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## Speech and feeding development: a longitudinal study on Quebecois French-Speaking children between 8 and 14 months

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► **To cite this version:**

Leslie Lemarchand, Macleod Andrea, Mélanie Canault, Sophie Kern. Speech and feeding development: a longitudinal study on Quebecois French-Speaking children between 8 and 14 months. 14th International Congress for the Study of Child Language, Jul 2017, Lyon, France. hal-01972131

**HAL Id: hal-01972131**

**<https://hal.univ-lyon2.fr/hal-01972131v1>**

Submitted on 31 Oct 2024

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### Introduction

- Masticatory and language skills develop concomitantly during the first year of life.
- Clinical, anatomical and phylogenetic findings suggest an interaction between feeding and language development (Palladino, Cunha & Souza, 2007; Malas et al., 2015; MacNeilage, 1998).
- Speech and chewing development :
  - Motor activities characterized by rhythmic jaw oscillation (mouth opening-closing alternation).
  - Mandibular rhythm acceleration (MacNeilage, 1998; Wilson & Green, 2009).

**Objective : Investigate the mandible temporal patterns evolution during nutrition and speech between 8 and 14 months.**

#### Hypotheses :

- Syllable duration and chewing cycle duration will decrease with age.
- Chewing temporal patterns evolution will influence speech temporal patterns changes.

### Method

#### Participants :

- 4 Canadian-French-speaking children (2 females and 2 males).
- Longitudinal study (8, 10, 12, and 14 months of age).
- Typical development: born at term, no neurological, physical or oro-motor impairments and no clinical history of eating disorders.

#### Material & Procedure :

- Audio and video recordings in a soundproof room.
- **Speech** : Spontaneous productions (vocalizations, babbling).
- **Feeding** : Standardized administration and textures (semi-solid, cracker, puree, solid) from the Schedule for Oral-Motor Assessment (Skuse, Reilly & Wolke, 2000).

#### Data analysis (Table 1) :

- **Syllable duration** (Praat software) : consonant-vowel type
- **Chewing cycle duration** (Datavyu software) for semi-solid (e.g. green peas, banana, cheddar) and crackers textures

= 1 mandible opening-closing sequence

	Syllables				Chewing cycles			
	8 months	10 months	12 months	14 months	8 months	10 months	12 months	14 months
Participant 1	108	58	62	54	66	66	167	49
Participant 2	50	39	52	50	94	186	153	77
Participant 3	28	34	71	54	65	32	101	32
Participant 4	54	72	51	61	61	86	58	235

Table 1 : Number of syllables and chewing cycles per participant for each session.

### Results

Figure 1 : Evolution of (a) mean syllable duration and (b) mean chewing cycle duration between 8 and 14 months of age.

