ISGS 5

The International Society for Gesture Studies

The communicative body in development

Lund, July 24–27, 2012

BOOK OF ABSTRACTS

The abstracts summaries in this book have been inckuded as they were submitted on the ISGS5 online abstract submission system. This book of abstracts can be found online at the conference website http://www.gesturestudies.com/isgs2012/

Layout and editing: Maja Petersson
Printing: MediaTryck, Lund University

The 5th Conference of the International Society for Gesture Studies

The communicative Body in Development

Book of abstracts

July 24-27, 2012
Lund

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Welcome to Lund and ISGS 5!

We are very pleased to welcome you to the Fifth Conference of the International Society of Gesture Studies, *The communicative body in development,* held here at Lund University, Sweden. We are especially honoured to host the conference that marks the tenth anniversary of the International Society for Gesture Studies (ISGS).

The ISGS was founded in 2002 during the inaugural conference, *Gesture: The Living Medium,* held at the University of Texas at Austin in June 2002. Since their inception, the ISGS conferences have become *the* meeting place for scholars interested in the study of gestures and the link between gesture and sign language, regardless of their disciplines and theoretical inclinations. The purpose of the ISGS is to promote and foster the growth of gesture studies as an academic field, to facilitate dialogue across disciplinary and institutional boundaries, and to integrate the study of gesture with investigations into a diverse range of topics and disciplines. The biennial conference series is key to this endeavour and its steady expansion testifies to the success of the enterprise.

The theme for this conference is the communicative body in development. We are very excited to present the rich, multi-disciplinary programme that the theme has generated, covering a wide array of theoretical and methodological approaches to the study of gestures and signs. The plenary speakers reflect this broad spectrum of perspectives. We are very grateful that they have accepted our invitations. We have a few days ahead of wonderful opportunities to learn new things, to broaden our horizons, and of course, to strengthen our professional networks.

We wish to express our sincere thanks to the members of the Scientific Committee who helped us review 256 submitted abstracts, 170 of which were selected for oral presentations, and 29 for poster presentations. We are equally grateful to our sponsors: Crafoordska stiftelsen, the City of Lund, and John Benjamins Publishing Company. Last but not least, we thank the many volunteers – students, researchers, teachers – who have contributed to the practical realisation of this event.

Finally, a few words about Lund. Lund is the second oldest city in present-day Sweden. Located in one of the most fertile regions in Scandinavia, it has been populated since the earliest times. Lund has a long history of both religious and secular scholarship as the seat of the Archbishops of Scandinavia from the 12th century onwards. Lund was part of Denmark until 1658 when it was ceded to Sweden after much warfare. Lund University was then founded in 1666 as part of the process of turning the region more Swedish. Whether or not that particular goal has successfully been achieved, Lund University is now the biggest university in Sweden. Today Lund is a vibrant town combining the medieval and the contemporary, scholarship and industry. We invite you to enjoy strolls in the pedestrian-only city centre and its many restaurants and cafés, all at walking distance from the university campus.

We wish you all a happy and rewarding conference and hope that you enjoy your stay in Lund.

On behalf of the Local Committee,

Marianne Gullberg, conference chair
Lund, June, 2012

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LUND

Social programme

June 24, Palaestra, 08.45-09.00
Conference opening
Welcoming words by Lund University Assistant Vice Chancellor, Prof. Sven Strömqvist

June 24, Lund University Main building, Atrium, 19.00
Opening reception – Celebrating the 10th Anniversary of the ISGS
Opening reception sponsored by John Benjamins Publishing Company and the City of Lund
Welcoming words by the Mayor of Lund, Annika Annerby Jansson
Festive words by the ISGS Executive Committee on the 10th anniversary of the ISGS

July 26, the Grand Hotel
Conference dinner

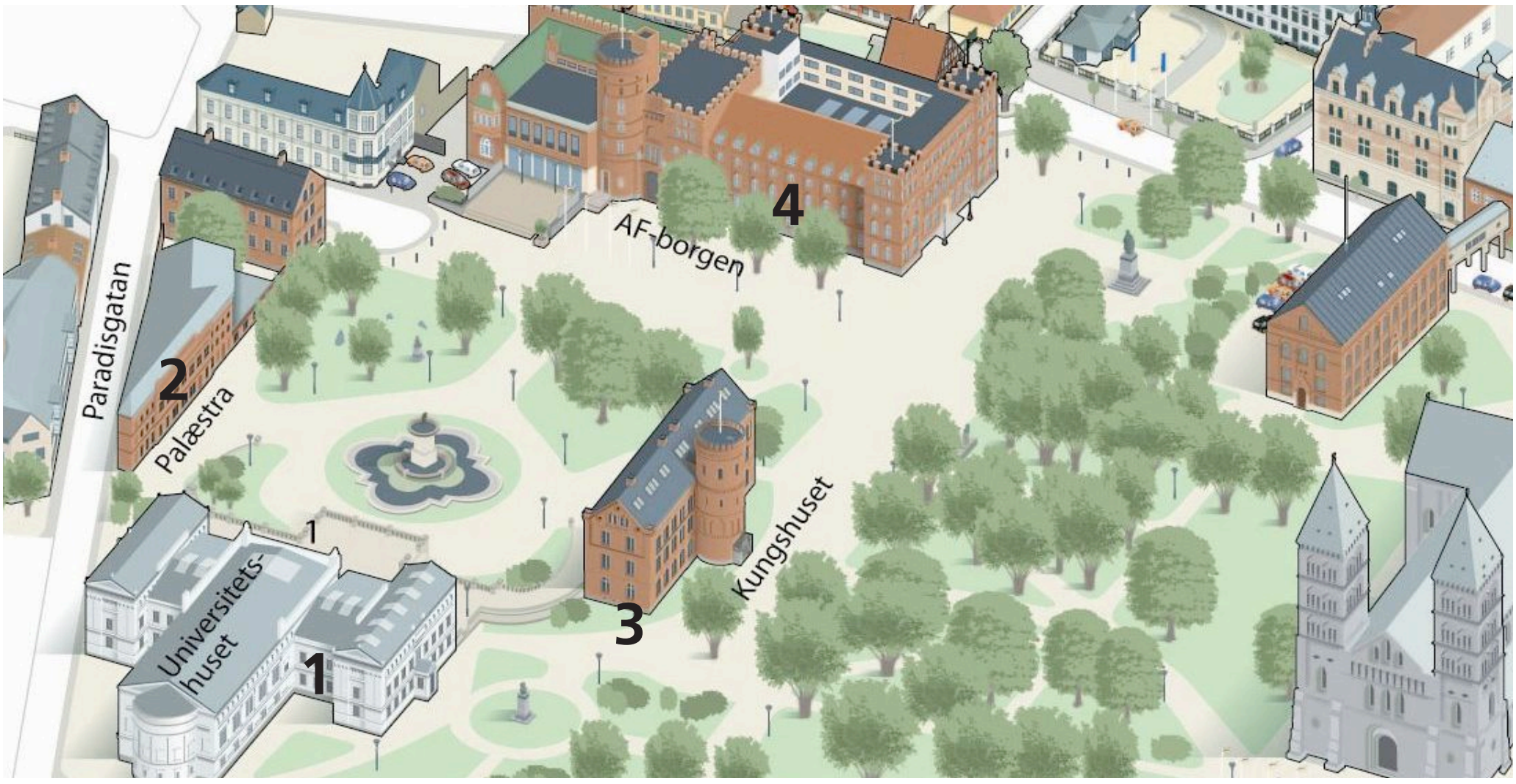
July 27 16.00
Guided Citytours

July 28
Excursion, Foteviken Viking Village

ISGS business meeting

July 25, Palaestra, 18.00
ISGS Annual General Meeting

Congress Centre, Lund University



1. Lund University Main Building. *Welcome Reception*
2. Palaestra. *Plenaries, Sessions P1-4*
3. Kungshuset (the King's House). *Sessions K1*
4. AF-Castle. *Lunches*

Plenaries

Jana Iverson

University of Pittsburgh

The Dynamic Give and Take of Early Communicative Development: Gesture in Parent-Child Interaction

This talk presents findings from three lines of research designed to address the broader issue of the role of gesture in communicative development. The first focuses on gesture as a predictor of developing language in typically- and atypically-developing toddlers. The second explores the use of gestures by parents when interacting with typically- vs. atypically-developing toddlers ("gestural motherese") and asks whether parent gesture is modified in relation to the child's developmental level. The third documents enhanced variability in early gesture use in infants at heightened biological risk for autism spectrum disorder and explores the consequences of this variability for the language-learning environment.

Wendy Sandler

University of Haifa

Designated Gestures and the Emergence of Sign Language

The relation between sign language and gesture is not clearly understood. Some take the view that sign languages are just like spoken languages, distinguished only trivially by the medium of production, while others hold that sign languages are derived directly from gesture, although different from co-speech gesture in crucial ways. The work presented here suggests that we are confronted with this puzzling dichotomy because we have often been looking in the wrong places in our quest to understand the relation between sign language and gesture. I begin by isolating gestures of different parts of the body that are designated to manifest grammatical structure in established sign languages. Turning to a very young sign language in a Bedouin village, I will show that the body begins as a nondesignated whole, with only the hands designated to create images. Across four age groups, we will see, not a magical and sudden appearance of grammatical structure, but instead a gradual activation of different parts of the body, to create increasingly complex grammatical form. Through this process, the designated gestures of visual language illuminate the emergence of grammar in a way that could not be observed in a newly emerging spoken language, even if it were possible to encounter one.

Spencer Kelly

Colgate University

Offering a Hand to Language Understanding and to Understanding Language

Hand gestures are a ubiquitous part of human communication. In this talk, Dr. Kelly will discuss the role that these gestures play with speech during the process of language understanding. Specifically, he will draw from multiple fields—developmental psychology, cognitive neuroscience and second language (L2) learning—using both behavioral and brain approaches to show that gesture and speech are integrated to differing extents on different levels of language. In so doing, he hopes to ultimately provide insights into our understanding of what language is. He will conclude by discussing the possibility that the human body is not just a communicator of language, but potentially also a fundamental part of it.

Lorenza Mondada

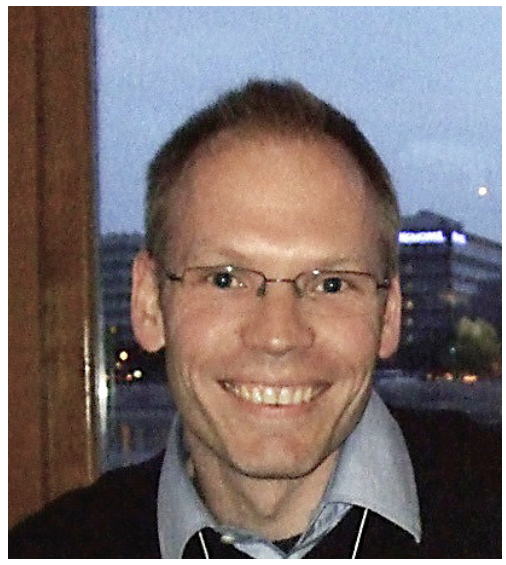
University of Basel

Deixis, talk and the body: the interactional organization of complex multimodal Gestalts

This talk focuses on a phenomenon largely studied by the gesture studies literature: deixis. The aim of the paper is to take deixis as a paradigmatic case of a phenomenon that is achieved not only by mobilizing language and gesture, but which involves the entire body, within complex multimodal Gestalts which are progressively and emergently build in social interaction. Deixis will be taken as a starting point to investigate the way in which complex multi-layered dimensions intervene in the achievement of reference as it is naturally organized by participants in their routine practice. In order to refer to objects in the environment, participants in interaction mobilize talk, gesture, gaze, body postures, as well as their entire mobile bodies. The paper deals with the timely coordination of these embodied dimensions, within the action of the speaker as well as, more globally, within social interaction. It shows that the observation of naturally occurring social activities can reveal systematic sequential practices involving the emergent composition of multimodal Gestalts. Empirical examples will be drawn from corpora of video recorded interactions in a diversity of social settings, in ordinary conversations as well as in workplace interactions.

Stefan Kopp

Bielefeld University

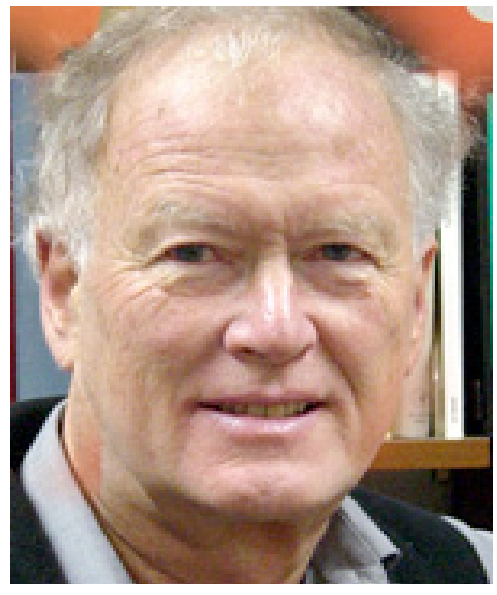


Computational Gesture Studies -- How computational modeling can help to reveal the workings of gesture

Gesture research has a long tradition grounded in empirical and theoretical investigation. The systematic use of computational modeling to understand a behavioral or cognitive phenomenon, however, as spearheaded by Artificial Intelligence and Cognitive Science, has not been applied to the study of co-occurring speech and gesture and its underlying cognitive mechanisms. I will argue that computational methods actually do offer attractive additional means of investigating gesture: By devising cognitive models and implementing simulations of speech and gesture behavior, theoretical models are put to the test to make detailed and verifiable predictions. By grounding these models in empirical data, new tools for annotation and analysis are created that answer detailed questions to the data. Finally, by employing simulators for controlled experiments, the effects and constituents of multimodal behavior can be studied when transferred to non-human communicators. I will present work along all of these lines. The results I will report demonstrate how computational gesture studies begin to unfold their potential for gesture researchers, by providing them with new kinds of questions, tools, and answers.

Michael C. Corballis

University of Auckland



How language evolved from manual gestures

It is widely believed that language emerged in our species within the last 100,000 years. This "big bang" theory of language evolution makes little evolutionary sense. I argue instead that language was built on the primate mirror system, a brain circuit specialized initially for manual grasping. In bipedal hominins, it expanded into pantomime, with progressive movement from hand to face, and ultimately to vocal gestures. Evidence from this scenario comes from gestural communication in primates, language-like gestures in apes, overlapping lateralized systems for speech and gesture in humans, and sign languages. The cultural big bang of the past 100,000 years may stem from the emergence of speech as the dominant mode, and not from language itself.

Panels

Navigating the Connections among Mathematical Representations: Exploring Gesture's Role during Mathematical Instruction of Algebra

CHAIRS: R. Breckinridge Church, *Northeastern Illinois University*

July 26 13.00

Representational gestures occur with speech in a variety of communicative contexts, such as narrative, conversation and explanation. A number of studies focusing on mathematics learning show that instruction accompanied by gesture promotes learning more than instruction provided through speech alone. There is a burgeoning literature suggesting that gesture works effectively with speech during mathematical instruction, enhancing teacher's communication about connections among mathematical representations. This panel suggests that gesture aids speech in linking representations during mathematical instruction of pre-algebraic and algebraic concepts in several ways: (1) The first paper, using naturalistic classroom data, identifies a common method of communicating links among mathematical representations between the teacher and learner. This talk describes "addressee gestures," in which teachers gesture to words or inscriptions on the blackboard along with students' utterances, (2) using an experimental study, the second paper examines the link between representations expressed by the teacher and student. This talk demonstrates that variation in how teachers represent math concepts (speech mismatching gesture vs. speech matching gesture) benefits the learner differently depending on whether the learner expresses his/her understanding in speech or gesture, (3) the third paper presents experimental data of gesture in both video and "live" lessons, and shows that gesture provides non-verbal, readily accessible imagery that helps learners connect spoken instruction to underlying mathematical concepts, and (4) the fourth paper reports an experiment suggesting that most learning occurs when a teacher's gestures highlight representational links expressed in speech and that gesture can particularly help students connect a less familiar representation to a more familiar one. This panel provides cohesive evidence that gestural communication operates "under the radar," but nonetheless, hugely influences communication and learning.

Panel presentations

Gestured Instruction: Is it more influential "live" or on video?

R. Breckinridge Church, Diana Hernandez, Jennifer Ross, Theodora Koumoutsakis & Saba Ayman-Nolley, *Northeastern Illinois University*

Modality of communication in teaching has recently been identified as a critical variable for determining whether learning occurs. In addition, great emphasis has been placed on the role that video and media play in imparting instructional information. The value of video-streamed input has been hotly debated. Previous studies that have examined the role of gesture in instruction have either looked at gesture "live" or on "video" but no study compared the role of gesture across these two mediums. Our research compares the effect of gestured instruction across "live" and "video" presentation. Video is compelling and tightly focuses the listener on both speech and gesture. Live presentation reflects more accurately the normal circumstances of teaching in which gesture helps to make abstract concepts for accessible. Therefore, we felt an investigation comparing gesture in these two instructional mediums was warranted.

We used basic instruction that consisted of lessons showing how the equal sign represents equality in pre-algebraic problems (e.g., 3+4+5= __+5). We examined 69, 8-9 year old students from private schools investigating the effect of the following factors on learning: (1) Instruction medium (video vs. live), and (2) instruction modality (speech vs. speech + gesture). Preliminary analysis suggests that: (1) children exposed to instruction that includes gesture are more likely to learn than children exposed to speech instruction without gesture, (2) Children exposed to video instruction or more likely to learn than children exposed to live instruction and (3) The effect of gesture is more enhanced in "live" than "video" presentation. This finding suggests that gesture may play a different role depending on the medium of expression; that gesture may also have a focusing role in communication.

Watching and Producing Gesture Impacts Knowledge Retention

Melissa Singer & Kristin Rochefort, *Bridgewater State University*

Researchers have found that both teachers and children spontaneously produce gesture in instructional settings. Children's gestures offer teachers another means of assessing what they know and teacher's gestures offer children another means to understand the instruction. This study examined whether both watching gesture as well as producing one's own gestures promotes more learning than either one alone. One hundred and sixty, third and fourth graders individually completed a pretest, instruction, posttest, and follow-up test on mathematical equivalence. Children were randomly assigned to one of three types of instruction: 1) Strategies presented in a mismatch (one strategy presented in speech with a different complimentary strategy presented in the accompanying gesture), 2) Strategies presented in matching speech and gesture (the same strategy presented in speech and the accompanying gesture), or 3) Strategies presented in speech only with no gesture. Children's gestures were categorized based on where they produced correct strategies during instruction: Producing a correct strategy in speech only, in both speech and gesture, in gesture only, or no correct strategy at all. Learning was measured by the total number of problems solved correctly on the posttest and on the follow-up test, two weeks later. It was found that both instruction with gesture and children's own gestures impact learning two weeks later on the follow-up test. Specifically, children who produced the correct strategy in both speech and gesture benefitted most from instruction with mismatching speech and gesture while children who produced the correct strategy in speech benefitted most from instruction with matching speech and gesture. While studies have shown that gestures produced or watched by the learner benefit learning, this study showed that the benefits of gesture depends on the types of gestures produced by the instructor and whether or not the learner produces those strategies in gesture during instruction.

How Does Teachers' Visual Scaffolding Affect Students' Learning? A Study of Connecting Mathematical Representations via Gesture

Amelia Yeo[1], Noelle M. Crooks[1], Elise Lockwood [1], Iasmine Ledesma[1], Janel Bergsbaken[1], R. Breckinridge Church[2], Eric J. Knuth[1], Mitchell J. Nathan[1] & Martha W. Alibali[1]

(1) University of Wisconsin, Madison; (2) Northeastern Illinois University

Teachers often use gestures to connect different representations of mathematical ideas (e.g., graphs, equations, verbal statements) during mathematics instruction. As such, gestures may promote both encoding and learning of instructional material. This study investigated whether teachers' gestural scaffolding of connections among representations affects student learning. We hypothesized that teachers' gestures would help students more accurately encode, and consequently better understand, connections among representations.

We constructed video lessons about slope and y-intercept that involved equations and graphs. Lessons varied in the teacher's use of gesture: (1) no gesture, (2) gesture to equations only, (3) gesture to graphs only, (4) gesture to both representations. Seventh-grade students (N = 57) completed a pretest, viewed a video lesson, and then completed a posttest. Pretests and posttests included: (1) an encoding assessment, in which participants viewed a graph or equation briefly and then reconstructed it, and (2) a problem-solving assessment, in which they solved problems involving slope and y-intercept.

Participants who saw the teacher gesture to both representations (equations and graphs) improved their encoding more than students exposed to the other video lessons (no-gesture, $t(53) = 2.19$, $p < .05$; graphs-only, $t(53) = 2.19$, $p < .05$; equations-only, $t(53) = 1.84$, $p = .07$). In addition, students learned more in conditions in which the teacher gestured to graphs (i.e., the graphs-only and both-representations conditions) than in conditions in which she did not gesture to the graphs, $\beta = 1.84$, $t(54) = 2.23$, $p < .05$.

Our findings suggest that teachers' gestures appear to scaffold understanding in two ways: by highlighting the referents of teachers' speech, and by helping students to connect a less familiar, highly spatial representation (the graph) to a more familiar, more abstract one (the equation). When teachers highlight links between representations using gestures, it appears to be especially beneficial for student learning.

Addressee Gestures as Means to Foster Common Ground in the Classroom

Rachaya Srisurichan, Rebecca Boncoddo, Iasmine Ledesma, Elizabeth Pier, Mitchell J. Nathan& Martha W. Alibali, *University of Wisconsin, Madison*

Classroom instruction often involves communication about new concepts, new procedures for solving problems, and new ways of representing information. As such, maintaining shared understanding, or common ground, can be challenging for both teachers and students. In this paper, we report on a phenomenon that is relatively rare in ordinary face-to-face conversation, but commonplace in the classroom, which we term addressee gestures. We define addressee gesture as gestures produced by listeners (addressees) to correspond with other speakers' utterances. Such gestures frequently occur in classrooms when students speak from their seats, either to the teacher or to the class as a whole, and teachers gesture to the relevant words, diagrams, or other inscriptions on the blackboard along with the students' utterances.

We present illustrative examples of addressee gestures drawn from middle and high school mathematics classes and from high school pre-engineering classes. Through these examples, show that teachers are sometimes silent as they produce addressee gestures during students' turns at talk, and at other times teachers integrate addressee gestures with utterances in which they repeat or revoice the content of students' utterances. Thus, with addressee gestures, teachers attempt clarify the students' speech and make it more precise and accurate. We argue that teachers produce addressee gestures, not only to insure that they share common ground with the student who is speaking, but also to foster common ground among the class as a whole.

Gestural communication in a comparative perspective

CHAIRS: Marie Bourjade[1] & Simone Pika[2]

(1) Aix-Marseille University; (2) Max Planck Institute for Ornithology

July 26, 13.00

The evolution of language poses evolutionary problems to modern science in the sense of chicken-and-egg questions. On the one side, language might have triggered uniquely human cognitive skills, while on the other side, human linguistic abilities may have evolved as parts of older communication systems from cognitive building blocks already present in the primate lineage. These two evolutionary scenarios call for cross-taxa comparative studies of communication systems. The most dominant hypotheses see precursors of human language in (1) vocalizations, (2) gestures, or (3) a combination of both. Recently, Tomasello (2008) however wrote: "In all, I personally do not see how anyone can doubt that ape gestures—in all of their flexibility and sensitivity to the attention of the other—and not ape vocalizations—in all of their inflexibility and ignoring of others— are the original font from which the richness and complexities of human communication and language have flowed". In particular, communicative gestures of apes seem to share commonalities with our linguistic symbols. Apes gesture to communicate with social partners in dyadic interactions and in a flexible way, sometimes producing sequences. Both apes and pre-linguistic children gesture intentionally to influence their partner's behavior, and also use them in triadic ways to direct their partner's attention toward external entities. Behavioral and neuroanatomical asymmetries for communicative gestures appear both in humans and in some non-human primates with similar left-hemisphere dominance. However, it is unclear whether the gestural modality is restricted to the hominoid primates only. This symposium aims to address this question by focusing on the following aspects: (i) the understanding of the focus of attention and the intentional use of gestures, (ii) the understanding of triadic relations and the referential use of gestures, and (iii) the hemispheric specialization for gestures in relation to their functions.

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Panel presentations

Intentional Communication by Great Apes: Implications for Language Origins

David A. Leavens, *University of Sussex*

Based on evidence available at that time Leavens (2003) argued that language may have been multimodal from its inception, because great apes displayed apparently intentional control of some of their calls, as well as their gestures. Since then, recent experimental findings by ourselves and others have tended to support that view. Here we will review the empirical evidence on intentional communication in great apes, summarising relevant findings pertaining to both manual gestures and calls. As Brinck (2000) put it: "Intentional communication is purposeful or deliberate, goal-intended, and about something else than the sender herself." In both comparative and developmental psychology the empirical study of intentional communication therefore involves measurements of goal-directed activities in which the signaller manipulates the perceptions of a social partner, for example by drawing the interlocuter's attention to a particular locus.

Since Tomasello et al. (1994) demonstrated modality-appropriate signalling in chimpanzees, subsequent research has confirmed that the great apes display intentional communication with their manual gestures. These findings refuted a long-standing dogma that only humans communicate intentionally; apes are capable of referring to things in their environments.

However, there remains a persistent idea that humans are the only primates with volitional control over their vocal behaviour, which renders our species uniquely capable of referring to entities with sounds (e.g., Arbib et al., 2008). Vocalisations in non-humans are widely believed to comprise reflexive expulsions in the presence of evolutionarily relevant stimuli (reviewed by Owren et al., 2011). Recent studies suggest that this is not strictly true (Taglialatela et al., 2011). Taken together, these findings suggest that the last common ancestor of apes and humans had considerable voluntary control over their communicative signals long before the evolution of speech. Humans were, thus, pre-adapted for voluntary communication about entities in their environments.

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Apes and feathered apes: A case for referential signalling?

Simone Pika, *Max Planck Institute for Ornithology*

From early childhood on, human infants commonly use distinct gestures, for example giving (e.g. objects, food), offering, showing and pointing (Bates, Benigni, Bretherton, Camaioni & Volterra 1979), to coordinate attention towards a social partner and an object of mutual interest (Werner & Kaplan 1972). These triadic interactions (i) qualify as referential, because they are used to attract the attention of others to some outside entity; (ii) include joint-attention behaviors (e.g. eye-contact with an adult before, during or after the performance of a gesture), and (iii) are used either to make requests (imperatives, e.g. "take this") or to show a third entity to recipients, without requiring the person to do anything else but to attend to the object (declaratives, "look at this") (Bates et al. 1979). These gestures thus mark a pivotal change in the infant's communicative competence and have been viewed as the foundation to engage in symbolically mediated conversations (Bates et al. 1979; Bruner 1975).

In stark contrast, observations of comparable gestures in non-human animals are relatively rare and mainly concern our closest living relatives, the great apes (Gardner & Gardner 1969; Leavens, Hopkins & Bard 1996; Miles 1990; Pika & Mitani 2006) and a single bird species, ravens (Corvus corax) (Pika & Bugnyar 2011). The present talk aims to provide an overview of the state of the art, to then address the question whether evolutionary new inferential processes ensue when communication becomes governed by more cooperative motives.

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Communicative nature of baboons' gestures using the requesting food paradigm

Hélène Meunier[1], Marie Bourjade[2] *&* Jacques Vauclair [2]

(1) Primate Centre of Strasbourg, Strasbourg; (2) Aix-Marseille University

Many individuals, from either ape or monkey species who get involved in regular contacts with humans do acquire and use some human-like gestures such as pointing toward -or begging for out-of-reach pieces of food. These requesting gestures appear to form triadic relationships between the two interactants, with reference to an external entity, i.e. the food. However, the intentional and referential values of these gestures have been questioned, because not all primate species would be capable of understanding partner's attention and directing it toward an external entity. Here, we draw on two experimental situations of a requesting food paradigm to address this issue in baboons (Papio anubis). By varying the attentional state of the human partner in some extent, we have examined whether baboons (i) displayed joint attention and gaze alternation accordingly, (ii) adjusted their requesting behavior to the audience, and (iii) showed consistency with lateralization of other communicative gestures. Nine and 16 baboons respectively were tested in two requesting situations (in which subjects could request out-of-reach pieces of food from a human experimenter) differing by their complexity. In the pointing situation, baboons had to attract and direct the experimenter's attention toward a baited container, while in the begging situation the experimenter held the piece of food in her hand. The latter situation would require the monkey to only attract experimenter's attention, not to direct it toward food. We show that baboons, as do apes, distinguished the attentional state of a human experimenter based on subtle postural cues, and were able to behave accordingly as evidenced by the significantly increased number of gestures and directed gazes when the experimenter attended. However, the monkeys failed to attract the attention of an inattentive partner. Lateralization of their gestural behaviors also supports the communicative nature of their requesting gestures.

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This research was supported by a French National Research Agency (ANR) grant; reference ANR-08-BLAN-0011_01.

Gestural communication, lateralization and hemispheric specialization for language: a comparative approach between human and non human primates

Adrien Meguerditchian[1] & Hélène Cochet [2]

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Most language functions involve a greater activation of the left hemisphere, including Wernicke's and Broca's areas, two key regions of the language cortical network involved in the comprehension and production of signals. Left lateralization for language has been historically linked to right-handedness for manipulative actions, but 70 per cent of left-handed humans show a similar left lateralization, suggesting that the direction of handedness for manipulation is not a perfect predictor of hemispheric lateralization for language. An alternative model claims that hand preferences for gestural

communication may constitute a better predictor of hemispheric specialization for language, which some believe support the gestural origins theory of language evolution. Within this evolutionary framework, nonhuman primates, our closest relatives, may be a relevant model for investigating the potential precursors of left hemisphere specialization for language in humans. Regarding the gestural theory of language, there are some questions about whether the gestural system in both nonhuman and human primates involves a left hemisphere specialization, as it does in human language. Here we will review our works within such a comparative approach that revealed specific patterns of right-handedness predominance for gestural communication compared to non communicative motor actions in human toddlers and adults, baboons and chimpanzees. These findings indicate that gestural communication in both human and nonhuman primates might involve a specific lateralized system in the left hemisphere. Interestingly, brain imaging studies in captive chimpanzees reported that hand preference for gestural communication (and not for other motor actions) were specifically correlated with neuroanatomical asymmetries in the homologues of language cerebral regions such as Broca's and Wernicke's areas. We believe these collective comparative findings provide additional support to the hypothesis that gestural communication has played a significant role in the origin of language and its left-hemispheric specialization in our common ancestor.

The spontaneous representational gestures of preschoolers: Comparison across culture and language

CHAIRS: Cristina Caselli [1] & Gary Morgan [2]

(1) Institute of Cognitive Sciences and Technologies, National Research Council, Rome, Italy; (2) City University London

July 26, 13.00

Although spontaneous gestures have been much studied in young preschoolers (e.g., Iverson et al., 2008), there have been few comparisons of early gesture use by children in different language and cultural contexts that are controlled for content. Recent work using the Parole in Gioco (PinG) task devised in Italy (Bello et al., 2010) has provided an opportunity to compare children's spontaneously produced gesture for a fixed set of targets across individuals, languages and cultures. This panel will report on work occurring with children using Italian, English (both in Britain and in Canada), LIS and BSL . The projects share a method (spontaneously generated gesture from a language production and comprehension task) and an age group (children between the ages of 24 and 48 months) to explore gesture. The analyses focus on the comparability of form and function of gestures produced to a fixed set of pictures across linguistic and cultural contexts.

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Panel presentations

Types and forms of representational gestures produced by children aged between 24 and 36 months in a naming task: comparison of English and British Sign Language learners

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Research has firmly established the importance of gesture in early language development from before the emergence of first words to the two-word stage. However, relatively little is known either about the role of gesture as children's vocabularies expand or how gesture is used by deaf children whose parents are not native sign language users.

Twenty hearing learners of English (age range: 29-34 months, mean: 31.33 months) and 15 deaf children acquiring English and BSL (age range: 23-37 months, mean: 30.39 months) were tested on a task used previously with Italian and Japanese children (Stefanini, Caselli and Volterra, 2007; Stefanini, Bello, Caselli, Iverson and Volterra, 2008). In these studies gesture was argued to provide a cognitive/sensorimotor link between the object or action depicted and the spoken word. The aims of the present study are to investigate 1) the types and forms of gestures produced by hearing children acquiring spoken English, and 2) the types and forms of gestures and signs produced by deaf children with hearing parents acquiring English and British Sign Language (BSL).

The task comprised comprehension, where children were required to recognise pictures of objects and actions, and production, where children were required to name pictures of objects and actions. Responses were analysed in terms of language (correct, incorrect, no-response) and gesture/sign (type and form). Hearing children produced fewer examples of representational gestures e.g. 'combing action' to label a picture of a comb, than reported in previous studies of children acquiring Italian or Japanese. Possible reasons for these differences will be discussed. The deaf children named almost all of the pictures using either BSL lexical signs or idiosyncratic representational gestures. We will discuss these responses in terms of their semantic and structural properties and their relationship to BSL signs.

Differences in frequency and similarities in form between English- and Italian-speaking children's representational gesture

Paula Marentette[1], Arianna Bello[2], Virginia Volterra [3] & Paola Pettenati[2]

(1) University of Alberta, Augustana Campus; (2) University of Parma; (3) Institute of Cognitive Sciences and Technologies, National Research Council, Rome, Italy

The present study is a cross-cultural comparison of gesture production with a focus on the form of gesture in the second year. We were particularly interested in whether children would use their body to represent objects or use gestural forms indicating handling of objects. Existing research on the use of body parts as objects is focussed on older children's comprehension of form (Bigham & Bourchier Sutton, 2007; O'Reilly, 1995). Representational gestures were spontaneously produced during the administration of a language production and comprehension test (Picture Naming Game- PiNG: Bello et al., 2010). Monolingual hearing children, aged 24-37 months, and speaking either English (Alberta, Canada) or Italian were compared (see Pettenati et al., 2012; Pettenati et al., 2010).

The English children (n=14 to date) performed similarly to the Italian children (n=22) on the verbal production (English 50% correct, Italian

56% correct). There was a great difference in frequency of gesture production. While all the Italian children produced at least one gesture, many of the Canadian children produced no representational gestures (5 of 14). The Canadian children also produced substantially fewer representational gestures (a total of 48 of which 16 were produced by one child, a median of 2 gestures per child). This contrasts with the Italian children who produced a total of 156 gestures, a mean of 7.1 gestures per child). The Canadian children did not produce any gestures using their own body part as the object in question, but all representational gestures were of the handling or tracing forms.

These results differ from Pettenati et al.'s (2012) results with Japanese children. We will discuss the differences in frequency and the similarities in form, with particular attention to the use of body part as object in young children's gesture.

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Vocal and gestural modalities in a lexical task: a comparison between preterm and typically developing infants at 2 years

Alessandra Sansavini [1], Arianna Bello [2], Annalisa Guarini [1] & Silvia Savini [1],

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In typical development (TD), gestures support the building of meanings and convey them in combination with vocal production. Lexical development can be affected by preterm birth showing delays with respect to TD children. However, the early lexical abilities and the spontaneous use of gestures supporting lexical development of preterm infants and, in particular, of extremely low gestational age (ELGA: ≤ 28 weeks) preterms, have not been investigated till now. Our study aimed to examine the emergence of lexicon in ELGA preterms compared to TD infants, by considering vocal and spontaneous gestural responses in a task of word comprehension and production.

Forty monolingual Italian ELGAs with no major cerebral damage and a comparison group of 40 full-terms (FT) were assessed at 2 years through a task of lexical comprehension and production of nouns and predicates (PinG).

Compared to FTs, some ELGAs were unable to complete the tasks. ELGAs who completed them, produced significantly fewer correct responses in the comprehension as well as in the production tasks (p values <.05). Error analyses revealed that ELGAs produced more non responses, while FTs tried more frequently to retrieve the referent by giving uncorrected responses. The analysis of vocal and gestural responses in the production task revealed that both groups used mainly unimodal vocal and bimodal gestural-vocal strategies. Deictic gestures were frequently accompanied to vocal responses by both groups, while some referential gestures were produced especially in the predicates task, but less frequently by ELGA with respect to TD infants.

The use of the PinG task highlighted ELGA preterms' difficulties to retrieve and produce lexical referents by both vocal and referential gestural modalities. An integrated model relying upon linguistic, cognitive and motor factors is proposed for the interpretation of the results.

