1. Keynote Speeches

Learning from others in childhood and adulthood: the role of multimodal input

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Abstract

From birth, we are immersed in social contexts, in which we learn new information. Through interaction with caregivers, infants and young children learn about the world, including language, social norms, and culture. Adults continue expanding their knowledge through interactions with teachers, colleagues, friends, and other more knowledgeable individuals. For example, a young child may learn the word “kazoo" and what the object is while playing with their parents, an adult may learn the word “strigil" and its referent from a friend while visiting the British museum. In everyday interactions teachers (being caregivers or any more knowledgeable person) when introducing novel concepts and words provide a range of multimodal cues (e.g., gestures, eye gaze) that may help learners. However, we know little about the extent to which these multimodal cues may support learning above and beyond linguistic properties of their explanations and characteristics of the learner (e.g., their vocabulary or their working memory). In the talk, I will present analyses of the ECOLANG multimodal corpus of dyadic interaction that answer the following questions: (1) what are the verbal and/or non-verbal behaviours by a caregiver that predict learning of new words and vocabulary growth in young children? And (2) what are the verbal and non-verbal behaviours by a more knowledgeable person that predict learning of new words and their corresponding concepts in adult learners?

The potential for harnessing iconicity in the visual modality for language learning

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Abstract

From establishing joint attention to guiding visual attention, from singling out referents for naming to providing information about the size, shape, actions, or sounds of referents, there has been a substantial accumulation of evidence for the inherently multimodal nature of early caregiver-child interactions and for the role of multimodality in communicative development. A crucial process in language development is learning to map (spoken or signed) word forms to referents. However, this process encompasses much more than creating simple mappings between phonological forms and things in the world. Children need to become knowledgable about the referents that they learn words for. This includes understanding how things are used and for what functions, as well as being able to generalize across a range of different exemplars that a single label can refer to. Moreover, children need to learn that words refer to both present and displaced (non-present) referents and to both concrete and abstract entities. Finally, children need to learn that many words have more than one meaning, and that specific patterns of polysemy (e.g. instrument for activity) may exist in a language. In this talk, I discuss ways in which multimodality in early caregiver-child interactions may be harnessed to support these challenges of language learning. I focus in particular on the presence and use of iconicity in the visual modality, looking at sign and gesture, and present findings from a mix of studies, either directly investigating the use of child-directed language or, more generally, the role of iconicity in shaping the lexicon.

Gesture in parent-infant interaction: using the hands to read the mind

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Abstract

Spoken language emerges in a reliable way, with infants achieving key milestones at predictable ages. Gesture researchers identified how verbal milestones are both preceded and predicted by achievements in the gestural modality. For example, infants typically produce their first word around their first birthday, yet months beforehand they begin to point. Pointing predicts the size of infants' subsequent spoken vocabularies, and also the individual words they will acquire. Subsequent milestones in spoken language can also be traced back to a corresponding development in gesture.

In this talk I will give an overview of my work that has examined gesture in parent-infant interaction, including the use of baby sign by parents with their pre-verbal hearing children and the impact this has on the infant's language development and the mental attunement between parents and their infants. I will present a review of the evidence for the role of pointing in language development, discuss the proposed mechanisms, and highlight the paucity of work that has examined this relationship in non-western and bilingual infants. The findings from a cross-cultural investigation of mother-infant interaction across a Ugandan and British sample will be shared, focusing on infant pointing and maternal response to pointing. The similarities in pointing production and frequency between Ugandan and British mothers and infants will be discussed and an analysis of the cultural differences in the ways in which mothers respond to their infant's gestures will be presented. The findings will be examined in light of current theories around the function of gesture and the methodological challenges of cross-cultural work will be discussed.

Finally, recent studies that are attempting to examine pointing and differences in parental responses in UK bilingual infants will be discussed.

2. Oral Presentations

1.

How do you sign to children? – A case study of child-directed signing in a Balinese sign language

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Abstract

Parent-child interactions are often (though not universally) characterized by altered input (Bunce et al., 2020): speaking parents may modify pitch or syntax and signing parents may sign slower or on the child's body (Holzrichter & Meier, 2000; Pizer et al., 2011). The latter, termed child-directed signing (CDS) has been little studied, and exclusively in Western contexts where most deaf children have hearing non-signing parents. I present a case study of CDS in Kata Kolok (KK), a sign language that emerged due to congenital deafness in a Balinese enclave where deaf children receive immediate input from many hearing and deaf signers (Marsaja, 2008).

Using 96 hours of naturalistic recordings from four deaf children (1;0-3;0 years; Kata Kolok Child Signing Corpus, 2023), I document how CDS shapes social interactions. Three CDS strategies are common:

(i) **signing on the child's body**: limited to body-anchored signs yet often attested with high-frequency signs.

(ii) **displacing signs into the child's vision**: often coupled with explicit attention recruitment.

(iii) **moulding the child's hand into the target sign**: occurs with older children and more complex handshapes.

These strategies are also attested in other sign languages, suggesting universal characteristics of CDS. Moreover, I find that the strategies 1) are used by KK signers of all ages, including older siblings; and 2) require physical proximity, predicting higher use in settings with fewer conversation partners, despite the high frequency of multi-party conversations in KK. This study highlights how social and cultural practices influence parent-child interactions in an understudied sign language.

References

Bunce, J., Soderstrom, M., Bergelson, E., Rosemberg, C., Stein, A., Alam, F., Migdalek, M., & Casillas, M. (2020). *A cross-cultural examination of young children's everyday language experiences*. PsyArXiv. https://doi.org/10.31234/osf.io/723pr

Holzrichter, A. S., & Meier, R. P. (2000). Child-directed signing in American Sign Language. In C. Chamberlain, J. P. Morford, & R. I. Mayberry (Eds.), *Language acquisition by eye* (pp. 25–40). Lawrence Erlbaum Associates Publishers.

Lutzenberger, H.**,** de Vos, C., Kanta, K., Primantara, G.I., Astini, N.D., Sumarni, N.M., (2007-2023). "Kata Kolok Child Signing Corpus (KKCSC)" (2023). The Language Archive. https://hdl.handle.net/1839/f47a1a94-2d09-4e19-b721-7e9547cc796c.

Marsaja, I. G. (2008). *Desa kolok: A deaf village and its sign language in Bali, Indonesia*. Ishara Press. Pizer, G., Meier, R. P. and Shaw Points, K. (2011). Child-directed signing as a linguistic register. In R.

Channon & H. van der Hulst (Eds.), *Formational Units in Sign Languages*, Berlin: De Gruyter Mouton, 2011, pp. 65-84. https://doi.org/10.1515/9781614510680.65

2.

Sensorimotor Properties of Word Learning in Young Children with Down Syndrome

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Abstract

Head-mounted eye-tracking has previously been used to identify patterns of sensorimotor behaviour that are associated with word learning in typically developing children (Yu & Smith, 2012; 2017). However, these processes have not yet been explored in children with intellectual disabilities (ID). This study is the first to use head-mounted eye-tracking with young children with ID to explore child looking and holding behaviours in relation to word learning during parent-child interaction.

Fifteen parent-child dyads of typically developing (TD) children (17 – 27 months), and 15 parent-child dyads of children with Down syndrome (DS; 36 – 58 months) were included, matched on general ability level. Participants engaged with a free-flowing novel word-learning paradigm, while wearing head-mounted eye-trackers. Linear-mixed effects models were used to explore how child sensorimotor behaviours during parent labelling of the objects were associated with label learning.

For TD children, it was found that visually attending to the named object was predictive of word learning (Figure 1a). TD children were also likely to be holding the named object during moments when the object was named (Figure 2a). However, no significant relationships were found for children with DS for either measure (Figures 1b and 2b).

The findings for TD children are reflective of previous research. However, these relationships did not hold for children with DS. This suggests that there are group level differences in the sensorimotor properties underlying word learning between children with DS and TD children, indicating that further exploration of these processes in DS is necessary.

Figure 1

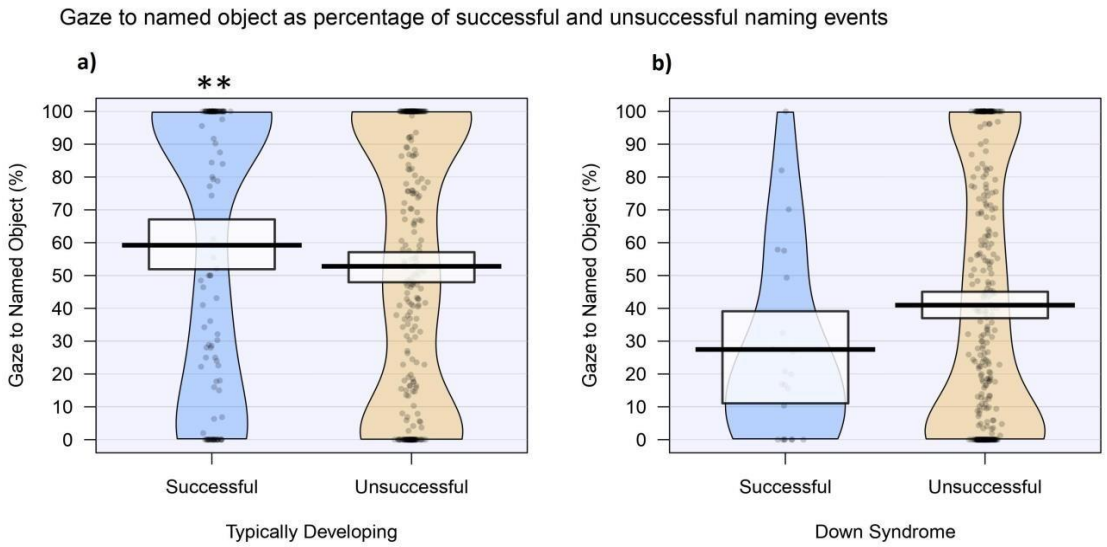
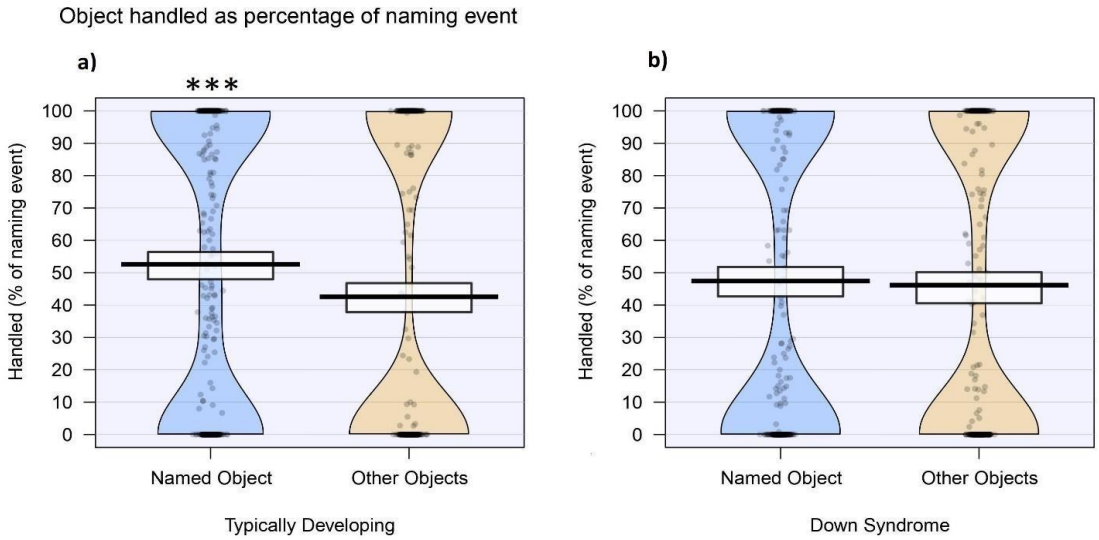


Figure 2



References

Yu, C., & Smith, L. B. (2012). Embodied attention and word learning by toddlers. *Cognition*, *125*(2), 244-262.

