LSURC

Language Sciences Undergraduate Research Conference

February 8-9, 2019

University of British Columbia, Vancouver, BC

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Abstracts

Friday, February 8th, 2019. IBLC 182

Speaker Session 1

Understanding the effect of stereotype and stigma on minority language speakers

Mario Tavolieri
University of British Columbia, Linguistics/Anthropology

It has been well documented that many language speakers can hold negative thoughts, beliefs, stigmas and stereotypes about speaking their language (Gluszek & Dovidio, 2010). This effect is prevalent across the spectrum of languages from heritage languages (Seals, 2018) to pidgins (Makihara & Schieffelin, 2007), and even dialects and accents (Luhman, 1990). In this presentation my review of the current literature seeks not only to identify the manifestation of this insecurity but also, to propose possible solutions at combating such negative beliefs. Initially, observing the instances in which such effects occur and establishing to what degree these negatives beliefs affect speakers over all attitudes about themselves, and their ability to perform tasks they may lack confidence in due to their inherent beliefs (Paladino et al., 2009). Secondly looking at interventions such as self – affirmation (Goyer et al., 2016), and the Spring Board to Languages initiative (Barton & Bragg, 2006), observing what may improve these language speaker's ability to learn and perform activities proficiently. Understanding the role of stereotype and stigma on perceived speaker identity is crucial for finding solutions to combat their effects.

Cluster dissimilation via the Obligatory Contour Principle in Mori Bawah

Ian Carpick
University of British Columbia, Linguistics

Based on data from Blust (2012, p. 368), I provide an Optimal-Theoretic analysis of a pattern of consonant cluster dissimilation in Mori Bawah, an Austronesian language spoken in Central Sulawesi, Indonesia (Barsel, 1994, p. 1).

Mori Bawah words contain at most one consonant cluster. Cluster dissimilation is an active process in the language: if a prefix ending in a consonant is attached to a word that already contains a consonant cluster, the prefix's final consonant is deleted, i.e. if a morphological operation would create a word that has two consonant clusters, one of the clusters is simplified to satisfy the one-cluster-per-word limit. (The pattern is somewhat obscured by the occurrence of segments that appear to be other clusters but are analysed as single segments, both by myself and Barsel (1994, p. 13-14)). Current phonological theories of the representation of the structure of words cannot, by themselves, explain such patterns of dissimilation.

The Obligatory Contour Principle (OCP) states that in a phonological representation, adjacent identical elements are prohibited (Leben, 2011). I analyse cluster dissimilation in Mori Bawah as a strategy for avoiding violations of the OCP. This analysis requires that consonants in clusters, or some constituent associated with them, be adjacent on some level of the representation.

In phonological representations, consonants which are preceded but not followed by a vowel (coda consonants) project constituents called moras; vowels also project moras. Representing consonant moras on a different tier from vowel moras causes the consonant moras to be adjacent on their tier; because the moras are adjacent and identical, they violate the OCP. To resolve the violation, one of the coda consonants is deleted, leaving a single mora on the consonant mora tier and satisfying the OCP. This approach requires only a small modification to existing moraic theory, can in principle be adapted for theoretical frameworks other than Optimality Theory, and makes a number of interesting predictions about moraic structures.

Cross-cultural differences in speech rate in infant-directed speech

Paula Correa, Elise McClay, Senay Cebioglu, Tanya Broesch, Henny Yeung
Simon Fraser University, Linguistics

Infant-directed speech (IDS), known informally as "baby talk", is the register of speech that parents direct to their infants, and has been well-studied in language development research; it contrasts with adult-directed speech (ADS), which is adult-to-adult. Previous studies have shown that IDS is spoken with higher pitch, shorter utterances, and a slower speech rate than ADS (Fernald, Taeschner, Dunn, Papousek, de Boysson-Bardies & Fukui, 1989). Majority of studies on speech rate in IDS have described Western, Educated, Industrialized, Rich and Democratic (WEIRD) populations (Henrich, Heine, & Norenzayan, 2010); but few have described small-scale societies. The subject of "baby talk" is interesting to explore because it may not actually be as universal as previously thought. Also, while linguistic factors affect the characteristics of IDS, many studies have suggested that cultural factors can also play a role. For instance, McClay, Cebioglu, Broesch and Yeung (2018) compared the IDS of mothers in the small-scale society of Vanuatu with mothers in the WEIRD society of Vancouver, Canada in regards to spectral information. Results showed that Vancouver mothers had increased vowel variability in IDS while Vanuatuan mothers did not (McClay et al., 2018). On the other hand, Broesch and Bryant (2017) compared suprasegmental information of the IDS of Vanuatuan fathers with fathers in WEIRD Atlanta, Georgia. While both languages demonstrated higher pitch range in IDS, Atlantan fathers had slower speech rate and Vanuatuan fathers did not (Broesch & Bryant, 2017).

In contrast to Broesch and Bryant's (2017) comparison of fathers' IDS in two different societies, the present study investigates speech rate in the IDS of mothers in two different societies on a larger scale. By investigating speech rate in IDS, the present study explores the question of speech rate in IDS in a small-scale society to establish whether IDS in WEIRD societies is different from IDS in small-scale societies.

Comparisons were made between two different populations: speakers of dialects of Lenakel from small-scale villages in Vanuatu and speakers of English from urban Vancouver. Thirty-seven mother-infant-peer triads in Vanuatu and fifteen triads in Vancouver participated in the study. Mothers were recorded interacting first with infants, then with adult peers. From these recordings, 10 seconds of uninterrupted speech in IDS and ADS conditions were annotated and analyzed using Praat (Boersma & Weenik, 2018); within each 10-second sample, annotation tracked number of syllables per second and pause duration.

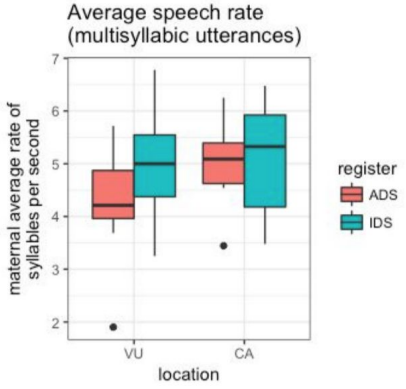


Figure 1. Boxplots illustrating speech rate data.
Vancouver (CA) mothers did not speak faster to their infants than to adults ($p = 0.54$) while Vanuatuan (VU) mothers spoke faster to their infants ($p < 0.02$).