Gesture and Sign in young deaf and hearing children labeling pictures

Olga Capirci[1], Alessio Di Renzo[1], Tiziana Gulli[1], Paola Pettenati [2] & Virginia Volterra [1]

(1) Institute of Cognitive Sciences and Technologies, National Research Council, Rome, Italy; (2) University of Parma

Studies comparing hearing persons' gestures with signs produced by older children (Morford, Singleton & Goldin-Meadow, 1995) or adults (Schembri, Jones & Burnham, 2005) indicated that interesting similarities as well as important differences can be found. In a study using a lexical task (PinG) on hearing children between 2-3 years, a detailed analysis of formational parameters of co-verbal representational gestures showed interesting similarities in the form of gesture produced by many children with the same visual stimulus: the choice of one or two hands and very similar locations. More variability was observed in handshapes and movements. This indicates that there is consistency in the way that different children gesture when they are given the same picture to name (Pettenati, Stefanini and Volterra, 2010). The goal of the present study is to consider whether co-speech representational gestures produced by hearing children are similar to the corresponding signs in Italian Sign Language (LIS). The study explores the form of representational gestures and/or signs produced by 7 hearing speaking and 7 deaf signing children (age range 2;0–3;1) asked to label the same pictures: the Picture in Game task (PING). Six pictures depicting objects and six pictures depicting actions were chosen for more detailed analysis. Gestures and signs have been analyzed according to the same parameters: handshape, location, movement and facial expression. Results show that gestures for a given picture exhibit similarities in many of the parameters across children. Some motor characteristics found in the production of hearing toddlers' gestures are similar to those described for early signs. Results confirm that gestures are linked to motor actions similarly for all children, suggesting a common developmental stage influenced by the linguistic input the children are exposed to. Implications of the similarity between gestural and signed

linguistic representations in young children are discussed.

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Gesture Production by people who have Communication Impairments

CHAIRS: Naomi Cocks & Lucy Dipper, *City University London*

July 24, 13.00

This panel will include a series of presentations that systematically investigated gesture production in people with communication deficits. Clinical participants include adults with Aphasia and children with Language Delay, drawn from English- and German-speaking populations. Consideration of such cases is important both theoretically and clinically. Understanding how language and gesture breaks down, either simultaneously or independently, helps us understand how gesture and language are related, with important implications for theoretical models of gesture and language processing. Additionally, exploring the gestures produced by people with language and communication impairments allows for a more in depth understanding of the deficits and is useful for determining the most effective therapy.

Panel presentations

Gesture and posture imitation in young German-speaking children with specific language delay and typical language development

Andrea Dohmen [1], Shula Chiat & Penny Roy [2]

(1) Oxford University; (2) City University London

Research has highlighted relations between gesture and posture imitation and language in typically developing (TD) children (e.g. Snow, 1989) and children with Autism Spectrum Disorders (e.g. McDuffie, Yoder & Stone, 2005). In the population of children with Specific Language Impairment (SLI) the focus of research on imitation has been mainly verbal, with nonword repetition and more recently also word and sentence repetition seen as key sources of evidence (Graf Estes, Evans & Else-Quest, 2007; Conti-Ramsden, Botting & Faragher, 2001). In contrast, there has been very little exploration of nonverbal gesture and posture imitation skills in children with SLI, and existing studies have almost exclusively involved school age children (Hill, Bishop & Nimmo-Smith, 1998; Marton, 2009).

The aim of this study is to compare groups of TD and specifically language delayed (SLD) children on their elicited immediate gesture and posture performance.

More specifically this study sought to determine:

- which – if any – imitative behaviours differentiate groups of TD and SLD children at different ages

- how children's patterns of gesture and posture imitation performance and the rate and nature of their errors evolve across age.

Participants were German-speaking TD (n=60) and SLD (n=45) children aged 2-3½ years. A range of novel imitation tasks measured their willingness and ability to copy different types of representational gestures (object related and conventional) and postures (facial and manual).

Results showed that the SLD groups performed poorly on all gesture and posture imitation tasks, but not at all ages. In depth analyses of imitative errors revealed that the performance of children in the SLD groups was delayed rather than qualitatively different. Implications of results for different sources of deficits will be discussed.

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The relationship between aphasia type and iconic gesture production

Naomi Cocks, Lucy Dipper & Madeleine Pritchard*, City University London*

Research suggests that while spoken language skills are affected, people with aphasia often use gestures to communicate complex ideas. Preliminary research with just a handful of single case studies suggests that the type of language breakdown experienced by people with

aphasia may be reflected in their gesture production (e.g. Cocks et al, 2011 and Dipper et al, 2011, Kemmerer et al 2007).

In this presentation we will report our findings from a study that explored the iconic gestures produced by 29 people with aphasia when describing the Sylvester and Tweety Cartoon Canary Row. The participants had a range of different types of aphasia and language breakdown. In this presentation the relationship between type of language breakdown and types of iconic gestures produced will be discussed.

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The relationship between impaired language and iconic gesture production: motion verbs revisited

Lucy Dipper, Naomi Cocks, Madeleine Pritchard & Gary Morgan, *City University London*

The picture emerging from cross-linguistic and developmental studies of motion verbs (e.g. Kita & Özyürek,2003; Özyürek et al 2008) and from second language development studies of placement verbs (e.g. Gullberg 2011) suggests that language and co-speech iconic gesture are highly interrelated. Investigating the co-speech iconic gestures produced by people with aphasia has the potential to add crucial evidence, raising the possibility that impairment to the communication system might also implicate co-speech gesture. Preliminary, single-case based, research suggests that language breakdown may be reflected in gesture production (e.g. Cocks et al, 2011 and Dipper et al, 2011, Kemmerer et al 2007).

In this presentation we will report findings from a study that explored the iconic gestures produced by 20 people with aphasia when describing two key events from the Sylvester and Tweety Cartoon Canary Row ('swing' and 'roll'). The research reported here aimed to determine whether the co-speech iconic gestures produced by the participants with aphasia to describe these key scenes were a) different to the data reported in the published literature; and b) reflective of their language impairment. Gestures produced during the cartoon retelling were compared with data from the same two events in the published cross-linguistic literature, as well as with matched control participants.

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Enhancing Communication in Aphasia through Gesture

Anna Caute[1], Wendy Best[2], Naomi Cocks[1], Madeline Cruice[1], Jane Marshall [1] & Tim Pring[1]

(1) City University, London; (2) University College, London

For people whose linguistic abilities have been disrupted by severe aphasia, gesture may provide an alternative means of communicating. While there have been reports of people with severe aphasia using complex, language-like gestures (e.g. Kemmerer et al, 2007), others are impaired in this modality (e.g. Goldenberg, 2003). Results of previous studies suggest that people with severe aphasia can benefit from therapy aiming to teach pantomime gestures as a compensatory strategy (e.g. Daumüller & Goldenberg, 2010; Helm-Estabrooks et al, 1982). However, there have been few experimentally designed studies and even fewer have examined whether people with aphasia are able to use gestures learnt in therapy in communicative contexts.

This study investigated whether people with severe aphasia were able to learn a set of pantomime gestures and compared their learning of gestures with their learning of spoken or written words. We also examined whether gestures cue word production and vice versa. The communicative use of gesture was evaluated using novel assessments of participants' ability to convey messages and narratives to a partner. All assessments included treated and untreated items.

The study used a repeated measures design with a double baseline and two post-therapy assessments. Fourteen participants completed the study. All received 15 hours of therapy aiming to teach 20 gestures and 20 words. Half completed a second block of therapy which aimed to develop the communicative use of gesture.

The results showed that participants made significant improvements in their gesturing and naming of items, and improvements generalised to the communicative tasks. Gains were confined to treated items and there was no evidence that using pantomime gestures cued word production. Surprisingly, participants made greater gains in naming than gesture. However, individual results showed that a minority of participants benefited more from gesture than naming therapy.

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Gesture, action, language and context in early communicative development

CHAIRS: Jean-Marc Colletta, *Université Stendhal, Grenoble* **& Christiane Moro,** *University of Lausanne*

July 25, 13.00

It is now well established that bodily communication and gesture play an important role in the child's language and cognitive development. The panel contribution focuses on early developmental stages and the relation between gesture, object, action, language and the context of acquisition. First, the role of gestures involving objects in early communicative development has received little attention despite their importance in communication. How are these gestures related to communication with others or with oneself? How are these two types of communication related to the appropriation of the conventional uses of objects? What is the role of the adult in this development? Second, communicative development is grounded in the familial and social context of the child. All children start using gestures to communicate during the first year and learn new forms and appropriate use of conventional gestures as they grow older. How does the child react to models provided by the adults or caregivers? What is the part of spontaneous imitation and of deliberate trials in the process? Third, the research on situated action and on communicative gestures in the construction of meanings shows that pointing and representational gestures help the child produce and understand language. Yet, the part played by the adult or caregiver in the process also needs to be better documented, in children with typical language development as well as in children with developmental disorders. Fourth, as words become the preferred form of communication, the child combines gestures and words into bimodal utterances that precede the first two-word utterances in her repertoire. An unstudied issue relies on the assumption that gesture is at the "cutting-edge" of early language development and stresses the emergence of monologic discourse abilities: the first tentative narratives of the child should show in bimodal utterances prior to verbal utterances.

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Panel presentations

Tracking the emergence of narratives in bimodal utterances

Aurore Batista & Jean-Marc Colletta, *Université Stendhal, Grenoble, France*

During the second year of life, the child freely combines gestures and words. Some gesture+word utterances are redundant while others are not. The production of non redundant bimodal utterances was found to predict the coming out of syntax (two-word utterances) in the verbal repertoire of the child. According to Goldin-Meadow, Kita and colleagues, this developmental change corresponds to a general scheme: e.g. the complementary relation between gesture and speech in bimodal utterances indexes a new linguistic acquisition.

Our concern here is to check the relevance of the above-mentioned thesis on the emergence of narrative abilities. The child over 2 years of age starts producing longer (three words and over) utterances. In the mean time, bimodal combinations do not disappear. Would they play a role in the emergence of the first narrative trials of the child, whom we know to be short scripts he starts producing during free play and whose complete production relies on scaffolding from the interlocutor? Our hypothesis predicts the young child to use bimodal communication means to express her first tentative script-like narratives before succeeding to express them in the sole verbal expression.

The data used for this study was collected in nurseries of Grenoble and its surroundings. 80 children aged 18 to 41 months were filmed twice, six months apart, during a play session with an adult. The method used was to solicit language productions, leaving the child to play freely with the material placed at his disposal (a common play house that contains a number of pieces representing characters and accessories). 10mn of each play session was transcribed and annotated with ELAN for language, gesture, actions and situational context. We are now looking for script-like bimodal and verbal sequences in the children's production in order to test our hypothesis.

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Gestures to oneself in the context of the appropriation of the use of object by the child between 8 to 16 months in triadic interaction

Christiane Moro, *University of Lausanne*

Within the important body of literature on gestures, the role of gestures that involve objects has received little attention despite their importance in communication and cognition (Moro, 2011; Moro & Rodriguez, 2005 ; 2008 ; Streeck, 1996 ; Andrén, 2010). Furthermore, gestures that involve objects considered as cultural entities in respect to their canonical uses are rare compared to studies on gestures as mere physical entities. From a pragmatic and semiotic perspective based upon Vygotsky's theory, we (Moro & Rodríguez (2005) ; Rodríguez & Moro (2008) have shown that gestures and objects are tightly integrated in early childhood, specifically in the process of transmission by the adult and appropriation by the child of the uses of the object. In these works, it has been noticed that when children appropriate the canonical use of the object, they become able to produce gestures related to these uses directed either toward other people, either toward oneself.

IIn the current study, we focus on the production by the child of gestures toward oneself. Six children interacting with one of their parents with four different complex objects (for 7 minutes with each one) were videotaped at child age 8, 10, 12, 14, 16 months old in the context of appropriation of the uses of four complex objects. The analysis extends our understanding of gestures directed to oneself and suggests criteria for their identification. Through microgenetic and semiotic analysis, gestures to oneself will be exemplified in relation to executive functions related to the appropriation of the use of the object. We will also point out the role of adult in that development.

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Social interaction and touch in gestural development: The acquisition of the 'Thumbs-up' gesture among South African children

Heather Brookes, *University of Cape Town*

South African Bantu language speaking children grow up in a gesture rich environment with a large vocabulary of quotable gestures (Brookes 2001, 2004, 2005). One of the most prominent quotable gestures is the 'thumbs-up' gesture. Adults use this gesture to greet children from four months of age, and children produce it as they reach the one-word stage. Speakers usually hold the hand out extending the thumb upwards. However, from 2001, speakers touched thumb pads with each other with a flick like movement in opposite directions when greeting.

Using observation and video-recordings of spontaneous use and elicitation, I examine how this change in the use of the 'thumbs-up' gesture impacted on its development in children up to 24 months. We observed four subjects' acquisition of the gesture before the introduction of the 'thumbs-up touch,' and observed and filmed spontaneous and elicited instances of use from 14 subjects from 6 to 18 months after the change.

Studies of gesture in early development show that children use gestures to convey information before they can speak (Iverson et al. 2008). A number of studies note that conventional gestures such as pointing, agreement and refusal are learned during the one word stage (Guidetti 2002). Few studies have examined the development of quotable gestures or gestures in ritual exchanges in early childhood.

Before 2001, infants produced the 'thumbs up' gesture from 9 to 12 months using the index finger pointing upwards instead of the thumb. The transition from index finger to thumb occurred from 20 to 24 months. With the introduction of the 'thumbs-up touch,' children seldom use the index finger and begin to use the correct digit by 18 months. The role of touch and visual perception, social interaction and embodied

cognition are discussed in relation to these findings.

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Action, gesture and word in the interaction of mother and child with Down syndrome

Arianna Bello [1], Olga Capirci [2], Maria Cristina Caselli [2] & Pasquale Rinaldi [2]

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Few studies have explored the relationship between shared attention, action with objects, gesture, and language in children with developmental disorders involving delayed or deviant language, as children with Down syndrome (DS) (Iverson et al., 2003; Iverson et al., 2006; Lagerstee & Fisher, 2008, Longobardi, 2007). The present study compares the communicative interactions of 10 mother-child with DS dyads (mean chronological age 4;1 years; mean developmental age 2;4 years) and 10 mother-typically-developing (TD) child dyads matched for developmental age and lexical comprehension. Children's word comprehension and gestural production were also evaluated using the MacArthur-Bates CDI and a standardized lexical test (Picture Naming Game- PiNG). All sessions were videotaped and transcribed in order to analyze how mothers direct children's attention and action and the role action and gestures play in the construction of meanings. Results showed that mothers of children with DS tended to produce more speech with gesture utterances than mothers of TD children ($Z=-1.664$, $p<.094$) and that both groups of mothers produced more deictic gestures than representational gestures ($Z=-2.46$, $p=.014$). The proportion of bimodal utterances (speech+gestures) in mothers of children with DS and in mothers of TD children was positively correlated with the accuracy in comprehension at PING test (rho DS= .56; p =.09; rho TD =.64; p < .05); and the production of Action Control utterances of mothers of children with DS was positively correlated with the spontaneous production of representational gestures during predicate denomination at PING test (rhoDS = .80; p =.02). These results support the hypothesis of a strong integration between the linguistic and the motor systems, further underlining the cognitive and communicative valence of actions and gestures (Rizzolatti & Craighero, 2004; Rizzolatti et al., 2001).

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How to invent nouns

CHAIRS: John B Haviland, *UCSD*

July 24, 13.00

When interactants must rely on their hands rather than their mouths to talk—either from enforced pantomime or as a result of deafness—the emerging systems of gesture and sign display what have been described as robust "linguistic" properties. Few properties of language are, in turn, more robust than formally marked categorical distinctions between "parts of speech"—between nouns and verbs, for example. This panel considers a wide spectrum of gesture-based communication systems, including (1) experimentally induced attempts at pantomimic representation, (2) homesign systems developed between single deaf individuals and their hearing caregivers, (3) "village sign" systems emerging in circumstances where small communities of deaf and hearing individuals persistently and sometimes over several generations communicate in part through visible signs, and (4) nascent institutionalized sign languages on their way to becoming regional standards. This panel asks a deceptively simple question: where do gestured nouns come from? If gesture is "visible action," then the iconic raw material of gestural signs is by necessity (at least modeled on) action. How do emerging sign systems extract, highlight, and communicate object properties from such action profiles to create visible analogues of nominal constituents?

Panel presentations

Sign as grammaticalized gesture: emerging grammar in a first generation sign language

John Beard Haviland, *UCSD*

The relationship between sign and gesture has long been vexed by a conviction that the semiotic modalities, the internal systematics, and the functional virtues of each are in important ways distinct. On the other hand, studies of "emerging sign languages"—developed spontaneously in social circumstances where sign-language co-evolves with spoken language (in deaf education where there is no established sign language, or in naturally occurring communities with high degrees of deafness)—contemplate more direct links between co-speech gesture, in its many forms, and the morphological raw material of an emerging sign language.

Zinacantec Family Homesign (Z) is a new sign language emerging spontaneously over the past three decades in a single family in a remote Mayan Indian village. It provides a unique opportunity to explore fundamental questions about the nature, origins, and evolution of human language. Three profoundly deaf siblings, their Tzotzil-speaking age-mates, and now their infant children, have had contact with no other deaf people nor with any pre-existing sign language. They thus represent the first (and perhaps also the last) generation of Z signers.

In previous work I have considered how "pointing" gestures, familiar and ubiquitous in Tzotzil conversation, are evidently incorporated into the emerging grammar of the new sign language. In this paper, based on both naturally occurring signed conversation and semi-experimental elicitation, I explore two quite different concrete "grammaticization paths" which appear to lead from co-speech gesture among hearing family members to two different sorts of grammatical elements in Z. On the one hand what seems to start as a conventional gestured command accompanying spoken Tzotzil leads to a productive pragmatic marker in Z; and on the other an iconic gesture representing a concrete action becomes incorporated into the sign language as a central morphological element in marking "parts of speech," to distinguish nouns from verbs.

Gestural Origins of Nouns in Sign Languages

Amber Martin[1], Ann Senghas[1] & Carol Padden[2]

(1) Barnard College of Columbia University; (2) University of California San Diego

Work on new sign languages such as Nicaraguan Sign Language (NSL) and Al-Sayyid Bedouin Sign Language (ABSL), has revealed how gesture spontaneously becomes primary language in the first two or three generations of signers. An area of recent interest has been the emergence of lexical categories (e.g. nouns, verbs) in new sign languages.

In American Sign Language (ASL), which is approximately 200 years old, signs for hand-held objects show the dimensions of the object, such as its length and shape. In other established sign languages, however, signs for the same objects show how it is held with the hand, called the handling type. Though both types are equally iconic, some sign languages favor one type over the other, as a preferential lexical pattern. In this study we explore whether preferential lexical patterning can be identified in a new sign language with a shorter history, such as NSL, which is about thirty years old. Since the establishment of a deaf school in Managua in 1976, NSL has been transmitted across three cohorts of children.

We elicited signs from seven adult Nicaraguan signers for hand-held objects and found that signers do not show a clear preference for either the handling (45%) or object type (47%). We gave the same pictures to six deaf homesigners (ages 3;6 to 13;7) who had just arrived at the deaf school with no exposure to NSL. Unlike adult NSL signers, the children slightly prefer handling gestures (57%) over object gestures (39%). In order to examine which type of forms are more likely to be found among hearing non-signers, we will elicit responses from hearing non-signing Nicaraguan and US children and adults. We discuss whether spontaneous gestures differ across age and culture with respect to the object or handling type.

Being human: experimental evidence that nominal gestures for humans shape constituent order in pantomime

Matthew Hall, University of California *San Diego*

If the creation of nominalized gestures is governed by systematic cognitive principles, then familiar patterns from homesign and young sign languages should recur in experimental simulations. Among nominal gestures, those denoting humans may have particular properties that set them apart as a communicative system evolves. I ask naïve hearing gesturers to describe transitive video vignettes in gesture without speech; thus, each vignette is expected to yield at least one verbal gesture and two nominals (agent & patient). I then examine the order of these three constituents. For canonical events (human agent, non-human patient), both SVO- and SOV-speaking participants have a strong tendency to use SOV order. In contrast, reversible events (human agent, human patient) elicit very different constituent orders in both SVO and SOV speakers. Participants tend to use at least one of three main strategies: (1) change word order, usually to OSV or SVO; (2) repeat constituents, generally accompanied by role-shifting; or (3) produce extra gestures that indicate thematic roles, analogous to case markers. These patterns are familiar from the ways that spoken and sign languages deal with reversible events, but whereas traditional accounts explain these patterns in terms of ambiguity (thus implicating comprehension), our results implicate production. We propose a cognitive constraint on production that forbids OV sequences when the O is human. This constraint arises from the unique way that participants embody action gestures and nominal gestures for humans, but do not embody other types of nominal gestures. Thus, the need to use human nominal gestures when describing reversible events may drive the emergence of significant linguistic structures.

Hierarchical structure in a self-created communication system: Building nominal constituents in homesign

Susan Goldin-Meadow & Dea Hunsicker, *University of Chicago*

Deaf children whose hearing losses are so severe that they cannot acquire spoken language and whose hearing parents have not exposed them to sign language nevertheless use gestures, called homesigns, to communicate. Homesigners have been shown to refer to entities by pointing at the entity (a demonstrative, that). They also use iconic gestures and category points that refer, not to a particular entity, but to its class (a noun, bird). We used longitudinal data from a homesigner called David to test whether these different types of gestures are combined to form larger, multi-gesture nominal constituents (that bird). David was videotaped in his home interacting with family members and the experimenters. We analyzed 11 sessions from ages 2;10 to 5;02 (years;months); each session lasted for approximately two hours. We found that David's multi-gesture combinations served the same semantic and syntactic functions as demonstrative gestures or noun gestures used on their own. In other words, the larger unit substituted for the smaller units and, in this way, functioned as a nominal constituent. Children are thus able to refer to entities using multi-gesture units that contain both nouns and demonstratives, even when they do not have a conventional language to provide a model for this type of constituent structure.

Gestures and their relation to speech and sign

CHAIRS: Silva H. Ladewig [1], Jana Bressem [1] & Simon Harrison [2]

(1) Europa Universität Viadrina Frankfurt/Oder, Germany (2) RWTH Aachen University

July 24, 15.30

Starting with the assumption that speech and gesture are two distinct semiotic systems while sharing common characteristics as, for instance, the capability to represent things and events (Müller 1998; Armstrong & Wilcox 2007), to form meaning pairings (e.g. Müller 2004), or to create linear and hierarchical structures (Kendon 1980, Fricke in press), several gesture scholars have sought to emphasize a multimodal approach to language that is grounded in semiotic and linguistic theory (Fricke in press; Mittelberg 2006; Müller 1998). Aiming at discovering commonalities, differences, and specificities of the two modalities (for example: Bressem & Ladewig 2011; Fricke in press; Harrison 2010, Ladewig & Bressem fc.), studies within a linguistic-semiotic framework thereby do not aim at proving gestures to be like language. As Kendon (1972) wrote: "It means, rather, adopting the level of analysis at which linguists operate when they approach speech and seeking for their mode of expression." (p. 443) The panel takes up the linguistic-semiotic perspective and presents studies that investigate possible commonalities of gestures with spoken or signed languages. More precisely, it aims at bringing together studies on gestures approaching forms, meanings, and linear structures on the level of the medium of gesture alone and examines how characteristics of this medium may relate to the properties of language.

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Panel presentations

Nouns and verbs in gesture, speech, and sign

Silva H. Ladewig, *European University Frankfurt Oder*

Research on the integration of gesture and speech has argued that gestures can adopt all kinds of syntactic functions. (Slama-Cazacu 1976) Empirical analyses have shown that gestures can be structurally and functionally integrated into a spoken utterance by occupying syntactic gaps of adjectives and fulfilling the function of attributes, for instance (Fricke in press; Streeck 2002). The question that remains to be answered is whether such gestures share characteristics of words or signs in spoken or signed languages.

The study aiming at an answer of this question is based on 20 hours of video data from different discourse types. It examines interrupted spoken utterances that expose a syntactic gap occupied by a gesture. Syntactic analyses revealed that the inserted gestures preferably occupy syntactic positions of nouns and verbs and take over the functions of objects or predicates. (Ladewig 2011) Contrary to the assumed hypothesis, a correlation between "acting gestures", re-enacting an action, and verb positions as well as "representing gestures", embodying objects, and noun positions could not be determined (see Müller 2010a,b). Rather we found that in the majority of cases gestures depict both an entity and an action or, in cognitive-linguistic terms, a THING and a PROCESS (Langacker 1987). Based on these observations, we argue that gestures show a similar internal information structure as signs, in which nouns, represented by or inferred from the hand shape, are "capable of joining into a close union with another kind of form, a verb", which is depicted by the movement of the hand (Stokoe 1991/2001; Armstrong & Wilcox 2007).

On the basis of these findings the paper tries to draw a relation between gestures and spoken and signed language based on their commonalities (see also Bressem 2012). Furthermore, it takes a step towards identifying the principles that govern a "multimodal cognitive grammar".

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Duplicating gestures, signs, and words: Similarities of repetitions across modalities

Jana Bressem, *Europa Universität Viadrina Frankfurt/Oder, Germany*

Analyses have shown that repetitions in sign languages exhibit similar structures and functions as repetitions in speech. Both modalities use repetitions for stylistic reasons, for lexical purposes as in the creation of new nouns, or for grammatical purposes as in the denotation of concepts such as plurality, numbers, or reciprocity (e.g., Fischer 1973; Hurch 2005; Klima and Bellugi 1979). However so far, analyses addressing different types and function of repetitions in gestures are still missing. Based on a broad empirical basis, we will argue that gestural repetitions show similar structural and functional properties as repetitions in spoken and signed languages.

Our analysis rests upon 23 hours of video data from different discourse types. Using a linguistic approach to the study of gestures (Bressem and Ladewig 2011; Ladewig and Bressem fc.; Fricke in press; Müller 2010), 225 gestural repetitions were investigated on the levels of form, meaning, and function and they were classified into iterations and reduplications. The study revealed different structural characteristics for both types of repetitions, and moreover identified differences in meaning and function. Concluding, the study showed that gestural repetitions are used for stylistic, lexical, and/or grammatical purposes (Bressem 2012). Based on these structural and functional characteristics, we argue that gestural repetitions exhibit similar properties as repetitions in spoken or signed languages. Accordingly, we propose that irrespective of the modality, repetitions exhibit a general structural and functional potential, which leads to commonalities in repetitions expressed in gesture, sign, and speech.

With these findings, the present paper contributes to the investigation of commonalities in gesture, speech, and sign against the background of applying a common methodological and theoretical framework to different media of expression (Pike 1971; Fricke in press; Ladewig 2011).

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Learning to negate with gestures and signs: A study of non-native signing in a French Sign Language classroom

Simon Harrison*, RWTH Aachen University*

Gesture and sign have been described as occupying the extremities of a continuum of bodily actions involved in communication (McNeill 2005; Kendon 1988). Recent work suggests this distinction is not so clear-cut however (cf. Kendon 2008). For example, Liddell (2003) has demonstrated that key aspects of signing are based on an integration of linguistic and gestural components. Kendon (2004) has drawn explicit parallels between ways that speakers gesture and ways that signers sign (pp. 307-325). In this paper, I will study specific instances where gestures and signs meet and examine their interaction.

This study reports analysis of video data collected from a French Sign Language (LSF) classroom where a group of 5 students at the A2 level ('advanced beginner') are learning to negate. In the first part of the class, the teacher has taught the students basic manual signs for negation, such as Y EN A PAS, NON, and NE PAS AIMER. In the 5 recordings to be analysed, each student can be seen creating negative sentences in LSF as elicited by picture stimuli being presented by the teacher sat opposite. The recordings are approximately 3 minutes each and contain an average of nine negative sentences per student.

My analysis of these videos integrates a descriptive framework for negation in French coverbal gesture (Calbris 1990, 2005) with online dictionaries containing accounts of LSF negation in citation form (e.g. http://lsf.wikisign.org/). Combining transcriptions of visible bodily action in ELAN with insights from semi-structured data sessions with native LSF signers, I show that although the articulation of the students' negation signs is more or less accurate, their impulse to gesture in a particular way when signing is not. This suggests that signing not only integrates gesture, but does so in a way that is determined by a language already in the gestural modality.

Discussion on "Gestures and their relation to speech and sign"

Discussant: Elisabeth Engberg-Pedersen, *Köpenhamns Universitet*

The blossoming of negation in gesture, sign and vocal productions

CHAIRS: Aliyah Morgenstern, *Sorbonne Nouvelle- Paris 3*

July 25, 13.00

The study of the expression of negation in longitudinal data of adult-child conversations is a privileged locus to combine multimodal analyses of gesture with prosody, syntax, semantics and pragmatics. First negative constructions seem to take over from early gestures of rejection and avoidance, but tracing the transitions between actions and gestures, and between gestures and signed or vocal expressions in very young children is quite complex. This panel will focus on multimodal analyses of negations in the productions of speaking and signing children between the ages of 0;10 and 4;0 interacting with their parents in various linguistic environments (monolingual French, monolingual English, monolingual LSF, bilingual French/LSF). The presenters were given three main goals: - To analyze the modalities used according to the context. - To grasp formal elements that would enable us to understand the transition from action to symbolic gesture. - To locate formal differences between the various functions of negation (negative assertion, rejection/refusal, absence, epistemic negation). A specific coding system was developed combining the use of Excel, CLAN and ELAN with the video data and the transcriptions in order to make micro and macro analyses of the functions of the different forms of negation according to context in dialogue. We will present the individual multimodal path of each child and focus on the commonalities and differences between the children according to the languages they are in the process of acquiring. The first presentation will focus on multimodal negation in monolingual and bilingual speaking children. The second presentation will focus on negation in a monolingual signing child (LSF) and a bilingual child (French/LSF). The third presentation will focus on the role of gesture in the blossoming of negation. The three presentations will be followed by a discussion by Sotaro Kita and exchanges with the audience.

Panel presentations

Multimodal negation in speaking children

Pauline Beaupoil [1], Stéphanie Caet [1], Sandra Benazzo [2] & Aliyah Morgenstern [1]

(1) Université Sorbonne Nouvelle - Paris 3; (2) Université Lille 3 - STL

As discussed by Spitz (1957), first negative constructions seem to take over from early gestures of rejection and avoidance (Clark 1978). For Kendon (2002), in many cultures, gestures of negation are the ritualization of spontaneous actions. Guidetti (2005) argues that gestures of agreement and refusal are the first symbolic gestures (aside from pointing) used by children.

In order to trace the transitions between actions and gestures and between gestures and verbal productions in children's data, we analyzed all the actions, gestures, vocal and verbal productions of five speaking monolingual and bilingual children from the ages of 0;10 to 4;0. We were particularly interested in a) trying to distinguish actions (pushing an object away, avoiding a spoonful of broccoli), and conventional gestures with headshakes or the index; b) the combined use of gestures and words; c) the use of each modality on its own; d) the introduction of co-verbal gestures at the end of the data.

We also analyzed what the first functions of negation were (rejection/refusal, absence, epistemic negation, negative assertion) their order of emergence and their forms in different modalities from the very beginning of our data.

Our study shows that the five children use the two modalities throughout the data for all functions of negation, but with very great individual differences. Some children seem to follow a path that leads them from actions to symbolic gestures in isolation and then combine them with words before they make verbal productions alone. Other children are very quick at entering the verbal modality and do not rely on symbolic gestures. But the visual-gestural modality makes a spectacular comeback in all five children's data with the use of co-verbal gestures of negation when speech seems to be already quite elaborate.

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Formal variations in children's negation gestures

Marion Blondel [1] & Dominique Boutet [2]

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Acquisition studies on children's gestures of negation generally involve descriptions and a functional analysis of gestures and head movements in relation to simultaneous verbal productions (Guidetti 2005; Andrén 2010; Limousin 2011). Even if the analysed gestures are identifiable as markers of negation, little attention has been paid to their forms in child language. In contrast, there are inventories of the forms of negation

gestures in adults in French contexts (Calbris 1990; Ferré et al. 2007) and in international contexts (Kendon 2002, Harrison 2009), as well as in inter-modal contexts between LSF and French (Harrison et al. 2010). Thus in France, adult negation gestures have been inventoried, but the constant elements have not been closely examined (Calbris ibid).

We will highlight some constant features of the gestures of negation, based on a corpus of spontaneous productions of French-speaking children, that have been recorded on a monthly basis (CoLaJE ANR project) from 0;10 to 4;0.

The form of the negation gestures was annotated on ELAN, focusing on the decomposition of movements and positions with respect to the degree of freedom of the segments of the upper limb (Boutet 2007). The use of a physiological basis to structure meaning has been employed for twenty autonomous gestures (Boutet 2010). It has been shown that primitives of meaning are associated to degrees of freedom or to combinations of gestures.

We observe that in children's development, similarly to adult's gestures, negation involves two types of invariant gestural forms. We will present the patterns of action associated with these forms and discuss their roles.

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Negation in signing children

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Zeshan (2006) introduces negation as one of the "very suitable candidates for SL typology" and proposes that "the relation between signing and gesturing, with both manual and non-manual aspects is important [..] in negation". We address this topic in the data collected from two children with LSF input: Charlotte, a monolingual deaf child and Illana, a hearing bilingual LSF/French child.

Charlotte benefits from input through the visual modality, from actions to signs, as well as visual input derived from the vocal modality: mouthing and lips reading. We have observed expressions of rejection, then refusal through headshakes and the index finger; later, she uses negative predicates and facial expressions (e.g., furrowed brows, wrinkled nose, corners of the mouth pulled down).

Illana can benefit both from the complete auditory modality and from the complete visual modality, all the way to signs. As in other children, her actions of rejection or refusal get grammaticalized into gestures, words and signs, but the visual forms do not decrease to the advantage of the vocal forms, since Illana continues to use headshakes, index finger negations and all kinds of symbolic gestures. It seems to us that Illana clearly illustrates the blossoming of a gestural pattern based on the systemic combination of movements. As she gets older, she seems to resort more and more to the combination of vocal productions with symbolic gestures. This is not only an illustration of what Zeshan (2006) calls "emphatic negation" for SL, since Illana, adds the vocal production non, addressed to her hearing mother. She uses also visual-gestural cues when her father is involved in the conversation, even when she speaks to her mother. This entangled situation is a wonderful opportunity to understand multimodality in its very unique use by a bilingual bimodal child (Emmorey et al., 2008).

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Papers

Directing Others' Attention: a study on families with infants in rural and urban Gujarat, India

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July 24, 15.30

It can be considered a basic problem for communication to create a joint attentional focus with other individuals. Communication about objects or processes outside the dyad becomes possible through this shared focus of attention. Joint attention can be observed in the second year of a child's life but precursors are being shown early on in behaviors such as gaze following. In this presentation two samples (21 families from rural Gujarat, India; 20 urban families) of nine-month old infants and their caregivers are compared on how caregivers direct the infants' attention. The children and their caregivers were observed in two settings: 1. In their normal daily routines (observations of 2-4 hours) 2. In a video-recorded task in which mothers were asked to show their children something out of immediate reach In the existing literature there has been a focus on declarative gestures to guide attention. The data for this presentation contains an analysis of gestures, body motions (video only) and non-verbal acoustic signals. The data indicate that there are few differences between rural and urban caregivers in the use of gestures in the video-recorded task, there were different uses of the body with the rural mothers directing the children more frequently whereas urban mothers follow their children's orientation more frequently. The preliminary results from the observations indicate that rural caregivers use non-verbal acoustic ways of guiding their children's attention more and have fewer episodes of child-initiated shared attention during their normal daily routines. Urban caregivers also have more gesture teaching episodes with the infants in their families. These results are in line with general childrearing and teaching patterns found in earlier cross-cultural studies. The focus on non-verbal acoustic and bodily ways of guiding attention may be a fruitful approach for comparative studies including other species.

Up, over, and across. Bilingual and monolingual motion descriptions in French and Dutch

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July 24, 16.30

Bilingualism studies ask whether bilinguals operate with two separate systems or one system incorporating properties from both of their languages. Studies of bilingual speech typically find patterns suggesting a single system. Studies that also consider gestures typically investigate second language (L2) learners rather than functional bilinguals, often finding patterns typical of only the first language. It therefore remains unclear what a speech-gesture analysis might reveal about the functionally bilingual system. We elicited descriptions of 18 scenes of voluntary motion (6 UP, 6 DOWN, 6 ACROSS) from 5 monolingual Belgian-French, 5 monolingual Belgian-Dutch speakers, and 4 fluent Belgian-French/Dutch bilinguals in both languages. Speech was coded for manner (M) and path (P) information; gesture for semantic content (M/P/MP) and coexpressivity with speech. The speech results show that Dutch monolinguals express M in verbs and P in satellites across all the motion subtypes. In contrast, the French monolinguals differentiate subtypes (Hickmann, 2006) expressing a mix of P-only and MP constructions for UP-items, but P-only for DOWN- and ACROSS-items. The bilinguals exhibit language-specific patterns for the UP and ACROSS items, but they display more variability for the DOWN items. The gesture results show that all groups predominantly produce P-gestures, replicating previous findings for French and providing new findings for Dutch. Regarding co-expressivity, Dutch speakers talk about MP but gesture only about P, French speakers are largely co-expressive. Importantly, the bilinguals perform in language-specific ways, talking about MP but gesturing about P-only in Dutch while being more coexpressive in French. In contrast to findings from L2 studies, these results thus suggest that functional bilinguals can develop language-specific speech and gesture patterns and that they keep these separate in production. We discuss the implications for bilingualism and gesture studies.

