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Using a Sentence Repetition Task in French Sign Language : a new approach to assess LSF abilities

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I. The Sign MET Project

Our aim was to develop new methodologies and tools in several sign languages (LIS, LSF, DSGS, LSC) in order to evaluate SL comprehension and production skills in deaf children (4-11 y.o.)

- Linguistic goal : to define methodologies to study sign language acquisition and master processes in deaf signing children.
- Clinical and rehabilitative goal : to diagnose language disorders in sign language.
- Educational goal : to assess linguistic skills and strengthen these skills.

<http://signmet.eu> & <http://www.prosigne.fr/SignMET/index.php>

II. The assessment of LSF skills : a short review

There is no existing specific test operational enough that assesses linguistic abilities in LSF.

Two tests have been developed previously: lack of several methodological features for the first one (too long for caretakers to administer, need to have a strong linguistic knowledge, etc. ; TELSF, 2001) and failure to adapt the second one (LSF Receptive Skills test adapted from BSL Receptive Skills test, 2010).

As a result, caretakers, teachers and others transpose vocal tests to SL tests without taking into account the linguistic specificities of SL.

Courtin et al., 2010 ; Niederberger et al, 2001; <http://www.signlang-assessment.info/>

III. Assessment of repetition skills in sign languages

In vocal languages, the repetition ability is a strong marker of general linguistic abilities (Marshall et al, 2014).

It is a reliable marker of language development and language processing. It requires robust linguistic representations, accurate phonological skills.

Gestural skills and short-term memory are not sufficient to recall a longer and /or syntactically complex sentence correctly.

Sentence Repetition Tasks already existed in ASL , BSL and have been used in several psycholinguistic studies with native and late signers.

4 SRT were created for LSF, LIS, DSGS, LSC

BSL Marshall & al., 2014 ; ASL Hauser, 2008 ; Emmorey, 2002

IV. The current study : to elaborate a tool in order to assess repetition abilities in LSF

Participants

- 33 Deaf signing Children of Deaf signing Parents, aged from 4;02 to 10;8, all deaf native signers.
- 7 children of 4-5 y.o , 9 children of 6-7 y.o , 9 children of 8-9 y.o , 8 children of 10 y.o.

Procedure

Participants were asked to recall in the exact same way 20 sentences that varied in complexity.

Complexity is defined according to length of the sentence, morphosyntactic structures (classifiers, inflection, role shift).

