Markers of (dis)fluency across signers' profiles in French Belgian Sign Language (LSFB)
A comparative analysis between Native, Near-Native and Late Signers
Handouts/additional information to the poster

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1) Theoretical Framework: Componential approach of (dis)fluency (Götz 2013)

(Dis)fluency = result of combinations of many independent markers ("fluencemes") that are considered not only as a signal of the speaker's difficulties to plan and encode the discourse, but also as a positive signal for rhetorical purposes for example. Depending on its context, its combination with other features, its position and frequency, the same feature can contribute either to the fluency or to the disfluency of a production.

Aim: to identify fluency and disfluency profiles in terms of combinations of fluencemes, taking into account all the occurrences of the fluencemes and not only the occurrence that appears in a phase of hesitation.

Choice of the analyzed fluencemes:

- The spectrum of functions related to **palm-ups** (expression of modality, backchannel signal, elicitation of evolvement, start or end of a turn, conjunction, interrogative particle or pause filler) prompted us to count them as a potential (dis)fluency marker (van Loon 2012).
- **Stops between signs, word search gestures and truncations** are moments of interruption of the flow of speech and these fluencemes can be a way to punctuate a discourse or to fill a period of hesitation.
- **Speed** can give information on the signer ease to express himself.
- Gaze shows how one signer manages the presence of the interlocutor and the organization of the discourse. A signer may cut the communication depending on if he looks at the interlocutor or not, and if his gaze gives keys to organize the message in the frontal space.

2) Tag set

Glosses for right hand and left hand achieved by Deaf colleagues following annotation guideline of Trevor Johnson (2011).

Annotation protocol partly created in collaboration with the University of Louvain-la-Neuve (ARC-Fluency n°12/17-044) to cover the annotation of markers of (dis)fluency in audio-oral and visual-gestural modalities (Crible, Grosman, Dumont & Notarrigo 2015).

Parent Tires	Code	Meaning
Fluencemes	<S2:NE>	Stop between signs with relaxed hands in the neutral space
	<S2:CR>	Stop between signs with hands crossed
	<S2:BO>	Stop between signs with hands along the body
	<S3:EU>	Word search gesture : waving fingers / « erm »
	<S3:CL>	Word search gesture : clapping hands
	<S3:RU>	Word search gesture : rubbing fingers together
	<S3:BA>	Word search gesture : palm toward the interlocutor
	<S3:IN>	Word search gesture : index flying without grammatical value
	<PU>	Upward palm orientation sign in the neutral space resulting from a wrist rotation
	<TR> <TR TR> <TR <IL> TR>	Truncation = sign fragment • Abandoned • Completed directly • Completed with lexical insertion
Gaze	<FL>	Floating Gaze: gaze towards the floor, the side or in the air (not addressed nor related to meaningful positions in space)
	<AD>	Addressed Gaze (1): gaze towards the interlocutor
	<SP>	Spatialized Gaze (1): gaze towards meaningful positions in the space or towards the hands
	<AD:RS>	Addressed Gaze (2): gaze towards the interlocutor in relation to the actualization of a role-play
	<RS>	Spatialized Gaze (2): gaze towards positions in the frontal space in relation to the actualization of a role-play

3) Non-manuals co-occurring on PU, S2 and S3

Categories based on the meaning in context and the way that Non-manuals are activated. One fluenceme can receive more than one Nms annotation.

Child tire	Code	Meaning
Non-manuals (Nms)	<SU>	Suspension = blank in the communication, neutrality of Nms
	<EM>	Emphasis = signer stresses a point of his discourse, hold of the Nms activated in the previous sign
	<MO>	Modality = comment or evaluation, expressing by Nms, from the point of view of the role-played character or the signer himself on what is being said
	<PH>	Phatic = Signer makes sure he is well understood by producing a nod
	<EE>	Editing expression = signer attitude showing difficulties to encode the discourse, hesitation, signer awareness of a mistake
	<OT>	Others = frame for a complete mouthing, negation or affirmation

<S2:CR> with <SU>   <S2:CR> with <EE>   <S2:CR> with <MO>
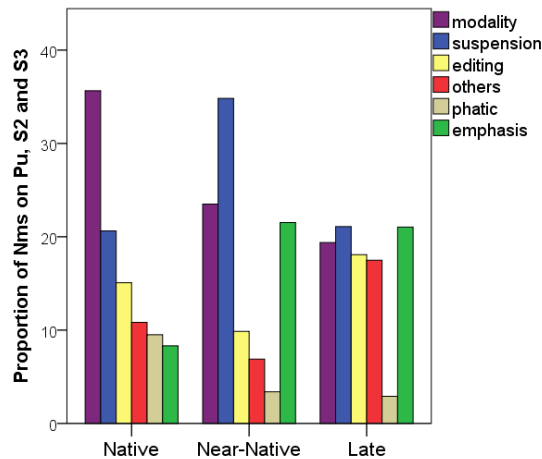
Sign : « SOLUTION »   <S2:BO> with <EM>

Different strategies among the three groups of signers to fill in the moment of non-lexical signs.

