

## ABSTRACT BOOK

International Online Conference  
of Psycholinguistic and Neurolinguistic Research:  
Methods, Materials, and Approaches

# PSYNEUROLING

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- University of Salamanca of Spain
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17 DECEMBER 2020

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## Effect of education on cognitive and communicative abilities in mild dementia: Preliminary study from India

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**Background:** There is mixed evidence available on effect of education and bilingualism on cognitive-communicative abilities in dementia across disease-progression stages. Indian bilingual heterogenous cultural dementia population presents with intricate cognitive-linguistic skills which needs to be investigated for effective neuro-rehabilitation.

**Aim & Objective of the study:** To study the relation of education and cognitive-communicative skills in persons with mild dementia and control group.

**Method:** This cross-sectional study comprised of 12 Marathi-speaking individuals with mild neurodegenerative dementias, who fulfilled the inclusion criteria and 12 age, gender & education-matched controls (mean-age 68 years, mean education 12.5 years). All participants were administered on CDR, ACE-III (Marathi), Test of Cognitive-Linguistic Abilities in Marathi (TOCLA-M) and Instrument to Assess Communicative Effectiveness in Marathi (IACE-M).

**Results:** A difference in the cognitive-communicative performance across the tests was observed between the control and dementia groups. Statistical analysis agreed with literature revealing that there is a significant relation between education and cognitive-communicative skills of PWD ( $p < 0.005$ ). 68% PWD had poor topic maintenance, delayed story recall & episodic memory deficits, poor theory of mind related to personal information with preserved immediate recall & confrontation naming. About 60% of mild dementia population was found to have certain cognitive neuropsychological impairment including memory, connected speech breakdown and cognitive communicative morbidity related depression related to their understanding of progressive dementia (VaD > AD > FTD > PD). About 40% of the poor-literate dementia population showed regressed abilities in performance of their second language (Alladi, S, et al., 2013) but preserved spiritual related communication effectiveness.

**Conclusion:** The present study demonstrated a strong relation between education and cognitive-communication abilities in persons with mild dementia, with differences between the vascular and non-vascular dementias. Bilingual proficiency, biliteracy in connected speech, episodic memory tasks, and verbal fluency were significantly affected among PWD than healthy aging.

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**Key Words:** Dementia, Cognition, Communication, Education

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## Cognitive and communicative reserve in bilingual biliterate lady with Alzheimer's dementia: A case study

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**Introduction:** Alzheimer's disease (AD) is a neuro-degenerative disorder which causes cognitive-behavioural-communicative dissolution following degenerative changes as disease progresses. Though, SLP plays a vital role in assessment and intervention of cognitive-communicative and safe-swallowing abilities throughout the disease progression, it's not well-accepted and understood, thus remains underutilized in Indian neuro-rehabilitation. Literature has proven that detailed connections of narrative abilities in dementia disease-progression across spoken and written modalities can help address cognitive-communicative breakdown and determine the factors influencing cognitive reserve, and that cognition and language go hand-in-hand.

**Aim & Objectives:** To profile cognitive-linguistic and communicative abilities and explore cognitive and communicative reserve in a bilingual biliterate lady with Alzheimer's disease, pre- and post-intervention.

**Method:** A 65-year-old non-depressed healthy and active lady with recent memory loss, was evaluated at Memory clinic at BV(D)U, SASLP, Pune. A series of cognitive-communicative test batteries (CDR, ACE-III-M, Instrument to Assess Communicative Effectiveness in Marathi [IACE-M], Connected speech tasks, WHODAS 2.0) were administered and effective tailor-made neurorehabilitation was executed.

**Results & Discussion:** Pre-intervention, Mid therapy (post one-year) and Post therapy (post 2-years) comparative profiling revealed interesting findings in this biliterate lady. Cognitive-communicative rehabilitation helped in her ADL, everyday memory skills and bilingual active work-up showing a positive impact enhancing cognitive reserve and literacy in the 2.5 years of MCI-moderate AD journey. Social communication and retrieval abilities in connected speech was markedly deteriorating with L2 proficiency. Everyday communication abilities remained less affected than extra-linguistic abilities in Pre- and Post-2 years intervention. However, the progression of the disease and cognitive morbidity was quite slow, indicating a good cognitive reserve, as cognitive activity strengthens the functioning and plasticity of neural circuits (Cheng, 2016).

**Conclusion:** Narrative abilities and cumulative cognitive-communicative performance can help understand cognitive reserve and the factors associated. Education and active bilingual cognitive-communicative rehabilitation with SLP services can be yielding.

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**Key Words:** Dementia, Cognition, Cognitive-Communicative rehabilitation, Cognitive reserve

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## Communicative Guidelines for Caregivers of People with Dementia: A Decalogue

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Every passing year we further our knowledge on patterns of language impairment in people suffering from dementia (see, among others, Cummings, 2020; Davis & Maclagan, 2020; Ivanova et al. 2020). However, it is not unusual that these data stay within the scientific community and caregivers cannot use this information to improve their communicative practices with those beyond their care. Even if there are several published guidelines for dealing with Alzheimer's Disease (see, for example, NHI, 2019; Alzheimer's Society, 2020), communication is not dealt with therein in depth. Moreover, we have found no communicative language guidelines for caregivers in Spanish that were written from a scientific approach or based on data from the field of linguistics. Taking this into account, this paper aims to establish a bridge between research and caregivers, by designing a decalogue with communicative guidelines for successfully interacting with people with dementia. In order to do so, a vast review of the literature on this topic will be conducted and ten rules are going to be devised purely based on research data. The results will be presented as an infographic, with the purpose of making this work more attractive for readers and improve its possibilities of being spread outside the academic world. Our results intend to provide help to all those people out there taking care of someone with dementia, who sometimes do not know how to talk to them or help them be understood. This work also aims to lay the foundations for an eventual comprehensive manual on communicative practices for caregivers.

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**Keywords:** dementia, Alzheimer's Disease, decalogue, guidelines, caregivers.



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## Humor and dementia: what can the type of neurodegeneration tell us about pragmatic competence in human language?

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This work analyses the impact of neurodegenerative processes with three different neural loci -Alzheimer's disease, frontotemporal dementia and semantic dementia- on the pragmatic ability of patients to understand verbal and non-verbal humour. Impairment in humour consists in the difficulty of speakers with neurodegenerative diseases to properly decode language symbols with social and emotional background. In different types of dementia, histopathological processes can unchain uneven language, cognitive or sociocultural dysfunctions, and it is the purpose of this work to outline positive correlations between specific neurocognitive loss and pragmatic disruption. Pragmatic competence does not specifically form part of the language structure itself and, contrarily to other language levels -like phonetics, morphology or syntax- is frequently described as a detractor of the language retrogenesis model for dementia. In the present research we seek to prove that the way in which humour, as a pragmatic subcompetence, is affected in different types of dementias actually points in two directions: (i.) the necessity to exclude pragmatic competence from retrogenesis model, but also (ii.) the necessity to access language structure impairments in dementia through pragmatic competence assessment. The present work is based on a solid review of the state-of-art literature on humour impairment in dementia and on the qualitative analysis of humour perception and production in persons with different types of dementia as accessible through different language production database (*PerLA*, *Aphasia Bank*, *Corpus lingüístico de definiciones de categorías semánticas de personas mayores sanas y con la Enfermedad de Alzheimer*).

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**Keywords:** Dementia, Alzheimer's disease, humour, pragmatic competence

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## Oscillatory tracking of syntactic structure and cross-linguistic variation

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Oscillatory tracking of syntactic structure and cross-linguistic variation Jordi Martorell<sup>1</sup>, Simona Mancini<sup>1</sup>, Nicola Molinaro<sup>1,2</sup> & Manuel Carreiras<sup>1,2,3</sup> <sup>1</sup> Basque Center on Cognition, Brain and Language (BCBL), Donostia-San Sebastián, Spain. <sup>2</sup> Ikerbasque, Basque Foundation for Science, Bilbao, Spain. <sup>3</sup> University of the Basque Country UPV/EHU, Bilbao, Spain. Contact: j.martorell@bcbl.eu Recent findings suggest that neural oscillations track syntactic structure by aligning to the rhythmic presentation of syntactic units (phrases and sentences) during continuous speech perception (Ding et al., 2016). Despite the replicability of these findings in other languages (e.g., Makov et al., 2017), the linguistic constructions under study always had equivalent syntactic properties regarding their word order. Specifically, they were head-initial (subject-verb-object) structures and, therefore, it is still unknown whether syntax-tracking effects also generalize to other languages with head-final (subject-object-verb) configurations. In this magnetoencephalography study, we investigate oscillatory tracking of syntactic structure from a cross-linguistic perspective, focusing on word order as a prominent aspect of variation across languages. Our aim is to assess how such word-order characteristics modulate syntaxtracking in head-initial and head-final languages like Spanish and Basque, respectively. Moreover, we test such word-order differences within the same group of Spanish-Basque bilinguals. To do so, we implement the same paradigm from previous studies, but in the visual modality, by rhythmically presenting sequences of written words containing different types of syntactic structures at certain frequencies. More concretely, Spanish-Basque bilinguals (n = 39) were presented with trials composed by word sequences, which repeatedly corresponded to three different syntactic structures: 1-word noun phrases, 2-word verb phrases, and 3-word sentences. Each syntactic condition was presented either in Spanish or Basque. Our sensorlevel oscillatory power results show that tracking at the frequency of phrases and sentences emerges similarly for both languages regardless of their word order. Moreover, despite their non-identical topographic distribution, these syntax-tracking signatures mostly extend over left-hemisphere fronto-temporal sensors, likely involving the classical language network. Interestingly, individual variability in certain bilingual variables seems to play a role in such oscillatory patterns. Thus, our results extend previous findings and suggest that syntaxtracking largely occurs in a similar manner for languages varying in word-order characteristics.