Yu, C., & Smith, L. B. (2017). Multiple sensory-motor pathways lead to coordinated visual attention. Cognitive science, 41, 5-31.

3.

Caregivers dynamically and adaptively alter their salience, moment-by-moment, contingent on the child's attention state

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Abstract

Classic approaches emphasise joint attention as a one-way flow of information from an adult caregiver, who didactically structures infant attention using ostensive cues, to an infant, who passively receives those cues (Csibra & Gergely, 2009).

However, an overwhelming body of evidence now suggests that, in fact, children are remarkably insensitive to adults' ostensive signalling during shared interaction (Southgate & Begus, 2012). For example, they do not follow caregiver gaze (Yu & Smith, 2012), and show little to no neural responsivity to caregiver gaze behaviours (Marriott Haresign et al., 2023). Therefore, our study investigates the hypothesis that caregivers influence infant attention by dynamically and adaptively altering the salience of their own multimodal behaviours, moment-by-moment, contingent on the attention state of the child.

We recorded free-flowing dyadic toy play across a tabletop of 5 ($N_{current}$ = 8, $N_{planned}$ = 30) and 15 ($N_{current}$ = 10, $N_{planned}$ = 30) month-old infants and their caregivers. We recorded infant and caregiver vocalisations and hand-coded infant attention shifts at 50Hz. We analysed multiple features of the caregiver's behaviour in a multimodal fashion: spectral flux, and semantic

complexity of caregiver vocalisations; and head orientation and velocity. We time-locked those time-series to infant look onset to the caregiver. Next steps will include extracting other salient features for the caregivers that could drive infant attention (e.g. hand and facial movement) and conducting cluster-based permutation analyses to check significance.

Preliminary visual examination (Fig.1-4) suggests that, during shared interaction, caregivers could dynamically recalibrate their own multimodal behaviours, moment-by-moment, contingent on the attention state of the child.

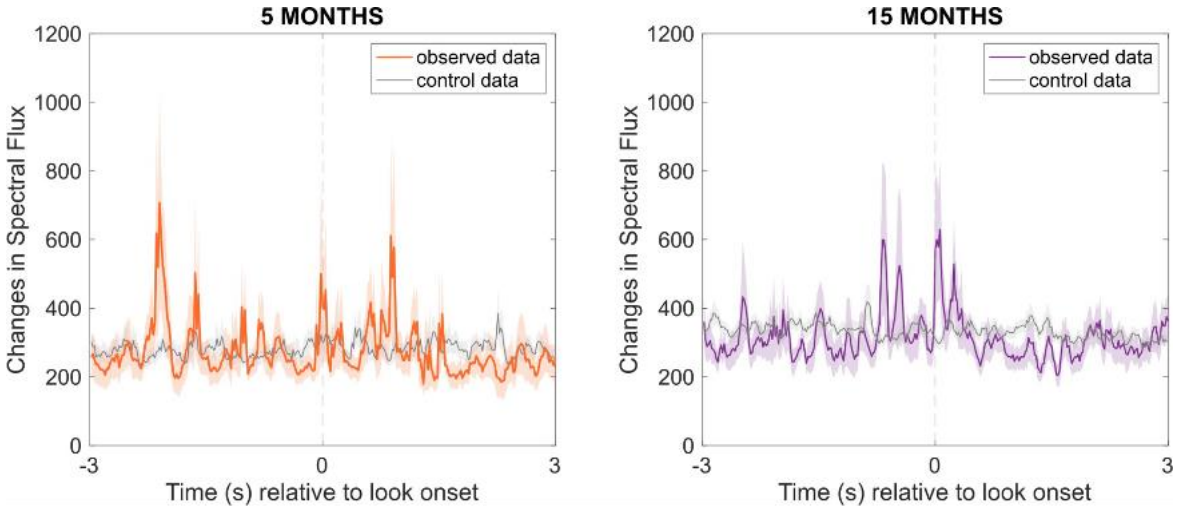

Fig 1:Caregivers' spectral flux around infant look onset at 5 and 15 months

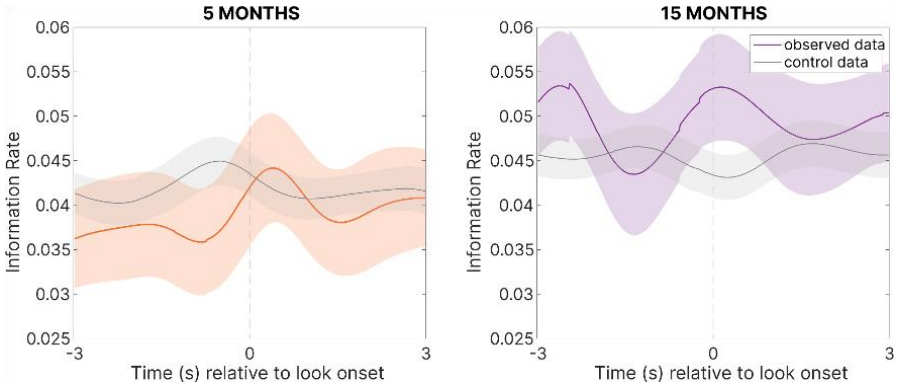

Fig 2: Caregivers' speech information rate head around infant look onset at 5 and 15 months

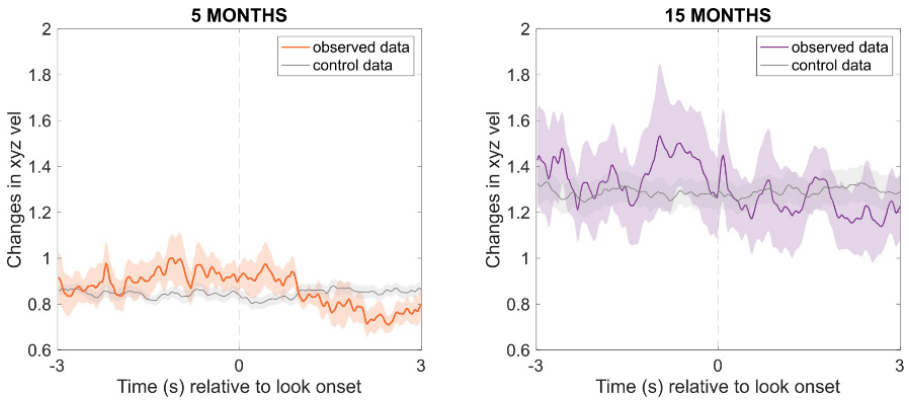

Fig 3: Caregivers' head velocity around infant look onset at 5 and 15 months

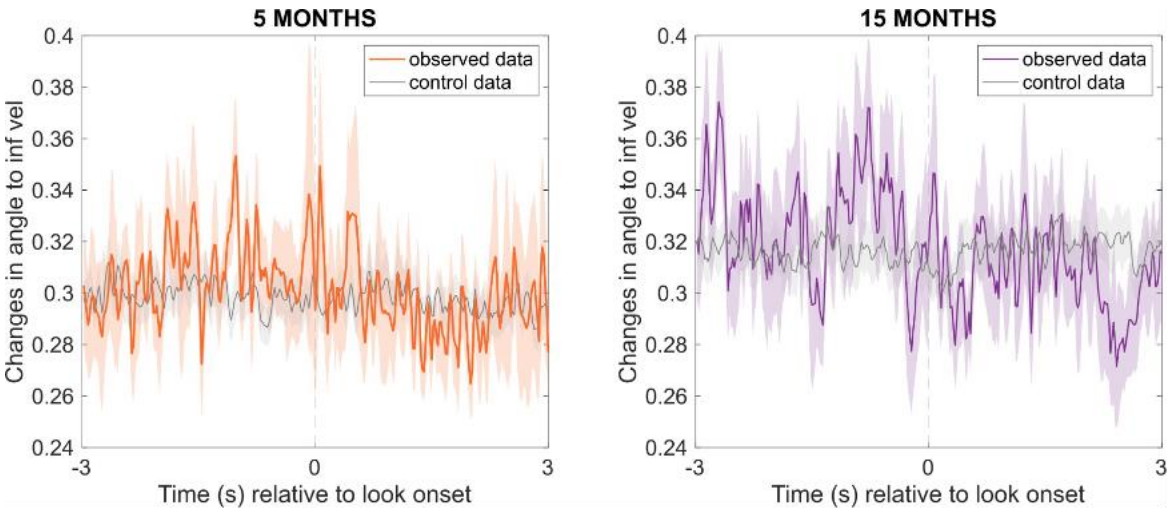

Fig 4: Caregivers' angular deviation from infant's head around infant look onset at 5 and 15 months

References

Begus, K., & Southgate, V. (2012). Infant pointing serves an interrogative function. *Developmental Science*, 15(5), 611–617. https://doi.org/10.1111/j.1467-7687.2012.01160.x

Csibra, G., & Gergely, G. (2009). Natural pedagogy. *Trends in Cognitive Sciences*, 13(4), 148–153. https://doi.org/10.1016/j.tics.2009.01.005

Haresign, I. M., Phillips, E., Whitehorn, M., Lamagna, F., Eliano, M., Goupil, L., Jones, E. J., & Wass, S. (2023). Gaze onsets during naturalistic infant-caregiver interaction associate with 'sender' but not 'receiver' neural responses, and do not lead to changes in inter-brain synchrony. *Scientific Reports*, 13(1). https://doi.org/10.1038/s41598-023-28988-0

Yu, C., & Smith, L. B. (2012). Embodied attention and word learning by toddlers Cognition, 125(2), 244–262. https://doi.org/10.1016/j.cognition.2012.06.016

4.

Understanding individual differences in multimodal child-directed language: The role of empathy and personality traits

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Abstract

Child-directed language usually has a slower speaking rate, higher pitch, shorter utterance lengths and more representational gestures. This study aims to better understand individual differences in multimodal child-directed language, specifically, the role of empathy and the Big Five personality traits. Forty-two female broadcasters participated in a simulated live broadcast for both adults and children. Participants' empathy and Big Five personality traits (neuroticism, extraversion, openness, agreeableness and conscientiousness) were assessed.

Using linear-mixed effects models, we analysed the differences in prosody (pitch; intensity; speaking rate), linguistic features (MLU; lexical diversity; lexical frequency) and gestures (saliency; rate) as a function of programmes, empathy, and personality traits.

Results showed that not all participants adapted in the same way in child-directed programmes: Prosodically, participants of higher empathy, neuroticism or lower extraversion talked faster; participants of higher empathy or lower openness raised mean pitch and intensity; participants of higher neuroticism or conscientiousness paused more frequently. For linguistic features, higher-empathetic participants used more frequent and diverse vocabulary; high neuroticism and conscientiousness led to longer utterance lengths. Moreover, broadcasters with high conscientiouness had small differences between programmes, while lower conscientiouness performed longer utterance lengths in ADL than

in CDL. Gesturally, higher-empathetic participants produced more salient pointing and beats, while higher-extroverted participants made more salient representational gestures. The rate of representational gestures was negatively correlated with neuroticism. High neuroticism resulted in little differences between programmes, while those with low neuroticism had a reverse pattern. In conclusion, empathy and personality traits play vital roles in predicting individuals' multimodal child-directed language.

