



The ESRC International Centre for Language  
and Communicative Development

# Summer Conference





# Day 1

## Tuesday

### 11th June 2024

#### 12.00 - Lunch (1hour)

13.00	Welcome	Julian Pine
13.05	WP2.3 The Influence of Information Structure on Children's Production of Adverbial Clauses	Shijie Zhang
13.30	WP2.1 Testing pragmatic accounts of complex linguistic restraints	Liam Blything

#### 13.55 - Coffee break (15mins)

14.10	WP3.2. Modelling the trochaic bias in English as an emergent property of incremental chunking	Andrew Jessop
14.35	WP2.4 Multicultural families' home and community language environment	Chen Zhao

#### 15.00 - Coffee break (15mins)

15.15	Understanding peripheral sensory contributions to speech and language difficulties (following on from WP 1.1)	Samuel Jones
15.40	WP1.2 Neural correlates of statistical and prosodic cues during speech segmentation in typical adults	Panagiotis Boutris

#### 16.05 - Coffee break (15mins)

16.20	WP 1.3. Modelling the cross-linguistic pattern of verb-marking errors in typically developing children and children with DLD	Julian Pine
16.45	WP 2.2. Putting lexical cues into discourse context: A study of young children's processing of relative clauses	Silke Brandt

#### 17.10 - Close

#### 18.30 - Conference Dinner (Lancaster House Hotel Foodworks Restaurant)



# Day 2

## Wednesday

### 12th June 2024

#### 10.00 - Coffee break (15 mins)

13.00	Keynote: How we got here and where we might go	Elena Lieven
-------	--	--------------

#### 11.45 - Coffee break (15 mins)

12.00	Explaining individual differences in early language development: Insights from the Language 0-5 project	Caroline Rowland
12.30	Predicting language and literacy development from early statistical learning	Padraic Monaghan
13.00	Bigger or smaller? Children's interpretation of size comparison words changes across development.	Alissa Ferry

#### 13.30 - Lunch

#### 14.30 - Close

**Day 1**  
Tuesday  
11th June  
2024



# The Influence of Information Structure on Children's Production of Adverbial Clauses

---

**Shijie Zhang**



Efficient communication builds on the information we already share as common ground (i.e., given information). In what order the given information is presented, and in which syntactic structure the given information is located both affect how easily we process the information. The present study investigates how information structure influences the production of adverbial clauses in three age groups (four- to five-year-olds, eight-year-olds, and adult controls). We used a sentence repetition task in which information structure (main clause contained given information; subordinate clause contained given information), clause order (main-subordinate; subordinate-main) and connective type (before, after, because, if) were manipulated. Preliminary results show that four-year-olds ( $N=43$ ) and five-year-olds ( $N=43$ ) produced sentences containing given-before-new information more accurately than sentences containing new-before-given information, regardless of whether the given information was in the initial main or subordinate clause,  $\beta = 1.82$ ,  $SE(\beta) = 0.29$ ,  $z = 6.32$ ,  $p < 0.001$ . This finding indicates that young children already show sensitivity to information structure in their production. Moreover, the given-before-new information structure facilitates their processing of adverbial clauses. On the other hand, eight-year-olds ( $N=40$ ) also produced sentences containing given-before-new information more accurately, but only when the given information was in the initial subordinate clause (i.e., subordinate-main order),  $\beta = 1.52$ ,  $SE(\beta) = 0.39$ ,  $z = 3.87$ ,  $p < 0.001$ . This is likely because children get better at producing main-subordinate sentences in general as they age.

