

# **Continuity between babbling and first words ? : a crosslinguistic answer**

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# Rationale for study of acquisition

Emergence of complexity

## **Multidimensional system**

Production <-> Perception <-> Neural/Cognition

## **Early simplified phases**

### **Products**

Behavioral repertoire

Central tendencies & Individual variation

### **Process**

Stability/change

## **Rationale for Study of acquisition**

Consideration of the processes underlying modern speaker's acquisition of the most complex human action and knowledge system available in nature.

Potential window into the historical process whereby early hominids began use of the auditory - vocal channel to effect communication

# Background

**Since the 90ths there have been a number of longitudinal crosslinguistic comparisons of children**

(Davis & MacNeilage, Vihman, de Boysson-Bardies, Stokes, Roug, Langberg & Lundberg)

Outcome:

**>> Same steps across languages:** babbling (6/8 months), first words (12 months), later word learning → lexical spurt (<50 word-mark)

# Background

## Production Patterns

### >>Continuity between babbling and first words across languages:

#### - Sound preferences :

Consonant manner: *stops* [p, b, d, g], *nasals* [m, n] and *glides* [w, j]

Consonant place: *labial* [b, p, m] *coronal* [d, t, n]

Vowel mid and low, front and central [★ , →, e , ↗ , a]

#### -Syllable preferences

Open CV and CVCV syllables

Mono-, di-, and poly-syllables co-exist

#### - Within syllable preferences :

Labial consonants + central vowels [ba]

Coronal consonants + front vowels [d<sup>→</sup>]

Dorsal consonants + back vowels [k<sup>✌</sup>]

#### - Across syllable preferences :

Both reduplicated and variegated sequences

Vowels: more high-low variegation than front-back variegation

Consonants: more manner than place consonant variegation

# Background

## Perceptual Capacities

### Lab Studies:

**Children exhibit abilities to learn rapidly from language input regularities** as early as 8-10 months (Saffran, Aslin, & Newport, 1996; Werker & Lalonde, 1988).

### Observational Studies:

**Children's vocalization output begins to show ambient language differences** in the late babbling and first word periods:

- \* **utterance and syllable structures**

(Boysson-Bardies, 1993; Kopkalli-Yavuz & Topbaç, 2000),

- \* **vowel and consonant repertoires and distribution** (de Boysson-Bardies, Hallé, Sagart & Durand, 1989 & 1992)

- \* **CV co-occurrence preferences** (Lee, 2003).

# Background

**Acquisition = Interaction between production and perception**

**Common trends:**

**based on bio-mechanically motivated characteristics of the production system**

**Frame-content theory (MacNeilage & Davis 1990, 1993)**

- Central status to emergence of rhythmic CVs : serial consonant-vowel alternations emerging from the open-close alternation of the mandible (frame)

- Frame then Content

Syllable structures (Frames): oscillation of the mandible

Segmental structures (Content) Permitted segmental elements founded on emergence of capacities for independent movement of articulators within the jaw cycle

**Crosslinguistic differences:**

influence of perceptually based learning of target language characteristics and cognitive increases across acquisition

# Goal

## **Longitudinal and crosslinguistic study on early speech acquisition (French, Dutch, Romanian, Tunisian)**

Describe the similarities (common trends) & differences (learning)

- Do all children follow the same developmental stages ?
- Preferred trends in terms of sounds and sound combinations ?
- Continuity between the babbling period and the first words period ?

### **Uniqueness of the study**

- Large longitudinal databases with consistent data collection & analysis
- Never or rarely studied languages at these early stages (Romanian, Tunisian)
- Interindividual differences included



# Methodology

**Participants:** 20 children, 4 children per language

**Languages:** (Turkish), French, Romanian, Dutch, Tunisian

## **Data collection:**

*Spontaneous data:* One hour of audio-video recording every two weeks from 8 months of age till 25 months of age in the children's homes

*Dictionaries:* 1000 entries per language

## **Data processing:**

IPA transcriptions

LIPP entering

# Analysis

- 1) Consonant manner of articulation
- 2) Consonant place of articulation
- 3) Vowel types
- 4) Reduplicated vs variegated babbling
- 5) CVCV : manner vs place change for C's
- 6) CVCV: height vs front-back change for V's

## Children

3 different time periods

- *Babbling* (8 to 12;15)

- *Early words* (1 to 50 words)

- *Later words* (>50 words till 25 months of age)

## Target Languages

same analysis for 1,000 words per language

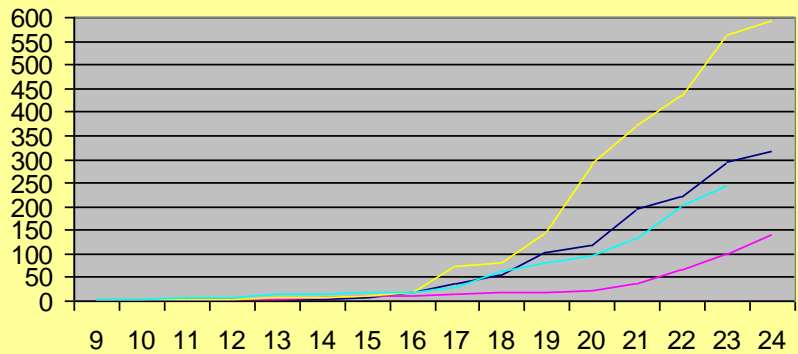
	Number of sessions (60 minutes)		
Children	Babbling	Early words	Later words
French Total	<b>32</b>	<b>75</b>	<b>42</b>
Romanian Total	<b>26</b>	<b>60</b>	<b>6</b>
Dutch Total	<b>38</b>	<b>56</b>	<b>57</b>
Tunisian Total	<b>32</b>	<b>78</b>	<b>27</b>
ALL	<b>128</b>	<b>269</b>	<b>132</b>
Segments	<b>100000</b>	<b>50000</b>	<b>150000</b>