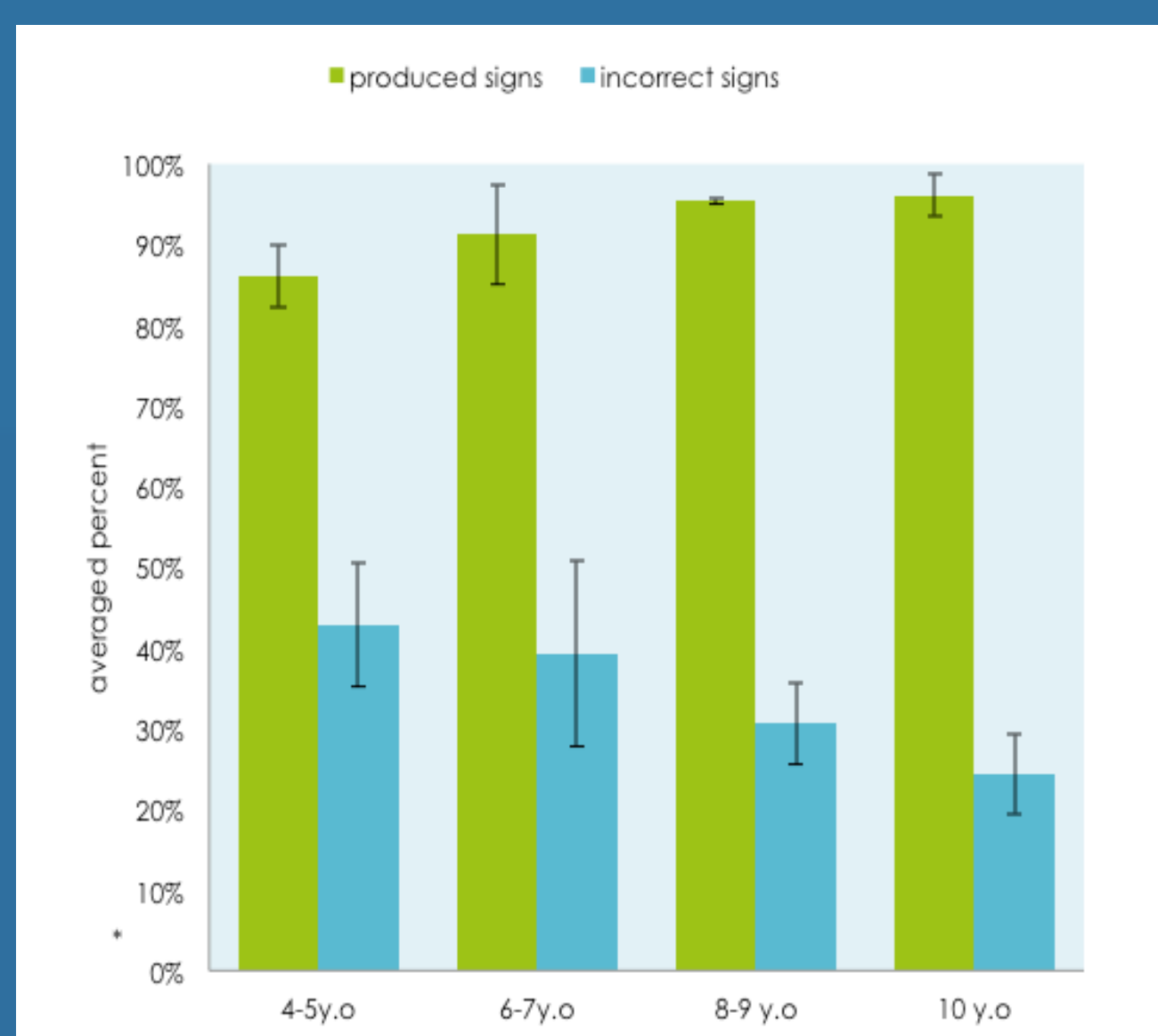
Sentences are presented from the easiest to the hardest ones.



