Early prosodic development: Evidence from intonation and tempo

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1. Introduction

Studies on prosodic development have shown cross-linguistic differences on early word and utterance production, reflecting the properties of the input: e.g., presence/absence of word-minimality effects (English, Japanese / French, Portuguese), or the dominance of trochaic/iambic shapes (Demuth 2006; Grimm 2007; DePaolis, Vihman & Kunnari 2008).

The beginnings of prosodic integration of words (word combinations as prosodic phrases or SS Wu), and its relation to syntax show contradictory evidence (Behrens & Gut 2005).

Prosodic features relevant to characterise the prosodic status of early productions: stress and pitch shape (Fikkert 1994; Behrens & Gut 2005; Grimm 2007), duration (including final lengthening - Hallé et al. 1991; Odorico & Carubbi 2003; Demuth & McCullough 2008), pauses (Branigan 1979), intonation (distribution of pitch accents, pitch accent types and their combinations – Fikkert & Chen 2007).

However, studies that integrate various sources of evidence are scarce and our understanding of the pathways of prosodic development is still limited.

The present study:

Production data on intonation, word stress, and duration patterns at segmental, syllabic and phrasal levels, from the speech of one monolingual Portuguese child (Luma) between 1;0 and 2;4.

Empirical database of unique recording density and combination of different kinds of records: longitudinal corpus of every other week video tape recordings (Corme & Costa 2010) + corpus of nearly daily audio recordings (LumaLiDaAudy).

Goal: To describe the development of prosodic structure on the basis of evidence from intonation and tempo.

2. Background

Prosodic and intonation properties of European Portuguese (EP)

Declarative contour: (H')H*L* L* Most common nuclear accent: H*L* Most common prenuclear accent H’ Sparse pitch accent distribution within the IP: accentless high plateau

Phrase-final lengthening only at the IP-level; Pauses inserted at IP-boundaries Duration as the main cue to word stress (Delgado Martins 2002; Frota 2000, 2009)

3. Method

840 utterances were analysed (meaningful one-word and multiword combinations within a single speech event). SpeechStation 2.0 and Praat.

Perceptual analysis: utterance type and pragmatic meaning (from context)

Intonational analysis: pitch accent type & distribution, boundary tones, reset, downstep/uptop step, pauses (Reliability of prosodic transcription: 95%)

Duration measurements: syllables (n=756) and words (n=545) (Turk et al. 2006)

Coding of syllables for stress and position in PW and IP: Size of PW and IP

Luma’s lexical development, MLU-word and word size (Frota 2010).

4. Results

Production of disyllabic targets (1.0 – 1.4)

Word combinations: from SS Wu to multiword prosodic phrases

Production of disyllabic targets (1.5 – 1.9)

Analysis of duration

Correlations (duration units in a prosodic domain): 2 moments of temporal reorganization, 1;4 (PW) and 1;8-1;9 (phrasal). Syllable duration by position: Up to 1;09, similar pattern for PW and IP; After 1;9 final lengthening at IP-level and different patterns for PW and IP.

Duration findings support the same 3 steps

5. Discussion

Evidence for 3 developmental steps in the acquisition of prosodic structure in early child speech: The Prosodic Unfolding Hypothesis

Our findings suggest a path of development where key prosodic domains are initially aligned, and development proceeds by unfolding of the different levels. Unfolding proceeds bottom-up.

Cross-linguistic implications: Variation across languages in the lower unit (syllable/root) or an additional foot PW phrase step for some languages (English, Dutch, Japanese versus EP, French)?

Prosodic integration of words and its relation to syntax (contradictory evidence in the literature): Evidence for the emergence of phrasal prosody prior to combinatorial speech and independently of the (adult) syntactic frame of the utterances produced (unlike findings in Behrens & Gut 2005).

Confirmation of prior findings that prosody in production approaches adult-like status before 2;0, coinciding with lexical development (Vihman et al. 2006, DePaolis et al. 2008, Prieto et al. 2011).