



## **Structural correlation between location and movement of signs: lacking motion economy for co-speech gestures.**

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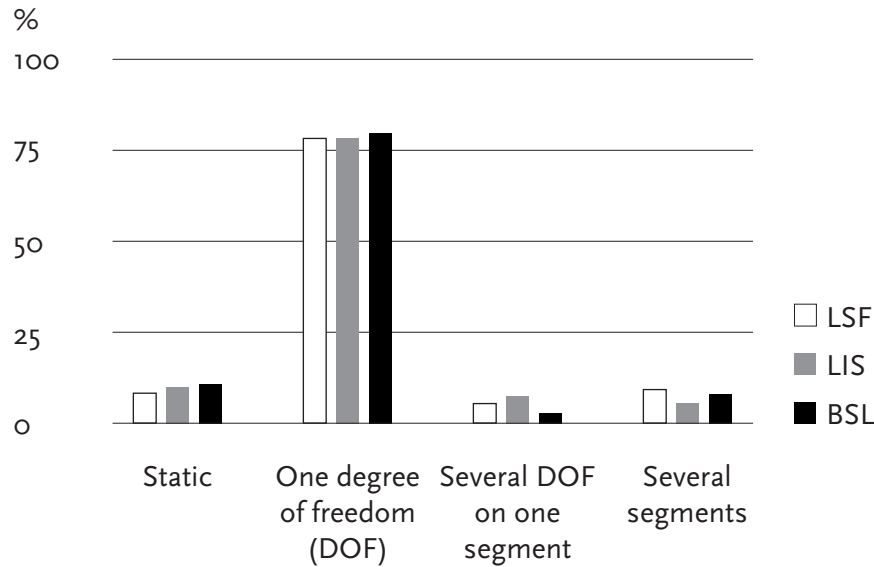
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E – Results

**1 Distribution of types of MOVement**

Hyp. 1 is interesting.  
Optimal use of ressources.  
Reduction of the motor control > stabilization of Signs.

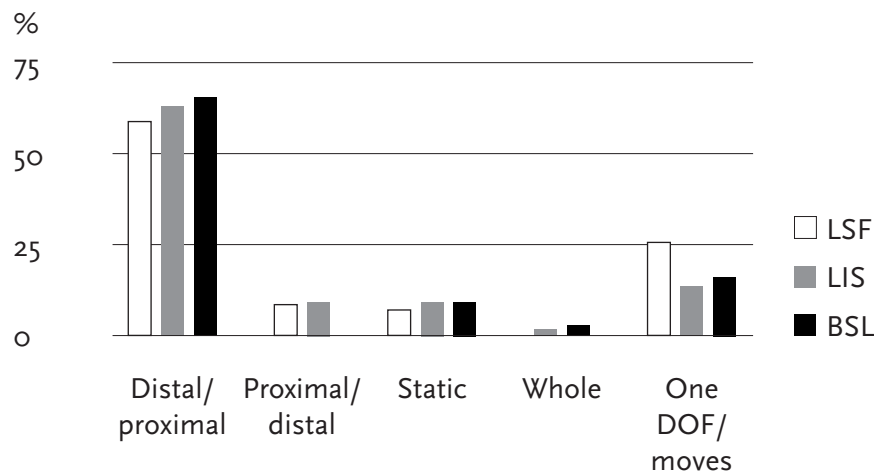


**2**

	LSF	LIS	BSL
Trackable MOV of the Signs	90.22%	95.43%	95.46%

**3 Distribution of the Flow**

Hyp. 2 is interesting.  
The Distal-Proximal is the main flow.  
The organization of the MOVement is coming from the distal segments.



F – Outcomes

**1 Proof of concept**

– The motor control is reduced for the most unstable parameter: the MOVement. This observation is available if and only if we consider signs according to intrinsic frames of reference (one per each segment).

It is one of the specificity of the project Typannot.  
– The parameter LOCini participates to the conditions of realization for the stabilization of signs: the set up of the relative position of segments for a following simple MOVement.

**2 Assumption**

The MOVement for the preparation phase could be more unstable, more complex or more proximal-distal.  
It gives some clues for the signs segmentation.

**3 Next step**

Check these points with a MOCAP Corpus.

Structural Correlation between Location and Movement of Signs: Lacking Motion Economy for Co-speech Gestures?


Building a formal transcription system for Sign Language and gestures: Typannot.

**GestualScript**  
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A – General Framework

11st step:  
Graphematic formula



1TOCscCO 234Fo  
  
1 Index  
TO Thumb Opposed  
Csc Curved semi-closed  
CO COn tact  
234Fo Middle Ring Pinky Flat open

22nd step:  
Generic glyphic formula

Lateralization  
← →

Finger designation  
... ..

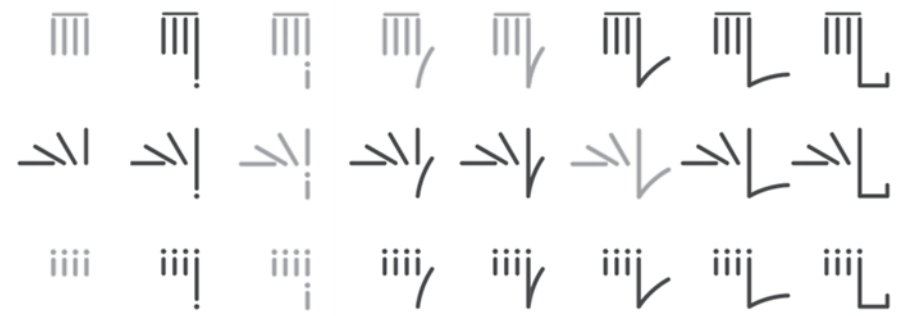
Angle  
↙ ↘ ↗ ↖

Finger selection  
Counting  
1 2 3 4 5  
Clustering  
. . . . .