Preliminary findings suggest that Vanuatuan mothers did not slow down in IDS compared to ADS, but rather sped up ($p < 0.02$), while Vancouver mothers did not speak faster to their infants than to adults ($p = 0.54$). While Vancouver mothers demonstrated longer pause durations in IDS than in ADS, Vanuatuan mothers did not demonstrate any differences in pause duration between IDS and ADS. Findings of the present study reveal that "baby talk" is different around the world and is not universal, but rather, culturally and linguistically conditioned.

Speaker Session 2

Coarticulation of speech and smile movements

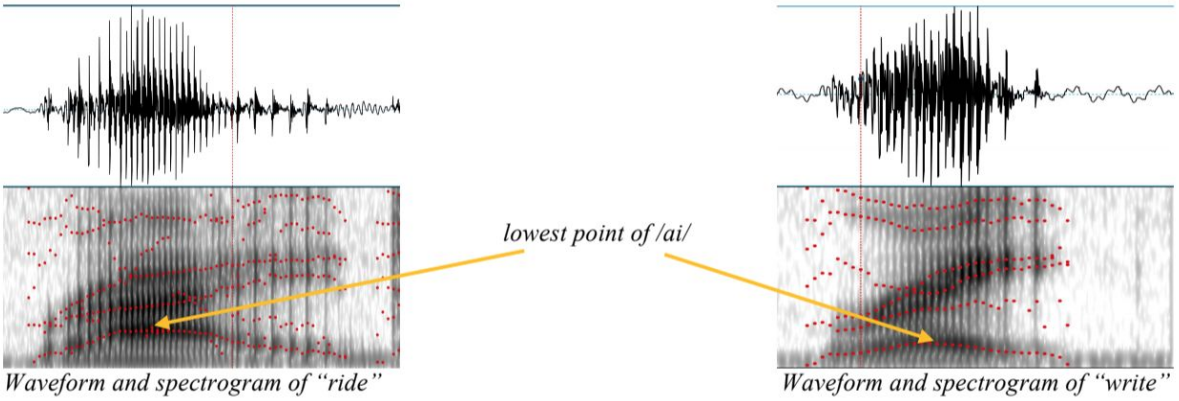
Terrina Chan, Ryan C. Taylor, Bryan Gick
University of British Columbia, Linguistics

Facial expressions and speech movements can impose conflicting demands on articulators. For example, the lip spreading movement associated with smiling is incompatible with bilabial closures for /m/, /b/ or /p/ where production demands closure of the lips. Anecdotal evidence suggests this conflict may resolve as labiodental stop variants [Wells, 2012] with production reduced to contact between the upper teeth and lower lip, though this discussion has been controversial [Ladefoged & Maddieson 1996, p.18]. The simplest model of coarticulation – one of unmediated superposition of muscle activations [Gick et al., 2013, POMA 060207] – predicts that the outcome of this conflict should be determined by summing opposing forces due to competing muscle activations. If so, varying degrees of smile and varying degrees of closure force (e.g., for different stop consonants) should be expected to produce distinct outputs. Previous work suggests that closures for /m/, /b/ and /p/ vary increasingly in both intraoral pressure (pressure between opening of vocal folds and mouth) [Lubker & Parris 1970, JASA 47: 625] and muscle force [Gick et al. 2012, JASA 131: 3345]. We propose that the frequency of labialized bilabials will vary due to differences in intra-oral pressure, with greater levels negatively influencing the likelihood of labiodentalization. On the other hand, higher degrees of smiling, thus greater degree of stress on articulators, will positively influence the frequency of labiodentalization. An experiment will be presented in which bilabial stops are produced under varying smile conditions. Undergraduate students from the University of British Columbia are recruited to participate in this experiment where participants will be video recorded and tasked to read aloud 31 different sentences, each containing one bilabial consonant, under three facial conditions (neutral, smiling, and laughing). Preliminary results indicate that labiodental stop variants occur more frequently for lower-force stops under higher-force smile conditions, as predicted. Implications for models of coarticulation will be discussed. [Funding from NSERC]. With a better understanding of coarticulatory mechanisms such as this, we hope to better determine the underlying control mechanisms in speech and add to the existing literature examining articulatory conflict.

Canadian Raising: Variation in Meaford, ON and Vancouver, BC

Geoff Fullerton
University of British Columbia, Linguistics

Canadian Raising (CR) is a well-studied phonological phenomenon which was first described in the early 1940s and more robustly quantified in the 1970s. In general terms, it is the process by which, under specific and seemingly well-defined conditions, the low onset of the diphthongs /aʊ/ (the vowel sound in "house") and /aɪ/ (the vowel sound in "wife") is produced in a "raised", mid position. The main condition which seems to trigger this alternation is the occurrence of these vowel sounds immediately preceding a voiceless consonant. For example, the vowel sound in a word like "ride" changes when it appears in the word "right". The the /d/ in "ride" and the /t/ in "right" are identically articulated in terms of tongue position; however, they differ in the presence and absence, respectively, of vocal fold vibration. In some dialects of English – most famously in Canadian English – when these vowel sounds are followed by consonants produced without vocal fold vibration (like /t/, /s/, /k/, /p/, etc.) they are produced with the tongue higher in the oral cavity than when they are followed by consonants with vocal fold vibration (like /d/, /z/, /g/, /b/, etc.). This is readily audible, and particularly salient to speakers whose dialects do not include it; popular caricatures of Canadian speech ("oot and aboot", for example) persist, though Canadians are by no means unique in exhibiting this feature. It can also be seen by looking at a spectrogram, where the lowest dark band represents the "height" of the tongue in the oral cavity (counterintuitively, the lower on the spectrogram this band lies, the higher the vowel). In the spectrograms below, the lowest band (highlighted in red) in "ride" is higher than that in "write" (i.e. the vowel is lower in "ride" than in "write").



