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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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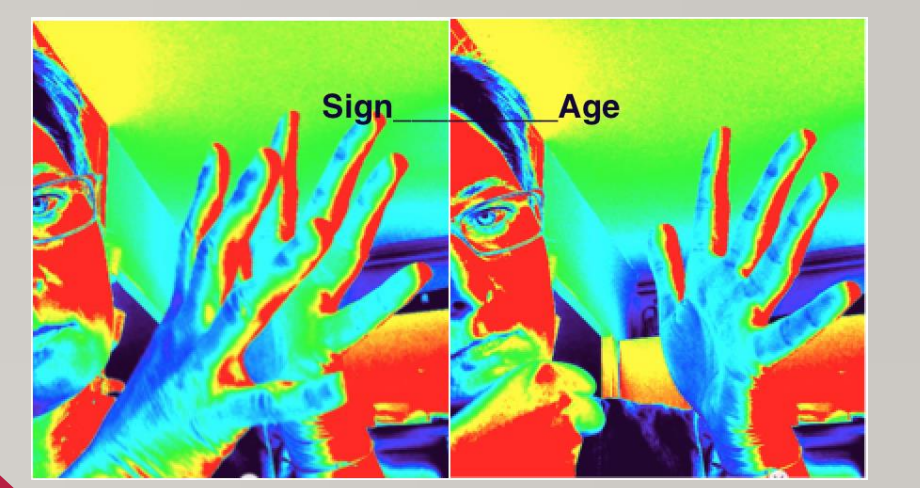
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1. Introduction

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)

