Connecting discourse in speech and gesture

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STUDYING THE PRAGMATIC FUNCTIONS OF SPEAKER GESTURES: HISTORICAL NOTES AND CURRENT UNDERSTANDINGS

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Why, until recently, in modern gesture studies, the pragmatic functions of gestures received relatively little attention with some suggestions for a framework for a contemporary understanding.

COHESION IS HEARD AND SEEN: CROSS-LINGUISTIC DIFFERENCES IN GESTURES REFERRING TO THE SAME ENTITIES IN SUSTAINED DISCOURSE

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For communication to be successful, speakers must refer to entities coherently across discourse, differentiating between referents introduced for the first time, maintained across longer stretches, and reintroduced after a gap (Givón, 1983; Hickmann & Hendriks, 1999). Interestingly, languages differ in the way in which they do this in speech, but, surprisingly, little is still known about the contribution of co-speech gestures. A few studies show that gestures closely mirror the information flow in speech, for instance occurring with new information rather than old (Debreslioska et al. 2013; Gullberg, 2006; Levy & McNeill, 1992; Perniss & Özyürek, 2014). However, it is still unclear what effects discursive strategies in different types of discourse (e.g. narrative vs. instruction) and in different languages may have. Furthermore, much of the previous work has focused on the presence/absence of individual gestures, so it remains largely unknown whether gestures linked to the same entity or event show recurrent gestural properties over the flow of discourse, a phenomenon labelled catchments (McNeill 1992). We present two studies investigating speech-gesture coordination over the flow of sustained discourse, and possible crosslinguistic differences between Italian and Dutch.

In Study 1, we asked 16 Italian and 16 Dutch native speakers to describe to a naïve addressee how to solve two games (the Tower of Hanoi, and Camelot, a game of arranging blocks to create a path for a prince to reach a princess). We analysed all referential expressions coded for 1) information status (first mention, maintenance, and re-introduction); 2) linguistic form (noun, modified noun-phrase, pronoun, zero anaphora); 3) presence/absence of a concomitant gesture; 4) the function of the gesture (representational vs. pragmatic; Kendon 2004). The results suggest that cohesion is achieved in the same way in instructions and narratives: gestures occur more often with new information than with old, and with full forms rather than with pronouns.

Study 2 draws on the same corpus to investigate whether cohesion is achieved in gesture through catchments. For this analysis, we identified all referents mentioned more than once. The gesture analysis focused on strings of gestures related to the same referent. Gestures were coded for 1) handedness (right hand, left hand, both), 2) space (centre, right, left), and 3) handshape (e.g. grappolo, ring, open hand). Preliminary results suggest that there are significant differences both between languages and between tasks. Crosslinguistically, gestures referring to the same entities are more frequently performed with the same hand in Italian than in Dutch, whereas Dutch speakers are more consistent in the use of the handshape and space than Italians. Concerning the task differences, gestures are more frequently performed in the same spatial locus in the description of the Tower of Hanoi than in Camelot.

Overall, the findings show that cohesion in gestures is achieved differently depending on participants' language and on the nature of the task. As such, they indicate a need to expand current models of speech-gesture production (e.g., Kita & Özyürek 2003) to accommodate speech-gesture integration also at a discourse level. Furthermore, the use of space and handshape as a cohesive device suggests that a common mechanism could underpin the achievement of cohesion in co-speech gestures and sign languages (Winston 1991; Engberg-Pedersen 1993).

THE INTERACTION OF GESTURE FREQUENCY AND VIEWPOINT WITH LINGUISTIC MARKERS OFINFORMATION STATUS

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Discourse reference is a bimodal endeavor. Speakers combine referential expressions with precisely timed gestures in order to represent referents during the flow of information in discourse. Depending on the referents' information status (new/less accessible vs. old/more accessible), speakers vary richness, definiteness and grammatical role of spoken referential expressions. In parallel, they vary gesture frequency such that the less accessible the referent is, the richer the spoken expression and the more likely the presence of gestures (Gullberg, 2006; Levy & McNeill, 1992; Marslen-Wilson, Levy, & Tyler, 1982). However, we know less about how gesture viewpoint – the means whereby an entity can be depicted from the perspective of an observer (observer viewpoint) or of a character (character viewpoint) – interacts with linguistic markers of information status. In his scale of gesture progres-

sion, McNeill (1992) proposes that the richness of referential expressions co-varies not only with gesture frequency but also with variation in gesture viewpoint, such that modified (=richer) lexical NPs used for less accessible referents are more likely to occur with character viewpoint gestures than unmodified (=leaner) lexical NPs used for more accessible referents. Other studies suggest a link between modes of representation in gesture and other linguistic markers of information status, such as definiteness and grammatical role (Debreslioska, .zyürek, Gullberg & Perniss, 2013; Parill, 2012; Wilkin & Holler, 2010). To test these hypotheses, we collected German narratives (n=20), and examined the relationship between richness of expression, definiteness (definite/indefinite lexical NPs), grammatical role (subject/object) in speech, and frequency (presence/absence) and viewpoint (observer/character) in gesture. The results confirmed previous findings that gestures were more frequent with less accessible referents expressed with richer spoken expressions, but did not show a relationship between richness of expression and viewpoint. In contrast, nominal definiteness and grammatical role interacted with both gesture frequency and viewpoint. Gestures were overall more frequent with indefinite lexical NPs and referential expressions in object position. Character viewpoint gestures tended to occur with indefinite lexical NPs and with objects+verbs.