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**Keywords:** neurolinguistics; neural oscillations; sentence processing; syntax; magnetoencephalography

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## The effect of transitivity on cortical regions involved in action naming: evidence from navigated Transcranial Magnetic Stimulation

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**Introduction:** Navigated Transcranial Magnetic Stimulation (nTMS) can be used to understand the cortical representation of language in preparation for the surgical removal of a brain tumor. Next to the gold standard (i.e. object naming), action naming may be employed to provide additional information. Little research has focused on the properties of the verbs that are used in action naming tasks, such as their transitivity. Understanding verb transitivity may provide more accurate nTMS mappings because individuals with aphasia have more difficulties producing verbs with increased number of arguments, and neuroimaging studies connect the processing of transitive verbs with bilateral posterior perisylvian regions.

**Aim:** In the present study, we employed nTMS and action naming with finite verbs to investigate the cortical underpinnings of transitivity.

**Method:** Twenty neurologically healthy native speakers of German participated in the study. They underwent language mapping of both hemispheres with nTMS. The action naming task with finite verbs consisted of transitive (e.g., The woman waters) and unergative verbs (e.g., The woman winks). Errors were classified in four different error categories (i.e., lexicosemantic, non-linguistic, grammatical, sound level) and were analyzed quantitatively.

**Results:** We found more nTMS-induced errors in the left hemisphere, particularly in the left parietal lobe, during the production of transitive compared to unergative verbs. These positive points most commonly appeared in the context of lexicosemantic errors (e.g., anomias, semantic paraphasias, hesitations on the target).

**Discussion:** Our findings are in line with previous lesion and neuroimaging studies, suggesting that the production of verbs with a larger number of arguments is more prone to errors during nTMS. The higher number of lexico-semantic errors with transitive compared to unergative verbs in the left parietal lobe supports previous claims for the role of left posterior areas in the retrieval of argument structure information.

**Keywords:** action naming, navigated Transcranial Magnetic Stimulation, transitivity, argument structure, parietal lobe

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## The Contribution of the Motor and Auditory Cortex in Priming Action and Sound Verbs: A Pilot Study

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**Introduction.** According to embodied cognition theories, concepts are represented in sensory and motor brain systems (i.e., somatotopic representation). In that regard, action verbs (e.g., to push) have higher association with motor features, whereas sound verbs (e.g., to snore) with auditory features. These representations can facilitate the processing of stimuli presented in a subsequent manner (i.e., priming effect).

**Aim.** This study assesses whether activation of the sensorimotor cortex, particularly motor and auditory cortex, differently influences the visual lexical-decision of action and sound verbs.

**Methods.** Seventy-five Russian-speaking healthy adults participated in the experiment. An online lexical-decision task with cross-modal priming was administered. Participants were presented with meaningless and general primes such as a video clip of a moving hand (i.e., hand prime), a bike bell sound (i.e., sound prime), or a static video clip (i.e., neutral prime). After that, they saw a verb (i.e., action verb, sound verb, pseudoverb) and they had to decide whether or not it was a real word (i.e., lexical decision) by pressing a button on the keyboard.

**Results.** Linear mixed effect models indicated no priming effects between hand prime and action verbs, nor between sound prime and sound verbs. However, action verbs were significantly more accurate than sound verbs.

**Discussion.** The results showed a somatotopic verb-motor priming effect for hand-related action verbs due to the manual response, which supports the contribution of motor cortex in the lexical decision of action verbs. The non-significant interactions between hand prime and action verbs, and sound prime followed by sound verbs might be due to the limitation of meaningless and general primes.

**Conclusion.** Our findings support embodied cognition theories and await further replication.

**Keywords:** embodied cognition, verbs, cross-modal priming, lexical decision, mirror neurons

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## Hemispheric Differences in Conflict Sentence Processing in Multilinguals

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Prior research suggests that early bilinguals exhibit left hemisphere involvement in language processing, while late bilinguals tend to be involved in gestalt processing<sup>1</sup>. Proverbio, Čok, and Zani (2002) found that bilinguals exhibited strong left hemisphere activation for the semantic violation and equal activation of both hemispheres for syntactic errors<sup>2</sup>. A recent study by Moreno, Bialystok, Wodniecka, and Alain (2010) discussed that bilinguals recruited both hemispheres for syntactic processing while monolinguals showed left lateralization<sup>3</sup>. Thus, there are mixed findings regarding the hemispheric involvement in sentence processing in bilinguals, and there have been no studies that examined conflict sentence processing in multilinguals so far. Considering this, the current study aimed to compare the relative role of the right and left cerebral hemispheres in sentence processing in monolinguals and multilinguals using electroencephalography (EEG). Sixteen healthy individuals participated in the study. The monolingual group comprised native English speakers, while the multilingual group comprised participants who were fluent in English and at least two other languages. The participants were involved in sentence judgment tasks (semantic acceptability and syntactic judgment). Semantic acceptability task was used to elicit N400 responses and syntactic judgment task to elicit P600 responses. Semantic violations elicit a negative waveform N400 around 400 ms post-stimulus onset, and syntactic violations elicit P600 around 600-800 ms post-stimulus onset<sup>3</sup>. The brain responses of the participants were collected using a 64-Channel EEG equipment. The hemispheric difference in sentence processing was analyzed by comparing the EEG waveform amplitude over the left and right frontal and parietal scalp regions. Preprocessing and post-processing of the EEG data was carried out using Net Station Tools Software. A three-way mixed-model ANOVA was carried out to analyze the hemispheric differences in sentence processing in monolinguals and trilinguals. The results suggest a strong left hemisphere involvement in all the participants.

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**Keywords:** Hemispheric Differences, Conflict Sentence Processing, Multilinguals, Electroencephalography

(9)

## Assessment of verbal fluency skills in Kannada-English speaking bilingual and Kannada speaking monolingual children in the age range of eight to ten years

Suma Raju & N.P. Nataraja

Verbal fluency is a commonly used neuropsychological test of language production, requiring subjects to name as many words as possible beginning with a specified letter or belonging to a certain semantic category. These tasks requires both language proficiency and varying levels of executive control during lexical retrieval in a language production task. Study aimed at investigating the verbal fluency skills in the incipient bilingual children with Kannada as the first language (L1) and English as the second language (L2) and Kannada speaking monolingual children in the age range of eight to ten years. For this purpose 120 monolingual and 120 bilingual children participated in this study, belonging to two age groups  $>8 \leq 9$  years ( $n=60$ ) and  $>9 \leq 10$  years ( $n=60$ ), with 30 male and 30 female children in each group. The study included two tasks, phonemic fluency task where the participant was asked to generate as many meaningful words as possible from a given syllable (three syllables were presented one after the other). The semantic fluency was assessed for two categories namely 'animals' and 'fruits'. The results showed that the monolinguals generated significantly higher number of correct words on phonemic fluency task when compared to the bilinguals and were significantly better than bilinguals in the task of semantic fluency. These findings indicates that the bilinguals may have a smaller overall vocabulary than the monolinguals in each language and this deficit may particularly affect the performance in category fluency test in case of the bilinguals.

**Keywords:** verbal fluency, phonemic fluency, semantic fluency, monolingual, bilingual

(10)

## Emotion Categorization based on Phrase Order Preferences in Bengali

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The conceptualization and expression of emotions, when given a particular syntactic structure, are known as construals (Croft & Cruse, 2004). When a certain experience is conceptualized, its components, namely stimulus, response and the associated emotion, are reflected in the construals used in the language. Based on six basic emotion types of *Happiness, Surprise, Anger, Sadness, Fear* and *Disgust* proposed by (Ekman, 1993), this study aims to find whether we can categorize emotions by virtue of their preferences of phrase orders patterns between the available construals in language describing an event involving some emotional component.

For this study, a SOV word-ordered Indo-Aryan language, *Bengali* (spoken in East-India), was considered. Data has been collected from 100 healthy native Bengali-speaking participants [50 male and 50 female, between ages 16 years to 57 years (mean age = 26.41 years, SD = 6.84 years)] after taking their consent. Construals of situations involving a Stimulus Phrase (*S-phrase*), a Response Phrase (*R-phrase*) and an Emotion Phrase (*E-phrase*) were presented and a grammaticality judgement test was carried out. Taking into account that stimulus always precedes response, the position of the *E-phrase* was varied sentence-initially (*ESR ordering*), sentence-medially (*SER ordering*) and sentence-finally (*SRE ordering*) for each of the six basic emotions.

	<i>S-phrase</i>	<i>E-phrase</i>	<i>R-phrase</i>
je	porikk <sup>h</sup> a-e      b <sup>h</sup> alo nombor pe-j-e	k <sup>h</sup> u <sup>i</sup> ho-j-e	nec <sup>h</sup> -e      ut <sup>h</sup> -l-o
	3.SG examination-LOC	get-CP	dance-CP rise-PST-3
	good marks	happy be-CP	
	'She danced in happiness after getting good marks in the exam.'		

*[SER phrase ordering]*

Results show that the SER ordering is the most preferred. The basic emotions could be categorized into two groups based on the number of orders permitted for a particular emotion. It was seen that the emotion fear is different with respect to the other five emotions. Statistical test results (ANOVA and post-hoc analysis) were found to be significant [p-value<<0.01]. It was observed that Bengali males show ESR ordering only for *Sadness* and *Surprise*. The findings of this paper indicate that based on relative ordering of emotion construal phrases in sentences, languages may have typological differences.

