The temporal alignment between prosody and gesture in Catalan babbling infants
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In recent years, several studies have worked on the relation between gesture and speech in communicative acts, showing that both are tightly related (McNeill, 1992; Goldin-Meadow 1997, 2000; Kita, 2000; Loehr, 2004, among others). Some research in the field has focused on the temporal synchronization between gesture and intonation in adult communication. For instance, Bolinger (1986) suggested that body movements and pitch movements act in parallel in a ‘metaphor of up and down’, Kendon (1980) found an alignment of the gesture hierarchy with the intonational hierarchy, McClave (1991) observed an alignment between gestural phases boundary tones and between beats and nuclear tones, and Loehr (1994) found that apexes of gestures were aligned with pitch accents. Yet, whereas in adult communication most of the gestures occur during speech, it is not until the end of the one-word period that children primarily use gestures in combination with speech for communicative purposes (Butcher & Goldin-Meadow, 2000). In this analysis of gesture and prosody in English children, the authors found that it is not until the one-word period that gesture and speech are temporary synchronized, i.e. that gestural strokes (or peaks of effort in gestures) occur during or after the stressed syllable. Before the first words, hence, communication is performed by means of gestures and vocalizations which are sometimes combined and that entail intentionality (Bates, Camaioni & Volterra, 1975; Crais et al., 2004; Iverson & Goldin-Meadow, 2005; Tomasello et al., 2007). Yet, there are no studies on the relation between prosodic patterns and gestural patterns in the babbling period, nor on the precise temporal alignment between the two.

This study aims at investigating the nature of intentional communicative acts where gesture and speech occur together at the babbling stage in language development. The empirical database for this study will be part of the Esteve-Prieto corpus, a longitudinal corpus of four Catalan-learning children recorded from 0;6 to 1;8. All communicative acts produced when children were 0;9, 0;11, 1;1, and 1;3 will be submitted to prosodic and gestural analysis with ELAN (Lausberg & Sloetjes, 2009). The methodology used is the following: first, all communicative acts are classified as being ‘gesture only’, ‘speech only’, or ‘gesture and speech combinations’; second, temporal synchronization between gestures and vocalizations are analyzed to investigate if gestural strokes are aligned with the pitch peaks in vocalizations, following Loehr (2004) (see example of prosodic and gestural analysis in Figures 1 and 2). Results after analyzing communicative acts at 0;11 (408 minutes of recordings) have shown that 54.7% of the communicative acts involve only speech (616 out of 1,127), 24.4% entail only gesture (275 out of 1,127), and 20.9% are combinations of gesture and speech (236 out of 1,127), confirming results found by Butcher & Goldin-Meadow (2000). The analysis of the alignment of the gesture-speech combinations has shown that the gestural stroke is aligned with pitch peaks in 80.5% of these communicative acts (Figure 3). Thus, our pilot results suggest that even before the one-word period, communicative acts combining gesture and speech are temporally synchronized. Final results will show further information about the temporal alignment between gesture and speech. Thus, the babbling period is claimed to be a stage in development at which they are able to express intentionality through gesture and prosody.
no alignment between stroke and pitch peak alignment between stroke and pitch peak

References


