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# Signing amplitude and other prosodic cues in older signers: Insights from motion capture from the SignAge Corpus

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## 1. Introduction

### Q1) Older signers: any systematic 'phonetic' and prosodic differences?

The literature indicates that elderly people use gestures with reduced amplitude (Carmeli et al. 2003). Any adaptive strategies? Hypotheses

- Reduced ranges of motion of degrees of freedom (=> more transfer of the movement?)
  - Finger selection: lower ratio of the inertial mass between the hand and the forearm (=> a motion further on the forearm and a smoother gesture?)
- Proximal-distal flow: proportionally less movement on the hand?  
Distal-proximal flow: more developed movement of the forearm?

### Q2) Older signers and motion capture setting?

SignAge = corpus of interactions between or with older deaf signers in LSF  
• to test motion capture systems to complement analysis on the basis of video recordings (3D data; descriptors such as speed or acceleration of the different body parts)  
• a step forward to get semi-automatic annotation

- A kinesiological model based on linguistics:
- variation of the signing amplitude for each degree of freedom
  - global movement quantity
  - possible correlation with some articulatory segments

## 2. Corpus

Methodological protocol adapted from CorpAGEst (relatives or friends as interviewers)

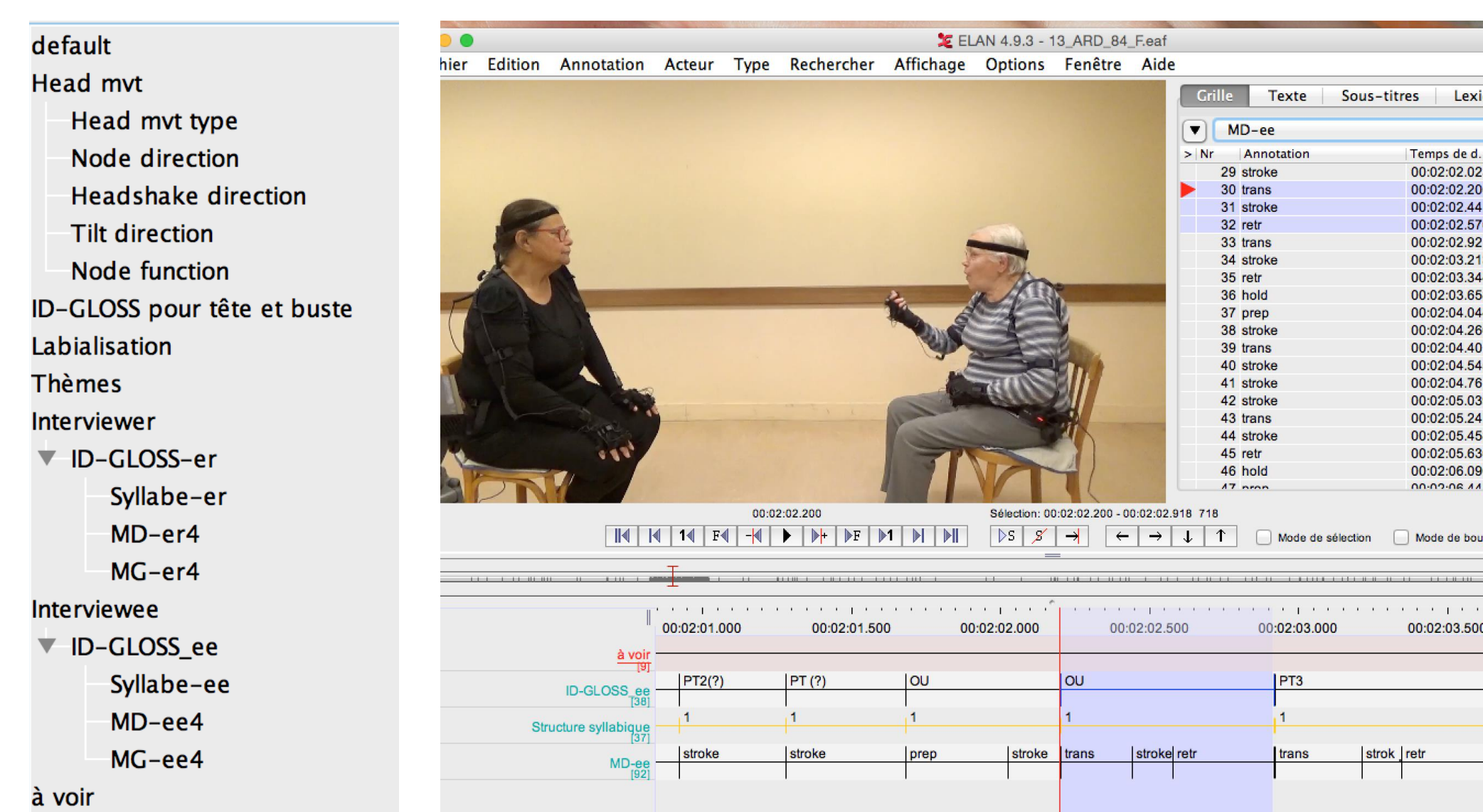
Participants	13
Male	7
Female	6

Age		
64-65 y.o	4	2M 2F
72-76 y.o	5	3M 2F
79-84 y.o	4	2M 2F

**13 participants**  
over 65 years old  
use LSF as their main language  
**6 - 10 min interviews**  
themes of the evolution of transport, access to care, culture and new technologies

A collection combining video (2D) and biomechanical (3D) data

### 2D Digital cameras



Annotation of interviews recorded in video with the manual annotation software ELAN

### 3D Motion capture systems



Equipping the participants with body straps

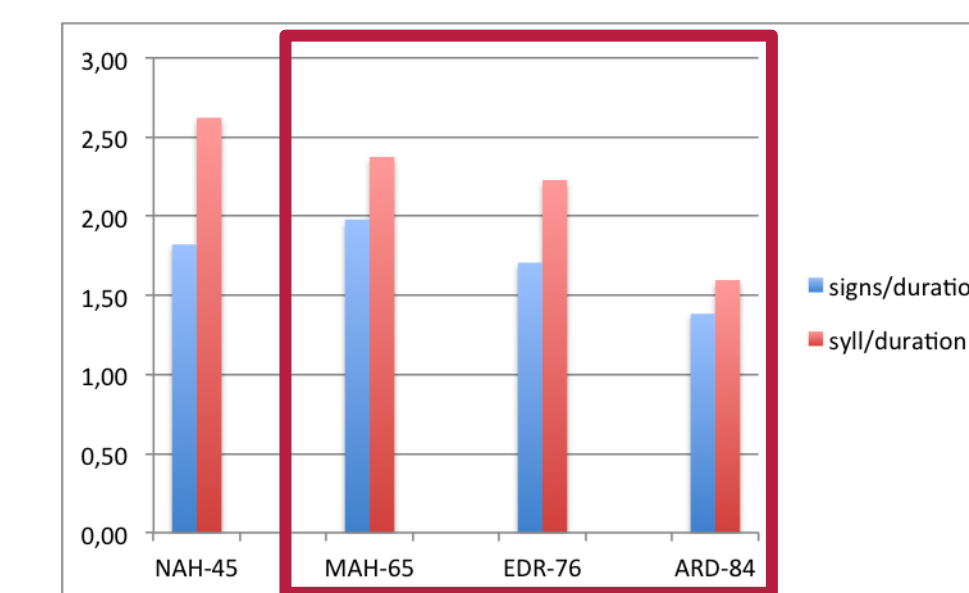
Calibration

Interview

Tests with Kinect and Inertial Measurement Unit sensors, which permit measuring acceleration and relative position differences on xyz axis

