent condition, suggesting cross-linguistic influence. Furthermore, both prediction and transfer were modulated by vocabulary knowledge. These results suggest that while bilingual children process speech incrementally, properties of one language may influence processing of the other, even when children are tested in their dominant language. |
|  | 18 | Pamela Freitas Pereira Toassi (Universidade Federal do Ceará), Bernhard Angele (Bournemouth University), Elisangela Nogueira Teixeira (Universidade Federal do Ceará) | Disentangling orthographic similarity from semantic overlap in cognate facilitation effect | There is ample evidence that multilinguals process cognates faster than non-cognates (Lemhöfer, Dijkstra, & Michel, 2004). However, it is not clear whether this facilitation effect is due to orthographic similarity or due to the semantic overlap between the representations of the cognate in each language. We present an eye-tracking study in which Brazilian Portuguese/Spanish/English multilinguals of different proficiency levels read English sentences containing cognates (e.g. “error”), “false friends” which appear to be cognates but have a different meaning (e.g. English “exit” and Portuguese/Spanish “êxito/éxito”, meaning “success”), and non-cognate control words. In order to force readers to rely more on top-down language knowledge, we introduced a condition in which the sentences were visually degraded. We found lower gaze durations on the target word when it was either a cognate or a false cognate compared to the non-cognate control, but no significant difference between cognates and false friends, suggesting that, in early processing, visual familiarity with the cognate/false friend was responsible for the facilitation. However, there was a significant difference between cognates and false friends in total viewing time, indicating that readers are sensitive to the semantic mismatch in later processing. This effect was stronger the higher a participant’s proficiency in English and Spanish was. Finally, there was a main effect of the visual noise manipulation, but it did not interact with the cognate manipulation. |