A comparative study of phonological awareness in bilingual French-LSQ adult, teenagers and child deaf subjects

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INTRODUCTION

Aside from the interest that SL phonology presents from a descriptive view, the issue of a phonological level for SL is also relevant to written language acquisition in deaf children who are enrolled in bilingual teaching programs using a SL and the dominant written language.
Although there is no formal system of written representation in LSQ, the organization of language units into phonemes can act as a starting point for a metalinguistic transfer toward learning the phonological units of oral French and then their written representations.
In order to explore this issue, we will first address here the following questions:

Does the concept of phonological awareness (PA) apply to signers of LSQ?

In other words, do LSQ signers can consciously manipulate the minimal units as described by theoretical models of SL phonology?

CONCEPTUAL FRAMEWORK

- The level of phonological awareness proficiency in hearing children at the preschool and kindergarten levels can be used to predict the reading skills they will have at the end of first grade year (Adams, 1990; Blachman, 1991).
- Phonological awareness refer to the conscious and explicit knowledge that words are decomposable into smaller units, either syllables or phonemes (Adams et al., 2000; Adams, 1990).
- Although phonology is often associated with sound, it has been suggested that sign languages (SL) are phonologically organized linguistic systems. Several models have been proposed to account for SL phonology structure (Brentari, 1998; Klima and Bellugi, 1979; Liddell et Johnson, 1984, 1985, 1986 Sandler, 1986, 1989; Miller, 1997, among others).
- The only research on the question of PA in sign languages (Di Perri, 2004) shows that children (n=29) of 4-8 years old can manipulate phonological units of ASL, via tasks of identification, categorisation, discrimination, fusion, segmentation and substitution.

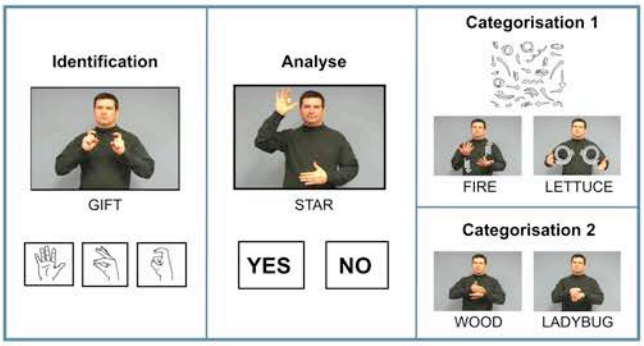
Considering…

… An (almost) essentially only theoretical conception of LS phonology ;
… The lack of LSQ phonological awareness (PA) measurement ;
… The absence of data from a control group of hearing people non-signer ;
… The issue of a phonological level for SLs is relevant to written language acquisition in deaf children who are enrolled in bilingual teaching programs.

Our objective

Provide a statistical account of phonological awareness of LSQ in deaf children, teenagers and adults, in order to determine whether signers of a language like LSQ are aware of this level of internal structure and to what extent they can manipulate the phonemes of this language.

LSQ TESTS



Description of the tasks

Number of items	Identification			Categorisation (beginner)			Categorisation (advanced)			Analyse
	HS	Loc	Mvt	HS	Loc	Mvt	HS	Loc	Mvt	
CHILDREN	8	8	8	8	8	8	4	4	4	24
TEENAGERS	40	40	40	24	24	24	20	20	20	90
ADULTS	40	40	40	24	24	24	20	20	20	90

The participants

	Bilingual program	Age	Number
CHILDREN			
	√	3;6-5;6	6
	√	6-9	9
	√	10-12;6	3
Total			18
TEENAGERS			
	√	12-18 (avg=15;8)	17
ADULTS			
		21-66 (avg=35;6)	21

RESULTS

All T-tests, based on Anova results or paired.

Q1 Do all deaf groups have phonological awareness of LSQ?

		Number of items	Average %	Standard deviation	min	max
CHILDREN						
Identification		24	86.6	14.0	58.3	100
Categorisation	Beginner	24	80.8	11.4	58.3	95.8
	Advanced	12	74.5	16.0	41.7	100
Analyse		24	86.6	10.4	62.5	100
TEENAGERS						
Identification		120	89.1	4.3	81.5	96.7
Categorisation	Beginner	72	80.2	9.9	56.9	94.4
	Advanced	60	68.4	20.9	21.7	93.3
Analyse		90	78.3	7.0	62.2	88.9
ADULTS						
Identification		120	94.2	3.0	88.3	98.3
Categorisation	Beginner	72	78.2	13.5	45.8	95.8
	Advanced	60	77.4	17.0	31.7	93.3
Analyse		90	76.1	10.7	58.9	96.7

Q2 Do all deaf groups have an equivalent mastery of the different types of tasks?