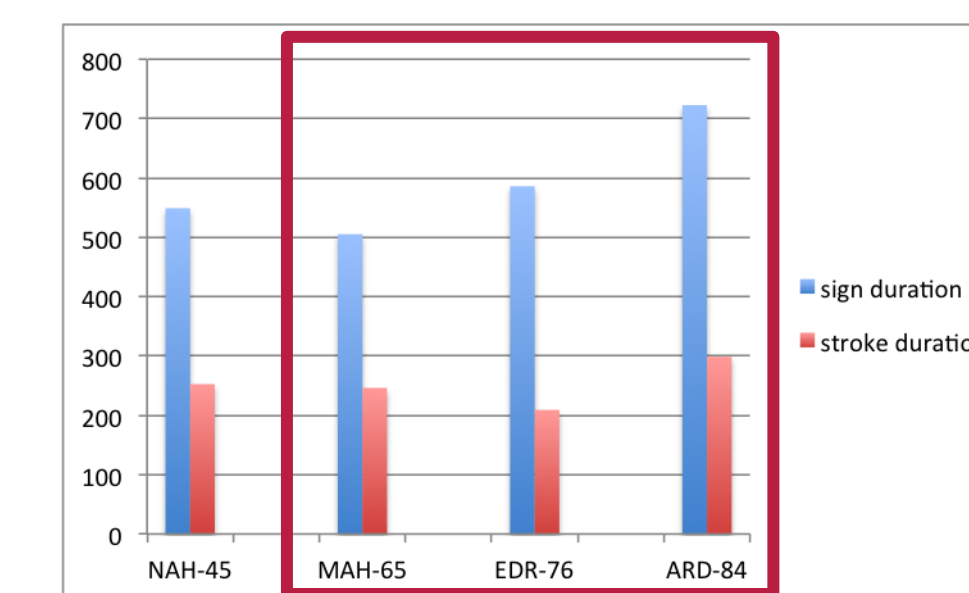
## 3. Measures

### (1) Signing rate



Ratio: signs or syllables / time