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**Keywords:** emotion phrases, preference patterns, basic emotions, phrase ordering, cognitive linguistics

(11)

## An acoustic and neural study of emotions expressed in Bengali speech: A Pilot Study

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The modalities involved in the processing of emotional speech acts in human brain is a material of quest for researchers across the globe. What are the prosodic cues which make a particular emotion conveyed through speech different from others? Are these prosodic cues universal, i.e. do they remain the same for the listeners belonging to other linguistic groups? In the present pilot study we wish to investigate the acoustic, psychological and neural cues involved in the expression of emotions in Bengali speech. For the purpose of our study we have decided to identify the characteristics of the speech signals (in Bengali language) corresponding to four different emotions expressed intentionally by a Male and a Female L1 speaker of Bengali Language viz, the states of Anger, Sadness, Happiness and Neutral. The acoustic feature extraction for the classification of emotional class would be done on the basis of measurement of parameters related to speech prosody, vowel articulation and spectral energy distribution which are considered as a function of emotion. An acoustic (Bengali Sentence/Speech) corpus of about 100 sentences that cover all four emotional states of Anger, Sadness, Happiness and Neutral at approximately 25 sentences per emotional state have been made. A human response study was conducted on 30 L1 Bengali speakers who were asked to identify the emotional content of each utterance/sentence on the basis of a 5 point Likert psychological scale. The psychological perceptual test gives the amount of emotional arousal expressed in each utterance. The acoustic similarities and dissimilarities on account of the different emotions being expressed has been studied by subjecting the aforementioned acoustic (speech) samples to linear as well as non-linear parametric analysis. Linear methods of spectral analysis such as MFCC (mel-Frequency Cepstral Coefficients) and LPC (Linear Predictive Coding), spectral centroid shall be compared with the results obtained from non-linear means such as DFA (Detrended Fluctuation Analysis) which is done to obtain Scaling Exponent or Hurst Exponent of the signal (where the amount of Long Range Temporal Correlations is a measure of the Hurst Exponent). Furthermore, a EEG study will be performed based on two volunteers (L1 speakers of Bengali) using the speech utterances of four different emotions as input stimuli. Robust EEG features such as signal complexity and ERP signatures would be evaluated to assess the response corresponding to all the emotional acts. This pilot study is part of a large project which looks to study the similarities and differences in emotional utterances corresponding to different languages of South Asian groups. With this study, we intend to propose a robust emotion classification algorithm using state of the art methods which is expected to shed new light on how emotional meaning is communicated in South-Asian language speaking groups.

**Keywords:** Emotion, Bengali speech utterances, acoustic analysis, EEG, nonlinear analysis



(12)

## The acquisition of emotional nouns in children

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The processing of emotional language by children has been poorly researched to date. This may be partly related to the lack of stimuli that have been adequately assessed by the children. For this reason, the present study aims to obtain some knowledge about how children's acquire of emotion-denoting vocabulary from preschoolers to adolescence. To this end, the contribution of emotional and psycholinguistic variables to the age of word acquisition was examined. Data were collected from 360 Spanish schoolchildren and adolescents (180 girls and 180 boys) from 8 schools in the Community of Madrid. They were divided into 18 age groups formed by 20 children respectively (10 girls and 10 boys). Their ages ranged from 32 months to 181 months. Children aged 32 months to 97 months were tested in 6-month age groups, while older children and adolescents were tested in 12-month age groups. The task consists of naming 200 drawings representing positive, negative and neutral nouns. The results obtained in the regression and mixed model analyses showed that positive words are learned before neutral words, which is followed by the acquisition of negative words. Therefore, it seems that the valence of the words was a significant predictor in the task. No arousal effects were observed in word acquisition. The theoretical implications of our findings on affective theories are discussed.

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## Emotionality: meddling in the debate on the encapsulation vs interactivity of grammatical processing

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The emotional connotation of words, a semantic property of language, has been found to affect word and sentence processing (Hinojosa et al., 2019). There is abundant evidence demonstrating that emotional words are processed differently from neutral ones, both at the behavioural (reaction times) and electrophysiological levels (Citron, 2012). While the effects of emotionality are interesting per se, incorporating this semantic variable in the methodological design of psycholinguistic studies can provide us with evidence to prove or refuse linguistic theories.

Specifically, some recent studies have explored whether emotionality can shed light on the debate between the presumable encapsulation or interactivity of grammatical processes. While the Syntactic Encapsulation Hypothesis (Fodor, 1983) maintains that syntactic processes, such as agreement co-indexations, should both precede any other types of processes and be unaffected by them (Friederici & Weissenborn, 2007), interactive models defend the view that that these operations are influenced not only by syntactic information but also by other extra-syntactic sources of information (Haskell & MacDonald, 2003). Thus, if an operation like grammatical gender co-indexations in agreement is affected by semantic or lexical variables (as the emotional connotation of the words), then that will demonstrate that such an operation is not truly -formally- encapsulated.

With this aim, we developed a series of experiments in which participants performed a grammatical judgment task while their electroencephalographic activity was recorded. We tested if word emotionality interacted with the processing of gender agreement errors in native Spanish speakers. Results obtained with the event-related potentials (ERPs) technique seem to support the Syntactic Encapsulation Hypothesis. Here we will present these findings as evidence of how emotionality can be useful to the study of linguistic theories.

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**Keywords:** emotionality, event-related potentials (ERPs), gender agreement, language processing, syntactic encapsulation

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## Experimental methods in child language research: Elicited production task design in grammatical gender acquisition

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Child language acquisition is an area of interest for Psycholinguistics and Developmental Psychology. One of the widely used approaches in this field is the elicited production paradigm (Ambridge & Rowland, 2013). In this paper, a design of an elicited production task which explores grammatical gender acquisition in Russian will be presented. Russian gender system is quite transparent. That is, the phonological form of the noun helps to predict its gender. For instance, nouns that end in a consonant are masculine (stul 'chair'), those ending in -a are feminine (ruka 'hand'), and nouns ending in -o are neuter (okno 'window'). Previous research showed that gender of transparent nouns is acquired at 3-4 years (Gvozdev, 1963; Ceitlin, 2009; Rodina & Westergaard, 2012; Mitrofanova et al., 2018). However, there are nouns that can be considered opaque, that is, according to the noun's phonological form, it can be assigned either one or another gender. For example, nouns ending in a palatalized consonant can be masculine or feminine (e.g. ten' 'shadow' is feminine, whereas den' 'day' is masculine). The design of the elicited production task is developed to explore the acquisition of gender of this type of nouns. The experimental conditions are: (i) Adjective-noun matching condition, i.e. a transparent gender cue in noun's ending and in adjective (M+M or F+F): bel-yj rlok 'white-M rlok-M', golub-aja vim-á 'blue-F vima-F. (ii) Adjective-noun mismatching condition, i.e. a transparent gender cue in adjective's ending but not in noun's: bel-yj pluk' 'white-M pluk'-M/F' or golub-aja pluk'-M/F 'blue-F pluk'-M/F'. In the experiment, participants see two unknown objects on the screen and will hear an auditory stimulus: "here you see vimá". Following that, one object will disappear from the screen, and the participant will be asked "what has just disappeared?". The expected answer is "golubaja vimá has disappeared". Ceiling effect is expected in (i), whereas in (ii) we expect that transparent cue in adjective will predict noun's gender.

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**Keywords:** child language, grammatical gender, gender cues, elicited production, Russian

(15)

## An eye tracking study with children: gender in code-switching

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Codeswitching has been used as a window to explore how the properties of the two language systems interact in the mind of the bilingual. Previous works have mainly focused on adult bilinguals with very few studies analyzing eye tracking data from bilingual children. We target bilingual children in Spain (a group of L1 Spanish-L2 English bilinguals (21) and a reduced group of L1 Spanish-heritage English bilinguals (5)), aged 11-15, in order to formally explore the directionality of the switch (1) and the type of implicit gender agreement mechanism in the case of Spanish determiner switches (2-3).

- (1) a. El señor está arreglando LA WINDOW with a hammer (Spanish D - English N)  
b. The man is fixing THE VENTANA con un martillo (English D - Spanish N)
- (2) la<sub>F</sub> window<sub>F</sub> // el<sub>M</sub> book<sub>M</sub> (gender congruent)
- (3) el<sub>M</sub> window<sub>F</sub> // la<sub>F</sub> book<sub>M</sub> (gender non-congruent)

D=determiner; N=noun; F=feminine; M=masculine

Using an EyeLink Portable Duo, reading eye-movement data were collected. The task consisted of 156 sentences (48 experimental items, 54 fillers and 54 distractors); comprehension questions followed half of the fillers and half of the distractors; and frequencies of the target nouns were controlled. Three eye-tracking measures were extracted (gaze duration, regression path duration and total duration) and calculated for two target regions (the target noun and the determiner plus 4 characters preceding the determiner).

Processing costs are higher in the case of English determiners for the two participant groups. Differences appear in the processing of nouns: while the L2 group finds the English nouns harder to process, Spanish nouns are so for the heritage group. As for gender agreement, longer fixations in the noun appear in gender non-congruent switches. This could be linked to the strength of Spanish as L1 that imposes gender agreement operations. This result is in line with previous works on adult eye-tracking data.

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**Keywords:** code-switching; eye-tracking; child data; Spanish grammatical gender; DP and adjectives

(16)

## **The Processing on Grammatical Gender in Spanish in Heritage Bilinguals: The Effect of Task Modality**

**Vicente Iranzo**

Weber State

This presentation reports the results of a study on the acquisition and processing of the effect of the modality task in research design. Participants in this study included 63 heritage bilinguals enrolled in Spanish language courses both at the graduate and undergraduate level at a midsize public university in the southwestern US. All participants completed a proficiency test, a language background questionnaire, a vocabulary and gender assignment task, a WM test, and two speeded acceptability judgment tasks (SAJT). The SAJTs investigated Spanish gender agreement through aural and written comprehension. Participants were presented with sentences containing gender agreement concord/discord in the determiner phrase (e.g., El carro más nuevo es del abogado) and the verbal phrase (e.g., La silla es fea para el salón). However, although the noun-adjective agreement operation was performed within and across phrases, the linear distance remained constant. This study found an effect of the task modality on linguistic performance. This effect was dependent upon the type of bilingualism and proficiency. Because the study focused on different variables (linguistic, methodological, and cognitive), the results contribute to an improved understanding of early and late bilingualism.

