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Measuring lexical diversity in discourse of children with and without DLD in free-play

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Developmental Language Disorder (DLD) & Lexical development

Temporal gap in comparison between DLD and TD children (McGregor, 2009)

Restricted vocabulary: chronological age or linguistic level (Leonard et al., 1999; McGregor et al., 2002)

Comparable distribution of grammatical categories (Hick et al., 2002)

Importance of intervention on lexical disorders to reduce communication disabilities

Assessment of lexical skills in childhood

Standardized test
Vocabulary test (labelling)
e.g. PEABODY Picture Vocabulary test (Dunn & Dunn, 2007)

Language sample analysis
recommended but lack of tools and data (da Silva-Genest et al., 2023; Klatte et al. 2022)

Parent report
e.g. CDI / IFDC in French (Fenson et al., 1993; Kern, 2003)
BUT < 3 y.o.

What about verbs?

Lexical poverty of verbs (Conti-Ramsden & Jones, 1997 for English; Parisse & Le Normand, 2002 for French)

Frequent use of General All-Purpose (GAPs) verbs (Kambanaros & Grohmann, 2015; Rice & Bode, 1993; Watkins et al., 1993)

But inconsistent data in the literature (Thordardottir & Weismer, 2001)

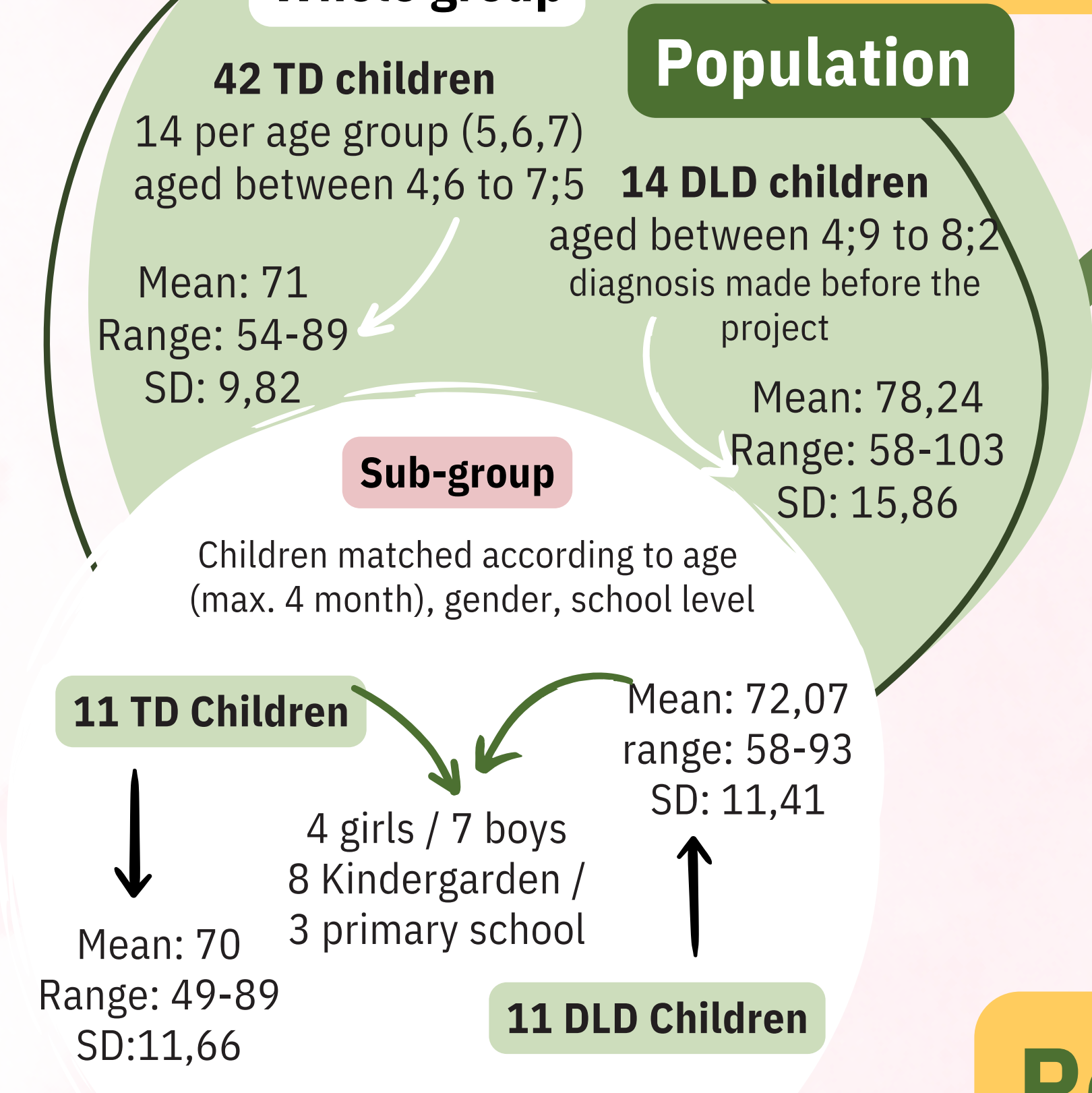
Objectives

- Greater knowledge of DLD children's lexical profile
- Better understanding of the differences between DLD and TD children's lexical profile
- More efficient functional assessment of lexical skills through free-play activities

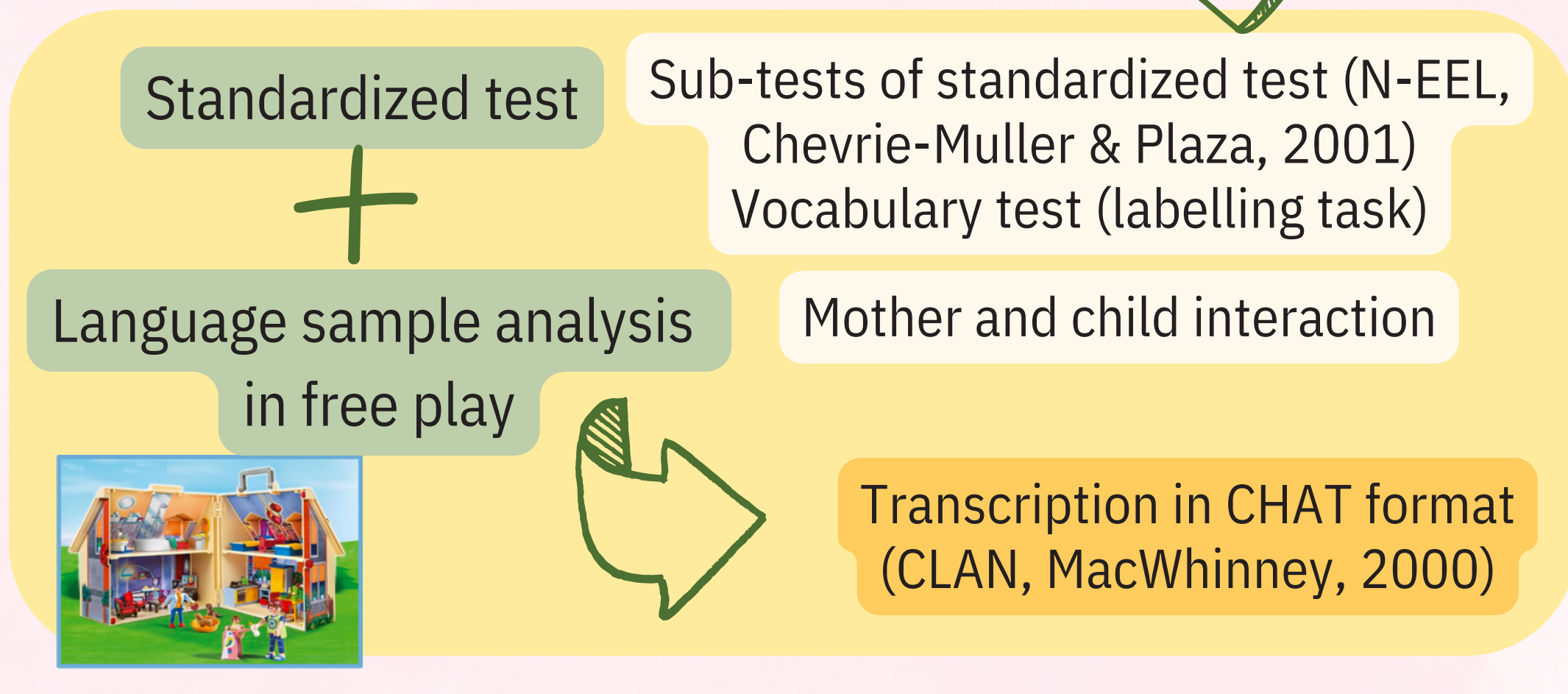
Is lexical diversity a relevant measure for french-speaking children over the age of 4?