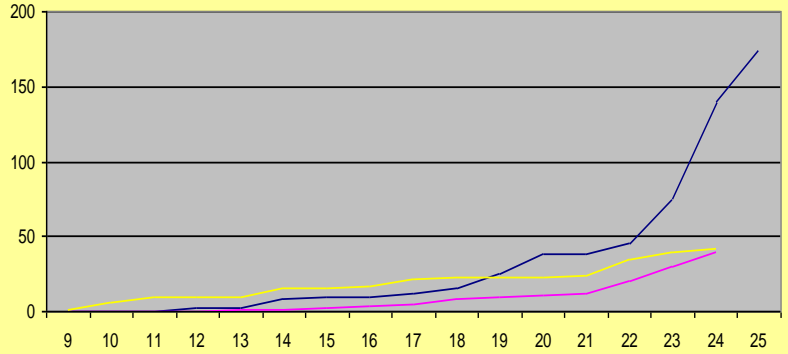
Developmental steps : Lexicon size

# Cumulative vocabulary

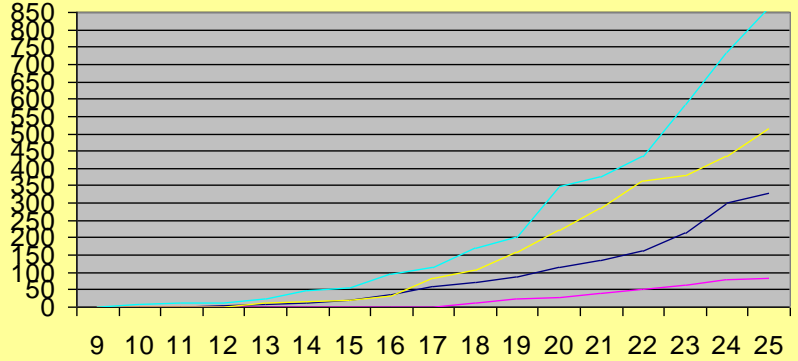
**French**



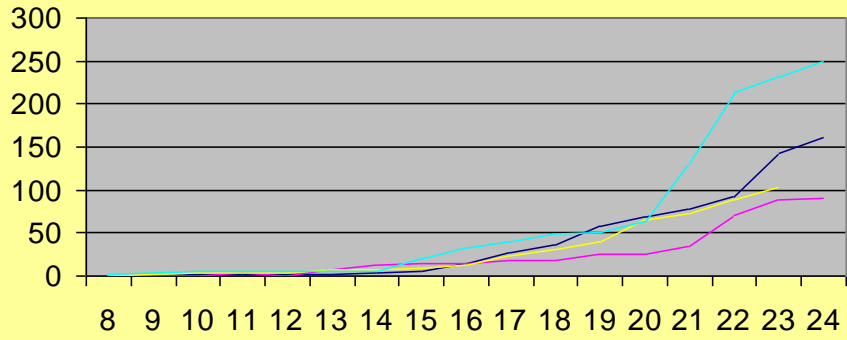
**Romanian**



**Dutch**



**Tunisian**



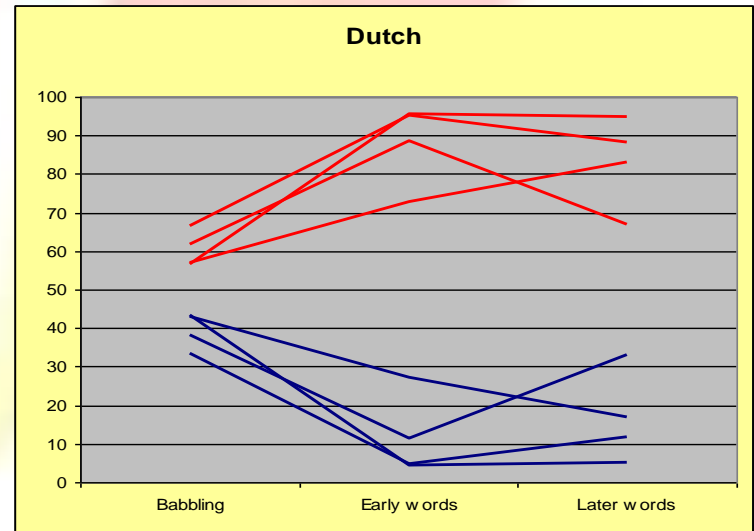
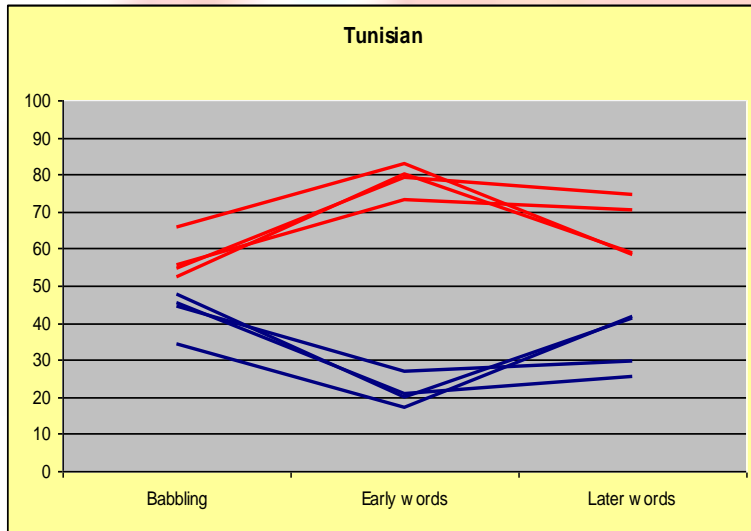
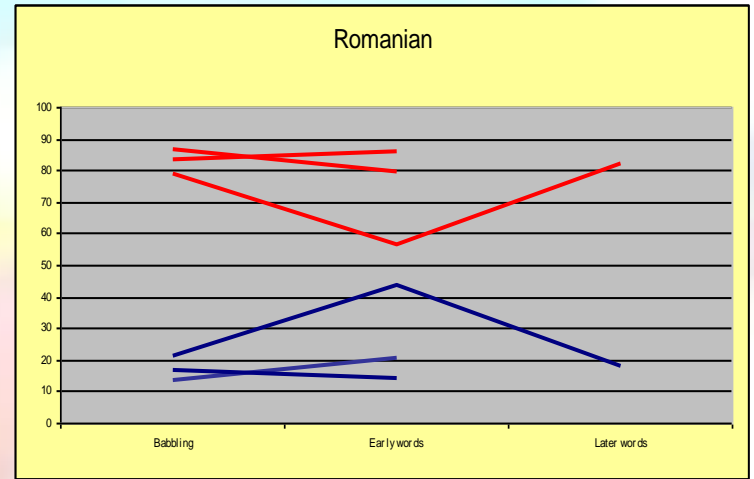
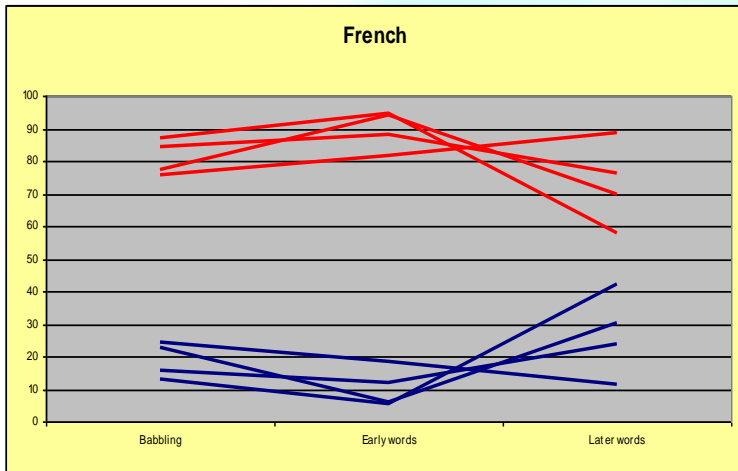
# Consonant manner of articulation