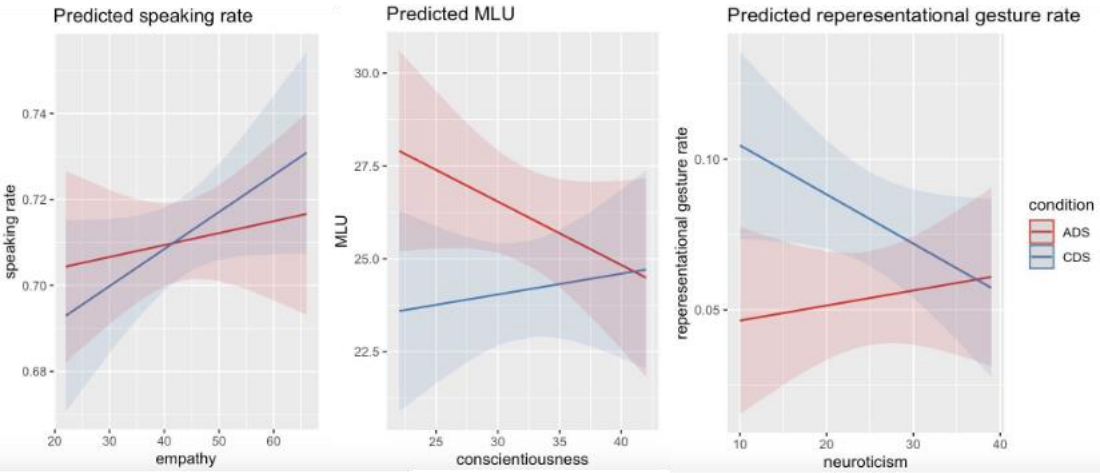

Figure: *An interaction between empathy and speaking rate (left), an interaction between MLU and conscientiousness (middle) and an interaction between representational gesture rate and neuroticism (right).*

References

Campisi, E., & Özyürek, A. (2013). Iconicity as a communicative strategy: Recipient design in multimodal demonstrations for adults and children. Journal of Pragmatics, 47(1), 14-27.

Chu, M., Meyer, A., Foulkes, L., & Kita, S. (2014). Individual differences in frequency and saliency of speech-accompanying gestures: The role of cognitive abilities and empathy. Journal of Experimental Psychology: General, 143(2), 694-709.

Cooper, R. P., & Aslin, R. N. (1994). Developmental differences in infant attention to the spectral properties of infant-directed speech. Child Development, 65(6), 1663–1677.

Cristia, A. (2013). Input to language: The phonetics and perception of infant-directed speech. Language andLinguistics Compass, 7(3), 157-170.

Han, M., De Jong, N. H., & Kager, R. (2022). Prosodic input and children's word learning in infant- andadult-directed speech. Infant Behavior and Development, 68, 101728.

Kempe, V. (2009). Child-directed speech prosody in adolescents: Relationship to 2D:4D, empathy, andattitudes towards children. Personality and Individual Differences, 47(6), 610–615.

McCrae, R. R., & Costa, P. T., Jr. (1997). Personality trait structure as a human universal. American Psychologist, 52(5), 509–516.

Pang, H. T., Canarslan, F., & Chu, M. (2022). Individual differences in conversational self-touch frequencycorrelate with state anxiety. Journal of Nonverbal Behavior, 46, 299–319.

5.

Get the Point in Space: What Children's Gestures Reveal about Their Mental Mappings of Spatial and Temporal Distances

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Abstract

Children use space to conceptualise time, but do they understand that longer temporal distances correspond to longer spatial distances? Given that gestures provide a window into spatial cognition (Levinson, 2003), we investigate children's pointings to reveal their mental mappings between the temporal and spatial distances.

145 Mandarin-speaking children (3-6 years, mean=4.86) undertook an 18-item pointing task of time-space mappings. Participants were asked to point out the appropriate location of 18 temporal terms in the white squares that were up to three units of spatial distance away from the black square "now" on each direction (e.g., left/right/up/down, Fig 1). The terms were divided into two distances based on length of time: shorter and longer duration (Fig 2).

Results revealed firstly words with longer temporal distances corresponded to longer spatial distances (2.20 vs. 1.89, $p<.0001$). This showed at four-year-olds (2.04 vs. 2.23, $p<.001$) and five-year-olds (1.75 vs. 2.20, $p<.0001$), but not three-year-olds (2.01 vs. 2.09, $p>.05$). Secondly, children more frequently mapped time to the vertical than the horizontal axis (59% vs. 41%, $p<.0001$). Specifically, terms representing the past were more often pointed to the left/top (LT, 58%) than right/bottom (RB, 42%) ($p<.0001$), whereas the future was more often pointed to

the RB (59%) than LT (41%) (p<.0001) (Fig 5). This study highlights (1) how gestures can visualize Chinese children's spatial understanding of temporal distance, especially in non-western contexts; (2) age four is a milestone to start forming correspondences between time and space, offering new insights into early cognitive development.

References

Levinson, S. C. (2003). *Space in Language and Cognition: Explorations in Cognitive Diversity* (1st ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511613609

6.

Linking vestibular, tactile, and somatosensory rhythm perception to language development in infancy

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Abstract

First experiences with rhythm occur in the womb, with different rhythmic sources being available to the human fetus. Among sensory modalities, vestibular, tactile, and somatosensory perception (VTS; Provasi et al., 2014) plays a crucial role in early processing (Phillips-Silver and Trainor, 2005; Tichko et al., 2021). However, a limited number of studies so far has focused on VTS rhythms in language development. In this work, VTS rhythmic abilities and their role in language development is explored through two Experiments with 45 infants (21 females; M age = 661.6 days, SD = 192.6) with middle/high socioeconomic status (Russo et al., 2024). Specifically, VTS rhythmic abilities are firstly assessed through a vibrotactile tool for music perception (Experiment 1). In Experiment 2, their link with linguistic abilities is evaluated by testing phonological and prosodic processing in the same cohort of infants. Discrimination abilities for rhythmic and linguistic stimuli across experiments are inferred from changes in pupil diameter to contingent visual stimuli over time, through a Tobii X-60 eye-tracker (Hepach and Westermann, 2016; Mathôt, 2018; Calignano et al., 2023). The predictive effect of VTS rhythmic abilities on linguistic processing and the developmental changes occurring across ages were explored by means of generalized, additive and linear, mixed-effect models (Baayen et al., 2008; van Rij et al., 2019). Results are discussed in terms of cross-sensory (i.e., haptic to hearing) and cross-domain (i.e.,

music to language) effects of rhythm on language acquisition, with implications for typical and atypical development.

References

Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of memory and language*, *59*(4), 390-412.

Calignano, G., Girardi, P., & Altoè, G. (2023). First steps into the pupillometry multiverse of developmental science. *Behavior Research Methods*, 1-20.

Hepach, R., & Westermann, G. (2016). Pupillometry in infancy research. *Journal of Cognition and Development*, *17*(3), 359-377.

Mathôt, S. (2018). Pupillometry: Psychology, physiology, and function. Journal of Cognition, 1(1).

Phillips-Silver, J., & Trainor, L. J. (2005). Feeling the beat: movement influences infant rhythm perception. *Science*, *308*(5727), 1430-1430.

Provasi, J., Anderson, D. I., & Barbu-Roth, M. (2014). Rhythm perception, production, and synchronization during the perinatal period. *Frontiers in Psychology*, *5*, 1048.

Russo, S., Carnovalini, F., Calignano, G., Arfé, B., Rodà, A., & Valenza, E. (2024). Linking vestibular, tactile, and somatosensory rhythm perception to language development in infancy. *Cognition*, *243*, 105688.

Tichko, P., Kim, J. C., & Large, E. W. (2021). Bouncing the network: A dynamical systems model of auditory–vestibular interactions underlying infants' perception of musical rhythm. *Developmental Science*, *24*(5), e13103.

van Rij, J., Hendriks, P., van Rijn, H., Baayen, R. H., & Wood, S. N. (2019). Analyzing the time course of pupillometric data. *Trends in hearing*, *23*, 2331216519832483.

3 Poster Presentations

1 Ana Mendoza Garcia

Multimodal dynamics of early triadic interactions: Insights from home and nursery school settings

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Abstract

Mapping the landscape for the development of early adult-infant interactions has been a frequent topic of interest in developmental psychology. Early interactions are fundamental in achieving key developmental milestones such as referential communication and language. Recent research has stressed the multimodal nature of early interactions (which includes the use by both adults and children of diverse communicative strategies such as gestures, actions on objects, physical and haptic contact, or emotional responses), as well as its predictive capacity on later communicative and linguistic development.

In this study, we aim at analysing the communicative strategies of infants and adults during free-play interactions in two natural settings. First, we filmed monthly longitudinal recordings of the interactions at home from 2 to 12 months of infants' age. Second, we filmed circle-time activities in nursery schools, over the school year and on a quarterly basis, with children 0-1 year, and 1-2 years of age. Data collection also included parental reports on children's communicative development using the MacArthur-Bates Communicative Development Inventories. Following a mixed-methods approach, we are qualitatively characterizing the interactions through microgenetic video analysis and behavioral coding, and we will use descriptive and inferential statistical techniques for quantitative variables (i.e. regressions and/or structural equations). Findings could be informative for depicting the complexity of the linguistic contexts to which

children are exposed, and that is particularly underexplored in nursery schools. They may also contribute to better understand the multimodal communicative dynamics that pave the way for language acquisition in the first two years of life.

References

Moll, H., Pueschel, E., Ni, Q., & Little, A. (2021). Sharing experiences in infancy: from primary intersubjectivity to shared intentionality. *Frontiers in Psychology*, *12*, 667679. https://doi.org/10.3389/fpsyg.2021.667679

Moreno-Núñez, A., Murillo, E., Casla, M., & Rujas, I. (2021). The multimodality of infant's rhythmic movements as a modulator of the interaction with their caregivers. *Infant Behavior and Development*, *65*, 101645. https://doi.org/10.1016/j.infbeh.2021.101645

Murillo, E., Montero, I. & Casla, M. (2021). On the multimodal path to language: the relationship between rhythmic movements and deictic gestures at the end of the first year. *Frontiers in Psychology*, *12*, 616812. https://doi.org/10.3389/fpsyg.2021.616812

Terrace, H. S., Bigelow, A. E., & Beebe, B. (2022). Intersubjectivity and the emergence of words. *Frontiers in Psychology*, *13*, 693139. https://doi.org/10.3389/fpsyg.2022.693139

A helping hand: Does gesture act as a compensatory communication tool during storytelling in former Late Talkers?

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Abstract

Children with a history of language delay are known to continue performing at the lower end of the language ability spectrum throughout development. Research on children with language delays typically focuses on expressive language. This study extends this work by examining how formerly language delayed children (former Late Talkers) convey information nonverbally using gestures, investigating the role of gesture in former Late Talkers' communication. Preschool aged former Late Talkers and Typical Talkers told four stories from wordless cartoons during a remotely conducted study visit. We examined their nonverbal communication in terms of gesture frequency, type of gestures used, and the informational relationship between spoken language and gesture. We hypothesized that former Late Talkers would rely on gesture more than their typically talking peers, recruiting gesture as a compensatory communication tool during storytelling. We found that former Late Talkers indeed use gesture when telling stories, however, we found no significant differences between the two groups in how much they gestured, which types of gestures they used (deictic and representational), and how they conveyed information in gesture relative to information conveyed in their spoken language. Thus, gesture appears to be a communication modality that former Late Talkers use adeptly as their typically talking peers,

suggesting that gesture may be a communicative strength of those with a history of language delay.

