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Input characteristics and impact on the acquisition of phonological variables in French

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Context of the study (1)

- ALIPE project (*Acquisition de la Liaison et Interactions Parents-Enfant / Acquisition of the Liaison and Parents-Child Interactions*).
- Four main objectives:
 - collect and structure a corpus of acquisitional data,
 - describe the characteristics of the Child Directed Speech (CDS) concerning liaison and elision,
 - observe the construction of alternative phonological patterns,
 - propose a scenario for schwa acquisition.

Context of the study (2)

- Liaison:
 - The liaison is the phenomenon of producing a **consonant** that is **graphically present and normally mute** at the end of a word (Word 1) preceding a second one (Word 2) **beginning with a vowel**. For example:
 - “Trois **-Z-** ours” (*three bears*) but “trois” (*three*) and “ours” (*bear*)
 - Two types of liaison can be distinguished:
 - **categorical** liaisons like “un **-N-** ours” (*a bear*),
 - **variable** liaisons like “il est **-T-** arrivé” (*he arrived*).

Context of the study (3)

- Schwa elision:
 - The schwa is a **vowel** with a particular status: it **can be produced or not**, depending on several criteria e.g. communication situation, speaker's geographical origin etc. For example:
 - “*J'ai pris le bus pour venir à la conférence*” or “*J'ai pris l(e) bus pour v(e)nir à la conférence*” (I took the bus to come to the conference)
 - Four main contexts can be distinguished. In this study we will only observe the variable elision of the schwa in monosyllabic contexts, when the latter precedes a word starting with a consonant.
 - We do not deal with contexts such “*l'ami*” (the friend) where the schwa elision is obligatory in the article “*le*”.

Outline of this presentation

- Child Directed Speech and the acquisition of phonological variables liaison and schwa elision
- ALIPE project: data collection methodology and data structuration
- The acquisition of schwa elision in French L1 : what do we learn from Child Directed Speech ?

Child Directed Speech and the
acquisition of phonological
variables liaison and elision

CDS: main characteristics when compared with Adult Directed Speech (ADS)

- **Structural:** CDS is more associative, repetitive and consistent (Hills, 2013).
- **Syntactic and lexical:** shorter and simpler utterances (less complex sentences), more limited lexicon (Snow & Ferguson, 1977 ; Fletcher & MacWhinney, 1995).
- **Phonetic/Phonological:** lower rate of speech, higher pitch, exaggerated intonation and hyper-articulated vowels (Jisa & Richaud, 1994 ; Uther *et al.*, 2007).

CDS: phonological characteristics when compared with ADS

- Phonological characteristics:
 - less vernacular variants (Foulkes *et al.*, 2005 ; Dilley *et al.*, 2013),
 - most frequent variable liaisons (Liégeois *et al.*, 2011),
 - less schwa elisions in the nouns than verbs (Andreassen, 2011).

CDS: effects on the acquisition of phonological variation

- Liaison and elision: phenomena with **problems of overlap** in first language acquisition:
 - Syllables boundaries Vs. lexical boundaries

un | ours
[œ̃ | n u r s]

l(e) | chat
[l | ʃ a]

le | chat
[l ə | ʃ a]

- Production variability:
 - variable liaisons,
 - variability in use of liaison consonants,
 - variability in schwa production.

CDS: effects on the acquisition of phonological variation

- Usage-based conception (Tomasello, 2003) of categorical liaison acquisition (Chevrot et al., 2009):
 - Step 1: memorisation of a **chunk**
 - Step 2: memorisation of **several exemplars**
 - Step 3: construction and memorization of more **general patterns**

Step	Input	Memorisation
Step 1	un ours	[un n - ours]
Step 2	un ours, des ours, petit ours	[n - ours] [z - ours] [t - ours] Example of error: un -z- ours
Step 3	un ours, un âne (a donkey), un enfant (a child)	[un - n+X]

CDS: effects on the acquisition of the variable schwa ?

- To maximise speech segmentation, comprehension and lexical acquisition, parents tend to respect the Consonant-Vowel schema recurrent in French:
 - **variable liaisons** are produced more frequently in CDS than in ADS (Liégeois *et al.*, 2011),
 - **the schwa in nouns** is more often produced in CDS than in ADS (Andreassen, 2011).
- In this study, we focus on **schwa elision in monosyllabic words** (*ce, de, je, le, me, ne, que, se* and *te*) in order to determine:
 - what are the characteristics of CDS concerning schwa elision,
 - if the schwa elision frequency in CDS influences schwa acquisition.