4) Speed measures

Four measures (Grosjean 1979):
- Number of lexical signs / signing time
- Number of lexical signs / articulation time
- Number of all units / signing time
- Number of all units / articulation time

Number of all units = number of lexical signs adding number of palm-ups, truncations and word search gestures
Number of lexical signs = number of lexical signs without palm-ups, truncations and word search gestures
Signing time = signing slot used by a signer to express himself without occasional interruptions due to backchannels
Articulation time = signing time without the time spent in stops between signs

Speed	Native Signers	Near-Native Signers	Late Signers
Number of lexical signs / signing time	135/min	102,5/min	101/min
Number of lexical signs / articulation time	139,5/min	108/min	107/min
Number of all units / signing time	150,5/min	115/min	112/min
Number of all units / articulation time	155/min	121/min	119/min

5) Articulation : activation of hands

Four categories:
- Sign articulated in the flow of signing with one hand, that is the preferred hand. For example, if the signer is right-handed, it will be his right hand.
- Sign articulated in the flow of signing with one hand, that is the non-preferred hand. For example, if the signer is right-handed, it will be his left hand.
- A single sign articulated in the flow of signing with two hands.
- Two signs articulated in the flow of signing with two hands, that is each hand takes over one sign simultaneously.

One annotation in these four categories counts as one element even if two signs are produced simultaneously. The choice is motivated by the fact that, most of the time, there are cases of buoys. The example below shows ten elements according to our way to count the number of units.


SEE   THERE   GROW UP   BRUSSELS   IF   PERSON   GROW UP   TOURNAI   MONS   SEE
--- Classificator (person) ---
Traduction : « You can notice if a person grew up at Brussels or if she grew up in « Tournai » or « Mons ». »

Proportionally, Native Signers do less signs with two hands, more signs articulated with the preferred hand and more simultaneous signs on both hands than Near-Native and Late Signers. There is a gradual modification of the proportions between the three groups of signers. Results for the non-preferred hand are too variable among groups.

Frequency of signs articulated on the preferred hand is positively correlated (r=0,837, p=0,001) to the articulation speed unlike the other categories of signs.
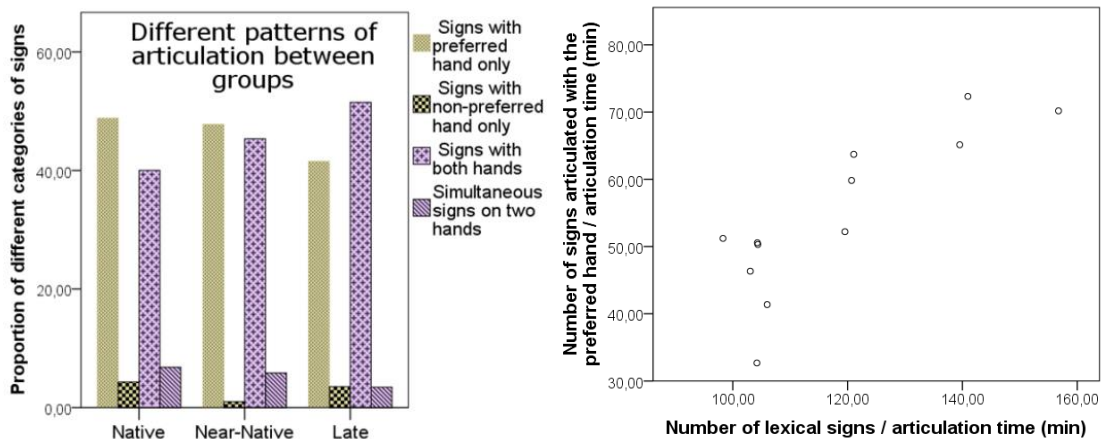