References

Alibali, M. W., Evans, J. L., Hostetter, A. B., Ryan, K., & Mainela-Arnold, E. (2009). Gesture-speech integration in narrative: Are children less redundant than adults? HHS Public Access. *Gesture (Amst)*, *9*(3), 290–311. https://doi.org/10.1075/gest.9.3.02ali

Alibali, M. W., Kita, S., & Young, A. J. (2000). *Gesture and the process of speech production: We think, therefore we gesture*. https://doi.org/10.1080/016909600750040571

Bates, E., Camaioni, L., & Volterra, V. (1975). THE ACQUISITION OF PERFORMATIVES PRIOR TO SPEECH. *Merrill-Palmer Quarterly of Behavior and Development*, *21*(3), 205–226. http://www.jstor.org/stable/23084619

Bernardis, P., & Gentilucci, M. (2006). Speech and gesture share the same communication system. *Neuropsychologia*, *44*(2), 178–190. https://doi.org/10.1016/J.NEUROPSYCHOLOGIA.2005.05.007

Bishop, D. V. M. (1998). Development of the Children's Communication Checklist (CCC): A method for assessing qualitative aspects of communicative impairment in children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *39*(6), 879–891. https://doi.org/10.1017/S0021963098002832

Bishop, D. V. M., & Edmundson, A. (1987). LANGUAGE-IMPAIRED 4-YEAR-OLDS: DISTINGUISHING TRANSIENT FROM PERSISTENT IMPAIRMENT. *Journal of Speech and Hearing Disorders*, *52*, 156–173. https://doi.org/10.1044/jshd.5202.156

Blake, J., Myszczyszyn, D., Jokel, A., & Bebiroglu, N. (2008). Gestures accompanying speech in specifically language-impaired children and their timing with speech. *Www.Sagepublications.Com*, *28*(2), 237–253. https://doi.org/10.1177/0142723707087583

Butterworth, G., Franco, F., McKenzie, B., Graupner, L., & Todd, B. (2002). Dynamic aspects of visual event perception and the production of pointing by human infants. *British Journal of Developmental Psychology*, *20*(1), 1–24. https://doi.org/10.1348/026151002166280

Capone Singleton, N. (2018). Late Talkers: Why the Wait-and-See Approach Is Outdated. *Pediatric Clinics of North America*, *65*(1), 13–29. https://doi.org/10.1016/j.pcl.2017.08.018

Catts, H. W., Fey, M., Tomblin, J. B., & Zhang, X. (2002). A Longitudinal Investigation of Reading Outcomes in Children With Language Impairments Language and Reading Research Consortium View project Syntactic Development in Adolescents With a History of Language Impairments View project. *Article in Journal of Speech Language and Hearing Research*. https://doi.org/10.1044/1092-4388(2002/093)

Cheung, R. W., Hartley, C., & Monaghan, P. (2021). Caregivers use gesture contingently to support word learning. *Developmental Science*, *24*(4). https://doi.org/10.1111/desc.13098

Collisson, B. A., Graham, S. A., Preston, J. L., Rose, M. S., McDonald, S., & Tough, S. (2016). Risk and protective factors for late talking: An epidemiologic investigation. *Journal of Pediatrics*, *172*, 168-174.e1. https://doi.org/10.1016/j.jpeds.2016.02.020

Colonnesi, C., Stams, G. J. J. M., Koster, I., & Noom, M. J. (2010). The relation between pointing and language development: A meta-analysis. *Developmental Review*, *30*(4), 352–366. https://doi.org/10.1016/J.DR.2010.10.001

Congdon, E. L., Novack, M. A., Brooks, N., Hemani-Lopez, N., O'Keefe, L., & Goldin-Meadow, S. (2017). Better together: Simultaneous presentation of speech and gesture in math instruction supports generalization and retention. *Learning and Instruction*, *50*, 65–74. https://doi.org/10.1016/J.LEARNINSTRUC.2017.03.005

Conti-Ramsden, G., & Durkin, K. (2012). Language Development and Assessment in the Preschool Period. *Neuropsychology Review*, *22*, 384–401. https://doi.org/10.1007/s11065-012-9208-z

Dale, P. S., Price, T. S., Bishop, D. V. M., & Plomin, R. (2003). Outcomes of Early Language Delay: I. Predicting Persistent and Transient Language Difficulties at 3 and 4 Years. In *Journal of Speech, Language, and Hearing Research* • (Vol. 46). https://doi.org/10.1044/1092-4388(2003/044

de Ruiter, J. P. (2006). Advances in Speech Language Pathology Can gesticulation help aphasic people speak, or rather, communicate? *International Journal of Speech-Language Pathology*, *8*(2), 124127. https://doi.org/10.1080/14417040600667285

Demir, Ö. E., Levine, S. C., & Goldin-Meadow, S. (2015). A tale of two hands: Children's early gesture use in narrative production predicts later narrative structure in speech. *Journal of Child Language*, *42*(3), 662–681. https://doi.org/10.1017/S0305000914000415

Demir, Özlem Ece, Fisher, J.A., Goldin-Meadow, S., Levine, S. C. (2014). Narrative Processing in Typically Developing Children and Children with Early Unilateral Brain Injury: Seeing Gesture Matters. *Developmental Psychology*, *50*(3), 815–828. https://doi.org/10.1038/jid.2014.371

Desmarais, C., Sylvestre, A., Meyer, F., Bairati, I., & Rouleau, N. (2008). Systematic review of the literature on characteristics of late-talking toddlers. *International Journal of Language & Communication Disorders*, *43*(4), 361–389. https://doi.org/10.1080/13682820701546854

Evans, J. L., Alibali, M. W., & Mcneil, N. M. (n.d.). *Language and Cognitive Processes Divergence of verbal expression and embodied knowledge: Evidence from speech and gesture in children with specific language impairment*. https://doi.org/10.1080/01690960042000049

Fenson, L., Pethick, S., Renda, C., Cox, J. L., Dale, P. S., & Reznick, J. S. (2000). Short-form versions of the MacArthur Communicative Development Inventories. In *Applied Psycholinguistics* (Vol. 21).

Girolametto, L., Wiigs, M., Smyth, R., Weitzman, E., & Pearce, P. S. (2001). Children With a History of Expressive Vocabulary Delay. *American Journal of Speech-Language Pathology*, *10*(4), 358–369. https://doi.org/10.1044/1058-0360(2001/030)

Goldin-Meadow, S. (1999). The role of gesture in communication and thinking. *Trends in Cognitive Sciences*, *3*(11), 419–429. https://doi.org/10.1016/S1364-6613(99)01397-2

Goldin-Meadow, S., & Butcher, C. (2003). *Pointing : where language, culture, and cognition meet*. L. Erlbaum Associates.

Goldin-Meadow, S., & Iverson, J. M. (2010). Gesturing across the Lifespan. *The Handbook of Life-Span Development*, *1*, 754–791.

Goldin-Meadow, S., & Singer, M. A. (2003). *From Children's Hands to Adults' Ears: Gesture's Rolein the Learning Process*. https://doi.org/10.1037/0012-1649.39.3.509

Goodwyn, S. W., Acredolo, L. P., & Brown, C. A. (2000). IMPACT OF SYMBOLIC GESTURING ON EARLY LANGUAGE DEVELOPMENT. *Journal of Nonverbal Behavior*, *24*(2).

Hawa, V. v., & Spanoudis, G. (2014). Toddlers with delayed expressive language: An overview of the characteristics, risk factors and language outcomes. *Research in Developmental Disabilities*, *35*(2), 400–407. https://doi.org/10.1016/J.RIDD.2013.10.027

Hostetter, A. B., & Alibali, M. W. (1986). Cognitive skills and gesture–speech redundancy. *Gesture*, *11*, 40–60. https://doi.org/10.1075/gest.11.1.03hos

Hostetter, A. B., Alibali, M. W., & Kita, S. (2008). *LANGUAGE AND COGNITIVE PROCESSES I see it in my hands' eye: Representational gestures reflect conceptual demands*. https://doi.org/10.1080/01690960600632812

Iverson, J. M., & Braddock, B. A. (2011). Gesture and motor skill in relation to language in children with language impairment. *Journal of Speech, Language, and Hearing Research*, *54*(1), 72–86. https://doi.org/10.1044/1092-4388(2010/08-0197)

Iverson, J. M., Capirci, O., & Caselli, M. C. (1994). From communication to language in two modalities. *Cognitive Development*, *9*(1), 23–43. https://doi.org/10.1016/0885-2014(94)90018-3

Iverson, J. M., Capirci, O., Volterra, V., & Goldin-Meadow, S. (2008). Learning to talk in a gesture-rich world: Early communication in Italian vs. American children. *First Language*, *28*(2), 164–181. https://doi.org/10.1177/0142723707087736

Iverson, J. M., & Goldin-Meadow, S. (2005). *Gesture Paves the Way for Language Development*.

Kendon, A. (2004). *Gesture: Visible Action as Utterance.* Spain: Cambridge University Press.

Luinge, M. (2006). The Ordering of Milestones in Language Development for Children From 1 to 6 Years of Age. *Journal of Speech, Language, and Hearing Research*, *49*, 923–940.

Mainela-Arnold, E., Alibali, M. W., Hostetter, A. B., & Evans, J. L. (2014). Gesture-speech integration in children with specific language impairment. *International Journal of Language and Communication Disorders*, *49*(6), 761–770. https://doi.org/10.1111/1460-6984.12115

McGregor, K. K., Rohlfing, K. J., Bean, A., & Marschner, E. (2009). Gesture as a support for word learning: The case of under. *Journal of Child Language*, *36*(4), 807–828. https://doi.org/10.1017/S0305000908009173

McNeill, D. (1992). Hand and mind: What gestures reveal about thought. In *Hand and mind: What gestures reveal about thought.* University of Chicago Press.

Miller, J., & Iglesias, A. (2020). *Systematic Analysis of Language Transcripts (SALT), Version 20*. Madison, WI: SALT Software, LLC.

Novack, M. A., & Goldin-Meadow, S. (2022). Harnessing Gesture to Understand and Support Healthy Development. In *Reference Module in Biomedical Sciences*. Elsevier. https://doi.org/10.1016/b978-0-12-818872-9.00075-3

Özçalişkan, Ş., & Goldin-Meadow, S. (2005). Gesture is at the cutting edge of early language development. *Cognition*, *96*(3). https://doi.org/10.1016/J.COGNITION.2005.01.001

Parrill, F. (2010). Viewpoint in speech–gesture integration: Linguistic structure, discourse structure, and event structure. *Language and Cognitive Processes*. https://doi.org/10.1080/01690960903424248

Parrill, F., Lavanty, B., Bennett, A., Klco, A., & Demir-Lira, O. E. (2018a). The relationship between character viewpoint gesture and narrative structure in children. *Language and Cognition*, *10*(3), 408–434. https://doi.org/10.1017/langcog.2018.9

Parrill, F., Lavanty, B., Bennett, A., Klco, A., & Demir-Lira, O. E. (2018b). The relationship between character viewpoint gesture and narrative structure in children. *Language and Cognition*, *10*(3), 408–434. https://doi.org/10.1017/LANGCOG.2018.9

Rauscher, F. H., Krauss, R. M., & Chen, Y. (1996). *Research Article GESTURE, SPEECH, AND LEXICAL ACCESS: The Role of Lexical Movements in Speech Production*.