		ACCURACY	TIME RESPONSE
Identification		Teenagers < Adults	=
Categorisation	beginner	=	=
	advanced	=	=
Analyse		=	Teenagers < Adults

IDENTIFICATION	TEENAGER	ADULT	TEENAGER * ADULT
Accuracy	89.1%	94.2%	Teenagers < Adults (p=0.0003)

ANALYSE	TEENAGER	ADULT	TEENAGER * ADULT
RT (avg in ms)	2392.7	2579.4	Teenagers < Adults (p=0.0001)

Task	age	average %	stand.dev.	min	max
Identification	3;6-5;6	77.1	13.6	58.3	91.7
	6;0-9;0	89.1	14.3	58.3	100.0
	10;0-12;6	95.8	3.4	91.7	100.0
Categorisation (beginner)	3;6-5;6	72.2	13.4	58.3	87.5
	6;0-9;0	84.9	8.6	66.7	95.8
	10;0-12;6	85.4	7.2	75.0	91.7
Categorisation (advanced)	3;6-5;6	63.9	6.8	58.3	75.0
	6;0-9;0	78.1	9.9	58.3	91.7
	10;0-12;6	83.3	28.1	41.7	100.0
Analyse	3;6-5;6	77.1	10.1	62.5	87.5
	6;0-9;0	89.1	7.0	75.0	95.8
	10;0-12;6	95.8	3.4	91.7	100.0

Task	academic year	average %	stand. dev.	min	max
Identification	2008-2009	78.7	17.0	37.5	100
	2009-2010	86.6	14.2	58.3	100
Categorisation (beginner)	2008-2009	70.8	16.0	41.7	95.8
	2009-2010	80.1	11.6	58.3	95.8
Categorisation (advanced)	2008-2009	58.3	17.2	33.3	91.7
	2009-2010	72.2	17.2	41.7	100
Analyse	2008-2009	82.4	15.1	50.0	95.8
	2009-2010	90.7	7.7	75.0	100

Q3 Do all deaf groups have an equivalent mastery of the different categories of phonemes?

INTRAGROUP

Accuracy	Time response
HS> M (Except for Identification)	HS< M (Except for Analyse)

ACCURACY	TEENAGER	ADULT
Type of phoneme	HS = L (p>0.05)	HS < L (p=0.0113)
	HS > M (p=0.0494)	HS > M (p=0.0160)
	L > M (p=0.0018)	L > M (p=0.0001)

INTERGROUP

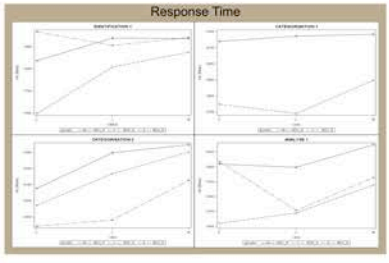
IDENTIFICATION	
ACCURACY	TEENAGER * ADULT
Type of phoneme	Teenager HS < Adult HS (p=0.0025)
	Teenager L < Adult L (p=0.0006)
	Teenager M < Adult M (p=0.0187)

TIME RESPONSE	TEENAGER * ADULT
Type of phoneme	Teenager HS < Adult HS (p=0.0009)
	Teenager L < Adult L (p=0.0013)
	Teenager M < Adult M (p=0.0083)

Q4 Do hearing subjects can manipulate LSQ units without linguistic skills in LSQ ?

		Number of items	Average%	Standard deviation	min	max
HEARING ADULTS						
Identification		120	86.5	5.1	75.8	97.5
Categorisation	Beginner	72	81.3	18.2	18.1	97.2
	Advanced	60	83.6	9.8	60.0	96.7
Analyse		90	42.4	10.8	15.6	61.1

Identification	< DA *	= TEEN
Categorisation	= DA * = TEEN	= DA > TEEN* * MVT (p=0.02)
Analyse	< DA *	< TEEN



DISCUSSION

Handshape and movement are always distinct from each other (HS > mo)

- HS - variability
- Loc and mov + variability
- Categorical perception
- Access to mental lexicon
- Graphic representation of movement

CONCLUSION

GROUPS
Teenager = Adult
Youngest children < Oldest children
2009 cohort < 2010 cohort

TASKS
IDENTIFICATION < CATEGORISATION (beginner) < CATEGORISATION (advanced) (except for adults)

PHONEMES
HANDSHAPE > MOVEMENT (location = variable)