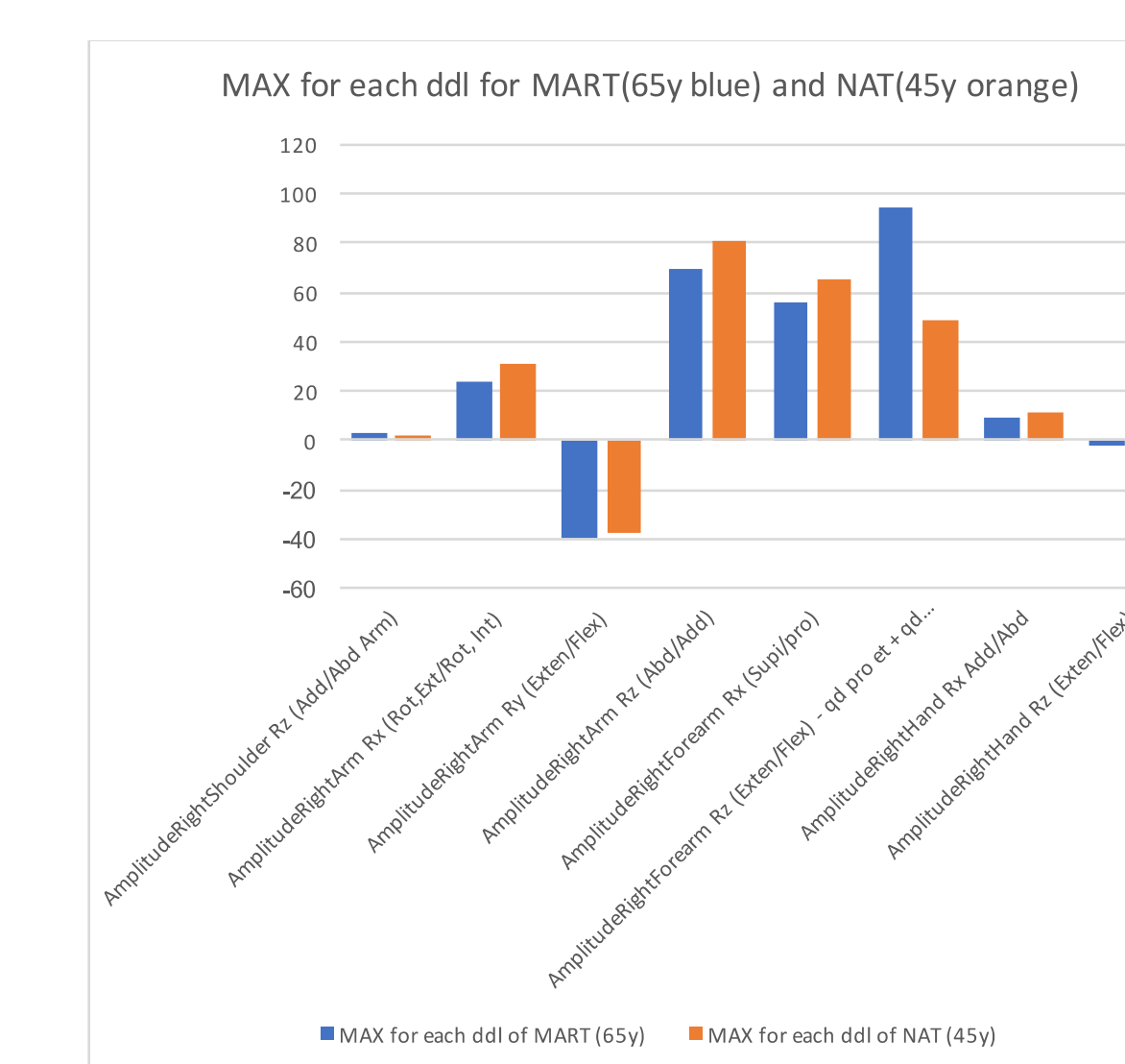
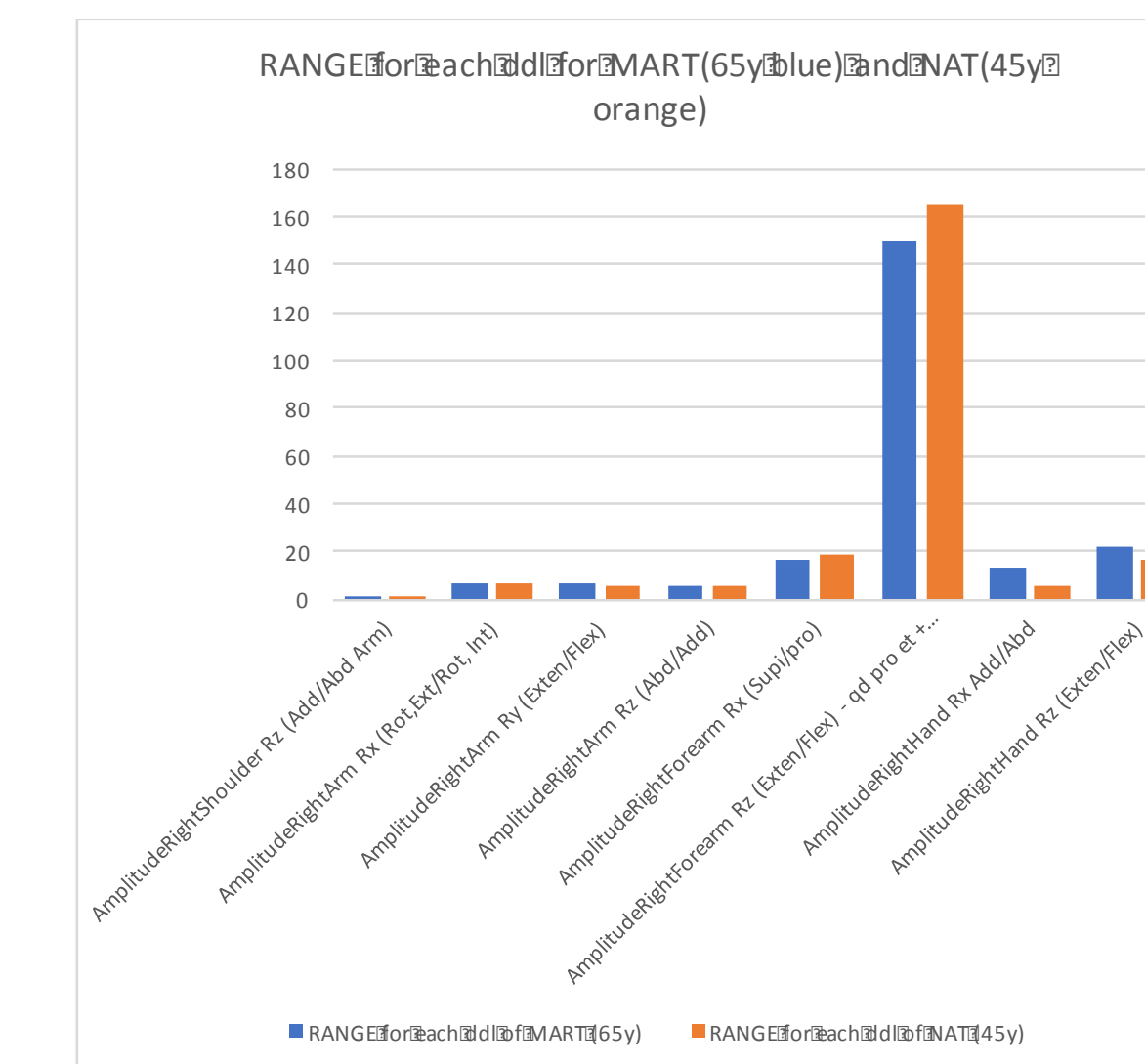
Signing rate slows with increasing age