Rescorla, L. (1989). The Language Development Survey: a screening tool for delayed language in toddlers. *Journal of Speech and Hearing Disorders*, *54*(4), 587–599. https://doi.org/10.1044/JSHD.5404.587

Rescorla, L. (2009). Age 17 language and reading outcomes in late-talking toddlers: Support for a dimensional perspective on language delay. *Journal of Speech, Language, and Hearing Research*, *52*(1), 16–30. https://doi.org/10.1044/1092-4388(2008/07-0171)

Rescorla, L. (2011). Late talkers: Do good predictors of outcome exist? *Developmental Disabilities Research Reviews*, *17*(2), 141–150. https://doi.org/10.1002/ddrr.1108

Rescorla, L., Dahlsgaard, K., & Roberts, J. (2000). Late-talking toddlers: MLU and IPSyn outcomes at 3;0 and 4;0. *Journal of Child Language*, *27*(3), 643–664. https://doi.org/10.1017/S0305000900004232

Rescorla, L., Mirak, J., & Singh, L. (2000). Vocabulary growth in late talkers: Lexical development from 2;0 to 3;0. *Journal of Child Language*, *27*(2), 293–311. https://doi.org/10.1017/S030500090000413X

Roos, E., & Ellis Weismer, S. (2008). Language Outcomes of Late Talking Toddlers at Preschool and Beyond. *Perspectives on Language Learning and Education*, *15*(3), 119–126. https://doi.org/10.1044/lle15.3.119

Rowe, M. L., Wei, R., & Salo, V. C. (2021). Early gesture predicts later language development. In *Gesture in language: Development across the lifespan.* (pp. 93–111). De Gruyter Mouton. https://doi.org/10.1037/0000269-004

Suttora, C., Guarini, A., Zuccarini, M., Aceti, A., Corvaglia, L., & Sansavini, A. (2022). Integrating Gestures and Words to Communicate in Full-Term and Low-Risk Preterm Late Talkers. *International Journal of Environmental Research and Public Health*, *19*(7). https://doi.org/10.3390/ijerph19073918

Thal, D. J., & Tobias, S. (1992). Communicative gestures in children with delayed onset of oral expressive vocabulary. *Journal of Speech and Hearing Research*, *35*(6), 1281–1289. https://doi.org/10.1044/jshr.3506.1289

Thal, D., & Tobias, S. (1994). Relationships between language and gesture in normally developing and late-talking toddlers. *Journal of Speech and Hearing Research*, *37*(1), 157–170. https://doi.org/10.1044/jshr.3701.157

Visser-Bochane, M. I., Reijneveld, S. A., Krijnen, W. P., van der Schans, C. P., & Luinge, M. R. (2020). Identifying Milestones in Language Development for Young Children Ages 1 to 6 Years. *Academic Pediatrics*, *20*(3), 421–429. https://doi.org/10.1016/J.ACAP.2019.07.003

Weismer E. (2007). Typical talkers, late talkers, and children with specific language impairment: a language endowment spectrum? In R. Paul (Ed.), *Language disorders and development from a developmental perspective* (pp. 83–101). Mahwah (NJ): Lawrence Erlbaum Associates.

Musical turn-taking: The Reciprocal Relationship between Maternal Infant-directed Singing and Infant Behaviour

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Abstract

Infant-directed (ID) singing has traditionally been divided into playsongs and lullabies (Trainor, 1996). Their distinct acoustic features are argued to have specific functions - to arouse and soothe, respectively (Cirelli et al., 2020). Previous studies have investigated the acoustic qualities of ID singing and infant reactions to it separately. Our study is the first to explore the reciprocal and multimodal relationship between fine-grained acoustic variability of live, naturalistic maternal ID singing and infant attention. Seventy-three mothers sang a playsong and a lullaby to their 7-month-old infants while we recorded infant attention via social gaze. Maternal ID singing was characterised via spectral-flux, which measures the multimodality of the acoustic signal via frequency and amplitude variability (Müller, 2015). We time-locked beat-normalised spectral-flux of maternal singing three beats before and after infant social gaze onsets. Results showed that, overall, spectral-flux was higher in playsongs than in lullabies ($p = .019$). Cluster-based permutation tests (1000 permutations) showed that in playsongs, spectral-flux was significantly above-threshold around 2.5 beats before and around 1 and 2 beats after look onset ($p < .0167$; Fig. 1). There were no significant changes in spectral-flux in lullabies. These findings suggest that infants and caregivers show mutual adjustment to each other across different modalities

which is modulated by song function. Infants react to changes in maternal singing by shifting their attention, and caregivers scaffold salient events after infant social gaze to maintain infant engagement.

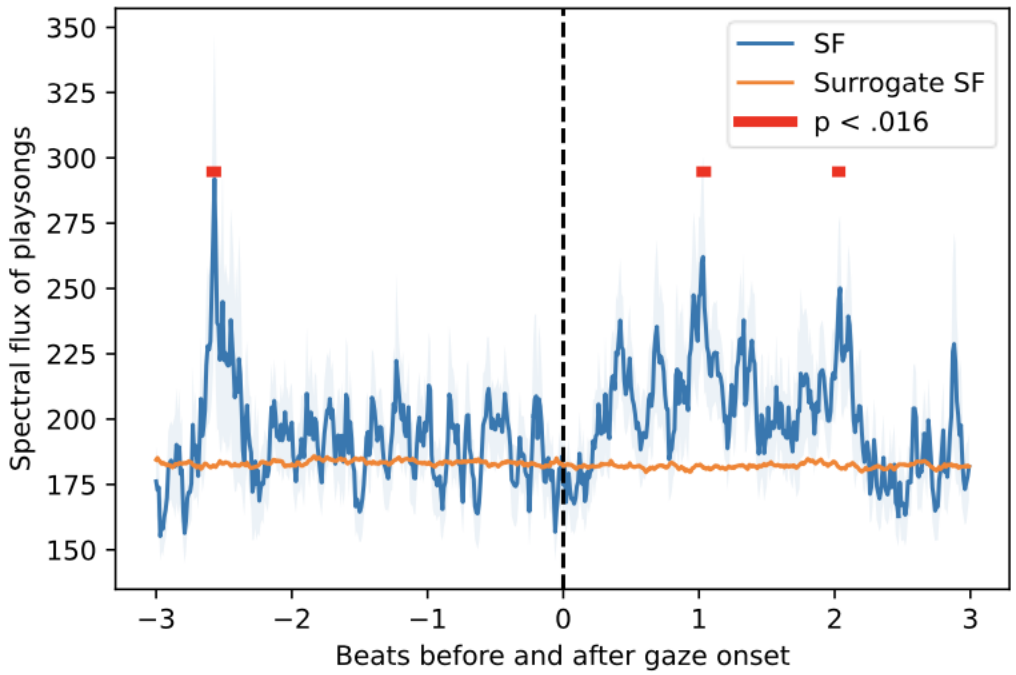

Figure 1: Spectral-flux of playsongs six beats around gaze onset, comparing original (blue) against surrogate data (orange).

References

Cirelli, L. K., Jurewicz, Z. B., & Trehub, S. E. (2020). Effects of maternal singing style on Mother–Infant arousal and behavior. Journal of Cognitive Neuroscience, 32(7), 1213–1220. https://doi.org/10.1162/jocn_a_01402

Müller, M. (2015). Fundamentals of music processing. Cham, Switzerland: Springer International Publishing. 467 pp. ISBN 9783319219448

Trainor, L. J. (1996). Infant preferences for infant-directed versus noninfant-directed playsongs and lullabies. Infant Behavior & Development, 19(1), 83–92. https://doi.org/10.1016/s0163- 6383(96)90046-6

Weineck, K., Wen, O. X., & Henry, M. J. (2022). Neural synchronization is strongest to the spectral flux of slow music and depends on familiarity and beat salience. eLife, 11. https://doi.org/10.7554/elife.75515

Various means of communicating likes and dislikes by children with severe and profound physical and intellectual disability in teacher-pupil interactions

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Abstract

Children with severe and profound physical and intellectual disability typically use various non-verbal means of communication to show what they like and dislike. Laughing, for instance, could reveal very different preferences. It does not only express a feeling of exhilaration but also carries other meanings (Bänninger-Huber & Salvenauer, 2023). It could be used as a means of regulating negative emotions in overwhelming situations (Bänninger-Huber & Salvenauer, 2023) or might convey dominance without resorting to verbal or physical aggression (Wood & Niedenthal, 2018). Another way of communicating likes and dislikes is tactile exploration. Hands eagerly investigate the immediate environment if an individual is interested in it and enjoys tangible stimuli. Hands can be withdrawn if non-preferred items are encountered. Children with visual impairments are frequently exposed to the use of tactile symbols (Lloyd, Fuller, & Arvidson, 1997) and Objects of Reference (OoR) to express their choices. In this way, a symbol, an entire or partial object represent an activity or a lesson. Preferences can be also communicated with the use of various eye tracking technologies. The Eye Gaze by *Smartbox* offers an opportunity to communicate 'more' for preferred items/activities and 'stop' for an activity to cease or to select a different one. Additionally, eyes closing is frequently an indicator of intentional decision to stop whatever is in progress. Finally, manifestations of self-harming and aggressive behaviours can be linked with the absence of preferrable objects/people or a wish to remove undesired environmental settings, staff or items.

References

Bänninger-Huber, E., & Salvenauer, S. (2023). Different types of laughter and their function for emotion regulation in dyadic interactions. *Current Psychology, 42*(28), 24249-24259.

Lloyd, L. L., Fuller, D. R., & Arvidson, H. H. (1997). *Augmentative and alternative communication: A handbook of principles and practices*. Needham Heights, MA: Allyn and Bacon.

Smartbox. Retrieved from https://thinksmartbox.com/

Wood, A., & Niedenthal, P. (2018). Developing a social functional account of laughter. *Social and Personality Psychology Compass, 12*(4), e12383.

Supporting Multimodal Literacies in Early Learning Settings

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Abstract

In early learning settings, multiple modes of communication are used to help young children convey meaning. These modes, or multimodal literacies, include signs, images, gestures, sounds, speech, movements, and actions (Kress, 2010; Makovichuk et al, 2014; Serafini, 2014). In this doctoral research, I explored how early learning and childcare educators support multimodal literacies in young children. Using a multiple case study, I utilized video walk-throughs of eight different educator playrooms, interviews with early childhood educators, and pedagogical documentation collected from educators to further my understanding of how multimodal literacies are supported in early childhood settings. The findings of this study revealed that educators of young children use multiple strategies to support multimodal literacies including pedagogical documentation (Stacey, 2015; Wein, 2013), responsive environments (Makovichuk et al, 2014; Curtis, & Carter, 2015) and a co-inquiry model of noticing, naming, and nurturing (Abramson, 2008*;* Hill, Stremmel, & Fu, 2005; Stacey, 2018). Lastly, my findings reveal that educator participation and finding a balance between supporting play and ideas and following children's lead in play is critical in supporting multimodal literacies. Implications include the need for early learning and childcare educators to use a broad view of multimodal literacies and a co-inquiry model first to observe the children's multimodal literacies, then reflect on their observations, and then nurture or extend these literacy practices. Early childhood educators should also consider how responsive environments are used to support multimodal literacies.

References

Abramson, S. (2008). *Co-inquiry: Documentation, communication, action. Voices of practitioners: Co-inquiry meetings for facilitated professional interchange.* National Association for the Education of Young Children. https://www.naeyc.org/files/naeyc/file/vop/Voices_Abramson_Co-Inquiry.pdf

Curtis, D., & Carter, M. (2015). *Designs for living: Transforming early childhood environments* (2nd ed.). Redleaf Press.