# Testing pragmatic accounts of complex linguistic restraints

---

**Liam Blything**



Consider the sentence 'He listened to music when Samuel felt tired'. English speakers interpret that 'he' cannot refer to 'Samuel', but instead refers only to a hypothetical previously-mentioned character. Therefore, languages appear to block certain pronouns from referring to particular characters. But how? A traditional account (Chomsky, 1987) is that interpretation is driven by an innate grammatical constraint that pronouns like 'he' and 'she' may not precede their referents when the pronoun is the subject of the sentence. More formally speaking, it argues that pronouns generally can only refer to referents that are within higher branches of a syntactic phrase structure tree – for example when the pronoun is in the subordinate clause (lower syntactic branch) and the intended referent is in the main clause (higher syntactic branch): 'When he listened to music, Samuel felt tired.' In three experiments, we tested our functionalist pragmatic account (Kuno, 1987; Ambridge et al., 2014) by means of a rating study with native English adult speakers. We provided two-clause sentences that each contain a 'he' or 'she' pronoun in the first clause, preceding a noun phrase in the second clause. If our account is correct, then the acceptability of intersentential coreference will increase with the mere plausibility that the pronoun within the first clause is the topic of the context expression within the second clause, alongside the extent to which the information within the clause containing the pronoun is defocused/backgrounded (i.e., is construable as providing only incidental information).

# Modelling the trochaic bias in English as an emergent property of incremental chunking

---

**Andrew Jessop**



From early in development, children acquiring English as their first language show a learning and processing advantage for words with trochaic stress (strong-weak: doctor, candy, broken) compared to words with iambic stress (weak-strong: giraffe, police, forgot; Graf Estes & Bowen, 2013; Jusczyk et al., 1993). One explanation is that children gradually construct an abstract trochaic template to guide their language processing across different contexts (McGregor & Johnson, 1997), since most content words in English are stressed on the first syllable (Cutler & Carter, 1987). However, another possibility is that the trochaic bias is the culmination of multiple word-specific effects rather a generalised stress representation. To test this hypothesis, we ran simulations with the CIPAL architecture (Jessop et al., 2024), which learns patterns in the language by building a diverse collection of chunks that have dynamic processing times based on how often they are used to recode the input. We trained CIPAL with samples of English child-directed speech that were presented as a stream of phonemes. The model was then tested with a set of 25 strong-weak and 25 weak-strong target words that were matched in frequency. CIPAL showed a consistent group-level preference for the strong-weak items. Specifically, the trochaic words were more likely to be represented as single chunks in long-term memory and had faster mean processing times compared to the iambic items. CIPAL also demonstrated an iambic bias when the phonemes in the training samples were presented in reverse order (ɪt ɪz ɛmpti → itpmɛ zɪ tɪ), consistent with evidence that children can adapt to different stress patterns in their input (Thiessen & Saffran, 2007). We suggest that the trochaic bias in English may emerge through an incremental chunking process without an abstract stress representation, as learning trochaic sequences may help children process their input more efficiently.

# Multicultural families' home and community language environment

---

**Chen Zhao**



The nature of the home and community language environment (HCLE) has received much attention over the years in terms of its effect on developmental outcomes. However, the HCLE of minoritised groups remains under-represented in the literature. In part one of our ongoing study, we are investigating the nature and effects of the HCLE on school readiness in British-heritage and Chinese-heritage families with children between ages of 3 and 5 living in the UK. Families were asked to complete short questionnaires covering features of the HCLE (parent-child activities such as frequency of reading or playing at home, attending events together; screen device usage; and number of books at home) and also parental child-rearing values, acculturation status (for the Chinese-heritage families), and parental perception of school readiness. The preliminary analysis reveals the following results. Firstly, more positive parental perceptions of children's school readiness were associated with more frequent interactive and enrichment activities, healthy media use, and more children's books. Additionally, we found a strong association between parental perceptions of children's school readiness and family socio-economic status. Secondly, British-heritage families were more frequently engaged in HCLE activities compared to the Chinese-heritage families. Children from the two heritage groups showed similar screen device usage and children's books at home. Furthermore, among Chinese-heritage families, parents who value independence and autonomy over conformity and obedience in rearing their children tend to engage in more interactive and enrichment activities and have more children's books at home, and their children use screen devices in a healthy manner.