**Keywords:** Gender Agreement, Task Design Processing, Language Processing

(17)

## Psycholinguistic perception of past verbal tenses in Spanish

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The main goal of this research is to explore how different sociolinguistic profiles might or might not interfere with the psycholinguistic perception of past verbal tenses in Spanish (specifically, we will focus on one variety of Spanish: Peninsular Spanish). In order to achieve this, we have developed an online survey targeted to subjects matching the following characteristics: Spanish native speakers residing in Spain or Germany; subjects ranging from the age of 20 to 40 years old, with university education and no previous physical or mental conditions. The above-mentioned survey contains three blocks: 1) sociolinguistic information, 2) filling in the gaps exercises and 3) qualitative assessment tasks. In all cases each informant is shown block 1, while block 2 and block 3 are presented randomly and evenly. Using this tool, we have created a small database composed of two groups: Spanish speakers residing in Spain, and those living in Germany (each group contains roughly 60 answers). Establishing this division regarding the type of informant will allow us to study the tendencies of every group in their country of residence and then compare changes and similarities across groups. After gathering the answers, the data obtained will be processed using different statistical tools in order to draw significant conclusions for the field. Through these activities, we aim to determine whether certain sociolinguistic variables (such as “Country of residence”, “Years of residence”, “Level of proficiency in German”, “Native territory inside Spain”, etc.) influence the way in which native speakers use past tenses as well as the way in which they evaluate their use (i.e. whether certain forms are appropriate or not in a given context). In conclusion, we will establish which variable or variables are the most influential in terms of psycholinguistic perception when speakers need to choose a specific tense in a certain context.

**Keywords:** Spanish as a native language; Spanish past tenses; psycholinguistics; sociolinguistic profile; contact linguistics

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## Deviant mind style of a schizophrenic offender

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This presentation sets out to identify the linguistic patterns that are indicative of the mind style (Fowler, 1977) of a schizophrenic offender named John Doe (name changed). He published an account of his criminal offence on his freely accessible webpage. The discerning diagnosis John Doe offers in his reflections and which I take for granted gives rise to a document which is probably the result of his mental disorder and which consequently illustrates a 'deviant understanding of the world' (Semino & Swindlehurst, 1996, p. 145). The document thus constitutes the starting point for identifying by means of stylistic analysis 'distinctive and striking textual patterns' (Boase-Beier, 2003, p. 254) in John Doe's account of events which can shed light on how he conceptualises reality (Bockting, 1994, p. 159). Doe's statistically significant overuse of the self-referring pronoun *I* (*I*-talk), his preference for predicators falling into the category of mental process types (Halliday & Matthiessen, 2014), a body-related theme in his use of metaphors as well as his preference for epistemic modal expressions are indicators of his mind-style, characterised by constant observing, both of the self as well as of other people's behaviour. Doe's action which constitutes a criminal offence and his reasons for committing it can be better understood by insight into his deviant mind style.

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**Keywords:** lingschizophrenia, linguistics, mind style, transitivity, metaphor



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## Investigating Patterns of Repair During Neurotypical-Neurodivergent Dyads: Focusing on Repair in Conversation Interactional Loops

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This study investigates the patterns of repair in conversations between children with autism and their family members/speech therapists. This study, by keeping in view the characteristics of autism, defines such children as neurodivergents and their co-interlocutors are named as neurotypicals. The central argument of the research article is that communication breakdowns, which occur during neurotypicals-neurodivergents conversations, are repaired in distinctive ways and this calls for the need of a unique methodology for carrying out such sort of studies. The data for the present study are gathered through audio-recording conversations between neurotypicals and neurodivergents. The data are recorded in both home and clinical settings. The collected data is analyzed by methods of conversation analysis. The results of the study show that children who suffer from autism have impairment in social communication and interaction. The neurotypicals when indulge in conversation with such children seem to repair this impairment by (may be unconsciously) constructing conversation interactional loops. The study introduces different categories of loop each of which reciprocates to the amount of exertion required to repair it. Finally, the study concludes that this new proposed methodology can help in improving our current level of understanding regarding the mechanism of repair, which occurs during conversations involving atypical population.

**Keywords:** Autism, Conversation analysis, Repair, Interactional loops, Neurodivergent Dyads

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## Language, cognition and communication in epilepsy

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Cognitive linguistic deficits in seizure associated brain injury are well documented. (Widjaja et al., 2013) Literature strongly explores link between contribution of language to cognition, as well as Cognition to language (Owen, 2008). There is strong need to explore language and cognition in Indian bilingual population with heterogenous diverse profile and needs in drug resistant eloquent cortex epilepsy. This will enable clinicians understand, plan and provide adequate neurorehabilitative intervention to individuals with epilepsy. Current presentation aims to explore cross sectional study on occurrence of cognitive linguistic deficits among individuals pre and post surgical eloquent cortex epilepsy & related rehabilitation from Neuro Speech language Pathologist's perspective. It will also discuss neural correlates of language in human brain, common hypothetical linguistic assumptions and cerebral reorganization in eloquent cortex epilepsy from lesion studies. Rarely frank aphasia, apraxia of speech is observed in eloquent cortex epilepsy as compared to vascular lesion based Neurocommunication disorders. It is interesting to investigate and profile how multimodality wise verbal, spatial and social cognition is sub served across dominant neural substrates and their effect on language post surgical epileptic tissue resection. Understanding cognitive linguistic communicative related neural substrates, their dynamics in eloquent cortex epilepsy pre and post surgery can help in minimizing communicative disability, and facilitate overall QOL among individuals with intractable epilepsy.

**Keywords:** Language, Cognition, Eloquent cortex Epilepsy

## Spontaneous Speech Evaluation in Spanish Speaking Patients with Brain Tumors and Vascular Malformations

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Spontaneous speech (SpS) has been traditionally considered a useful research tool to characterize non-pathological linguistic phenomena and to assess the scope of language disorders in the event of brain insult. Moreover, SpS has become a crucially relevant clinical resource to pinpoint language deficits in patients with brain lesions other than stroke due to the generalized absence of validated population-specific instruments for these cases.

The aim of this study is to evaluate the adequacy of the ALEA, a tool designed to analyze SpS in Spanish speaking adults, to obtain preoperative objective and quantifiable measures of the linguistic profile of patients with tumors and vascular malformations (VMs). To fulfill this aim, 12 brain tumor and 5 VM Chilean patients and a matched control group took part in the study. Semi-spontaneous speech samples, recorded and transcribed following the ALEA guidelines, were analyzed and the linguistic indices included in the protocol (n = 10) were calculated. These included word and sentence level features (e.g. MLU, subordination) proven to be informative to distinguish across populations. The results of the two patient groups were compared against those of the control group and against the ALEA norms for non-brain damaged Chilean adult speakers.

Similar subtle deficits at the sentence level were found both in patients with brain tumours (not restricted to low grade gliomas) and in patients with VMs. No differences were found at the word level. These preliminary outcomes bring out the need for further research into the potential of SpS as a quick, non-invasive method to detect subtle changes associated to brain tumors and VMs of diverse nature, as well as the importance of properly designed/adapted protocols for data collection and analysis including normative data.

**Keywords:** Brain tumors, Vascular Malformations, Aphasia, Spontaneous speech, Spanish

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## Do gender differences really affect language performance? Evidence from the Mandarin Aphasia Bank in healthy participants

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**Background** Studies show gender differences may affect the aphasia outcomes and prognosis[1-2]. Saryu Sharma et al. show males tend to have more severe language disorders than women in the subtests based on WAB-R (Western Aphasia Battery-Revised)[3]. If this discrepancy is observed in healthy persons, it may be the baseline of different aphasia severity in different genders. The gender-dependent differences in healthy language performance deserve further investigations.

**Objective** To compare language performance between male and female healthy volunteers in the Mandarin AphasiaBank.

**Methods & Procedures** 82 healthy participants were recruited in the study (33 men, 49 women). Age ranges from 19 years to 83 years. The education level is between 0 to 20 years. Each subject was instructed to complete WAB-R and Mandarin AphasiaBank (MAB). Aphasia Quotient (AQ) was derived from WAB-R. The MAB included three tasks: free speech, narrative speech, and picture-description. To measure lexical diversity, we firstly analyzed the Type Token Rates (TTRs) from MAB. However, TTRs declines with increasing sample size. As a more informative measurement, the D-value was another variable of vocabulary diversity in our analyses. It represents how the TTRs varies over a range of token size[4]. All data were compared using independent samples t-tests and Pearson correlation analysis.

**Outcomes & Results.** No significant gender differences were observed in age, education level, AQ, TTRs, and D-value (Table 1 and Table 2). However, we found age was significantly related to AQs, TTR, and D-value. And education level showed a similar pattern (Table 3).

**Conclusions** No gender differences were observed in the linguistic performance of healthy individuals. However, there were significant correlations of language behaviors with age and education. The gender differences may not explain why males suffer more severe language impairments than females.

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**Keywords:** Gender differences; Language performance; Mandarin AphasiaBank; Type Token rate; D value

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## Is self-paced listening sensitive to downstream consequences of focus?