Waveform and spectrogram of "ride"

Waveform and spectrogram of "write"

The present research continues a study of speakers in Meaford, Ontario, conducted by Hall (2005), the preliminary results of which suggested that conditions licensing CR among a subset of male speakers aged 65 or older were less well-defined than previously assumed. Put another way, raising was sometimes occurring in unexpected contexts, while sometimes not occurring where it would traditionally be predicted to.

This paper presents the results of a similar experiment conducted in Vancouver. Productions of local speakers, both of around the same age as the Ontario participants and in a younger, university-aged population, are acoustically analyzed, using the same method as above. Comparison of the two older groups will examine whether the unpredicted patterns found in the Ontario speakers arise within Vancouver speakers also, suggesting regional heterogeneity of CR if not. Comparison of older and younger Vancouver-based speakers will examine the stability – or change – of the conditions which compel CR in Vancouver.

Saturday, February 9th, 2019. IBLC 182
Invited Speakers Session

How structure emerges in young languages: Insights from novel compounding in Israeli Sign Language and Al-Sayyid Bedouin Sign Language

Oksana Tkachman (ABD)
(Dept. of Linguistics, UBC)

Sign languages can provide insights into many daunting linguistic questions, e.g., which properties of languages are truly linguistic and which are just an artifact of the modality (visual or auditory). As sign languages are also very young, they can also provide insights into how language develops in its earliest stages. In this talk, I will discuss how some of the basic structures, compounds, can emerge and conventionalize in young languages. Compounding is claimed to be universal and emerge early in language evolution, and the resulting units (compounds) have structure, albeit simple (the head-modifier relationship). Focusing on novel compounds coined by signers of Israeli Sign Language and Al-Sayyid Bedouin Sign Language, I will discuss how this structure develops in these young sign languages as well as implications for theories of language evolution.

Where there's a will, there's a way: **The Role of Motivation in Learning Languages**

Dr. Stefka Marinova-Todd
(School of Speech Science and Audiology, UBC)

It is commonly believed that the ability to achieve very high levels of proficiency in a non-native language (L2) gradually declines with age and learners exhibit great degree of individual variation in their ultimate language proficiency. However, research evidence has shown that post-pubescent learners could achieve native-like proficiency in their L2s. Language aptitude and motivation have been identified as more consistent predictors of language proficiency than the age of first exposure to the L2. I will present data from a project which examined the French language proficiency of French immersion high-school students in Vancouver. I will discuss our findings which highlight the role of motivation and socio-linguistic background as better predictors of foreign language proficiency than age or amount of time spent learning a language. In an increasingly #global world we must account for the changing demographics of students and support their language learning needs.

Simulated faces don't perfectly represent the real speech that underlies them: how perceivers deal with imperfect information

Dr. Ryan C. Taylor
(Dept. of Linguistics, UBC)

As communication occurs to a great extent through simulated faces, such as Apple's Animoji or avatars in virtual reality (Bloomberg, 2017), speakers are required to interpret simulated speech articulation and facial expressions. When interlocutors communicate with a virtual face, they use their long experience in communicating with real humans as a template to interpret speech coming from a simulated face (Cohen & Massaro, 1990), but bandwidth and technical limitations mean that these simulated facial expressions will not always show the expressions and speech articulations of the real face they represent with 100% fidelity. I will discuss recent experiments examining the perception of individual phonemes and prosodic emphasis from simulated faces, and how perceivers deal with imperfect information.

Speaker Session 3

Simulating Biomechanical Endpoints in Sign Language Movements

Himanshu Goyal, Praneeth Srungarapu Venkata, Oksana Tkachman, Bryan Gick
University of British Columbia, Linguistics

Sound is considered essential in determining the kinds of coordinated movements used in the phonetics of spoken language. While sign languages also have phonetics, they do not use sound, making sign language a valuable context for testing hypotheses about the speech phonetics. In speech we focus on acoustics but even speech depends on biomechanics. Our question for the present study primarily focuses on the fact that even though sign languages have a very wide spatial area and infinite number of movements through which different signs could be produced, most sign languages use very similar movements. Taking inspiration from the lip model of Gick et al. (2011), we used the ArmDemo model in ArtiSynth to demonstrate that the kinds of signs that are frequently observed across sign languages involving contact with other surfaces are robust to muscle activation overshoot errors where we relied on the concept of biomechanical endpoints.

Lateral Bias in Tongue Bracing During Speech

Felicia Tong, Yadong Liu, Megan Keough, Oksana Tkachman, Kate Radford and Bryan Gick
University of British Columbia, Linguistics

Bracing describes a tongue posture in which the tongue is in continual contact with another vocal tract surface. Lateral bracing, in particular, refers to when the two sides of the tongue contact the roof of the mouth, along either the upper molars or hard palate. Bracing assists in the mechanics of certain tongue movements and defines the sides of the tube through which medial speech sounds are produced e.g. /e/ or /s/, but bracing is interrupted during the production of some laterals and occasional low vowels (Gick et al., 2017). Some evidence suggests the movement away from the braced posture may be produced by lowering one side of the tongue first and that the leading side is consistent within speaker (Chen et al., 2017). This suggests that lateral bias may be present during tongue bracing.

Lateral Bias refers to a certain side of the body, left or right, being dominant, as in handedness. Human bodies exhibit lateral biases between many laterally symmetrical body parts (e.g., hands, feet, eyes, and ears) that increase the efficiency of behaviour and functionality of a system (Strauss & Wada, 1983).

We aim to examine lateral bias in English speakers, its correlation with other lateral biases of the speakers, and how this contributes to the origins of this bias. Preliminary results indicate some variation, with a population-level bias (preference for one side over the other). It may be case that the bias could develop with cortical modulation in a similar way that handedness is thought to arise.