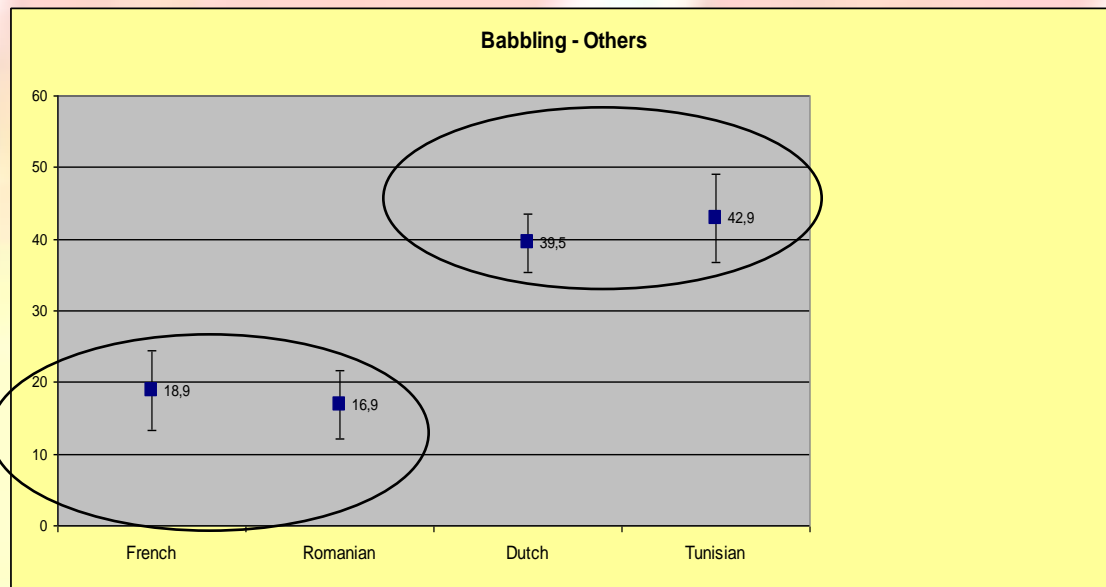
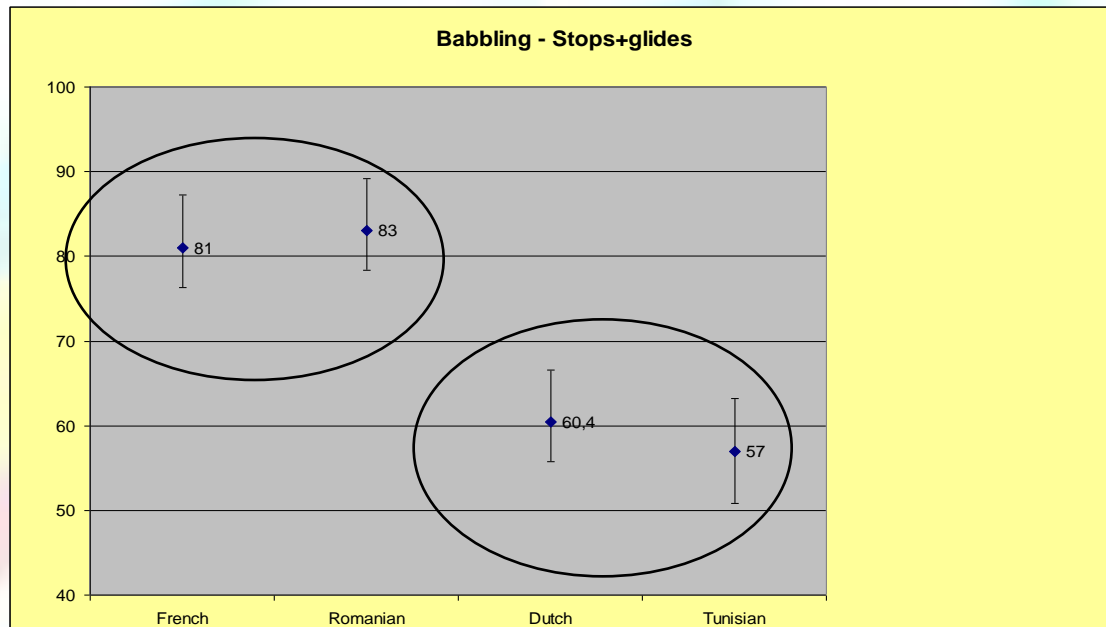
oral stops + nasal stops + glides (stops+glides)

vs.

Fricatives + affricates + liquids + trills + taps (others)

# Stops+glides vs Fricatives+liquids+others







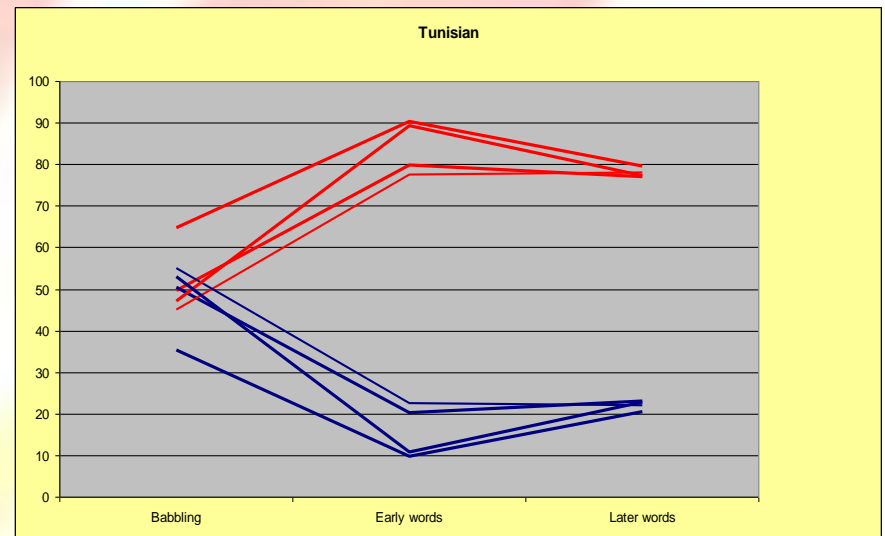
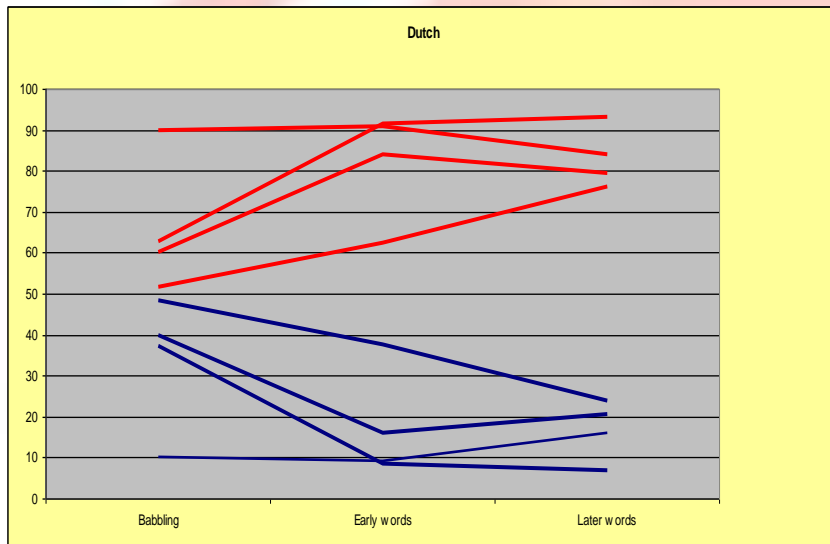
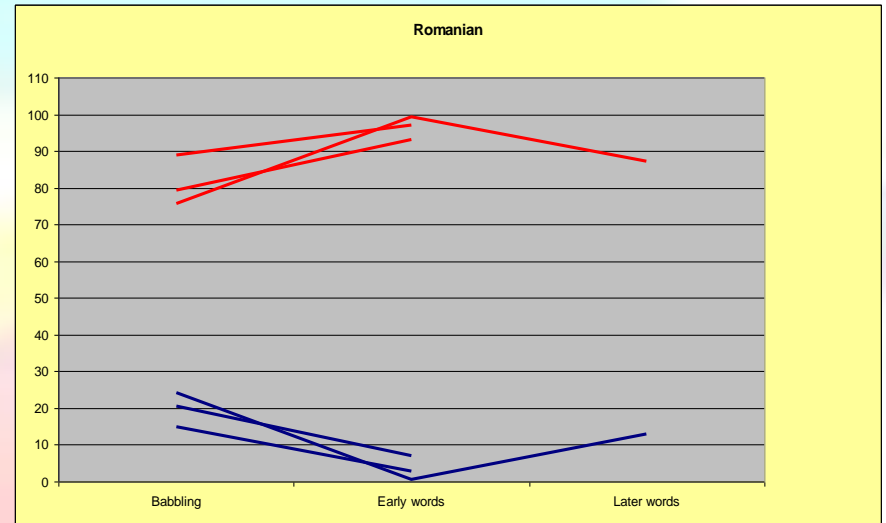
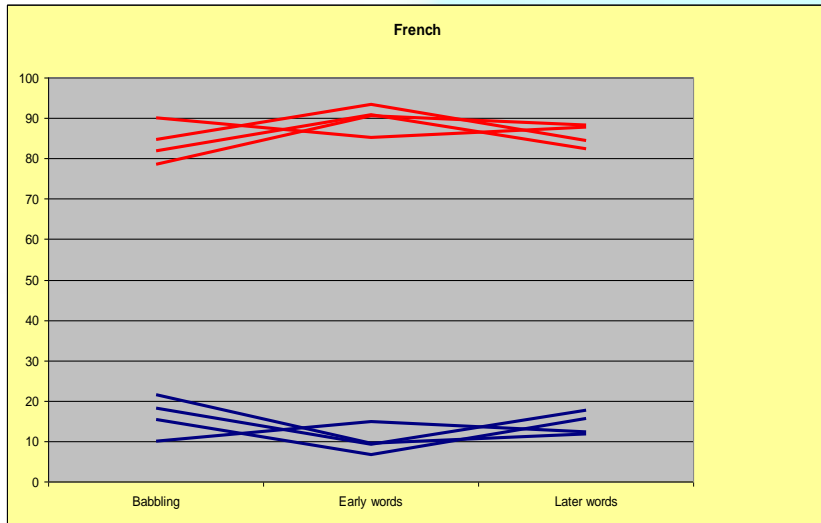
# Consonant place of articulation