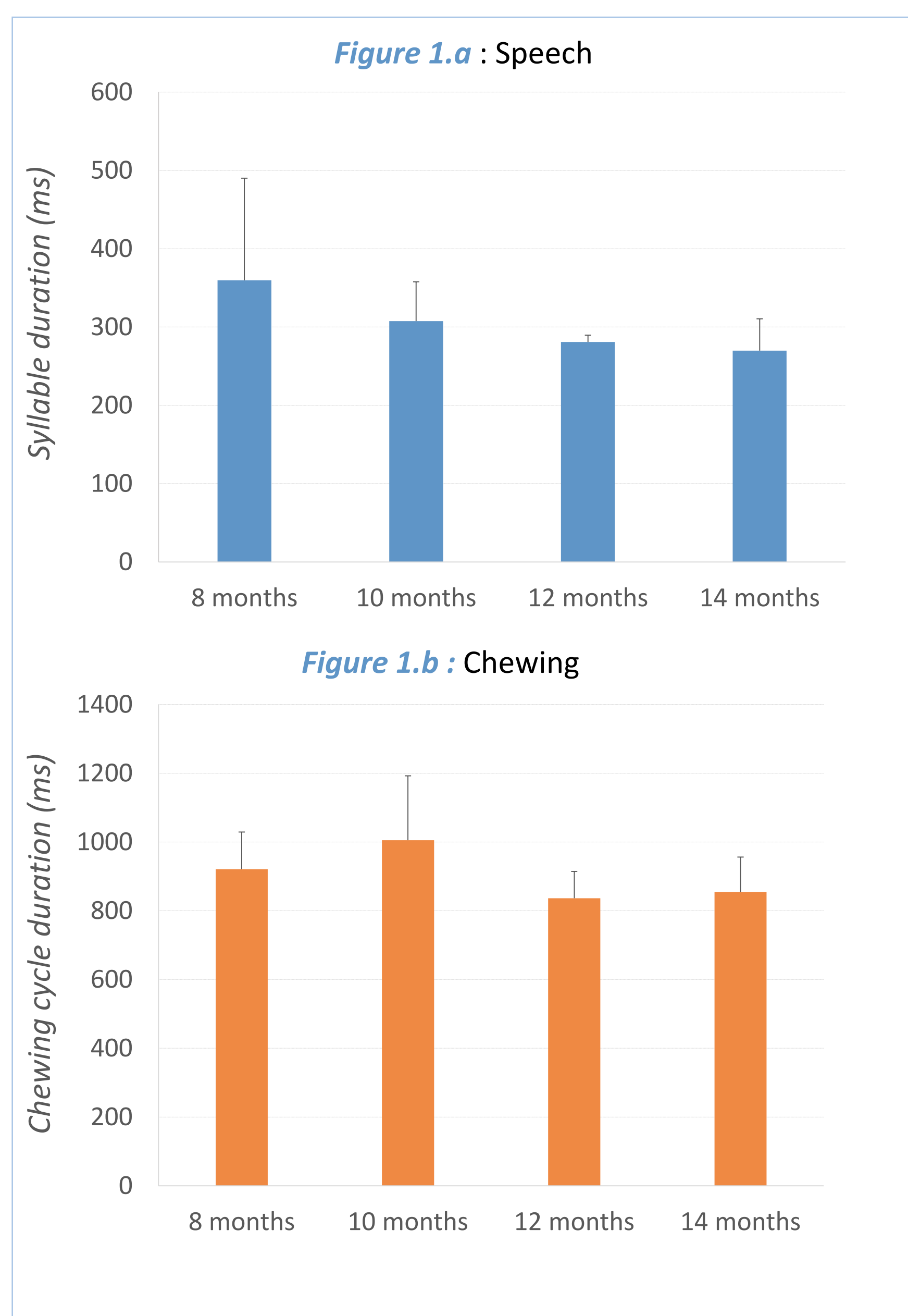


Figure 2 : Evolution of (a) mean syllable duration and (b) mean chewing cycle duration per participant between 8 and 14 months of age.