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Bodily Expression When Retracting From an Action: Structures of action meets the logic of grammar

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July 25, 16.30

This study is part of a larger endeavour to outline the class of actions that (a) has explicit gestural features of expressiveness (Kendon 2004:15), but (b) also involve handling of the physical world (Streeck 1996; Goodwin 2007). Such "expressive handling" may potentially occur at any juncture in the flow of manual engagement with an object (Andrén 2010; Andrén in press): when reaching for, grabbing, holding/manipulating, putting down, or withdrawing from, an object. The present study is an analysis of recurrent gestural features emerging during the last of these "phases"; the withdrawal from an object/action (e.g. when the hands retract from having placed a piece of a puzzle). The data analyzed consists of recordings of Swedish children (18–30months) interacting with their parents at home. In parent-child interaction, an issue dealt with again and again by the interactants is the reciprocal recognition and evaluation of the child's performance of some action. Viewed through this lens, the moment a child retracts from an action that was completed just before (the shift from "ongoing

action" to "finished action") is of particular relevance, as a moment of evaluation. The child's action may be treated as successful, suitable, correct, interrupted, failed, etc. The child may express such evaluations herself, by turning something that would otherwise has been "mere withdrawal" of the hands into something explicitly expressive: a blend of stroke and retraction qualities ("marked retraction"). I will show a set of video clips that demonstrate key aspects of such expressions in the children. Part of the picture is also how these marked retractions are coordinated with gaze and speech. I will show how the Swedish word "så" ("so"/"like that") has several distinct usages in the context of withdrawing from an object/action (both similar and different to the analysis of Streeck 2002). These usages are distinguished from each other in part through different kinds of temporal coordination with the bodily movement. Interestingly, it is possible to trace aspects of these hands-on uses of "så" all the way into the semantics of the Swedish "om-X-så-Y" ("if-X-then-Y") construction, in the very core of grammar and logic.

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Questions about Confederates and Other Unnatural Interactions: Evidence from Inconsistent Visibility Results

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July 25, 15.30

Visibility experiments are a common research design in the debate over whether gestures are communicative or cognitive. These studies compare an experimental condition in which the participants can see each other with a condition in which they cannot (e.g., interacting face-to-face versus through a partition). We found 14 well-documented visibility experiments with adult native speakers (1973-2011). Seven studies reported a significantly higher rate of gesturing in the visibility condition than in the no-visibility condition. The other seven found no significant difference. Our review identified a single procedural choice that accounted for these dichotomous findings: The seven experiments that found a significant difference between the visibility and no-visibility conditions used a procedure that constrained the addressee's interaction with the speaker/gesturer. Whether the addressee was a confederate, the experimenter, or another real participant, he or she had instructions that limited responsiveness to the speaker/gesturer (e.g., "respond minimally"). In contrast, the seven studies that found no significant visibility effect all permitted true dialogues; the speaker/gesturer and the addressee were both real participants, and they could interact freely about their assigned task. The findings of Bavelas, Gerwing, Sutton, and Prevost (2008) on the importance of dialogue as a distinct variable suggest a plausible explanation. In that experiment, talking in dialogue (versus monologue) produced a significantly higher rate of gesturing, which was independent of the effect of visibility (e.g., the rate in a telephone dialogue was significantly higher than in a monologue with no addressee). Thus the effect of a true dialogue may override any effect of visibility on gesture rate. Also, the studies that limited interaction were heterogeneous and inconclusive because instructions to addressees were vague, varied widely, and lacked a check on compliance. For example, visible actions (especially nodding, smiling, and gaze) could make the visibility condition more dialogic than the no-visibility condition.

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Gestural Alignment in Natural Dialogue

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July 24, 13.00

A well-known phenomenon in natural interaction is that speakers adapt their linguistic and nonverbal behaviors. Research on gestural alignment is, however, still in its early stages based on evidence from experimental settings (e.g. Kimbara 2008, Holler & Wilkin 2011, Mol et al. 2012). We present a first systematic study of gesture form convergence based on a large sample of naturalistic dialogue data (4449 iconic/deictic gestures) where we found evidence for gestural alignment. Remarkably, not all gesture features seem to be subject to this effect. While the form features 'wrist movement' and 'finger orientation' seem resistant to these contingencies, we found that the use of particular gestural representation techniques (Müller 1998, Kendon 2004, Streeck, 2008) as well as the gesture form features 'handshape', 'handedness' and 'palm orientation' are significantly subject to inter-speaker convergence effects. In a detailed analysis of those sensitive features we addressed the question whether intra-speaker or inter-speaker influences on gesture form are stronger: For all features under

consideration, alignment effects were found to be significantly stronger within speakers than across speakers. That is, a speaker's gestures influence each other more than the gestures an interlocutor performs, albeit the effectiveness of other-alignment. Finally, we investigated how gestural alignment depends on the temporal distance between gestures. Here a multi-faceted picture emerged: alignment in 'handshape' and gestural representation techniques becomes weaker with greater distances, while alignment in 'handedness and 'palm orientation' remains constant. It will be discussed whether this heterogeneous picture of gestural alignment at the level of different features may be due to the fact that particular features are communicatively bound, i.e., more crucial for conveying intended meaning and less amenable for inter-personal coordination.

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How do Greeks ask questions?

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July 24, 17.00

The Italian co-speech gestures and specifically the characteristic 'purse hand' shape called 'grappolo' or 'mano a borsa' have been studied intensively during the last two centuries for their functions in discourse (De Jorio 1832, Kendon 1995, Kendon 2004). In Southern Italian conversation it is often used as a question or a demand marker (Kendon 2004, Poggi 2007). De Jorio (1832) states that Southern Italian gestures originate from Ancient Greeks who colonized this part of Italy. However, there is hardly any research done on Greek gestures, especially on the 'purse hand' shape used frequently in everyday conversations, so it is difficult to support this hypothesis. In my research I have found out that the 'purse hand' is also used in the context of questions in everyday conversations in today's Greece, but it is not as conventionalized and has more kinetic variations than the Italian one. All of the 10-day data collection was done in Crete with 15 subjects (8 male and 7 female) who came also from other parts of Greece. Some of the video recordings were made during narrations, set-up discussions, but mainly during natural conversations. The analysis of the 4 hours of data was done using the multimedia coding and analysis programme ELAN and around 90 occurrences of the purse hand were described and analyzed in relation to the speech they accompanied. A 'purse hand' occurred in 25% of the examples from the corpus and formed the biggest function category. This research was conducted to raise a discussion and interest in studying Greek gestures. More studies need to be done to investigate this topic in more detail, and to reach a deeper understanding of Greek discourse and conversations.

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A Diachronic Approach for Human – Humanoid Discourse

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July 27, 9.30

We consider gesture communication between a human and the "species" of artificial intelligent agents. In particular, we develop a common gesture language to enable a customer–bar waiter discourse between a human and an Aldebaran Nao, a humanoid robot. Although the ultimate interaction should be multimodal, this work focuses on gestures only. The dialogue uses human and robot gesture vocabularies (HGV and RGV). The goal of the discourse is to allow a natural interaction resulting in the robot providing services in response to human requests, and to initiate services by recognizing the human's intent. A synchronic approach is employed to create basic gesture vocabularies. A diachronic approach is then taken, to evolve this basic vocabulary over time. The evolution takes the form of the modification, or introduction of new gestures, when a new gesture is needed (either for the robot or the human) to enhance the richness of the communicative vocabulary. The need for a new gesture is triggered by: failure of the humanoid to perform tasks, correct errors or accidents, or when a robot needs more expressive power to resolve misunderstandings or ambiguities. To add a gesture for each new meaning to the HGV and RGV, adaptive gesture recognition and interactive genetic algorithms (IGA) are used, respectively. The IGA is an evolutionary method, where a human rater assigns

preference values to candidate robot gestures. This method is appropriate for measures of likeability, intuitiveness or understandability. To teach the humanoid a new gesture or modify an existing one, the IGA starts with an initial population of candidate gestures (some seeded by the human and others randomly generated) representing a meaning, unknown to the robot. This population is refined through genetic transformations of selection, crossover, mutation, and human evaluation, until convergence to a single gesture representing the meaning.

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Multimodal metaphors – their dynamic activation and interactive elaboration

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July 26, 14.00

The paper to be presented investigates the emergence and dynamic as well as interactive elaboration of metaphoric meaning in an argumentation on self-realisation. More precisely, based on an analysis of gesture and speech, it explores how the notion of self-realisation is conceptualized and embodied by the participants and how metaphoric meaning evolves over the whole conversation. The case study is based on 30min of video data taken from a set of data on self-realisation. In the example, three students are negotiating about the notion of self-realisation. In order to investigate the participant's understandings and experiences of self-realisation, all metaphors relating to self-realisation were identified and analyzed from a discourse dynamics perspective and by taking the dynamic evolvement of metaphoricity in different modalities into account (Cameron & Maslen 2010, Kappelhoff & Müller 2011; Kolter et. al. 2012; Müller & Tag 2010.). The analysis revealed that the participants construed the concept of self-realisation differently in their gestures, i.e. either as a process or as a static container. Furthermore, taking the step-wise evolvement and the interactive elaboration of metaphoricity over the whole conversation into account, the study uncovered that the participants work towards a common understanding and conceptualization of self-realisation: The student who is expressing self-realisation as a static container starts to move her hand such that self realisation becomes an embodied moving container. The case study demonstrates first and foremost that metaphors are not a static property of words or gestures but must be understood "as materialized products of the process of establishing metaphoricity" (Müller 2008b: 23). It shows how those metaphors can be interactively elaborated and most importantly it documents that gestural metaphors may reveal individual embodied understandings of abstract concepts. This latter aspect being in line with Cienki's findings regarding multimodal metaphors for the abstract concept of honesty (Cienki 1998).

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Pointing: Rich but lean

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July 25, 15.30

In a series of articles, Liszkowski, Tomasello, Carpenter et al claim that human pointing is cooperative, presupposes shared intentionality and aims at changing the audience's mental states. 1-year-olds' prelingustic communication is a uniquely human form of communication that depends on socio-culturally mediated, social-motivational and higher cognitive skills (Liszkowski, 2011). Southgate et al (2007) criticize their interpretation of the data for being too strong, suggesting that pointing is not cooperative but interrogative. While the data is highly interesting, I agree with the criticism. Initially I will briefly specify the problems I find with Liszkowski's et al. approach, then present an alternative account in favour of a bottom-up approach (de Waal & Ferrari, 2010) that emphasizes the multimodal and dynamic nature of gesture. To avoid speculation about the proper function of referential pointing, Bates' (1976) distinction between the illocutionary and perlocutionary dimensions of pointing provides the basis for my explanation of the underlying mechanisms of pointing. The illocution corresponds to the referential act itself; the perlocution concerns the act's purpose, say, to inform or share (Brinck, 2004). Using data on mainly gaze-related behaviour in preverbal communication and on infants' understanding of (inter)action, I will argue that referential acts do not require higher-order intentions but depend on attention reading. Then I will explain how the cognitive, evaluative and motivational components of emotion interact to enable recognition of the purpose of pointing (Ben Ze'ev, 2000). Bates' distinction also contributes to explain the much debated difference between pointing in apes and humans. Apes have been observed to point referentially, show handedness and have similar attentional skills as humans, but mostly point imperatively (Pika, 2008). I suggest that the difference pertains to the perlocutionary dimension, relating to interaffectivity, and consequently performance should be sensitive to local environmental conditions, rearing, and motivation (Leavens & Bard, 2011).

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Gesture and Mental Representation in Abacus Problem Solving

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July 25, 13.30

A growing body of research demonstrates that gesture can facilitate cognition. When encouraged to gesture, participants show improved performance on tasks as simple as counting and as complicated as solving algebra problems . The present research explores the mechanisms by which gesture and cognition interact by examining how individual differences in gesture during problem solving relate to performance. Participants were children who attended after-school programs in India that taught the abacus method of arithmetic. Children initially learn to use a physical abacus, but quickly transition to "mental abacus", in which they manipulate a mental image of an abacus in order to solve arithmetic problems. All 86 children in our sample spontaneously used their hands to simulate moving the abacus beads while solving problems. These gestures were coded for size, clarity, and relationship to the problem. Our findings suggest a meaningful relationship between gesture size and performance. First, within participants, the difficulty of a problem is correlated with gesture size. Secondly, the tendency to increase gesture size as problems get harder varies across participants, and is indicative of greater dependence on gesture: participants whose gesture size is closely linked to problem difficulty suffer the most when they are not permitted to gesture. Finally, when children are instructed to produce smaller gestures, their performance is better than when asked to produce large gestures. These findings suggest that the consistency of a child's abacus gestures may reflect the stability of their mental representation of the abacus state, and the degree to which this representation relies on supportive motor information.

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Motion Event Construal in Satellite-framed, Verb-framed, and Equipollently-framed Languages: Manner in Speech and Gesture

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July 26, 10.30

Numerous studies have found differences between satellite- and verb-framed languages in construal of Manner of motion in speech (e.g. Slobin, 2006) and in gesture (e.g. McNeill, 2001). However, few studies have considered spoken and gestural construal of Manner in the third category, equipollently-framed languages, recently proposed by Slobin (2004). The findings that exist are contradictory, specifically with respect to distinctions between satellite- and equipollently-framed languages and whether a three-way typological pattern can clearly be observed in both speech and gesture in this domain (Chen, 2007; Chen & Guo, 2009; Chui, 2009, 2011; Duncan, 2005; Guo & Chen, 2009). This study compared elicited descriptions of motion from 14 native speakers of Mandarin Chinese (equipollently-framed) with those from 13 native speakers of English (satellite-framed) and 16 native speakers of Japanese (verb-framed). Analyses focused on distribution of information about Manner across modalities, both at the levels of event description and clause. Results, largely in line with Chui (2009, 2011), showed that speakers of Mandarin encoded Manner in speech significantly more often than speakers of Japanese and to the same high degree as speakers of English. Furthermore, Mandarin speakers, like English speakers, rarely depicted Manner in gesture when it was absent from speech, so-called 'foregrounding' of Manner through gesture or 'Manner Fog' (McNeill, 2001), a phenomenon found more frequently in Japanese. However, they significantly differed from English and Japanese speakers in the extent to which they 'backgrounded' Manner through gesture ('Manner Modulation' in McNeill 2001), by frequently encoding Manner in speech but encoding only Path in accompanying gestures. Therefore, a three-way typological distinction was observed in some aspects of Manner expression. These findings are discussed with respect to how the integrated system of speech and gesture contributes to typological, cross-linguistic differences in event construal.

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Addressing salient mismatches in the gesture-speech interface in order to more effectively mediate second language learners' conceptual understanding of two French tenses

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July24, 14.30

This presentation will report on a study of the importance of identifying salient mismatches (e.g., Alibali & Goldin-Meadow, 1993; Church, 1999; Church and Goldin-Meadow, 1986) between a second language learner's use of gesticulations and verbal language when attempting to think through and demonstrate the learner's understanding of the pluperfect and its relationship to preterit in a French narrative during a distributed group reading activity. Although the importance of gesticulations in second language pedagogy has begun to receive more attention, research thus far has focused solely on the use of gesture by learners (e.g., Lantolf, 2010; van Compernolle & Williams, 2011)

or by teachers (e.g., Sime, 2008) to mediate learners' conceptual understanding. This study focuses on a mediator's and a learner's use of spontaneous gesticulations and verbal language to negotiate, mediate, and develop in real time one learner's, as well as the other group members', conceptual understanding of these grammatical concepts. The salient mismatch in the learner's gesture-speech interface provided the mediator with crucial information to be able to more effectively diagnose the learner's current conceptual understanding of the grammatical concepts and attune the mediation to more adequately promote the learner's and the group members' conceptual understanding. The mediator's use of both gesticulation and verbal components in her mediation provided the learners with clearer, richer and more thorough mediation and provided the learners with an opportunity to begin internalizing the mediational tool. This study has important implications for second language pedagogy and teacher education.

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Using the hand to ground the mind: Parents' use of gesture during decontextualized speech to typically-developing children and children with early brain injury

Erica A. Cartmill, Özlem Ece Demir & Susan C. Levine, *University of Chicago*

July 24, 10.30

Decontextualized speech (i.e. speech not about the immediate environment) is the type of language children encounter in academic settings and written text. Parental use of decontextualized speech in preschool years relates to children's later-developing language outcomes, such as vocabulary size and narrative skill (Beals, 2001; Fivush, 1991; Rowe, in press). Using data from a longitudinal study of 65 parent-child dyads, Demir and colleagues (2009) found that parent use of decontextualized speech at child age 2.5 years predicts child vocabulary and narrative skill at 5 years of age, for both typically developing children and children with early brain injury. Using data from the same dyads, we asked whether the gestures parents produced during decontextualized speech at child ages 2.5 and 3.5 years differed from the gestures they produced during other speech, and whether there were differences in the gestural input received by typically developing children and children with early brain injury. We found that parents used gesture more often during decontextualized speech than other speech, $F(1, 64) = 11.48$, $p < 0.01$. We also found that representational gesture was used more frequently during decontextualized speech than other speech, $F(1, 64) = 5.60$, $p < 0.05$. Moreover, parents of children with early brain injury gestured more during particular types of decontextualized speech (e.g. narrative) than parents of typically developing children. These gestures might provide unique support for children with early brain injury in understanding reference removed from the immediate environment, a possibility we will explore. We propose that all parents use representational gesture to ground their speech when it is not grounded in the immediate environment. We will discuss the relationship between this grounding and children's later language outcomes.

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Motion event typology in Mandarin and English: evidence from gesture and prosody

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July 26, 11.30

According to Talmy (1991), Chinese and English are strongly satellite-framed type, regularly using satellites to specify PATH, with conflating MOTION and MANNER into a main verb. This, however, is challenged by many studies, in which features of both verb-framed and satellite-

framed languages have been found in Chinese. Then a hypothesis arose that Chinese is a third extra type, i.e. equipollently-framed language (e.g. Slobin, 2004; Shen Jiaxuan, 2003). Gestures can reflect linguistic choices (Gullberg, 2008) because speech and gesture share the same cognitive origin (McNeill, 1992; De Ruiter, 2000). Gestures are language-specific (Kita & Özyürek, 2003), e.g. the stroke of a gesture often synchronizes with a verb in English, while with an object in Chinese (McNeill, 1992). Furthermore, speech equals text plus prosody (Hirst, 2011), suggesting prosody should be taken into consideration when studying speech. In English, content words often bear stress, and function words usually not – those with contrastive features excluded (Wells, 2006). So words specifying PATH (particles) in English should not be accented. But different accentuation patterns were found in Chinese verb complements (Chao, 1968; Lin, 1957). For these reasons, we need to investigate Event Framing in Chinese and English from gestural and prosodic perspectives. 20 Chinese and 20 English natives involved in the present study. Each participant was asked to retell a cartoon story in his/her L1 to an addressee who knew nothing about the story. L2 English was also produced by Chinese subjects. The process was videotaped. Preliminary findings are as follows. English natives behave a typical satellite-framed language, with accenting on MOTION and gesturing Manner and PATH simultaneously Chinese natives have the same pattern in L1 and L2. Both stresses and gestures were found to fall on PATH predominantly. This shows that Chinese is not a typical satellite-framed language. The results will be discussed separately.

Functions of co-speech gestures as probed by individual differences

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July 26, 11.00

Abstract People spontaneously produce gestures when they speak. Different theories have been proposed about the reasons people produce gestures. Some claim that gesture is motivated by the demand to communicate with others (e.g., Holler & Beattie, 2003; Kendon, 2004; Özyürek, 2002). Others hold that gesture benefits the speech production processes, by lightening general working memory load (Goldin-meadow, 2003), maintaining mental images in visuospatial working memory (de Ruiter, 2000), transforming and packaging spatial-motoric information into suitable units for speaking (Kita, 2000), facilitating retrieving words from mental lexicon (Krauss, Chen, & Gottesman, 2000). The present study aims to test these theories by examining individual differences in gesture production. If gesture played certain roles in speaking and communication, individual variations in these aspects should predict individual variations in gesture production frequency and saliency. We measured 129 native adult English speakers' verbal working memory capacity; visual-spatial working memory capacity; spatial transformation ability; word retrieval efficiency; the conceptualization efficiency; and the empathy ability. We elicited co-speech gestures by an English phrase explanation task and a social dilemma solving task. We found that individuals' visual working memory, spatial transformation ability, conceptualization ability were negatively related to the frequency of representational gestures. Empathy ability was positively related to the frequency of interactive gestures, and was positively related to the saliency of gestures. The results support the theories that gesture helps maintaining spatial representations in working memory (de Ruiter, 2000), and transforming and packaging information for speaking (Kita, 2000). The results also support the views that gesture is produce for communication (Holler & Beattie, 2003; Özyürek, 2002). Thus, the present study helps to differentiate among theories regarding the cognitive and social basis of gesture production and deepens our understanding of individual differences in gesture production.

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Multimodal alignment during shared remembering: Towards a qualitative method of analysis

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July 25, 10.30

Research from the fields of cognitive linguistics, conversation analysis, and gesture studies (among others) is providing converging evidence about ways in which speakers may come into, and go out of, alignment with each other. Examples include repeating and varying use of syntactic constructions across utterances (dialogic syntax; Du Bois 2001), seamlessly latching onto another's turn at talk (Mondada 2006; Sacks et al. 1974), and/or 'returning' each others' gestures across turns at talk (de Fornel 1992) by copying and re-adapting them. Some researchers attribute alignment processes to automatic (unconscious) behaviors (Pickering & Garrod 2004) while others consider how the

effortfulness and/or visual attention to behaviors can indicate degrees of metabehavioral awareness (Müller 2008). Alignment can also be an indication of some level of intersubjectivity between participants in terms of the sharing of thoughts, feelings, and linguistic meanings (Zlatev et al. 2008). This is leading some researchers to study alignment in relation to collective memory (Tollefsen & Dale 2010). We propose a method for analyzing alignment qualitatively from a multimodal perspective which can be used as a means for analyzing how interactants engage in shared processes of remembering in real time. Special consideration will be given here to the role of different types of gestures (pointing, placing, representing, discourse-structuring) within this process.The video data for analysis comes from an ongoing project on how collective remembering takes places among small groups of Argentinean Spanish speakers as each group recalls a vacation taken together several years ago. The method of analysis reveals types of alignment not only 'vertically' in terms of the use of simultaneous clusters of synchronized 'resonating' behaviors across modalities (e.g., dialogic syntax and the echoing of gesture use) but also 'horizontally' by examining the temporally structured, sequential, dynamic processes by which these clusters come into being and then dissipate.

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Attributing abstract meaning to hand gestures

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July 24, 17.00

Hand representational gestures are daily used to process and convey abstract meanings through metaphor (Cienki & Müller, 2008). Developmental studies of children's narratives and oral explanations showed evidence for age-related changes regarding the frequency of use and the formal aspects of gestures of the abstract (McNeill, 1992; Colletta & Pellenq, 2009). Following Goldin-Meadow (2003), we postulate that gesture development is a window into the development of abstraction abilities. One way to test this hypothesis is to track abstraction in children's gestures. Another way is to study the reception side of abstract representational gestures. However there is little information about the way people detect and process the abstract use of gestures. Boutet (2010) showed that hand gestures selected from the sole physiological parameters (extension/flexion, pronation/supination, etc.) are easily categorized and seen as bearing meanings. The assigned meanings to gestures by the subjects (to appear/disappear, to offer/refuse, to accept/reject, to consider, etc.) applied both to actions and properties of objects in the physical world and to abstract ideas. Our study aims to compare the pattern of attribution of abstract meaning to hand gestures in three age groups: children, adolescents and adults. We filmed seven hand gestures that have both concrete and abstract representational properties, with which we have developed two tests. In the first test, subjects were asked to produce three sentences that were appropriate for each gesture they viewed. And in the second, they were asked to assign priority to the choice of three sentences that we proposed for each gesture, each sentence calling for a deictic, or concrete, or abstract representational co-speech gesture. Although we did not find statistical evidence for an age effect, the results show that participants tend to attribute abstract meaning more frequently to certain hand gestures than others. These promising results will help design new experiments.

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Learning with gesture improves over time

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July 25, 10.30

Students learn more when instruction is accompanied by gesture. We explored the effect of observing gesture on how conceptual knowledge is maintained over time. If observing gesture affects the conceptual knowledge that children acquire, then gesture should have positive effects over time, above and beyond any effects on initial learning. There is some evidence that the production of gesture contributes to how learning is maintained over time (Cook, Mitchell & Goldin-Meadow, 2008), but it is not known whether simply observing gesture has the same effect. Classrooms of elementary school children watched videotaped lessons in mathematical equivalence. For half of the children, the instructor gestured during instruction and for the other half, the instructor did not gesture. Children were tested immediately after training and twenty-four hours later. The gesture group learned more initially and showed significant improvement across the 24-hour retention interval whereas the speech-alone group learned less initially and did not show any evidence for improvement at the delayed test. If the effect of gesture on lasting learning is driven by changes in comprehension during instruction, then student understanding after learning should predict consolidation above and beyond any effect of condition. However, we found that, even when performance immediately after training was taken into account, the gesture group still demonstrated significant improvement over time, suggesting that gesture had an effect on conceptual knowledge over time that was not mediated by comprehension during learning. These findings suggest that gesture goes beyond facilitating understanding in the moment to affect how knowledge is represented over time. Indeed, the largest effects of gesture seem to emerge with time. Gesture can improve sustained learning even when presented to classrooms of children via videotaped instruction. Thus, gesture may provide a tractable way to facilitate lasting math learning in children in a classroom setting.

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The achievement of metaphoric meaning in co-speech gestures: towards a dynamic and intersubjective approach

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July 26, 13.00

From the point of view of philosophy of language, work in metaphoric gesture poses a fascinating challenge. When a researcher classifies a particular gesture as 'metaphoric' in virtue of its 'iconic representation' of the source domain, he or she decides that the source domain is being gesturally depicted, while the target domain is being intended (e.g. Chui 2011). Such implicit pragmatic ascription of communicative intent demands exploration and justification. Are we certain that the target domain is not depicted directly? How is metaphorical meaning achieved (in various modalities or multi-modally)? I submit that the process of gesturing metaphorically involves spontaneous, intentional appropriation of culturally sedimented ways of conceiving the world with and for others. I argue for this claim as an extension of Müller's (2008) important work on metaphoric gesturing, which I locate as straddling the fault lines of a persistent tension between 'meaning-leaking' and 'meaning-building' approaches in gesture study. Müller makes explicit effort to avoid succumbing to a prevailing tendency to see gestures as "a mere 'window' onto thought processes that are active during speaking," (what I call the 'meaning-leaking' approach) (Müller 2008, 95). Nevertheless, her treatment of co-speech hand gestures as cues that indicate cognitive activation of a source domain suggest exactly this. While she offers description of metaphoric gesturing as an enactive process that 'opens doors' for the speaker (2008, 94), an intersubjectively constructive ('meaning-building') account of metaphoric gesturing is wanting. How can we carry out Müller's project of explaining metaphorical activation as a dynamic, multimodal process of language use when her analyses frequently treat gestures as indicative products? Via this critique, I elucidate the simultaneous appeal of meaning-leaking and meaning-building approaches in gesture study, so that we may better follow through on the constructive possibilities in Müller's account.

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Space, emotions and affordances: The contextual flexibility of utterance configuration

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July 24, 16.30

A crucial aspect of communication is the flexibility of utterance formulation; speakers thus adapt their utterances to various parameters of the communicative context. Utterance choices are usually affected by the structural properties of language, social status of the communicants, visibility of the addressee, amount of shared common-ground assumptions, or the nature of conversation such as whether it is a dialogue or monologue. One of the most important factors affecting a communicative utterance is, however, its informative function. Utterances can serve different functions. They can be used to create representations of various kinds, as, for example, of spatial layouts (in contexts of giving directions), of structural properties of objects (in contexts of explaining use of an object), or of affective states (in contexts of describing one's emotions). In this paper, we document how utterance strategies are affected by the intended function of the utterance. Strategies, here, refer to any change in utterance configurations, both in terms of 'types' of semiotic resources used, such as facial expressions, hand gestures or prosodic manipulations, and in terms of detailing and prioritizing any of the tokens of these semiotic resources. Participants were shown descriptions of contexts and subsequently asked to explain their reactions to these contexts. The analysis of participant responses revealed that there was a significant difference in the choice of 'types' of lexical words and 'types' of gestures, as well as in the detailing of the 'tokens', in accordance with the specific utterance functions involved. This study provides insights into how communicative bodies adapt dynamically to the physical and social parameters, and also to conceptual parameters relevant to different types of contexts. It highlights how utterance functions are conceptualised and realised through our communicative bodies, and thus has major implications for our understanding of the cognitive dimensions of 'enchronic' and embodied pragmatics.

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Speakers vary viewpoint and location with activeness/accessibility of referents in listener's mind

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July 24, 11.00

For discourse to be coherent, listeners must understand who and what is referred to. Speakers achieve this by varying forms depending on how accessible a referent is (e.g., new vs. old). Referent accessibility and information status influences both spoken referential expressions and gestures: less accessible referents (new entities) are marked by more material (e.g. nouns) and co-speech gestures. More accessible referents (old entities) are marked by less material (e.g. pronouns) and fewer gestures (e.g. Gullberg, 2006; McNeill & Levy, 1992). In addition to effects on gesture rate, McNeill (1992) hypothesized that information status will influence gestural complexity, suggesting that with decreasing accessibility (i.e. greater novelty) there should be an increase in expressive complexity from pronouns to nouns in speech, from beats/pointing via observer- to character-viewpoint in gestures. This study explores the discursive effects on gestural viewpoint and location in space in 41 German narratives produced by 6 speakers. The analysis focused on expressions for animate entities in topic position operationalizing accessibility as coreferentiality (Hickmann& Hendriks, 1999), i.e. when a referent is mentioned in two consecutive utterances. Representational gestures were coded for viewpoint (observer or character) as well as locatedness (located or non-located), where locatedness is defined as outside of the neutral gesture space. The results showed that less accessible referents are typically marked by full nouns in speech and located observer viewpoint in gesture. Conversely, more accessible referents are typically marked by zero anaphora in speech and non-located character viewpoint in gesture. We will argue that modalities thus display parallel shifts in expression depending on the degree of referent accessibility, supporting the notion that speech and gesture form an integrated system also in discourse. However, the shifts in gesture only provide partial support for McNeill's suggested complexity scale. We discuss implications of these findings.

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Gesture and Serial Verb Constructions in Avatime

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July 24, 15.30

Serial verb constructions are single clauses containing more than one verb with no subordination or coordination. In contrast to other types of complex clauses, they are generally claimed to refer to single conceptual event units (Aikhenvald, 2006; Comrie, 1995; Durie, 1997). There is, however, little evidence regarding this connection (Foley, 2010). The present study uses gestural units as a speech external measure for comparing the conceptual event units of different types of complex clauses during thinking for speaking (following Kita and Özyürek, 2003). Avatime is a Ghana-Togo Mountain language from the Kwa branch of the Niger-Congo language family. It is spoken by approximately 20, 000 people in south-eastern Ghana. Avatime has three types of serial verb constructions, defined by their syntactic properties. These three types also differ in their degree of semantic integration. Type 1 constructions contain highly integrated verbs that describe simultaneous aspects of events. Type 3 constructions are the least integrated and contain verbs which refer to consecutive actions. Avatime also has coordinating clauses and five types of subordinating clauses. The alignment of gestural units and syntactic units was measured in two hours of speech: roughly ten minutes of narrative and ten minutes of procedural text from 6 different speakers. Gestures occurring with the tightly integrated Type 1 serial verb constructions consistently overlapped with the entire construction. In contrast, subordinating complex clauses tended to have multiple gestures overlapping with individual parts of the clause. The less integrated Type 3 serial verb constructions fell in the middle: often there was a single gesture overlapping with the entire construction but it was also possible for the alignment to be with only part of the construction or for there to be multiple gestures. Hence some, but not all, serial verb constructions refer to single conceptual event units.

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Flow of people in public spaces - Embodied action and gesture contextualization

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July 26, 11.30

This presentation show how individual travelers coordinate and adapt their bodily movements in public transit halls. By using different kinds of symbiotic gestures in interaction (Goodwin, 2002) individuals produce embodied action structuring effective flow of people, a specific form of multimodal interaction were other resources than the own body are used, such as other people and environmental elements (gesture contextualization). Empirical illustrations are taken from video recordings of naturally occurring individual trips in a public transport system. Video clips show people with functional limitations and ordinary people handling a "door-to-door" trip by navigating among and by different modes of transportation. The analysis is based on chosen episodes of 36 video documented trips (mobile camera and mobile microphone). A "think loud" methodology was used to grasp perceptions of the interactants in real time. Such information contributes to the analysis, indicating how to interpret the meaning of communicative interaction. The presentation illustrate how individuals use their bodies as communicative devices (postural configuration). The embodied gesture is clearly co-created in interaction. It is typically multimodal (gesture composites), including the wide range of nonverbal devices (but seldom words). Multimodal resources are used for socially coordinated action with others in the transit environment. Travelers with functional limitations (different kinds of handicaps) create specific symbiotic gestures due to their limited communicative resources. Other travelers have a wider repertoire of resources for gesture based communication and social coordination. From different transport episodes we see how embodied gestures indicate 'direction', 'turning', 'passing', 'searching', etc. were the interactants use each other as resources. Small changes in bodily movements direct the communication and ease the flow of people. Such gestures also create emotions (irritation, frustration, enjoyment, delight).

The role of gestures in L2 construction learning

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July 24, 17.30

By investigating the use of gestures in L2 construction learning, this paper expands current approaches on constructionist usage-based L2 research (e.g., Ellis & Cadierno 2009). Building on Eskildsen (2012), we draw on the construction- and exemplar-based view on language

knowledge as espoused by usage-based linguistics to trace the role of gestures in the development of linguistic constructions over time. Our data come from the Multimedia Adult English Learner Corpus at Portland State University, an audio-visual database of classroom interaction consisting of 4,000 hours of recordings, in which we follow two students over more than 2 years. The database allows us to trace student's embodied activities in the classroom over time. We will show that the gestures used by L2 learners are inextricably linked with ongoing processes of maintaining a shared mutual understanding (or 'intersubjectivity') with interlocutors (Mori & Hakayashi 2006). We also intend to show that specific gestures are coupled with specific constructions and are drawn upon as resources for both teaching and learning of these constructions. Our data suggest that 'incidental learning' refers to individualized constructional sediments of embodied co-constructed achievements of intersubjectivity in interaction.

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Temporal coordination of intonation and gesture movements

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July 25, 11.00

Previous work on the gesture-speech temporal alignment obtained partially contradictory results: (1) that prominence in gesture coordinates with focused words (Roustan & Dohen, 2010); (2) that it coordinates with lexically-stressed syllables (Loehr, 2007; Rochet-Capellan et al., 2008); (3) that it coordinates with syllables with intonation peaks (Nobe, 1996; De Ruiter, 1998 – Exp 2); or (4) that there is no alignment (De Ruiter, 1998 – Exp 1; Rusiewicz, 2010). This study investigates the gesture-speech temporal coordination by testing whether intonation peaks are the anchoring site for the gesture apexes. Research questions were: (1) Does the metrical structure of the target word influence the position of intonation peaks and apexes? (2) Do intonation peaks and apexes align? Fifteen Catalan speakers performed a pointing-naming task in a contrastive focus condition. Target words had different metrical structures to elicit distinct pitch peak locations (Prieto & Ortega-Llebaria, 2009). As for (1), RM ANOVAs revealed that the position of intonation peaks and apexes within the accented syllable depended on the metrical patterns ($F(1.894, 433.760) = 580.318$, $p < .001$, $\beta p2 = .717$ and $F(1.921, 440.008) = 196.675$, $p < .001$, $\beta p2 = .462$, respectively). Also, that intonation peaks and apexes occurred towards the end of the accented syllable in trochees, they were retracted in iambs and in monosyllables (the latter are less retracted due to a 'gesture lagging effect', since monosyllables do not have pre-tonic syllable to anchor part of the gesture). As for (2), the analyses revealed that intonation peaks align with apexes although the synchronization is relaxed in monosyllables due to the lagging effect ($F(2, 458) = 34.743$, $p < .001$, $\beta p2 = .132$). In conclusion, intonation peaks synchronize with apexes, thus showing that intonation and gesture movements are bound by prosodic structure because.

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Gestures on Trial: Applying Gesture Studies to Forensic Interrogations and Interviews

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July 24, 11.00

Despite the amount of research bridging gesture studies and forensics, many studies are based within a lab setting (e.g. Broaders & Goldin-Meadow, 2010, Vrij & Fischer, 1995). This paper attempts to contribute to the existing literature on the role of gestures in forensic contexts

by presenting a descriptive analysis of real-life data. Researchers have noted that people attend to the communicative content of gestures less than in speech, and that information encoded in cospeech gestures often goes unnoticed by speaker-producers, but not by interlocutors. In a forensic context, this means that interviewers potentially reveal information (such as prior knowledge and bias) that is undocumented in written transcripts, influencing witnesses' replies, and compromising the validity of the entire process. Similarly, information encoded in the interviewees' gestures could aid interviewers, trained in recognizing gestural cues (beyond "pop-science" body-language), by guiding their interviews. The data we present is a series of interviews, conducted by a forensic psychologist and a judge, with four pre-teen girls in an alleged child molestation case in Italy. Children's testimonials tend to be more problematic because of children's suggestibility (Ceci & Bruck, 1993). We present data which indicates that children may conform to the adult's way of gesturing, influencing the way they respond verbally, and also suggests that children are able to "tell" their thoughts with their hands before talking about it, especially when dealing with taboo discourse. We discuss the implications gesture studies applied to psychological and forensic interviews and interrogations have on the legal process. We advocate videorecording interrogation sessions for accountability and transparency so that they can be analyzed with a modern gesture studies framework. We also discuss potential hazards that might arise from this process, such as decontextualizing gesture production and creating "lie-detection" gestural codes (e.g. Pease, 1981, Gordon & Fleisher, 2006).