Labials + coronals (Lab+cor)

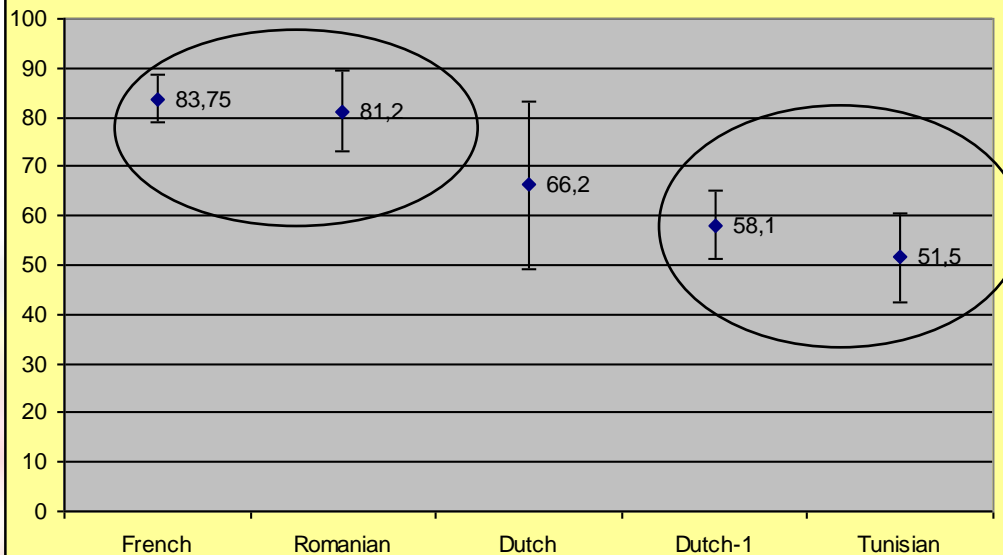
*vs.*

Dorsals + gutturals (Dor+gut)

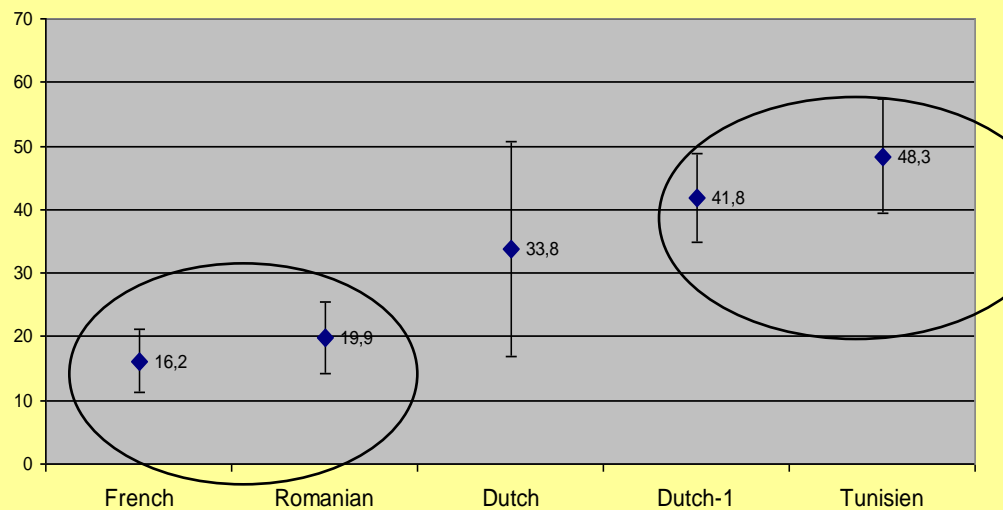
# Labial+coronals vs Dorsal+gutturals



Babbling - Labial + coronal



Babbling - Dorsal + guttural



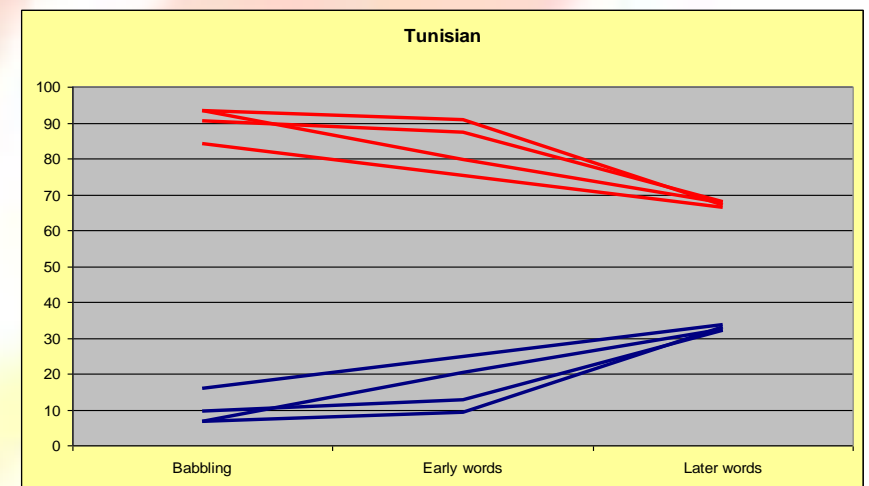
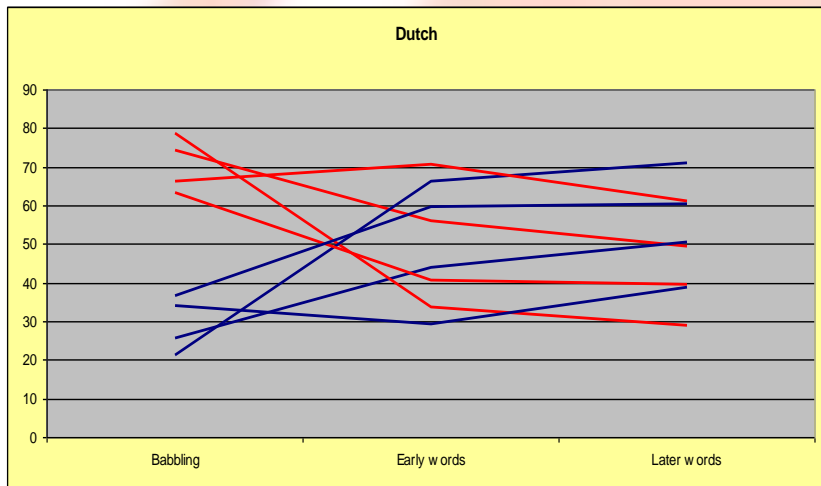
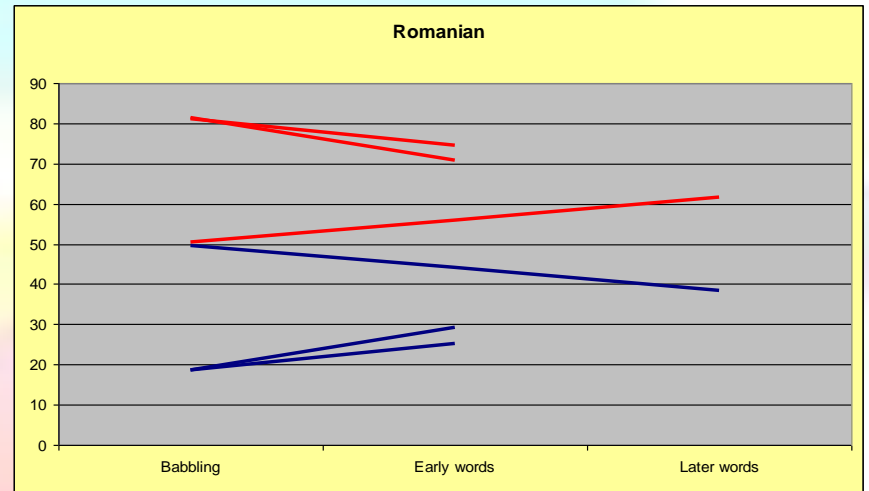
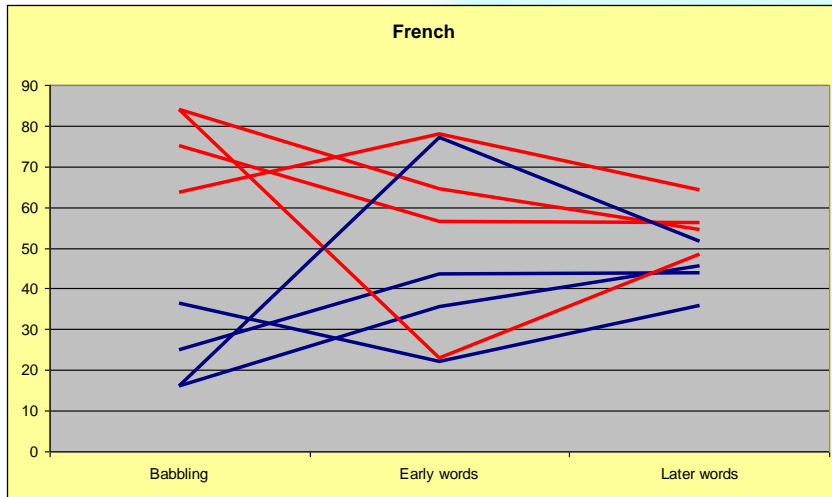
# Vowels