Hill, L. T., Stremmel, A. J., & Fu, V. R. (2005). *Teaching as inquiry: Rethinking curriculum in early childhood education.* Pearson Education Inc.

Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication.* Routledge.

Makovichuk, L., Hewes, J., Lirette, P., & Thomas, N. (2014). *Flight: Alberta's early learning and care framework.* http://www.childcareframework.com

Serafini, F. (2015). Multimodal literacy: From theories to practices. *Language Arts, 92*(6), 412–423. http://www.jstor.org/stable/24577533

Stacey, S. (2015). *Pedagogical documentation in early childhood: Sharing children's learning and teachers' thinking* (2nd ed.). Redleaf Press.

Stacey, S. (2018). *Emergent curriculum in early childhood settings* (2nd ed.). Redleaf Press.

Wien, C. A. (2013). *Making learning visible through pedagogical documentation.* Queen's Printer for Ontario.

Learning *apparently*: Attention and joint attention in contexts of abstract word use

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Abstract

Research on the acquisition of concrete word meanings has revealed the importance of joint attention (e.g. [1], [2]). We extend this to an abstract word, *apparently*. In ongoing work, we argue that *apparently* is used by speakers to indicate they have evidence for or a reason for believing their proposition. E.g. "Apparently it's raining" could be used when a speaker sees puddles and infers it is raining. We test the possibility that a speaker's attending to the evidence (e.g. looking at the puddle) constitutes a potential behavioural cue available for episodes of *joint* attention.

We extracted *all* utterances containing *apparently* spoken around children (n=24) from PhonBank's video-taped Providence corpus ([3], [4]). Tokens were coded for (1) what the speaker's evidence for their proposition was and whether it was something observable (i.e., a physical object/action), (2) if observable in principle, whether the speaker was attending to the evidence during the utterance or the utterance before (e.g. looking/pointing at it), and if so (3) whether the child appeared to be attending to the evidence.

For 19/24 tokens, the speaker's evidence/reason was inferable by the coder and for 12/19, the evidence was observable in principle. For 10/12, the speaker was attending to the evidence. For 4/10 the child also attended to the evidence (and for another 4 the child themselves was the evidence). These data support the possibility that *apparently* could in principle be learned using joint attention; however, actual joint attention was not frequent, suggesting learning by this process might be protracted.

References

Tomasello, M. (1988). The role of joint attentional processes in early language development. *Language Sciences*, *10*(1), 69-88.

Clark, E. V. (2015). Semantics and language acquisition. *The Handbook of Contemporary Semantic Theory*, 714-733.

Rose, Y., & MacWhinney, B. (2014). The PhonBank Project: Data and software-assisted methods for the study of phonology and phonological development. In Durand J., Gut U., & Kristoffersen, G. (Eds.), *The Oxford handbook of corpus phonology* (pp. 380-401). Oxford, UK: Oxford University Press.

Demuth, Katherine, Jennifer Culbertson, & Jennifer Alter. 2006. Word-minimality, Epenthesis, and Coda Licensing in the Acquisition of English. *Language & Speech, 49*, 137-174.

Evidence of mutual non-verbal synchrony in autistic learners and support workers: A Motion Energy Analysis study

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Abstract

Some research indicates that neurodivergent people are less likely than 'neurotypical' people to adapt their movements to a partner's movements to facilitate interpersonal motor synchrony. Researchers therefore suggest synchrony deficits underlie the social differences associated with autism and other neurodivergences. Intensive Interaction (II) is a client-led approach, where Learning Support Workers (LSW) follow the lead of learners to create balanced and reciprocal interactions. The purpose of our study was to examine the balance of synchrony in learners with autism and Severe Learning Disabilities (SLD) and their LSWs in a special education college where learners had prior experience with II. Using Motion Energy Analysis, we assessed the degree to which each partner acted as a leader, and hence which partner acted as a follower, during moments of close synchrony. Overall, learners and LSWs showed higher than chance synchrony. There were also no differences in the degree to which each partner led the moments of synchrony, or the amount pairs synchronised with zero-lag, where there was no delay between each partners' movements. The equal balance of leading and following in the learner and LSW pairs demonstrates that both partners consistently adapted their movements to their partner's movements to facilitate synchrony. The findings challenge the notion of a synchrony deficit in autism and suggest synchrony can be present in cross-neurotype pairs in comfortable and engaging conditions. We discuss the potential for client-led, movement-based approaches to support smooth interactions across neurotypes.

Influence of gestures in pedagogical settings

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Abstract

Introduction*:* Gestures play an essential role in predicting the development of language and communication skills in children [1]. Gestures have a positive impact on mathematical learning [2], [3], individual's navigation skills [4], and cognitive processes [5].Gestures can be rendered meaningful by highlighting the structure of a problem [6], thereby improving story recall [7], enhancing instructions' effectiveness[8], and supporting second language acquisition [9]. Adults display a greater number of gestures when their listeners are present [10], and employ more and wider gestures while communicating with a child [11]. Thus, the hypotheses are that participants use more gestures in the presence of a present listener (H1), more gestures while interacting with a child (H2) and that French speakers use more gestures than German speakers (H3).

Methods: Participants complete four tasks in the presence or absence of a five-year-old child or an adult. Ten stories with a consistent structure are presented, developed by [1], Gerlind Große and Crisna-Ioana Galusca. For the second task, participants describe a path, as adults utilize a greater number of deictic and iconic-deictic gestures in such tasks [12]. They present novel words [13], [14], [15]. Finally, there is a Piagetian Conversation task with liquids [16].

Results: The current research is ongoing, and thus, initial findings will be shared during the upcoming conference.

Significance and implications: The study is also noteworthy in that it will involve the documentation of participants through video recordings, which will subsequently be utilized for additional research endeavors.

Keywords: gestures, gesture coding, social learning, young children

References

[1] Vilà-Giménez, I., Igualada, A., & Prieto, P. (2019). Observing Storytellers Who Use Rhythmic Beat Gestures Improves Children's Narrave Discourse Performance. *Developmental Psychology*, *55*(2), 250–262. https://doi.org/10.1037/dev0000604

[2] Ausn, E. E., & Sweller, N. (2017). Geng to the elephants: Gesture and preschoolers' comprehension of route direction information. Journal of Experimental Child Psychology, 163, 1–14. https://doi.org/10.1016/j.jecp.2017.05.016

[3] Cook, S. W., Friedman, H. S., Duggan, K. A., Cui, J., & Popescu, V. (2017). Hand Gesture and Mathematics Learning: Lessons From an Avatar. *Cogn Sci*, *41*(2), 518 535. https://doi.org/10.1111/cogs.12344

[4] Gala, A., Weisberg, S. M., Newcombe, N. S., & Avraamides, M. N. (2015). Individual Differences in Spatial Ability Influence the Effect of Gesturing on Navigation and Spatial Memory. In G.Ferré & M. Tuton (Hrsg.), *Gesture and Speech in Interaction* (4th edtion (GESPIN 4)).

[5] Goldin-Meadow, S. (2000). Beyond Words: The Importance of Gesture to Researchers and Learners. *Child Development*, *71*(1), 231–239. https://doi.org/10.1111/14678624.00138

[6] Novack, M. A., Goldin-Meadow, S., & Woodward, A. L. (2015). Learning from Gesture: How Early Does It Happen? *Cognition*, *142*, 138–147. https://doi.org/10.1016/j.cognion.2015.05.018

[7] Aussems, S., & Kita, S. (2019). Seeing Iconic Gestures While Encoding Events Facilitates Children's Memory of These Events. *Child Dev*, *90*(4), 1123–1137. https://doi.org/10.1111/cdev.12988

[8] Ping, R. M., & Goldin-Meadow, S. (2008). Hands in the Air: Using Ungrounded Iconic Gestures to Teach Children Conservaon of Quanty. *Developmental Psychology*, *44*(5), 1277–1287.https://doi.org/10.1037/0012-1649.44.5.1277

[9] de Wit, J., Willemsen, B., de Haas, M., van den Berghe, R., Leseman, P., Oudgenoeg-Paz, O.,Verhagen, J., Vogt, P., & Krahmer, E. (2021). Designing and Evaluang Iconic Gestures for Child-Robot Second Language Learning. *Interacting with Computers*, *33*(6), 596–626. https://doi.org/10.1093/iwc/iwac013

[10] Alibali, M. W., Heath, D. C., & Myers, H. J. (2001). Effects of Visibility between Speaker and Listener on Gesture Producon: Some Gestures Are Meant to Be Seen. *Journal of Memory and Language*, *44*(2), 169–188. https://doi.org/10.1006/jmla.2000.2752

[11] Kang, S., Tversky, B., & Black, J. B. (2015). Coordinating Gesture, Word, and Diagram: Explanation for Experts and Novices. *Spatial Cognition & Computation*, *15*(1), 1–26. https://doi.org/10.1080/13875868.2014.958837

[12] Ausn, E. E., & Sweller, N. (2018). Gesturing Along the Way: Adults' and Preschoolers' Communicaon of Route Directon Information. *J Nonverbal Behav*, *42*(2), 199–220. https://doi.org/10.1007/s10919-017-0271-2

[13] Walter, A., Fritzsche, T., & Höhle, B. (2021). Grammacal gender acquision in German: Three-year-old children use phonological cues to learn the gender of novel nouns (http://www.lingref.com/bucld/45/BUCLD45-56.pdf). In *Danielle Dionne & Lee-Ann Vidal Covas (Eds.), Proceedings of the 45th Annual Boston University Conference on Language Development (Vol. 2, pp. 746–760). Cascadilla Press.*

[14] Grimm, H. (2015). SETK 3–5. Sprachentwicklungstest für drei- bis fünähnige Kinder. Göngen:Hoegrefe.

[15] Kauschke, C., Dörfler, T., Sachse, S., & Siegmüller, J. (2022). Patholinguissche Diagnosk bei Sprachentwicklungsstörungen. Elsevier.

[16] Church, R. B., Ayman-Nolley, S., & Mahooan, S. (2004). The Role of Gesture in BilingualEducaon: Does Gesture Enhance Learning? *International Journal of Bilingual Education and Bilingualism*, *7*(4), 303–319.https://doi.org/10.1080/13670050408667815

Sign-augmented word learning: what can we learn from the embodied experiences of young children with Down syndrome?

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Abstract

Introduction

Intellectual disability (ID) is often associated with language delay, which commonly emerges early in life but is responsive to early intervention (Fidler, 2005; Fidler & Nadal, 2007). There is much evidence to suggest that augmenting communication with manual signs, such as Makaton, can facilitate expressive language development in young children with ID (Cockerill, 2002). However, there is currently limited research on the specific learning processes involved in sign-augmented communication.

Previous research has used head-mounted eye-tracking to explore the sensorimotor properties of word learning in parent-child interaction (Yu & Smith, 2012; 2017). However, this research has so far omitted sign-augmented language in children with ID, despite its prevalent usage.

This study will be the first to use head-mounted eye-tracking to explore the sensorimotor properties involved in the development of sign-augmented language in young children with Down syndrome.

Methods

The study will recruit Makaton-using children with Down syndrome aged 2-5 years. The design will be adapted from previous research with typically developing children. While wearing head-

mounted eye-trackers, participants will engage in a free-flowing, novel word learning paradigm. Parents will be provided with a novel label and Makaton-like sign, assigned to novel toys. These signs have been co-produced with The Makaton Charity. Following the interaction period, the children will be tested on their receptive learning of the novel signs.

Analysis

The data will be frame-by-frame coded for gaze and handling behaviours, alongside parental speech and signing. Linear mixed effects modelling will be used to explore how these behaviours may be associated with learning of the novel signs.