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Gesture in Narration: A comparison of children with language impairment and typical language development

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July 24, 11.00

We will present the results of a study where children (8-11yrs) with typical language development (TL) and language impairment (LI) retell cartoon plots. The analysis is conducted in terms of Kendon's (2004:158) distinction between referential and pragmatic functions of gesture and how they relate to McNeill's (1992:185) distinction between the narrative, metanarrative, and paranarrative levels of narration. There are some studies of (S)LI children's use of gesture (e.g. Evans et al. 2001; Månsson 2003; Blake et al. 2008; Marton 2009; Botting et al. 2010), but none that relate LI children's use of gesture specifically to narrative structures. A better understanding of LI children's gestural abilities is important both to understand the nature of LI from a scientific point of view, and to be able to design well-informed assessment and intervention methods for Speech-language therapists. In studies of TL children's development it has been found that pragmatic functions of gesture emerge later than referential functions of gesture (Graziano 2009; Andrén 2010) and that the emergence of pragmatic functions in gesture go hand in hand, in several respects, with the development of narrative abilities in the spoken modality (Graziano 2009; Colletta et al. 2010). We therefore expect (a) LI children to use more referential gestures and less pragmatic gestures than TL children, and (b) that the use of pragmatic gestures will be positively correlated with metanarrative/paranarrative elements in the spoken modality. We will also address questions such as whether LI children use gesture in a compensatory manner (if so: how?) or not, and whether gesture seem to be a forerunner to verbal skills or not. The study is still in progress at the moment of writing this abstract; hence the results of the study cannot be reported in the abstract.

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Categorizing dual viewpoint gestures: The importance of addressing the notion of viewpoint.

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July 24, 10.30

When narrating, alongside their speech speakers often use iconic co-speech gestures as a means of conveying the content of their story. These co-speech gestures thus contribute to representing events in a narrative. The nature of co-speech gestures makes it so that they represent information from a certain viewpoint, most often either a character or an observer viewpoint (McNeill 1992). These two notions refer to the situations in which a viewpoint belongs to either a participant or character in an event, or to an observer of the event, respectively. On occasion, however, speakers use a gestural representation that contains two simultaneous viewpoints. This type of gestural representation, termed dual viewpoint gesture by McNeill (1992), has been studied only rarely (e.g. McNeill 1992, Parrill 2009), but it offers an interesting insight into the human language capacity and cognition, since using this type of gesture indicates that two conceptualizations of an event are simultaneously present in a speaker's mind. The process of defining and analyzing dual viewpoint gestures highlights difficulties with the concept of viewpoint as it is used widely in the gesture literature today. The paper addresses this issue by attempting to clarify the form and content aspects involved in dual viewpoint gestures. Data for this study comes from 12 native speakers of Danish who were recorded narrating a series of speechless film and cartoon clips to a peer. Using methodology and concepts from sign language research (non-prototypical alignment (Perniss 2007), classifiers), we distinguish type of representation (observer representation and character representation) from viewpoint proper, thereby presenting an alternative categorization of dual viewpoint gestures.

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Bi-modal bi-lingual acquisition of Israeli Sign Language (ISL) and Hebrew by a hearing child of deaf parents

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July 25, 10.30

The aim of the present study is to investigate the issues of sign advantage and continuity during sign-language acquisition. The research is based on a longitudinal case study tracking bi-modal bi-lingual acquisition of Israeli sign language (ISL) and Hebrew by a hearing child of deaf parents between the ages of 8 to 24 months. Currently, a debate is underway in the literature whether the acquisition of signed language is an advantage in achieving the classical milestones of language development, namely the first word and the first 10 and 50 words. Opinions also diverge on whether, in the course of sign-language acquisition, the child's transition from 'gestural' representations to signs (i.e., signed words) can be clearly defined. In this respect, a long-term follow-up study showed that for the hearing child, sign language presents an advantage over spoken language in terms of the age at which the developmental milestones are achieved. Both languages manifested similar patterns in the rate of word acquisition at different ages. At 16 months, a noticeable acceleration in the acquisition rate of signs was observed. Towards the end of the second year, the spoken-word acquisition rate accelerated dramatically. In each language, the semantic groups in the early lexicon were similar to those documented previously for both hearing and deaf children. With regard to continuity, the results suggest that conceptualizing the gesture and the sign as two distinct kinds of action may be counterproductive, as the manual modality allowed for a smooth gradual transition from early recognizable patterns of ostensive semantic actions to their more conventional forms.

Gestures Give a Hand to Caused Motion Event Descriptions in Both Children and Adults in Turkish

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July 26, 11.00

Caused motion events (e.g. a girl pushes a basket into a room) involve semantic elements such as Action, Agent, Figure, Goal and Path, which are expressed in different lexicalization patterns across languages [1]. These differences have been shown to influence the development of speech and gesture both in early and late stages [2, 3]. Here, we investigate to what extent the argument-omission properties of Turkish and its specific lexicalization patterns of encoding Action (with or without Path) in the verb influence adult speakers' speech-gesture patterns and their development. A total of 40 Turkish adults and 3- to 5-year-olds described videoclips depicting caused motion events to a listener. All groups represented Action the most frequently in speech. Adults as well as children omitted the semantic elements that were encoded outside of the verb, and children tended to do so more than adults. Crucially, although gestures mainly reinforced the semantic information in speech, adults used supplementary gestures 30% of the time (supplementing mainly Path), while children in all age groups did so in

half of their descriptions (supplementing Path and Figure). These results show that supplementation with gesture is an integral part of caused motion descriptions of Turkish speakers of all ages. In time, gestural supplementation possibly changes function, starting out as a developmental/language-general communicative device that paves the way for language development [4, 5] and becoming more pragmatic/ language-specific as children are able to express all semantic information in speech. Insights into speech-gesture patterns in languages with different typological properties are necessary to understand the changing role gesture plays in development and language.

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Pointing in different Portuguese-speaking cultures: the visible and the hidden

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July 25, 13.00

This paper is about the results obtained from the qualitative analysis of hand shape and other movement features in pointing with the upper limbs in four different kinds of interactions: a) European Portuguese from Porto; b) European Portuguese from the Northern countryside of Portugal; c) Africans from the Lusophone African Diaspora in Porto; Africans from the island of São Tomé, São Tomé e Príncipe, an African country where Portuguese is the official language. Taking advantage of a language which is spoken in different cultures, hand-shapes and the amplitude of upper-limbs' pointings in the four above mentioned contexts and cultures will be analysed and compared. The following aspect will be highlighted: 1. accompanying word(s), more precisely: deictic elements, nouns, verbs or other linguistic elements; 2. the relevance of indicating an object, a place, a space, a path or an abstract idea; 3. the relevance of visibility in the real world vs. fictive world; 4. movement amplitude and muscular tension of arms, hands and fingers, in relation to prosody; 5. speakers' expectations regarding hearers' knowledge or the need for precision in pointing; 6. speakers' subjectivity towards the objects, locations and persons they point at. Is there any subjectivity embodied in the way speakers point at things? This paper aims to complement the former analysis of the pointing gestures of an illiterate European Portuguese speaker, an analysis which focused on hand configuration and correlated linguistic elements as well as on the speaker's expectations regarding the interviewer's pre-knowledge and the importance of the precise location of a place.

Spatial cohesiveness in gesture sequences: Effects of mutual visibility

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July 26, 10.30

One test of gestures' communicative function is to assess whether (and how) speakers adjust gestures' qualitative features (e.g., form, size, location) according to communicative conditions. We developed an analysis to quantify how participants' mutual visibility influenced the spatial relationship between contiguous gestures produced during a picture description task. Thirty speakers described a line drawing of a continuous "pathway" either in a face-to-face dialogue, telephone dialogue, or alone, into a tape recorder. We analyzed whether speakers' gestures represented pathway sections as (1) discrete features separate from each other or as (2) spatially-cohesive, linked components of a larger whole. First, analysts reliably identified illustrative gestures (depicting pathway sections within the main gesture space). Second, analysts reliably evaluated whether contiguous illustrative gestures were linked, that is, the speaker (1) held the preceding gesture stroke's end without retracting and (2) placed the subsequent gesture such that both gestures maintained their referents' spatial relationship. A one-way ANOVA indicated the three conditions differed significantly on the mean proportion of illustrative gestures. Post-hoc tests revealed equal proportions in the face-to-face (M=.89; SD=.13) and telephone (M=.81; SD=.21) dialogues; both were significantly higher than the tape recorder (M=.22; SD=.32). Speakers in face-to-face dialogues linked more than half of their illustrative gestures (M=0.60; SD=0.11), significantly more than speakers in telephone dialogues (M=.11; SD=.12; $t=9.112$, $p<0.00$). Speakers used illustrative gestures even when the addressee would not see them. However, in telephone dialogues, these gestures were spatially disconnected from each other; no cohesive pathway emerged. In face-to-face dialogues, speakers held the ends of gesture strokes and maintained their referents' spatial relationships, thereby creating a "virtual" pathway in which gestures worked together, demonstrating the whole picture. Thus gestures' semiotic affordances are not simply a matter of each individual gesture's form; they include the hand motion between gestures and their spatial relationship.

The tale of two gesture targets: Comparison of gesture production for communication with technology vs. humans.

Sukeshini Grandhi, Gina Joue & Irene Mittelberg

July 27, 9.00

Touchless gesture-based interaction in Human Computer Interaction (HCI) can potentially enable natural and intuitive interaction in domains such as sterile rooms, entertainment games, and rehabilitation games. In designing such interfaces, one of the challenges is to develop an appropriate gesture vocabulary. This requires a systematic understanding of how humans produce gestures [1][2][3][4]. Gesture studies have predominantly focused on human-human communication, laying the foundation for HCI designers to understand gestures for interaction with computer systems. However, it is not clear if gestures in human communication can simply be transferred to a gesture vocabulary in HCI. We hypothesize that how one gestures to communicate with people is different from communicating with technology. For example, potential differences may be found in gesture characteristics such as gesture space use, size and speed, driven by different mental models in gestural communication with technology compared to with people. In this paper we explore if such differences exist and why. We conducted a lab study where participants acted as a quality controller, required to communicate problems using a predefined set of gestures in two conditions: 1) to a human being and 2) to a flat screen monitor in a Wizard of Oz paradigm. Participants were presented with a stream of pictures on the screen and had to signal problems when any picture differed in content, orientation or size. From 10 participants, 1200 gestures were captured using high-speed video cameras and motion capture technology. Post-study semi-structured interviews were conducted to understand participants' perspectives on naturalness and comfort in communicating in the two conditions. Insights from these results will provide design and implementation guidelines for the gesture characteristics and mental models one should consider in designing touchless gesture-based interfaces.

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The rhetoric nature of asynchrony between speech and gesture. Evidence from monolingual and bilingual speakers

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July 25, 13.30

The temporal alignment between speech and gesture is a central argument in the theoretical debate on the nature and the locus of the link between the two modalities. Looking at the temporal pattern of the two signs may reveal insights about how speakers plan them. Different hypotheses have been proposed to explain how gestures function in relation to speech and they lead to different expectations about how speech and gestures may be temporally related in speakers' utterances. In the current study we test predictions about the timing of gestures relative to the semantically coherent units of speech arising from the Growth Point Theory (McNeill, 1992), the Lexical Retrieval Hypothesis (Krauss, 1998), and the Information Packaging Hypothesis (Kita, 2000). We tested the hypotheses in English/French monolingual and bilingual speakers in order to check whether the latter, known to experience higher degree of competition for lexical access (e.g., Gollan et al., 2008), reveal a different pattern in gesture-speech alignment as compared to monolinguals. Using elicited narratives, analyses were conducted on the stroke phase of referential gestures distinguishing whether it occurred in synchrony, before or after the semantic correlated part of speech. Results revealed no differences in the temporal pattern between gestures and co-semantic speech in bilinguals and monolinguals. In both language groups, synchronous gestures are significantly more frequent than asynchronous ones; asynchronous gestures both preceded and followed the correlated speech; yet, the preceding ones tend to occur more often. A qualitative analysis was also conducted for all asynchronous gestures revealing that they may serve a rhetoric function. We argue that the variability in gesture-speech timing results from speakers' strategic use of gesture (Kendon, 2004).

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The synchronization of speech and gesture

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July 25, 14.00

Co-speech gesture and speech are well synchronized. Although gesture-speech synchronization is a well-known phenomenon, little is known about the mechanism responsible for the synchronization. The current study tested two competing theories on how synchronization is realized in the course of motor planning and execution. According to the ballistic view, synchronization is pre-established during the planning phase, and speech and gesture systems do not interact during motor execution phase. In contrast, the interactive view proposed that synchronization is established by interaction between speech and gesture systems during both the planning and execution phase. In the present study, we focused on the synchronization of speech and gesture during deictic expression. Sixteen native Dutch speakers were asked to indicate which of an array of four lights was illuminated momentarily by pointing to the light and saying "dit lampje" or "dat lampje" ("this light" or "that light"). Using virtual reality technology, we interrupted participants' gesture execution in some of the trials by manipulating the visual feedback of the pointing trajectory. The pointing gesture took longer to reach its maximum distance from the starting point (gesture apex) in the interrupted trials than in the non-interrupted trials. More importantly, participants delayed their speech onset in order to synchronize with the delayed gesture apex in the interrupted trials. Participants were able to delay the speech onset even when the visual feedback was interrupted at the late stage of gesture execution. Our results indicate that people adapted speech onset to gesture apex. Our data support the interactive view, namely, the synchronization of speech and gesture can be established by interaction of the two systems during both the planning phase and the execution phase. The present study furthers our understanding of the processes underlying the coordination of speech and gesture.

Gesture form principles in object description. Insights from participant reports and Motion Capture analysis

Julius Hassemer

July 25, 16.00

In form-based gesture analyses, hands are often described in terms of parameters such as location, configuration, and motion (Stokoe 2005, Calbris 1990, Kendon 2004, Müller 1998, Bressem to appear). These parameters describe the hands in motion and held still, or more generally, the 'articulator form'. In contrast, this work proposes the concept of 'gesture form' (GF), as articulator form interpreted through cognitive-semiotic strategies such as modes of representation (Müller 1998), practices (Streeck 2008), and metonymic modes (Mittelberg & Waugh 2009). More specifically, GF is a consequence of certain cognitive principles operating on the articulator form: For instance, if someone holds her right hand statically in centre gesture space, index and thumb extended parallel to each other, other fingers curled in, GF can be the result of the operation of the following three 'gesture form principles'. 1) 'articulator profiling': profiling the hand as the active articulator, a 3D portion of the 3D body 2) 'shape profiling': profiling one form aspect of the 3D articulator (here, the 2D surfaces of the index and thumb pads) 3) 'extent measurement': displaying a certain 1D distance between these 2D surfaces (AUTHOR 2011; (topological) dimensions: Talmy 2000, Chapter 3) To investigate GF, 27 participants were recorded describing nine differently shaped physical objects. Immediately afterwards, they viewed a mute video of these recordings and had to report the type of curvature conveyed by their own hand shapes. This paper analyses two groups of gestures, in which index and thumb are profiled in different ways (Sowa & Wachsmuth 2005:146), as having different GFs and hence fulfilling distinct functions: one indicates the distance between finger pads (principles 1-3 above), the other outlines a circular shape (different principles). The study tests whether these two groups can be distinguished systematically by participants' reports and Motion Capture angle/curvature measurements.

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Visual leitmotifs – tracking recurrent gestures in interaction

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July 24, 11.30

Research into meaning-making practices in physically co-present interaction has demonstrated its profoundly multimodal nature (Goodwin, 2000). I explore one feature of such multimodal turn design, what Goodwin (2007) has called the 'environmentally coupled' gesture: gestures that are coordinated with talk and features in the physical environment. Research on environmentally coupled gestures has been mainly concerned with describing the constitution of single instances as they feature in a spate of interaction. The current paper extends

this line of investigation by considering sequences where an initial gesture is re-occasioned at subsequent points in the discourse. Kendon (1972) observed the recurrence of elements of particular gestures within an unfolding interaction, a theme developed later by McNeill (e.g. 2000) and his concept of 'catchments': "a thread of consistent visuo-spatial imagery running though a discourse segment that provides a gesture-based window into discourse cohesion" (2000, p316). This paper shows how an initial indexing of an object in the surround through gesture and talk provides a basis for later semantic development within a spate of discourse. Audiovisual data from university counselling meetings is subjected to a multimodal interaction analysis, drawing on EM/CA and micro-ethnography. The findings indicate that embodied components of multimodal turn design can be further operationalized at later points in the unfolding talk. However, rather than subsequent instances being produced with the same verbal reference of the initial gesture, they are developed as a category of semantic reference, mutually elaborating the talk on an ongoing basis, and providing emergent contextualization for the unfolding, multimodal, turn production. This further raises the question, which is potentially of significance to the study of gesture catchment sequences in general, whether the initial gesture in a catchment sequence is qualitatively different from those which follow it.

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From Mind to Hand: How Gesture Serves to Bridge Gaps in Knowledge

Caitlin Hilliard & Susan Wagner Cook, *University of Iowa*

July 25, 16.00

Do speakers alter their gesture based on knowledge they share with their listener? We know that when listeners are less informed about a topic, speakers gesture more and produce more informative gestures. However, it is still unclear if gestures change because speech changes, or as a direct result of speakers' and listeners' shared knowledge. We investigated this issue using the Tower of Hanoi problem-solving task, in which a stack of disks is moved from one peg to another following specific rules. We manipulated speakers' and listeners' knowledge about the manner in which the disks could be moved; they could either be dragged across pegs with a horizontal movement, or lifted over the pegs with a more curved mouse trajectory. We recruited participant pairs, each assigned to speaker and listener roles. Speakers first completed the task with the listener present, to establish common ground. Speakers then learned a new version alone, with the critical manipulation being how the disks were moved in this new version relative to the common ground previously established. Speakers and listeners either had shared knowledge because the manner was the same as the previous task (both lifting) or speakers had privileged knowledge because it was different (dragging together, lifting alone). Speakers then explained how to complete the new version to listeners. We coded the trajectory of each hand gesture, providing a fine-grained and objective measure of the gesture. We found that when speakers and listeners did not have shared knowledge, speakers produced more exaggerated gestures. Importantly, speakers did not encode the lack of shared knowledge in speech; none of the speakers with privileged knowledge explicitly mentioned the change in manner between versions of the task. Speakers use gesture to provide communicatively useful information, and they do so in a way that is sensitive to what listeners know.

'He asks him knowingly': facial expressions as a device for making conducive/biased question

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July 25, 16.00

This study reports one conversational procedure through which speakers make conducive/biased questions; the facial expressions those are keep holding during a question-answer sequence. As many linguists have shown, questions may be "biased" in terms of the speaker's expectations for an answer (Huddleston & Pullum, 2002). For example, speakers of Yes/No interrogatives sometimes already have an answer in their mind. Previous researches on conducive/biased questions have identified range of syntactic, semantic and pragmatic resources such as tag questions, negative polar questions (Quirk et al., 1985), and strong and/or idiomatic items (Borkin, 1971) for constructing conducive/biased interrogatives. On the other hand, there are conversation analytic investigations about the preference 'normative orientation toward certain social actions' for the answer in question-answer sequence (Sacks, 1987; Raymond, 2003). Based on the conversation analysis, this study investigates the role of facial expression such as smiley face in organizing question-answer sequence. The result of the analysis of naturally-occurring Japanese conversational data shows that facial expressions of the speaker are finely organized for making conducive/biased question during the question-answer sequence. When speakers make a question with marked facial expressions such as smiley face, they recurrently hold them until an answer is given. By holding the facial expression, speakers may show that 1) they had something in their mind when they made the question and 2) the answer given is what they had expected to have. On the other hand, speakers may release their facial expression when an answer is given or some sort of recognizable dispreferred response has launched. This release may show that 1) the speakers had something in their mind when they made the question and 2) the answer or the response given goes against their expectation.

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When gestures catch the eye: the influence of gaze direction on co-speech gesture comprehension in triadic communication

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July 26, 11.00

Co-speech gestures are an integral part of human face-to-face communication, but little is known about how the pragmatics of communication influence our comprehension of those gestures [1]. Our knowledge is particularly sparse with respect to the perception of co-speech gestures in situated, multi-modal contexts where gestures are not only accompanied by language, but by other nonverbal social cues, too. The present study investigated how a speaker's eye gaze direction influences recipients' processing of speech and iconic gestures (complementary in nature) in a triadic communicative situation. Participants (N = 32) took on the role of one of two recipients and were presented with 160 video clips of an actor speaking (e.g., 'she trained the horse'), or speaking and gesturing (e.g., whipping gesture). Crucially, because the speaker alternated her gaze between the two recipients, participants perceived some messages as addressed recipient (direct gaze) and some as unaddressed recipient (averted gaze). In these roles, participants made judgements concerning the speaker's messages. Half of these judgements related to the gestural component of the messages (and thus tapped primarily into the comprehension of gesture – our main analytical focus), while the other half related to the verbal component of the messages (and thus tapped predominantly into the comprehension of speech). Participants' reaction times showed that unaddressed recipients did comprehend speaker's iconic gestures differently to addressees (indicated through longer reaction times to gesture-related targets). Their processing of speech, on the other hand, appeared to be unaffected by recipient status. The findings provide a first insight into the influence of social eye gaze on iconic gesture comprehension and advance our knowledge of multi-modal language processing in more situated contexts. They will be discussed with respect to the topics of recipient status, perceived communicative intent as well as automatic and controlled processes involved in gesture comprehension [2,3].

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Combining gestures and baby signs – structural and functional characteristics

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July 27, 9.00

In the last 20 years, baby signing has been established as a new way of communicating between hearing parents and hearing toddlers because baby signs allow toddlers to communicate well before acquiring a vocal language. So far, research on baby signing has argued that it stimulates language acquisition and may even have a positive influence on speech comprehension (Barnes 2010, Doherty-Sneddon 2008, Goodwyn/Acredolo/Brown 2000, Müller 2009). Yet studies focusing on the structural and functional relation of gestures and baby signs are still missing. Accordingly, the study wants to provide a thorough description of baby signs used in combination with gestures. More precisely, it tests the hypothesis that infants combine a gesture and a sign before they combine a gesture and a word. Furthermore, it investigates the structural and functional characteristics of such a linear gesture sign combination. The study is based on five hours of video data in which five families using baby signing in their everyday interaction were filmed in different situations (e.g., in situations of playing or eating). Taking a linguistic perspective on the study of gestures (Fricke in press, Müller 2010), we identified all instances in which toddlers and parents used gesture sign combinations and analyzed them with respect to their form, meaning, and function. Applying this approach, we were able to identify a recurring structure of combining baby signs and gesture, in particular with deictic gestures. These different structural complexities seem to resemble the stages of language acquisition and in particular of gestures in relation to speech (Caselli 1994, Goldin-Meadow 1998, Iverson/Goldin-Meadow 2005). Based on our investigations, we argue that infants not only combine semiotic signs from different modalities as shown for speech and gesture but also from the same modality, maintaining the combinational structure of word and gesture.

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The Development of Elaboration Within and Across Clauses

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July 25, 11.30

Profoundly deaf children born to hearing adults are typically unable to acquire the spoken language they are exposed to by their parents. If they are raised orally, without access to a sign language, they still communicate, creating a gesture system called homesign. Recent work has shown that it's possible for a homesigner to develop noun phrases in his gesture system by combining deictic points that identify a specific object, functioning as a demonstrative, and iconic gestures that depict a category of objects, functioning as a noun (Hunsicker & Goldin-Meadow, Under Review). Homesigners have also been shown to produce coordinate sentences (Goldin-Meadow, 1982). Broadly speaking, there are two ways to elaborate on a sentence: by adding additional information within a clause (eg. noun phrases), or by adding an additional clause (eg. sentence coordination). In this study we look at how these types of elaboration develop in relationship to each other using longitudinal spontaneous data in two diverse groups, 4 US homesigners, and 18 hearing children acquiring English. The homesigners were videotaped in their home interacting with their parents and the experimenters for approximately 2 hours at each session. There are between 5-11 sessions, depending on the child, with age ranging from 2;10 to 3;10 at the youngest session, to 4;09 to 5;02 at the oldest session. The hearing children were also videotaped in their homes participating in typical daily activities with their parents for 90 minutes at each session. Data was collected every 4 months from the age of 1;02 to 4;02. We find the reverse pattern in the two groups. Hearing children acquire noun phrases before coordination, whereas homesigners develop coordination before noun phrases. This data suggests that noun phrase acquisition may depend more heavily on the presence of a language model than learning to coordinate propositions.

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Ordering a beer without your hands; the meaning of not gesturing.

Kerstin Huth & Jan De Ruiter, *Bielefeld University*

July 27, 9.30

In everyday interaction, people often gesture while they speak (Kendon, 2004; McNeill, 1992). Furthermore, as Goodwin (2007) noted, gestures are bound to environmental factors and accompany not only speech but also tasks the interlocutors are completing. But what does it mean when gestures do not occur? As Levinson (2000:6) suggested, divergence from usual signals, even when the signal is omitted, carries meaning. It has long been debated whether gesturing enhances the informative content of communication (Kendon, 1994). In contrast, we propose that there is a possibility of enhancing the information by not gesturing. We analysed 108 bartender-customer interactions and noted that in these interactions fewer gestures (or none) are made than in other contexts. These same customers gesture frequently while they are talking with their friends, so their change in gesture behaviour when interacting with the bartender can be considered as marked. Our findings suggest that the lack of certain common signals, such as gestures, carry a certain communicative intent, which is open to interpretation by the addressee (the bartender). Instead of gesturing, people use other means to indicate their intentions. We found that in the customer-bartender interactions we analysed body and head orientation are the primary non-verbal signals. These seem to play a significant role at the closing of the bartender-customer interaction as well. In that situation, the customers' non-verbal behaviour may be interpreted as off-record politeness (Brown & Levinson, 1987), which gives the bartender the opportunity to leave the interaction without being judged for behaving impolitely themselves.

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Multimodal methods of constructing the meaning of a word in classroom discourse

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July 24, 13,00

When people have contact with another culture and communicate in a foreign language, they often come across ambiguous or unknown words and expressions. This happens, for instance, in a foreign language class where the teacher introduces new words and expressions in a multimodal manner, using words and grammar, prosody and gestures as well as several supporting means (e.g. texts, figures, drawings, and videos). The efficiency of the teacher's explanations can be inferred from the learners' expressions and feedback. The present research combines discourse analysis with the micro-ethnographic approach. The study is mainly based on the material collected for the Multimodal Communication Research Group (MUSU) at the University of Tartu. The foundation of analyzing methods of foreign language learning in classroom discourse encompasses the works of Goodwin (2000), Gullberg (1998), Kendon (2004), Lazaraton (2004), Merola and Poggi (2004) as well as Poveda (2005). Lectures were videotaped in a university where Estonian and French are taught as foreign languages. The entire communication during the lectures is held in the target languages. On some occasions, unknown words are translated with the help of other languages. On the basis of data analysis, it may be concluded that the explanation created for an unknown word is usually not a definition that is clearly formulated as a sentence. The meaning is construed from pieces of information which the teacher organizes into an explanation via the engagement of several modalities: words, grammar and prosody; hand, facial and head movements. The teacher's verbal expression may remain incomprehensible if the learner does not observe the teacher's bodily behavior: for example, gestures provide information which is not included in the verbal expression and the teacher may also construct a gestural equivalent for the new word.

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Pointing and Complaining: The Importance of Co-Present Parties

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July 25, 13.30

This paper uses Conversation Analysis to examine how pointing with the open hand at co-present parties is displayed and what function it can have during adversarial exchanges in a political talk show on German broadcast television (Anne Will, airing on ARD, 2011). The focus is on how open-handed pointing gets used, together with speech, to do the action of complaining between two parties about a co-present third party. It appears that through such pointing the complainant makes use of a visual modality to display and underline his/her negative assessment towards the topic under discussion and the other party. It has generally been argued that in political news interviews the interviewer's primary task is to encourage the interviewees to discuss their different positions on the topic for the overhearing audience (Heritage, 1985; Greatbatch, 1992; Clayman, 2010). In this context, complaining about co-present parties can occur. In making a complaint, the perception that there is a trouble is openly expressed (Drew & Holt, 1988). In addition to the talk itself, gestures are crucial properties of interaction (Goodwin, 2000; Goodwin, 2007). As Schegloff (1984) argues, gestures are organized in reference to the talk. These semiotic devices, then, can be used for the construction of action in conversation (Kendon, 1985). This paper shows how open-handed pointing at a co-present party in an institutionalized setting not only functions as a basic means of reference but also as a further resource for the complainant to portray his/her evaluative stance on the topic and to emphasize his/her disaffiliation with the referent. Overall, very little work has been done on pointing at co-present parties, thus this study fills an important gap in the literature.

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The form and function of pointing gestures in task-oriented dialogues

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July 25, 16.00

Abstract Pointing gestures constitute a peculiar category of special importance. They emerge early in childhood and have been a subject of numerous developmental studies (Goldin-Meadow & Butcher 2003, Butterworth 2003). Unlike other gesture types, they are almost unanimously considered to be communicatively intentional (Bavelas et al. 2002). Their form and social acceptability is argued to be culture-dependent (Earley & Soon 2003). The present study is confessed to the analysis of form and function of pointing gestures in task-oriented dialogues. Our data come from DiaGest2 multimodal corpus (Karpinski & Jarmolowicz-Nowikow 2010) and include twelve "origami" task-oriented dialogue sessions. In each pair of subjects, native speakers of Polish, one participant (Instruction Giver, IG) could see an object made of paper, which was not visible to the his or her partner (Instruction Follower, IF). IG instructed IF how to re-construct the object using provided materials. IG and IF could normally communicate and could see each other. The dialogues were recorded using four camcorders and additional microphones. The realisations of pointing gestures were identified on the basis of their form (Kendon 2005). Their internal structure was analysed and described using ELAN (by MPI) in terms of a modified Kendon's model of gesture phrase (Jarmolowicz-Nowikow & Karpinski 2011). The verbal content of the co-occurring utterances was transcribed phonemically and segmented into syllables in Praat (Boersma & Weenink 2010). The temporal alignment between selected kinematic landmarks and potential anchor points in speech was analysed, following the ideas presented in (Leonard & Cummins 2010). The preceeding context of pointing gestures was analysed in order to judge their anchoring in the process of communication. Finally, the contribution of pointing gestures to various categories of dialogue acts (Bunt 2011) was investigated and described.

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The Interactional Function of Simultaneous Gestural Matching with Mimicry: Working as a Slot for a Pivotal Transition

Ayami Joh [1&2] & Hiromichi Hosoma [2]

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July 24, 11.30

In conversations, recipients can display their understanding, affiliation, and agreement with the current speaker by using gestures identical or similar to those of the speaker. Some researchers have not subdivided these phenomena according to the timing of the participants' gestures. For example, "return gestures" are made at almost the same time as or just after the speaker's iconic gesture (de Fornel 1992). In gesture studies, researchers who investigate this phenomenon have primarily treated two-party conversations (Kimbara 2006; de Fornel 1992;

Tabensky 2001, Graziano et al. 2011). Participants sometimes make the same gesture at the same time in multi-party conversations. This paper calls this phenomenon "simultaneous gestural matching" or SGM and uses microanalysis (Streeck 2009) to investigate the interactional functions when recipients imitate the shape of the current speaker's recurrent gesture simultaneously. In excerpts from an approximately7-h three-party conversation in Japanese, the recipient mimicked the core or circumstantial structure of the current speaker's gesture to produce the recipient's own gesture while adding a new structure to it. The recipient could thereby display his/her alignment with the current speaker while starting a new sequence in the next turn. Simultaneous gesture matching when the recipient mimics some structures of the speaker's gesture can minimize a sequence and enable the recipient to assume entitlement to tell about the ongoing topic. The display of entitlement occurs in a conversational situation that includes the speaker, a recipient who is a possible co-teller (Lerner 1992), and a listener who knows nothing of the topic. I claim that the recipient can use simultaneous gestural matching-related mimicry not only as a chance to resolve or continue the activity that started in a prior turn but also as a pivotal transition to start a new sequence in the next turn.

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Figuring the figurative: an fMRI study on metaphor and metonymy in coverbal gestures

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July 27, 9.30

Previous research on the cognitive processing of metaphor and metonymy has involved primarily written and (less commonly) spoken text. There are few neuroimaging studies on metaphoric gestures [10, 3, 9], and they have looked only at "multimodal" metaphors [1, 7, 2], where the conceptual metaphor is in the speech with the source domain iconically reflected in the hands. More neuroimaging studies of the metonymy in gestures have been done, but primarily on ideomotor praxis or transitive (usually tool-related) actions in the classic apraxic problem of body-part-as-objects (internal metonymic representation of the tool) vs. pantomimed action (external metonymic representation) (cf. [4] for a review; also [5, 6] for metonymy). We know of only one neuroimaging study on metonymy in language, using written sentences [8]. To fill this gap in gesture research, we conducted an fMRI study on the perception of metaphor and metonymy in coverbal gestures. Unlike previous studies, we considered only "monomodal" metaphors [1, 7, 2], of which the metaphoric mapping is expressed exclusively only in speech or in the gesture. We also investigated the processing differences of internal vs. external metonymic representation of the verbally expressed ideas in the gesture. Preliminary results reported are based on 25 adult native German speakers who watched short videos of an actor speaking a single German sentence and gesturing. The experiment was a fractional factorial design, where video/condition types varied according to gesture type (iconic, metaphoric, grooming), representation (internal or external metonymy), and whether the utterance was metaphorical. Our preliminary results show that regardless of modality, abstract metaphoric processing recruits the superior temporal region, an area implicated in audiovisual integration, biological motion perception and social cognition. Moreover, differences in internal and external metonymy processing in gestures are also found in this region. Together, these findings provide insights in abstract representation understanding in gestures.

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Proposal of a new transcription scheme for sign language utterances in interaction

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July 27, 10.30

In this paper, we propose a transcription scheme for sign-language utterances "in interactions" and present several analyses of actual cases using this scheme. Previous studies have developed several transcription schemes, most of which have focused on transcribing the linguistic structure of sign-language words or utterances. The earliest scheme was the American Sign Language writing system developed by Stokoe (1960). Transcription schemes developed subsequently include HamNoSys (Prillwitz, 1989), sIGNDEX (Hara et al, 2007), and SignWriting (Sutton, 1981, 1984). They focus on accurately transcribing each sign, including non-manual actions. However, these approaches present difficulties in accurately transcribing interactions for the following reasons: (1) they cannot transcribe the start and end points of utterances; (2) they cannot transcribe the shifts and timing of multimodal components; and (3) they cannot transcribe hesitation or the sudden cutting off of an utterance, which often occur in natural conversation. In short, the purpose of these schemes is to reproduce signs that are specialized for preformatted words and utterances. However, as conversation analyses (CAs) have revealed, erroneous or ungrammatical utterances are not mistakes, but important elements of communication in everyday interactions. Gail Jefferson developed this form of line-by-line analysis based on systematic transcription. To discuss sign-language interaction, we must develop another transcription scheme that, like CA transcription, focuses on accurately presenting utterances in interactions. To this end, we developed a new applied transcription scheme based on the concept of the gesture unit (Kendon, 2004). This scheme reflects the difference between one-handed and two-handed signing, identifies the co-occurrence of actions, and reflects the continuity and change of actions. It thus reflects interactions produced through sign language. Results of case analyses show that signed utterances were composed carefully, and that signers were sensitive to them. We hope that this scheme will lead to renewed and cogent discussion about sign-language interaction.

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Beat gesture helps L2 learners remember words' stress pattern

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July 24, 15.30

In classroom teaching, gesture provides an effective method for acquiring new vocabularies. It has been shown that seeing and executing iconic gestures when practicing unknown L2 words improves later recall of the words (Allen, 1995; Kelly et al, 2009; Tellier, 2008). Gesture seems to create a visual, kinetic cue for memorization which helps learners to retrieve the meaning at the time of recall. In the present study, I examined how beat gesture could help learners to memorize stress pattern of L2 words. In the experiment, Japanese speakers memorized 30 advanced level English words. On the white screen, the words were presented one by one with its Japanese translation. Each word was accompanied by audio recording of the word's pronunciation. To examine the effect of beat gesture on learning, speakers were divided into two groups. Speech-Only group pronounced each word twice while Beat-Speech group produced a beat gesture while pronouncing words. The Beat-Speech group were instructed to produce beat gesture so that the thrust of the arm would be timed with the stressed sound. As a memory test, students filled out Pre-test and Post-tests. Pre-test assessed students' knowledge of the words' meaning and stress pattern prior to the learning session. Post-test assessed their memory after the learning session. Since students could use certain rules to determine stress patterns even for unknown words, the gain score, the difference between Pre-test and Post-tests was compared across condition. The results showed that there was no difference between the groups when the students' memory was tested immediately after the learning. However, Post-tests conducted one week and three weeks after the learning indicated that Beat-Speech group was more likely to recall correct stress pattern than Speech-Only group. This showed that executing beat movement had positive effect on long term retention of the L2 words' stress pattern.