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Focus (stress placed on a word) can influence the contrast set that a hearer infers when comprehending a sentence. Consider the following sentences: 1) Type focus: The university was so empty today, I didn't even see one STUDENT... 2) Quantity focus: The university was so empty today, I didn't even see ONE student... In (1), the focus is on "student" (the most likely kind of person to see at a university), and the contrast set is other, less-likely-to-see-in-a-university people. In (2), the focus is on "one", and the contrast is on bigger numbers. We used self-paced listening to test how listeners use focus to derive contrast sets in online processing. 40 native speakers of Mandarin heard sentences like [the Mandarin equivalents of] (1) and (2), each followed by a follow-up like "...let alone a professor" or "let alone multiple students". We predicted that a contrasting word like "professor" would more expected and easier to comprehend after the context in which focus was on "student" (since that focus raises "professor" as part of the contrast set) than after the context in which the focus was on "one". The experiment used 28 items, and the most commonly used contrasting word (such as "professor") for each item was identified using a sentence completion norming test (N=50). Contra our expectations, there was no significant difference between participants' listening time for the critical word (e.g., "professor") in the context with type focus (1) vs. that in the context with quantity focus (2). While the results could suggest that focus does not modulate downstream predictions, we consider it more likely that the results show that self-paced listening is not sensitive to this modulation. These findings highlight the need for further research to delineate what self-paced listening is and is not sensitive to.

**Keywords:** Self-paced listening; reaction times; focus; negative polarity items; Mandarin

## Perceptual Categorization of Events in Bengali Multi-verb Constructions

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Multi-verb constructions are a typical feature of South Asian languages. In a Multi-Verb Construction, two or more verbs are combined together to refer to either a single event (Complex Predicate Construction, i.e., CPC), or a series of events which may occur sequentially or simultaneously (Serial Verb Constructions, i.e., SVC). A few multi-verb constructions may be realized both as SVC or CPC depending on the context and/or the speaker's perception of event boundaries.

1. Je    jott̪i-ta    bol-e    d̪i-l-o  
 3.SG truth-CLF tell-CP give-PST-3                    [Complex Predicate]  
 'He told the truth'
  
2. Je    jott̪i-ta    bol-e    e-l-o  
 3.SG truth-CLF tell-CP come-PST-3                    [Serial Verb]  
 'He told the truth and came back'

Thus, it becomes important to understand whether the multi-verb constructions are perceived uniformly by all speakers as either CPC or SVC under different linguistic contexts. Also, it entails the need for understanding whether the variation of perception (if any) results in a change in cognitive processing time corresponding to the different multi verb constructions.

To investigate this, we conducted a grammaticality judgement test for different combinatorial possibilities of 15 verbs leading to 225 valid and invalid multi-verb constructions (15x15 matrix). The reaction time was recorded for each combination, along with the grammaticality judgement (whether the combination is valid or invalid) using the PsychoPy software package. The observations obtained from 30 native Bengali speakers (male:female=1:1) were analyzed for the degree of agreement with our proposed hypothesis. Furthermore, the same set of participants were subjected to another test where they were asked to indicate the number of events denoted by the different verb combinations presented to them (thereby indirectly indicating their perception of the multi-verb construction as CPC or SVC). The grammaticality judgement, reaction time and the perceptual classification were analyzed for correlation using various statistical tests. The verbs have been grouped based on the quantitative scores obtained from above data. The data obtained sheds light on the perceptual processing load associated with event construals for CPC and SVC in Bengali. This study is a first of its kind which reveals interesting new insights towards perceptual linguistic representation of the event construals in Bengali.

**Keywords:** Serial Verbs, Complex Predicates, Reaction Time Test, Semantic Combinatorics, Correlation analysis.

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## The Role of Working Memory in Syntactic Ambiguity Resolution

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Earlier researchers has explored the influence of working memory on listener's sentence processing or comprehension. These research works has provided evidence that increase in syntactic complexity places a burden on listener's working memory system which typically leads to reduced comprehension accuracy. However, there are very few attempts in Indian context to document the age-related changes in working memory and relative clause attachment preferences.

**Aim:** To study the changes in working memory and relative clause attachment preferences across the age groups of 9-12 years, 22-25 years and 65-75 years.

**Method:** A total of 210 subjects were selected for the present study. 70 typically developing children in the age range 9-12 years (Group I selected from a primary/secondary school), 70 normal adults in the age range 22-25 years (Group II chosen from a Degree college) and 70 elderly subjects in the age range 65-75 years (Group III taken from an old age home). The phonological short term memory, verbal working memory, sentence comprehension and relative clause attachment task were assessed. The phonological short-term memory was assessed using the non-word repetition task, the verbal working memory was assessed using auditory working memory and digit ordering task, the sentence comprehension was assessed using the online sentence comprehension and grammatical judgment tasks, whereas relative clause attachment task was assessed using relative clause attachment preferences

**Results:** Parametric statistical evaluation (MANOVA, Scheffe's post hoc test and Paired T test) revealed that there was a statistically significant difference between the three age groups on the performance ( $p > 0.05$ ) of verbal working memory tasks, sentence comprehension tasks and relative clause attachment task

**Conclusion:** There was a decline in working memory with an increase in an age, which was attributed to reduced working memory capacity for verbal information. The age related variance in performance on relative clause attachment preferences was mediated by working memory differences.

**Keywords:** Working memory, sentence comprehension, relative clause attachment task, phonological short-term memory, Syntactic ambiguity resolution

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## Investigating Argument Reactivation: On the validity of the Growth Curve Analysis

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In a seminal study using eye-tracking and the Visual World Paradigm (VWP), Koring, Mak and Reuland (2012) applied the Growth Curve Analysis (Mirman, Dixon & Magnuson, 2008; henceforth GCA) to test the Unaccusative Hypothesis (Perlmutter, 1978; henceforth UH) in Dutch. The UH predicts a processing difference in unaccusative and unergative sentences in (a) subject reactivation after verb presentation, and (b) associated processing cost. Koring et al. (2012) reported earlier and larger reactivation of unergative subjects than unaccusative ones after verb presentation, suggesting distinctive processing patterns supporting the UH. However, Huang and Snedeker (2020) attempted to replicate these findings in English with no success, concluding (i) that the GCA is ill-suited to analyze VWP data and (ii) that the findings in Koring et al. (2012) constitute a false positive.

We contribute to this debate by reporting the results of a near-replica of Koring et al. (2012) in Spanish. We monitored the time-course of gaze fixations of 44 native speakers across a visual display while processing sentences with unaccusative, unergative and transitive verbs. The GCA of our data reveals that unergative subjects display a larger reactivation effect than unaccusatives after verb presentation. We found no difference between unergative and transitive subjects. The time-course of gaze fixations supports the predictions of the UH, although we did not find the same polynomial shapes as in Koring et al. (2012). To check the validity of our analysis, we also conducted a resampling examination with verb condition labels randomly assigned. Contrary to Huang and Snedeker (2020), we found that the GCA produces reliable p-values and we replicated the main findings in Koring et al. (2012). Thus, we argue that the findings in Koring et al. (2012) are unlikely to be a false positive and that the GCA is a valid method to examine argument reactivation.

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**Keywords:** eye-tracking, visual world paradigm, growth curve analysis, unaccusative hypothesis, argument reactivation



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## Semantic networks of space and time between deaf signers and Spanish listeners

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The mental lexicon is defined as a container of all the information about the meaning of a lexical piece and all its characteristics. Regarding the semantic dimension, this lexicon helps to describe the relationships between individual concepts as members of conceptual domains. Studies on the processing, functional, and social distribution of spoken languages and signed languages suggest partial overlaps between them. However, factors such as ontogenetic development, language acquisition conditions, the development of deaf culture, conceptual domains concreteness, and the lexical repertoire available in each linguistic modality could suggest important differences. The objective of this study was to explore the semantic networks of the conceptual domains of space and time in the Uruguayan deaf signers population and Spanish listeners. 60 participants (30 deaf signers and 32 listeners, matched in age and education) carried out a word association task in their respective languages and with semantically equivalent lexical items. Regarding the structure of their respective semantic networks, both groups showed an important similarity in measurements such as the clustering coefficient, the degree of centrality, or the betweenness. However, only one (SUMMER) of 40 nodes showed over a .80 of similarity in the associates between both populations. A categorical-semantic analysis of the participant's responses showed a bias of the listeners to taxonomic and introspective semantic relationships. In contrast, the deaf signers showed a bias toward situational semantic relationships and entities. These findings suggest differences in the involvement of memory mechanisms and concrete / abstract thinking between both populations when organizing their mental lexicon.

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**Keywords:** Language Modality, Space, Time, Mental lexicon

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## Lexical decisions tasks and ambiguity: trouble in paradise? New evidence on the processing of ambiguous words in Spanish

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The case of semantic ambiguity (i.e. words with more than one meaning) has been a particularly active field of study in Psycholinguistics, since multiple meanings could modulate how speakers process and access semantic information. Two types of ambiguity can be described according to the relation between their meanings, with homonymous words having unrelated meanings and polysemous words, related senses. Rodd, Gaskell and Marslen-Wilson (2002) proved that these categories influenced the processing of ambiguous units: in lexical decision tasks, polysemous units showed an advantage while participants were slower when recognising homonymous words.

This effect was obtained in other experimental designs in English (Beretta, Fiorentino and Poeppel 2005; Klepousniotou & Baum 2007), whereas in Spanish it seems much more difficult to find. The results are not consistent when the type of ambiguity is considered: Haro, Demestre, Boada and Ferré (2017) and Haro & Ferré (2018) did not find any relatedness of meaning effect and López (2019) and López & Horno (in press) found a disadvantage for homonymy but no effect for polysemy.

The objective of this presentation is to offer new evidence of the processing of ambiguous words in Spanish, focusing on the problematic difference between homonymy and polysemy. Two lexical decisions tasks were carried out and completed by 62 participants. Significant results were obtained when comparing unambiguous stimuli with homonymous and polysemous items, although these are not consistent with Rodd et al. (2002) findings. Our results point to a facilitation of ambiguity but a null effect of the relatedness of meanings. A possible explanation of this effect is that lexical decision tasks may not be sensitive enough to study the differences between related meanings (as already pointed out by Haro & Ferré, 2018) or that the linguistic description of the stimuli used in Spanish differ from those used in previous research.