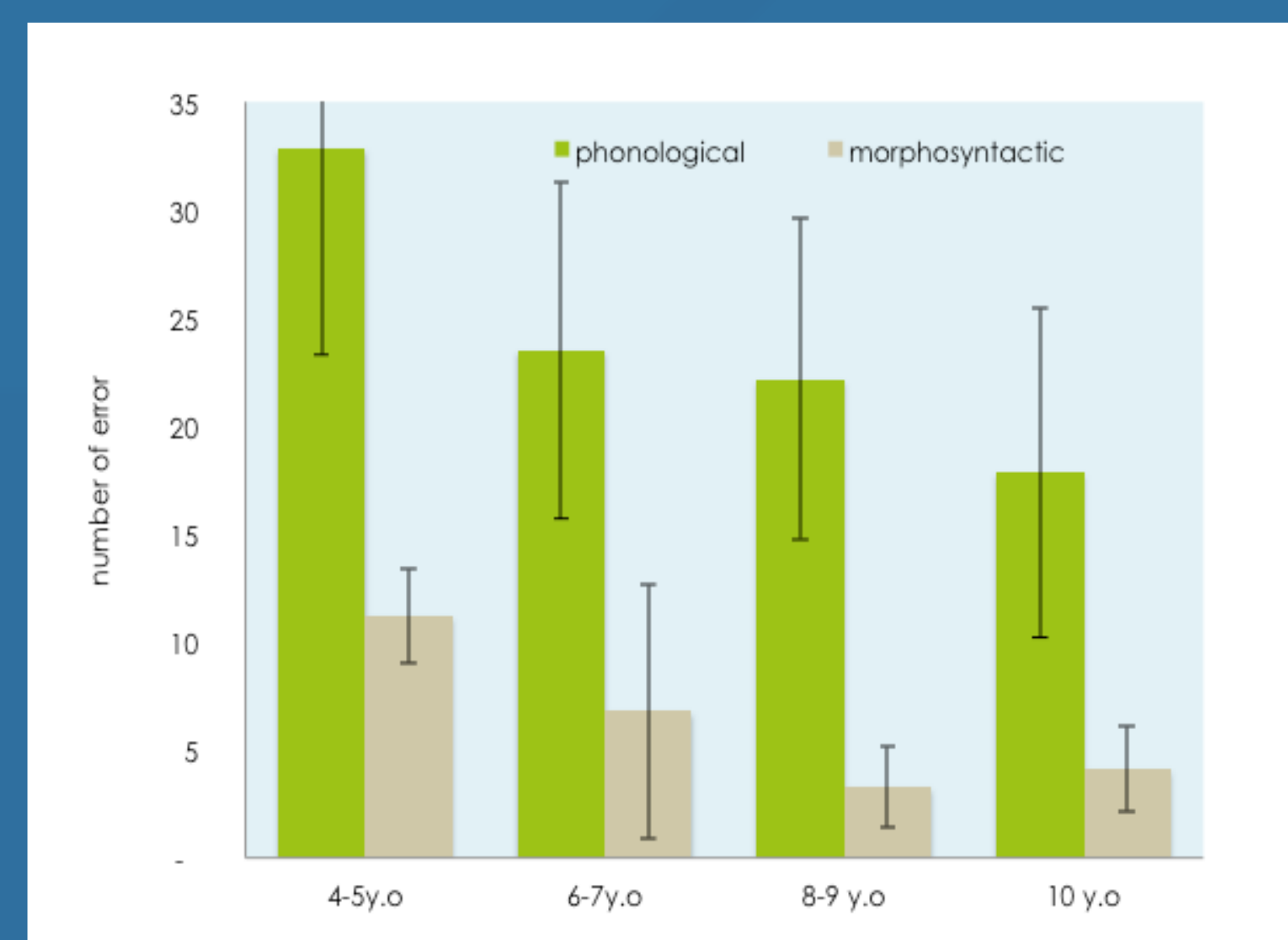
Coding

target sign	Glose	is the sign produced ?	If the sign is produced, is it DIFFERENT ?	If the sign is DIFFERENT, which kind of difference ?			
				parameter	error	ecart manuel	
	DOG (FS NDH) + CAT (CL DH)	YES	YES	produced sign	Substitution regionalism	0	0
		YES	NO	Manual parameters Frozen Sign (FS)	Substitution other sign		
		YES	NO	Manual parameters Frozen Sign (FS)	variation of the target sign		
		YES	NO	Classifier Dominant Hand (DH)	Handshape		
		YES	NO	Classifier Dominant Hand (DH)	Movement		
		YES	NO	Classifier Dominant Hand (DH)	Orientation		
		YES	NO	Classifier Dominant Hand (DH)	Place		
		YES	NO	Classifier Non Dominant Hand (NDH)	classifier size of dominant hand (if produced classifier is variant from the target)		
		YES	NO	Classifier Non Dominant Hand (NDH)	handshape		
		YES	NO	Classifier Non Dominant Hand (NDH)	movement		
		YES	NO	Classifier Non Dominant Hand (NDH)	orientation		
		YES	NO	Classifier Non Dominant Hand (NDH)	No holding of CL DH (reference is not maintained)		
		YES	NO	Classifier Non Dominant Hand (NDH)	inflection (plural)		
		YES	NO	Classifier Non Dominant Hand (NDH)	wrong location CL DH & maintained structure		
		YES	NO	Classifier Non Dominant Hand (NDH)	wrong location CL DH & unmaintained structure		
YES	NO	Classifier Non Dominant Hand (NDH)	classifier size of non dominant hand (if produced classifier is variant from the target)				
YES	NO	Classifier Non Dominant Hand (NDH)	configuration				
YES	NO	Classifier Non Dominant Hand (NDH)	orientation				
YES	NO	Classifier Non Dominant Hand (NDH)	inflection (plural)				
YES	NO	Classifier Non Dominant Hand (NDH)	No holding of CL NDH (reference is not maintained)				
YES	NO	Classifier Non Dominant Hand (NDH)	wrong location CL NDH & maintained structure				
YES	NO	Classifier Non Dominant Hand (NDH)	wrong location CL NDH & unmaintained structure				
YES	NO	Classifier Non Dominant Hand (NDH)	lexical semantic				
YES	NO	Classifier Non Dominant Hand (NDH)	dominant hand / non dominant hand rapport				
YES	NO	Classifier Non Dominant Hand (NDH)	laterality				
YES	NO	Classifier Non Dominant Hand (NDH)	facial expression	grammatical + CL			
YES	NO	Classifier Non Dominant Hand (NDH)	gaze	linguistic			
YES	NO	Classifier Non Dominant Hand (NDH)	size	linguistic			
YES	NO	Classifier Non Dominant Hand (NDH)	mouth	linguistic			
YES	NO	Classifier Non Dominant Hand (NDH)	labial movements	mouth gestures			
YES	NO	Classifier Non Dominant Hand (NDH)	Chest	lexical semantic			
YES	NO	Classifier Non Dominant Hand (NDH)		grammatical			

