

# Early evolution of syllable duration as a cue for oro-motor control development: a longitudinal study

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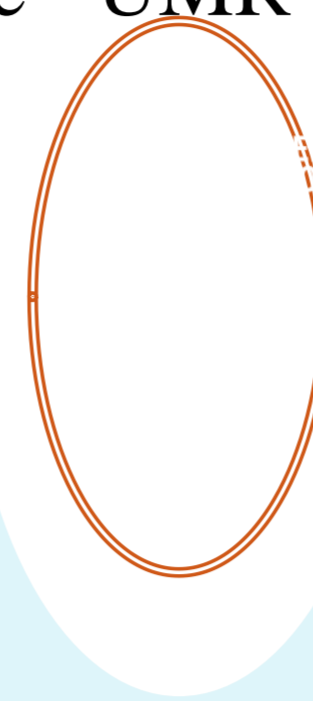
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## THEORETICAL BACKGROUND

### A POOR EFFICIENCY OF JAW AT THE BEGINNING OF BABBLING STAGE

- The early syllables arise from a mechanical movement : lowering and raising gestures of jaw associated with phonation (MacNeilage, 1998).
- Movements of the articulators at this stage are slow (Nip *et al.*, 2009, 2011) and variable (Steeve *et al.*, 2008).

### DOES MOTOR CONTROL EMERGE FROM BABBLING ?

At 1 year of age, jaw movement patterns are quite stable and similar to those of adults for speech activity (Green *et al.*, 2002).

### DOES LINGUISTIC COMPLEXITY EXPLAIN TIMING EVOLUTION ?

During linguistic development, the child must increase its motor skills and must acquire its language.

In adults, the syllabic duration may change according to syllabic complexity (Crystal & House, 1990 ; Roach, 1998).

## HYPOTHESES

On the one hand, the decrease of syllable duration could be expected during the babbling period as well as a decrease of temporal variability.

On the other hand, the assumption could be made that the variability of syllabic structures influences the syllabic duration.

## METHODS

### POPULATION

- 22 French children (11 girls – 11 boys)
- Typical development (French version of MCDI, Feeding questionnaire)

### CORPUS

- Monthly audio recordings of oral productions from 8 months to 14 months of age.
- A minimum of 50 syllables per subject and per stage.
- 16 600 syllables analysed.

## ANALYSIS

### Acoustical Analysis

Acoustical Analysis were made with Praat®. Each production has been annotated by an expert :

- Syllable segmentation (Duration)
- Transcription
- Syllable position
- Intersyllabic variations for polysyllabic utterances
- Utterance type (Reduplicated vs. Variegated)

### Statistical Analysis

ANOVA with repeated measures.