# Understanding peripheral sensory contributions to speech and language difficulties

---

**Samuel David Jones**



Infants and children show incredible variability in speech perception that is attributable to processes in the developing ear and brain which remain poorly understood. In recent work, we advanced the new hypothesis that variability in children's speech perception, and therefore language learning, may be explained by developmental differences in the prenatal maturation of a crucial structure of the inner ear – the basilar membrane – to which the auditory pathway adapts, and in certain cases may adapt sub-optimally, during the first two years of life. This hypothesis is novel because most investigations of early variability in speech perception and language learning are directed at brain-level processes, rather than fundamental processes in the peripheral auditory system and higher-order cascading effects. This talk will summarise this work and present a related ongoing project in which we are developing a new biologically accurate spiking neural network model of the maturing auditory system. Using this new model in conjunction with a high spec 'head and torso simulator', we will be able to critically test our hypothesis against behavioural and neuroimaging data collected from 1,583 primary school children. This research programme aims to enhance our understanding of the neurological overlap between three clinical profiles: developmental language disorder, auditory processing disorder, and auditory neuropathy spectrum disorder.

# Neural correlates of statistical and prosodic cues during speech segmentation in typical adults

---

**Panagiotis Boutris**



Learning and understanding a language starts by identifying its building blocks, i.e. the words. When we are not familiar with a language, we rely on cues such as transitional probabilities (TPs) and stress to detect word boundaries (Saffran et al., 1997; Hoareau et al., 2019). This is very similar to how infants bootstrap vocabulary and grammar (Aslin et al., 1998; Pelucchi et al., 2009). Twenty young adults took part in an artificial-speech segmentation paradigm, exploring the neural tracking of speech and its segmentation into words by interchanging or mixing stress and TPs. Using a time-frequency approach, power at the word vs syllable frequency showed successful word tracking, suggesting segmentation, but only in the conditions where at least one of the cue was available. Average phase of each condition further revealed that not all cues are equally solid. Results suggest that segmentation can be aided by different kinds of cues to a different degree, whilst successful word tracking might not imply successful segmentation; the latter might be more dependent on phase reset.

# Modelling the cross-linguistic pattern of verb-marking errors in typically developing children and children with DLD

---

**Julian Pine**



Explaining the pattern of verb-marking error in typically-developing (TD) children and the pattern of verb-marking deficit in children with Developmental Language Disorder (DLD) is a key challenge for theories of language acquisition. However, both the pattern of verb-marking error in TD children and the pattern of verb-marking deficit in children with DLD vary across languages. MOSAIC is a computational model of language learning that simulates the developmental patterning of verb-marking errors across several different languages in terms of the interaction between edge-based biases in learning and the distributional properties of the input language. MOSAIC simulates differences in the rate of OI errors in Dutch, French, German, and Spanish. However, in its current form, it cannot simulate either the very high rates of OI errors in English-speaking children or the cross-linguistic pattern of verb-marking deficit in children with DLD. In this study, we supplement MOSAIC's basic learning mechanism with a mechanism that defaults to the most frequent form of the verb when the relative frequency of that form in the input is above a certain threshold. We investigate whether this new version of the model (MOSAIC+) provides both a better explanation of the cross-linguistic data on TD children and a means of simulating the cross-linguistic pattern of deficit in children with DLD. Our simulations show that MOSAIC+ can simulate both the very high rates of OI error in early child English and the fact that English-speaking children with DLD tend to show significantly higher rates of OI errors than MLU-matched controls, whereas Dutch- and German-speaking children do not, tending instead to show elevated, though still relatively low, rates of agreement and verb-positioning errors.