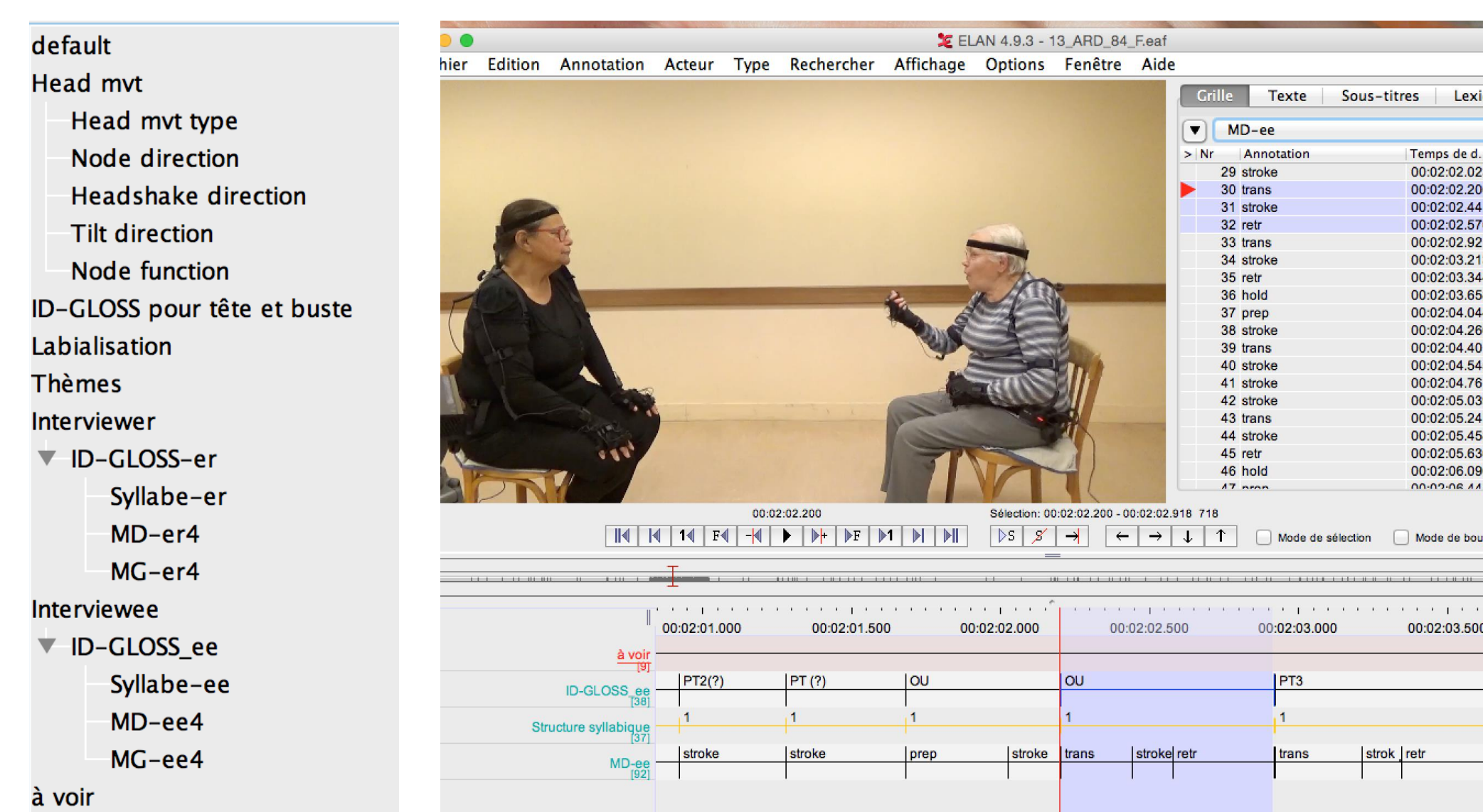
Participants	13
Male	7
Female	6

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