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On the audiovisual integration of speech and gesture

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July 27, 9.00

Kirchhof (2011) proposed that iconic gestures are not linked to lexical units in the accompanying speech, but rather to so-called "conceptual affiliates" (De Ruiter 2000). This suggests that the temporal synchrony of speech and gesture is more flexible than previously assumed. Recent ERP studies show that gesture strokes and words are integrated by the listener at least up to an auditory delay of 160ms (Habets et al. 2011; Özyürek et al. 2007). But how large can the asynchrony between gestures and their conceptual affiliates be before it is perceived as unnatural? In the present study, subjects watched sentence-long clips of narrations. The sound and video were desynchronized at six levels between -600ms and +600ms. Audio gaps were filled with silence, video gaps with stills. Two further conditions had blurred faces / a box covering the head. 618 native speakers of German rated the perceived naturalness of 9327 stimuli on a 4-point Likert scale. In condition 1 all results are around chance except for +200ms and -600ms (~73%), which is consistent with van Wassenhove et al. (2007). In the two obscured-head conditions, subjects rated all stimuli as ~68% natural. These findings suggest that the AVI window of gesture and speech is rather large. In a follow-up study, 5 stimuli with asynchronies of -600ms, +200ms, and the control in each condition were rated against each other for naturalness. While lip-visibility resulted in a 50/50 preference of 0ms and +200ms, the head-obscured stimuli again had more random ratings across asynchronies, with a lead of +200ms. We conclude that the language perception system is very tolerant of both semantic and temporal synchrony, and that the observed synchrony between gesture and speech might be an "accidental" side effect of the architecture of the speech production system.

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Facial gestures as a source of sign language nonmanual markers: Evidence (and counter-evidence) from Nicaraguan Sign Language

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July 24, 11.30

The appearance of common gestures as lexical signs indicates that gesture can serve as the raw material for a sign language's lexicon. Can grammatical forms similarly derive from gesture? Sign languages typically use facial movements (nonmanual-markers) to convey grammatical information. In American Sign Language, wh-questions are marked with a brow furrow: a common facial expression indicating puzzlement in American speakers. Some researchers suggest that nonmanual-markers in sign languages derive from the facial gestures used by local speakers (Janzen & Schaffer, 2002; McClave, 2001). We compared the facial gestures used alongside wh-questions by 14 Spanish-speaking Nicaraguans and 25 Deaf Nicaraguans, representing three sequential age cohorts of users of Nicaraguan Sign Language (NSL), a new language created thirty years ago. We observed five facial gestures across cohorts (Fig. 1), and found that their distribution has changed over time and does not reflect hearing gestural "input." The nose wrinkle is evident early, but by the third cohort, the brow furrow dominates (Fig 2.). We consider three explanations for this pattern. Frequency in hearing gesture: Disconfirmed; no gesture appears to dominate, indeed, the brow furrow is the least frequent. Salience in hearing gesture: A tendency to hold the brow furrow is intriguing but inconclusive; no facial gesture was held significantly longer than others (Fig. 3). Associated spoken question word: Also disconfirmed; Spanish-speakers produced the brow furrow primarily with when, whereas the deaf signers produced it primarily with WHAT (Fig. 4). We consider an alternative account. The brow furrow, while not dominant in Nicaraguan hearing gesture, appears to dominate cross-linguistically in sign languages. Perhaps once gestures have been repurposed into sign language, the factors that then lead to the grammaticalization of one form over another are internal to the sign language, leaving gesture behind. Once the language has blossomed, its seed is no longer visible.

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Age and cultural impact on co-speech gesture development

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July 26, 13.00

As in all forms of speech acts and spoken discourse, narratives involve the use of both auditory (linguistic and prosodic) and visual (gesture) communication means. But how does this activity develop in children? To study age related changes in the way children and adults gesture while narrating leads us to better estimate the relative weight of social and cognitive factors in narrative development (Berman, 2004). Studies on late language acquisition have shown that from 9 years of age and onwards, narratives gain in linguistic complexity and children increase their frequency of co-speech gesture use to represent the narrated events and characters, to maintain the internal coherence of the narrative, and to mark the transitions between the account of events and the commentaries (Colletta et al., 2010; Graziano, 2009; Kunene, 2010). Is discourse development universal across all languages or does language structure have an effect on the multimodal acquisition of discourse? The present study presents the results of an empirical investigation that compares 72 narratives produced by Zulu and French participants. Participants watched a speechless short cartoon and then were asked to retell the story they had seen to the interviewer. Narratives were annotated for language complexity; length and type of clause, syntax, as well as memory recall across the ages. Narratives were also annotated for gesture; type of gesture, function of gesture, temporal synchrony to speech and the form of gesture. The focus will be on the speech and gesture narrative development of children between the ages of 6 and 12 years as well as to investigate its underlying linguistic and social factors. Results show a significant and linear age effect on the pragmatics of speech and gesture activities. There is also an effect of culture and language structure on this multimodal discourse acquisition.

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I understand therefore I trust: developing mutual understanding in a gatekeeping encounter.

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July 24, 14.30

Gestural mimicry is one of the devices believed to facilitate mutual understanding (Holler & Wilkin, 2011; Kimbara, 2006; McNeill, 2008). Studies on job interviews have indicated links between mutual understanding and positive evaluation of the candidate as trustworthy (Kerekes, 2003, 2006; Roberts & Campbell, 2006). Despite a growing body of research which approaches gatekeeping form a multimodal perspective (e.g., Glenn & LeBaron, 2011), very little is known about the role of gestural mimicry in such settings. This paper reports on a multimodal analysis of job interview data collected in New Zealand. My presentation is based on the identification of gestural mimicry as a feature emerging in job interviews with candidates who were evaluated as successful. As such, it is an attempt at gaining more insight into the relationship between mimicry and the development of mutual understanding in institutional settings. I will focus on two cases in which the interview participants negotiate meaning through lexical and gestural reinterpretation. First, I observe how a mimicked gesture, although not expressed in speech, facilitates mutual understanding of the underlying expectations behind an interview question and results in the interviewer's endorsement of the candidate's self-presentation. I then look at another case in which a gesture-word unit produced by the candidate is reinterpreted by the interviewer in an ongoing process of recording the information on paper. I discuss this process in terms of how it enhances institutional processability of the candidate's answer. I draw attention to the notion of 'co-authoring' (Streeck, 1994) as it emerges through gestural mimicry and discuss it as evidence of accumulating trust and perceived credibility. The main contribution of this paper lies in gaining a more comprehensive understanding of the subtleties of institutional evaluation.

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Gesture use and storytelling in French-English bilinguals

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July 24, 17.00

Among the variety of functions served by gestures, two complementary accounts have been underlined: the Information Packaging Hypothesis states that gestures contribute to the conceptual packaging of information whereas the Lexical Retrieval Hypothesis argues that gestures help the retrieval of the right word in lexical access difficulties situations. Even if the former assumption has been sufficiently documented, the latter tends to have more suitability for bilingual (or multilingual) people who might experience lexical retrieval difficulties more frequently than monolinguals as they often speak one language better than the other. One finding that supports this idea is that gesture frequency and story length are positively correlated in adults' and children's stories retelling. It is therefore possible that, if we restrict gesture use during speech, bilingual adults would have more lexical retrieval difficulties and should tell shorter stories. To explore this assumption in depth, we asked 34 French-English bilingual adults and 15 English-speaking adults to tell a story, in two conditions: "no-gesture" and "gesture". Two short segments of Pink Panther were used and the retelling was done in either French and English or in English exclusively depending on the participants linguistic background, once with their hands free and once while sitting on their hands. All participants were from Edmonton, a mainly English-speaking area in Canada with an active French-speaking community. Their retellings were transcribed and the gestures were coded according to McNeill's taxonomy. By preventing bilingual people from gesturing, we first supposed that they might recount shorter stories. We also assumed that their speech fluency might be more interfered in this condition, and the participants might experience more hesitations while speaking. Finally, we took a look at different linguistic variables, such as stories elaborateness, that might be impacted (weakened) in the "no-gesture" condition for both populations.

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NEUROGES Gesture Coding System

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July 27, 11.30

The NEUropsychological GESture coding system is a tool for empirical gesture research that combines a kinetic with a functional analysis of gestural behavior. The NEUROGES interactive learning tool is a stand-alone application that has been developed to facilitate the comprehension of the NEUROGES coding system. Based on the NEUROGES coding system manual, the NEUROGES interactive learning tool consists of three separate modules and an exercise part. Each of the introduced modules is presented by a short description and one or more video examples that promote a better understanding of the coding system obligatory criteria, such as movement dynamics or trajectory.

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Motor experience increases gesture rate: Does the type of motor movement matter?

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July 27, 11.30

Abstract The Gesture as Simulated Action (GSA) framework proposes that gesture emerges from perceptual and motor simulations that activate mental imagery (Hostetter & Alibali, 2008). Previous findings showed that motor experiences lead to an increase in the production of gestures (especially representational gestures) (Hostetter & Alibali, 2010). However, GSA does not examine whether different types of motor movement would influence representational gesture rate. We ask whether actual/concrete movements (e.g., drawing patterns on a paper) elicit more representational gestures than abstract movements (e.g., index fingers tracing patterns in the air). In addition, we ask whether motor movement also influences beat gesture rate (Hostetter, 2008). Participants (N=90) were presented with different map routes and randomly assigned to three conditions. In the concrete-movement condition, they rehearsed the routes by drawing them on papers with pens. In the abstract-movement condition, they used index fingers to trace the routes in the air. In the control condition, they mentally rehearsed the routes while holding a ball in their hands. Then all participants were asked to verbally recall the route directions to an experimenter. Speech was transcribed and gestures were coded. Representational and beat gesture rates per spatial direction were measured. Findings showed that participants in the concrete-movement condition produced more representational gesture than did those in the control condition, $p<.01$(Bonferroni Pairwise-comparison). However, no difference was found between the abstract-movement and control conditions. Conversely, participants whose hand movements were restricted in the control condition produced more beats than did those in the actual-movement, $p<.005$, and abstract-movement condition, $p<.05$. These results suggested that concrete, rather than abstract, hand movements are associated with higher rates of representational gestures. In addition, there is a trade-off between representational and beat gesture, with fewer (more) representational gestures associated with more (fewer) speech beats.

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A collaboration of hands and the gesturalisation of touch

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July 26, 11.00

Relatively few studies have investigated how touch and tactility feature as communicative resources in social action. Although gesture studies are beginning to move beyond the empty hand (e.g. Andén, in press), there is still a tendency to describe the communicating hand as if "it only ever handled dead matter, but never other bodies" (Streeck, 2009, p. 206). With a general interest in the "collaboration of hands" (Goffman, 1979, p. 35), this study takes a starting point in number of video recorded episodes from courses in handicraft where teachers and students are engaged in the instruction and production of textile objects. The presentation focuses on three communicative practices frequently found in the material: a) touching the body of the other as a way of pointing, b) moving the hands and fingers of the other party into certain positions and c) shaping the actions of the other by physical manipulation. While there are many characteristics shared with interaction that does not involve touch – such as the coordination of embodied conduct and speech as well as the organisation of actions in sequences – the use of touch provides the investigated episodes with some additional features. Actions involving touch and tactility are not only visible and observable to the other party, but also available as haptic and kinaesthetic sensations. The intercorporeality of the interaction also has organizational imports for of the coordination and co-production bodily conduct. In sum, the study contributes to the understanding of the communicative body by beginning to shed some light on the gesturalisation of touch and its social organization.

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Negation in gesture and 'negative incorporation' in American Sign Language

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July 26, 11.00

Gesture plays an important role in the development of sign languages (Wilcox, 2004). This study analyzes gestures of negation produced by speakers of American English and compares them to a phenomenon termed 'negative incorporation' (Woodward, 1973) in American Sign Language (ASL). In signs that undergo negative incorporation, negation is realized as an outward and/or downward twisting movement of the hand(s) from the place where the positive sign is made. There are four verbal predicates in ASL that have been claimed to undergo negative incorporation, namely WANT, LIKE, KNOW, and HAVE. This study therefore focuses on gestures that speakers produce when talking about not liking, not wanting, not knowing or not having something. To elicit data on gestures that express these four concepts, I designed a role-playing experiment involving 4 scenarios with two participants each. Each scenario was designed to elicit the expression of not wanting, not liking, not knowing or not having something. The participants (native speakers of American English) were asked to have a conversation with a partner based on the situations described. Each pair was video recorded having conversations based on all 4 scenarios; there were 7 pairs total. Occurrences of participants producing one of the target negative constructions simultaneously with a hand gesture were selected, transcribed and analyzed with respect to the gesture's form and sequence context. The results demonstrate that English speaker produce several different kinds of negative open hand gestures (for similar findings see, e.g., Kendon, 2004; Harrison, 2008). These gestures have a number of formational characteristics (hand shape, hand position, movement) that are similar to the outward/downward movement of the hand(s) in signs undergoing 'negative incorporation'. These findings, supported by the evidence from ASL history (Fischer, 2006; Supalla, 2006), suggest that 'negative incorporation' in ASL developed as a result of grammaticalization of negation gestures.

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Gesture or home position? Manual movements synchronized with speech but not treated as gesture

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July 25, 14.30

This paper reports on speech-accompanying body movements in three-party conversation that we would not willingly consider as gestures, but as some kind of "home position," or at least something that is irrelevant to the communicative contents. This poses a question regarding what counts as gestures, and what not. In gesture studies, home positions refer to the place or position, which the moves in interaction (including gesture) depart from and return to (Sacks & Schegloff, 2002). On the other hand, gesture unit is defined as "entire excursion, from the moment the articulators begin to depart from a position of relaxation until the moment when they finally return to one" (Kendon, 2004). These definitions are apparently tautological, because the definition of gesture unit refers to home position, while that of home position refers to gesture. Whether gesture involves movements does not help distinguish between gesture and home position, because gesture includes holds, which do not involve movements by definition. Additionally, as we will describe in this presentation, certain manual movements of the participants, despite the perfect synchronization with his own speech, are not treated as gesture. We thus need to consider better set of criteria to draw a line between the two. For one thing, the notion of synchronization has to be reconsidered, because in most cases it only means nothing but a temporal overlap between the two streams of events, i.e., speech and gesture. Another possibility is eye gaze and other linguistic or gestural devices as they might contribute to indexing certain movements as gesture and others as non-gesture. Moreover, mechanical repetitions of one and the same movements imply "lapse of meaning" (Werner & Kaplan, 1963), and this may play a role in making the movements under discussion look like home position. These factors will be discussed in the presentation.

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Speech-gesture mismatch and the neural response to mathematical information

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July 27, 10.30

Children asked to explain their mathematical reasoning sometimes convey different problem-solving strategies in their gestures than in their speech—a so-called gesture-speech mismatch (Kelly et al, 2002). The presence of these mismatches can predict a child's readiness-to-learn (Alibali and Goldin-Meadow, 1993). Here we used event-related brain potentials (ERPs) to study how gesture-speech mismatch affects processing of mathematical information. In Experiment 1, participants viewed naturalistic video-recordings of children explaining their solutions to mathematical equivalence problems, followed by a still image of the correct solution (e.g., "8+2+3=8+5"). The children in the videos either solved the problems correctly or incorrectly, and the strategies expressed in their speech and gestures either matched or mismatched, producing a 2 (Correctness) x 2 (Match) within-participants design. The correct solution was followed by a list of strategies, and the participants' task was to indicate which strategies the child used to solve the problem. ERPs, time-locked to the onset of the still of the correct solution, elicited a larger N400 component following Mismatch than Match videos. There was no effect of Correctness, or interaction between Correctness and Match. The procedure in Experiment 2 was identical to Experiment 1, except that participants had to indicate whether the child in the video had solved the problem correctly. Unlike Experiment 1, ERPs to the still image of the correct solution revealed no effect of gesture-speech Match. Rather, solutions following Incorrect videos elicited a larger P3b component than did those following videos where the children described Correct solutions to the problem. In summary, naïve participants spontaneously integrated speech and gesture to interpret students' solutions—but only when attending to their strategies, not to the correctness of the solutions. When it comes to teaching problem-solving, attending to the process rather than the product—to strategy rather than correctness—may allow educators to better identify children who are ready-to-learn.

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Development of Vocal and Motor Behaviours in Infancy: A case study

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July 27, 9.30

Studies have reported co emergence of oral and manual systems in a developing child that leads to the emergence of adult-like, coupling of gesture and speech (Iverson & Thelen, 1999).This study aimed to document the frequency of occurrence of vocalic and body movement gestures namely, hand, facial expression, facial movements and eye gaze and to understand the emergence of vocal-motor link in a longitudinal study of a single typically developing child. The child was from a Kannada speaking family and the mother-infant dyad interactions were audio-video recorded once a month, from the 3rd to the 5th month (average session duration was 10 minutes). The samples were coded by two independent coders, using a coding "key" developed by the investigator and the percentage of agreement was 85%. The vocalic productions (47.6%) were more frequent across the three months, than syllabic (15%) and vegetative cries (9%). Gaze at mother was more in the 3rd month, while gaze at object was frequent by the 5th month. Among facial movements, random lip and tongue movements at play (33%) were more during the 3rd month while by the 5th month mouthing (57%) and tongue protrusions (36%) were seen. Facial expression for distress (25%) and interest (63%) were more in the 3rd month while that of smile (59%) was observed by the 4th and 5th months. The oral and body movements occurred as early as 3rd month wherein hand, gaze and facial movements were more when the infant was silent or during vegetative productions. The same trend continued in the 4th month, whereas in the 5th month these movements were seen during vocalic productions and silence. Thus, a typically developing infant is endowed with a repertoire of vocal, facial, and bodily signals and as young as 5 months there is a clear indication of vocal-motor linkage.

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Sign language acquisition after a childhood of gesture

Rachel Mayberry, *University of California San Diego*

July 24, 10.30

Children born deaf who do not have access to spoken or sign language are well documented to gesture for inter-personal communication, which shares some features with language. The question we ask here is what the subsequent sign language acquisition of children who have gestured throughout childhood looks like. Do they begin by using their gesture as a base from which they acquire additional language, as in L2 acquisition? Alternatively, do they acquire language from scratch because this is the first time they have acquired language? Furthermore, how much sign language are they able to acquire given their late start? Using a cross-sectional design, we studied the American Sign Language (ASL) acquisition of four deaf cases who had acquired no language (spoken, signed, or written) prior to being immersed ASL. All four cases were immigrants who had no contact with other deaf people or education in their countries of origin prior to moving to North America and becoming immersed in ASL at age 13. Two cases had been acquiring ASL for two years; two other cases had been using ASL for 9 years. Despite diverse backgrounds, the four cases show remarkably consistent patterns of language development. Although they initially acquired ASL signs faster than children, their ASL development showed a tapering off uncharacteristic of the explosive lexical and MLU growth of child learners. Their utterances were short and simple with little grammatical inflection, closed class signs, or pronouns. This was true after 2 years of acquisition and remained true after 9 years of ASL acquisition. Our data suggest that the initial stages of language acquisition are common to all first language development independent of age. The subsequent slowing of acquisition, especially for morpho-syntactic development, may reflect maturational limits on first-language acquisition begun in adolescence.

The semantic and synchronic relationship between 6-year olds' gestures and speech

Audrey Mazur-Palandre & Kristine Lund, *CNRS - University of LYON*

July 25, 13.00

The goal of this paper is to analyze gesture production of 6-year old French children during "how" explanations. 60 participants, in dyads, played two on-line educational games: one on numbers and the other involving spatial concepts. In phase 1, a child-instructor played the game alone. In phase 2, the child-instructor explained the game to a peer. In phase 3, the child-learner played the game. The two last phases were carried out in one of two conditions: the child's interlocutor was visible, or was not. The present study focuses on phase 2. Gestures and speech are commonly understood to be temporally and semantically synchronized (McNeill, 1992; McNeill & Duncan, 2000) during a speaker's talk. They are systematically organized in relation to one another, expressing an integrated message (Kendon, 2000; McNeill, 1992, 2000; McNeill & Duncan, 2000). However, although gestures and speech express the same idea, each can introduce different aspects. A previous study sought to illustrate this by analyzing the extent of synchronicity between adults' gestures and speech (Bergmann, Aksu and Kopp, 2011). These authors showed that if gestures and speech are temporally synchronized, then they are also semantically synchronized. In contrast, when gestures anticipate speech, they introduce detail absent in speech. Following this result, we analyzed children's gestures and speech in order to see: a) to what extent gestures and speech are synchronized; b) if certain gestures are not synchronized with speech, do they bring supplementary information? And if so, what type? Initial analyses confirm in part the results on adults from Bergmann, et al. (op. cit) for a child population and show that: a) the majority of gestures are indeed temporally and semantically synchronized and b) the rare gestures that temporally anticipate the speech can bring additional detail but this is not systematic.

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Where are the signs? (And when?) – The case for transcribing movement phases of the two hands separately in signed discourse

Leland McCleary, *University of São Paulo*

July 27, 11.00

It has long been known that the two manual articulators in signed languages assume complementary roles, dominance and nondominance, and that movements of the hands may be either structural elements of signs or transitions between them (Liddell, 1984; Johnson & Liddell, 2011). However, the combined implications of these facts have tended to be obscured by the widespread practice of transcribing the manual aspects of signed discourse as a sequence of one-handed and two-handed target signs. Relatively little attention has been given to the independent course of action each articulator takes not only as it collaborates with the other to produce signs, but also as it works to structure the signing space and to maintain discourse and intersubjective cohesion. Sign linguists can benefit from the common practice in gesture studies of analyzing gestural excursions into "gesture phases" (Kendon, 1980; McNeill, 1992), and from the less common practice of transcribing the movements of the hands separately (Lausberg & Sloetjes, 2009). I will present data from Brazilian Sign Language narrative

and conversation, transcribed in ELAN following Kita et al. (1998), with tiers for marking the movement units of each hand separately, then for dividing each unit into movement phases. By noting the behavior of each hand separately, phenomena such as Nondominant Hand Spread (Sandler, 2006), dominance switching, hand deletion and mirroring (Nilsson, 2007) can be found and studied in their natural habitats. By identifying the nature of the hand movements leading up to and away from signs, explicit attention can be given to how placements and precise timings serve to trigger real-space blends (Dudis, 2004) and to how they contribute to the management of turn-taking and repair (Leite, 2008).

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Gesture, intention, and “context”

Karl-Erik McCullough

July 26, 10.30

Some years ago, a debate over the intentionality of gesture was played out, in particular in the back and forth between D. McNeill, R. Krauss, G. Beattie, and various members of the MPI group on gesture. Do listeners attend to gesture? Are gestures part of the communicative bundle speakers bring to bear during speaking? Do gestures primarily serve a lexical or conceptual access function in support of speaking rather than being an intrinsic part of the communication itself? The various parties brought the usual investigative tools of their various specializations to bear on the issue, but their often rather different assumptions about the boundaries of permissible analysis were rarely examined as a possible source of what seemed to be, at the time, incompatible results from otherwise apparently similarly focused studies. By comparing the different underlying assumptions in a select set of studies from this debate, we will show how different assumptions lead to somewhat different conclusions. We will do this by using a set of examples taken from publicly available audio/video that demonstrate how adopting these different analytic constraints dramatically alters the analysed interpretability of specific gesture productions. We will then show that the same variation in interpretability holds for conceptually similar speech-only constructs, when subjected to the same differing analytical constraints, and conclude by showing how modality constraints in particular (allowing only visual contextualization for gesture, allowing only auditory contextualization for speech) are biasing against gestural interpretability. Having demonstrated that the interpretability of parts of communications, whether gestural or verbal, is not directly affected by the modality of expression, but is rather a function of the degree of contextualization allowed in the analysis, we suggest that adopting a relational (“contextual”) perspective (W. Hanks, M. Silverstein) can effectively subsume the issue of gestural intentionality to discursive intention.

Theatre and gesture mimicry.

David McNeill, *University of Chicago (Pre-recorded presentation)*

July 24, 17.30

Themes:

• Spontaneous, unconscious mimicry of gestures and bodily attitude, together with mimicry of their speech, is a force in theatrical performance.

• It creates an actor à audience, audience à actor, author à actor gesture triangle.

• Mimicry is a natural social response, sometimes overt but often unnoticed and unwitting, and need not be conspicuous.

• We can see the activation via mimicry of joint contexts (or ‘fields of oppositions’) and idea units (or ‘growth points’), the author’s, the actor’s and the audience’s.

• Each leg has its own realization. The actor to audience portion is similar to what gesture coders do – spontaneously mimic the gesture

and speech of a subject on video made even decades before. The author to actor leg is more surprising. Carefully written 'scanable' prose contains gesturelike imagery. Part of writing is building in gesture, not describing it but placing it as a pattern on which the written text is orchestrated. Actors can recover the author's built-in gestures (Colin Firth as Mr. Darcy, Bette Davis as Jezebel are my examples). Finally, the audience to actor leg arises when actors mimic what have been termed 'phantom' gestures and bodily attitudes in the audience. The triangle exists in film acting with the actor conjuring an audience of his or her own to complete it.

• The audience is active on the triangle too. It's experience is more complex and participatory than just watching. Many reactions take place and are part of the performance triangle.

• Theater has the same dialectic of semiotic opposites as gesture and language. Not simply that actors speak and gesture but that in theater, too, there is imagery and codified form, and they are a dialectic unity. In this sense, in heightened and public form, theater is a continuation (not just an exploiter) of language.

Meaning expressed in gesture is copied across interlocutors and gesture types

Lisette Mol, *Tilburg University*

July 24, 10.30

Interlocutors sometimes repeat each other's representational hand gestures (e.g. Kimbara, 2008). Previously, we presented evidence that in particular meaningful features are copied, rather than complete gesture forms (Mol, Krahmer, Maes, & Swerts, 2012). In the current study, we examine whether meaning observed in one type of gestures (path gestures) influences the production of another type of gestures (iconic gestures). Participants interacted with a confederate on a route description task. The confederate illustrated directions with either path gestures in the vertical plain, such as when pointing out the route on a vertically oriented map, or in the horizontal plane, such as when following the route through a horizontally laid-out city. We coded participants' iconic gestures illustrating landmarks, for whether these were performed in a vertical map or a horizontal route perspective. For example, a house could be depicted as small and in the upper-right corner, or as larger and in front of and to the right of the speaker. Agreement between two coders was 82%, Cohen's kappa = .73, indicating substantial agreement (Landis & Koch, 1977). Participants (N = 40) produced more iconic gestures in the vertical map perspective when the confederate produced vertical path gestures (M = 2.15, SD = 2.18) than when she produced horizontal path gestures (M = .55, SD = .76) (MD = 1.60, 95% CI = .55, 2.65), $F(1, 38) = 9.58$, $p < .01$, $\beta 2 = .20$. Note that the form of path gestures and landmark gestures differs markedly, such that copying all form features of the confederate's gestures was usually not possible. This confirms that meaningful features perceived in one type of gesture influence the production of another type of gesture, supporting the hypothesis that perceiving gestures influences the construction of a conceptualization, which in turn influences gesture production (Mol, et al., 2012).

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Producing gestures when stuttering facilitates speaking

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July 26, 11.30

Speech dysfluencies often indicate that speakers find it difficult to proceed (Clark and Fox Tree, 2002). Recently, Alibali et al. (2009) proposed that speakers who face difficulties with expressing ideas in words might produce gestures during speech dysfluencies (Alibali, et al., 2009). Of the different types of gestures, representational gestures help speakers to parse pre-linguistic thoughts into a sequence of discrete units suitable for speech (Information Packaging Hypothesis, IPH, Kita, 2000). The present study examined whether representational gestures produced during dysfluencies would facilitate speech production by increasing speech accuracy. Forty English-speaking adults (N=40)learnt and memorized map routes and the directions taken before verbally recalling them to an experimenter. Their speech and gestures were transcribed and coded. We were particularly interested in the language behaviors that indicate speech dysfluencies, e.g., filled pauses (e.g., uh, um, er), and repetitions (e.g., move to the, the right hand side) (Levelt, 1983). We investigated the gestures that speakers produced during speech dysfluencies, focusing on two types of gestures: 1) representational gestures that referred to the direction of a step (e.g., index finger traces from right to left) or the shape of a path (e.g., index finger draws the shape of a curve); and (2) beats that involved simple hand movements, which followed the rhythm of speech (e.g., index finger flips outward). Interestingly, our findings revealed that speakers produced speech beats (but not representational gestures) more often when their speech was dysfluent than when it was not, $t(38)=3.48$, $p<.001$. Nonetheless, producing representational gestures during speech dysfluencies led to an increase in accuracy of concurrent recall, compared to when representational gestures were absent, $t(38)=2.01$, $p<.03$. Such findings were not observed for speech beats. Our findings hence further support IPH in that producing representational gestures facilitated the production of accurate recall in the event of dysfluencies.

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"I gesture a lot because I'm French": The myth of French as a high gesture frequency language

Elena Nicoladis & Sinead O'Carroll, *University of Alberta*

July 24, 17.30

Anecdotally, speakers of Romance languages use lots of co-speech gestures relative to speakers of many other languages (e.g., Kendon, 1981). The quote in the title came from an acquaintance; she attributed her high gesture frequency to her speaking French. Certainly, some Romance languages, notably Italian, are associated with a rich set of conventional gestures (e.g., Kendon, 1995). But, knowing many conventional gestures does not necessarily mean that Romance-language speakers use gestures with a high degree of frequency. Indeed, one study showed that French monolingual preschoolers gestured at the same rate as English monolinguals (Nicoladis, Pika, & Marentette, 2009). In contrast, bilingual preschoolers in that study gestured more frequently in both languages than the monolinguals. Given that that study concerned preschoolers, the researchers could not conclude whether the bilinguals had adopted a high-gesture-frequency style before the French monolinguals (and used that style in both their languages) or whether there was evidence against French being a high-gesture-frequency language. The purpose of this study is to test whether a high gesture frequency can be associated with French or with bilingualism in adults. 11 English monolinguals, 11 French monolinguals, and 11 French-English bilinguals participated in this study. They watched a cartoon and told the story back to a native speaker of the relevant language. The bilinguals did this twice, language order counterbalanced. Their stories were transcribed and coded for the use of representational and beat gestures. Results showed that both monolingual groups gestured at comparable rates, for both kinds of gestures, while the French-English bilinguals gestured significantly more often for both kinds of gestures in both languages. We argue that bilingualism is more prevalent in the French-speaking population so the high-gesture-frequency rate attributed to French may actually be more accurately attributed to bilingualism.

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Specific pantomimes for specific objects: A study on the different modes of representation used in pantomime.

Karin Van Nispen, *Tilburg University*

July 24, 16.30

Pantomimes are gestures that occur without speech and whose meaning is not determined by any convention (McNeill, 2000). They can be very informative still. Yet how do people comprehend pantomimes in absence of any convention on their meaning? Iconicity (iconic mapping between form and meaning), which is considered a natural property of gestures (Müller, 1998) is likely to play an important role in the perception of these gestures. To construct iconicity in pantomimes, people use different modes of representation (Müller, 1998). This raises the question whether comprehensibility is influenced by the mode of representation used in pantomiming certain concepts. We study the use of pantomimes for naming pictures of objects from the Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983). Based on Müller's approach (Müller, 1998), we developed a coding scheme to analyse the different modes of representations used. Preliminary findings indicate that for most objects in our dataset, people tend to use the same (combination of) modes of representation. For instance (almost) all participants make the same pantomime combination to express the concept 'igloo', namely 'outlining' (its shape) and 'enact' (pretending to be cold). This adds to Müller's (1998) findings, because not only do people use different modes of representation to construct iconicity, they tend to use specific pantomimes for specific objects. In future analyses we will study whether the use of specific modes of representations is related to the comprehensibility of these gestures. Furthermore, we will analyse the (salient) elements created in pantomime which represent a certain concept (e.g. whiskers for 'cat'), a strategy which is typically used in sign languages (Thompson, Vinson, & Vigliocco, 2009).

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Words in Action: Using Gestures to Improve Verb Learning in Primary School Children

Jacqueline De Nooijer & Rolf Zwaan, *Erasmus University Rotterdam, the Netherlands*

July 25, 14.00

According to theories of embodied cognition, language and action are closely intertwined (e.g., Fischer & Zwaan, 2008). The present study seeks to exploit this relationship, by systematically investigating to what extent motor activation, in the form of observing, imitating, or generating gestures, can improve vocabulary learning in 8-9 year old children. As of yet no study has compared these methods of instruction. Furthermore, most studies in this field have only used concrete verbs (e.g., Willems et al., in press). We investigated whether the effect of gestures during learning would be similar for two types of concrete verbs (i.e., object manipulation and locomotion verbs) and abstract verbs. In a within-subjects paradigm, 49 children learned novel verbs via a verbal definition alone or in combination with gesture observation, imitation or generation (i.e., enactment). Three types of verbs were learned under each condition: object-manipulation (e.g., to chisel), locomotion (e.g., to stride) and abstract verbs (e.g., to fear), allowing us to compare the effect of gestures on verbs that have a direct link to the motor system and those that do not. After each condition a post-test was administered, consisting of a recall test and a fill-in-the-gap test. Results showed a significant interaction between method of instruction and verb type. There was no effect of instructional method for the abstract verbs. Learning of locomotion verbs significantly improved through gesture observation compared to the verbal definition condition. For object-manipulation verbs, children with good language skills benefitted from imitation or enactment, while children with poor language skills were hindered by that and instead benefitted from observing gestures. This study suggests that observing and generating gestures may have different effects depending on verb type and language proficiency, and that effects of gesturing on learning apply only to verbs that have a direct link to the motor system.

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Arithmetic in action: Evidence in gesture of the flexible deployment of complementary embodied conceptualizations of abstract arithmetic

Rafael Núñez, Tyler Marghetis & Benjamin Bergen, *University of California, San Diego*

July 25, 13.00

Mathematical activity is often accompanied by gesture, and these gestures suggest rich and varied conceptualization (Núñez, 2006). Indeed, like many everyday concepts, mathematical notions often invite more than one construal. For instance, we may conceptualize arithmetic metaphorically as Motion-Along-a-Path or as Object-Collection, thus drawing on more concrete, embodied conceptual domains (Lakoff and Núñez, 2000; Fauconnier and Turner, 2002). However, there are presently no experimental studies of the real-time conceptualization of arithmetic. We used spontaneous gesture to address two questions: (Q1) Are these hypothesized construals deployed during real-time reasoning? (Q2) How flexible are these construals? Participants began by completing one of two task-irrelevant mental imagery tasks designed to prime concrete domains (containment or motion-along-a-path) and then answered questions about arithmetic (e.g., "Is the sum of an odd number and an even number always odd?"). Video-recorded co-speech gesture was segmented into target gestures that co-occurred with talk of arithmetic; two analysts coded these for handshape, handedness, and stroke-direction. We reasoned that, if conceptualizing arithmetic involves recycling more concrete conceptual domains, then the mental imagery should prime associated conceptualizations as enacted in gesture. Two recurring gesture profiles suggested the real-time deployment of two complementary construals (Q1). "Collecting" gestures were bimanual and used grasping handshapes, suggesting a conceptualization of arithmetic as Object-Collection. "Path" gestures were one-handed and used canonical pointing morphology, suggesting a conceptualization as Motion-Along-a-Path. We next focused on the flexibility of these construals (Q2). Participants switched fluidly between gesture profiles—sometimes even within a single gesture unit—integrating multiple construals of arithmetic during real-time reasoning. Additionally, as predicted, participants who completed containment mental imagery were significantly more likely to exhibit an Object-Collection construal; likewise for motion-along-a-path imagery and a Motion-Along-a-Path construal. The deployment of these complementary conceptualizations of arithmetic, therefore, was flexible and context-sensitive, shaped by the salience of embodied mental resources.

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The acoustic origin of the smile: an update

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July 25, 15.30

Abstract My presentation will be an update on that given in Ohala 1980. The acoustic origin of the smile, J. Acoustical Soc. America. 68;S33. I argue that: (1) the smile – lip corner retraction – is not uniquely human; as a signal of appeasement, non-threat, accommodation, etc., it is found in many other species that have a plastic (moveable) face covering, e.g., other primates, canids, raccoons, etc. (2) in origin it served to modify the resonances of an accompanying vocalization, i.e., to raise them in order that the vocalizer will sound small (and thus non-threatening). (3) this meaning is reinforced by being in contrast to an opposite facial gesture signaling threat involving a protrusion and rounding of the lips which lowers the resonances of the vocalization thus making the vocalizer sound large. I have called this latter facial gesture the "o-face". (4) through ritualization these facial gestures can now be performed soundlessly but with the same meaning. (5) in its origin and in its subsequent development it is a signal designed to influence the behavior of the receiver and does not necessarily or primarily reflect the inner psychological or emotional state of the signaler (unlike, e.g., tremor, perspiration, pupil dilation which are presumably involuntary and which do reflect an inner psycho-physiological state). (6) this account of the smile resolves a long-standing puzzle: why would an appeasement signal, if purely visual, display more teeth – a potential weapon – than the contrasting facial expression, the "o-face", a threatening signal, which partially restricts the display of teeth?