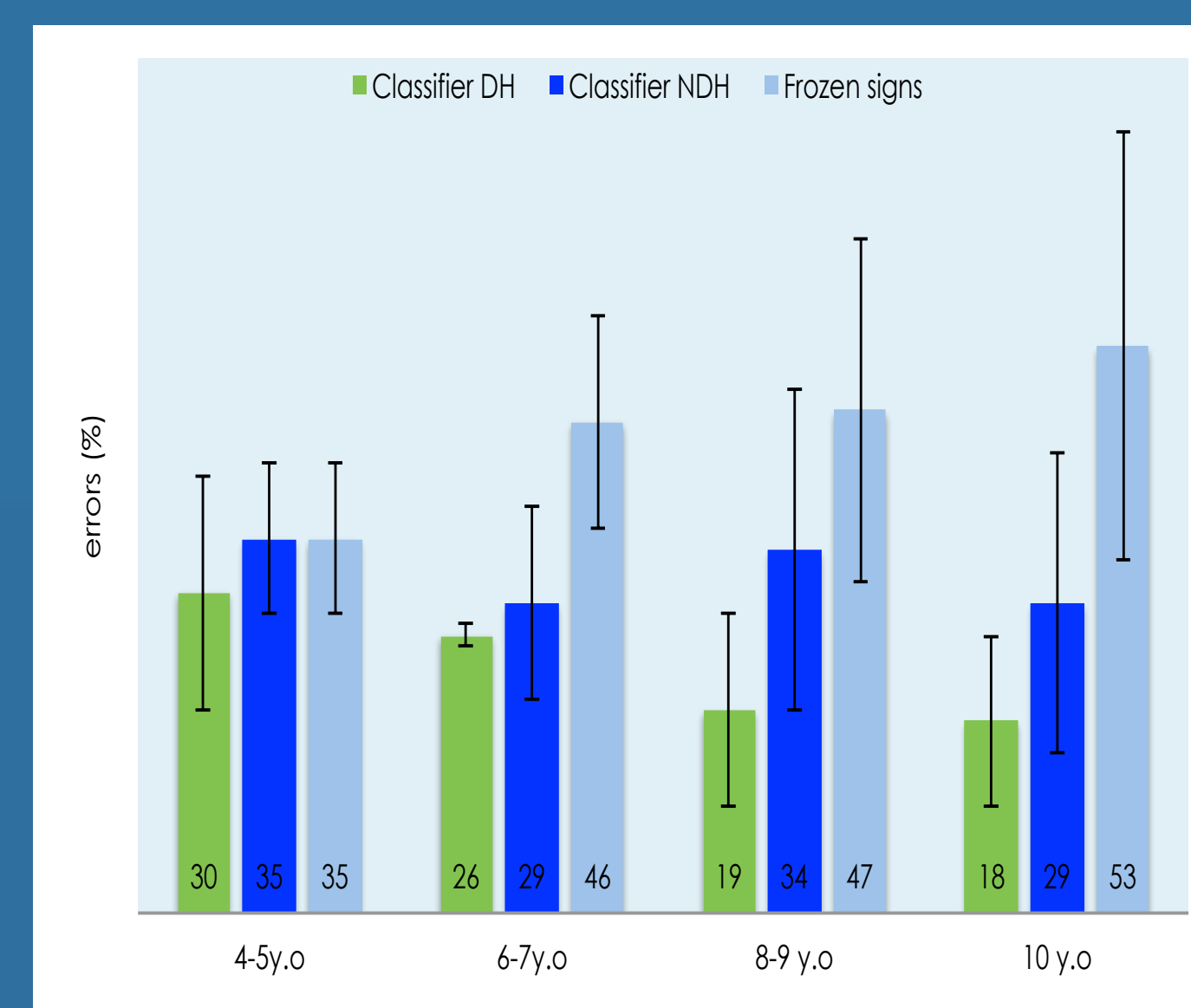
V. Main results



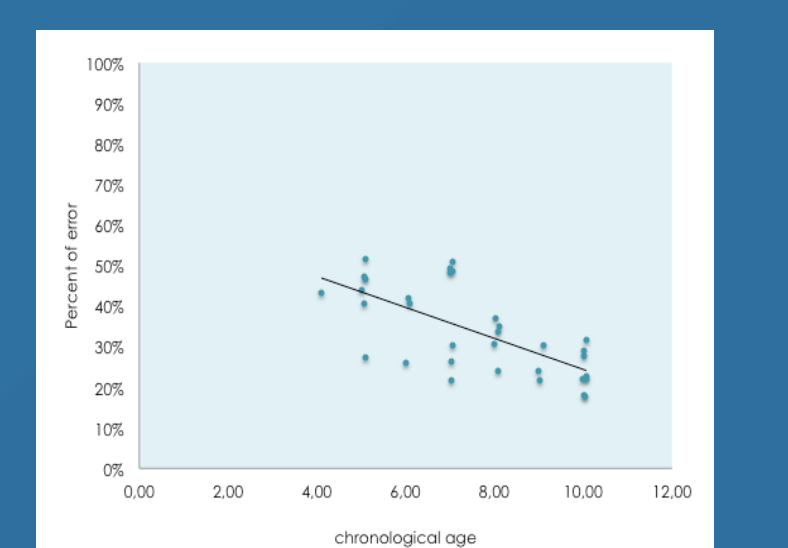
Main effect of group on sign repetition $F(3,29)=10,79 ; p=.0001^{***}$
 Main effect of group on incorrect repetition $F(3,29)=9,34 ; p=.0001^{***}$



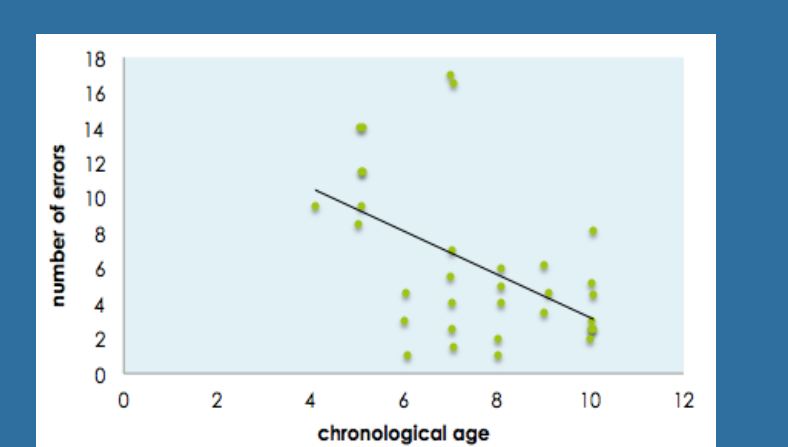
Main effect of error type $F(1,3)=143,14 ; p=.000^{***}$
 Main effect of group $F(3,29)=8,60 ; p=.001^{***}$
 No interaction age x type of error



Main effect of lexical structures $F(1,3)=34,86 ; p=.000^{***}$
 interaction structures x group near to the significance level
 no effect of group
 Bonferroni correction : FS vs CL DH $t(32)=5,5 ; FS vs CL NDH t(32)=3,34 ; CL DH vs. CH NDH t(32)=-2,80$ all $p<.01$



Pearson correlation $r(33)=-.667^{**}$



Pearson correlation $r(33)=-.504^{**}$

Results can be discussed in terms of

- Phonological development and mastery. Phonological skills are mastered early, even by young toddlers.
- Movement seems to cause more difficulties to all children.
- Classifiers are less failed than frozen signs : are their articulatory structures more reliable ? Are children better trained to produce classifiers ? Is a classifier occurrence that shares the structure while the referent is different, more frequent ?

VI. Conclusion and perspectives

Conclusion

The first test to assess repetition skills in LSF, and to assess some overall abilities of deaf signing people.

First data on sign language development.