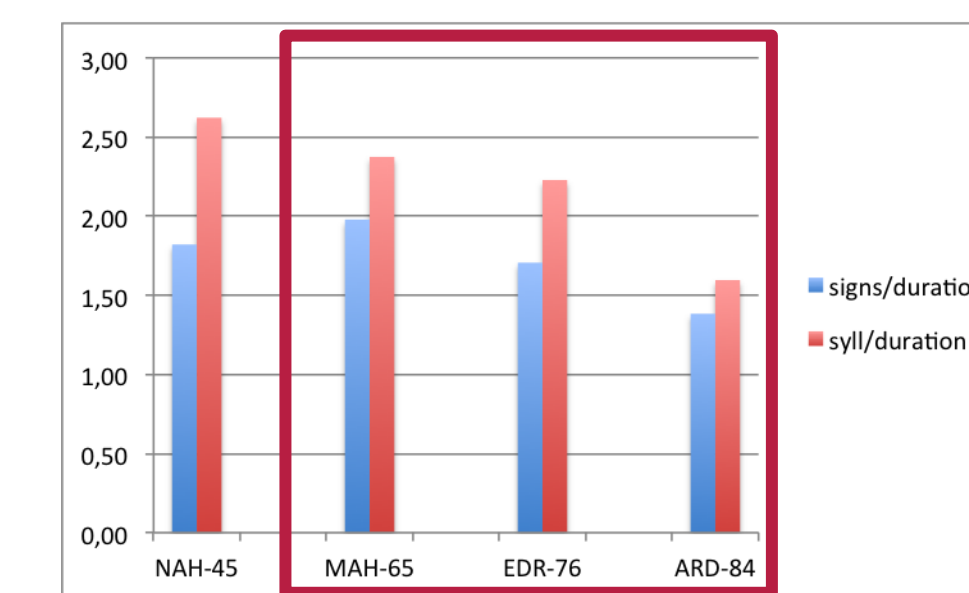
Calibration

Interview

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