Remembering through body movements

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July 25, 11.00

The relation between gestures and memory is a rarely studied phenomenon in contemporary psychology of remembering. In this work, we conceive the remembering phenomenon as a situated activity experienced by an individual (Bartlett, 1932; Ingold, 2000). Remembering is fundamentally a dynamic process in which the experiential dimension determines, in every moment of the actual experience, the mode and the content of remembering (Bergson, 1896/1988; Mori, 2008). In this vein, body movements and gestures are inextricably connected with the lived experiences of a person (Streeck, 2009). We conducted a microgenetical study on videographical material including sixteen undergraduate students. Participants, in dyads, answered an adaptation of the Fast Friends protocol (Aron et. al.,1997), a fast guide that includes questions about studies, professional interest and hobbies, among other things. The protocol also included a question about the earthquake occurred in Chile on 2010. At the end of the conversation, participants were interviewed separately. Interviews included the questions ¿What do you remember the most about the conversation? and ¿What do you remember about the earthquake experience? We selected six interviews for this study. Result clearly showed that remembering is a lived experience in which bodily movements and gestures plays a key role. We identified video streams in which subjects shift continuously between two remembering modes, each of them being correlated to particular body movements. A first mode of remembering suggests reflexive activity: face expression and gaze show effort, body activity decreases or stops during these moments. In some cases, a body movement emerges that indicate a reflexive process, like ceiving described for Streeck (2009) or abstraction processes shows for McNeill (2005). A second mode of remembering includes moments characterized by an increase of body and face movements organized around the intensity of person's lived experience (Bergson, 1913/2001). Fondecyt Project N°1100863

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Embodied claims to speakership after side sequences

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July 24, 17.00

In the course of complex turns in conversation, recipients of those turns can engage into types of actions that can be potentially competitive to the current speaker's trajectory and therefore be treated as problematic by him, leading to an abandon of his talk. While the abandons by a current speaker can exhibit an interactional problem at first sight, the way he treats the overlapping talk afterwards may reveal different ways of handling them. Inspired by Conversation analysis (Sacks, Schegloff & Jefferson 1974), we analyze some instances of such potentially

problematic overlaps, with an emphasis on the participants' bodily conduct. Based on a corpus of videotaped French and German ordinary conversations, this paper shows a collection of inserted sequences (Jefferson 1972) following an abandoned turn. A fine-grained multimodal analysis (Goodwin 1979, Mondada 2004, Schmitt 2005), aligning audible and visible conduct of the speakers, illustrates how the overlapped speakers embody their claims to speakership and how they orient to the incoming talk as being an insertion. Although they often resume their suspended line of talk after the side sequence, they exhibit different stances towards the incoming talk and the continuity of their status as current speaker. While a strong claim to speakership, embodied through a stable position or the maintain of a gesture, may be shown during and shortly after the overlap, overlapped speakers may then orient to the overlapping speaker and respond to his action. By exploiting different resources (for example a short vs. a continuous gaze), they may embody a more or less constant claim throughout this sequence. We wish to underline some of the systematics of embodied conduct during simultaneous talk, in order to shed light on the interplay of verbal actions and bodily resources and to contribute to a multimodal concept of turn-taking in interaction (Mondada 2007).

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On the relationship between words, signs and gestures: A cross-modal lexical decision study

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July 26, 11.30

Abstract The common belief that sign languages are one universal gestural system may stem from the resemblance between iconic signs and some gestures. For example, the pantomime of cigarette smoking and the thumbs-up emblem are visually similar to the BSL signs TO-SMOKE and GOOD, respectively. However, while gestures appear to be holistic without systematic internal structure (McNeill, 1992), signs are made up of meaningless constituents derived from a language specific phonological repertoire (Brentari, 1998). These constituents are important as they come into play during lexical retrieval by deaf signers (Dye & Shih, 2006). However, despite not being able to draw upon a visual phonological system, non-signers can extract meaning from iconic signs and are biased towards learning them more easily than arbitrary signs (Campbell, Martin & White, 1993). It is possible that non-signers' ability to access the iconic properties of signs and their capacity to produce gestures is what drives sign comprehension. In the current experiment, it was hypothesised that if iconic signs are processed as gestures in the minds of non-signers, they may activate spoken language lexical items semantically related to these gestures. To test this hypothesis, a cross-modal priming experiment was conducted. Hearing non-signers participated in a lexical decision task in which a word was preceded by an iconic sign which depicted an action or an object. Sign-word pairs were either semantically related or unrelated. The predictions were that the fastest reaction times would be produced by: 1) semantically related pairs, and, 2) signs depicting actions. Our results suggest that non-signers interpret signs as gestures and accordingly process their meaning visually which activates related words. However, despite action signs being more directly mapped onto their referents there was no significant difference with perceptual signs. Based on these results, the relationship between words, signs and gestures will be discussed.

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Effects of age and observing gestures on learning a problem solving task from video-based instructions.

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July 25, 11.30

Producing and observing co-speech gestures are suggested to benefit learning, by reducing working memory load (Ping & Goldin-Meadow, 2008; Wagner, Nusbaum & Goldin-Meadow). Working memory functions, such as the ability to inhibit irrelevant stimuli and integrate information, are suboptimal in children and older adults compared to young adults. We hypothesized that by guiding attention and linking the verbal message to task-related references, co-speech gestures would lighten working memory load and that this would be especially beneficial for children and older adults. Video-based instructions were presented to three age groups, children (aged 10 to 12 years), young adults (aged 18 to 30 years) and older adults (aged 50 years and older). The learning task used was a water jug task, in which many interacting information elements must be processed simultaneously, and therefore impose a substantial burden on working memory. Participants within each age group were randomly assigned to one of three video conditions, in which an instructor explained the problems; 1) verbally and with pointing gestures, 2) only verbally and, 3) verbally with an arrow pointing to the locations where the gestures in the first condition pointed. Four videos explained tasks with increasing difficulty and immediately after each video, performance on isomorphic problem-solving tasks was measured. At the end a transfer of learning task followed. For the children, rough preliminary analyses showed no effect of video condition on overall performance on the isomorphic or transfer tasks. However, data collection was only very recently completed and more detailed analyses will be conducted, incorporating difficulty level of the problem solving tasks and mental effort ratings (a measure of experienced cognitive load). Data collection in young adults and older adults is in progress and results will be available before the conference.

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The nature and role of teachers' gestures in first grade mathematics classes: A cross-cultural comparative study

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July 24, 16.30

When learning math, experimental studies show that learners learn more effectively when when teachers gesture and when learners are taught to use correct gestures (Goldin-Meadow et al., 2009). Where learners are not competent in the language of instruction, they learn better when teachers use gesture (Breckinridge Church et al., 2004). Observational studies show that learners' gestures are integral in the learning process and reflect developing conceptual understanding (Yoon et al., 2011). What kinds of gestures do teachers use in maths classes, and how do they use them? Do teachers vary in their use of gestures? Does gestural behaviour vary according to cultural and linguistic background or due to other factors? What role do teachers' gestures play in learning? In this study, we filmed and analysed the gestures of four South African first grade teachers (two Tswana and two Afrikaans first language speakers) teaching a math lesson on halving that they had prepared together beforehand. The teachers taught in English and followed the same lesson plan using similar teaching materials. We classified the gestures and their sematic relation to speech on ELAN using an adapted version of Colletta et al.'s (2009) coding scheme. Teachers used similar types of gesture. The highest proportion of teachers' gestures was representational, followed by deictics, performative, discursive and interactive gestures. Similar to Tellier's (2006) findings among language teachers, teachers' gestures had three main roles: explanation, management and evaluation. Teachers used gesture types in similar proportions except for one teacher. The way in which teachers used gestures as a semiotic resource varied. The data showed that conceptually accurate gestures used at key stages in the learning process aided learning. In particular, gestures appeared to play an important role in mediating the transition from material objects and personal symbolic processes to institutional mathematical signs.

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The gestures ASL signers use tell us when they are ready to learn math

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July 26, 10.30

The manual gestures that hearing children produce when explaining their answers to math problems, when taken in conjunction with their speech, predict whether the children will profit from instruction in those problems. Children whose gestures convey different information from the information conveyed in speech — gesture-speech mismatches — learn more from instruction than children whose gestures convey the same information as speech (Church & Goldin-Meadow, 1986). Gesture-speech mismatches juxtapose two different ideas within a single response. We ask whether it is essential that the different ideas be conveyed in different modalities by examining gesture in deaf children whose primary communication system is in the manual modality. Forty ASL-signing deaf children explained their solutions to math problems and were then given instruction in those problems. We coded the hand movements that the children produced during the explanations: Hand movements that resembled the gestures hearing children produce on this task (e.g., tracing, sweeping, or pointing towards the items in the problem; Perry et al., 1988) were considered gestures; hand movements that were recognizable ASL lexical items were considered signs. We found that both gesture and mismatch occurred in our sample of deaf children at rates comparable to those found in hearing children (Perry et al., 1988). Importantly, deaf children who produced many gestures conveying different information from their signs (gesture-sign mismatches) were more likely to succeed after instruction than children who produced few, suggesting that mismatch can occur within-modality and that mismatch between gesture and sign predicts learning as well as mismatch between gesture and speech. We suggest that mismatch's ability to predict learning stems from the juxtaposition of different information conveyed in distinct representational formats (a mimetic, analog format underlying gesture vs. a discrete, segmented format underlying language, sign or speech), rather than the juxtaposition of two modalities.

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Attitudinal emotions and gestures in Danish first-acquaintance conversations

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July 24, 16.00

There is wide agreement about the fact that head movements and facial expressions are used extensively in face-to-face communication for various purposes e.g. expressing feedback, emphasis, turn management and emotions, or supporting the speaker's own communication management. Recent studies, moreover, have shown that personality traits are reflected in gestural behaviour. While these findings confirm the general intuition that gestural behaviour and traits like extroversion and openness correlate, they do not model the fact that the same person may act and feel differently in different situations. In this paper, we look at the relation between gestural expressions and the way participants perceive the interaction they are engaging in. Our data come from a multimodal corpus of annotated first-acquaintance conversations in Danish consisting of 12 filmed interactions between pairs of speakers. Each subject engages in conversations with two different interlocutors. Subjects were asked to fill in a questionnaire where the interactions were scored on a 5-point scale along dimensions concerning various emotional reactions. Head movements and facial expressions are annotated following the MUMIN coding scheme. The hypothesis we explore here is the fact that the experience of the conversations, surroundings and mood can have an impact on gesture output. If a subject's experience of the conversation stands out from the norm, it will be reflected in their gestural behaviour. We have selected subjects whose experience of the interactions deviates from average more than the general standard deviation on several dimensions. We can see by looking at the gesture counts that there are interesting differences between them and other speakers, and between the different conversations in which they interact. In the paper, we analyse the conversations and show examples of how speaker's emotional attitudes are reflected in head movements and facial behaviour.

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Keeping your place: the role of the visual modality in reference tracking in sign and gesture

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July 27, 11.00

Reference tracking - knowing who does what to whom - is a crucial part of discourse and depends in large part on marking the informational status of referents. In spoken languages, consistent linguistic devices mark referents occurring in coreferential (maintained referents) and non-coreferential ((re-)introduced referents) contexts [1, 2]. In contrast, we know little about how referential context influences expression in the visual modality, i.e. in co-speech gesture and signed language, where the iconic and deictic affordances of the hands and space provide unique means of identifying and representing referents ([3, 4, 5] for co-speech gesture). To address these issues, we asked signers of German Sign Language (N=8) and native speaker-gesturers of German (N=10) to narrate a video vignette featuring referents engaged in a collaborative activity. For each referent predication, we identified the referential context (coreferential, non-coreferential), the type of sign/gesture used (e.g. point, enactment), whether it was localized in space or not, and whether spatial locations were used consistently, and then compared these aspects across the two modes of expression. We found similarities between the signers and gesturers in that pointing signs/gestures were used to consistently localize referents in non-coreferential contexts. However, compared to gesturers, signers additionally exhibited consistent localization of other sign types (e.g. enactments) and also used localization in coreferential contexts. Our findings provide further evidence that co-speech gesture is sensitive to the informational status of referents, and provide a first demonstration for a signed language of the systematic influence of referential context on the type of referential expression and the use of space. The study moreover provides a first direct comparison between co-speech gesture and signed language in the domain of reference tracking and demonstrates a reflection of discourse structure in the visual modality.

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Does schooling influence the way children gesture?

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July 27, 11.00

Slobin (1990) showed that children's narrative abilities undergo dramatic changes when they start school. Comparing kindergarten and primary school children in five different language communities, he found that the latter give significantly more background information and are much more capable of telling logically and chronologically consistent story lines. Whether this development affects only verbal skills or communicative abilities in general can be tested using gesture that has been regarded as an additional source of information on language acquisition processes (Goldin-Meadow, 2000). The hypothesis is that gesture is linked to speech, displaying a rise in complexity with increasing demands placed on the children. Primary school children are expected to gesture more and more concisely than kindergarten children, where "concisely" means that they use fewer pointings and more iconic gestures that display a more symbolic content because they encode not only the common context, e.g. the location of an object or action but also their characteristics or functionalities. To test this hypothesis a study with 5-6-year-old children was designed who visited either kindergarten or primary school. Given German school policy, parents of children born between October and June can choose whether to send their children to school or let them stay in kindergarten for another year. This allows for a comparison of kindergarten and primary school children of the same age. A developmental test (K-ABC, Kaufman Assessment Battery for Children) ensures a comparable state of development. The children were presented with a situation in which they (1) had to solve several tasks with the experimenter and (2) witnessed a person dropping several objects. They were then asked to give an account of this event to an experimenter. The narrations will be compared as for the number and types of gestures used.

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Interrelationship between musical and body gestures in musical meaning

Irene Porzio Zavala

July 24, 14.30

Interrelationship between musical and body gestures in the context of musical meaning This work is a study of gesture as a foundational component of musical experience. It entails the denial of the Cartesian dualism which has prevailed until today in western culture. From the perspective of embodied cognition, some features related to the way we create meaning through perception are crucial to the understanding of meaning and expressive communication in music: intermodality as a quality of our senses of operating together, mirror neurons and their relationship with our mimetic ability, as well as the way our body schema "hides" on perception. Music is an art of movement. Sound is the movement of sound waves through the air. Musicians move their bodies to produce sounds with their instruments. The listener, although not necessary moving while listening, departs from his experience of movement in every-day life in order to understand sounds and give them meaning. The performer, during rehearsal and live performance, uses body and mind in an integrated way. Playing an instrument comprises intentional movements that aim to express musical ideas. In the context of music, gesture has a two-fold component that is implied: body gestures, movement with expressive meaning; and musical "movements", which are considered musical gestures in the way they constitute significant units (gestalts) that shape the sound through time and are perceived synthetically (HATTEN, 2004, p. 95). I develop these two concepts of gesture in musical meaning and discuss the way they inter-relate in musical interpretation, giving practical examples in musical works. Following Merleau-Ponty´s conception of the primacy of our body in the perceptual experience, I show how body gestures are not subordinated to musical gestures: they are connected in the core of musical construction and interpretation, and in consequence, they must be studied through their complementary roles.

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Comparing viewpoint strategies used by co-speech gesturers and signers

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July 27, 11.30

Research on gestural viewpoint suggests that several dimensions determine which perspective a narrator takes, including properties of the event described (Parrill, 2010). Certain events evoke gestures from the point of view of a character (CVPT), others from the point of view of an observer (OVPT), and some from both perspectives. We ask how these patterns relate to depiction strategies in American Sign Language (ASL). Comparisons have been made between OVPT and the use of classifiers (CL) in sign (Schembri et al., 2005). The use of constructed action (CA) in ASL, wherein signers portray aspects of a character with their bodies (Metzger, 1995), has been compared to CVPT in gesture (Quinto-Pozos & Parrill, 2008). By showing signers the same stimuli from Parrill (2010) we can compare the strategies signers and gesturers use when describing certain events. Ten ASL signers described the cartoon stimuli used in Parrill (2010). Following Parrill's approach, descriptions were matched to particular stimulus events. Events that were shown by Parrill to elicit a particular gestural strategy (CVPT, OVPT or both) were coded for signers' instances of CA and CL. We divided CA into two categories: CA involving the torso or display of affect, or CA depicting the handling of objects (CA-HO). An analysis of the frequency of use of CA, CA-HO and CL showed that signers used CA for all events, but most frequently when gesturers used both viewpoints. CA-HO was most frequent when gesturers used CVPT. Signers also used CL throughout, but least frequently when gesturers used CVPT. These results show co-occurrence trends in the sign data that are not always demonstrated in the gesturer data. The signers sometimes use more strategies for event descriptions than the gestures do. Similarities between CVPT and CA are supported by the lack of CL when the gesturers primarily used CVPT.

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Showing how the work is done in art studio instructional interactions

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July 24, 13.00

Instruction in craft practice makes extensive use of gesture in order to demonstrate the practical and aesthetic possibilities of hands and minds, tools and materials. The present report focuses on instruction concerning a specific a feature of manual work namely the progressive transformation of materials. Ingold has referred to "the processional character of tool use" (Ingold, 2006) and in an account that reflects on his own practice, articulates how the conduct of a basic action (sawing a plank) involves and requires different sawing action at different phases of the job as the cut progresses. The sites where craft skills are developed characteristically involve learning through observing or co-participating with expert practitioners (Marchand, 2008; Sennet, 2008) or through forms of guided participation in activities (Ekström, Lindwall, & Säljö, 2009). Drawing on Conversation Analysis to examine the sequential organization of actions in videorecordings of 16 classes in a printmaking studio and a metalworking studio, this paper shows how instructors use gesture in coordination with other resources (such as talk and the manipulation of tools) to display the progressive character of different jobs. In particular, the analysis shows how bodily conduct and facial expressions are used to show effort and care during different phases of procedures. Instructors reveal a concern with getting students to appreciate what should be done, the manner in which it should be done (e.g. what degree force or care is required); what should be looked for (or otherwise sensed) and what might be found. The paper concludes be discussing how instruction in this configuration of mindful action which can accommodate and control progressively unfolding work is fundamentally dependent on the coordination of gestural resources.

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Temporal co-speech gestures in Chol Maya

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July 24, 16.00

This paper explores the ways in which notions of time are spatialized in the speech-accompanying gestures of Chol speakers. Chol is a Western Mayan language spoken mostly in Southern Mexico. In most of the literature on gesture studies and cross linguistic studies of gesture, gestures that co-occur with time expressions are reported to be consistently linear (Calbris 1990; Cienki 1998; Cooperrider and Nuñez 2009; Casasanto and Jasmin 2012). This paper aims at answering the question: is linearity in time gestures a human universal? I propose that, although linearity seems to be a universal feature of temporal thought and gesture, it is instead merely a reflex of certain features of non-universal grammatical structures. Most studies have been conducted with languages that show the grammatical feature of inflectional tense, in which the time of a narrated event is expressed in relationship to the time of speaking. But grammatical tense is not present universally across all languages, and we cannot rule out the possibility that the widespread linearity of speech-accompanying gestures which has been reported to date simply reflects this fact. The tendency to describe "time" gestures as based in an abstract "timeline" may be the result of decades of research that have concentrated on tense languages. Therefore, the critical test would come from studying temporal gesture in languages without grammatical tense. Duncan's (2002) study of a classic tenseless language, Mandarin, showed that aspect was in fact represented in gesture; however, she focused her analysis in the categories of duration and complexity of the gesture stroke, rather than on linearity. This paper describes the type of gestures that co-occur with temporal expressions in Chol Maya, a tenseless language, in order to determine whether these reflect a linear conception of time or not.

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Gestural input in a specific situation like joint book reading

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July 26, 14.00

Reading a book to a child constitutes a specific situation. In recent literature, we are beginning to understand how this kind of situation impacts language acquisition. In Horst et al. (2011), e.g., it has been shown that children benefit from repeated stories, in which new words were embedded. This finding shows that stories contained in books basically elicit a repetition of a situation, in which the input can be experienced once more to deepen the child's understanding of it. While the verbal input seems to be under investigation, little is known about gestures contributing to language acquisition in this situation. Rowe & Pan (2004) revealed a positive correlation between mothers pointing to depicted objects during a joint reading and their children's productive vocabularies. However, to date, we know very little about (a) what kind of gestural input plays a role in joint book reading and (b) whether book reading elicits a general or a specific gestural frame depending on the book content and (c) how different forms of gestural input relate to children's language skills. In a longitudinal study with 10 mother-child dyads, we investigated mothers' gestural behavior during joint book reading when their children were 11 and 18 months old. With respect to: (a): Comparing to a free play situation, we identified various forms of gestures typical for book reading (b): We provided two different book materials (a book with single objects depicted on each page vs. a book with two objects related to each other depicted on a page). We hypothesized that similar gestural input should be observed in both conditions if a book situation constitutes a general gestural frame (c): We correlated maternal input with children's linguistic abilities with 24 months in order to gain first ideas about which gestural input can be related to language acquisition.

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Manual requesting serves the management of multiple involvements

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July 27, 9.00

Everyday social life relies on the production of mutually-recognisable actions. Human actors use a range of resources to implement actions, most importantly language and the body. In this paper I examine manual behaviour used to make requests, and in particular requests that have to be coordinated with other simultaneously-occurring courses of action. This study is part of a larger project aimed at describing the functions of communicative resources employed by speakers of Italian to do requesting in everyday interaction. The present analysis starts from 142 cases in which a speaker attempts to pass or obtain an object, for which manual action is necessary. In 30 of these cases (21%), speech is not used to accomplish the request. I argue that a central reason for the selection of manual action alone over manual action coupled with speech is the need to manage a participant's engagement in more than one simultaneous course of action, an interactional contingency also known as 'multiple involvements' (Goffman, 1963; Schegloff, 1998; Toerien & Kitzinger, 2007; Raymond & Lerner frth.). I examine cases in which the speaker carries out a request and a concurrent action, either with the same or with two different parties (e.g., speaker answers someone's question while requesting somebody else's empty plate), as well as cases in which it is the recipient of the request who is already engaged in another course of action with a third party (e.g., speaker requests salt from someone who is chatting with someone else). The analysis demonstrates that making a request by employing only manual action is a choice from alternatives, a resource drawn from a 'system of strategies' that allows an actor to establish a hierarchical relationship between the request and a concurrent course of action in which the speaker or recipient is involved.

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The semantic interplay of speech and co-speech gestures in the description of pain sensations

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July 25, 16.00

Pain presents a problem within medical and everyday contexts because it is an internal sensation, directly accessible only to the sufferer and often with no visible signs, meaning that effective communication is vital if others are to understand the experience. Despite this, verbal communication is problematic and carries the risk of misinterpretation, particularly when communicating about pain sensation (Schott, 2004). Co-speech gestures are frequently produced during pain communication and contain important information (Heath, 2002; Hyden

& Peolsson, 2002; Rowbotham et al., 2011); with sensation most often represented simultaneously in speech and gestures (Rowbotham et al., 2011). The present study builds on this work by investigating the semantic interplay between speech and gesture when describing pain sensation. The focus is on whether gestures contribute information not contained in speech and provide a more specific representation than speech alone (Gerwing & Allison, 2009). Study 1 revealed that 53% of speech units describing pain sensation were accompanied by a gesture also depicting sensation. Moreover, 43% of gestures contributed additional information about sensation (i.e. that was not in speech). This suggests that even when both modalities represent the same aspect of pain, gestures add unique information, allowing for a more complete representation of the sensation. Study 2 provides a qualitative analysis of how pain sensation is represented in speech and gesture and supports the conclusion that the two modalities complement each other, thus providing a more specific representation of sensation than speech alone. These findings highlight the important role of co-speech gestures in representing internal, visually inaccessible perceptual sensations and suggest that this modality offers a means by which we can obtain additional information to supplement and clarify problematic verbal pain messages. The research will be discussed with respect to its application in health-care contexts.

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Gestures Across Time: The accumulation of understanding as gestures move between participants and across time.

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July 24, 13.30

This study looks at the development of shared understanding in interaction as gestures move between participants and across time. For example, as a chemist explains his research to two non-experts, he gestures to depict the chemical configuration of polymer solar cells. The depiction develops as it is passed between participants in conversation where ideas are explained and achievement of understanding becomes a mutual endeavor mediated by the gesture. Our prior research shows that in such expert/non-expert explanations, gestures function predominantly as communicative tools in the hands of the expert, thinking tools when passed to the learner and, for all, a tool to regulate the interaction But what happens to the gesture when the conversation is over, but learning continues? Little investigation has focused on if and how gestures used in teaching and learning interactions travel with the learner over time and across conversations. We employ the methodology of comparative microanalysis of five pairs of videotaped conversations in which (1) experts explain concepts to non-experts, and (2) non-experts re-explain the concept to another. Findings show that gestures do, in fact, travel across time and across conversations. Beyond this, the study shows that the gestures continue to be tactically employed as communicative tools, thinking tools and tools to direct interaction, but, by comparing features of the gestural practices across conversations, we reveal that the distribution of these functions is very different. For instance, the learner as explainer employs features of gestural practices that suggest a significant increase in the use of the gesture as a tool to think through ideas in the process of organizing and communicating new information. The study gives insight into how concept development is achieved across time as learners strategically and creatively re-employ their hands and bodies, to think through ideas in the process of communication.

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Metaphor in dance gestures

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July 26, 14.30

Following McNeill (1992) and Mittelberg (2006), this work describes gestural metaphors in choreographies, incorporating the Peircean subdivision for icons into images, diagrams and metaphors. The description is based on two versions after Romeo and Juliet, by Shakespeare:

Kenneth McMillan's one for The Royal Ballet, and Rudolf Nureyev's for the Ballet de L'Ópera de Paris. The first step to approach the description of metaphors in dance gestures was to establish the concept of gesture in a semiotic system which is in itself kinesthetic. Following the tripartite structure proposed by Poyatos 2002 for linguistic discourse (verbal, paralinguistic and kinesthetic levels), I assume three different levels for the danced discourse: dance technique, paradance and gesture. Gesture will, then, be considered any expressive movement of body and/or face that is not part of dance technique. In natural languages, there are a number of indications for the mapping of source and target domains in building up a metaphorical space. In dance, these indications are gestural and dependent on the space built by the choreographies. What I intend to show is how conceptual metaphors (as proposed by Lakoff & Johnson 1980) are reflected in the bodies, movements, and facial expressions of the dancers. The description of particular metaphors in dance aims to contribute to the general analysis of metaphors in face-to-face conversation. The Max Planck software, largely used to transcribe sign languages, ELAN (EUDICO Language Annotator), version 4.1.1, was used for the transcription of the data in several different tiers, to highly and better describe, simultaneously, many aspects of the gestures such as hand movement, features of facial expressions (eyebrows, eyelids, gaze and mouth movements), among others.

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Integration of speech and cohesive use of space in gesture

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July 25, 11.00

The number of studies on comprehension of gestures and speech has increased recently. However, it is not understood at what age children can integrate information from speech and gesture at the discourse level. Thus, this study examined how well 5-, 6-, 10-year-olds and adults integrated information from spoken discourse and the cohesive use of space in gesture, in comprehension. In Experiment 1, participants were presented with a combination of spoken discourse and a sequence of gestures, and selected an interpretation of the final sentence that best matched the preceding spoken and gestural contexts. The final sentence was ambiguous, but it was disambiguated by the cohesive use of space in gesture. We found that adult listeners could successfully integrate spoken and gestural contexts to derive the correct interpretation, but it was difficult for 5-year-olds to do so. This suggests that children aged six and over can use the location information assigned by gesture to disambiguate a semantically underspecified sentence, and integrate information from spoken discourse and cohesive gestures. In Experiment 2, only 5-year-olds participated. They were presented with a combination of spoken discourse and a sequence of paper dolls, instead of gestures, in the same manner as Experiment 1. The result showed that 5-year-olds could successfully integrate the spoken and paper doll contexts. This indicates that 5-year-olds can associate the referent with the location indicated by the concrete visual image, and integrate information from the visual image and that from speech to disambiguate a semantically underspecified sentence. However, they could not do so when the visual stimulus provided an extremely schematic representation, namely a gesture indicating a location in gesture space. From these results, we concluded that speech-gesture integration gradually develops in early childhood.

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The performativity of gesture: factors in the development from gesture to sign language in Nicaragua

Richard J. Senghas, *Sonoma State University*

July 24, 11.00

Psycholinguistic studies show that predictable linguistic principles are at play in patterns of language change in Nicaraguan Sign Language, but that these changes are permitted to occur because of social circumstances, which are, in effect, determined by cultural norms and expectations (Senghas, et al. 2005). Drawing on ethnographic fieldwork conducted in Nicaragua in the 1990s and onwards, and interviews and fieldwork in Sweden in 2006-7, the influence of at least some of these norms at play in Nicaragua can be traced back to Swedish intervention in the 1980s, including the arrival in Nicaragua of Deaf and other Swedes with their sign language interpreters and institutional affiliations and support, the bringing of Nicaraguan individuals to Sweden resulting in exposure to Swedish practices, and especially the Swedish models of linguistic development for deaf individuals that include providing early social interaction and linguistic exposure. These models reveal issues of performativity, a concept that Kulick (2000) and other linguistic anthropologists employ to analyze effects certain culturally-salient communicative behaviors, especially those that speakers might be forced to adopt, even when those forms have cultural valence that run counter to the individual's needs or intents. For example, when all gesturing is considered to be entirely non-linguistic, then using linguistic gestures might categorize one as less than linguistic, and hence the tracking we observe in the 1970s and 1980s of deaf Nicaraguans into classrooms intended for those with cognitive or other syndromes, rather than simple deafness without linguistic impairment. Changing ideologies in Nicaragua occurred, in part, due to contact with international circles. Those advocating the use of sign could appeal to established models that recognize signing as "real language" (cf. Polich 2000), allowing deaf individuals the ability to socialize with other deaf individuals, providing circumstances for a new signing community and a new sign language to form.

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Preliminaries to a Kinematics of Gestural Accents

Stefanie Shattuck-Hufnagel & Pei Lin Ren, *MIT*

July 25, 10.30

The communicative significance of speech-accompanying gestures of the hands, head, face and torso was highlighted by the groundbreaking work of Goffman (1983), Kendon (1980) and McNeill (1992) and colleagues, and considerable work has been devoted to movements with a strong ideation component, such as metaphoric and deictic gestures. Fewer studies have focussed on less-ideational gestures, such as rhythmic sequences of movements, and their timing with respect to speech. Exceptions include McClave (1994), who reported that rhythmic hand movements do not align with lexically stressed syllables, and Loehr (2004) who found that gestural accents do align, at least roughly, with spoken pitch accents. More recently, Shattuck-Hufnagel and colleagues studied the timing of these less-ideational gestures using multi-tiered labelling, combining the ToBI system for transcribing intonational accents and phrasing (syllable-by-syllable) with gestural timing transcriptions at the level of individual video frames, (Renwick et al. 2004, Shattuck-Hufnagel et al. 2007). They classify the kinematics of these gestures informally into hits (accent-lending movements that end abruptly, Renwick et al. 2004), beats (rapid sequences of up-down or back-and-forth movements) and continuous gestures (repeated movements, often quasi-circular in shape, with less-obvious temporal inflections). Results suggest that American English speakers tend to align the ends of their gestural accents (hits) with rhymes of pitch-accented syllables or the following weak syllable. This study expands such kinematic investigation by tracking the shape and velocity profiles of individual gestures, using commercially available video tracking software (ProAnalyst). Initial results (one speaker) suggest that hits, beats and continuous gestures are distinguished by their shapes in space, their velocity profiles and possibly the velocity peak alignment with the speech; results for four additional speakers will be reported. This progression toward more fine-grained and comprehensive labelling of gestures tests ever-more-detailed hypotheses about the relation of gesture planning to prosodic planning in speech production.

An exploratory analysis into the role of gesture in instrumental music teaching and learning

Lilian Simones, Franziska Schroeder & Matthew Rodger, *Queen's University Belfast*

July 24, 13.30

This paper will present the first of a series of studies investigating the role of gestures during teaching and learning to play the piano as part of a PhD research at the Sonic Arts Research Centre in collaboration with the School of Psychology at Queen's University Belfast. Findings from research into the role of body movements and gesture from a performer's/performing point of view (Davidson 1993,1994; Woodard, 2009; Rodger, 2010), allied to research focused on gesture, communication and education (Cook, Mitchel & Goldin-Meadow, 2008;

Trevarthen, Delafield-Butt & Schogler (2011), Sassenberg, 2011) suggest that more attention should be given to the quite overlooked context of instrumental-music teaching, namely to the "physicality" involved in learning to play a musical instrument and the essential role of teachers in the development of this embodied skill. This case study combining qualitative and quantitative approaches, intends to provide an understanding of the role of body movement/gesture in teacher and student communicative interaction during piano lessons, specifically in the communication of symbolic and functional musical knowledge and the impact of body movement/ gesture for teaching and learning. Participants were required to teach/learn two small extracts of contrasting pieces during their usual lessons, according to skill level (identical within each skill group). Initial data was collected by video recordings of piano lessons. The analysis is based on the type and frequency of movements/gestures employed by teachers and students in association with lesson activities, verbal and non-verbal content of the lesson, and verifying if the body movements shown fit under predefined classifications (e.g. McNeill 1992, 2005; Jensenius et al. 2009). Spontaneous gestures co-occurring with the piano teaching process were found and termed as spontaneous co-musical gestures. Whilst having similar communicative purposes as McNeill's spontaneous co-verbal gestures (1992, 2005) they differ in form/shape and in the nature of the communicative function.

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Comparison of Verbal Language and Gesture Types in Children with Expressive Language Delay and Mild Cognitive Impairment

Gargi Singh & Manjula Rajanna

July 24, 11.30

Acquisition of gesture and language in typically developing children emerges in parallel and is sequential. Although much is reported about emergence of certain gestures (i.e., reaching, showing, giving and pointing) in typically developing children, little is reported on the developmental hierarchy of a variety of gestures and their associated function in children with communication disorders. The clinical relevance of knowing which gesture function typically emerges first may assist the speech language pathologist in targeting the most viable communication function and target the same in early intervention strategy. The study explored hierarchical emergence of language (vocabulary and word types) and gestural behaviors (gesture types) in two clinical groups of children with communication disorders including expressive language delay (ELD) and mild cognitive impairment (MiCI). Eight children in the experimental group (four with ELD and four with MiCI, Mental age: 2-4 years) and eight age-matched typically developing children in the control group, belonging to middle class Kannada-speaking families were selected for the study. Spontaneous verbal and gestural productions of the participants were video-recorded during 45-min mother-and-child free play sessions in home interaction carried out once a week for three consecutive weeks. The spontaneous verbal productions, communicative gestures and crossmodal transitional forms were transcribed in detail by the principal investigator and coded separately for types and frequencies of occurrence. The results indicated that children with ELD used gestures to communicate like that of typically developing children while children with mild cognitive deficits produced fewer gestures along with a limited verbal vocabulary and word types. The results are discussed as to the potential usefulness of an understanding of gestural hierarchies in targeting verbal communication in children with ELD and MiCI.

The relationship between iconic gesture use and verbal memory among bilinguals and monolinguals

Lisa Smithson & Elena Nicoladis, *University of Alberta*

July 24, 16.00

The use of gestures may contribute to speech production by facilitating lexical access (Frick-Horbury & Guttentag, 1998; Krauss et al., 2000; Rauscher et al., 1996). How gestures might serve this function remains largely unknown. Since lexical items are stored in memory gestures may serve a facilitating role in lexical access by influencing verbal memory. The purpose of studies 1 and 2 was to examine whether individual differences in verbal short-term memory and verbal working memory predict iconic gesture use among bilinguals and

monolinguals respectively. In both studies participants were asked to watch two cartoons and to retell the stories to an experimenter while being videotaped. Additionally, verbal short-term memory and verbal working memory capacities were evaluated using a standardized computerized assessment. The results from Study 1 demonstrated that verbal working memory capacity was a negative predictor of iconic gesture production among bilinguals. The results from Study 2 demonstrated that verbal short-term memory capacity was a negative predictor of iconic gesture production among monolinguals. These results suggest that among bilinguals, individuals with weak abilities to store and manipulate language information tend to use iconic gestures more than individuals with strong abilities to carry out these cognitive tasks. In contrast, among monolinguals, individuals with weak abilities to store language information tend to use iconic gestures more than individuals with strong abilities to store this information. The role of executive functioning in bilingual speech production is discussed as one possible explanation for this difference. These results suggest that iconic gesture production may play a role in the storage and rehearsal of lexical information in verbal memory and that this may be one way in which gestures facilitate lexical access.