Cross-Cultural Exchange and Language Complexity: A Backwards Relationship

Julian Rey
University of British Columbia, Linguistics

In this presentation, I discuss the reductive effects that globalization has had on the morphosyntactic complexity of English and German. To address the idea of language simplification, I will use Sampson and Trudgill's challenge of the stability of language complexity (Sampson and Trudgill, 2009) to support McWhorter's claim that overall language simplification is solely due to foreign loaning (McWhorter, 2008). Nailing down the definition of overall linguistic complexity is well beyond the scope of this paper, so I will focus on just a few areas of morphology and syntax. While globalization is a term that sees varied use, for this presentation I will draw on two perspectives: 'modern globalization', as described by Blommaert (Blommaert,2010), and 'general globalization', as described by Kusters (Kusters, 2004). I will demonstrate how English's loss of a number of features that are nearly universal to Germanic languages is directly related to globalization via McWhorter's theory. I will address the popular critiques of English's obscure, etymological spellings, demonstrated by titles such as BBC's 2005 "How the English language became such a mess," and briefly explain the persistence of these spellings in the face of globalization and standardization. Concerning German, I will address the concerns of Hoberg and his colleagues regarding the rapid disappearance of German language features (Hoberg, 2004), and to what extent they are justified in attributing this to the spread of English. I will compare English and German to claim that, among Germanic languages, there seem to be certain features that are more vulnerable to the effects of globalization, including inflectional morphology and variable S-V-O order. In addition, I discuss the parallel between the effect of globalization on language complexity and pidginization/creolization. This paper is motivated by the common lament of language change, which I have generally found among language purists (but also sometimes elsewhere). The sentiment is that a feature of language (e.g. lexical item, or morphological feature), once lost, is lost with a grave finality like the extinction of a biological species, supposing that nothing matching such elegant and unique expression could ever rise
again. If the reasons for the simplification and complexification of a language could be better understood by all, it would go a long way toward assuaging that fear (regardless of whether it is justified).

Speaker Session 4

Morphological Development of Typically–Hearing and Hearing–Impaired Children: Corpus Analysis

Esther Rhi, Abilgail Sayson
University of British Columbia, Linguistics

Exposure to language is necessary for a child to learn the established language of his or her particular community. This paper addresses children's morpheme development. According to Brown (1973), children go through the same language stages and show the same language learning behavior whatever language they are learning. Brown (1973) states that there is an order in which grammatical morphemes are acquired. He claims that the pattern of morphological development remains clear and consistent among children. Based on a finding by Cannon & Kirby (2013), children with hearing loss demonstrate language delays, with pronounced delays in phonological development. Following this research (Brown (1973) and Cannon & Kirby (2013)), the present study examines whether the patterns of morphological development is uniform by comparing the sequence in which typically-hearing (TH) and congenital severe-profound hearing-impaired (CSHI) children produce the following four morphemes: present progressive –ing, regular plural –s, third-person singular present tense –s, and regular past tense –ed. This topic has the potential to discover the mechanism that aids CSHI children's morphology, which can contribute to the improvement of interventions for children with hearing loss. Based on previous research outlined by Moeller et al. (2010) and McGuckian and Henry (2007), we predict that CSHI children will display a different acquisition pattern: present progressive –ing, regular plural –s, third-person singular present tense –s and regular past tense –ed, while TH children will mirror the morphological acquisition pattern explained by Brown (1973): present progressive –ing, regular plural –s, regular past tense –ed, and third-person singular present tense –s. The comparison was made from the Nicholas et al. (1997) corpus of naturally occurring speech of TH and CSHI children from 12 to 54 months. The order obtained from the data for CSHI children was regular plural –s, present progressive –ing, and regular past tense –ed while for TH children was present progressive –ing, regular plural –s, third-person singular –s and regular past tense –ed. These orders of the produced morphemes differed between the groups, which confirmed the hypothesis that the morphological development differ with TH and CSHI children. The finding revealed the order of morpheme acquisition in CSHI children's morphological development. Further research is required to support the order since there may be other alternative explanations that are likely to influence a child's morphological development.

Phonology of Adjective Intensification in American Sign Language

Yurika Aonuki
University of British Columbia, Linguistics

American Sign Language (ASL) has a phenomenon of intensifying the meanings of adjectives (i.e., expressing 'very' as in 'very good') by changing the form of the adjective itself. This project aims to provide phonological descriptions of this process as well as variability across lexical items in manifestation of intensification, with implications for the linguistic status and representation of the properties involved.Previous literature has identified a range of properties associated with intensification, including nonmanual components, modifications of movement, and longer duration of initial (i.e., pre-movement) and final (i.e., post-movement) holds, or periods in which the hand(s) are stationary (Klima & Bellugi, 1979; Padden, 1988; Brentari, 1998; Sandler & Lillo-Martin, 2006;Wilbur, Malaia, & Shay, 2012). However, a number of issues remain with regards to specific manifestations of these changes. For example, modifications of lexical movement include enlargement or addition of a movement path (Wilbur et al., 2012). Since signs can have a path movement, produced by the shoulder or elbow joints, and/or a local movement, produced by the wrist or finger joints (Brentari, 1998), it is not clear whether and how this modification applies to local movements, which, by definition, do not have a movement path. Moreover, repetition of movement is assumed to be lost under intensification (Klima & Bellugi, 1979; Padden, 1988), but this contradicted my initial observation of natural signing. This study considers a total of 99 adjectives. For each adjective, a female nonnative fluent Deaf signer from B.C., Canada was asked to sign a pair of sentences in the form of, for example, BOOK GOOD[1] 'The book is good,' with the adjective non-intensified in the first sentence and intensified in the second. Video recordings of each production were coded for their phonological properties, including duration, type of movement, size of the movement path, number of cycles of repetition, and joint(s) involved in each movement, as applicable.My results provide statistical support for lengthening of initial and final holds. A paired t-test shows that duration of the initial hold is significantly longer under intensification in both signs with a path movement [$t(71)=5.16$; $p=2.169\times10\text{-}6$] and those with only a local movement [$t(26)=4.55$; $p=0.0001$]. The same is true of the final hold in both signs with [$t(71)=4.10$;$p=0.0001$] and without [$t(26)=3.27$; $p=0.003$] a path movement. The tendency for enlargement of the movement path in signs with a path movement is also supported (Table 1). On the other hand, contrary to the previous assumption, for both path and local movements, repetition is maintained. The number of repetitions tends to even increase under intensification (Table 2).

Smaller	Same	Larger	Total
4	8	58	70

Table 1. Size of the movement path in intensified forms as compared to non-intensified forms

	Fewer	Same	Greater	Total
Path movement	2	6	7	15
Local movement	2	3	3	8

Table 2. Number of repetitions in intensified forms as compared to non-intensified forms

These generalizations will be followed by descriptions of other possible markers of intensification that can apply to local movements.