Lower left quadrant (LLQ)

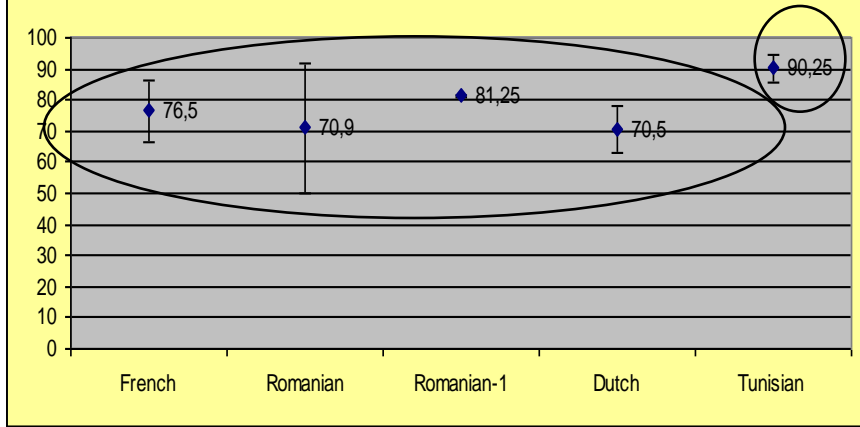
vs.

Others (O)

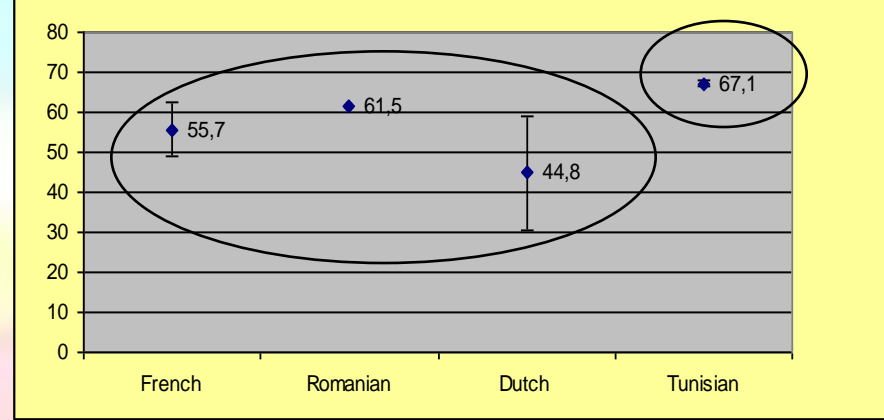
# Vowels from the LowerLeftQuadrant vs Others