Closeness  
○ × ≡ ⇌ ⊕

Shape  
┘ ┐ └ ┌

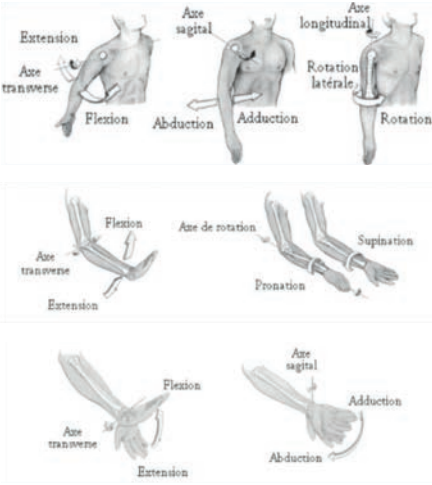
33rd step:  
Specific glyphic formula for all the handshapes



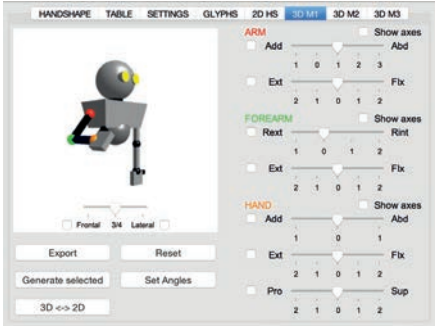
B – INItial LOCation (LOCini)

Motoric schemas (Keele 1967) are present before and during the Sign.

1Each degree of freedom (DOF) must be considered in its own frame of reference > Multiple intrinsic Frame of Reference (Boutet 2015).  
  
Then the LOCalization is much more complex than the location of the hand alone.  
  
Hand Place =  
Arm LOC + Forearm LOC + Hand LOC



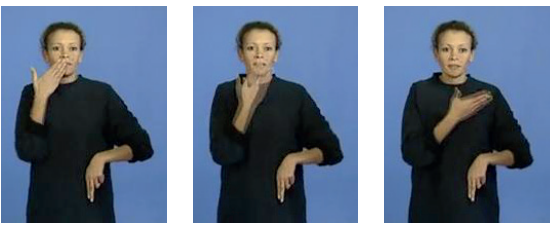
2A virtual keyboard to compose graphematic formula.  
  
Ex: ArmAbd1 ArmFlexØ  
ForFlexØ ManuSupiØ  
ManuFlexØ ManuAbdØ

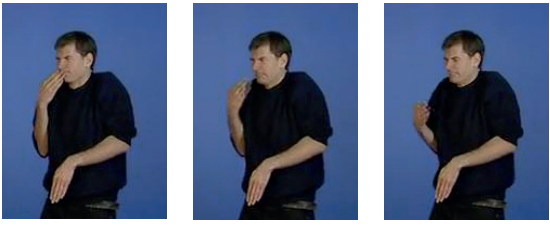


C – MOVement (MOV)

1How MOVements in SL can be stabilized and simple while motion is changing?  
  
Motoric schemas (Keele 1967) are present before and during the Sign.  
  
How to establish the MOVement from the preparation phase to the MOVement involved in a Sign?

2Preparation has a target:  
– find a well balanced LOCini;  
– stabilized enough to be the starting point of simple MOVements  
  
Complex MOVements → LOCini → Simple MOVements → SIGN  
  
A simple motoric schema stabilizes Signs:  
– because of the simplicity of what the motor control has to do after the LOCini positions;  
– because of the transfer of the MOVement on other DOF due to inertia and to geometric relationships between what the joints allow as movements;  
– when the transfer of the movements corresponds to the alignment of other DOF.

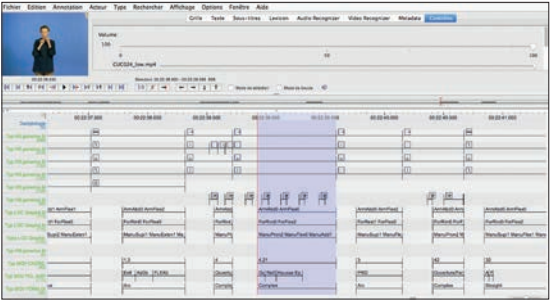
3LOCini: ArmAddØ FlexØ  
ForFlex2RotInt2 Manu-SupiFlexØAdd1  
MOV.: Segments affected: Forearm to Hand  
Pulse: Supi Exten  
  
[THANKS]

4LOCini: ArmAddØ FlexØ  
ForFlex2RotInt2 Manu-SupiFlex1Add1  
MOV.: Segment affected: Arm  
Pulse: Exten  
  
[THANKS]

D – Hypothesis

- 1Hyp. 1: The MOVement has a simple motor schema to minimize the motor control during the sign.  
Hyp. 2: The distal-proximal flow of the MOVement is predominant in SL.

E – Transcription

1

Transcriptions to proof our concept:  
FSL: 1 min;  
LIS: 1 min 53 s;  
BSL: 50 s