ALICE project : data collection
methodology and data
structuration

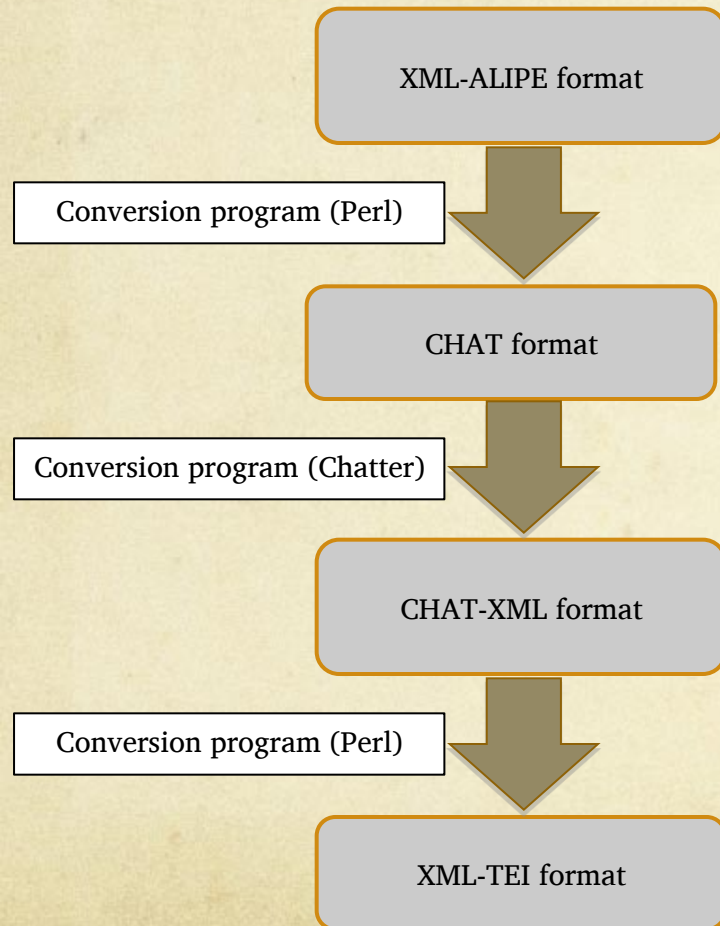
Data collection

- Audio corpora recorded during **everyday situations** e.g. bath time, meals, playtime...
- **Two recording periods** – eight-month interval between them.
- **Recordings managed by the parents:**
 - unobtrusive method,
 - few parental interventions: they just had to start and stop the recorder.

Corpora

	Salomé	Baptiste	Prune
Age at stage 1 (S1)	28 months	36 months	40 months
Age at stage 2 (S2)	36 months	44 months	48 months
Coverage: length of recordings	14h (liaison) 10h (schwa)	10h (liaison + schwa)	14h (liaison) 11h (schwa)
Coverage: number of liaisons contexts	2347	1555	3363
Coverage: number of monosyllabic schwas contexts	6126	2667	6007

Corpora



- Two standard formats used:
 - CHAT format
 - XML-TEI format
- These standards enable:
 - data exchange,
 - analyses' replication and results' verification,
 - corpora databases' enrichment.

Corpora database

<http://lrl-diffusion.univ-bpclermont.fr/alipe/>

Transcription

- Fichier audio :

- pour l'écoute en streaming : [ali-prune-071120-1.m3u](#)
- pour télécharger le fichier mp3 : [ali-prune-071120-1.mp3](#)

- Transcription complète en TEI : [ali-prune-071120-1.xml](#) (section TEI/text/body)

Ce corpus distinguable fait partie du corpus global : [ali-prune-global](#)

Transcription complète (simplifiée)

CHI-Prune : [chaîne incompréhensible]
CHI-Prune : on joue
FAT-Prune : ouais
FAT-Prune : j'ai mis les la cabane là c'est bien
FAT-Prune : approche-toi
FAT-Prune : assieds-toi
CHI-Prune : attends
CHI-Prune : faut que j'enlève mon mon ma main de pirate
FAT-Prune : d'accord
CHI-Prune : parce que c'était rigolo de jouer [liaison non realisee] aux pirates
FAT-Prune : ah ouais hein
FAT-Prune : c'est bon
CHI-Prune : j'enlève mon mon bandeau de pirate et c'est bon
CHI-Prune : et ces jouets [liaison non realisee] aussi
FAT-Prune : hein
CHI-Prune : [laughs]
FAT-Prune : ah
CHI-Prune : ils [liaison realisee en z] habitent juste à côté les voisins
FAT-Prune : oui
CHI-Prune : et tu la mets
CHI-Prune : tu peux la mettre juste à côté
FAT-Prune : d'accord
CHI-Prune : juste
FAT-Prune : juste
CHI-Prune : oui
CHI-Prune : et l'arbre
CHI-Prune : tout qui fait des des des des mûres
FAT-Prune : des mûres
CHI-Prune : hum
FAT-Prune : il fait des
FAT-Prune : il fait quoi l'arbre
CHI-Prune : et et des mûres
CHI-Prune : et ça on dirait que c'est la souris qui vit [liaison non realisee] ici
FAT-Prune : hum hum

- Streaming playback.
- Possibility to **download** transcription and recordings.
- Transcription overview:
 - orthographic transcription,
 - liaison annotation.