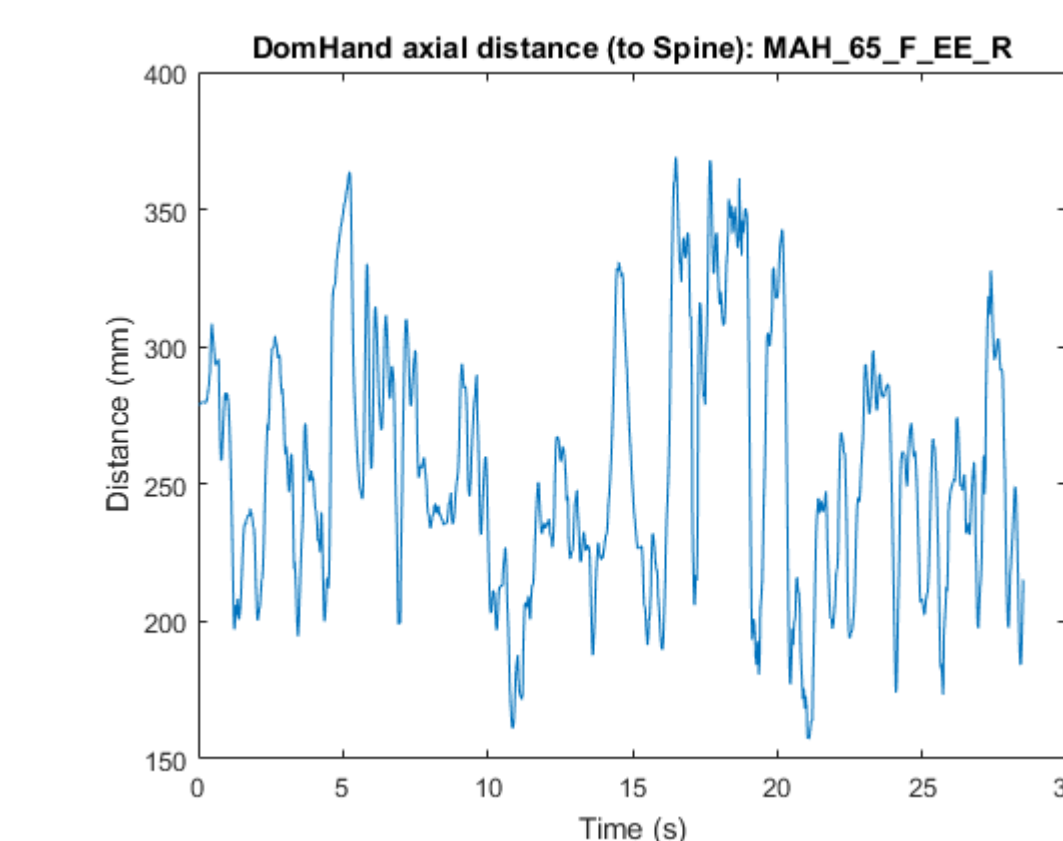
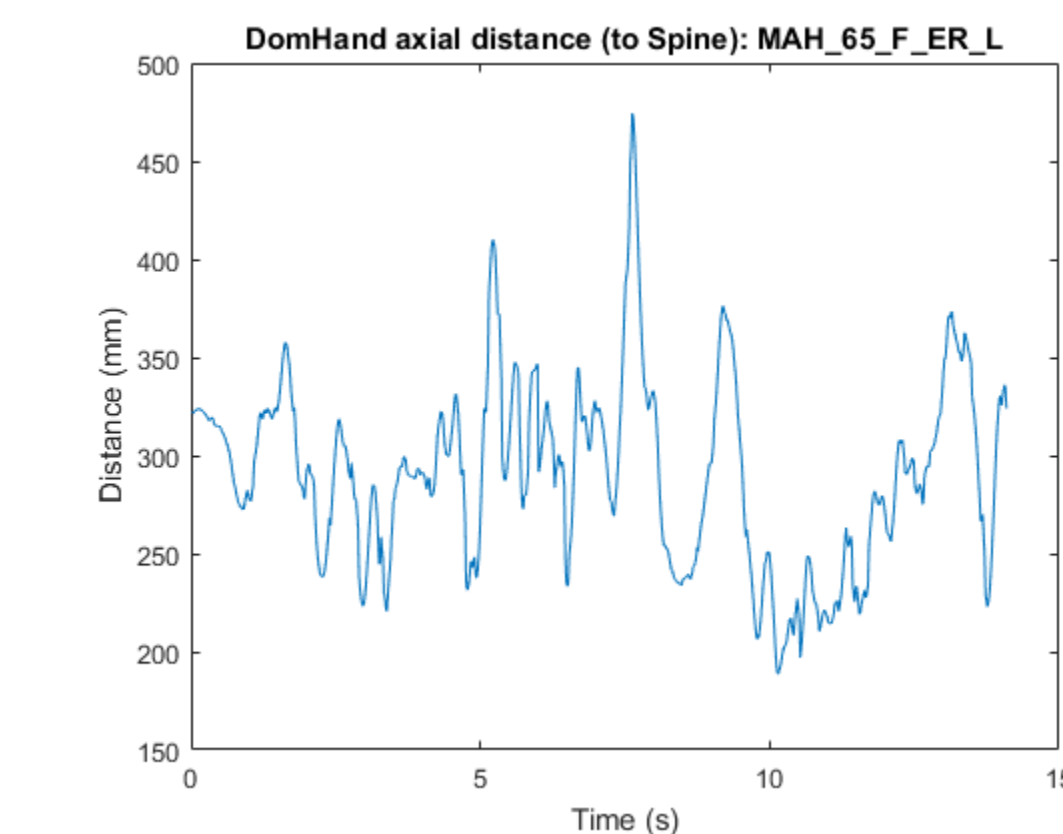
Sign and stroke standard duration