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**Keywords:** ambiguity, polysemy, homonymy, lexical decision task, language processing

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## Morpho-orthographic segmentation of opaque and transparent derived words: New evidence for Spanish

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This study analyses the role of semantic transparency in the visual word recognition. Under the masked priming paradigm, it has consistently been shown that opaque and transparent words are facilitated relative to form-related controls, but differences in priming between one condition and another have not been conclusively proven. Hence, research has been unable to theoretically elucidate the possible value of semantic transparency in the processing of derived words. This study describes two lexical decision tasks under the paradigm of masked priming in Spanish, with university students. To our knowledge, this is the first time that research has been carried out in Spanish. Experiment 1, a typical Latin Square design revealed differences between the transparent and orthographic conditions, with no differences between the other conditions in the analyses of the error rates. It is possible to explain these weak results by the low power of the statistical analysis (despite a reasonable sample size of 49 participants). Although, it is true that the Latin Square has multiple benefits, it requires a large number of participants to obtain considerable power in the results (see Brysbaert, 2019). An alternative would be to use a within-subject design (this design reduces variability and the sample size required). Therefore, Experiment 2 is proposed. In the second experiment, the participants visited the laboratory on two occasions, separated by a week. The task was administered twice, with participants responding to one of the experimental lists on each day. The results of this second experiment revealed significant differences in the size of the priming effect of the opaque and transparent conditions compared to the form-related condition, but without differences between these two effects. Although the effect of Day reached significance, it did not interact with other variables, thus supporting the appropriateness of the design. These results are consistent with theories proposing that early, automatic morphological processing occurs at a stage prior to semantic processing. We discuss these findings from the perspective of current models of visual lexical processing.

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**Keywords:** lexical decision task, masked priming, morphological processing, semantic transparency, Spanish

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## The neural dynamics of semantic diversity in spoken language recognition: The role of alpha-beta power

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Word recognition performance is significantly affected by semantic diversity (SemD), a corpus-based measure that indexes the degree to which the contexts associated with a word are similar in meaning. Due to the prominence of SemD as a determinant of behaviour, it is important to understand its neural correlates, but these remain underexplored. To address this gap, this study examines whether and how SemD information is reflected in alpha-beta power dynamics during spoken word recognition. Given previous evidence linking stronger alpha-beta power decreases to semantically richer words, high-SemD words were predicted to elicit stronger alpha-beta power decreases relative to low-SemD words. Electroencephalographic data were recorded while 13 older adults performed a word-picture verification task. Average alpha-beta (10-20 Hz) power around 400-600 ms post-word onset served as the dependent variable in linear mixed models whose fixed effects included SemD and other psycholinguistic variables. Results showed that SemD was not a significant predictor when posterior sites were considered. However, when anterior sites and a later time window were examined, a significant effect of SemD was found, with higher scores predicting stronger alpha-beta power decreases. Additional analyses on event-related potential responses around 300-500 ms post-stimulus showed no effects of SemD. These findings provide the first insights into the electrophysiological signature of SemD and corroborate previous reports of stronger alpha-beta power decreases when more lexical-semantic information needs to be retrieved from memory. The null results are discussed in view of a few methodological aspects, which could be explored in future studies.

**Keywords:** semantic diversity, electroencephalography, older adults, spoken word recognition, alpha-beta power

## Exploring lexical organization and production in high and low creative EFL learners: a distributional semantic approach

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Over the last decade, neural and cognitive research has investigated patterns of creativity or divergent thinking based on semantic distance between words, as a measure of associative ability (e.g. Beaty, et al., 2014; Prabhakaran, et al. 2014; White & Shah, 2016). Among the most interesting findings, the most creative people show a higher number of responses and more distant semantic connections (Benedek & Neubauer, 2013; Benedek, et al., 2020). These findings might well help explain some of the patterns identified about the superiority of creative learners in foreign language production (Albert & Kormos, 2011; Krönert, et al. 2016). This study seeks to explore the EFL lexical organization and production of a high creativity (HC) group and a low creativity (LC) group of 17 12th graders each. Following Ryan et al. (2013), an automatic distributional semantic model is applied to the identification of clustering and switching processes along with further semantic relatedness metrics along each group's retrieval in three fluency tasks (*red*, *games and entertainment*, and *intelligence*). A series of ANOVAs revealed that the HC group produced more words and switches in all categories. They produced longer chains and clusters, although this difference was not significant in any of the categories. *Red* was the only category for which differences were statistically significant on category relevance and global relatedness. This trend is also identified in *games and entertainment*. The HC group explored the semantic space more deeply since its retrieval contained more uncommon responses, i.e. less related to the category and to the entire response. Some effect of the category is also found as no variation between groups was found in *intelligence* concerning global/local relatedness, and category relevance. Overall, these results are consistent with previous research on creativity, although further research is needed on this variable in the field of foreign language learning.

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**Keywords:** Lexical production, lexical organisation, EFL, semantic fluency task, distributional analysis

## Interactions of the L1 and L2 in a language attrition context: A visual world eye-tracking study

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Despite the considerable amount of literature on bilingual development, little is known about how languages interact during online lexical processing (Berends, Brouwer, & Sprenger, 2015). Existing research recognises that crosslinguistic interaction affects not only the bilingual's L2, but also the L1's, altering their underpinning processing mechanisms at all linguistic levels and all stages of development (Kroll & Bialystok, 2013). However, further research is needed to understand how lexical access occurs in bilinguals' native language and L2s, and to what extent the two languages interact during this process.

Language attrition research can provide us with as much information about the structure of a linguistic system as studies investigating how languages are acquired (Schmid & Köpke, 2017). Thus, bilingual research investigating attriter linguistic systems might reveal processes otherwise not taken into account in the bilingual development spectrum.

This research is part of a doctoral project that aims to shed light on bilingual lexical processing at the word level from a novel approach in the context of bilingual development. We compare the selective attention mechanisms that take place when Spanish-English bilinguals-late attriters (n=59), Spanish monolinguals (n=48) and English monolinguals (n=40) process competing L1 and L2 lexical items via two Visual-World eye-tracking experiments with manipulation of onset/rhyme overlap.

We will address the question of to what extent Spanish-English bilinguals-late attriters pay more attention to the rhyme competitor, as Spanish monolinguals do, and if not, whether they tend to perform similarly to English monolinguals by paying more attention to the cohort competitor. In addition, this study examines how the subjects' performance varies depending on their levels of proficiency, language use, length of exposure, and aptitude, among other external factors.

It is expected that the findings will contribute to a better understanding of bilingual lexical processing in the language attrition context.

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**Keywords:** language attrition, bilingual development, eye-tracking, visual world paradigm

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## Vertical and horizontal space conceptualization of Russian legal discourse via metaphor terminology

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The paper highlights the Russian legal discourse in the aspect of its space conceptualization represented via metaphorical terminology.

Although there is a broad variety for classification typology, the conceptualization of the knowledge structures depends directly on the branch of law. Legal branch metaphor terms are constructs of a particular branch of legal discourse, which reveal special concepts of mentality regarding the objects of a particular branch of legal discourse.

The conceptual structure of the legislation system arranged in the form of the horizontal line classification by branches of law and the vertical hierarchical system of conceptual metaphor representation is depicted through the metaphor terminology of the legal discourse.

In our research at the current stage, we focus on identifying the dependence between typology of the legal system and the conceptualization of SPACE 1) as a general concept, 2) through the horizontal (forward-backward and right-left axis) and 3) vertical dimension in metaphorical terminology.

Totally by manual selection from the Dictionary of Russian legal terminology we have identified with MIPVU 1001 conceptual metaphors where 194 metaphorical terms refer to the SPACE category: 79 metaphorical terms reflect the concept of horizontal projection and 43 metaphorical terms actualize the model of vertical projection, which indicates the fact that the horizontal prevails in space conceptualization of the legal discourse on the example of metaphorical terminology.

The analysis of the specifics of the institutional legal discourse reveals the interdependence of the knowledge conceptualization within metaphor modeling in the legal terminology. The nominative means for the concepts system transfer are based on the terminology concept system and are determined mainly by the legal context (i.e. legal branch). The content of the knowledge structures in the legal discourse terminology is determined and influenced by the evolution of the legal knowledge within the framework of language and socio-cultural community.

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**Keywords:** legal discourse, vertical, horizontal space conceptualization, legal metaphor terminology.

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## Automated Dichotic listening test- Exploring the combined effect of Attention, Delay and Phonology

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**Introduction:** Dichotic listening is a well-known paradigm to assess hemispheric asymmetry where two different stimuli are presented to the right and left ear simultaneously. Currently, there are no clinically validated full version (Forced recall condition) of dichotic word test in Indian English with established normative. In this paper, we attempted to automatize the dichotic listening test including stimulus presentation, provide inputs to type the response, analyse the response and display the scores pictorially. This modification provided the scope to study the combined effect of several modifications of dichotic listening tests like attention and lag effect on a single subject. Finally, the current study explores the effect of Phonological priming (presenting stimuli which begins with the same phoneme) on dichotic listening.

**Method:** 350 English words were selected from a standard English repository out of which 250 familiar words were recorded from a fluent English speaker. MATLAB was used to develop the automated dichotic listening test with all the modifications like attention, lag and phonologic constraint incorporated in a single test. The developed test was administered in 100 English speaking right handed individuals with normal hearing sensitivity.

**Results** Overall results showed right ear advantage for free recall condition with and without lag which reflected the classical dichotic effect. Interaction effects were evident which showed that the scores were better in the attended ear with a stimulus delay compared to the other conditions which shows the combined effect of attention and delay on dichotic scores. Phonemic constraint also had contributed to effect were the scores were better for phonologically related words compared to unrelated words which shows the priming effect.