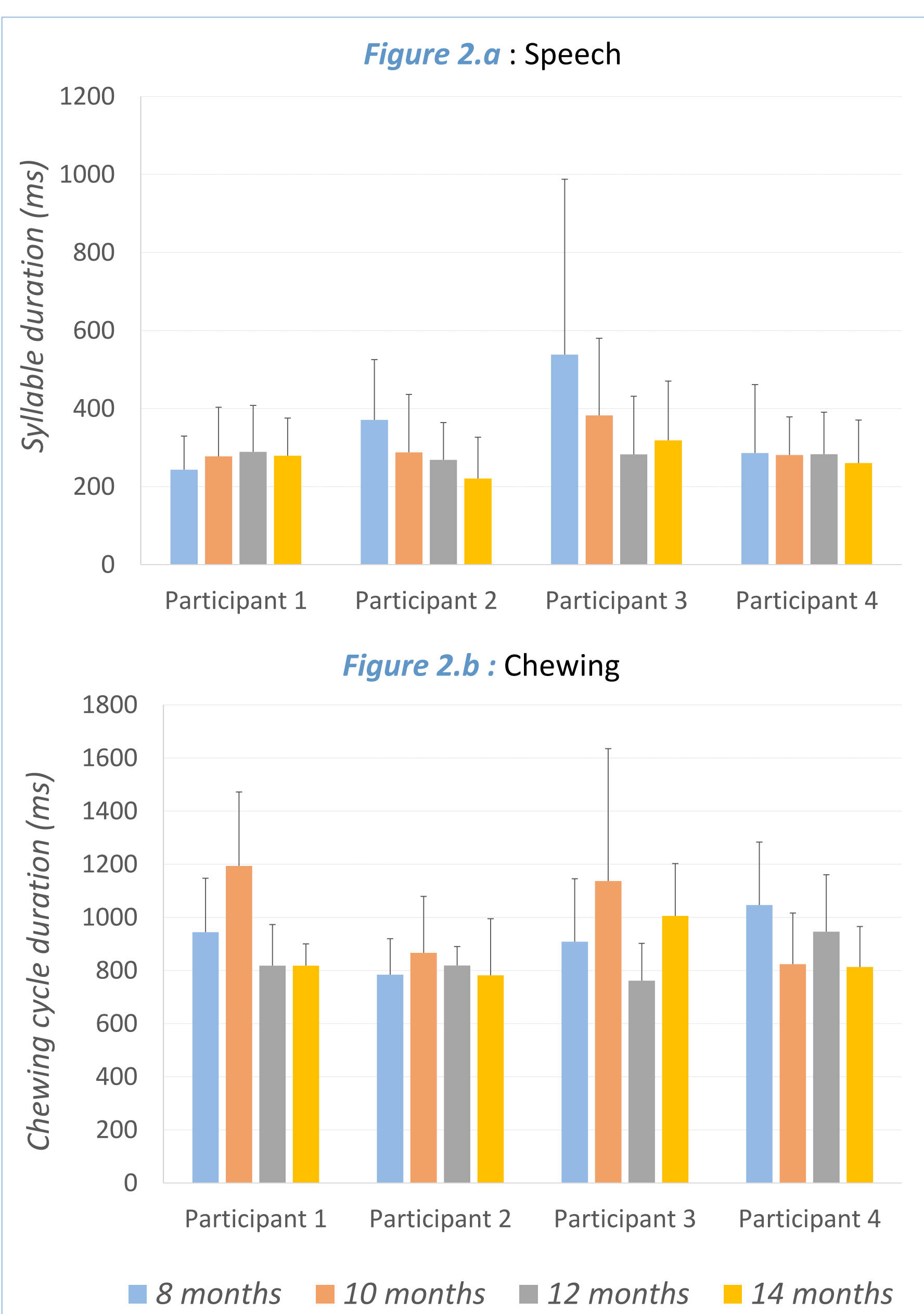
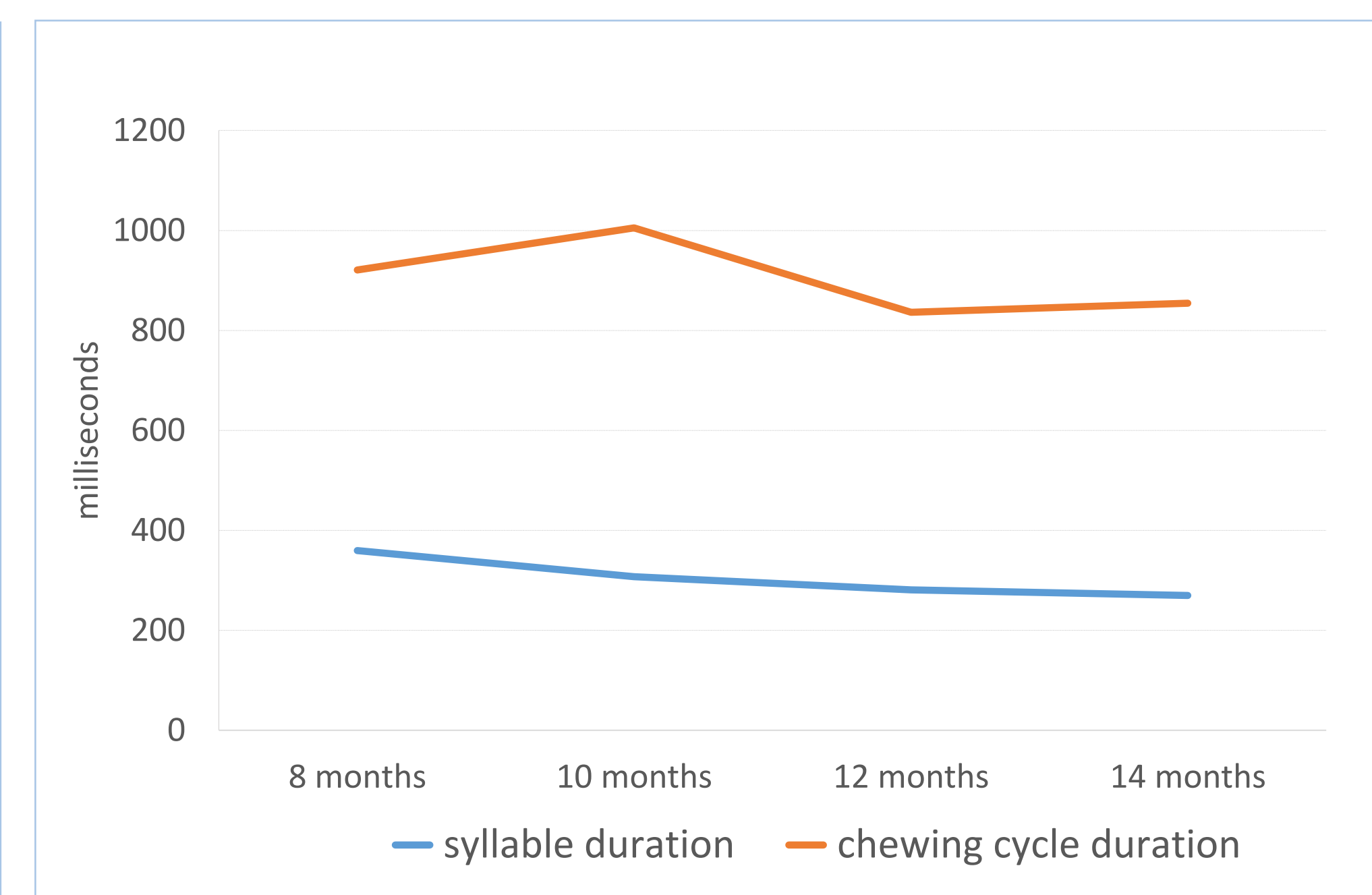


Figure 3 : Comparison of mean syllable duration and mean chewing cycle duration evolution between 8 and 14 months of age.



- Mean syllable duration decreases between 8 months (360 ms) and 14 months (270 ms) of age (Figure 1.a).
- Mean chewing cycle duration decreases slightly between 8 months (921 ms) and 14 months (855 ms) of age (Figure 1.b).
- For chewing, 3 of 4 individuals patterns (Participants 1, 2,3) follow the same trend as the group pattern (Figures 1.b, 2.b).
- Mean chewing cycle duration is greater than mean syllable duration from 8 months of age (Figure 3).

### Discussion

- Despite large inter-individual differences, preliminary results show a syllable duration decrease as well as a decrease of chewing cycle duration between 8 and 14 months of age.
- There is a large distinction between chewing temporal patterns and speech temporal pattern from 8 months of age.
- This great difference found between chewing cycle duration and syllable duration leads us to believe about a mandible temporal pattern specification activity from an early stage of development.
- Further in-depth analyzes will be needed to explain clinical findings and to determine in which way mastication and speech development can interact with each other.
- To support these results, a cross section study carried out with a larger sample and completed by kinematics measures is in progress.

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