

## Stress development in italian children

Previous studies have investigated the developing of stress accent in young children learning English, showing that the period between two and three years of age is crucial to learn how to modulate duration, intensity and pitch parameters in order to produce the differences between stressed and unstressed syllables (Pollock et al., 1993, Kehoe et al., 1995; Schwartz et al., 1996). The studies about Italian children are few (see Arciuli, Colombo, 2015) and they focus mainly on periods after an age of three years.

Our aim is to investigate the development of lexical stress in italian children during their second year of life. We investigated five subjects, all from North Italy (Trieste and Padova), at the age of 21, 24 and 27 month. All the recordings had been collected and transcribed in IPA for previous studies (Zmarich and Bonifacio, 2004; Zmarich and Bonifacio, 2005). In this corpus, we identified target corresponding to spontaneous productions. For both stressed and unstressed syllables of each target word, we calculated, by mean of a script in Praat, vowel duration and peak intensity. We also calculated at the vowel midpoint two measures related to the parameters of spectral emphasis: spectral balance (Bocci, Avesani 2011) and spectral tilt (Fulop, Kari, Ladefoged, 1998). We also calculate F1 and F2 at the vowel midpoint. Some of those measures were already used by other scholars in order to investigate stress (Bertinetto, 1981; Farnetani, Kori, 1982; Bertinetto 1985; Vayra, Fowler, 1987; Albano Leoni, Cutugno, Savy, 1995; Savy, Cutugno, 1997; Vayra, Avesani, Fowler, 1999; D'Imperio, Rosenthal, 2009; Tamburini, 2009).

As a control group, we recorded and analyzed four adult subjects.

Children have shown to produce propely the difference between stressed and unstressed vowels since the 21 month. The most significative parameter differentiating stressed and unstressed vowels was duration, followed by intensity. We also found some differences in measures of F1 (for [a]) and F2 (for [i]). More problematic was the interpretation of results related to spectral emphasis: both adults and children showed differences in measures of spectral balance between stressed and unstressed syllables, however this difference was not found in measures of spectral tilt. A possible explanation of this outcome is that spectral tilt is a normalized (from the point of view of the vowel quality) measure.

In conclusion our research shows that young children handle propely all the parameters used by italian adults in producing stress.

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