**Conclusion** The results showed ideal retention of original dichotic effects and therefore is a good test which can be used in clinical population. The test also showed good test retest reliability.

**Keywords** Dichotic listening, Free recall, Forced recall, Lag effect, Phonologic constraint, MATLAB



## Voice Onset Time Analysis of Speakers with Spastic Dysarthria and Healthy Group: A Comparative Study

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Production of plosives requires coordination of breathing and laryngeal and supra-laryngeal structures (Hammarström, et. al., 2015). Therefore, acoustic measurements of speakers with distinct linguistic backgrounds varies, resulting in the production of sounds differently. Moreover, literature also reveals that speech production of normal speakers is different from speakers with speech-language disorders. Dysarthria (speech motor disorder) causes difficulty in the execution of the sounds (Duffy, 2013). Many studies focused on perceptual and acoustic measurements of dysarthria, however, comparative acoustic analysis of dysarthric speakers from different linguistic backgrounds, with healthy group needs to be explored. As, different languages and dialects are spoken in Pakistan, therefore, the researcher aims at examining the voice onset time (VOT) of spastic dysarthric and healthy controls. The sample included 18 participants, 9 spastic dysarthric and 9 age and gender matched healthy speakers. The researcher further explored the effects of voiced/voiceless variables and place of articulation, age, gender and language on VOTs of both groups. The current study is quantitative in nature and PRAAT software version 5.3.56 and SPSS version 21 are used as the analytical tools for acoustic and statistical analysis, respectively. The following study is not only helpful for language teachers and learners, it is useful for speech pathologist, as well as, phoneticians in various ways. The results of the study demonstrated that VOTs of spastic dysarthric speakers were longer than healthy subjects and there was a huge mean difference between the two groups. However, T-test reveals that the difference was not statistically significant ( $p > 0.05$ ). Moreover, voiced/voiceless variables and place of articulation affected the VOT measurements, simultaneously. The study further demonstrated no significant effect of gender, age and language on VOT values of both groups. At the end, the researcher recommends the future linguists to explore more on speech motor disorders through different acoustic measures, which will help speech pathologists and linguists in numerous ways.

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**Keywords:** Laryngeal and supra-laryngeal structures, acoustic measurements, speech and language disorders, voice onset time, dysarthria

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## **A comparative study of phonological processes among educable mentally retarded and typically developing children**

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Phonology is the systematic study of the sounds used in language, their arrangement into syllables, words and phrases, and how the speech sounds are organized in the mind and used to convey the meaning. Educable mentally retarded children are a special category of people with mild mental retardation who are capable of attaining up to fifth grade of education. The linguistic skills of mentally retarded children vary according to the range of retardness. For those communication skills are typically under-developed can result in misunderstanding of directions (Cascell, 2004). Studies show that there are chances for excessive use of phonological processes among the mentally retarded individuals in the sense that they lack the ability to coordinate sounds intelligibly results in poor linguistic skills. This study focuses on the comparison of phonological processes while using expressive skills between the educable mentally retarded children and typically developing children. Samples were selected on convenient sampling method among the children whose mother tongue is Malayalam. Fifteen children of educable mentally retarded and fifteen children of typically developing were selected with matching mental age. Picture naming and word imitation tasks were applied to collect the data. The collected data were analyzed through qualitative and quantitative techniques. Through this study the degree of variation in phonological processes between the typically developed and the educable mentally retarded children is found. This study is done in view of developing remediation for the children facing difficulty in phonological processes while employing expressive skills.

**Keywords:** Linguistic skills, Phonological processes, Educable mentally retarded

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## Estimation errors of acoustic analysis in oro-nasal multilanguage syntax

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The conversational speech has various sounds which are produced after modulation of the glottal air stream through the vocal tract. These are oral and nasal sounds. Varieties of reading passages such as "Rainbow passage", "My Grandfather", "The Grandfather passage", "Zoo Passage" have been reported in the literature. There are several studies which indicated that nasalance scores vary across languages (Jayakumar T. & Pushpavathi M, Nandurkar A).

**AIM OF THE STUDY.** The study aimed to find out estimation error in acoustic parameters of oral and nasal sentences across different languages i.e. Hindi, Punjabi and English.

**METHODOLOGY.** Acoustic analysis was done on five normal hearing individuals of age range of 18-23 years. Oral and nasal sentences were taken in three languages i.e. Hindi, Punjabi, and English. Hindi language was taken as a standard for acoustic analysis and different parameters were analysed.

**RESULTS AND DISCUSSION.** Results of this study showed that there is a difference in acoustic parameters when sentences of different languages were used i.e. Punjabi, Hindi and English. Parameters of Hindi sentences were compared with Punjabi and English sentences. Mean Fo (Hz) difference observed was 1.68, 1.36 and 6.01, 5.33 in Punjabi and English nasal and oral languages respectively. Min Fo, and Max Fo differences of 2.24, 9.39 and 5.84, 3.04 and also 4.07, 1.1 and 22.87, 22.18 was observed in Punjabi and English nasal and oral languages respectively. In case of Jitter and shimmer difference of 0.44, 0.18 and 0.5, 0.4 and also 0.52, 1 and 1.28, 0.7 was observed in Punjabi and English nasal and oral languages respectively.

**CONCLUSION** We have found that estimation errors of acoustic analysis in oro - nasal Multilanguage syntax. This study suggested that always we should be keeping in mind during oro - nasal analysis of Multilanguage syntax.

**Keywords:** Fundamental Frequency, Hertz, Jitter, Shimmer

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## Neural Processing of the Prosodic Features Related to Communicative Intent in Spoken Bengali Language

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Spoken language is considered as a unique mode of communication that provides the listeners information through the linguistic content of speech—the syllables, words, or phrases of a talker’s utterance—and also through a host of extra-linguistic elements. Prosody or the melody of speech is one such interesting feature which consists of the intonation, rhythm, and relative loudness and timing of components of an utterance and is revealed primarily in the acoustic correlates of fundamental frequency, amplitude, and relative duration. In this work, we have tried to investigate the human brain response to the prosody and semantics of natural speech in Bengali language. For this, we have chosen two sets of utterances namely Type 1 and Type 2. Type 1 consists of utterances that consist of semantically ill-formed but prosodically well-formed utterance, i.e. each utterance carries no meaning in the particular language, but the prosody or intonation is well understood. Type 2 is both semantically and prosodically well formed. Each type consists of three forms of utterances with different communicative intent i.e. declarative, interrogative and exclamatory. Each type of communicative intent has five utterances, with three different prosodies, i.e. there are a total of  $5 \times 3 \times 2 = 30$  utterances, which makes up our target corpus. The utterances have been recorded in standard PRAAT software with 44.1 KHz sampling rate. Spectral analysis of the acoustic signals revealed similar pitch profile patterns for Type 1 and 2 utterances. An EEG experiment was conducted on 10 (6 male and 4 female) native Bengali speakers. The EEG recording template was designed in 1:2 ratios - i. e. there are two distractor utterances for each target utterance. This design ensures that the participant is not primed about the target utterance. The obtained EEG signal was subjected to robust linear and nonlinear fractal and ERP based analysis techniques. This study intends to provide first of its kind data on the neural classification of different categories of communicative sentences in Bengali language using prosody as the primary classification cue. The results are anticipated to provide the neuro-cognitive manifestation of prosodic features related to communicative intent in case of Bengali language.

**Keywords:** Prosody, Communicative intent, Semantics, EEG, Nonlinear Analysis, Spectral Analysis

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## Development and Validation of a Cross-linguistic Bilingual Naming Test in Kannada and Tulu

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Bilingualism is a fascinating and evolving cognitive-linguistic skill that humans possess. While assessing language skills in bilinguals (normal or clinical), there is a need for culturally and linguistically balanced language test materials. However, many language-dyads experience the dearth of such materials, including the languages under consideration in the present study. Hence, we introduce a novel bilingual naming test for the Kannada-Tulu population found in India's southern west coast. To develop the test, 86 non-cognate nouns were identified from 56 lexical categories (Battig and Montague, 1969). We emphasized that the selected words were colloquially similar across dialects. A painting artist initially portrayed them into black outline drawings, and a digital artist subsequently transformed them to individual, color images. Seventy-two normal adult bilingual participants (Males=36; Age range= 18-70 years) participated in tasks that aimed to provide four psychometric measures, viz. name agreement, image agreement, familiarity, and visual complexity. Following the administration of these tasks, 60 nouns were selected, were further divided into two parallel sets (n =30, maintaining equivalence of the four psychometric measures) in each language with a maximum score of 30 per set. Subsequently, both tests were administered on 100 participants (Age range=18-87 years; Females=54) to obtain the norms. The raw data were converted into Z-scores, and used -1SD as the lower cutoff, leaving the full score as the upper cutoff. The current cross-linguistic bilingual naming test is expected to foster both research studies and clinical services in Kannada-Tulu adult bilinguals with aphasia or neuro-degenerative disorders like dementia, as well as to set a trend in the development of such test dyads in other languages.