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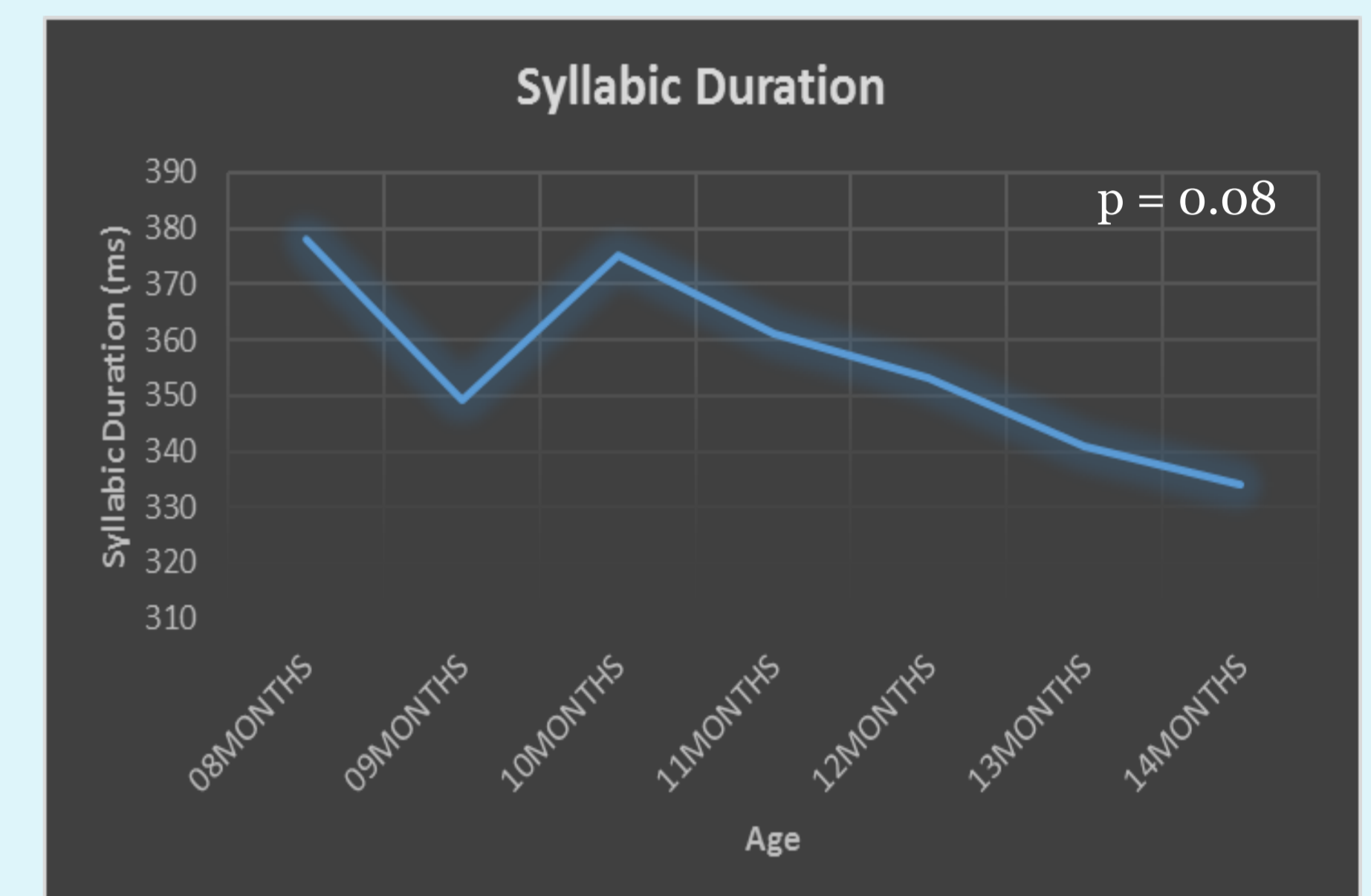
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## RESULTS

### EVOLUTION OF SYLLABIC DURATION

A decrease of syllabic duration is observed across the period.

This decrease seems to actually begin at 10 months and continues until 14 months.