References

Cockerill, H. (2002). Supporting communication in the child with a learning disability. *Current Paediatrics*, *12*(1), 72-76.

Fidler, D. J. (2005). The emerging Down syndrome behavioral phenotype in early childhood: Implications for practice. *Infants & Young Children*, *18*(2), 86-103.

Fidler, D., & Nadel, L. (2007). Education and Children with Down Syndrome: Neuroscience, Development, and Intervention. *Mental Retardation and Developmental Disabilities Research Reviews*, *13*, 262–271.

Yu, C., & Smith, L. B. (2012). Embodied attention and word learning by toddlers. *Cognition*, *125*(2), 244-262.

Yu, C., & Smith, L. B. (2017). Multiple sensory-motor pathways lead to coordinated visual attention. Cognitive science, 41, 5-31.

Exploring the interrelation of communicative-pragmatic skills: A study on speech act sequences in 2- and 3-year-olds

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Abstract

Language acquisition is rooted in the human desire to understand and express intentions – a social- cognitive, pragmatic skill (Tomasello 2000; Bruner 1975, 1983) that is a "cat's cradle of abilities" (Matthews 2014, p. 1; Bates 1976) which interact to adapt language use based on social context.

Coding speech acts is a means of categorising intention, verbally and nonverbally, which is at the core of communication development, including word learning (Tomasello 2000). Understanding successful communication better will help to identify difficulties in development sooner. Previous research on speech acts has focused on case studies (Bruner 1983; Halliday 1975; Bates et al. 1979; Dore 1974), parent's engagement (Pan et al. 1996), comprehension (Reeder 1980), nonverbal expressions (Lüke et al. 2020; Tomasello et al. 2007), or age of emergence and interchange growth (Snow et al. 1996; Ninio and Snow 1996; Schmidt et al. 2012). To date, we do not know much about how speech acts are realised in the transition between preverbal and early verbal development. Considering the complexity of pragmatics, how can we elicit comparable expressions of intent, and how do these different expressions compare?

Based on findings on pragmatic flexibility (Snow et al. 1996; Ninio and Snow 1996) and argument production (Köymen et al. 2014; Domberg et al. 2018), we developed a task to elicit

negotiations as a target speech act sequence – the PragmaSet. Twenty-two mother-child dyads participated remotely, providing self-recorded videos. We investigated the frequency of negotiations elicited by a violation of expectation in a house furnishing task (e.g. toilet in living room) and associated speech acts. We show that the PragmaSet is an effective way to code negotiations and speech acts (table 1 and table 2), including how different behaviours can encode the same intention (table 3).

The results suggest that the PragmaSet is a viable tool to elicit negotiations as a function of children's developing expression of communicative intent through verbal and nonverbal behaviour.

	Age								
	24 months (N=7)			30 months (N=9)			36 months (n=6)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Item-based negotiations	4.4286	4.0000	4.07665	6.8889	7.0000	3.48010	7.3333	7.0000	2.87518
Task-based negotiations	1.8571	2.0000	1.86445	2.0000	2.0000	2.29129	1.1667	.5000	1.47196
Situation-based negotiations	.1429	.0000	.37796	.5556	.0000	.88192	.0000	.0000	.00000
Off-task	.0000	.0000	.00000	1.7778	1.0000	1.71594	1.3333	.0000	2.80476
Unsuccessful overtures	1.1429	.0000	1.67616	.3333	.0000	.70711	1.5000	.5000	2.73861
Diversion	1.1429	1.0000	1.46385	2.4444	2.0000	2.69774	1.3333	.5000	1.75119
Uncooperative behaviour	.1429	.0000	.37796	.8889	.0000	1.36423	1.0000	.5000	1.26491

Table 1. *Descriptive statistics for the frequency of interchanges.*

	Age		
	24 months (N = 7)	30 months (N = 9)	36 months (N = 6)

Speech Acts	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Error detection	.7143	1	.75593	2.2222	2	.97183	3.5000	2	3.78153
Error correction	1.0000	1	1.15470	3.1111	3	2.08833	4.0000	4	1.89737
Error explanation	.1429	0	.37796	1.0000	0	1.50000	2.3333	1.5	2.58199
Criticism	2.5714	1	3.50510	3.0000	2	3.70810	3.6667	2.5	3.44480
Give ins	1.7143	1	1.60357	1.6667	1	2.12132	1.1667	0.5	1.47196
Promise	.0000	0	.00000	.0000	0	.00000	.1667	.0	.40825
Requests	7.7143	6	6.72593	2.8889	2	2.84800	3.6667	2.5	4.76095

Table 2. *Descriptive statistics for the frequency of speech acts associated with negotiation development within the entire PragmaSet.*

	Age	
	30 months	36 months
Multi-word utterances	12.00	26.44	20.33
One-word utterances	17.43	12.56	14.33
Vocalisation	3.71	5.11	5.00
Index-finger points	2.43	3.11	2.17
Hand points	.00	.44	.50
Iconic gestures	.29	1.22	.83
Emblem gestures	.71	2.11	2.17
Reaches	1.14	1.11	1.33
Taps	.86	.67	.67
Grabs	3.57	5.56	4.50
Shows	.71	.11	.83
Gives	.29	.00	.00
Moves	1.71	6.44	6.17
Other gestures	1.00	.22	1.17
Unrecognisable gestures	2.00	1.56	2.17

Table 3. *Mean frequencies of overlaps between verbal and nonverbal behaviour with item-based negotiations.*

References

Bates, Elizabeth (1976): Language and Context. The aquisition of pragmatics. In E. A. Hammel (Ed.): *Language, thought, and culture. Advances in the study of cognition.* New York: Academic Press.

Bates, Elizabeth; Camaioni, Luigia; Volterra, Virginia (1979): *The acquisition of performatives prior to speech*. In Elinor Ochs, Bambi B. Schieffelin (Eds.): Developmental pragmatics. New York, NY, London, UK: Academic Press, pp. 111–129.

Bruner, Jerome S. (1975): The ontogenesis of speech acts. In *J. Child Lang. 2* (1), pp. 1–19. DOI: 10.1017/S0305000900000866.

Bruner, Jerome S. (1983): Child's talk. New York: Norton.

Domberg, Andreas; Köymen, Bahar; Tomasello, Michael (2018): Children's reasoning with peers in cooperative and competitive contexts. In *The British journal of developmental psychology 3*6 (1), pp. 64–77. DOI: 10.1111/bjdp.12213.

Dore, John (1974): A pragmatic description of early language development. In Journal of *Psycholinguistic Research 3* (4), pp. 343–350.

Halliday, Michael A. K. (1975): *Learning how to mean. Explorations in the development of language.* London, UK, Caulfield East, AUS, Baltimore, US: Edward Arnold (Explorations in language study).

Köymen, Bahar; Rosenbaum, Lena; Tomasello, Michael (2014): Reasoning during joint decision- making by preschool peers. In *Cognitive Development 32*, pp. 74–85. DOI: 10.1016/j.cogdev.2014.09.001.

Lüke, Carina; Ritterfeld, Ute; Grimminger, Angela; Rohlfing, Katharina J.; Liszkowski, Ulf (2020): Integrated Communication System: Gesture and Language Acquisition in Typically Developing Children and Children with LD and DLD. In *Frontiers in psychology 11*, Article 118, pp. 1–13. DOI: 10.3389/fpsyg.2020.00118.

Matthews, Danielle (2014): Introduction. An overview of research on pragmatic development. In Danielle Matthews (Ed.): *Pragmatic development in first language acquisition.*

Amsterdam/Philadelphia: John Benjamins Publishing Company (Trends in language acquisition

research, 10), pp. 1–11.

Ninio, Anat; Snow, Catherine E. (1996): *Pragmatic Development.* Boulder, CO, Oxford, UK: Westview Press (Essays in Developmental Science).

Pan, Barbara Alexander; Imbens-Bailey, Alison; Winner, Kendra; Snow, Catherine (1996):

Communicative intents expressed by parents in interaction with young children. In *Merrill-Palmer Quarterly 42* (2), pp. 248–266.

Reeder, Kenneth (1980): The emergence of illocutionary skills. In *Journal of Child Language 7* (1), pp. 13–28. DOI: 10.1017/s0305000900007005.

Schmidt, Marco F. H.; Rakoczy, Hannes; Tomasello, Michael (2012): Young children enforce social norms selectively depending on the violator's group affiliation. In *Cognition 124* (3), pp. 325–333. DOI: 10.1016/j.cognition.2012.06.004.

Snow, Catherine; Pan, Barbara Alexander; Imbens-Bailey, Alison; and Herman, Jane (1996): Learning how to say what one means. A longitudinal study of children’s speech act use. In *Social Development 5* (1), pp. 56–84.

Tomasello, Michael (2000): The social-pragmatic theory of word learning. In *PRAG 10* (4), pp. 401– 413. DOI: 10.1075/prag.10.4.01tom.

Tomasello, Michael; Carpenter, Malinda; and Liszkowski, Ulf (2007): A New Look at Infant Pointing. In *Child Development 7*8 (3), pp. 705–722.

Infants can create different types of iconic gestures, with and without parental scaffolding.

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Abstract

Adults across cultures produce iconic gestures, but little is known about the early development of iconic gesturing in infants. Casting a wide net that included gestures produced during pretend play and those performed with objects in-hand, we identified the first 10 iconic gestures produced by five English-speaking children in a naturalistic longitudinal video corpus. Analyses of gestures' form and context shows that children produced their first iconic gesture between 12 and 20 months, the great majority of which depicted actions. We found mixed evidence suggesting that children produce conceptually less-challenging gestures earlier. Infants produced more object-in-hand gestures to depict transitive actions but also more imagined-object than body-part-as-object gestures. Most gestures were produced independently of models, and many demonstrated creativity. Overall, infants demonstrate impressive representational abilities and use gesture for a variety of communicative goals. Our findings highlight the importance of considering the interactional context when conducting gesture research.

Emergence of systemic communication - How infants employ motor components to create meaningful gestures in early interaction

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Abstract

The proposed lecture joins previous studies that have acknowledged gestures as playing an important role in communication development (McNeill, 1992; Goldin-Meadow, 2015; Volterra et al., 2017), and explores two types of the gestures used in early childhood – iconic and conventional gestures.

Our analysis relies on the fine-grained description of structural features of five typical gestures frequent in mother-child interactions, while integrating insights from manual motor development. Following the growing body of research that investigates formational aspects of gestures as key to understanding this symbolic system in both adults (Kendon, 2004; Calbris, 2011; Müller et al., 2013) as well as adult-child interactions (Goldin-Meadow, 2003; Graziano 2014), we analyze how motor components such as hand-shape, direction and range of movement, and contact are recruited by fifteen 1;5-year-old infants to create patterns conveying consistent meanings when they refer to entities and actions and when they manage the interaction in different contexts.

We will discuss, through its reflection in the gesture's structure, the process of embodied human communication in which the infants abstract away from everyday actions by using their body and represent the sensorimotor experience in which these actions are grounded (Glenberg & Robertson, 2000). Moreover, we will shed light on the symbolization constraints in the physical dimension and discuss the relationship between pragmatic complexity and the recruitment of early developing motor skills, such as the use of contact in early iconic gesture.

References

Glenberg, A. M., & Robertson, D. A. (2000). Symbol grounding and meaning: A comparison of high-dimensional and embodied theories of meaning. *Journal of Memory & Language, 43*, 379-401.