Standard duration for signs increases with age

### (2) Mvt amplitude / DoF



### (3) Mvt amplitude / hand-torso



First results encourage us to use signing rate, movement amplitude and segment distribution as measurements of prosodic characterization for the older signers' production.

## 4. In Progress

- ◆ Short term: to complete annotations and measures for the older corpus ; to build the younger corpus for comparison
- ◆ Longer term: to study (i) the linguistic specificities in the productions collected in interaction (speech turn, signing space, lexical and morphosyntactic variations, prosody in LSF), (ii) the possible markers of aging, whether ordinary or disturbed, in connection with existing studies on the articulatory manifestations of language or cognitive disorders (Tyrone & Woll, 2008; Tyrone, 2014) and (iii) adaptive strategies of elderly signers.

## 5. References

• Bolly, C. T. & Boutet, D. 2018. The multimodal CorpAGEst corpus: Keeping an eye on pragmatic competence in later life. *Corpora* 13 (2).

• Carmeli, Eli, Hagar Patish, et Raymond Coleman. « The aging hand ». *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 58, no 2 (2003): M146-M152.

• Luna S. 2015. Variation syntaxique de la langue de signes québécoise chez les aînés sourds, Actes du congrès annuel de l'Association canadienne de linguistique 2015 Proceedings of the annual conference of the Canadian Linguistic Association.

• Meurant, L. 2015. Corpus LSF. Un corpus informatisé en libre accès de vidéos et d'annotations de la langue des signes de Belgique francophone (LSFB). Laboratoire de Langue des signes de Belgique francophone (LSFB-Lab). FRS-F.N.R.S et Université de Namur. URL: <http://www.corpus-lsf.be>

• Parisot, AM & J. Rinfret. 2015. "Morphosyntactic variation in the use of space in Langue des signes québécoise (LSQ): a pilot study on verb agreement among two generations of signers" TISLR12, Melbourne.

• Parisot, AM. 2017. Intergenerational variation in the use of space in Langue des Signes Québécoise (LSQ) The case of verb agreement marking. International Conference CLARE3 Encounters in Language and Aging Research: Pragmatic Spaces, Longitudinal Studies and Multilingualism, March 6-8, 2017, Freie Universität Berlin

• Tyrone, M.E. 2014. Sign dysarthria: A speech disorder in signed language. In D. Quinto-Pozos (ed.) *Multilingual Aspects of Signed Language Communication and Disorder* (pp. 162-185). Bristol, UK: Multilingual Matters.

• Tyrone, M.E. & Woll, B. 2008. Sign phonetics and the motor system: Implications from Parkinson disease. In J. Quer (ed.) *Signs of the Time: Selected Papers from TISLR 2004*. Seedorf: Signum, 43 & 8211; 68.

## 6. Acknowledgements

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