What factors (among age, gender, school level, children's profile [TD or DLD]) should be considered?

Methodology



Data
Each child was observed in 2 situations

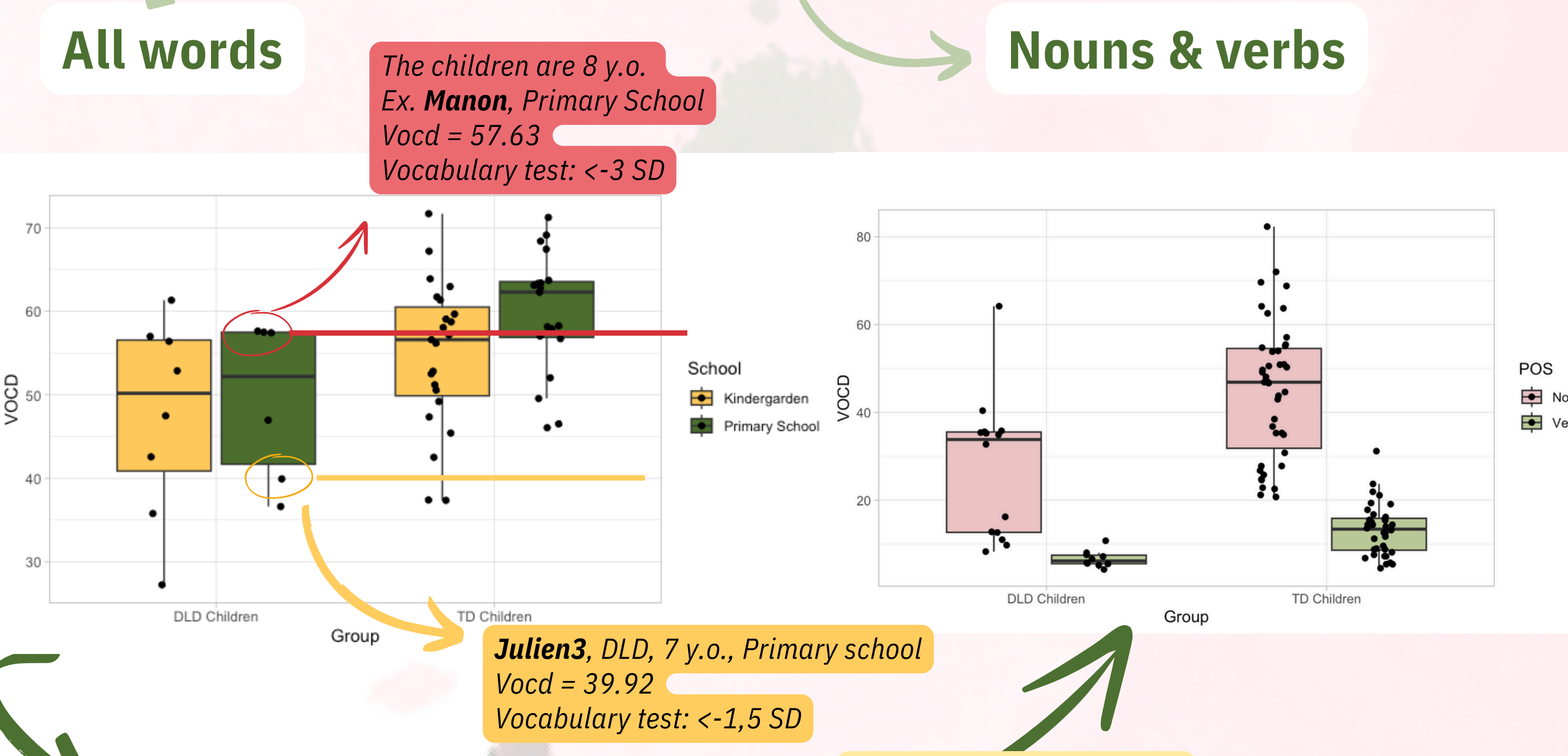


Analysis

- Lexical diversity (D score)**: Use of Vocd (vs. TTR) recommended for clinical assessment (Charest et al. 2020)
 - for all words,
 - for nouns & verbs
 according to group (TD vs. DLD) and school level
- Verbs description**: For the whole group and for the sub-group:
 - number of high-frequency verbs
 - formalized frequencies of verbs with a focus on GAPs Verbs