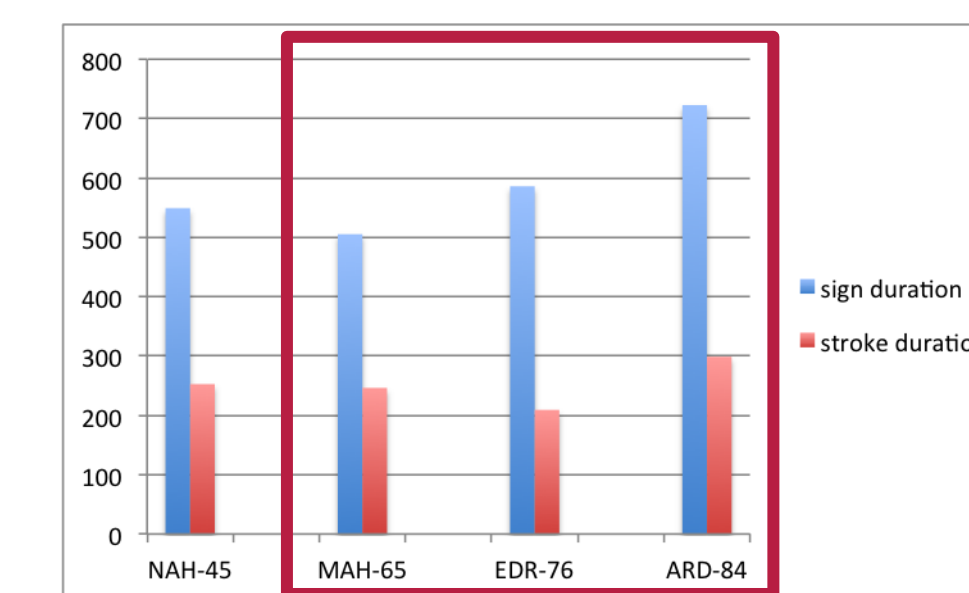
3. Measures

(1) Signing rate



Ratio: signs or syllables / time