[1]I follow the convention in the literature to represent signs with small caps.

Quantifier Scope in Medumba

Hyo Seok (Brian) Park
University of British Columbia, Linguistics

In consideration of the scopal relationships of doubly-quantified sentences, variations are set into two broad categories: languages that allow inverse scope readings (scope ambiguous) vs. languages that only allow surface scope readings (rigid scope). The paper draws upon current linguistic theories and existing literature to answer if the two variations are exclusive to one other, or are more similar than previously assumed. The primary goal of this paper is to add on to the ongoing debate and showcase Medumba's unique handling of scope calculations. First, in Part 1, I attempt to lay a firm foundation of what quantifier scope is. Next in Part 2, experimental evidence provided in this paper during a Medumba quantifier scope judgement task, suggests that Medumba falls in the latter category- only allowing surface scope readings. Using the Medumba case-study as a transparent example of the arguing statement, a proposal here is made: scope ambiguous languages are derived from, processing-wise, the most economical scope calculation - rigid scope.

Examining The Hemispheric Dominance: Tones in Clear and Conversational Speech Among Native Mandarin Speakers

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This paper explores the hemispheric processing of tones in clear and conversational speech among native mandarin speakers. Speech style differs in various aspects including duration and formant contour between enunciation and conversation (Amano-Kusumoto et al., 2014). The hemispheric dominance of each speech condition could differ due to separated cerebral functions, such as a left-brain hemispheric specialization for logical information and a right brain specialization for intuitive information (Corballis, 2014). It is hypothesized that the clear tone is mostly perceived as an individual linguistic prosody, whereas the conversational tone is perceived more as a holistic and affective prosody. More specifically speaking in regard to the lateralization, there is a higher chance that the process for the speech is more left-lateralized in clear tonal environment, where the tonal information is delivered explicitly. On the other hand, pitch information and intonations are not always as obvious in a natural conversational setting because linguistic information is presented as a whole. In this case, tonal segments would be perceived using the right-lateralized cerebral Functions.

For stimuli, the 15 clear segments were recorded individually on their own, and the other 15 conversational CVs were parsed out from a continuous utterance. Stimuli were presented using dichotic listening procedures, and afterwards, participants were asked to identify the sounds they heard in each ear. The results of the present study demonstrated contrasting patterns in the processing of clear and conversational tones by native Mandarin speakers. For the clear tonal environment, accuracy is higher in the right ear than in the left, illustrating a REA (Right Ear Advantage) for the processing of salient Mandarin tones. In contrast, LEA (Left Ear Advantage) was discovered among the same group of listeners in processing conversational Mandarin tones. In general, listeners processed sounds more accurately under clear the condition than the conversational condition.

On average, data gathered through the dichotic listening procedure consistently supported the hypothesis and previous findings from the structurality-related argument (Van Lancker et al.,1980). The tempo-based hypothesis however, could not be concluded from the results due to the conflicting lateralization (Abrams et al., 2008). From the results, right hemispheric processing was observed for clear tonal perception, whereas left-lateralization was observed for conversational tonal processing.

Poster Session

The Development of Pragmatics in Preschoolers: The Case of Gricean Maxims

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Pragmatics is an essential component of communication that children must acquire as they learn to use language. H.P. Grice's (1975) theory of conversational maxims has had an important role in pragmatics. Grice (1975) proposed that speakers should abide by four such maxims in order to engage in effective conversations, namely: Quantity (provide sufficient information), Quality (tell the truth), Relation (be relevant), and Manner (be clear). If speakers violate a maxim, their conversational partner does not receive the necessary information to progress the exchange, thereby leading to a conversational breakdown.

Even though there has been considerable research on preschoolers' ability to identify maxim violations (Eskritt, Whalen, & Lee, 2008; Vàzquez, Delisle, & Saylor, 2013; Skarakis-Doyle, Izaryk, Campbell, & Terry, 2014), there is limited data available on the maxim violations that young children themselves commit in a conversational context (for an exception see Pellegrini, Brody, & Stoneman, 1987).

The objective of the present study is to address this knowledge gap by contributing data on children's maxim violations in everyday conversation. Improving understanding of Gricean maxim development will lead to increased knowledge of the development of pragmatics and conversational skills.

We are examining the developmental trajectory of Gricean maxim violations in preschoolers using a longitudinal design in the context of a 25-minute parent-child interaction at three years and again one year later at four years. Data collection ($n = 75$ children) is complete; video recordings of the parent-child interactions are currently being analyzed for children's violations of the Quantity and Relation maxims. Following after Pellegrini et al. (1987), parents' reactions to these violations are also being coded. Exploratory analysis of 10 participants showed a decrease in quantity violations over a 1-year period that approached significance $p < .13$, but there was no decrease in relation violations. We are currently coding more data and we will also analyze whether parental reactions to quantity violations predict changes in quantity violations over time.

We expect that the frequency of maxim violations will decrease with age. Further, we posit that the frequency of parental reactions to children's violations will be predictive of the amount that the children's violations decrease over time.

One Child, Two Languages: An Analysis of Code-Mixing and Code-Switching in Bilingual Children

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Bilingual children may commonly produce sentences, phrases, and even single words in two or more language varieties during a single conversation. This phenomenon is commonly called code-mixing, if the language alternations occur within the clause, or code-switching, if they occur beyond the clause. While some adults may view the use of two or more language varieties within the same utterance as a sign of confusion on the part of a child who fails to distinguish between different languages, studies suggest that code-switching and code-mixing in bilingual children are not random phenomena, but in fact obey certain rules. In this literature review, I examine the evidence which supports this view, drawing from previous studies which approach the question from a linguistic, cognitive, or pragmatic lens. I begin with an investigation into the language differentiation ability of young children, as well as the motivation behind code-switching and code-mixing, propelled by the computational cost of inhibiting the other language. This is followed by an analysis of the methods employed by bilingual children in code-switching, such as the selection of switching sites and the impact of grammatical and phonological considerations. I also consider the broader pragmatic context in which code-switching and code-mixing occur, focusing on the role of input and the amount of code-switching to which a bilingual child is exposed and how much he or she, in turn, produces. Finally, I comment on the consequences of viewing code-switching and code-mixing as a sign of confusion, in particular the monolingual view of bilingualism.