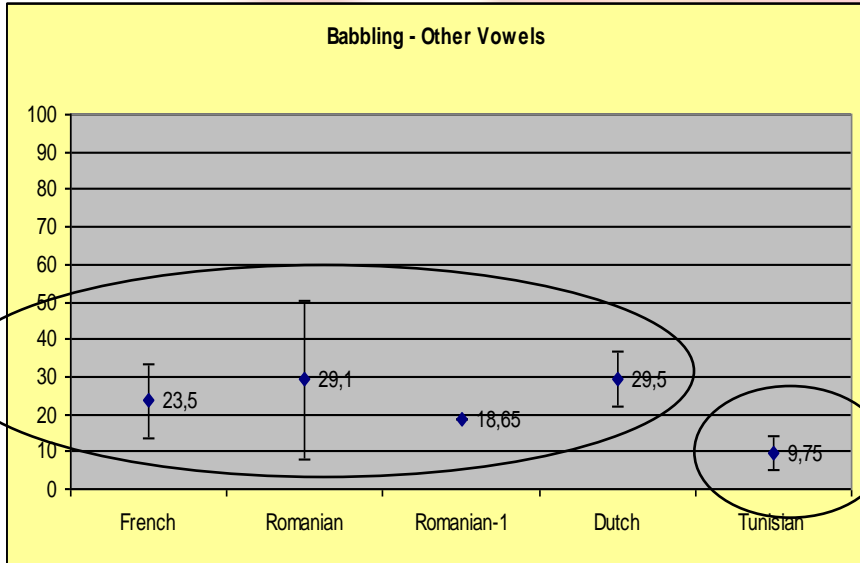
**Babbling - V<L**



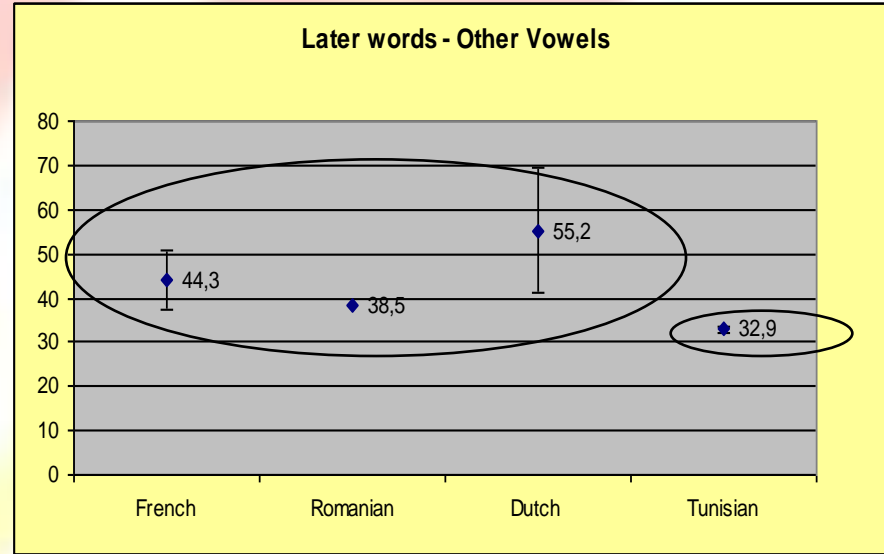
**Later words - V<L**



**Babbling - Other Vowels**



**Later words - Other Vowels**



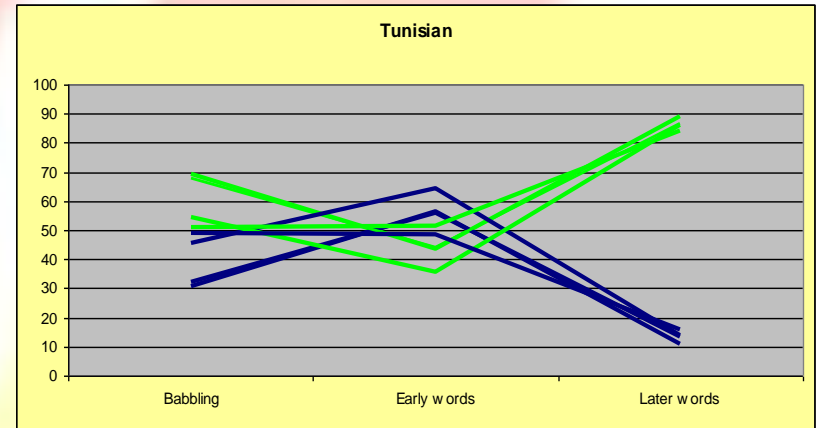
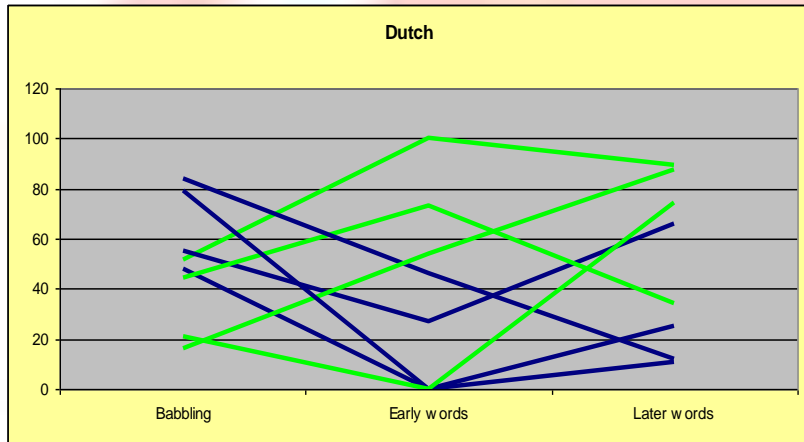
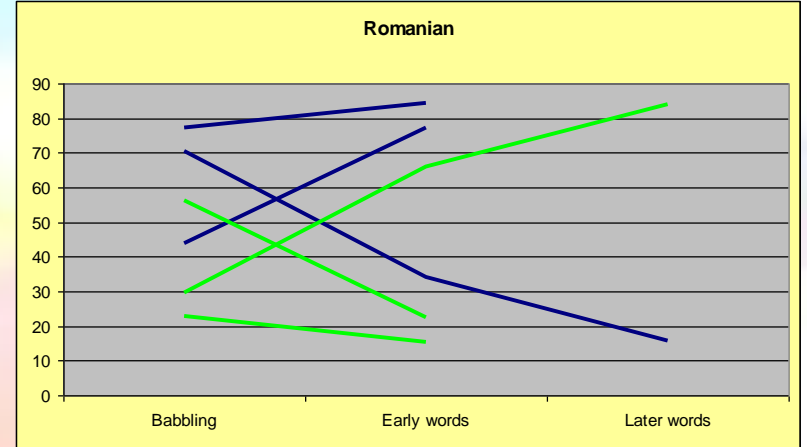
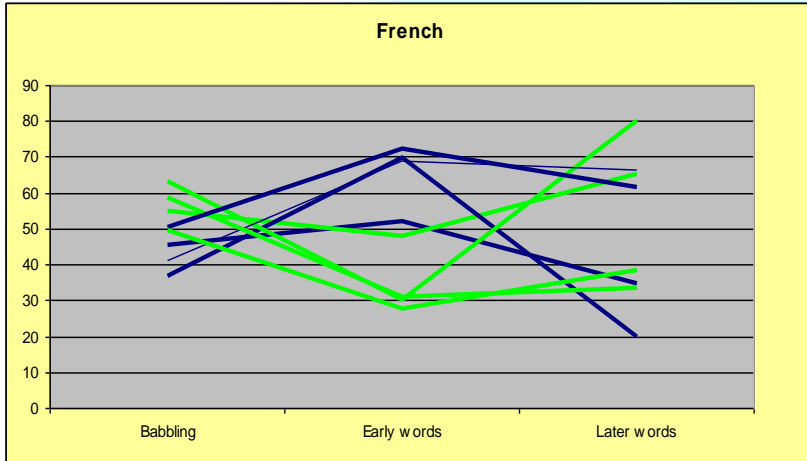
# Intersyllabic combinations

Reduplication (R)

vs.

Variegation (V)

# Duplicated vs Variegated CVCV





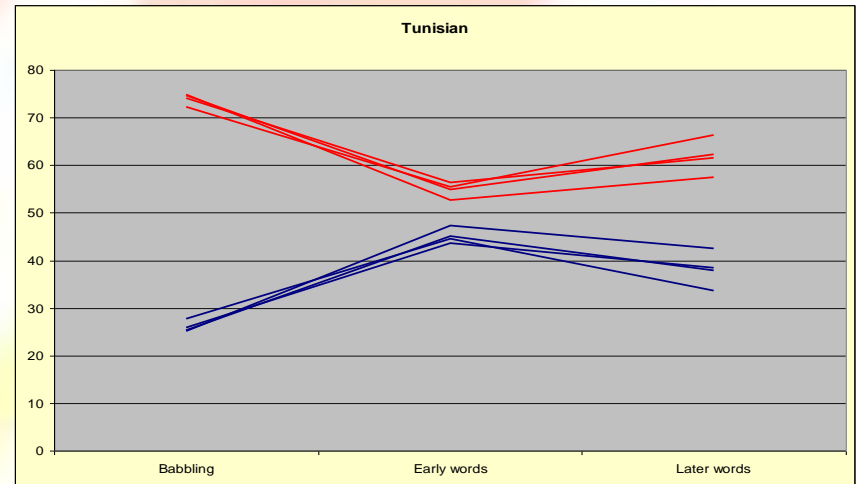
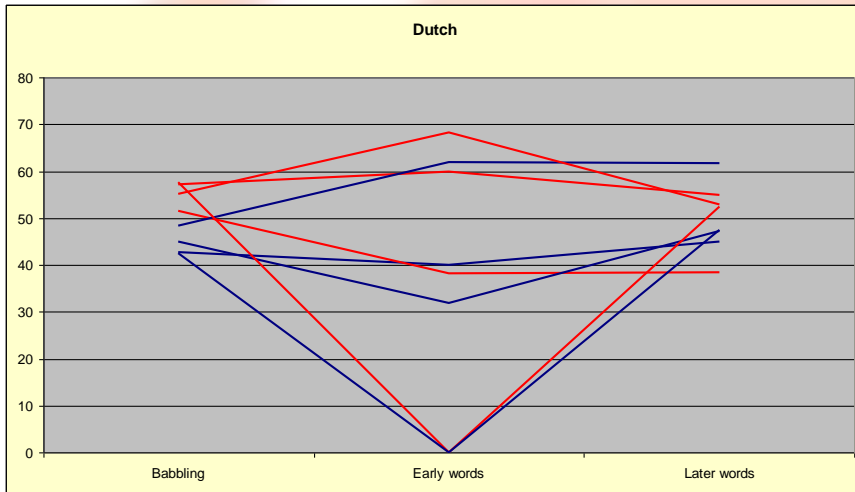
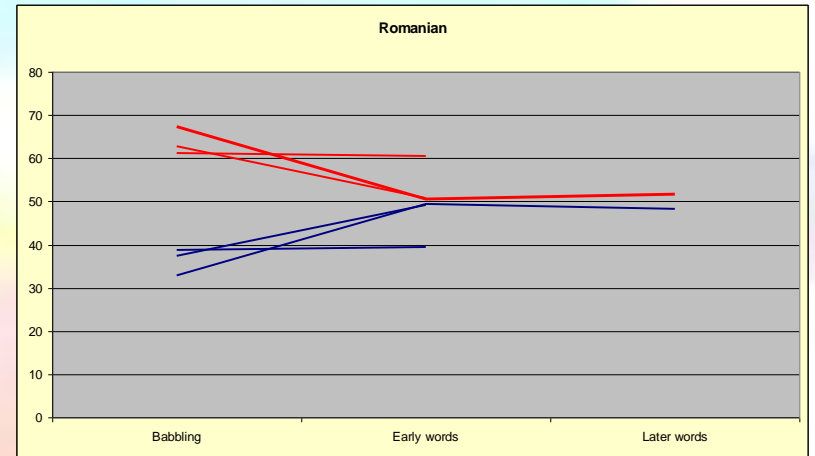
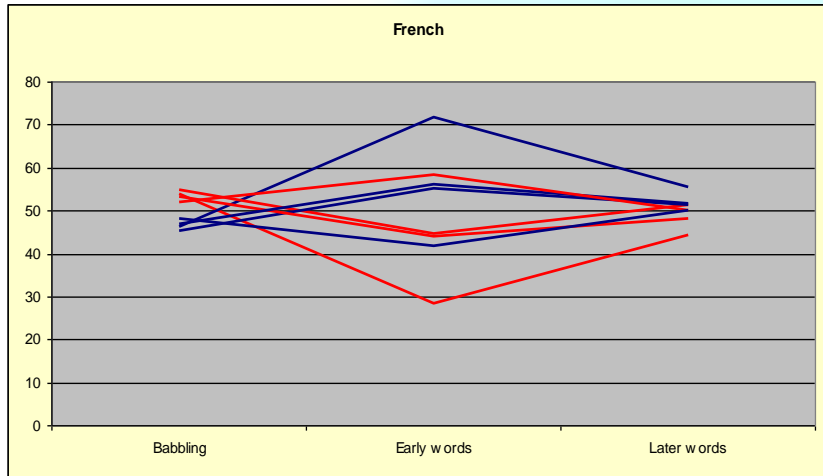
# Intersyllabic combinations