**Keywords:** Bilingualism, Naming, Psychometric, Aphasia, Dementia

## Norms for a novel set of 269 verb pictures in Kannada based on the argument structure classification

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Pictures are fundamental psycholinguistic stimuli. The availability of cross-culturally and cross-centrally pertinent, validated picture corpora is beneficial to assess cognitive-linguistic processing. Researchers and clinicians often develop their own idiosyncratic picture sets with limited utilities beyond the realm of their experiment. Normative data sets for verbs are sparse than nouns. They mostly comprise of action naming norms. Unlike nouns, verbs seldom exist independently and mostly correspond with the associated arguments. The variable argument structure, lower imageability, and complex representation of verbs constrain the generalization amongst them. Argument structure can vary across languages. Thus, using a translated version of standardized corpora in another language is unfeasible. Despite an overwhelming demand for linguistically and culturally acceptable standardized picture corpora, only a handful of such studies are accessible, often focusing on nouns. This study introduces a unique normative dataset in Kannada, a south Dravidian language with over 60 million first-language speakers spread globally. The dataset contains 269 verbs depicted as colored clipart images. They were classified, developed, and validated based on a sentence paradigm, highlighting the argument structure and the target verb. This study offers norms for verb name & argument agreement, image agreement, concept familiarity, and visual complexity by 120 adults (age range 18-80 years). The recruited participants belonged to Kannada's four major dialects, making the normative a suitable representation of the Kannadiga (native Kannada speaking) population. Overall, the results concur with previous datasets emphasizing the reliability of this corpus. Good name agreement, higher rating scores, and strong association amongst the rating tasks indicate that most of the items presented in this dataset are sensibly chosen and reasonably portrayed. Verb pictures from this dataset are suitable for inclusion in experiments, assessment, and therapy protocols.

**Keywords:** Verbs, Action pictures, Psychometric, Normative, Norms, Name Agreement, Image Agreement, Familiarity, Visual Complexity.

## Use of Corpora in Designing Eye-Tracking Studies on Word Processing

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Corpora and lexical databases such as *CELEX* (Baayen, Piepenbrock, and Gulikers, 1995) can be extremely valuable in determining frequency when designing eye tracking studies. This is because in reading studies, low-frequency words are more similar to nonwords than high frequency words in terms of familiarity, therefore they are more difficult to accept as a word (Cortese and Balota, 2013).

The aim of this paper is to show how corpus methodologies can be employed in psycholinguistic experiment design. The study investigated whether translingual German-English noun-formations incur cognitive costs in reading. A total of four corpora were selected, two of which were monolingual English: the *British National Corpus* (Davies, 2004-) and the *English Web 2013 Corpus* (Jakubicek et al., 2013), and the two monolingual German corpora were *Das Deutsche Referenzkorpus DeReKo* (Institute for the German Language, 2019) and the *German Web 2013 Corpus* (Jakubicek et al., 2013).

In order to compare frequencies of words from corpora of different sizes, the raw frequencies were “normalized as a ratio of occurrences per million words” (Gries and Newman, 2013, p. 275). A mean average of the two German and the two English normalized frequencies was calculated to give the output for the lexical items which were then categorized as being high or low frequency. A log likelihood test was run to determine overuse or underuse of the translingual items in German as opposed to English corpora. The results showed not only which translingual items had a high or low frequency, but the concordances also provided insight into the context in which the items were used, and which types of translingual noun-formations were more salient than others.

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**Keywords:** eye-tracking, word processing, psycholinguistics, corpus linguistics, experiment design

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## Neurolinguistic Disorders and the Legal Provisions in India

Prasannanshu, Anand Shankar, Hardik Choubey, Kshitij Rao, Shivanshika Samaddar, Udai  
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Neurolinguistic disorders are caused due to brain tissue damage, disorder, degeneration, or abnormality. These neuronal causes lead to manifestations in the form of language breakdown to different degrees. In several situations, especially if the language areas in the left hemisphere of the brain, namely, the Broca's and the Wernicke's areas are involved. It does not mean that damage to the other areas, or the right hemisphere do not lead to undesired linguistic outcomes. For example, if the right hemisphere is damaged, or affected then discourse maybe a casualty. It is well known that linguistic disabilities have severe psychological, familial, social, and professional consequences. Such people are not able to lead normal lives, and their ability to do useful work in the society is severely truncated. This means, almost half a percent of the country's population representing a very significant number is involved. Aphasia may strike anyone irrespective of religion, region, caste, gender, and even age. Hence legal safeguards, provisions, and support is essential. This paper aims at exploring the role of these provisions, and also to make recommendation to further strengthen the socio-legal edifice.

**Keywords:** Aphasia, Law, Social Security, Disability rights, Legal provisions, India, Neurolinguistic disorders



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## Comparing the Indian and Western Laws for Language Disorders

Prasannanshu, Debayan Bhattacharya, Diya Agrawal, Kalptaru Goel, Kushagra Rao, Nandini Goel & Sanskriti Shivangi

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Law is seen as a system of norms for the protection of the weak and the vulnerable. In the light of the advent of the concept of human rights, equality of human beings, irrespective of their physical attributes and limitations, is an accepted norm. To ensure this equality, legislatures across the world have enacted laws for the protection of the people who may need additional support to stand on equal footing. People suffering from language disorders may also be seen as a minority, and protection of minority rights is also an integral part of modern societies. Another way of looking at this issue is from the perspective of social security: We all are safe as long as we ensure the security of the people in need, because it can be anyone of us who may face disability or disease at some point in our lives, in a statistically calculable way. Comparative law, or comparison of laws gives us new insights about our own legal systems and the possibilities of enhancing it. This paper attempts at exploring legislations across the world concerning language disabilities. Language disabilities may include several conditions, including aphasia dyslexia, Parkinson's disease, Alzheimer's disease. The aetiologies of these disorders may be different, but the outcomes on the lives of the victims are devastating, and it requires a unified thinking for the betterment of their lives.

**Keywords:** Comparative Law, Language Disorders, protection, Minorities, Human Rights, Aphasia

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## Finding legal remedies for traumatic brain injury tragedies

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Traumatic brain injury as the name suggests is caused due to a trauma to the brain. The common causes of this trauma are road accidents, wars, fights, contact sports like boxing and cricket and mishaps. The outcomes are variable and several. These injuries can cause paralysis, death and other impairments including visual and linguistic impairments. The list is not exhaustive but indicative. Neither medical science nor law can undo the damage in most of the cases. However, medicine can work to heal the body and the mind but law can be used as a potent tool for healing the social and economic circumstances of a person. Law can intervene to ensure independence, dignity and justice. Very often when a person is exposed to trauma someone else or some other entity can be held responsible. Even if it is purely an accident or a mishap where no human agency is involved and where no angle of negligence is involved. Even if there is no negligence, the concept of human dignity, human rights and right to life can be constructed to lie as a responsibility of the society. This paper explores the rights of a victim of trauma especially to the brain in cases where acts of omission and commission are involved as well as where neither of these are there.

**Keywords:** Traumatic Brain Injury, Rights, Aphasia, Dyslexia, Negligence, Social Responsibility

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## Language Disorders due to Brain Tissue Damage, and Justice Administration

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Language, has been known for a long time, to reside in the brain. Early works of phrenologists gave this background to us which was followed by modern neurologists and neurolinguists, like Paul Broca and Wernicke, whose work further indicated that language is localized in certain regions of brain like the left parieto-temporal lobe, frontal lobe, transcortical area, etc. Later works pointed out at the presence of language processing areas in the right hemisphere, as well, that deal with certain functions of language like discourse. Hence, this is axiomatic, that if specific areas of brain are affected, there will be language disorders. There are several types of aphasias, e.g., Broca's aphasia, and Wernicke's aphasia, etc. that may be encountered as a result of brain tissue damage. Language disorders can also be an outcome of degenerative diseases like dementia, and infections including tuberculosis and other infections, or due to neoplastic growths like tumour and cancers, and developmental disorders like dyslexia. Prevalence of these diseases is not insignificant, and they can be debilitating in many cases. This paper will try to show the need of developing awareness about the presence of problems posed by these language disorders. The main focus, however, remains on the effect of language disorders on justice delivery, as production and comprehension of language is disturbed in these disorders, leading to a total or limited breakdown of communication. There are several situations, e.g. in the courtroom where efficient linguistic communication is required for seeking justice as a defendant or complainant. This paper also explores the legal remedies available and finally it concludes with certain recommendations for strengthening the laws for the mitigation of hardships of the people affected.

**Keywords:** neurolinguistic, brain damage, aphasia, dyslexia, degenerative brain disorders, dementia, law, disability, legislations.

## Implementing an International Collaborative Model of Knowledge Exchange for Linguists and Speech Language Pathologists

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Working independently, although allowing researchers to work at their fullest capacity, can undermine their results or practice as many disciplines indeed intertwine. Reflecting such truth, research funders are requesting more interdisciplinary, collaborative and partnership approaches to research (Nystrom, Karlton, Keller & Gare, 2018). Often, collaborations are national. We, however, emphasize the significance of cross-disciplinary and international collaborations. To illustrate this, we report a case study of collaboration between teams of speech language pathologists from the United States and linguists at Chiang Mai University, Thailand. Although speech language pathologists are well aware of basic concepts of linguistics, much of how linguistic knowledge and other covariates affecting online production and processing is left unsaid. Thus, adding more in-depth detail of linguistics into speech language pathology can strengthen research results and enhance practice. Moreover, as much as linguists would like to explore to what extent linguistic aspects or features are universal, speech pathologists have to be aware of cultural or language specific aspects that can interfere their assessments and treatments. In this sense, speech language pathologists and linguists mutually benefit from international collaboration (see Mitchel, Pirkis, Hall & Haas, 2009 for related discussion). To effectively and efficiently achieve collaborative or cross disciplinary goals, we argue that it is critical to utilize evidence based models for the achievement of cross organizational knowledge sharing. With our case study, we describe a collaborative model of knowledge exchange between the two teams, utilizing a modified version of the Knowledge Model Application Framework (Wei, Wu & Yan, 2020). Aspects of the model: opportunity search, resources flow and synergistic effect as specifically applied to this multidisciplinary international partnership will be presented. We will also describe the motivation for the concept, a SPELIT framework for establishing foundational context in a global setting, types of resources shared, and expected outcome.

**Keywords:** Cross disciplinary collaboration, Linguistics, Speech Language Pathology, Communication disorders

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