Results

1. Lexical diversity: D score



Lexical diversity (for all words) is significantly lower for:

- DLD children (vs. TD children)
- kindergarden children (vs. primary school)

$W = 144, p\text{-value} = < 0.005$

Also applies to:

- nouns $W = 130, p < 0,005$
- verbs $W = 47.5, p < 0.005$

Wilcoxon rank sum exact test

- No difference according to age or gender, both for TD & DLD children; no difference according to school level for DLD children.
- No correlation between D score and vocabulary test (N-EEL, labelling task) and verbal involvement.

2. Verbs description

Table 1 Number of high-frequency verbs and frequency of use by group of children in both corpora. High-frequency verbs are those that occurred with a frequency twice or more the average verb frequency (in accordance with definition of the Thordardottir & Weismer, 2001).

	Whole group		Sub-group	
	TD (42)	DLD (14)	TD (11)	DLD (11)
Number of high-frequency verbs	21	17	13	15
Average verb frequency (all verbs)	30.39	16.17	14.3	13.3
Number of different verbs	344	164	176	143
Number of verbs	10453	2651	2518	1896

- Children with DLD produce fewer verbs and fewer different verbs than TD children
- The number of high-frequency verbs does not differ according to the children's profiles, whether for the whole group or the sub-group ($\chi^2 = 2.3305; p > 0.05; \chi^2 = 0.60086; p > 0.05$)

GAPs verbs are not always high-frequency verbs Ex. ouvrir (open) et jouer (play)
Influence of the activity

Higher frequency of specific verbs in DLD children's discourse

Higher frequency of specific verbs in TD children's discourse

Relatively few differences between the 2 groups of children for high-frequency verbs

Differences observed in the use of verbs according to children's profiles
Ex. For DLD Children, **Savoir (know)** → je sais pas (I don't know) (TD vs. DLD; $\chi^2 = 5.8984; p < 0.005$)

Table 2 – Frequencies of High-frequency verbs and GAPs verbs
Relative verb frequencies for 10 000 verbs

Verbs	Whole group		Sub-group	
	TD (42)	DLD (14)	TD (11)	DLD (11)
être (be)	1901,85	1520,18	2021,45	1508,44
aller* (go)	1536,40	980,76	1382,05	891,35
avoir* (have)	842,82	814,79	901,51	864,98
mettre* (put)	650,53	652,58	627,48	701,48
faire* (do)	484,07	505,47	492,45	448,31
attendre (wait)	336,75	641,27	444,80	595,99
pouvoir (can)	242,04	282,91	242,26	200,42
regarder* (look)	158,81	430,03	162,83	527,43
dire (say)	216,21	177,29	270,06	158,23
dormir (sleep)	204,73	192,38	139,00	232,07
savoir* (know)	186,55	264,05	242,26	311,18
falloir (must)	157,85	282,91	353,38	353,38
manger (eat)	168,37	218,79	258,44	258,44
vouloir* (want)	131,06	139,57	142,97	142,97
tomber (fall)	102,36	245,19	131,06	268,99
prendre (take)	118,63	181,06	181,06	181,06
voir* (see)	106,19	147,11	179,33	179,33
venir (come)	79,40	73,66	73,66	73,66
réveiller (wake up)	73,66	73,66	73,66	73,66
rentrer (come back)	70,79	70,79	70,79	70,79
arriver (arrive)	62,18	62,18	62,18	62,18
Mean	372,92	451,55	553,86	500,00
SD	493,59	373,17	572,20	369,03

Discussion

1. DLD Knowledge

- Lexical abilities:** DLD children exhibit a lower lexical diversity for all types of words, and for both nouns and verbs; High-frequency verbs are not more frequent in the speech of DLD children than in the speech of TD children, thereby confirming the results of Thordardottir & Weismer (2001).
- Pragmatic & dialogic profile:** The analysis of high-frequency verbs reveals that DLD children use more regulation verbs (attendre wait, regarder look) and show their difficulty answering questions with a more frequent use of 'je sais pas' (I don't know) than TD children.

- Accessibility of lexical diversity data** to the research community and speech-language therapists, offering reliable measures for a more functional analysis of language.
- Perspectives:** automatic analysis tools should be developed and made more reliable for effective use in clinical settings.

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