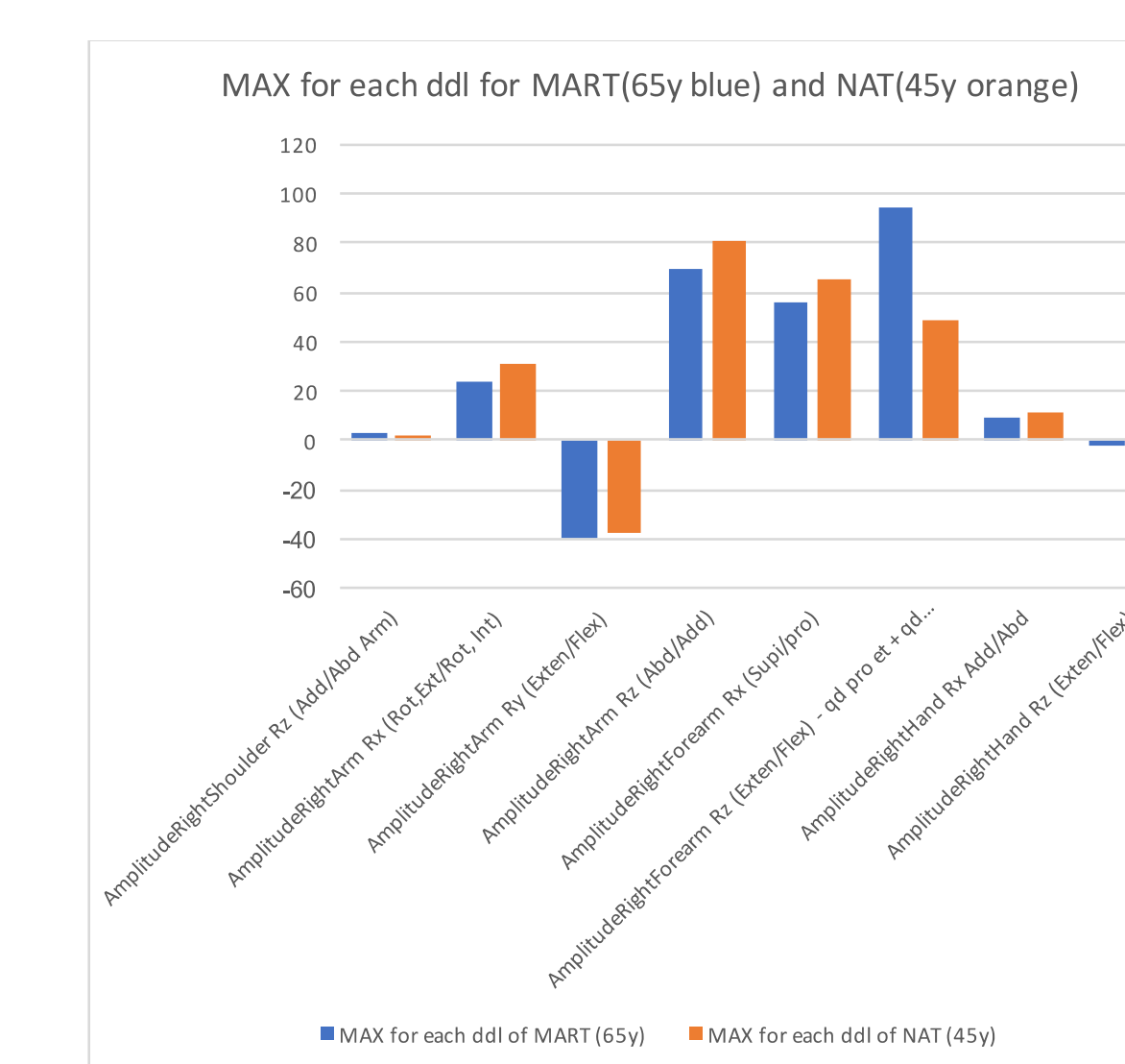
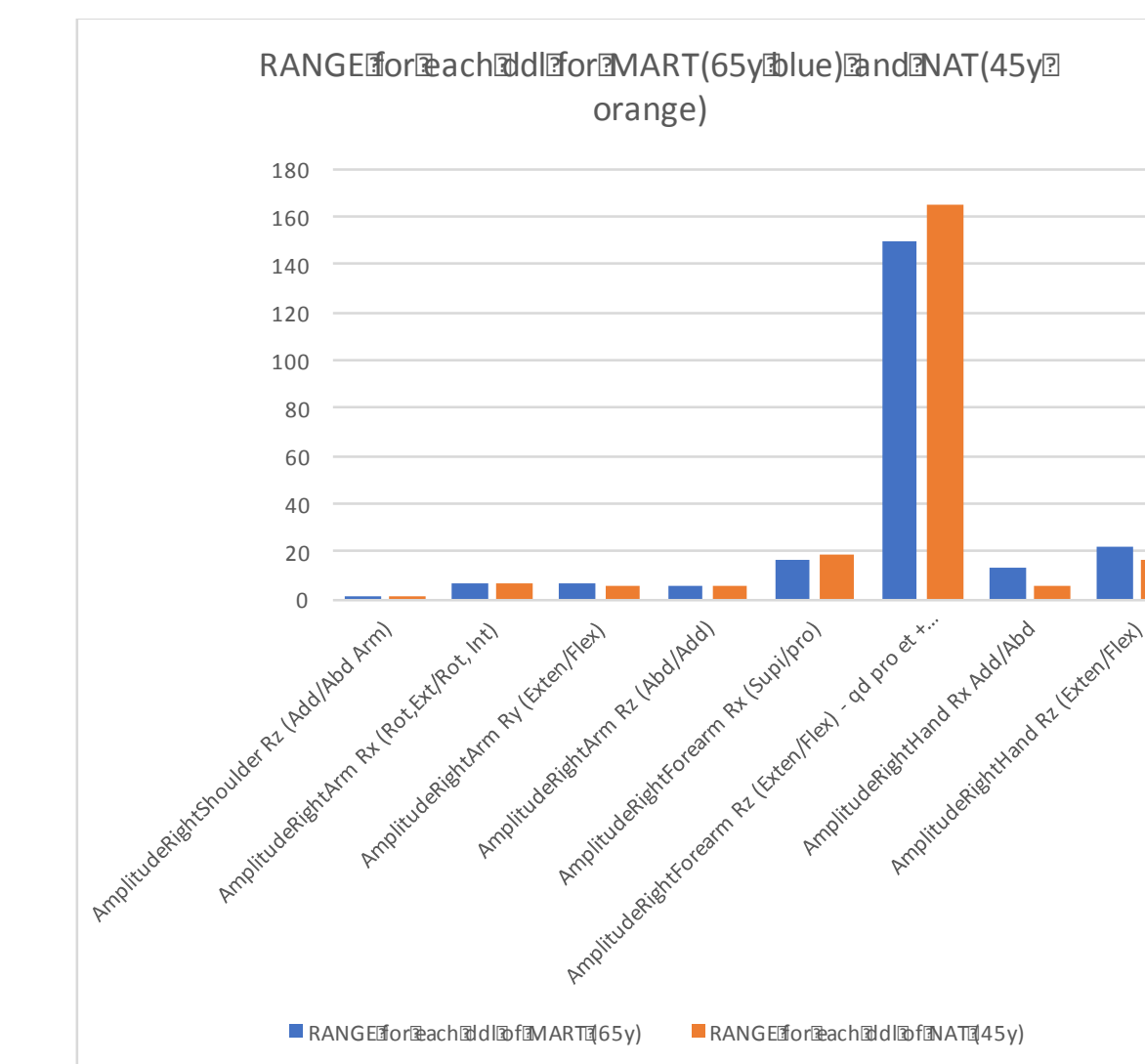
Signing rate slows with increasing age