The results support previous research showing that gesture frequency is linked to information status in discourse, indicating more or less accessible referents. Furthermore, the results highlight the discursive function of gesture viewpoint. Observer viewpoint gestures seem to be linked to a discourse focus on less accessible objects, whereas character viewpoint gestures are linked to a focus on actions performed on newly introduced objects. Thus the present study confirms that, not only gesture frequency, but also modes of representation in gesture are used in parallel with speech to structure information in connected discourse.

THE OPEN HAND SUPINE AS AN EXPRESSION OF EPISTEMIC MODALITY IN DANISH SIGN LANGUAGE

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In recent years, gesture studies and sign linguistics have converged on investigating conventionalization of meaning in communication (Wilcox 2013), and it has been shown that gestures can be recruited as grammatical markers or lexemes in a sign language (Janzen & Shaffer 2002; Wilcox 2004). Criteria for distinguishing between linguistic and gestural include semantic abstraction, formal reduction (Wilcox 2004), internal analysability (McNeill 1992) and sequential combinability (Emmorey 1999; Goldin-Meadow 2013; but see Müller, Brassem & Ladewig 2013).

A gesture family with one or two loose flat hands, palms up, the Open Hand Supine (OHS) gesture family, has been recognized as a communicatively relevant gesture for centuries (Müller 2004), at least in some cultures (Supalla 2013: 31). It has many form variants and functions with speech (Bavelas et al. 1995; Kendon 2004) and in signing (Engberg-Pedersen 2002), functions that seem to share the meaning element of presenting some content for inspection. In five dialogues in Danish Sign Language (DTS) native signers used many different means to express epistemic modality, including OHS. In my talk I will discuss criteria for seeing OHS as a lexical marker of speaker uncertainty. But the semantic-pragmatic versatility of OHS as a gesture appears to prevent it from becoming fully integrated as a lexical marker in contrast to gestures with more specific meanings (Wilcox 2004).

BIMODAL NARRATIVES: DEVELOPMENTAL PERSPECTIVES ON THE USE OF GESTURES TO MARK NARRATIVE STRUCTURE

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Narrative is a complex type of discourse generally consisting of alternations between narrative information proper (all mentions to events of the story) and extranarrative information (references to the structure of the story or commentary on the narrator's own production) (Labov, 1972; Stein & Glenn, 1979). Cassell and McNeill (1990, 1991) and McNeill (1992) propose that different kinds of gesture are differentially distributed over the narrative structure, providing clues on the process of narrative elaboration, such as the narrator's choice of perspective or the transition between levels of information, thus contributing to creating discourse cohesion.

Previous research has shown that the development of narrative competence in children is based on the increase of cognitive abilities and textual strategies (Berman and Slobin, 1994). In addition, studies focusing on the relationship between speech and gesture have provided evidence that children's gesture production also changes as a function of their language complexity, and their cognitive and pragmatic abilities (Capirci et al., 2011; Colletta, 2004; Graziano, 2009, 2010). Yet, little is known about how the relationship between different types of gestures and narrative structure may change over time.

The aim of this study is therefore to investigate this issue by comparing narrative structure and gesture distribution in narratives produced by 12 adult Italian speakers and 33 Italian children (4-, 6- and 9-year-olds). Narrative structure was analyzed in terms of narrative levels (narrative, metanarrative and paranarrative; McNeill, 1992). All gestures were identified and coded for function (referential vs. pragmatic; Kendon, 2004). Gesture distribution over the three narrative levels was analyzed.

Preliminary results indicate that 1) narrative structure is similar in all groups of children with a predominance of narrative clauses, while adults produce more metanarrative and paranarrative clauses than children; 2) gestures are overall functionally aligned with narrative structure: both adults and all groups of children mainly produced referential gestures with narrative clauses, and pragmatic gestures with metanarrative and paranarrative clauses. Moreover, adults produce a fair number of pragmatic gestures also with narrative clauses, an alignment that appears in 9-year-olds too but not in younger children. Finally, the use of pragmatic gestures shows a developmental trend with a steady increase at age 9.

Overall, the findings support McNeill's proposal about the gestural alignment with the narrative structure, thus reinforcing the view that speech and gesture are orchestrated together in order to arrange information in discourse and achieve cohesion. The results also confirm the developmental trend of more use of pragmatic gestures in older children. The data indicate that a developmental change occurs at the age of 9 when co-speech gestures are used in a similar way to adults (both representing and commenting on actions), although the structural organization of the narration does not show significant difference in three child age groups. Moreover, the observation that in Italian pragmatic gestures also accompany narrative clauses, differently in English (McNeill, 1992) and in Swedish (Graziano & Gullberg, in prep.), suggests that this gestural pattern and its development may depend on a language-specific rhetorical strategy in narrative discourse.