Height variegation (H)

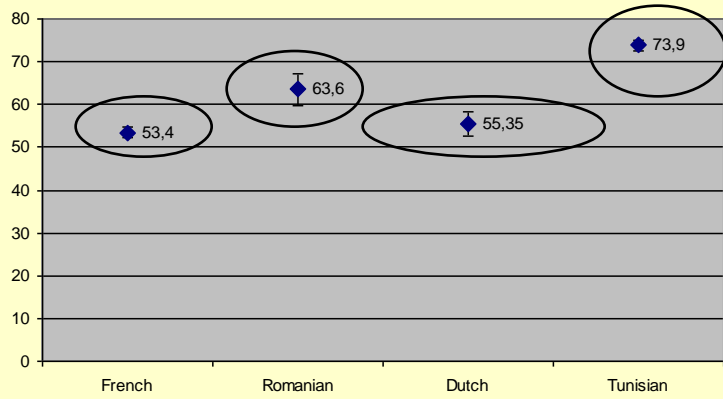
vs.

Front-back variegation (F/B)

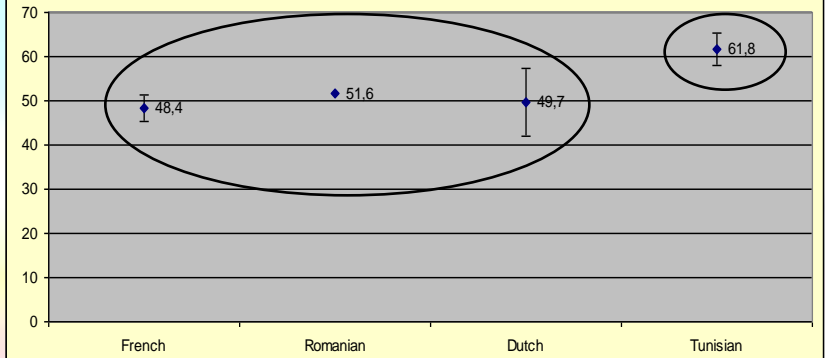
# Height vs Front-Back V changes



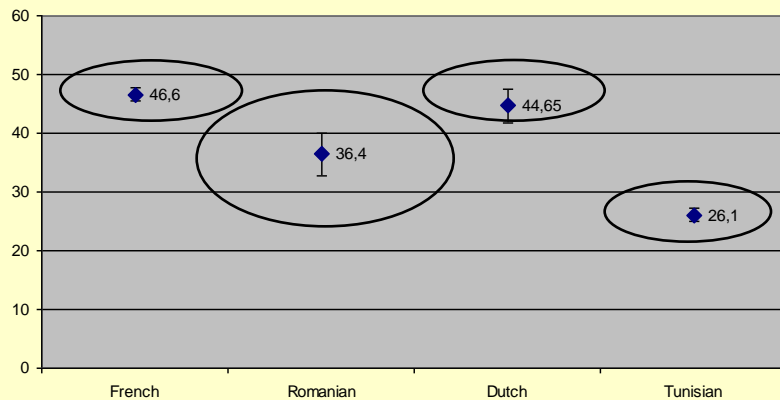
**Babbling - Height**



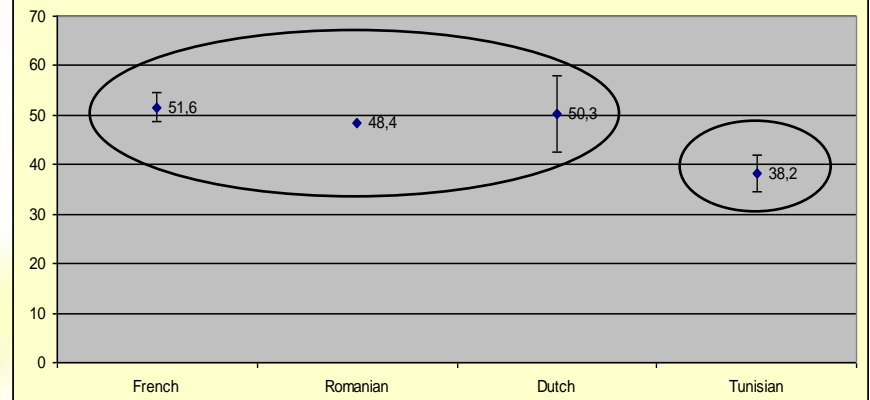
**Later words - Height**



**Babbling - Front-Back**



**Later words - Front-Back**



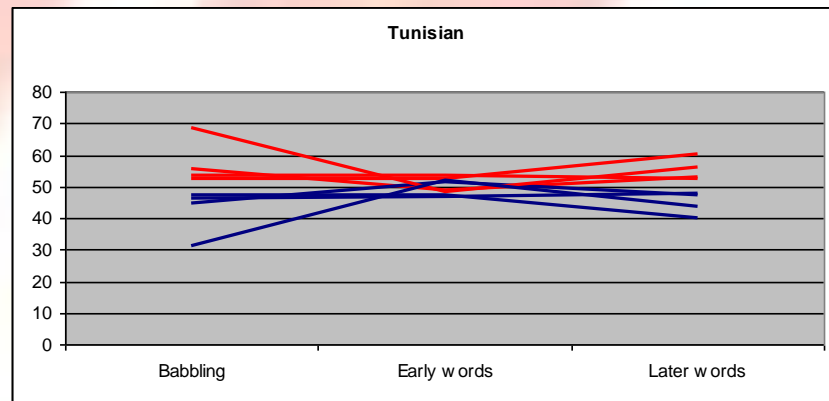
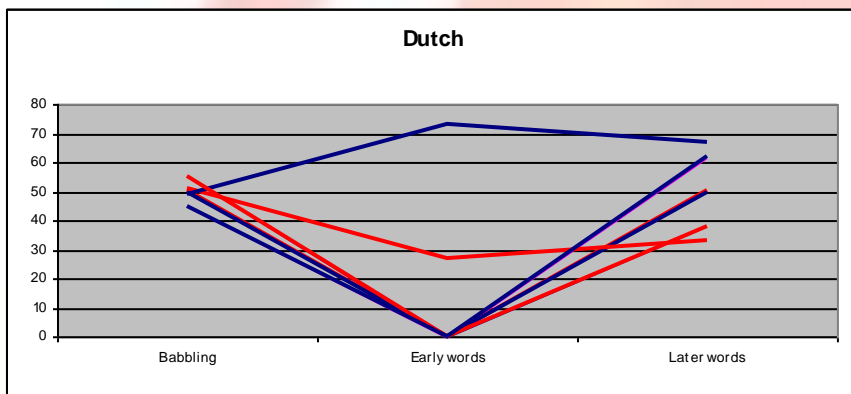
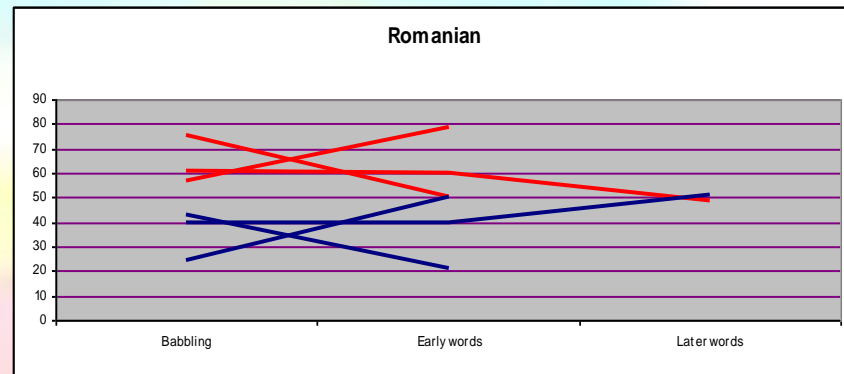
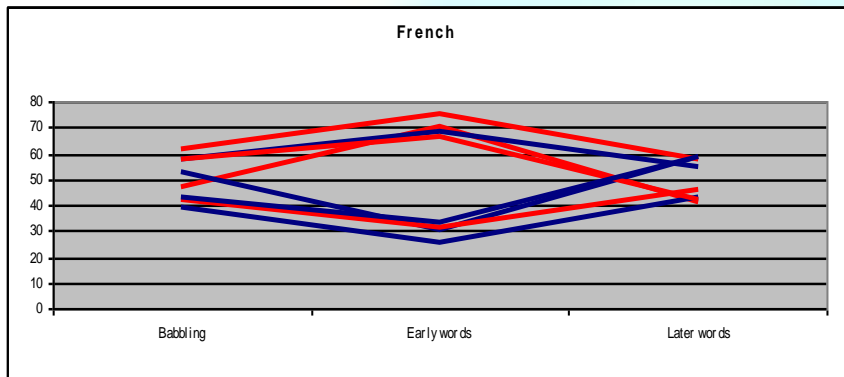
# Intersyllabic combinations

Manner variegation (M)

vs.

Place variegation (P)

# Manner vs Place C changes



# Conclusions

## - Same developmental stages in lexicon size?

Yes with interindividual differences higher than crosslinguistic differences

## - Same preferred trends ?

### Yes for

Oral/nasal stops > other manner of articulation (2 exceptions / 43)

Labial+coronal > other place of articulation (4 exceptions/43)

Vowels from the lower left quadrant > other vowels (6 exceptions/43)

Cooccurrence of variegated and duplicated CVCV sequences

### Not consistent for

Vowel Height > Front-back changes