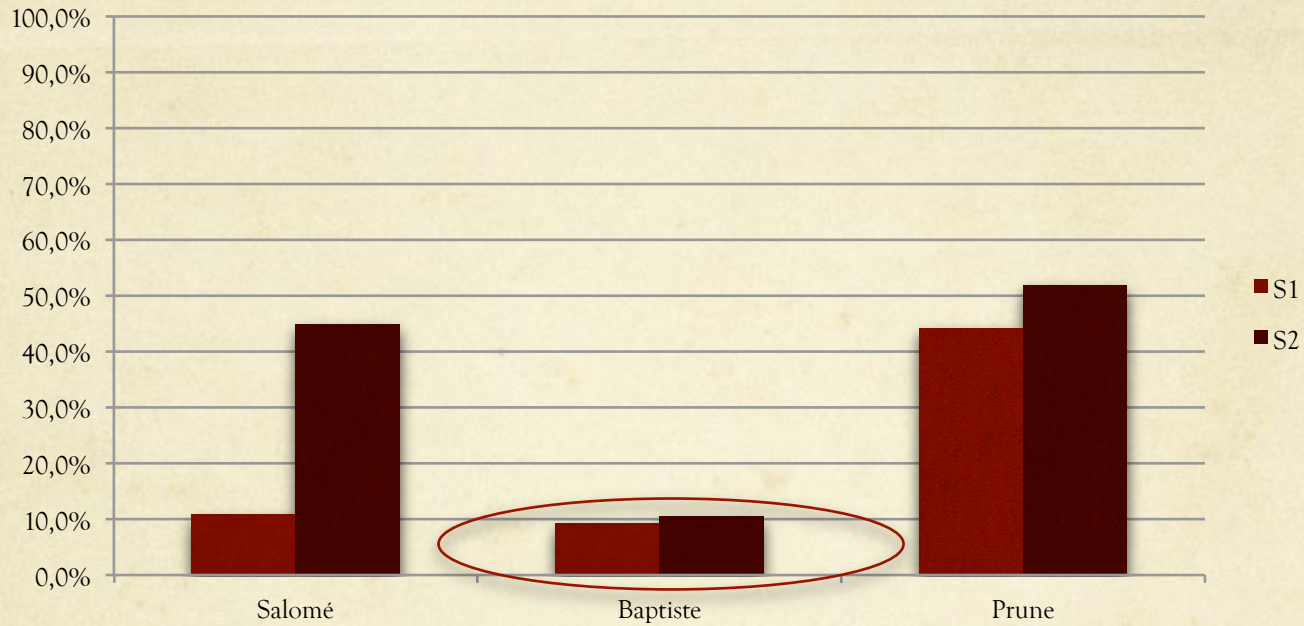
Acquisition of elision : what do
we learn from CDS?

Elision rates in ADS and CDS (monosyllabic words grouped together)



Parents	Stage of recording and age	Rate of elision in ADS	Rate of elision in CDS	χ^2	P
Salomé's parents	T1 : 2;4 ans	62,10%	37,00%	Chi2=95.0865	p<0,0001
	T2 : 3;0 ans	58,20%	56,10%	Chi2=0	p>0,05
Baptiste's parents	T1 : 3;0 ans	65,1%	31,7%	Chi2=75.9812	p<0,0001
	T2 : 3;7 ans	57,5%	35,9%	Chi2=40.7326	p<0,0001
Prune's parents	T1 : 3;4 ans	67,8%	31,6%	Chi2=95.0865	p<0,0001
	T2 : 4;0 ans	50,0%	51,2%	Chi2=0	p>0,05

Elision rates in the children's productions (monosyllabic words grouped together)



Child	Stage of recording and age	Rate of elision	χ^2	P
Salomé	T1 : 2;4 ans	10,81%	$\chi^2 = 216.0006$	P<0,0001
	T2 : 3;0 ans	44,91%		
Baptiste	T1 : 3;0 ans	9,2%	$\chi^2 = 0.0527$	P>0,05
	T2 : 3;7 ans	10,4%		
Prune	T1 : 3;4 ans	44,19%	$\chi^2 = 7.3637$	P<0,01
	T2 : 4;0 ans	51,9%		

What are the characteristics of CDS concerning schwa elision ?