6) Length of PU, S2 and S3

No significant distinction between the three groups according to the mean length of PU, S2 and S3.
But Native Signers are among the signers who produce shorter S2 and S3. These results are linked to the correlation found between the speed and the mean length of S2 (r= -0,610, p=0,035) and the mean length of S3 (r= -0,712, p=0,009) seeing Native Signers are the fastest signers. No correlation found for the length of PU.
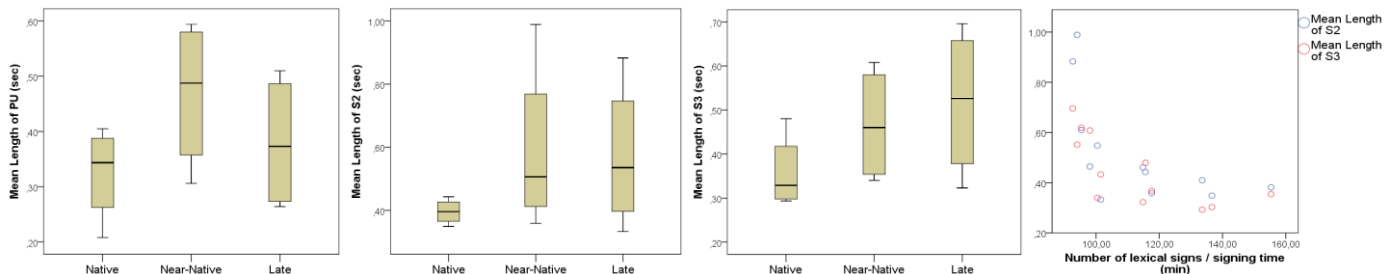
7) Truncations

Native Signers do slightly more truncations than Near-Native and Late Signers. But there is no distinction in the distribution of the different categories of truncations: same proportions among signers (50% abandoned, 40% indirectly completed and 10% directly completed).
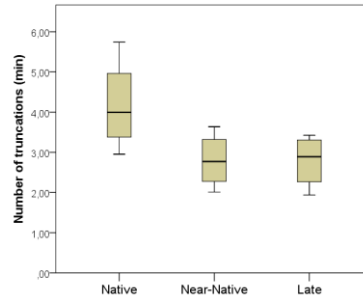

8) Gaze Direction

The number of addressed gazes (AD +ADRS) (r= 0,785, p=0,003) and the number of spatialized gazes (SP +RS) (r=0,901, p=0,000) are positively correlated to the speed, unlike floating gazes.

The length of addressed gazes (r=-0,775, p=0,003) and floating gazes (-0,607, p=0,036) are negatively correlated to the speed unlike spatialized gazes.
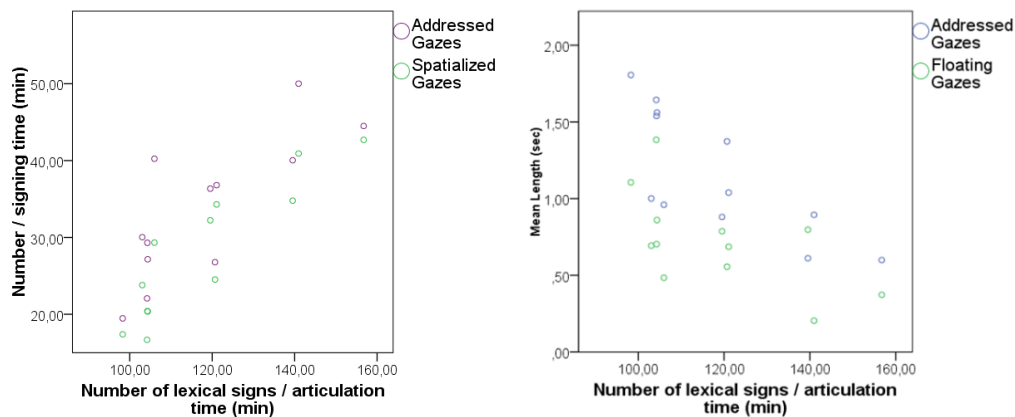
Proportions of type of gazes are quite the same between groups. Native Signers distinguish themselves from Near-Native and Late Signers by less floating gazes (FL) and more spatialized in role-play gazes (RS).
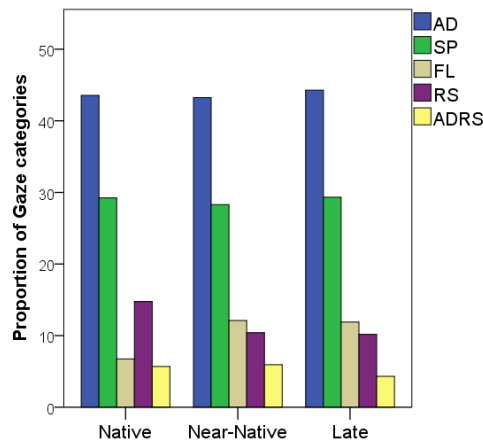
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