Biomechanical Constraints on Signed Languages: Repetitive Motion in Two-Handed Alternating Signs

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Do human walking patterns affect the type of signs that surface in sign language? Central pattern generators (CPGs) are neural pathways located in the spine that govern rhythmic, repetitive motions and result in unconscious coordination of anatomy that are activated in relevant movement such as locomotion (Grillner, 1985). In speech, these biomechanics shape phonetics-phonology: CPGs in the jaw evolved for chewing affect syllable patterns and a single motor action in the tongue may govern multiple kinematic speech events (Derrick & al, 2015). We propose that otherwise unexplained universal aspects of sign languages can be understood as resulting from a preference for repeated alternating arm movement that are triggered by CPGs from quadrupedal (that is, using four legs for locomotion) human ancestors that result in arms operating in similar ways to the legs (Emmerik & al. 1998). In sign language, signs can be categorized by the number of hands involved: one-handed, two handed unbalanced (where one hand dominates movement and the other is passive), and two-handed balanced (where the both hands move in similar fashions). It is the two-handed balanced category that we propose is affected by the pattern of locomotion. Two handed balanced signs can be symmetrical, in that they move in phase, or alternating, in that they move anti-phase. We consider the hypothesis that these alternating signs would be influenced to be repetitive in existing sign language lexicon, whereas symmetrical signs would not be repetitive as they would not activate the CPGs. Two sign language dictionaries were coded for these types of movements: Hong Kong Sign Language and American Sign Language, derived from separate sign language families. Alongside this, we coded whether the signs were repeated or done in a single motion, and the plane in which the signs moved. We discovered that in signs that were produced on the coronal plane, alternating signs showed a significantly greater tendency for repeated movement than symmetrical signs. Specifically, single symmetrical signs made up 74% of the symmetrical sign data, and repeated symmetrical 24%, whereas single alternating signs composed 28% of the alternating sign data, and repeated alternating 72%. Upon performing a chi-square these proportions were significant (for both languages, $p < 0.05$). The discussion proposes that these results suggest that alternating signs are influenced by the triggering of locomotive CPGs.

Aerodigestive and Communicative Behaviours in Anencephalic and Hydranencephalic Infants

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The aerodigestive and communicative behaviors of anencephalic and hydranencephalic patients are assessed from literature sources relative to neural structures present in the brainstem, subcortical, and cortical regions of the brain. Much of the data analyzed corroborate previous neurological studies which focus on central pattern generators and development in model organisms. However, findings suggest that further research is necessary to determine which components of these systems support these behaviors. A low reporting rate of behavior in tandem with pathology is observed throughout the literature. More data pairing behavior and pathology is recommended, both in the interest of understanding the relationship between neural structures and functions, and to provide clinicians with more information about a patient's signs and symptoms. Potential clinical practices are recommended to increase documentation about patients within this population.

Perception and Production: English Accent Training of Adult Native Speakers of Farsi Case study

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Perception and production tasks have been used to examine the role of training in accent reduction of English phonetics in Native- Speakers of Farsi who English is their second language. In this case study one adult Native- Speaker of Farsi has been chosen and three English consonants which they are absent in Farsi has been taught to him. A post-test and pre-test were conducted to see the result of training. Voiceless dental fricative//, voiced dental fricative // and glottal stop // are the 3 sounds that they are absent in Farsi and it is difficult for Farsi native- speakers to articulate those sound accurately. The goal of the present study is to examine brain plasticity and how the brain will be effected in the result of training and also to see if involved brain areas will change in Native- Speakers of Farsi after training. The result showed that after training Farsi speaker will be able to articulate the sound properly and there was a great improvement in his perception and production.

Audio Visual Speech Perception in South Asian Infants

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Speech perception in infants is a multisensory process: infants use auditory and other modalities including vision to acquire speech (Danielson, Bruderer, Kandhadai, Bateson, & Werker, 2017). Furthermore, past research has shown infants' ability to distinguish sounds regardless of their prior experience with those specific sounds. For instance, infants younger than six months of age are able to discriminate the dental [d̪] vs. retroflex [ɖ] in the Hindi language, even if they are not growing up with Hindi and hence are not hearing the distinction. In a pattern called perceptual attunement, discrimination of minimally different non-native speech sounds declines from six months to one year of age (Werker & Tees, 2002), whereas discrimination of native speech sound differences improves. Additionally, infants can match phonetic information to lips and voice, and this is seen in babies as young as two months (Patterson & Werker, 2002). However, it is not understood whether infants with prior experience with a language are better able to detect a mismatch in vocal and lip presentation. Thus, our research asks whether infants hearing Hindi are better able to detect a mismatch than those hearing English. In our study, Hindi-exposed six, nine and eleven-month-old infants are being recruited through the Early Developmental Research Group database in Vancouver, through social media sites and community organizations. Parents report that their infant hears approximately 50-100% of one of a specified set of South Asian languages. During the task, infants are seated on their caregiver's lap. In the first phase, infants watch a video of a speaker producing [d̪a] or [ɖa] repetitively and hear either the matching syllable or hear the mismatching syllable (e.g. see [d̪a] and hear [ɖa]). The next phase tests infants' auditory discrimination of the two sounds, with no visual speech information. Looking time to a still checkerboard in alternating (e.g. [ɖa] [d̪a] [ɖa]) vs non-alternating (e.g., [ɖa] [ɖa] [ɖa]) trials is measured, with differential looking time to one trial type as evidence of discrimination. An eye tracker is used to calculate the time infants look at the mouth and eyes in the first phase and the still checkerboard in the test phase. We predict a correlation between looking time to the mouth over the eyes in the first phase and longer looking to alternating trails compared to non-alternating trails in the test phase. The results of this study will be compared to previous data from English learning infants (published in Danielson et al., 2017), who detected the mismatch and discriminated the sounds at 6-months but no longer did so by 11-months. This study will advance our understanding of how language experience and multisensory speech perception interact in influencing perceptual attunement.