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The role of action in learning spatial sequence: Relative effectiveness of gesturing vs. drawing

Wing Chee So [1], Qi Ting Vong[2] & Ching Terence[2]

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July 25, 15.30

All gestures are produced in space (McNeill, 1992) and they often represent visuospatial information. Previous findings showed that producing gesture enhances spatial learning (Chu & Kita, 2011; Ehrlich, et al., 2006). Indeed, gestures are actions as they involve hand movements. Similar to gestures, actions on real objects also involve hand movements and these actual movements play a causal role in spatial learning (e.g., Weidenbauer & Jansen-Osmann, 2007). If gesture and actual movement are equally effective in improving spatial skills, then it can be action in general, not specific to gesture, enhances spatial learning. In order to understand whether gesture plays any unique role in spatial learning, the present study compares the effectiveness of gesture to that of actual movement in learning of spatial sequence, which is one of the important components of navigation. Participants (N=112) were asked to learn spatial sequence of steps shown in four diagrams, one at a time, and to rehearse each sequence by using one of the following methods: 1) gesturing with index fingers of their preferred hands; 2) actually drawing the sequence on papers; and 3) mentally simulating the sequence while having their hand movements restricted by holding a softball. Participants in the control condition did not rehearse. Finally, they verbally recalled the sequence to an experimenter. Our findings showed that participants in the gesture and drawing conditions had more accurate spatial recall and fewer errors than did those in the mental simulation and control conditions. Thus, actions in general improved spatial learning. However, participants in the gesture condition produced more accurate spatial recall and fewer errors than those in the drawing condition, suggesting that the impact of gesture on spatial learning was more powerful than that of actual movement. Thus, gesture plays a unique role in spatial learning.

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Mediated pointing: Temporal and spatial coordination between verbal and non-verbal resources

Anna Spagnolli, Silvia Caria & Luciano Gamberini, *University of Padova*

July 25, 16.30

This contribution investigates mediated pointing, in particular the pointing performed in a computer-mediated environment. The data collection is constituted of the full conversations of 26 couples of participants who collaborated to find an object hidden in a virtual environment (VE) constituted of two office rooms connected through a hallway. In each couple, one participant could move in the VE (the Explorer) and the other knew the position of the target object (the Helper). The Helper provided directions to the Explorer, who moved in the VE on the basis of such directions in order to reach the target. Therefore, the conversation focused spontaneously on the production of spatial references. Explorer's movements in the VE were visible to the Helper. Communication was possible through voice and – in one

condition - through a pointer, i.e. a white digital arrow appearing on the screen and controlled by the Helper with his/her mouse. The analysis focused on the way in which arrow movements and speech were jointly used to produce spatial references. The spatial configuration of the arrow movements could be punctual or non punctual (Schmauks, 1987), in association with the spatial property of the object identified by speech (object location or direction) and with the kind of verbal resource used to produce the spatial reference (indexicals or frames of reference, Levinson, 2003). The temporal coordination between verbal and nonverbal resources was also fine-grained, allowing the arrow to be on target before the co-referent speech was completed. Finally, the absence of the pointer dramatically reduced the production of indexical terms. These results represent a further support to the theoretical claim that tools become prosthesis of the body in expert users (e.g., Keating, 2005), legitimizing also the study of mediated pointing as a way to shed light on the practice of spatial reference in general.

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Toddlers associate gestures with actions rather than objects

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July 27, 10.30

Children learn both iconic and arbitrary gestures as object labels at 18 months; by 26 months, children prefer words for labels but will readily use iconic gestures (Namy et al., 2004; Namy & Waxman, 1998). Namy (2009) argued that very young children can learn symbols equally well in either a gestural or verbal modality, with a possible initial advantage for gestures. The purpose of Study 1 was to directly compare toddlers' ability to learn novel words and novel gestures as object labels. Toddlers between 18 and 26 months learned either 4 novel words or 2 arbitrary gestures and 2 iconic gestures as object labels. The children performed at chance for the 4 gestures and significantly above chance for the 4 novel words. Neither age nor vocabulary size correlated with children's ability to learn the gestures. These results replicated Namy et al.'s (2004) finding that toddlers have a preference for learning words but contradict their findings on gesture as toddlers in the present study rejected both iconic and arbitrary gestures as object labels. This failure to replicate could be related to children's default assumption that gestures are linked to actions. Marentette and Nicoladis (2011) have shown that children between 2 and 4 years of age treat gestures as action associates. Study 2 tested whether 18 to 26 month olds could learn gestures associated with actions rather than objects. Half the toddlers were taught 4 novel verbs and half were taught 2 iconic and 2 arbitrary gestures referring to actions. The toddlers learned the verbs and iconic gestures at equivalent levels but were worse at the arbitrary gestures. These results, combined with the preference for words over both types of gestures for object labels, lead us to argue that toddlers default to associate gestures with actions rather than with objects.

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Significant breaks: Space and viewpoint transitions in gesture

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July 27, 10.30

Looking at gesture in physical space, how do we know what mental space it represents? Virtual rotation in ASL (Janzen 2012) depends on subtle cues such as bodily position of a character to indicate which person is being enacted. In contrast, the ASL quotative evidential marker (Shaffer 2012) precisely and conventionally cues a minimal representation of the conversation frame: the signer glances to the side to look at the sign SIGN, with no rich representation of the interaction or the quoted signer whose content is presented. Gesturers, like signers, need to mark mental space transitions. Cienki (2009) notes the correlation of gesture with spoken mental space markers, as do Sweetser and Sizemore (2008). Dudis (p.c.) describes ASL signers "erasing" incorrect spatial maps to start over; Enfield (2009) shows a gesturer pushing a (gesturally outlined) family tree out of the way to make room for more generations. Gesture not only delineates the content of our mental spaces, it also marks the transitions from one mental space to another. In fact, these transitions may prove to be just as significant as their continuity. This paper starts developing a taxonomy of gestural space-builders and transition markers. Our data comes from video-recorded conversations between dyads of speakers. Some markers (new viewpoint character's posture) positively indicate a new space, while others

(lowered gaze, "air erasing") negatively indicate exit from an old space. Although all iconic mappings are necessarily metonymic and partial, we suggest that non-mappings and breaks in mappings are just as significant as the mappings themselves. Examination of the complexity of verbal viewpoint cues is a well-established tradition in stylistics, as well as in mental space theory (Dancygier and Sweetser 2012); gestural viewpoint, using very different affordances, is at least equally complex.

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Orchestrating Knowledge Building: Gestural Activity for the Coordination of Information for the Teaching and Learning of Chemistry

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July 25, 14.30

In this study we examine how gestures are used to coordinate information for science learning as we also explore novel instructional methods that employ effective gesturing in the classroom. First, through the process of microanalysis of videotaped episodes, we examine how interactions between an instructor and her students make use of gestures to link information and to promote conceptual change in chemistry. The teaching of chemistry is populated with multiple representations that must be coordinated effectively to construct a complete meaning. We show how an instructor's gestural activity to coordinate and sequence layers of information achieves three communicative functions: 1) to connect present information, 2) to bridge previously acquired information with present information, and 3) to orient a learner's visual perspective to important spatial information in representations. The analysis further shows that students also gesture 1) to coordinate information to communicate their understanding, 2) make requests for clarification, and 3) negotiate information to jointly achieve understanding. These findings not only show the importance of gestures for achieving meaning in learning interactions, but also reveal the specific role gestures play in the development of ways of thinking in chemistry. We show that gestural activity, in relationship to other forms of information, is more than an act of simply coordinating information, but rather a sequenced orchestration for knowledge building. Our analysis also demonstrates that such gesturing acts are only as useful as they are visible. Because of competing resources, students often miss critical information communicated in gestures. The realization of the value of gestures for teaching and learning in chemistry to orchestrate learning has sparked the authors to investigate innovative instructional designs for the chemistry classroom that make explicit and strategic use of gestures to develop understanding.

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Ponting, directing, dwelling

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July 25, 14.00

The word direction is ambiguous: it refers both to a vector in space (as in "in the direction of" and "giving directions") and to a speech act

by which the speaker seeks to influence the actions of others ("directing somebody to do something"). Pointing gestures, of course, combine both aspects, directing the addressee to direct gaze in some direction. Much of the research on pointing gestures has focused on the spatial aspects of pointing and revealed a great deal about spatial cognition and about the ways in which pointing gestures mediate problems of wayfinding and coordination in space. This paper concentrates on the other aspect. It investigates how someone directs the activities—and not just the gaze—of others by means of pointing gestures. The paper is based on a micro-ethnographic investigation of the entire set of acts of pointing by which by the owner of an auto-shop manages the activities of his employees in the course of one work-day. It is shown that pointing gestures often do more than directing gaze: they also demonstrate how the target is to be seen—they classify it (as an individual object, a set, an object within a set, a spatial domain, etc.), disclose some intrinsic feature (e.g. texture), or relate an object to other objects. By combining directional and directive functions, the auto-shop owner's pointing gestures form an integral component of the management of activities and the cognitive ecology of the auto-shop. We see how a man in constant motion constantly "re-emplaces" himself and re-incarnates his personal knowledge of his life-world by pointing. This is interpreted in light of a dwelling perspective (Ingold 2000) which treats social interaction and gesture as components of our pre-conscious "residence in the world" (Kockelman 2006).

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Development of locative expressions in Turkish and Turkish Sign Language: Are there modality effects?

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July 25, 11.00

The visual-spatial modality of sign languages allows signers to employ analogue mappings of spatial relations in the real world onto signing space. Many studies showed a hindering effect of the modality on the acquisition of locative expressions due to the challenges of simultaneous articulation and morphological complexity of spatial predicates in sign languages [1, 2, 3]. However, they lack controlled comparisons across ages, modalities, and data from typologically different and less studied sign and spoken languages. We, as the first time, compared the development of locative expressions by native Deaf children learning Turkish Sign Language and children learning Turkish to adult patterns in these languages. Picture descriptions containing three spatial configurations (IN, ON, and UNDER) were elicited from three age groups (4-6 years; 7-10 years; adults) in both languages. We examined the frequency of expression of spatial relations, the strategies used, and the introduction order of Ground and Figure. Both preschool-age Deaf and hearing children expressed fewer spatial relations than school-age children and adults. They were also similar in introducing "Figure" object before "Ground" object in their descriptions. School-age children in both groups, on the other hand, expressed the spatial relations as frequently as adults and were adult-like in following "Ground" before "Figure" order. However, while hearing children were similar to adults in preferring the most adult-like strategy (i.e., relational lexemes), Deaf children used the most adult-like strategy (i.e., classifier predicates) less frequently than adults. We suggest that there is no a big hindering effect of modality on development of locative expressions based on the striking similarities in the developmental stages of each group of children compared to adults - contrary to the results of many previous studies. The difference observed between Deaf and hearing children might be an effect of modality or a typological difference between two languages.

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Being funny – a way of doing gender

Hanna Söderlund, *Umeå University, Sweden*

July 24, 10.30

In my doctoral project I am studying how women and men are doing gender in humour. My material is the Swedish humour TV-show, Parlamentet (The Parliament). On the programme, stand-up comedians and actors participate doing political humour, discussing recent news and representing two political (fake) factions, in order to win the audience vote in the end. In each programme there are four participants divided in two factions, a blue and a red. The reason why I am interested in studying humour is that a lot of humour arises from stereotypes and taboos, things we are not supposed to think or say. This means gender may be actualized in different, more "extreme" ways than in "ordinary life". The setting in Parlamentet is specific, since the goal is to be funny (the funniest?). The show has been criticized for being sexist and giving male participants advantages. Women are normally in minority which may affect their possibility to be funny. What I am interested in is how the participants interact with each other in their conversations, using oral language, gaze, hand movements, head movements and body posture. The body is interesting in humour (as in many other situations) since humour can be very physical. When doing humour the person delivering the joke has to be able to take or get the floor, maintain the floor and to get feed-back after having delivered the joke. I want to find out what techniques are being used to either encourage or discourage the other members of the panel in being funny. The moderator plays an important role since he is the one distributing the turns. But all the panel members are important when it comes to giving feed-back.

When does a pointing have to retract?: The semiotic nature of "stroke" of pointing gestures.

Katsuya Takanashi, *Kyoto University*

July 25, 14.30

There are difficulties in describing pointing gestures according to McNeill(1992) and Kendon(2004)'s notation, in which a gesture unit is divided into preparation, stroke, hold and retraction phases. One of the difficulties is whether a period in which a hand with an extended index finger is kept suspended should be regarded as stroke or hold. From a descriptive view, a "stroke" should be a period in which a hand is moving, and such an immobile state should then be regarded as "(post stroke) hold." However, from a functional point of view, unlike iconic gestures, pointing gestures can "keep meaningful" even during such suspension. This is because pointing are indices. That is, if we conceive the primary function of indices is to establish joint attention between interlocutors (Clark, 1996), whether the hand is moving or not is not a problem as long as it can direct recipient's attention toward the target object successfully. One of the logical implications of this view is that a pointing "may" begin to retract at the moment joint attention has been established ("grounding based" account for retraction timing), though this does not mean a pointing "must" retract immediately at the moment. On the other hand, Mondada (2007) argues, based on the analysis of pointing which persist after turn completion, that end of a pointing is not solely determined by referential function but is also to be considered as orienting to several interactive features such as turn-taking or speakership ("turn-taking oriented" account). Here, a still remaining question is that, if there are cases pointing "must" retract rapidly, then what the reasons are. This presentation examines examples of pointing gestures which begin retracting before turn completion in order to answer it, and reconsider the nature of stroke and hold of pointing.

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Same speech, same gestures?

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July 24, 13.30

Individuals have their own unique way of gesturing; therefore, it is unlikely that different speakers saying the same sentence will gesture in the same way. However, what happens when a single person repeats the same thing to a single partner or to different partners? In an ongoing study on gestures in foreigner talk (Tellier, & Stam, 2010), we asked 10 future teachers of French to make different partners guess 12 words. They had to explain the same words to both a native and a non-native partner (a learner of French, level B1/B2 - European Framework), and we investigated how the change of partner affected their gestures. In a descriptive analysis, we have focused on self-repetitions. Participants tend to use the same sentences or expressions in both conditions (native and non-native) but with different gestures. For instance, gestures used in the non-native condition tend to be more iconic (examples 1 & 2) and/or larger, hence more helpful for the listener. (1) Native: "c'est un verbe / synonyme de / [de escalader]" Metaphoric / center center (2) Non-Native: "c'est un verbe / euh synonyme [de escalader]" Iconic / center center Moreover, when talking to a non-native, in a conversation that fails more often, participants often use self-repetitions in the course of the same interaction. In this case, gestures sometimes evolve to become more significant and visible (examples 3, 4 & 5). However this is not a consistent pattern. (3) "quand on traverse une rue" no gesture (4) "[donc on traverse la rue]" Iconic / center center (5) "[on

traverse]" Iconic / extended arm in front These findings are consistent with studies on how speakers adapt their gestures to their partners relying on the shared knowledge or the absence of it (Gerwing & Bavelas, 2004; Holler & Wilkin, 2009).

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Interactional viewpoint: An analysis of speech and gesture in co-telling conversation

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July 24, 15.30

In this study, we describe how participants in Japanese three-party conversation coordinate their gestural expressions and speech when two tellers collaboratively tell the same story to the other participant (Lerner, 1992). Our goal is to demonstrate how participants use each other's gestural expressions as a resource for their interactions and coordinate their body movements, especially with regards to how the gestural viewpoints are utilized among the participants in co-telling conversations. In the traditional gesture studies (McNeill 1992, Kita 1997), the relationship between speech and gesture has been investigated mainly on the cognitive structure inside an individual. They, however, have yet to fully discuss the interactional aspects of gestural expressions. In the last decade, there has been growing interest in the use of other participant's gesture as a resource of turn-construction in naturally-occurring conversations (Hayashi 2002, 2005, Hosoma 2009). For instance, using the Conversation Analytic approach, Hayashi (2002, 2005) shows how participants in Japanese conversation utilize the gestural movement to accomplish joint turn-construction. In contrast to the previous studies that focused on the local interaction, this study describes the global interaction among the co-tellers by analyzing examples of sharing gestural viewpoint. Two participants, S2 and S3, watched the same cartoon and were instructed to explain the contents to another subject, S1, who did not watch the cartoon. Throughout the data, S2 and S3 frequently took over the previous speaker's gestural viewpoint just after a turn had been exchanged between them. It is shown that this repetition of gestural viewpoint between the co-tellers serves as a resource to accomplish co-telling activity. Analysis of the interactional viewpoint among co-tellers seen in this study is one way to better understand interactional nature of spontaneous gestures in natural conversation.

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Gesture is more than just moving your hands as you talk

Caroline Trofatter, Carly Kontra & Sian Beilock, *University of Chicago*

July 25, 11.00

Not only do gestures reflect a person's experiences (Cook, Tanenhaus, 2009), but there is mounting evidence that gestures can also actively change a person's thoughts. Beilock and Goldin-Meadow (2010) hypothesized that gesture introduces action information into mental representations and, in support of this hypothesis, demonstrated that action information introduced by one's own gestures can negatively affect subsequent performance if the information is incongruent with the task. Participants solved the Tower of Hanoi task (TOH1), explained their solution, and solved it again (TOH2). All participants solved TOH1 using weight-correlated disks such that the smallest disk was the lightest and could be lifted with one hand. Participants in the no-switch group solved TOH2 using the same disks, but participants in the switch group solved TOH2 using disks with reversed weights, so that the smallest disk was too heavy to lift with one hand. The more frequently participants in the switch group gestured about the small disk using one hand during the explanation period, the worse they performed on TOH2. Participants in the no-switch group did not experience a TOH2 performance deficit, nor did participants who skipped the explanation step and simply solved the puzzle again without speaking (Goldin-Meadow, Beilock, 2010). Our study replicated these findings and extended the paradigm to an "action+speech" group. Unlike participants who explained their solution using speech and gesture, participants who explained their solution using speech and action did not experience a deficit in performance on TOH2. This finding

reinforces the notion that gesture does not merely reflect action information already present in a person's mental representations, but instead actively contributes to the construction of those mental representations. Gesture is thus more than just moving your hands as you speak—it may be a special form of action with a strong link between sensorimotor information and representational content.

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The influence of verbal interaction on speakers' gestural communication of mutually shared knowledge

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July 24, 14.00

While much research has focused on the influence of mutually shared knowledge (common ground [CG]) on speech, we still know very little about how CG influences communication in multi-modal, face-to-face contexts. An entirely unresearched topic within this domain is the role of the addressee's behaviour and the way in which it influences speakers' co-speech gestures. Since communication is a joint, collaborative activity influenced and shaped by both the speaker's and the addressee's behaviour [1], this issue requires urgent attention. The present study investigates the interplay between CG and addressee behaviour. It varies addressee feedback in three conditions: free dialogue, restricted feedback and no feedback. In addition, interactants (18 dyads per condition; N = 108) either did or did not share CG about scenes from a narrative. Our results show that, as expected, speakers' number of words in the CG compared to the no-CG conditions was significantly reduced, but speakers' gesture rate remained unaffected. Importantly, we also examined the qualitative nature of the gestures. This analysis showed that, despite no difference in rate, speakers used larger gestures when communicating with addresses who delivered reduced feedback as compared to addressees with whom they were engaged in free dialogue. Interestingly, the opposite pattern emerged in the corresponding no-CG conditions. The findings suggest that speakers enhance their gestural signals when communicating about mutually shared knowledge in order to actively elicit addressee feedback for grounding information in dialogue, and, further, that co-speech gesture use is based on a complex pattern of interaction between different socio-cognitive variables. We will discuss our findings in the context of previous research on CG and gesture [2,3,4], dialogue and gesture [5,6], and with respect to the social and affiliative dimensions influencing gesture use in talk with addressees of different knowledge status.

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Some uses of Index Finger Extended Palm Up

Minna Vanhasalo, *University of Tampere*

July 24, 17.30

Across conversations certain hand shapes recur regularly together with speech. The context-of-use of these recurring gestures is of interest in pragmatically oriented gesture studies (Kendon 2004). In my presentation I will focus on the context-of-use of gestures where the hand shape includes extended index finger, orientation of the hand is palm up and movement is towards the interlocutor (= IFEPU). In Finnish conversations pragmatic gesture IFEPU recurs frequently. In most of the cases this gesture is not used as specialized for (deictic) pointing but has other pragmatic use as prominent. In regard with this other pragmatic use I will concentrate on two contexts-of-use of IFEPU taken from 10 different mundane conversations (adding up to 200 minutes of data). The contexts-of-use of the IFEPU share some characteristics with PUOH (Kendon 2004, Müller 2004) and Iranian Pistol Hand (Seyfeddinipur 2004), yet are distinct from them. IFEPU offers and presents one specific detail of information. This piece of information is mutually known by the interlocutors in a sense that speaker trusts that listener knows, where speaker is referring to. Example with *IFEPU*: sillon mulla oli *se yks* mi-n-kä mä nyt-ki ajattel-i-n laittaa then I-ADE be-pst *it one* what-GEN 1SG now-CLI think-pst-1SG put_on-INF "At that time I had on *the one* that I am also now thinking of wearing."

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Gender and gesture space: Women and men use interactive gestures differently

Christina Vedar, *RWTH Aachen University*

July 24, 11.00

Gender plays an important role in behavioral differences. So far very few studies (e. g. Ostermeier 1997; Gordon & Labotka 2009) have investigated gender-specific gestural behavior in multimodal discourse, despite its importance for interaction in general. This talk presents a study examining gender differences in a subset of co-verbal gestures: interactive gestures (Bavelas et al. 1992; Bavelas et al. 1995). These gestures assist in the process of conversational exchange between interlocutors rather than to convey topical information. Previous work exploring formal and functional properties of interactive gestures (e. g. Holler 2009; Gullberg 1999; Kendon 2004) does not address gender differences per se. The interdisciplinary approach taken here combines cognitive-semiotic gesture analyses with the sociological framework of Pierre Bourdieu (1972; 1980). Drawing particularly on Bourdieu's concepts of habitus and social space, the aim is to examine some of the ways in which men and women might employ interactive gestures differently in dialogue due to gender-influenced aspects of their habitus. More specifically, it was hypothesized that while performing interactive gestures women and men use personal and interpersonal gesture space differently. To test this hypothesis empirically, four same-sex pairs and four mixed-sex pairs (two female groups and two male groups) were videotaped while performing a game task. The participants were native German speakers aged between 24 and 33 years. In the video corpus, all interactive gestures (cf. Bavelas et al. 1992) were identified, coded, and analyzed with a focus on hand shape and orientation, direction of movement, and location in space. Variance analyses revealed group differences: for instance, women prefer the upper gesture space in same sex pairs and the lower gesture space in mixed sex pairs, while men tend to use the upper gesture space in mixed-sex pairs and the lower gesture space in same-sex pairs.

Child-directed co-speech gestures and early vocabulary development in rural and urban Mozambique

Paul Vogt & J. Douglas Mastin, *Tilburg University*

July 24, 16.00

We research the amount of co-speech gestures directed at Mozambican infants by different communication partners in a rural and an urban community, and correlate these with the infants' vocabulary development. In each community, we videotaped natural interactions of 13-month old infants with their daily communication partners, and assessed vocabulary development using a parental checklist when infants were 17- and 25-months old. We coded the videotapes for child-directed co-speech gestures (gestures for short), such as, POINTING, SHOWING, REACHING, etc., and differentiated the producers of gestures as PEERS, SIBLINGS, ADULTS, primary CAREGIVERS or those engaging in MULTI-PARTY interactions. We observe that the total amount of gestures produced by all communication partners is 3.3 times higher in the urban community than in the rural area ($p<0.01$). This amount correlates strongly to vocabulary development in the urban area ($p<0.01$), but not in the rural area. The relative percentages of gestures produced by most interactants are similar across communities, except rural SIBLINGS produce, relatively speaking, 60% more gestures than urban SIBLINGS. Absolutely speaking, however, urban SIBLINGS produce more than rural siblings. When correlating individual gestures, such as POINTING, SHOWING and REACHING, produced by different interactants to vocabulary development, no general trend is observed. However, the total amount of gestures produced by rural SIBLINGS correlates positively to vocabulary development ($p<0.05$), while those produced by rural ADULTS have a negative correlation ($p<0.05$), as do those produced by urban PEERS ($p<0.01$). Concluding, the huge difference in the total amount of gestures across both communities correlates strongly to vocabulary development in the urban area, but the current analysis does not yet provide insights into which gesture or interactant contributes most to this correlation. The results do indicate that the gestures of SIBLINGS, who become increasingly responsible in child care in the rural area, contribute substantially to infants' vocabulary development.

Changes in the Iconic and Metaphoric Gesture Processing Networks across Development

Elizabeth Wakefield & Karin James, *Indiana University*

July 27, 11.00

To understand how co-speech gestures interact with speech during communication, researchers have investigated the neural correlates underlying gesture processing, primarily in adults, considering iconic gesture processing (e.g., Green et al., 2009; Holle et al., 2008; Willems et al., 2009). The present study adds to this neuroimaging literature, by investigating how gesture comprehension and use develops over time. We compared how children in three age groups and adults process both iconic and metaphoric gesture, extending recent developmental findings of Dick and colleagues (2011). In a functional Magnetic Resonance Imaging (fMRI) session, children (5.0-6.0, 7.5-8.5, and 10.0-11.0 year-olds) and adults watched movies in which a female (1) spoke a sentence (2) spoke a sentence with a corresponding gesture (3) performed a gesture. Sentence content was iconic (e.g., 'Bugs ran up his arm') or metaphoric (e.g., 'Chills ran up his arm'), and gestures were kept consistent across sentence pairs (iconic and metaphoric sentences were presented in separate blocks). Additionally, we assessed sentence comprehension, and natural gesture production for each age group. Behaviorally, we found that all age groups understood iconic sentences, but there was a developmental progression in understanding metaphor. Our neuroimaging results demonstrated differences in the patterns of activation among age groups in the processing of iconic and metaphoric gesture in regions thought to be sensitive to the semantic contribution of gesture during co-speech gesture communication (e.g., posterior middle temporal gyrus (pMTG), posterior superior

temporal cortex (pSTS/STG), inferior frontal gyrus (IFG)). Additionally, we found developmental changes in the activation pattern of motor planning areas. Taken together, we believe these results suggest that gesture processing changes across development based on advances in semantic understanding, multisensory integration systems, and changes in gesture production.

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Gesture Prosody

Eva Elisabeth Wehling, *UC, Berkeley*

July 25, 11.30

Research shows that pragmatic gestures often rely on the same embodied concepts that structure thought and language (McNeil 1992; Müller 2004). Pragmatic gestures that serve to control discourse events have been noted (Kendon 1995), and they are typically divided into gestures that emphasize communicative cooperation and inclusion (Bavelas et al. 1992; Kendon 1995; Müller 2004) and gestures that function to gain and maintain control in a discourse (Wehling 2010). In this study, the data analysis of roughly 45 minutes of publicly available audiovisual recordings of argumentative dialogue shows that interlocutors engage in prosodic mechanisms when gesturing: to embody different degrees of illocutionary force (Searle 1969) in bimodal speech acts (Wehling 2011), interlocutors gesture within different degrees of speed and range, and engage different numbers of gestural effectors (body parts used to move in a communicative meaningful way). While gestural prosody is usually engaged to function in the same way that speech prosody does - e.g., to increase the force of an illocutionary act in an amicable conversation or an argument -, the close observation of gestural prosody shows: gesture prosody allows communicators to embody the force of communicative acts in scalar differences of physical force. I.e., the prosodic nature of gestures is not only clearly grounded in spatial and force-dynamic reasoning about communicative forces (Talmy 1981; Sweetser 1990), it also directly employs bodily force to signal communicative force, in synch with linguistic exemplifications of the conceptual metaphors COMMUNICATIVE FORCE AS PHYSICAL FORCE and COMMUNICATION AS FORCE EXCHANGE (Grady 1997).

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Teacher gestures in foreign language vocabulary acquisition: a close look at interpersonal and intrapersonal use

Gerlinde Weimer-Stuckmann, *University of Waterloo*

July 24, 14.00

Vocabulary mastery is at the core of successful foreign language acquisition. Recent research has provided compelling neural evidence beyond anecdotal testimony that the use of gestures contributes significantly to vocabulary retention and retrieval (Macedonia, Müller, & Friederici, 2011; Macedonia & Knösche, 2011). However, while instructors may know of the benefits of enactment, there seems to be a gap between what teachers know, what they believe and what they do in class; a state Phipps and Borg (2009) term "the tension between beliefs and practices". This presentation reports on a pilot study on teacher gestures used to promote vocabulary acquisition in a foreign language class. Based on teacher observations, a concept mind assignment, an interview session, and a stimulated recall session, this pilot study explored the interpersonal and intrapersonal use of teacher gestures with regard to lexical processing. The findings suggest that while teachers indeed used gestures extensively in class, a close analysis based on Schegloff's conversation analysis revealed that teachers employed gestures significantly

more often when talking in a language that was a foreign language to them, whereas when talking in the target language of the language class, a native language to them; they used gestures less frequently. This indicated that intrapersonal gesture use to structure communicative acts dominated and gestures targeted to aid recipients' comprehension and acquisition of the target language were not primarily the focus of gesture use. This presentation concludes with proposals how gestures and enactment must be made the result of a self-reflection process and consciously planned interaction in the foreign language class in order to counterbalance gestures' intuitive intrapersonal use thus then turning them into an interpersonal teaching tool.

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Metaphoricity and gesture as interbodily and distributed phenomena in therapy sessions

Thomas Wiben Jensen, *University of Southern Denmark*

July 26, 13.30

In recent years the field of conceptual metaphor theory (Lakoff 1993) has been challenged by a more applied linguistic approach investigating metaphor as social and situated in actual language use (Zanotto et al 2008). This development has resulted in new interesting findings about the dual socio-cognitive nature of metaphor. In this talk I will address this new development within metaphor theory and relate it to the ongoing research on gesture and metaphor as a dynamic embodied activity (Cienki and Müller 2008). Furthermore I will attempt to integrate and reframe the relationship between metaphor and gesture within the new view on language and cognition as distributional phenomena as proposed by theories of distributed language and cognition (Cowley 2011) and thus proposing a new direction in the understanding and investigation of metaphor and gesture in interaction. New tendencies within metaphor research challenge the idea of metaphors as solely cognitive phenomena residing within individual speakers; instead metaphors can be investigated as clusters of lexical items distributed across stretches of talk and among different speakers (Cameron 2007). Through a detailed analysis of video recorded examples I will demonstrate how these notions can be reframed and taken a step further by investigating the metaphorical example as embedded in interbodily dynamics of gesture and other movements between a couple interacting in couple therapy. The analysis shows how gestural movements, gaze, facial expressions and voice contribute to the development of a metaphorical expression as a joint accomplishment originating between them. This point to new ways of investigating metaphors and gesture in human interaction as an interbodily distributed phenomenon constrained by contextual, cultural, emotional as well as cognitive structures.

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Constructing and Coordinating Representations in Multiple Gesture Spaces

Robert F. Williams[1] & Simon Harrison [2]

(1) Lawrence University; (2) RWTH Aachen University

July 26, 10.30

Gesture space is described as a "shallow disk" (McNeill 1992) or "quarter-sphere" (Sweetser & Sizemore 2006) in front of the speaker's body where communicative hand movements that accompany speech are produced. Goodwin (2007) points out that many gestures are "environmentally coupled," gaining meaning from their relations to objects on and over which they are articulated. In Haviland (2000), the speaker directs his gestures toward virtual objects in a narrated space as well as real objects in the material surround. These and other studies have begun to illuminate the variety of factors that affect where and how gestures are performed. In the data we're analyzing, the speaker, a lifeguard on a beach in southwestern France, produces gestures in four different spaces as he explains how to determine compass direction from a wristwatch and the sun. The speaker gestures over a diagram he has drawn in the sand; he gestures in relation to the surrounding horizon; he gestures on top of a wristwatch he is wearing; and he gestures briefly in the space in front of his body, the only time he depicts the watch face vertically. These spaces differ in scale as well as location and orientation: one is defined by the inscription in the sand; one by the geographic space inhabited by the interlocutors; one by the face of a mass-produced object; and one (conventionally) by the speaker's body. How are these different movements, spaces, and scales unified? Our answer comes from the perspective of distributed cognition supported by cognitive linguistic theories of meaning construction. We show how the speaker constructs and coordinates representations in multiple spaces using gestures shaped simultaneously by the structure of the functional system he is describing and by the communicative goal of guiding the listener's conceptualization toward an understanding of that system.

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Pointing as a story-entry device

Eiko Yasui, *Nagoya University*

July 25, 10.30

Drawing on a micro-analytic perspective, this study investigates a pointing gesture employed before the start of a spontaneous story during naturally-occurring conversations. Specifically, I focus on pointing directed toward a previous or ongoing speaker. Jefferson (1978) demonstrates that stories emerge through turn-by-turn talk and are often 'triggered' by an ongoing conversation. Sacks (1974, 1992) discusses that the start of storytelling is often indicated in advance since a story often takes more than one sentence to complete. There are thus two separate steps that can be involved before a spontaneous story starts in conversation: (1) a backward-looking step during which a link back to what was previously talked about is indicated, and (2) a forward-looking step in which an incipient speaker projects that s/he has something to talk about and draws others' attention to secure a turn-space. In this study, I examine how a pointing gesture is employed during these two steps during story entry. The data demonstrates that a pointing gesture directed toward a previous or ongoing speaker before story entry has additional roles besides its basic deictic function. It is often observed that storytellers try to insert a story into an ongoing stream of interaction instead of trying to initiate a story in a gap in talk. Therefore, they have to deal with the problem of stopping the talk to create a space for the story. Through pointing, storytellers can claim a turn while others are still talking (as is discussed by Mondada (2007)) and project talk in relation to the prior speech, and thus attempt to gain their joint attention to her proposed utterance. This study thus aims to expand the typology of interactional functions of pointing by exploring how body along with talk functions to secure the floor for storytelling during conversation.

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Musical Visual Vernacular: a developing semiological space

Anna Ambra Zaghetto, *University of Milano Bicocca*

July 24, 14.00

Musical Visual Vernacular (VVm) is a new expression style developed amog italian deaf people from 2008. VVm represents a new way of sign articulation related to the perception of the sound vibrations. Till now, only two VVm examples are known, and these are two italian works-art. The analysis of VVm performances (video-recording) clarifies the evolution of this style and his structure and organization. Data, collected between 2010 and 2011, show that VVm performances are based on the correlation of two different semantic dominions: on the one hand, the linguistic dominion (sign language), and, on the other hand, the music/sound dominion. The result is highly iconic and it can be defined as a sequence of images (based on the linguistic system) equally undertsndable by deaf or hearing audience. In this perspective linguistic and music signs are combined to create a new semiological space in which new meanings crop out from a common ground layer.

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Mimetic schemas and children's gestures

Jordan Zlatev & Mats Andrén, *Lund University, Sweden*

July 26, 13.30

Mimetic schemas have been defined as "dynamic, concrete and preverbal representations, involving the body image, accessible to consciousness and pre-reflectively shared in a community" (Zlatev 2005: 334), or alternatively as "fairly specific, cross-modal, consciously accessible representations based on imitation, and largely shared within a (sub)culture" (Zlatev 2007: 131). Together these properties constitute the necessary ingredients for a pre-linguistic semiotic system for communication, and a possible ground for children's gestures. To test this hypothesis, we conducted an empirical study of the early gestures of three Swedish and three Thai children, based on longitudinal naturalistic data, focusing on the ages 18, 22, and 26 months. The analysis showed that not only emblematic gestures such as NOD-HEAD and WAVE-BYE, and deictic gestures as INDEXFINGER-POINT constitute socially shared types, realized by recurrent instances in the children's data, but also that the children's iconic gestures to a large extent do likewise. It is such iconic gestures, especially when performed from a "character viewpoint" (McNeill 1992), or "first-person perspective" (Zlatev and Andrén 2009) that most clearly correspond to overt, communicatively used mimetic schemas. We also found that iconic gestures are less likely to be coordinated with spoken utterances, than deictic and conventionalized gestures, which stands in contrast to the widespread idea that "co-speech gesture" is mainly a matter of iconic gesture (at least in adults). We discuss the implications of the findings of the study, including the need to qualify the concept of mimetic schemas as previously characterized.

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Posters

Sign language for human-robot interaction

Siham Al-Rikabi & Verena Hafner, *Humboldt-Universität zu Berlin*

In everyday life and in particular in critical situations, deaf people face communication problems with hearing people. A hearing companion who knows sign language would be useful in these situations, even if it was just a humanoid robot. This robot would be able to communicate with you and others by using sign language (SL) and also by other means. We will show how a humanoid robot can interact with humans by using sign language. That can be done through experiments such as translating from natural language to sign language, learning, recognising, and understanding sign language. Up to now, we have shown that the humanoid robot could perform signs from translating an entry text, even within the current limitations of robot movement on our humanoid robot Nao [1]. We are currently working on recognising sign language gestures from video frames by using SIFT features [2,3,4] in order to realise a conversation between a robot and deaf people. Sign language vocabularies consist of well-defined gestures and have been classified in visual dictionaries [5,6]. The processing of those gestures seems to be almost easy at first, but if you go further, you will see that also in sign language, the context of the sentence needs to be taken into account as well as facial and emotional expressions. During our experiments, we figured out that we are in need for new and variant kinds of classification in order to process sign language, such as which gestures are in need for facial expression. We therefore have done classifications based on a SL dictionary [1]. This work highlights the challenges of human robot interaction by using sign language during the processing phases from different aspects to guide and help researchers in HRI and gesture studies.