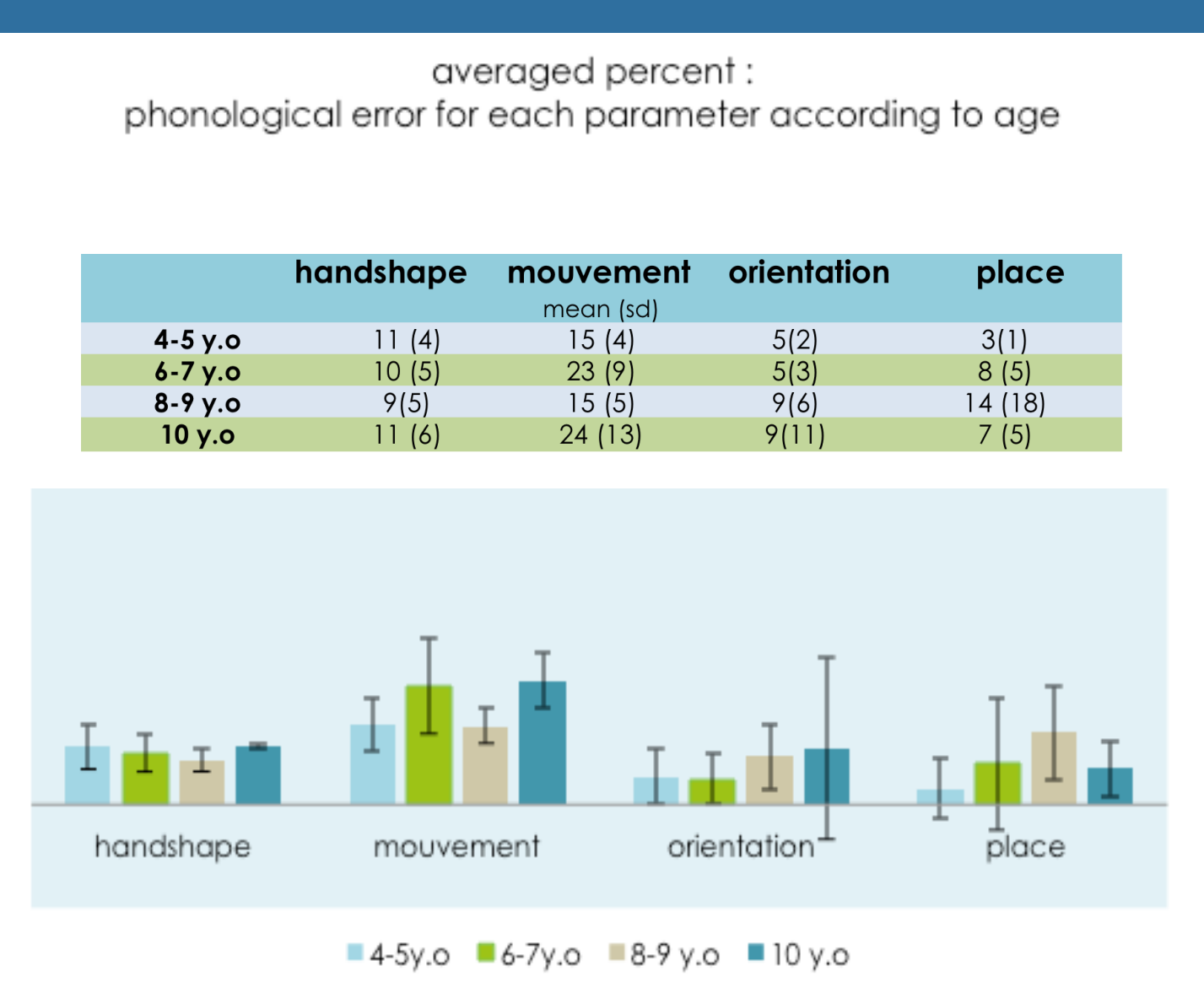
Perspectives

Coding of the late signing children is in progress.

Are difficulties detected in the SRT observed in the narrative production task, and in natural (spontaneous) sign ?

How could non manual parameters be better assessed ?

We need to evaluate the potential to use this tool to diagnose language disorder.



Main effect of parameter $F(3,87)=18,994 ; p=.0001^{**}$
 Main effect of group $F(3,29)=3,07 ; p=.04^{*}$
 No interaction parameter x group
 Bonferroni correction : movement vs. handshape $t(8)=-4,64 ; movement vs. orientation t(8)=6,33 ; movement vs. place t(8)=6,49 ;$ all $p<.008$