Graziano, M. (2014a). The development of two pragmatic gestures of the so-called Open Hand Supine family in Italian children From *Gesture in Conversation to Visible Action as Utterance: Essays in Honor of Adam Kendon*, eds Seyfeddinipur M., & Gullberg M. (Amsterdam: Benjamin), 311–330.

Goldin-Meadow, S. (2003). The Resilience of Language: What Gesture Creation in Deaf Children Can Tell Us About How All Children Learn Language (1st ed.). *Psychology Press.*

Goldin-Meadow, S. (2015). Gesture as a window onto communicative abilities: Implications for diagnosis and intervention. *Perspectives on Language Learning And Education,* 22, 50–60.

Kendon, A. (2004). *Gesture: Visible Action as Utterance.* Cambridge: Cambridge University Press.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Chicago: University of Chicago Press.

Müller, C., Cienki, A., Fricke, E., Ladewig, S., McNeill, D., & Tessendorf, S. (eds.) (2013). *Body – Language – Communication* (HSK 38.1), de Gruyter, 707–733. Volterra, V., Capirci, O., Caselli, M. C., Rinaldi, P. & Sparaci, L. (2017). Developmental evidence for continuity from action to gesture to sign/word. *Language, Interaction, Acquisition,* 8(1), 13–41.

Do Pre-verbal Infants Respond to Caretaker Body Language During Play?

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Abstract

Researchers have examined *gestural* communication between preverbal infants and caretakers. Abels (2020) found that 9-month-old infants express themselves through nonverbal gestures in triadic interactions, involving joint focus between an infant and caretaker on a separate item. Oryadi-Zanjani (2020) found that nonverbal communication, such as eye gaze and facial expressions were established between 0-3 months, while gestures, postures, and movement, became established from 6-12 months. These pieces of research highlight a range of communication methods, from caretakers using PPT, to infant responses using gestures. This project is concerned with manual gestures between infants and caretakers during a play scenario.

Thirty-seven infants were observed (5-14 mo.) across three trials which occurred at even intervals. Caretaker and infant dyads were provided stackable objects to be used in a 5-minute play interaction which was recorded. Interactions were coded for manual actions performed by both the infant and caretaker, which occurred in a sequence and included: mirror action, object interaction, observe and look away (infant responses); hand fold, wait and observe, mirror action, clap (caretaker signals). Results show that infants performed a response action following a caretaker signal 77% of the time. Folding hands was performed more than all other caretaker actions and were followed by an infant response 73% of the

time. Caretaker signals occurred in the highest frequency when infants were 8 and 9 months old, which is also when infant responses were at their peak.

Keywords: body language, infant, recognition, communication

References

Abels, M. (2020). Triadic interaction and gestural communication: Hierarchical and child- centered interactions of rural and urban Gujarati (Indian) caregivers and 9-month-old infants. *Developmental Psychology*, *56*(10), 1817–1828. https://doi.org/10.1037/dev0001094

Okamoto, Y., Sugano, Y., Shoji, R., Takahashi, C., Yagishita-Kawata, A., Aoki, Y., Ishikawa, A., Kamei, M., Kawata, M., Suda, O. (2014). The function of parental proxy talk in pre- verbal communication. *Japanese Journal of Developmental Psychology*, *25*(1), 23–37.

Oryadi-Zanjani, M. M. (2020). Development of the childhood nonverbal communication scale. *Journal of Autism and Developmental Disorders*, *50*(4), 1238 - 1248. https://doi.org/10.1007/s10803-019-04356-8

Trajectories of communication skills in children with developmental delays and those later diagnosed with autism

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Abstract

Little is known about whether early communication development in children later diagnosed with autism is similar or different to children generally with developmental delays. Understanding predictors of better communication outcomes may help to inform early interventions.

Secondary analysis of longitudinal data was used to explore communication outcomes of 112 children with autism and 54 children with developmental delays aged between 20 and 55 months at Time 1. Linear growth models were used to investigate trajectories of early communication skills across three-time points. Imaginative play, child behavioural and emotional problems, child initiation of joint attention skills, child response to joint attention skills, and child developmental level were examined as predictors of communication outcomes over two years.

Communication skills increased over time in both groups of children. However, children with autism displayed lower levels of communication skills compared to children with developmental delays. Imaginative play and child developmental level were associated with increased communication skills in both groups of children. In children with autism, response to joint attention skills was associated with increased communication skills. Behavioural and emotional problems were associated with decreased communication skills. Child initiation of joint attention skills was not associated with later communication outcomes in either group.

Children with autism have lower levels of early communication skills compared to children with developmental delays over time. Child response to joint attention skills, imaginative play, child developmental level, and child behavioural and emotional problems may be important factors to consider for targeted interventions to improve communication skills in children with autism.

15 Ana-Marija Bohacek

Contribution of Child–directed Behaviours on Imitation Skills in Toddlers

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Abstract

Through a transactional model of knowledge transmission, children adopt cultural specificities of the environment, and the main mediators in the transmission of knowledge about the world are adults. Imitation of others is a highly effective learning mechanism in early development. However, children do not imitate everything they see and hear, but rely on communication and social cues to help them imitate and select what is worth imitating.

The literature on the influence of child-directed behaviours (CDC) on imitation is sparse. Therefore, the main aim of this study was to investigate the individual effects of child directed speech (CDS) and child directed actions (CDA) and their synchronised occurrence on imitation of actions with objects and the occurrence of verbal imitation in children aged 18 months (N=120). Children were randomly divided into four groups of the same age and gender. There were thirty children in each group. All groups were presented with tasks to imitate actions objects, but the tasks were presented to each group in one of four ways: with neutral presentation (NP), presentation with CDS, presentation with CDA, and presentation with joint CDS and CDA.

The results clearly showed that the children's success in imitating actions with objects and the frequency of occurrence of verbal imitations differed significantly between the children in these four task presentation conditions ($p<.01$). The results obtained were interpreted in the

context of knowledge about early learning, such as understanding other people's intentions, preferences in imitation, segmentation of words and actions, and processing of multimodal information.

The Unpredicted Role of Prediction-Error Mechanism in Children's Word Learning

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Abstract

The evidence that children acquire their first language via an error-driven learning mechanism is mixed. In this pilot study (n=11), we asked how individual differences in children's ability to generate expectations and revise representations (in the process of novel word learning) relates to differences in word memory encoding and non-linguistic executive function abilities. Using eye-tracking, we measured semantic prediction generation and attention redirection in response to error, which we refer to as "predict-and-revise". We hypothesized that predict-and-revise would be beneficial to novel word learning and would be correlated with better task-switching abilities in children. 4-years-olds were exposed to novel objects labels in constraining context that should facilitate prediction, while their gaze to novel objects on the screen was tracked. Task-switching was assessed using a go/no-go Flanker task. Surprisingly, we found that predict-and-revise had a negative, not positive, effect on novel word encoding. Task-switching measures had a positive relation to predict-and-revise (as expected), but an unclear relation to word retention. These unexpected results could suggest error-driven learning but not benefit word acquisition in children; however, their robustness and significance need to be verified in a larger scale study before drawing conclusions.

More Iconic Caregiver Speech is Associated with More Infant Engagement in Interactions

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Abstract

Iconicity plays an important role in early communication. Children learn iconic words earlier than other words, and they are used disproportionately often by infants and caregivers. Previous research has suggested that iconic words scaffold word-learning because they help infants establish referentiality or because they have phonological structures that are easy to articulate. Here, we test a hypothesis derived from the idea that one function of iconicity is to increase infants' engagement in communication. We hypothesized that high iconicity in caregiver speech would be associated with high infant engagement and this higher engagement might, in turn, lead to better word learning. In Study 1, we examined video-recorded naturalistic interactions between five 18-month-old English-speaking infants and their caregivers using iconicity ratings of words to measure iconicity in the mothers' speech. For each dyad, we identified 10 high and 10 low iconicity bouts by calculating the rolling average iconicity per 5 words. Infant behaviour within a 5-second window before and after words with the highest and lowest rolling averages within the interaction was coded for features related to engagement. Results showed that highly iconic caregiver speech was more engaging to infants. In high compared to low iconicity bouts, infants gazed more at their caregivers, gazed more at the subject of conversation, and more often smiled, laughed, gestured and verbalized. In Study 2, we will apply the same coding and analyses to a new sample of 54 video-recorded English-speaking infants and caregivers (age-

range:13-23-months, 27 male, 33 white, 15 mixed-race, 6 other). In Study 3, we will test our hypothesis experimentally by introducing infant and caregiver dyads to pairs of toys where one toy has an iconic label and one toy has an arbitrary label, measuring their engagement with each object and testing their recall of object labels. We expect our findings to speak to the multi-functional nature of iconicity in parent-child interactions.

Does speed information embedded in iconic gesture facilitate 2-year-olds, 3-year-olds, and adults during verb comprehension?

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Abstract

Iconic gestures have been found to facilitate preschoolers' word learning, particularly in verb comprehension and generalization among 3-year-olds (Aussems & Kita, 2021; Mumford & Kita, 2014). However, most studies on iconic gesture's facilitation of verb learning have focused on resemblance based on frequently lexicalized features, such as the manner or path of the action referent, whereas less attention has been given to resemblance based on infrequently lexicalized features, such as the speed of the action referent. Thus, our project investigates how iconic gestures conveying speed information contribute to verb comprehension, and how the ability to utilize it develops over time. Particularly, whether 2-year-olds, 3-year-olds, and adults can utilize speed information from iconic gestures in a verb-action matching task. Participants will watch a pair of action videos accompanied by a modulated iconic gesture video (Gesture speed: fast vs. slow) and recorded speech introducing a novel verb. Then they will be asked to choose one of the two action videos that best matches the novel verb. The pair of action videos are the same video computer-modified into fast or slow versions. Specifically, we predict that participants are more likely to choose the slow action video in the slow iconic gesture condition, and the fast action video in the fast iconic gesture condition. We also predict that 2-year-olds will not show a main effect of gesture speed, whereas 3-year-olds will show a pattern similar to adults. We are currently collecting data and will report preliminary results at the conference.

The shared book-reading corpus: Introducing an annotated video dataset of caregiver-infant multimodal interactions during picture book reading

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Abstract

Caregivers and infants engage in shared book-reading from birth. It is well-known that caregivers' speech during shared book-reading is positively related to infants' vocabulary development. However, less is known about caregivers' gestures in this context. Since communication is multimodal, we will explore both caregivers' speech and gestures during shared book-reading. To this aim, we are developing an annotated corpus of video recordings of caregivers and their infants (aged 13-14 months) reading a "First 100 Words" picture book together in the research lab. We also collect data about infants' receptive vocabulary size using the UK-CDI. Our target sample is 50 families. This corpus is unique in that we video-record the participants' hands in a close-up shot during book-reading using head-mounted cameras on the caregiver and the infant. Using ELAN, we are annotating caregivers' speech and gestures. We will analyze two gesture types in relation to labelling pictures in the book: pointing and iconic gestures. When there are multiple pictures on a page, caregivers can use pointing to single out the picture they are labelling, which aids infants' word learning. Our pilot study shows that caregivers also produce iconic gestures during shared book reading. For example, when labelling a picture of a car, caregivers pretended to steer a wheel from side to side using their hands. Iconic gestures may also aid infants' word learning because they depict semantic information about one picture on the page that is being labelled. Therefore, we predict that infants will have a larger receptive vocabulary when their caregivers produce more pointing and iconic gestures

while labelling pictures during shared book-reading. We will present the development of the shared book-reading corpus and a preliminary correlational analysis (N = 20) of the multimodal nature of shared book-reading and infants' receptive vocabulary development.