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How metaphoric is it? The effect of gesture prohibition on interpreting metaphoric expressions

Paraskevi Argyriou & Sotaro Kita, *University of Birmingham, UK*

Previous research with right-handed participants has shown that the right-hand over left-hand preference for gesturing is significantly weaker while interpreting metaphoric expressions compared to non-metaphoric ones (Kita, de Condappa & Mohr, 2007). These findings have been explained in terms of differential hemispheric specialization for various linguistic processes – and in particular the privileged role that the right hemisphere has in the processing of figurative language – which might determine hand choice for co-speech gestures. To further expand this, we investigated the reverse causal relation in a gesture prohibition experiment. We explored whether gesturing with a particular hand determines metaphoric interpretations. To this end, we rated the "metaphoricity" of the explanations that 33 healthy right-handed participants gave in two gesture prohibition conditions (right hand vs. left hand prohibition), on the assumption that left hand gesturing enhances the "metaphoricity" of the speech output. The preliminary results show that participants produced more metaphoric explanations in the right hand prohibition condition – when their left hand was free for gesturing – compared to the left hand prohibition. Furthermore, when participants had their left hand free and did choose to gesture with it, their explanations were significantly more metaphoric compared to the ones they produced when they did not gesture with their left hand by choice. The findings suggest that gestures have self-oriented functions. More specifically, we propose that gesturing with a particular hand activates processes in the contralateral hemisphere such that left hand gestures relate to metaphoric interpretation, a specialized right hemisphere function.

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The Writing Hand – A Japanese Gesture Family

Paul Cibulka, *University of Gothenburg*

Gesture families which are limited to a particular geographical area, such as the grappolo in Southern Italy, have to some extent been studied by Kendon (2004). Contributing to this, the present study deals with a gesture family used among speakers of Japanese. It consists of a hand movement which mimics writing out individual strokes of Japanese characters, either in midair, on an object such as a table or on the palm of the passive hand. I call this gesture family W(riting)-family. Given its peculiarity in its usage and its geographical limitation it is surprising that no study with an interactional approach has been undertaken so far (see however Sasaki (1984)β and Matsuo et al. (2003)β for a cognitive approach) At first glance the W-family appears to be solely iconic, such as mimicking the act of someone writing (Kendon, 2004, p. 189)β.

However, close examination of natural Japanese conversation reveals that it is highly conventionalised as a pragmatic gesture. It not only (1) topicalises tokens as being related to writing and thus contextualising them, but it also (2) conveys the participants' interactional endeavour towards achieving intersubjectivity in how a specific expression or name is to be written. Furthermore, though its primary semantic theme being "writing", the spectrum of the W-family goes beyond that. It is also employed in order to (3) indicate that a token is to be read as technical terminology which not widely understood and thus unknown to the other participant(s). These interactional functions are yet to be investigated. As for other gesture families, gesture variants of the W-family are not created anew every time, but constitute shared knowledge of the speakers and used consistently. This study aims to shed light on their usage through a systematic analysis which combines context analytical as well as conversation analytical methodology.

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The Efficacy of Using Gestures Versus Objects in Improving Children's Understanding of Linear Measurement

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In order to master linear measurement, children must understand that the empty space between two lines on the ruler is the "unit" of measurement. We explore the relative benefits of using objects versus representational movements as spatial tools to highlight the unit space for young learners of linear measurement. We predict that using gesture might be as helpful or even more helpful than using discrete unit chips for improving children's understanding of ruler units. First and second grade children participated in a training study consisting of pre- and post-test assessments of their understanding of ruler measurement and a one-week follow-up assessment. There were four training conditions: (1) using unit chips placed on a ruler to measure objects that are aligned at the start point of a ruler, (2) using unit chips to measure objects shifted away from the start point, (3) using a gesture (thumb and forefinger) on a ruler to measure aligned objects (4) using a gesture to measure objects shifted away from the start point. At pre-test, the majority of children who made errors did so by counting hash marks rather than spatial units. For these children, preliminary results indicate that both gesture and unit chips resulted in improved performance on immediate post-test, but only when training involved measuring shifted objects. By the far post-test, one-week later, children in both of the gesture training conditions (aligned and shifted) performed better than those in the equivalent aligned and shifted unit chip conditions, reflecting the continued improvement over time of children in the gesture conditions. Our findings suggest that there may be benefits of gestured units over concrete object units in enhancing children's understanding of ruler measurement, and that this benefit is most apparent one week after initial training.

Investigating the dual function of co-speech gestures in blind and visually impaired speakers.

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Co-speech gesture research explores the role of gesture in communication, i.e. whether gestures are intended for the listener/audience (e.g. Mol et al. 2009; Alibali et al., 2001; Holler & Beattie, 2003) or support the process of speech production (Kita & Davies, 2009; Hostetter et al. 2007). To investigate the role of gesture in communication we turn to blind and visually impaired speakers whose opportunities to learn gestures visually are severely limited (cf. Iverson & Goldin-Meadow 1998; 2001). The present study aims at providing insight into the nature and occurrence of co-speech gestures in spontaneous speech and dialogs: between blind, severely visually impaired and sighted individuals. Participants were asked to read a short story (either in print or in Braille) and to re-tell it to the interviewer. Care was taken to establish an environment in which the participants would feel safe and would not refrain from gesturing for fear of hurting themselves or others. We predicted that if blind speakers did not gesture as much as their visually impaired peers it would suggest that gesture is to some extent acquired through visual instruction. However, following Iverson et al. (2000) and Iverson and Goldin-Meadow (1998) we hypothesized that despite the absence of visual gestural stimuli during the language-learning process gesture is present in the language of the blind participants - but there would be differences in gesture form, types and functions. The present study aims at exploring and categorizing these differences, particularly with regard to how sensory references are visible in the gestures of participants with various degrees of sight impairment. Regardless of dissimilarities, the presence of gesture in both the blind and impaired individuals points towards a dual function of co-speech gestures, namely a device for both the speaker and their interlocutor.

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Gesturer diarisation for speaker diarisation

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The gesturer is the speaker. Despite differences in the interpretation of the relationship between gesture and speech, the literature supports that there is a striking observed timing relationship between speech and gesture. One leading hypothesis proposes that gesture and speech together form an integrated communication system for the single purpose of linguistic expression. Gesture is linked to the structure, meaning, and timing of spoken language (Kendon 1980; McNeill 1985, 1996). We also observe that while a speaker may not be gesturing for the whole duration of the speech, a gesturer is usually speaking. This observation has an important implication to technologists. The implication is that the gesturer is the speaker and that identifying the gesturer can for practical reasons be taken as identifying the speaker. We propose that this conclusion has an important application in speaker diarisation, the problem of finding using machines "who spoke when?", which we claim, can now also be answered by solving "who gestured when?". Furthermore, we claim that "who gestured when?" can be answered by "which pixels moved when". Gesturers occupy different spatial points in the video. In the parts of the video where there are distinguishable pixel movements are the potential places for gesture occurrence. Significant pixel movements can be associated with a particular region and this region is generally the same region occupied by the speaker and not by the listeners. Using this idea, our preliminary experiments have shown encouraging results for annotation scenarios where: a) speakers do not unpredictably change their locations from one frame to the next and b) the audio quality is so noisy that speaker diarisation based only on audio is unreliable. We plan to do further research to exploit the gesture-speech synchrony to facilitate automatic annotation of multi-media documents.

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Audiovisual prosodic marking of information status in Chinese learners of English

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Generally, the information status of discourse referents is not only signalled by the degree of prosodic prominence in the words but also by speech-accompanying gestures, e.g., the first mention of a referent is spoken with a wider pitch range and longer duration than the second mention of the same referent (Arnold, 2008), and a new referent is usually produced with a gesture. L2 learners sometimes fail to vary intonation in reference maintenance and gesture over-explicitly for the maintained reference (Chen, 2010; Gullberg, 2006). However, limited work has been done examining how L2 learners' use both intonation and gesture when making reference. The study investigates how Chinese learners of English encode information status audio-visually. A video retelling task was used to elicit from speakers' noun phrases referring to (i) new referents, which are the 1st mentions of referents; (ii) given referents, which are the subsequent mentions of referents; and (iii) accessible referents, which are inferable from the discourse context. Chinese learners of English were asked to retell a video to the addressees in Chinese and English. Comparisons among newness, accessibility, and givenness in acoustics and gesture were made. Initial analysis showed that givenness led to attenuation in word duration and gesture in both Chinese and L2 English compared with that of newness and accessibility. Accessibility was accompanied by a gesture in L1 and L2 but it did not lead to a prosodic reduction in L2 English learners. Interestingly, there seems to be some correlations between acoustic prominence and gesture, e.g., an accented referent (full NP) was often produced with a gesture. Furthermore, when the referent was under contrastiveness or in focused, it could be marked by both intonation and gesture regardless of being a given referent. The results will be discussed in light of language transfer and speakers' adaptation to addressees.

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Embodiment, event type and gestures in German descriptions of motion events

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This study investigates what influences hand shape variation and the choice of viewpoint in co-speech gestures in descriptions of motion events from the perspective of embodiment (i.e., the degree to which an event can be mapped onto the body) and Hotstetter & Alibali's (2008) framework of Gestures as Simulated Action (GSA). McNeill (1992) suggested that transitivity of the accompanying speech is the main factor influencing viewpoint in co-speech gesture. Parrill (2010), however, showed that embodiment plays an important role in the choice for viewpoint. So far, American English is the only language that has been investigated with regard to the topic of gesture viewpoint. Furthermore, the influence of embodiment on hand shape variation (e.g., less variation if the event can more easily be embodied) has not been taken into consideration. We conducted a cartoon-retell task with 18 native speakers of German and coded the speech on motion events for transitivity and the accompanying gestures for viewpoint (character (CVPT); observer (OVPT); dual (DVPT); and No VPT) and form of the hand (using ASL hand shapes). Results show that, as is true for English and in line with the GSA, events that are more easily mapped onto the body are accompanied mostly by CVPT gestures. Furthermore, with the present study's speakers these gestures show less variation in hand shape than events that are difficult to embody. This is probably caused by the fact that such gestures are generally enactments (Müller, 1998) of what a character did, which leaves little room for variation. We conclude that embodiment plays an important role in determining gesture viewpoint and hand shape in co-speech gesture production and tentatively add that this may be a better explanation for the results of previous research and the present study than is transitivity of the accompanying speech.

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Gesture facilitates the syntactic analysis of speech

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Gestures are a pervasive phenomenon of human communication and there is good evidence that these gestures convey additional information not found in speech, but it is unclear whether gestures and speech interact at the level of phonology, semantics or syntax. To date, the best evidence (derived from iconic gestures) suggests an interaction at the semantic level. We designed an EEG experiment to test whether beat gestures interact with the syntactic aspect of language. Stimuli consisted of German sentences that were temporarily ambiguous with respect to their syntactic structure (either Subject-Object-Verb SOV or OSV). German speakers have a preference for SOV, and a disambiguation towards the less preferred OSV structure elicits increased processing costs, including an increased P600 component in the Event Related Potential. In Experiment 1, we explored whether beat gestures can help to disambiguate syntactically ambiguous sentences, by presenting sentences either without a beat gesture, with a beat on the first (NP1) or with a beat on the second (NP2) ambiguous noun phrase. We found that a beat on NP2 abolishes the P600 effect usually found for OSV structures, suggesting that OSV structures become more plausible when the beat highlights the subject of a sentence. The effect appears to be gesture-specific and was not found for other stimuli that draw attention to certain parts of speech, including prosodic emphasis, or a moving visual stimulus with the same trajectory as the gesture. This suggests that only visual emphasis produced with a communicative intention in mind (that is, beat gestures) influences language comprehension, but not a simple visual movement lacking such an intention.

The modification of gesture parameters in bilinguals

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The control mechanisms at play when bilinguals speak in one of their two language (inhibition of the unintended language, Green, 1998 vs selection of the intended language, Costa, Santesteban, & Ivanova, 2006) is currently under debate. In this research, we investigate bilingual communication through gestures. In particular, we focus on which aspects of the language not used are incorporated in the language being spoken, i.e. which aspects are "transferred" from a language to another. Though transfer in spoken languages has been studied extensively (see for example Grosjean, 2001; Costa et al. 2007), transfer in gesture is understudied (Gullber, de Bot, & Volterra, 2008). Most of the studies in gesture bilingualism have a focus on gesture frequency (e.g.,Nicoladis, Pika, Yin & Marentette, 2007), while the representational contents of gesture (Brown & Gullberg, 2008) and the gestural space are understudied. In this research the focus is on gestural space and

hand shapes. Bilinguals are asked to repeat twice (in Italian and English) a social dilemma task and the Tomato man task (Özyürek, Kita, & Allen, 2001). Italian and English "monolingual" speakers are asked to perform the task twice as control groups. In the first task we focus on participants' gestural space and the absence/presence of emblems. In the second task we focus on the modification of manner and path gestures, gestural space and hand shapes. Our goal is testing whether gestural parameters belonging to the two cultures are suppressed or not when speaking in the other language. In a pilot study with three bilingual participants we found a modification in manner and path, gestural space and hand shapes when they switched from a language to another. This confirm that 1) there is a selection of the intended language 2) this selection happens at the conceptual level (La Heij, 2005).

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Individual Differences in Gesture Production: Variability within and Stability across Tasks

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Abstract Despite the fact that wide individual differences (e.g., in frequency, speed, type, use of the gesture space) in gesture production are readily observable in the naturalistic environment, little or no research has specifically addressed the extent and consistency of these differences across contexts. The current study was designed to evaluate the nature and degree of individual variability in gesture production, to assess the extent to which individuals' gesture production is consistent across tasks, and to evaluate any relationship between individual differences in gesture production and participants' personal and cognitive characteristics. One hundred women aged 18 to 30 were administered a battery of gesture production tasks taken from the gesture literature in which they were asked to describe a cartoon they had watched, a story they had read, a static image, an everyday motor activity, and a controversial and generally abstract topic (e.g., Bavelas, Gerwing, Sutton and Prevost, 2008; Feyereisen and Havard, 1999; Hostetter and Alibali, 2007; Hostetter and Hopkins, 2002). Videotapes of their descriptions were analyzed and coded for speech, occurrence, type, spatial extent, speed, and handedness of gesture production. Within individuals results of task comparisons were generally consistent with the literature using group comparisons (viz., describing motor tasks evoked the most gesture, followed in descending order by describing dynamic visual material, static visual material and abstract concepts). Importantly, however, results also indicated surprising stability in individual differences between individuals. Frequency and type of gesture production remained broadly consistent across tasks (e.g., over context, high gesturers tended to remain high gesturers; low gesturers to remain low gesturers); and gesture style characteristics were related to both personality and cognitive variables. Findings are discussed in terms of the nature of individual differences in gesture production, and their implications for gesture research.

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Revisiting the role of iconicity in sign language acquisition: The early depictive gestures and pretense in toddlers

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In many signed languages analyzed there are constructions that appear to incorporate iconic components, such as, 'polycomponential verbs' (Schembri, 2003), 'perspective shift' (Morgan, 2002), and 'constructed action' (Metzger, 1995). These constructions comprise an abridged list of 'depictive utterances' or 'depiction,' which are considered to be a type of iconic structures (Dudis, 2004). Research has found a weak or nonexistent effect of iconicity in adult language processing (c.f. Bosworth & Emmorey, 2010) and in child sign language acquisition (e.g. Anderson & Reilly, 2002). However, distinctions exist between iconic words (e.g. TREE in American Sign Language) and depictive utterances. Even though we can deliberate the iconicity of TREE, its highly entrenched form may restrict the role of iconicity in the online processing

of words akin to TREE. In contrast, depiction has been analyzed to be comprised of underspecified forms (Liddell, 2003) that allow for the iconic representation of events, settings, or entities in ways that do not conform to classic linguistic definitions of morphemes or words. This opens up the possibility of this form of iconicity as having a larger role in language acquisition. This study investigates what fundamental properties of depictive utterances are shared with pretense play. While there are considerable differences between adult production of depictive utterances and pretense, the shared similarities increase as we look at younger children (e.g. a toddler symbolically using a brush to represent a phone and pretending to converse through the "phone" is quite similar to the same toddler using a specific handshape to represent a phone and depicting a conversation.) Understanding how children come to use depiction in everyday discourse allows for better understanding of the role of depiction in language and its acquisition. This presents a beginning of a clearer understanding of whether depiction in ASL has shared ontogenetic origins with pretend play.

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Automated gesture annotation using video analysis

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Annotation of multimodal resources is of key importance in gesture research. However, creation of such annotations is a very laborious task, easily taking 100 times the length of the annotated media, or more. For this reason innovative audio and video processing algorithms are needed in order to improve the efficiency and quality of the annotation process. This is the aim of the AVATecH project (Lenkiewicz et al 2011), which is a collaboration of the Max-Planck Institute for Psycholinguistics and the Fraunhofer institutes HHI and IAIS. A first range of audio and video processing algorithms have been developed: skin color estimation and hands/head tracking. The former one is able to detect color ranges representing human skin in given recording and the latter uses this information to trace the position of hands and head in every frame of the video. This is later used to detected gesturing action and automatically create appropriate annotations. The algorithms are being developed with the aim of performing well on recordings of any language and in different acoustic and light conditions, all with very limited user interaction. We use a highly modular structure so that elementary functionality can be re-used as building blocks, and future algorithms can be easily integrated into the current framework, using as input the results provided by the previous detectors. We have performed tests in which the same recordings were analyzed by our algorithms and by researchers of the MPI, who have created manual annotation of the same kind. The automated annotations were then corrected by a researcher to make them correspond to the needs of researchers. In our experiments the time that the automated annotation took equals on the average 0.55 of the time spent on manual annotation, which translates to a significant improvement of the researcher's efficiency.

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Beat it!: The Use of Beat Gestures in Learning to Perceive Japanese Vowel Length Distinctions

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To non-Japanese speakers, two similar-sounding Japanese words with only a vowel length difference (e.g. 'rika' meaning 'science' and 'rikaa' meaning 'liquor') are difficult to distinguish. The present study explores whether hand gestures, an important pedagogical tool tightly linked to speech (Kelly et al., 2008), will aid in learning to distinguish these novel sounds. As instruction, we will employ two kinds of beat gestures ('syllable' and 'mora') that visually segment Japanese long and short vowels in different ways. Participants will either just observe or actually produce the gestures during training. Forty native English-speakers will participate in a 5-day study, in which they will take a pre-test of vowel length identification (day 1) and then be assigned to one of four training conditions (days 2 and 3): Mora Observe, Mora Produce, Syllable Observe, and Syllable Produce. Following training, participants will be given an ERP auditory task (measuring the LPC, an index of strength of memory encoding) and a vocabulary test (day 4). Finally, they will take a post-test of vowel length identification (day 5). Although Syllable training is more intuitive to native English speakers, we predict greater improvement from the Mora condition because research suggests

that 'mismatching gestures' aid the development of new strategies for learning (Goldin-Meadow, 2003). We also predict that the Produce condition will be more effective than the Observe condition based on theories of embodied cognition (Hostetter & Alibali, 2008). We expect these differences to manifest across our three different dependent measures: improvement on the auditory identification task, more words recalled on the vocabulary test, and a larger LPC over parietal sites. These results would suggest that gestures facilitate language acquisition on both higher (i.e. semantic) and lower (i.e. phonetic) linguistic levels, providing empirical support for future innovations in foreign language education.

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Iconicity Facilitates Word Learning in Preschoolers

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Symbols in sign languages are arbitrary or iconic, where iconic signs depict their referents' characteristics. While hearing adults retain iconic signs better than arbitrary signs (Beykirch, et al., 1990), children acquire both around the same time (Acredolo & Goodwyn, 1988), suggesting that iconic symbols are not inherently easier for children to learn. Yet, preschoolers match iconic signs with familiar referents, identifying signs that describe function better than shape (Tolar, et al., 2008). The current study tests three hypotheses: 1.) recognizing iconic signs depicting shape improves with age, 2.) iconic signs are better mapped to familiar rather than unfamiliar objects, and 3.) those who successfully map iconic signs will use iconicity to remember new signs. In a between-subjects design, Experiment 1 assessed children's ability to recognize iconicity by showing 86 hearing preschoolers (Mage=4.18y, range=3.1-5.6y) a pair of familiar or unfamiliar objects and either an arbitrary sign or an iconic sign that represented one object's shape. Supporting our first hypothesis, 4- and 5-year-olds identified iconic signs' referents significantly above chance ($p<.001$), whereas 3-year-olds performed at chance ($p>.05$). Object familiarity had no effect. In Experiment 2, the experimenter taught 80 children (Mage=4.30y, range=3.1-5.6y) four iconic and four arbitrary signs for unfamiliar objects to assess whether iconicity supports children's retention. Older children remembered more targets than did younger children ($p<.001$). Both remembered more iconic than arbitrary signs ($p=.013$). Thus, iconicity conferred an advantage even for children who had difficulty recognizing iconicity in Experiment 1. Perhaps a one-time presentation of an iconic sign is insufficient for young children to map the sign to its referent. However in a word-learning task with multiple sign presentations, the iconic alignment between sign and referent is adequately highlighted to confer some advantage for 3-year-olds. Older preschoolers' enhanced analogical reasoning abilities may support their iconic sign-referent mapping with fewer repetitions.

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On the relationship between right handed pointing and language development

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Time

Research has shown a link between babbling onset in infancy and right handing shaking of toys (Locke et al, 1995). The current study intends to further previous research by investigating the links between very early language development and communicative gestures (i.e. pointing) rather than handling of objects. In the current study children were given a pointing task to assess right hand bias in pointing and a handling task to assess their overall right hand bias. Additionally a parent completed the Oxford Communicative Development Inventory (CDI) (Hamilton, Plunkett & Schafer, 2000). Preliminary results from 12 infants aged 10-12 months (M=335.8 days, SD= 28.06) revealed a strong positive correlation between infants' right handed bias during pointing and the number of words they understood (Spearman's R=.681, p=.015). This relationship appeared to be specific to communicative actions, as there was no correlation between infants' right handed biases during pointing and handling of objects (R=.239). Further, this relationship was not mediated by age as the infants' (in days) did not correlate with infants' right handed bias during pointing (R=-.283) or with the number of words infants understood (R=-.091). This suggests that the relationship between understanding words and right pointing bias is not an effect of general maturation. Finally, it does not appear that the relationship can be attributed to temporary activation of the left hemisphere during the experiment due to frequent vocalisations as the number of vocalisations an infant made with did not correlate with how many words infants understood (R=.067), or infants' right handed bias during pointing (R=-.154). The key finding is that handedness of pointing gestures co-varies with language development. These results suggest that the hemispheric specialisation for language and communicative gestures develop together at the very onset of language development.

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The role of action versus gesture in teaching mathematical equivalence

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Third grade children in the US struggle when asked to solve mathematical equivalence problems in an unfamiliar format, such as 3+5+7 = __ + 7. Previous research has shown that children improve on these problems when given instruction containing one strategy in speech and another strategy, simultaneously produced, in gesture (Singer & Goldin-Meadow, 2005). However, it is unclear whether the beneficial effects of gesture stem from its base in action (which grounds abstract mathematical concepts in a concrete physical form), or from the abstract structure instantiated in the gesture's movements. To investigate these possibilities, we taught children mathematical equivalence using one of four teaching strategies that fall along an action-gesture continuum. Children are taught a grouping strategy through (1) a physical action (i.e., moving number tiles placed over written numbers), (2) a concrete gesture intended to mimic the hand-movements of that action, (3) an abstract gesture instantiating the grouping principle, or (4) no movement at all. Learning is assessed through an immediate posttest, generalization problems, and a follow-up assessment four weeks later (none of the children produced any problems correct on the pretest). If children learn best from instruction that teaches concepts in the most concrete form, then we would expect children in the action condition to improve the most after instruction. However, interacting with physical objects might distract and confuse children, in which case we might expect the gesture conditions, which provide a physical instantiation of the mathematical concept without the distraction of irrelevant manipulatives, to be the best model for learning. Pilot data support this second hypothesis. Children in the gesture conditions improve more at posttest, and are able to generalize the concepts better, than children in the action condition, who also show greater improvement than children in the no movement condition.

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On the emergence of 'a public order situation': The case of police dogs and their handlers

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According to the legislation across the Europe, police dogs can be utilized as use-of-force in demanding situations where it is deemed appropriate to use dog for accomplishing given operational purposes or for guaranteeing the safety of a police officer. Defining the criteria for such a situation is not, however, straightforward. The proper behavior and resulting action in the use-of-force continuum may finally be defined in the court of law (Dorriety 2005). On a more mundane level, the same type of judgmental work, now however in situ, is performed by a police dog officer as part of his/her daily work practice. Further, despite the hours of training with and without a dog, a police officer may find him/herself in a force application situation where the dog is not responding as predicted. In fact, considerable compensations are paid annually for those accidentally bitten by a police dog. This work-in-progress-study analyses various "situational evolvements" (e.g. in demonstrations and street protests) such as entering a public space, lining up (demonstrators/police dogs/police) and finally the force application from the point of view of police dog work. It is argued that a certain kind of bodily attunement takes place during each evolvement. Special attention is given on how this tuning is corporealized: the length of the dog leash, for example, may indicate the readiness of the handler/dog to take part in arresting a person breaching public order. The analysis is based on recorded events of police dog work with the emphasis on the bodily interaction between police and his/her dog vis-à-vis the emerging public order situation. Empirical findings are reflected through the concepts of co(a)gent (Michael 2004) and bodily choreography (Puumala et al. 2011) as they help to describe and understand the oscillation between learned practices and instant, partly improvised reactions to the situation.

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The use of gestures in language animation study

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In line with embodied accounts of cognition, multiple studies have suggested a link between semantics and the motor system of the human body (e.g. Engelkamp & Zimmer, 1997; Zwaan, Taylor, & de Boer, 2010). In educational settings, little research has been conducted on the use of gestures (i.e. the motor system) in first language acquisition. Regarding math problem solving, however, research has shown that

children, when instructed to gesture, added strategies and remembered more from a subsequent lesson (Broaders, Cook, Mitchell, & Goldin-Meadow, 2007) and that this benefit remains after four weeks (Cook, Mitchell, & Goldin-Meadow, 2008). Moreover, there is little research that has investigated the use of gesturing in the context of learning from instructional animation (De Koning & Tabbers, 2011). In the present study, it is examined whether the use of gestures during animation study helps learning certain grammatical rules. Fifty children (11-12 years old) watched animations in which an active sentence, such as 'Pete is petting the dog' was transformed into a passive sentence ('The dog is being petted by Pete'). For half of the children, a human hand appeared on the screen, moving the words to the right places. These children were instructed to gesture along, as if they were moving the words themselves. The other half of the children did not see the hand and was not instructed to gesture along. They were tested on learning of the grammatical rule immediately and one week after the study phase. It is hypothesized that children in the gesture condition will perform better on both posttests. Data collection is currently being finished. Preliminary results (N = 31) show that children in the gesture condition found the animations more easy to understand. Performance data do not show clear effects yet.

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Sign language based literacy training with Omega-is-d

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Signed languages do not have a written form. Thus, deaf children, for whom sign language is the primary mode of communication, learn to read in a second language. Not surprisingly, the reading skills of deaf children generally lag behind those of their hearing peers. The mechanisms underlying reading in deaf individuals are only just beginning to be unraveled but it seems that language skills play an important role. The assumption underlying the present study is that encouraging deaf children to explore the relationship between signed language and written speech-based language can promote reading skill. We are developing and evaluating a sign language version of Omega-is, a computerized literacy training program that trains language abilities. Interventions with Omega-is and its forerunners have shown positive effects on reading abilities in children with sensory and cognitive impairments. In the sign language version, known as Omega-is-d, written sentences created by the user are presented in Swedish Sign Language. In a preliminary study, 12 deaf pupils (six in grade 1-2 and six in grade 4-6) at a Swedish state primary school for deaf and hard of hearing children trained language skills using a pilot version of Omega-is-d in a crossover design. Participants in grade 1-2 improved their word-decoding ability as a result of training. Although reading comprehension was below normal, cognitive skills were age appropriate. Better reading comprehension was associated with better word decoding skills, better syntax skills in written Swedish and Swedish Sign Language and better working memory capacity. These preliminary findings suggest that young deaf children with age appropriate cognitive skills can achieve better reading skills with sign based literacy training.

Perceiving bodies in motion: expression intensity, empathy, and experience

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Perceiving bodies in motion: expression intensity, empathy, and experience Vassilis Sevdalis & Peter E. Keller Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany In a series of psychophysical studies, dance was used as a research tool for exploring aspects of action understanding and social cognition. Specifically, expression intensity recognition in point-light displays depicting dancing performances was investigated. In a first session, participants danced with two different expression intensities to music, solo or in dyads. In subsequent sessions, observers watched point-light displays of various durations depicting individuals' recorded actions, and were asked to identify the intended expression intensity (expressive vs. inexpressive) of the performer. The results of the studies indicate that expression intensity could be discerned reliably from displays as short as 200ms. They also reveal a range of factors on which observers base their responses. The accuracy in judgment in the expression intensity recognition task increased with exposure duration and higher expression intensity. Judgment accuracy correlated also with self-report empathy indices, confidence in judgment, and indices of informal music/dance experience. The results and their implications are discussed in relation to perceptual and neural mechanisms underlying action understanding and social cognition, and with relevance to a recent study that applied a similar design for investigating individuals within the autistic spectrum.

ELAN - a multimedia annotation tool for multimodality research, a progress report

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ELAN is a multimedia annotation tool that is being developed by "The Language Archive" (TLA), a department of the Max Planck Institute for Psycholinguistics. It finds application in gesture and sign language research, but also in several areas of linguistics and beyond. The latest developments are highlighted in this paper. Playback of audio and video files is at the core of ELAN and it hooks up to media players of the operating system to ensure support for many media file formats. Up to four videos can be displayed simultaneously in the main window. The data model of ELAN is tier-based; annotations are added to a tier object, which is a kind of a layer and a container for annotations. A transcription can consist of any number of tiers and tiers can be grouped hierarchically. A set of tier-based operations have recently been finalized; annotations from overlap, annotations by merging and annotations by subtraction (together providing the logical AND, OR and XOR operators). These operations create new annotations and provide a way to find and quantify correlations between communicative events. A growing number of functionalities of ELAN have become available as a "multiple file operation"; meaning that a function can be performed in many files as one action. Creation of transcriptions, import and export, tier-based operations, searching, statistics and tier and type editing are already in the expanding list of timesaving multiple file actions. New task oriented working modes were introduced in the last year, each mode optimized for a particular task or set of tasks. The Segmentation mode has been designed for rapid creation of segments (annotations), the Transcription mode for conveniently entering text into existing annotations and the familiar interface to all available functions continues as the Annotation mode. New modes are in preparation.

How hard-of-hearing children learn a signed language? A socio-cultural analysis.

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We described how hearing impaired pupils learned Japanese Sign Language (JSL), the signed language of Deaf people in Japan, in an inclusive setting. The participants are 11 hearing impaired pupils who enrolled in the regular primary school (HH pupils, below). Spoken Japanese was their first language, though imperfect, because of their hearing impairment. A Deaf sign language teacher regularly visited their classrooms, and interacted with them with JSL. We observed their interaction, and analyzed it qualitatively from the socio-cultural point of view. In the earlier phase of encountering, we found 3 types of interaction. The first one was the encounter with speech culture and the culture without voices. The HH pupils usually used spoken Japanese among themselves and with hearing people. They continued to talk to Deaf teacher with speech, they sometimes tried to talk without voice, that is, with silent Japanese. The second type was the conflict between gesture and signed language. HH pupils knew several signed words and often used them with speech. Sometimes they used just gestures. The Deaf teacher tried to understand what HH pupils talked to her through signing and/or gesturing, though sometimes gesturing and signing had different meanings. An example showed that a HH pupil talked to her with one hand, the index finger extending, and the other hand making O shape, meaning 'I have one (air conditioner), but no (fan). The Deaf teacher misunderstood that he meant 'I have ten (air conditioners)', regarding the hand shapes as just gestures. The third type was the use of visual attention. When HH pupils talked to Deaf teacher with signing, sometimes they signed without getting attention from her, so failed in communicating. Finally, we discussed the importance and implications of socio-cultural viewpoints for HH pupils' sign language learning and instruction.

Have I told you this before?: Reduction in magnitude over repetition in co-speech gestures

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Abstract Speech production literature has shown that when words are used repeatedly, the first mention of a word is acoustically longer than subsequent mentions (Anderson & Howarth, 2002; Baker & Bradlow, 2009). This subsequent-mention reduction in speech production appears to be modulated by whether or not the first mention was mentioned to the same listener (Fowler 1988; Galati & Brennan 2010). In this study, we aim to investigate whether co-speech gesture also reduces in magnitude over repetition and, furthermore, if there is an effect of change in listener on the magnitude of co-speech gestures. While studies of reduction in speech production have largely focused on acoustic duration, gesture magnitude was the dependent variable selected for the present study since it can be independently coded; that is, unlike duration, scale is not confounded with issues such as speed of lexical access. Six native speakers of Thai participated in this study. They were asked to describe steps in stretching a pizza dough based on a short video clip. They described the steps to two listeners in the sequence of: listener 1, listener 2, then listener 1 again, with a 10 minute lapse between each telling. This experimental design allows examination of reduction in scale of co-speech gestures within listener and across-listeners, capturing how old/given and new information affect gesture magnitude. The result of this study will contribute to a better understanding of how information is managed multi-modally and extends the typological base of gesture studies to Thai, a language that has not yet been examined in the literature.

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Does the semantic content of the gesture matter? - Effects of meaningful and meaningless gestures on verb retrieval in aphasia.

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It has been shown that within treatment programs targeting verb retrieval in aphasia, the use of hand and arm gestures (alone or combined) can be effective. In various treatment studies iconic gestures, i.e. speech-accompanying gestures depicting concrete objects and/or actions (McNeill, 2005) were used in order to facilitate verb retrieval (e.g. Rodriguez, Raymer, & Rothi, 2006; Rose & Sussmilch, 2008; Boo & Rose, 2011). However, deficits such as limb apraxia or hemiparesis certainly have an impact on the (correct) production of iconic gestures. For instance, in participants with hemiparesis the completion of two-handed gestures, e.g. knitting or clapping possibly influences the iconicity of the gestures. This raises the question, whether the iconicity is a critical variable in facilitating word retrieval. Furthermore, Ravizza (2003) showed that non-iconic gestures can facilitate word retrieval in unimpaired adults, and in a treatment study, Richards, Singletary, Rothi, Koehler, & Crosson (2002) observed that the production of a non-iconic gesture led to improvements in word production in individuals with aphasia. The aim of the present study is to investigate the facilitative effects of meaningful and meaningless gestures on verb naming in adults with aphasia. Moreover, the iconicity of the meaningful gestures produced by the participants during the facilitation trials will be looked at in detail. Results of this study contribute to the questions (1) whether producing a gesture as a cue can improve verb naming in individuals with aphasia and (2) if the variable iconicity of a gesture has an impact on the facilitation of verb retrieval.

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Gestures with or without speech: What do they reveal about the developing gesture-speech system?

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Gestures produced without speech (i.e. pantomime) differ from co-speech gestures in adults (e.g. Goldin-Meadow et al., 1996). When they produce gestures without speech they segment information into its component parts and then combine these parts into sequenced units. There is barely any investigation of a corresponding behavior in typically developing children. Therefore we explored the skills of children to produce gestures without speech and examined how their pantomimic gestures differ from their co-speech gestures. We collected narratives of animated cartoons from seventeen five- and seventeen nine-year-old German children in a verbal condition (speech+gesture) and a pantomime condition (gesture only). Fifty hand gestures from each condition were transcribed for physiological properties (e.g. hand shape, movement). As dependent variable we used the Hamming distance which indicates in how many features two gestures differ from each other and allowed us to assess the degree of formal gestural diversity with and without speech (Hogrefe et al., 2011). Furthermore, we determined in both conditions whether gestures constituted gesture strings or formed single gestures. We found that both age groups produced more diverse gestures and combined more gestures to strings in the pantomime condition. However, the increase of gestural diversity and of the proportion of gestures in strings was significantly higher in the nine-year-olds. This change in gestural characteristics supports the view that children use co-speech gestures differently from gestures without speech. Co-speech gestures are linked to children`s speech production system, both modalities forming an integrated system of meaning expression (McNeill, 1992), whereas gestures without speech transmit the whole information on their own. In comparison with the five-year-olds the nine-year-olds reveal a more pronounced distinction between both kinds of gestures. We assume that this finding is related to a more advanced level of symbolization with age and to a higher symbolic compentence in the nine-year-olds.

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Gesture and Intonation in L2 Narrative Discourse

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Daily human communication is three-fold in modality, i.e., the visual modality (gesticulation), the auditory modality (prosody) and the actual speech (text). The meaning conveyed during communication depends on the dynamic interaction between the three. However, research investigating this dynamism is rather scarce (Loehr, 2004). Although Loehr and other researchers (Kendon, 1983; McClave, 1991; McNeill, et al., 2000) did pore over the alignment between intonation and gesture use, the studies have been universally limited to L1 English. There is no such research conducted on L2 speakers of English, therefore the possible variations between L1 and L2 English performance with all three modalities aligned still remain a mystery, let alone the plausible explanations. My research aims at depicting the interface between intonation and manual gesture in meaning conveyed in L2 English narrative discourse as well as scrutinizing the potential similarities and dissimilarities compared with L1 production, with the following aspects specifically concerned: 1) alignment between gesture and pitch accent; 2) alignment between gesture and phrasing; 3) alignment between gesture and boundary tones. Correlation between gesture and intonational events in meaning expressed, semantically and pragmatically (information status, focus, etc.), is also under investigation.

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