- At stage 1, parents tend to **maintain the schwa more frequently when they address their child.**
 - At stage 2, the **difference** in elision rates between CDS and ADS is **no longer statistically significant** when the child produces comparable rates of elision to the parents' (Salomé and Prune).
- The parents tend to **adapt their discourse** to the linguistic abilities of their child.

Schwa elision: focus on two particular monosyllabic words

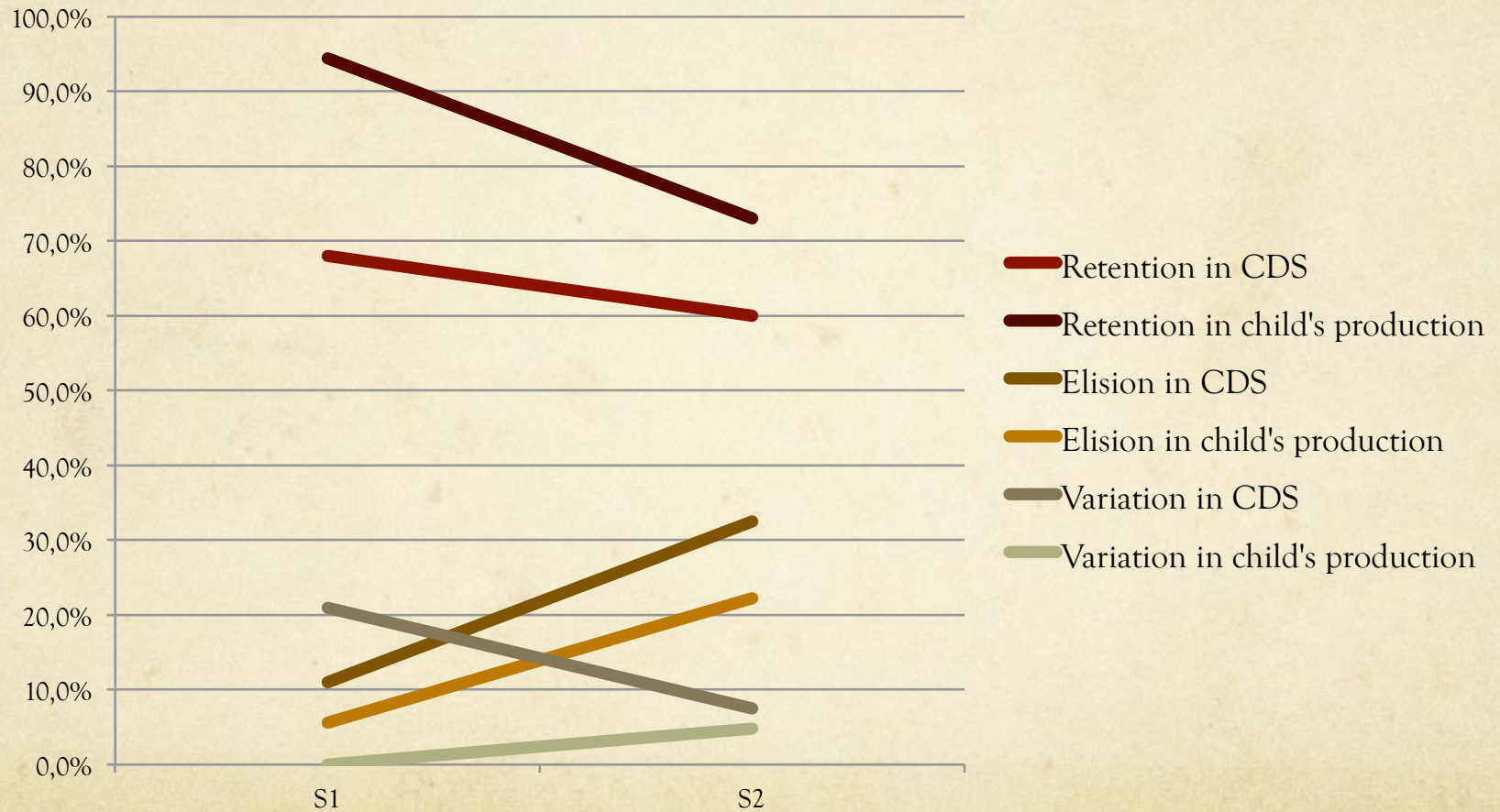
- Focus on “le” (*the*) and “je” (*I*), the most frequent monosyllabic words in our corpora.
- Particular status of “le”: it can precede a verb (pronoun) or a noun phrase (article). In this study **we only consider “le” when it precedes a noun phrase.**
- Focus on the constructions [le + X] and [je + X] to determine whether the **phonological variation in these contexts is modulated in CDS** and its effect on elision acquisition.