Exploring the power of language: How specific linguistic cues can guide children's attention to number

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We live in a rich perceptual world, making it difficult to attend to any singular perceptual dimension while inhibiting others. For example, even if we wanted to draw your attention to a particular object (e.g., a water bottle) you could still think about it along a number of different dimensions (e.g., its shape, purpose, size, colour, etc.). Thus, a challenge we face when communicating is, how do we reach common ground? We propose that one key role of language is to help guide our attention to particular perceptual dimensions, by exploring a case study of whether the use of number-specific linguistic cues (e.g., the quantifier "many") can guide children's attention to only the domain of number even in the presence of competing perceptual interference (i.e., contour length).

Children ages 7- to 8-years-olds were presented with sets of blue and yellow dots embedded in a visual illusion that created conflicts between non-numeric perceptual cues (i.e., contour length) and the number of dots on a screen. On half of the trials, the set with more dots appeared to have a longer contour length (i.e., the Congruent Trials); and on the other half of the trials, the set with numerically fewer dots actually had the longer contour length (i.e., the Incongruent Trials). These two types of trials were then compared across two tasks, one in which participants were asked to determine which side had "more" blue/yellow dots (i.e., the Discrimination Task; N target = ~30, current = 10), and another, where participants were asked to determine how "many" blue or yellow dots there were, without counting (i.e., the Estimation Task; N = 33). Importantly, if the number-specific quantifier (i.e., "many") is enough to draw attention solely to the domain of number, then we should expect that children will not be impacted by interference from the visual illusion.

Consistent with work in adults (Picon, Dramkin, & Odic, in press), our preliminary data suggests that when a broad linguistic cue (i.e., the quantifier "more") is used, children judge the set of dots with the longer contour length as being more numerous, demonstrating a strong bias towards contour length in the Incongruent Condition during Discrimination. In contrast, when children are given a number-specific linguistic cue (i.e., asked how "many" dots there are, during Estimation), we find no significant differences in the performance in the Congruent vs. Incongruent Conditions, suggesting that children's attention is drawn to only number and away from other competing perceptual dimensions (i.e., contour length).

These results suggest that providing different linguistic prompts may change what perceptual domains are attended to. Our findings contribute to a broader understanding of the power of language in helping to navigate our attention, including how children reason about their rich perceptual worlds.

Learning to estimate across domains: How children use language to reason about number, length, and brightness

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As adults, we can reason about quantity in several different ways: the first, is through an intuitive, albeit approximate, perception of quantity (e.g., when judging which line is shortest in the grocery store or which route the is the fastest to get to school), but importantly, we can also reason about quantity using language (e.g., through counting precisely the number of people in each line or measuring how many kilometers each route is). While these systems—the perceptual and the linguistic—are initially separate and distinct, around age 5, we begin to translate our perceptual representations into number words and vice-versa (Le Corre & Carey, 2007; Odic, Le Corre, & Halberda, 2015). As a result, children older than 5 can seamlessly produce an estimate of how many items they saw with relatively crude precision, without counting, demonstrating their ability to convert their perceptual representation of number into number words.

While previous research has largely focused on how children integrate language with their intuitive, imprecise perception of number, we explore how children accomplish this feat across other domains of quantity that, nevertheless share many of the same perceptual signatures, such as length and brightness (Starr & Brannon, 2015; Odic, 2018). Five- to 12-year-old children participated in two tasks. In the first task, the discrimination task, children were asked to determine which side of the screen was more numerous (e.g., judging which side had more dots, which line was longer, or which shape was darkest) in order to assess children's abilities to distinguish and perceive quantity across different domains (i.e., number, length, and brightness). Following the discrimination task, participants completed an estimation task in which they were asked to guess how many items there were in a display. To avoid the influence of experience, children were given novel units, corresponding to each dimension. For number, children were given a toma (i.e., a single dot), for length, a blicket (a single line segment), and for brightness, a modi (a single brightly coloured shape), and, were asked to estimate how many tomas, blickets, or modies they saw on the screen, following training with the new units. We then evaluated children's estimation performance by examining the accuracy and variability of their estimates against the true quantities shown.

Consistent with previous work (Dramkin, 2018; Odic, 2018; Odic, Libertus, Feigenson, & Halberda, 2013), we expect to find that children's discrimination abilities (i.e., their abilities to judge and perceive quantity) in the domain of number will not be related to their abilities to discriminate in other domains (e.g., length and brightness). However, we expect that once children are able to integrate perceptual representation with language (i.e., number words), their abilities to estimate in one dimension (e.g., number) should correlate with their abilities to estimate in others (e.g., length, brightness). We hope to show that while children's perceptual abilities are distinct, their ability to interface language with their representations of quantity are not. We will present and discuss our preliminary work within the broader context of the relationship between language and cognition.

A Syntactic Account of fo2 sing1 man4 – the New Cantonese-English Texting Language

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fo2 sing1 man4 is an emerging texting language used by teens and young adults in Hong Kong, in which they rapidly switch between Cantonese and English within sentences and phrases. Users of this language seem to have intuitions as to when and how switches are acceptable, which begs the question: is there a grammar to this language? If so, what are the rules? For my study, I hypothesize that *fo2 sing1 man4* does have a grammar, and fits with the framework proposed by Woolford (1983), developed from Spanish-English code-switching data. The preliminary results from the f*o2 sing1 man4* data suggest that the hypothesis is correct.

Given the facts from Spanish-English code-switching, Woolford (1983) proposes a generative model where speakers can freely draw phrase structure rules from both grammars. The lexicon of each grammar is limited to filling the terminal nodes created by the rules from the same grammar. In the case where a rule is common to both grammars, Woolford predicts that switching is allowed within that domain. For instance, since prepositional constructions (P NP) are the same in English and Spanish, the phrase *on les mesas* 'on the table' is allowed.

To test this hypothesis, my analysis targets three specific grammatical features, representing the three main categories in Woolford's framework:

(1) Cantonese-exclusive: perfective aspect particle *zo2* (*jor* in common orthography)
nei ***jo jor*** *survey mei?*
you do PFV survey yet?
"Have you finished the survey yet?"

(2) English-exclusive: determiner-noun constructions
this cafe *d cappuccino ging jeng u shd try try*
this cafe POSS. cappuccino super good you should try
"This café's cappuccino is super good, you should try it."