THE ROLE OF THE BODY IN RENDERING CONVERSATION A COHESIVE JOINT ACTIVITY

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Human communication is characterized by a turn-taking system based on alternating bursts of vocalization. This exchange of speaking turns is governed by a principle of minimal gaps and minimal overlaps—in fact, just around 200 ms elapse on average between two speakers' turns, and perceptibly longer gaps foreshadow particular types of social actions (e.g. a declination of an invitation) while more than minimal overlap is a marked social action in itself. This illustrates that temporal cohesion is a foundational element of turn-taking in conversation. At the same time, turn-taking requires cohesion in terms of the social actions consecutive turns perform. A question is supposed to be followed by a response, a greeting by a greeting, a joke by a laugh. Conversational turn-taking therefore poses a significant psycholinguistic challenge: interlocutors need to anticipate how an unfolding turn is going to continue in order to plan an appropriate response in advance, and be sensitive to cues of upcoming turn completion so that they can launch their turn on time. Turn-taking thus is a coordination problem par excellence, and by now we know quite a bit about the linguistic strategies and processes that allow interlocutors to deal with it. However, in face-to-face communication, conversation is accompanied by a rich inventory of bodily signals. I will present a set of studies that investigate the role of the body in the context of turn-taking. This research is based on a mixture of quantitative corpus studies (dyadic conversations in Dutch and multi-party interactions in English) and experimental work (manipulating the availability of bodily signals to measure their effect on cohesive coordination, social action projection and turn end anticipation). The findings advance our understanding of how we coordinate our minds and bodies in interaction and shed light on the psycholinguistic processes underlying the seemingly effortless and remarkably cohesive activity that conversation is.

THE MULTIMODAL DEVELOPMENT OF DISCOURSE

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Recently, there has been much research on the "bimodal period" of early language development, suggesting that gesture-word combinations precede children's first two-word constructions (Gullberg, de Bot, and Volterra, 2008; Capirci and Volterra, 2008; Goldin-Meadow and Iverson, 2010). McNeill's (2012, 2016) recent account of early language development extends this perspective to the emergence of a new relationship between gestures and speech – a "dual semiosis" that lies at the foundation of connected discourse. In this presentation I describe a longitudinal case study (Forrester, 2014) of changing relationships between gestures and speech in conversations between a young child and her parents (Levy and McNeill, 2013, 2015). By 2;7 the child uses sequences of gesture-speech combinations that both maintain cross-utterance continuity and at the same time push the communication further along, thus supporting McNeill's account of a major developmental shift, beginning for this child before the age of 3. This reflects the emergence of a new, discourse-level relationship between gestures and speech, the dynamic function of utterances in discourse. I suggest that gesture, an especially good medium for embodying at the same moment continuity and change, plays an important role in the development of this new relationship of gestures to speech. In this "second ontogenesis" (McNeill, 2012, 2016), gesture becomes part of language, and along with conventional words and grammar creates the potential for connected, cohesive discourse.

LEARNING ABOUT DISCOURSE: SOME EVIDENCE FROM PRESCHOOLERS' LANGUAGE ACQUISITION.

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Learning to engage in connected discourse is a challenge for young children, but one that it tackled from an advantageous starting point. I will argue that, from infancy, children naturally know what to talk about and follow Greenfield's Principle of Informativeness from very early on. Learning how to talk about a topic of interest is more of a challenge, in part because of the problem of referential choice. I will discuss evidence of the emerging ability to choose appropriate referring expressions given the current state of the discourse. I'll finish up by considering the learning mechanisms children may rely on to become more effective communicators.

THE COGNITION OF COHERENCE RELATIONS AND CONNECTIVES: CONVERGING EVIDENCE FROM LANGUAGE USE, ACQUISITION AND DISCOURSE PROCESSING

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People communicate through discourse. We talk to each other, we read the newspaper or interact on social media, and in all these contexts we use discourse. Constructing coherence relations between utterances is a crucial part of discourse processing. Understanding a discourse includes the inference of coherence relations between utterances, such as Cause-Consequence, Temporal Sequence or Contrast. Languages have specific devices to express such relations: Connectives like because, therefore and however, but also lexical cue phrases like As a result, The problem is, or To the contrary.

In this talk, I will outline a Cognitive approach to Coherence relations (CCR, going back on Sanders et al, 1992) and show how this approach is corroborated with empirical research, by looking at different types of converging evidence: cross-linguistic analyses of connective use as well as acquisition data and results from studies on discourse processing and representation.

For instance, languages of the world provide their speakers with means to indicate causal relationships. Causal relations can be expressed by connectives and lexical cue phrases, such as because, since, so and As a result. Striving for converging evidence, we may ask about these phenomena: What is the system behind the use of such connectives in languages like English, French, Dutch and German, or Mandarin Chinese? How can we describe these systems in a cognitively plausible way? How do children acquire this connective system? And what is the role of causal relations and connectives in discourse processing? Based on the results, we are able to identify salient categorizing principles, such as Causality and Subjectivity.

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