Elision rate in the constructions [*le* + X]

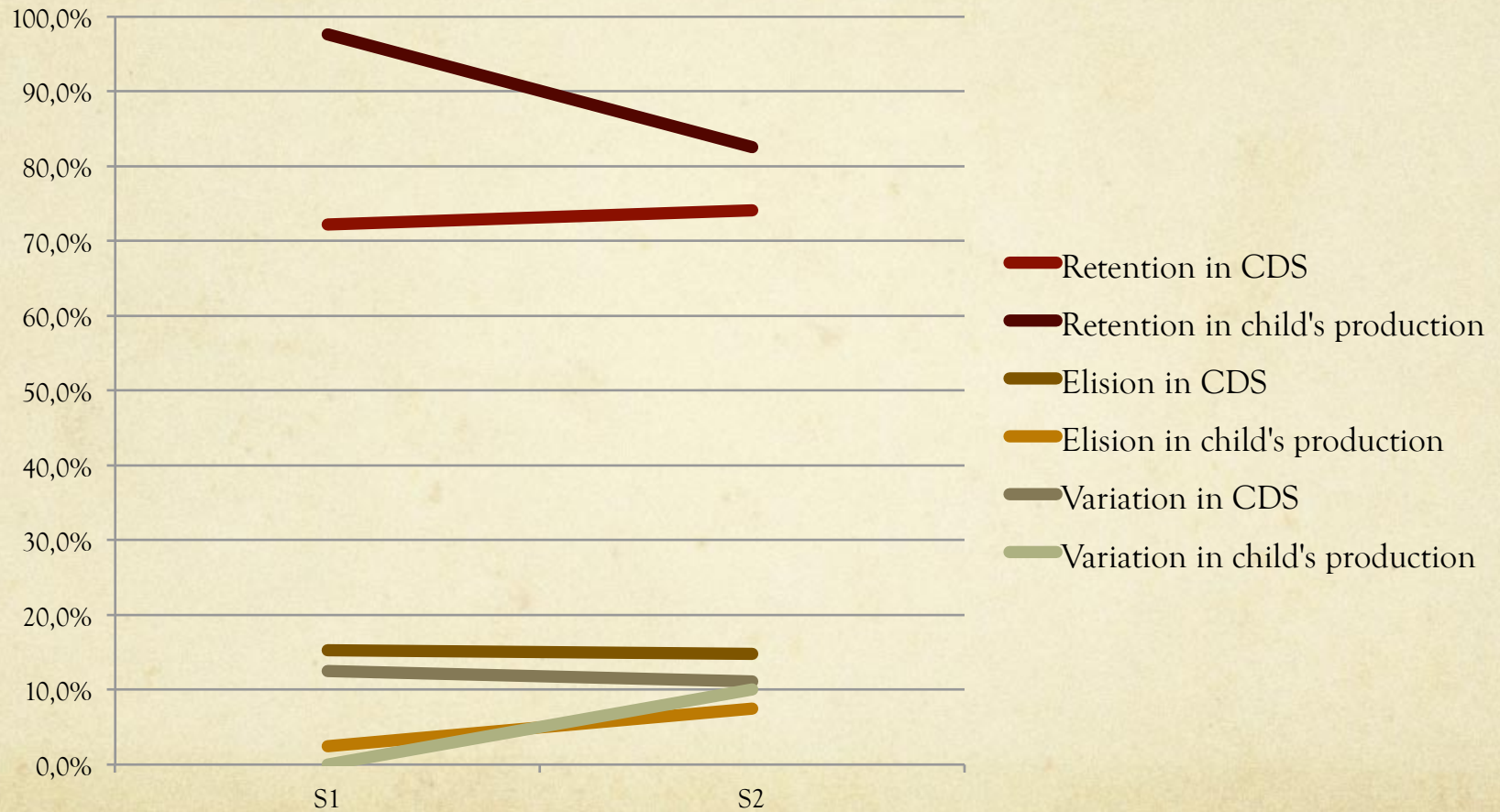
- For each particular construction, **categorisation** based on whether there is variation (3) or not (1 & 2):
 1. **Retention** → The schwa is always maintained: “*le ballon*”, “*le ballon*” (the ball)
 2. **Elision** → The schwa is always elided: “*l(e) ballon*”, “*l(e) ballon*”
 3. **Variation** → The schwa is maintained and elided: “*le ballon*”, “*l(e) ballon*”

Child	Number of constructions (S1 + S2)	Parents	Number of constructions (S1 + S2)
Salomé	117	Salomé’s parents	180
Baptiste	81	Baptiste’s parents	126
Prune	117	Prune’s parents	96