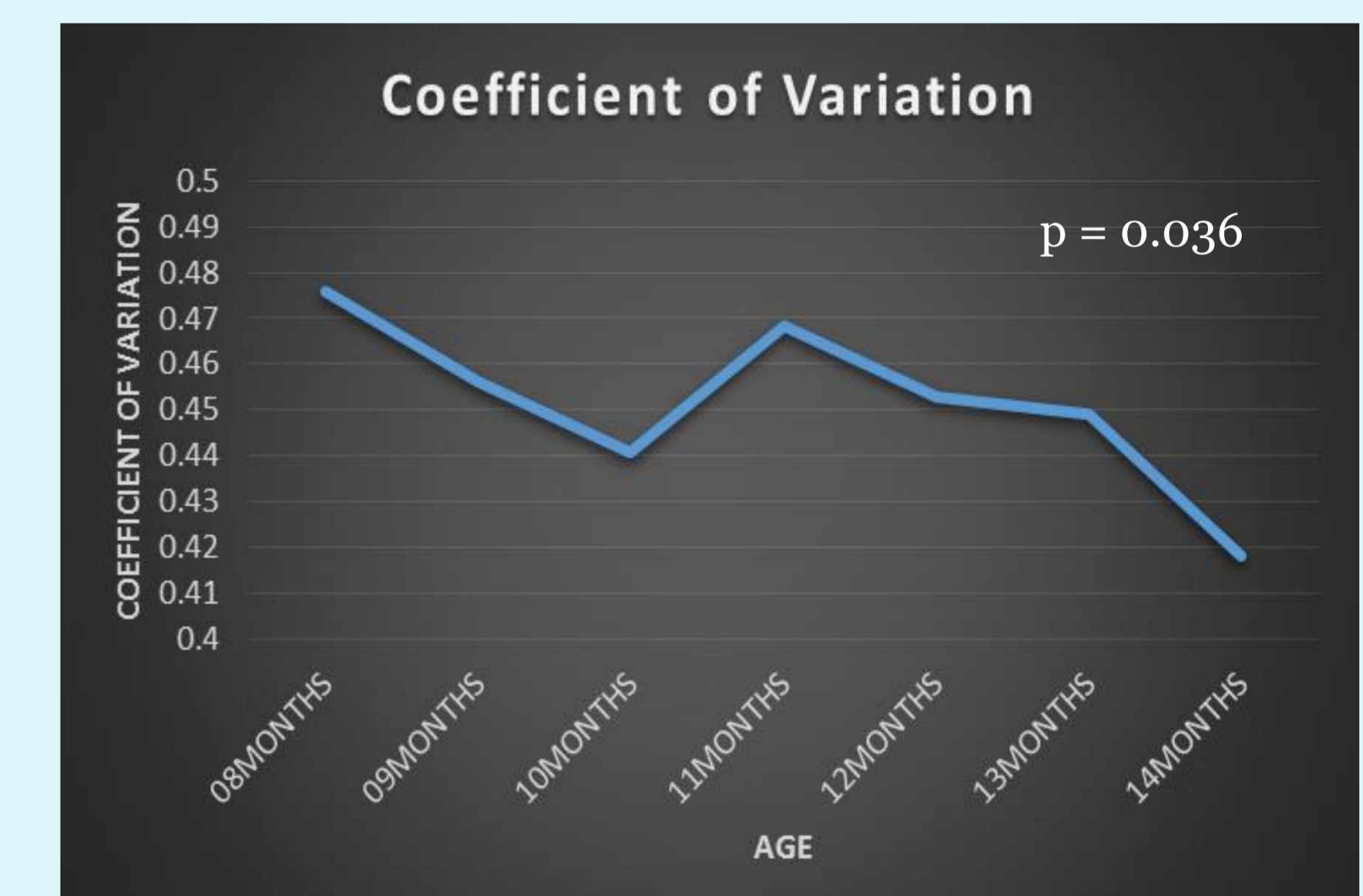
### SYLLABIC DURATION STABILITY

Syllabic duration becomes more stable between 8 months and 14 months.

8 mo. : high and unstable syllabic duration.