# Putting lexical cues into discourse context: A study of young children's processing of relative clauses

---

**Silke Brandt**



Object relative clauses (ORCs; the dog that the cat chased) are typically more difficult to process than subject relative clauses (SRCs; the dog that chased the cat), for both children and adults. Yet, some studies have shown that if the embedded NP (the cat) is replaced with a pronoun or mentioned previously, ORCs can be made easy. However, experiments with children have, to date, mostly presented relative clauses in isolation, without any discourse context. First, we examined the relationship between the lexical and discourse-level characteristics of embedded NPs in relative clauses through densely collected English-speaking developmental corpus data (range = 2-5 years) from three caregiver-child dyads. We analysed 1126 and 495 RCs from caregivers and children respectively and coded type of RC (SRC vs. ORC), and (1) type (pronoun vs. proper noun vs. lexical NP), (2) givenness, and (3) topichood of the embedded NP. For both child and child-directed speech, we found that a relative clause is more likely to be an ORC when the embedded NP is given and expressed by a pronoun. Our findings suggest that young children draw on both lexical and discourse-level cues when producing relative clauses. Secondly, we conducted an eye-tracking study with a picture-selection task with 3- (N = 48) and 5-year-olds (N = 48) to examine whether and how embedded NP type and givenness individually and/or jointly influence young children's online processing of SRCs and ORCs. Preliminary accuracy and response-time results suggest that ORCs were more difficult to process, especially when the embedded NP was expressed by a pronoun. However, when pronouns referred to given rather than new entities, processing became easier, suggesting that children are sensitive to interactions between discourse-level and lexical cues.



**Day 2**

Wednesday

12th June

2024

# How we got here and where we might go

---

**Elena Lieven**



I will start with a historical overview of the origins of LuCiD, followed by some reflections on the advantages and disadvantages of the different methods that have characterised our research. I will then turn to two of my major concerns: considerations of the innateness of language and the contribution of the input to learning. Finally, I will reflect on where I think the major, or most interesting, issues remain.

# Explaining individual differences in early language development: Insights from the Language 0-5 project

---

**Caroline Rowland**



The Language05 project was a multi-methodological longitudinal cohort study from LuCiD phase one (2014-19). It tracked the language development of 90 English-learning children from aged 6 months to 4;6 years, with the goal of establishing how differences in processing abilities, linguistic knowledge, socio-cognitive skills and the environment interact to predict individual differences in language acquisition. In this talk I summarise what we have learned from this unique dataset, including the effects of linguistic input, statistical learning, working memory, processing speed, babble, and gesture. Together the results point to a theoretical approach in which language development is conceptualized as emerging from rich pre-linguistic communicative and cognitive abilities, with individual learning trajectories being shaped by interactions between environmental input, the child's current knowledge, and the child's learning and processing mechanisms.

# Predicting language and literacy development from early statistical learning

---

**Padraic Monaghan**



Domain-general statistical learning ability has been proposed to underwrite children's oral language development and early reading development, but there are open questions about what type of statistical learning might relate most closely to language skills, and how their influence unfolds over time. In this talk I present our research on the Language0-5+ children, who were tested at 17 months on their statistical learning ability to segment and generalise an artificial language. We show how these abilities relate to children's oral language development over the next 3 1/2 years, and then how oral language and statistical learning come together to affect reading by age 6.



# Bigger or smaller? Children's interpretation of size comparison words changes across development

---

**Alissa Ferry**



The ability to compare things and to talk about those comparisons plays a key role in how humans learn, with associations with later educational outcomes. However, words that describe relations between objects, like comparisons, are difficult to learn and current evidence about their acquisition is mixed. We examined how children learn size comparison words, and how their interpretations of these changes across development. We tested how 3- to 8-year-olds interpret different words for size comparisons (e.g., bigger, smaller, taller) and examined how those interpretations change over development. We show that initial representations are initially imprecise, with children initially interpreting the comparison words to broadly refer to size increases. With age, children become sensitive to the distinction between words referring to increases compared to decreases (e.g., bigger vs. smaller) and finally dimensional attributes (e.g., that taller is bigger in a specific dimension). These findings suggest that children gradually refine their word-to-meaning mappings of comparative words across development.