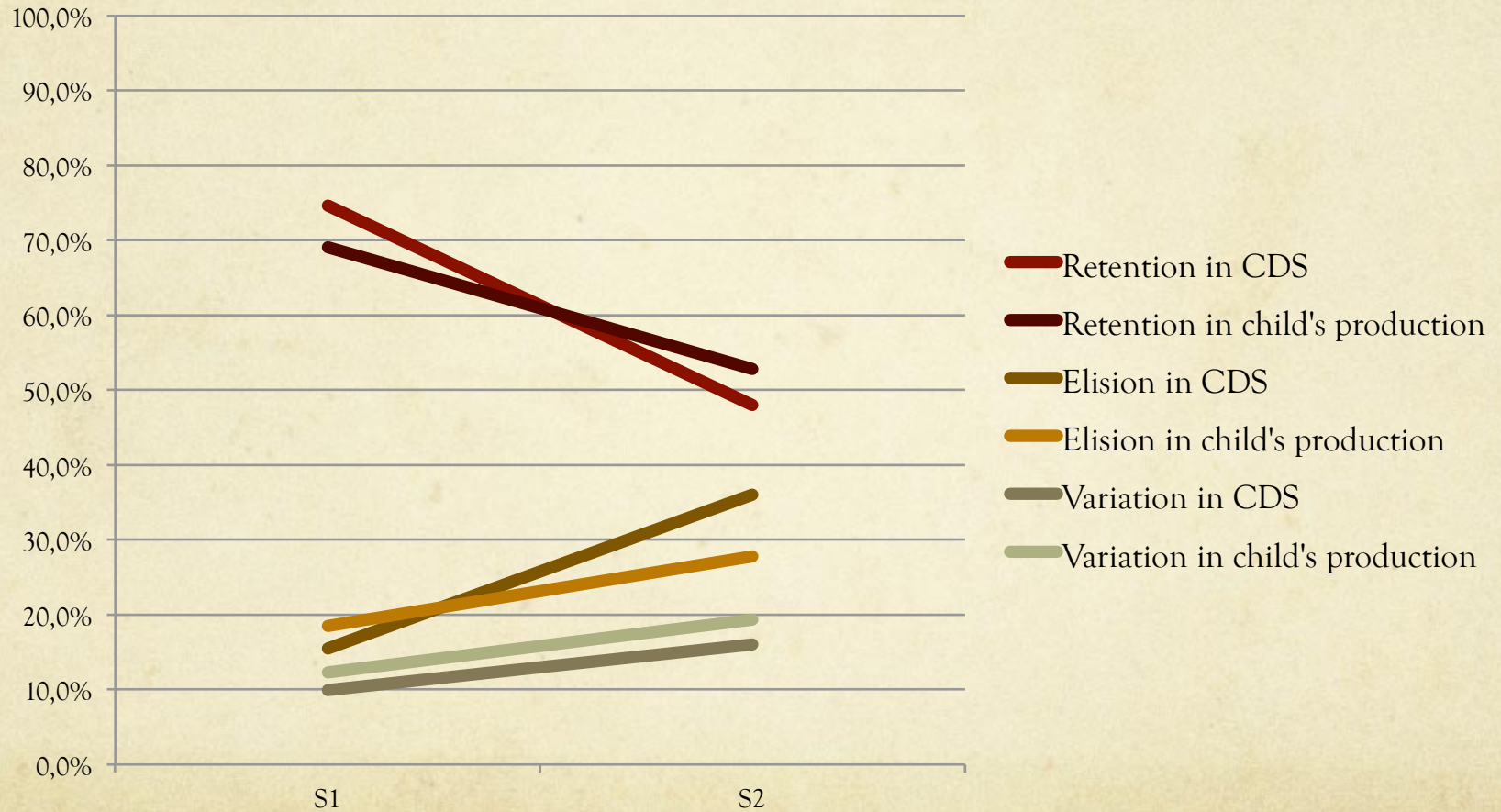
Productions of Salomé and her parents



Productions of Baptiste and his parents



Productions of Prune and her parents



Elision rate in the constructions [*le* + X]

- At S1, for the two youngest children (Salomé & Baptiste):
 - schwa elision is marginal,
 - variable contexts do not exist.
- Between S1 and S2, parents tend to adapt their productions to these characteristics.
- We postulate that at an early stage, the article is not memorised with a variable schwa.
- We suggest that the non-schwa variant of the article is memorized as a chunk with the noun, like liaison variants.

[je + X]

- Focus on “je”: the monosyllabic word with **the highest elision rate at S2** for all three children.
- Comparison of the elision rate in the CDS at S1 and in the children’s productions at S2 in a selection of constructions.