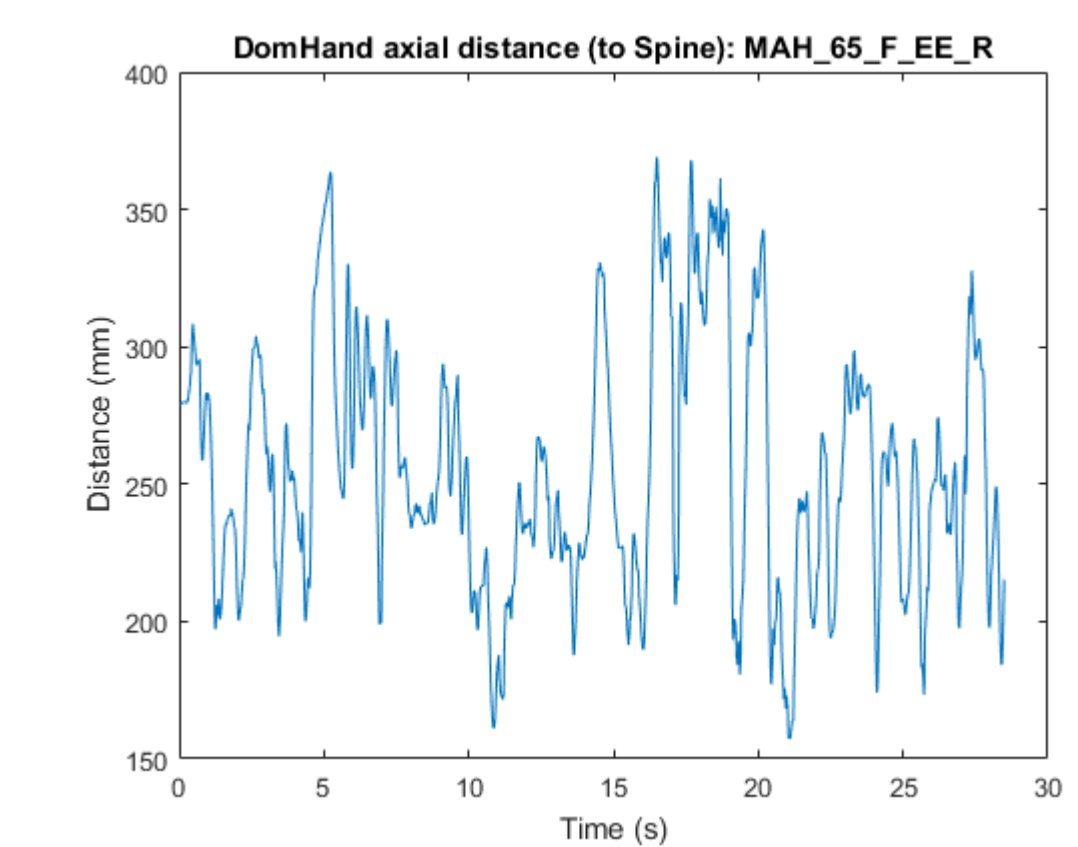
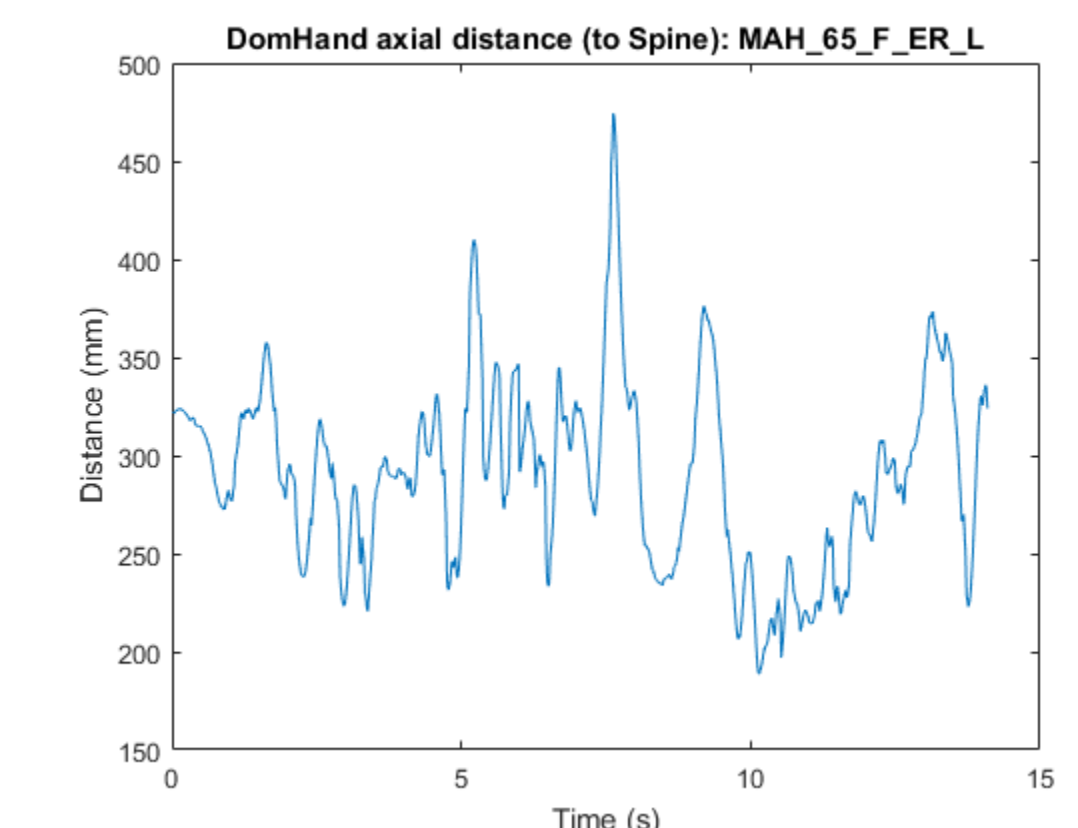
Sign and stroke standard duration

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

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6. Acknowledgements

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