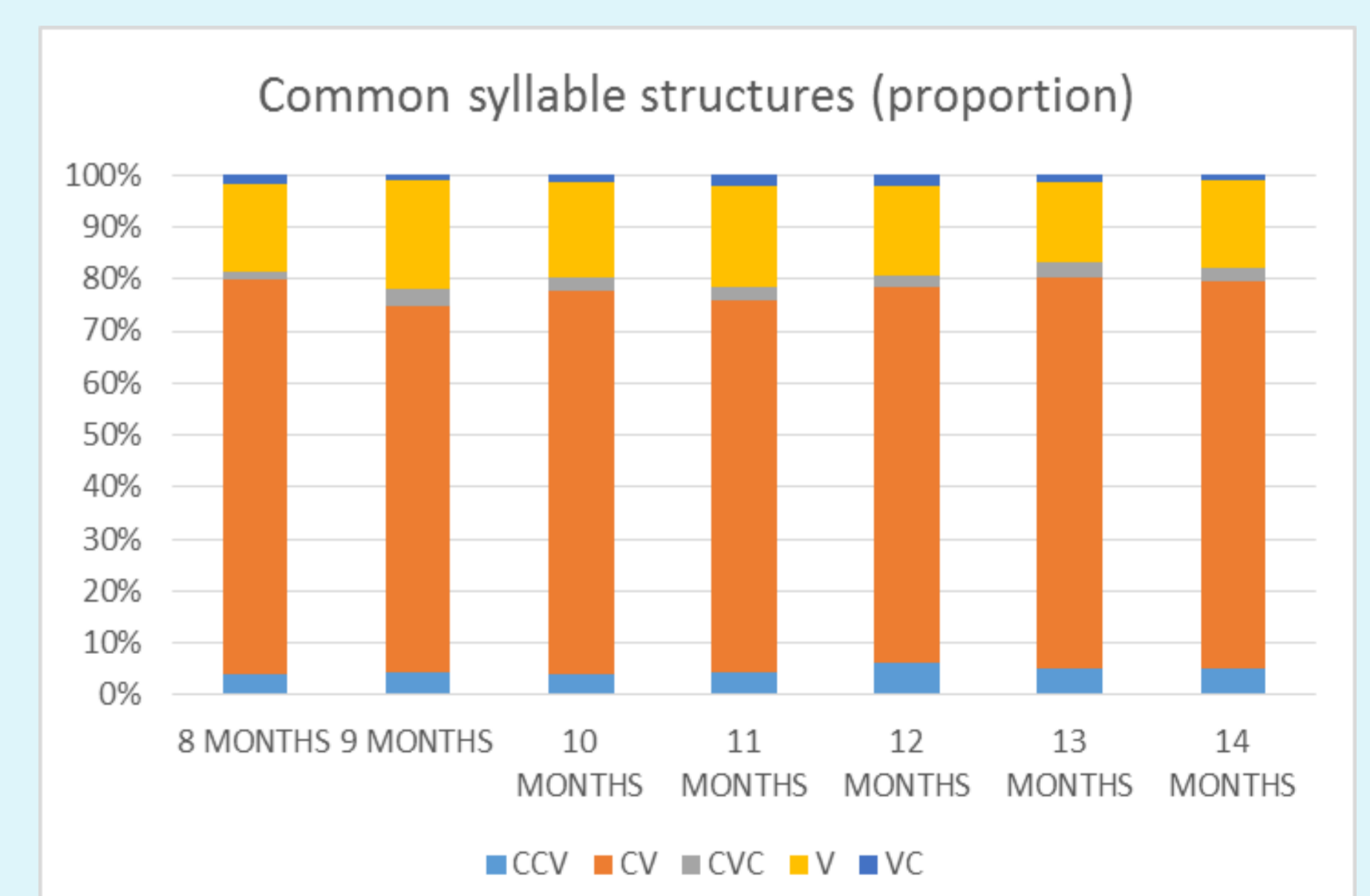
11 mo. : decrease in syllabic duration vs increase in temporal variation.

12-14 mo. : syllabic duration and variation decrease.



### EVOLUTION OF SYLLABLE STRUCTURES

The structure distribution remains relatively stable across the studied period with a clear predominance of CV and V types.



## CONCLUSION

- The syllabic duration decreases and becomes more stable between the age of 8 and 14 months.
- The evolution of the mean syllabic duration does not only depend on the temporal variation. The variation can be seen as an exploration predicting the emergence of motor control for speech (Smith & Thelen, 2003, Green *et al.*, 2010).
- The syllable duration decrease can't be explained by changes in syllabic structures and may attest an increase of motor abilities.