Selected constructions

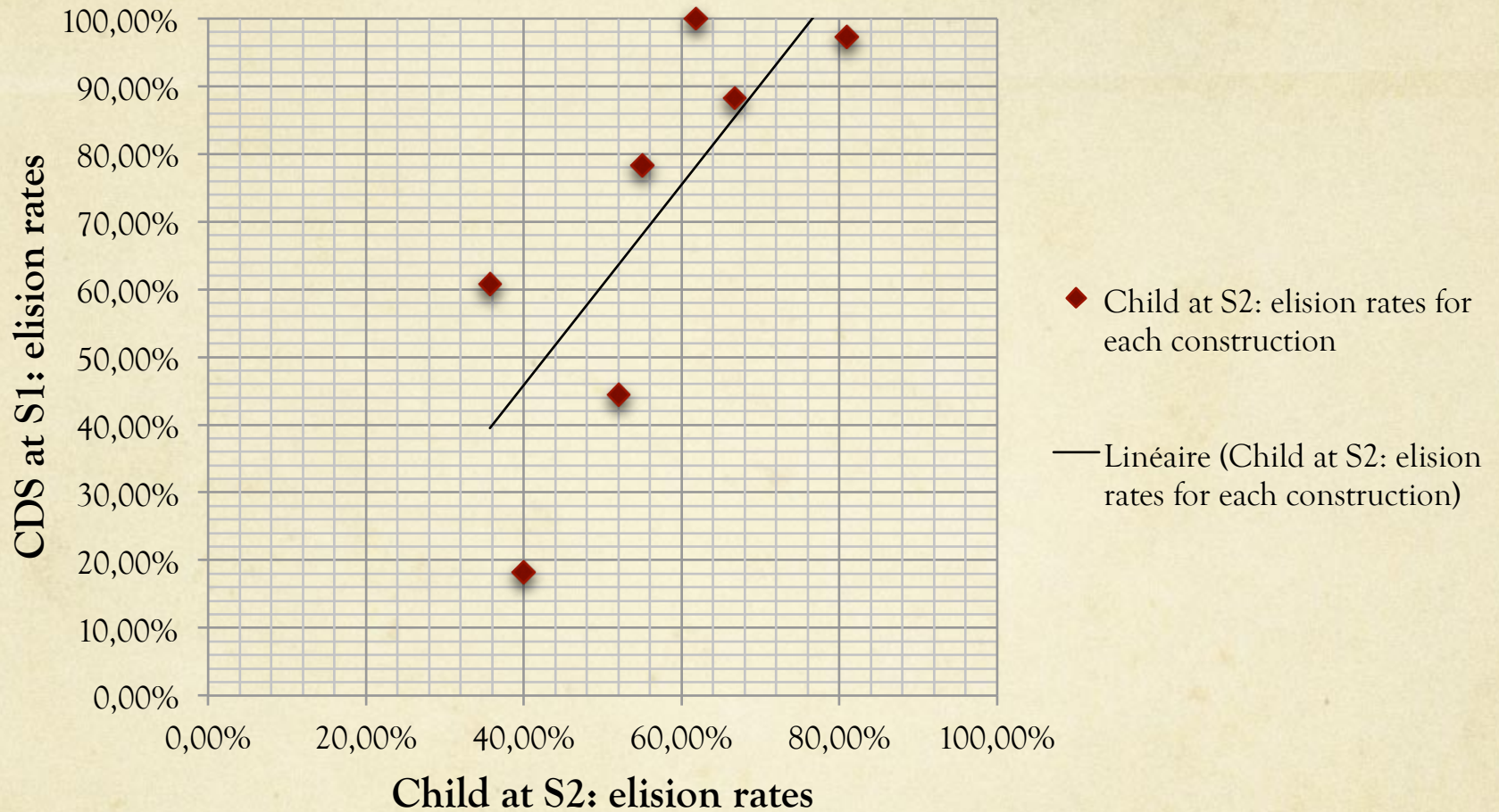
Salomé and her parents

je + sais, suis, te, crois, vais, peux, veux
Salomé: 112 contexts / Parents: 183 contexts

