Connecting discourse in speech and gesture
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/abscence 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 OF INFORMATION 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-
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 their cognitive and pragmatic abilities (Capirci et al., 2011; Colletta, 2004; Graziano, 2009, 2010). Yet, little is known about how gesture have provided evidence that children’s gesture production also changes as a function of their language complexity, and abilities and textual strategies (Berman and Slobin, 1994). In addition, studies focusing on the relationship between speech and gesture distribution over the three 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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