Consonant Manner > Place changes

Especially prevalent in Babbling, first words,  
More movement diversity after the 50 words mark

>> no clear influence of input (vs influence on syllable types and utterance length)

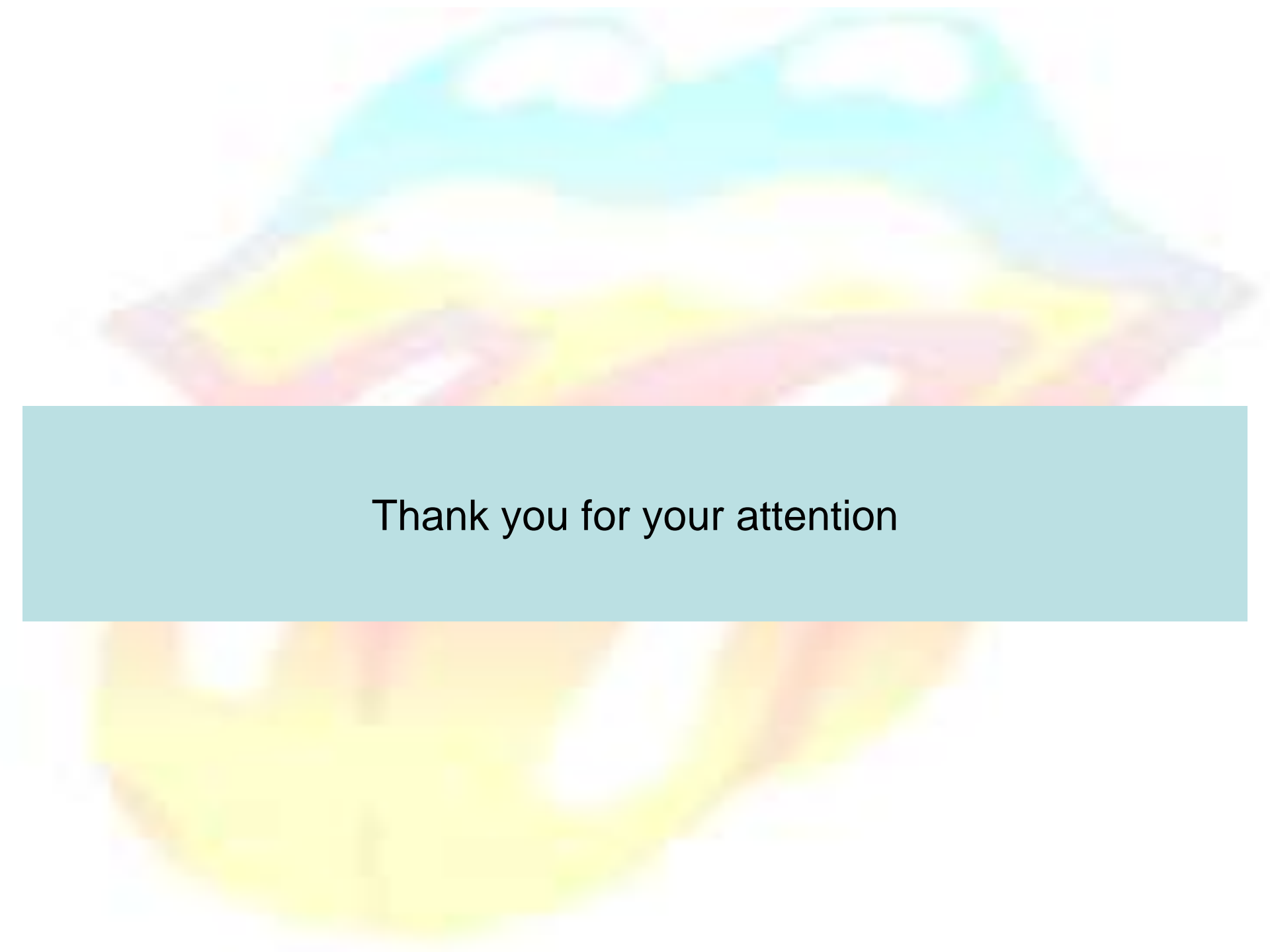
- Continuity between babbling and first words ?

	Babbling	Early words	Later words
Manner	+	+	-
Place	+	+	-
Vowels	+	+	+
Dupli/vari	+	+	-
Manner/place	+	+	+/-
Height/Front-back	+	+	+/-

# Conclusions

- Overall: children show generally the same developmental characteristics across these three periods
  - More interindividual (within language) than crosslinguistic variation
  - Large degree of continuity between babbling and first words
  - More diversity emerges after the lexical spurt : simple to complex
  - No obvious influence of perceptual learning from ambient language input
- Needed:
- Further statistical evaluation of the relationship between children and languages (in progress)
  - Comparisons with English as a frequently studied language (in progress) – The texas speech acquisition data base.



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Thank you for your attention