Prune and her parents

je + sais, suis, te, crois, vais
Prune: 212 contexts / Parents: 99 contexts

Productions of Salomé and her parents



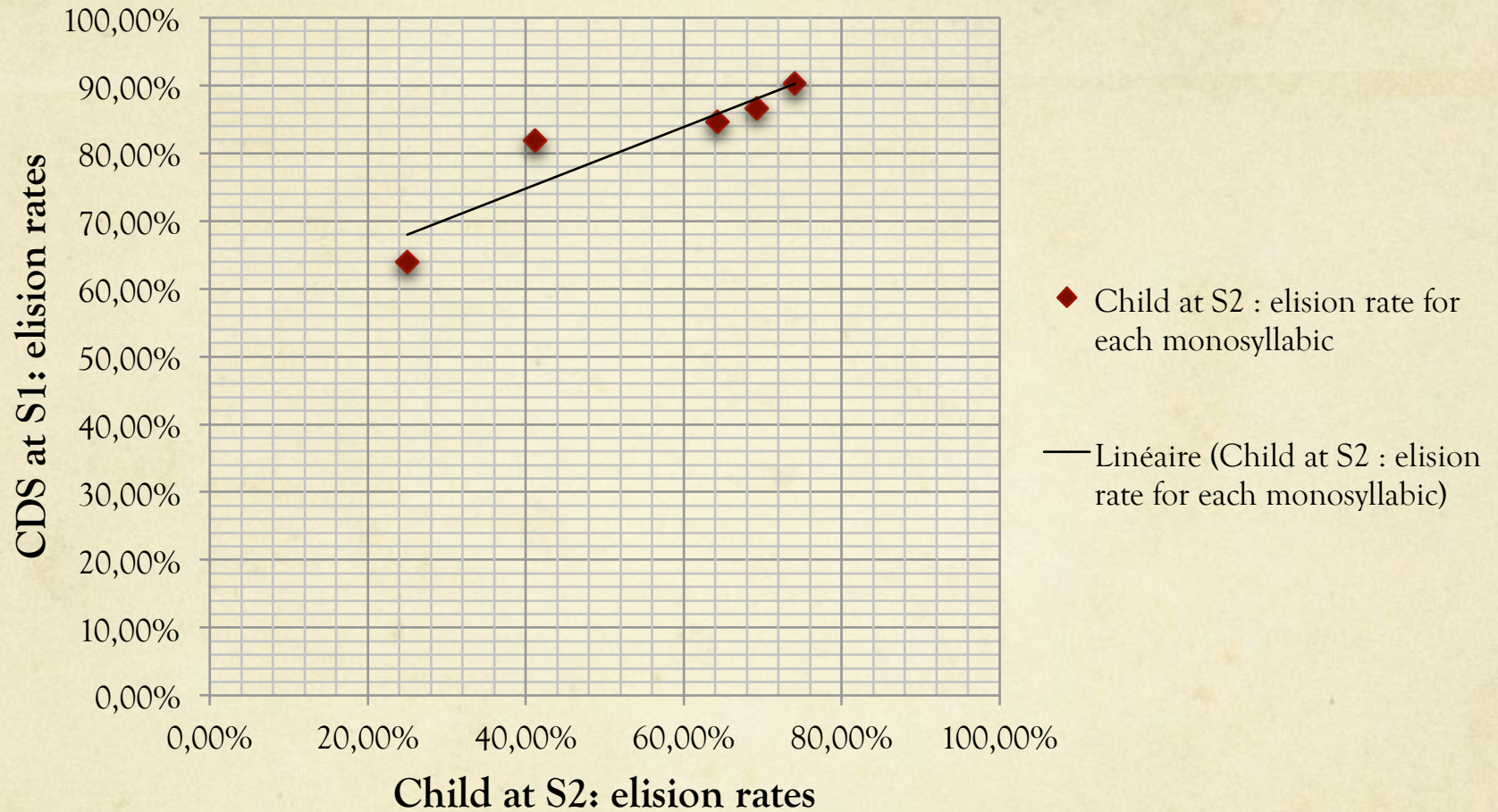
Rho

P

Rho = 0.7857143

P < 0,05

Productions of Prune and her parents



Rho

P

Rho = 1

P < 0,05

Discussion

- Concerning phonological variation, CDS is adjusted: parents tend to adapt their productions to the linguistic abilities of their children. **This modulation is not correlated with speech rate variation.**
- We propose that CDS specificities influence the acquisition of schwa variation:
 - In particular constructions [je + X], elision rates in parental CDS at S1 and children's productions at S2 are correlated

Discussion

- For the particular constructions [*le* + NOUN GROUP]:
 - **At an early stage**, elision contexts in children's productions are marginal and variable contexts are absent. We postulate that **the child memorize two types of constructions:**
 - a exemplar containing the non schwa variant of the article with the substantive, e.g. [l-chat]
 - a more general pattern whose permit her to insert a noun or an adjective beginning with a consonant after "le": [le + X]

Discussion

- For the particular constructions [*le* + NOUN GROUP]:
 - Later, the child is exposed to a more variable input and is able to construct and memorise a more abstract pattern allowing him to vary her production, in the same context, between the schwa variant and the non-schwa variant.
 - We can also postulate that the two patterns stay in competition. So, both the schwa and the non-schwa variants of the article would be stored as lexical entries, like Bürki *et al.* (2010 ; 2011) propose for nouns.
- These findings need to be deepened and confirmed by studying other corpora or through experimental tests.

Merci !

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Publications: <http://hal.archives-ouvertes.fr/LRL/>