(3) Cantonese-English inclusive: coordination constructions
nei shg ngo order **yu dan fun or ngau hor**
you want me order fishball noodles or beef noodles
"Do you want me to order fishball noodles or beef noodles?"

Texting samples were collected for each feature, and their phrase structure rules were entered and tagged with the language used (e.g. *beautiful and wuddud*, AdjP → AdjP[E] Conj[E] AdjP[C]). It is important to note that given the historical context of English and Cantonese contact (Li 1999; Bauer 2006), samples with English loanwords were excluded, to ensure that there was no misanalysis of the switching occurrences.

Results on all three features have so far agreed with the hypothesis. In particular, the determiner-noun constructions showed the most consistency, where almost all samples have no switching. I would like to note that the sample size is still not large enough to draw concrete conclusions yet, but I hope to expand the database and perform statistical analyses on it. Sebba et al. (2012), a book on written code-switching has mentioned that "despite the variety of data, written language mixing remains relatively unexplored and under-researched …" (Sebba, 2012, p. 2). fo2 sing1 man4 provides us with another vast domain of natural data to test and develop our hypotheses about code-switching languages, especially during the emergence of big data. If results of this study are significant, it will contribute to the areas concerning syntactic frameworks of code-switching.

An Analysis of Gitksan Intonation Contours

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Regarding intonation of yes-no questions in Gitksan, not much research has been done. Tarpent's (1987) work on Nisgha, a First Nations language closely related to Gitksan, has found no signs of differentiation between declarative and interrogative intonation (p. 149). Tarpent (1987) looks at sentence level intonation, and states that in Nisgha, the sentences are "usually intoned in a medium to high voice register, dropping on utterance-final unstressed vowels" (p.149). While working on Gitksan, Rigsby did not find any difference between declarative and interrogative intonation contours. According to Rigsby, yes-no questions in Gitksan are marked by a question suffix and there is no change in intonation from declarative statements (p. 296).

However, we have potentially found evidence to suggest otherwise. Thus, having identified this as a relatively unexplored topic in the literature, we have decided to look into interrogative intonation in Gitksan. Specifically, we will be looking at whether or not there are patterns of intonation rising at the end of a Gitksan yes-no question. In order to analyze the presence or lack thereof of this phenomenon, we decided to use Praat, an application that is commonly used for intonation analysis. Our analysis was performed on yes-no question audio samples which we have collected from two Gitksan speakers who work closely with UBC's Gitksan Lab. We also took another set of declarative tokens from both speakers, which we took to act as a control. Both sets of tokens will be analyzed in Praat in order to show if a contrast between yes-no questions and declarative statements were present.

Our prediction is that there will be a contrast between the two types of sentences. More specifically, we predict that yes-no questions will show a general trend of intonation rising at the end of the sentences. We have no specific prediction on declarative intonation, however we felt that it would be important to have the tokens present during analysis to act as a control. The prediction that polarity questions will show a trend to rise at the end of the sentences comes from a preliminary interpretation of our collected data. Utilizing Praat's Picture window and the function "draw visible pitch contour," we have already qualitatively observed a trend towards rising. The purpose of our project will be to extend this qualitative research into the rest of the tokens we have collected. In doing so we will contribute to the growing body of work on the Gitksan language, and hope to provide some insight into Gitksan intonation.

Dealing with English Consonant Clusters - A Comparative Study of Cantonese and Tagalog Native Speakers

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The world's languages encompass a plethora of variation in phonetic inventory and phonological grammar. In regards to phonological grammar, many languages have constraints on which speech sounds can be combined together to form words (Jacquemont, Pallier, LeBihan, Dehaene, & Dupoux, 2003). For instance, Cantonese has a maximum syllable structure of consonant-vowel-consonant (CVC) and Tagalog has a maximum syllable structure of consonant-consonant-vowel-consonant (CCVC). Therefore, both languages do not allow for a sequence of three consonants (a CCC-consonant cluster) within a syllable occurring word-initially (Bauer & Benedict, 1997; Schacter & Otanes, 1978).

Although there are previous studies on how speakers deal with consonant clusters consisting of two consonants, studies have yet to examine how speakers deal with CCC-clusters (Setter, 2008; Zuraw, 2007). To extend past studies, our study observes how Cantonese and Tagalog speakers deal with English CCC-clusters, given the high phonological restriction on their onset structures. Past research has found that violations to the phonological grammar of a language are corrected through insertion, substitution, or deletion of a speech sound (Jacquemont et al., 2003). Therefore, we hypothesize that our subjects would perform the processes to deal with English CCC-clusters.

Six speakers, two of Cantonese, two of Tagalog, and two of English were asked to pronounce a list of 48 English words, 18 of which contain word-initial consonant clusters /skɹ/, /stɹ/, or /spl/. Recordings of these speakers were then imported into Praat, a software for phonetic analysis and segmentation. To measure the existence of insertion, substitution, or deletion, spectrograms of the non-native speakers were compared to their English counterparts. In the case of insertion or substitution, the inserted or changed segments were measured by formant values and duration. If there was an absence of process, the phonetic quality of the approximants /ɹ/ or /l/ were measured.

In terms of phonology, our results indicate that both Tagalog and Cantonese utilized phonological strategies to deal with consonant clusters. Tagalog speakers inserted [ə] or [i] word-initially, and substituted the trill [r] for rhotic [ɹ]; Cantonese speakers used substitution and deletion on [l] in the /spl/ target words.

In terms of phonetics, we found that both Tagalog and Cantonese speakers replaced foreign sounds with sounds in their phonetic inventory. For instance, 5 out of 6 tokens of /skɹ/ were replaced with [sk^{w}] for one Cantonese speaker, presumably due to /kw/ being in the Cantonese phonetic inventory. We also found that Cantonese [ɹ] productions were significantly shorter than their English counterparts, and the lessened difference in F3 onset and offset indicate less lip rounding.

To conclude, our results were consistent with our hypothesis. Both Cantonese and Tagalog speakers used phonological strategies to resolve CCC-cluster productions. The findings suggest that non-native English speakers transfer their L1 phonology and phonetics into English pronunciation. We would like to note that since our sample size is small, we were unable to perform statistical analyses on the quantified data. We hope to expand our data collection in the future.

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