

Aspects of rhythm in Finnish and Swedish Sign Language (English & International Sign)

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In this paper we investigate a hypothesis, derived from the intuitions of native signers, that there is a rhythmic difference between two historically related sign languages, Finnish Sign Language (FinSL) and Swedish Sign Language (SSL). We define the notion of rhythm as 'the organization of units in time' and presume that the rhythmic feel of a language is determined by the phonetic properties and events that are used in the marking of the areas and borders of temporally ordered units such as signs and sentences (Patel & Daniele 2003; Patel 2006). In previous studies (Boyes Braem 1999; Sandler 2012), it has been suggested that the markers of rhythmic sequences in signed language are, for example, temporal duration, punctual indices (e.g. head nods), and articulatory contours. Accordingly, we approach our hypothesis with three main research questions: (i) Are the signing speed and sign duration different in FinSL and SSL, (ii) Are head nods aligned differently in terms of syntactic units in FinSL and SSL, and (iii) Is the motion of the head different in terms of its articulatory contour in FinSL and SSL sentences?

The study is based on narratives collected with identical tasks in both languages (5 *Snowman* and *Frog, where are you?* stories per language). The total amount of video material is one hour (30+30 minutes) and it includes signing from twenty (10+10) signers. All of the material has been annotated for signs, sentences and nods. The material also includes 3D numerical data on the head motion of signers (the yaw, pitch, and roll angles). The 3D data has been obtained with computer-vision technology implemented in SLMotion software (Karppa et. al 2014).

Concerning question (i), we have not so far found any significant differences in the signing speed and sign duration of the two languages. With a pilot sample of 4+4 signers and 1100 signs per language, we have determined the average signing speed to be two signs per second in both languages, and the average duration of (the core of) the sign to be 0.27 seconds in SSL and 0.29 seconds in FinSL. Concerning (ii), the average number of nods per story was higher in FinSL than in SSL but both languages tended to align nods with syntactic boundaries: of the total number of nods, 81% in FinSL and 77% in SSL occurred on a syntactic boundary, and generally also at the end of the sentence (Figure 1). Concerning question (iii), our initial tests with *Snowman* revealed that, for example, the amplitude of the tilting-like (roll) motion of the head decreased similarly toward the end of sentences in both languages (Figure 2) but FinSL signers employed this particular type of motion more often in the marking of syntactic junctures than SSL signers (Figure 3).

The preliminary results indicate some differences between FinSL and SSL. In our presentation we will present the final results and discuss them in detail with respect to our initial hypothesis.

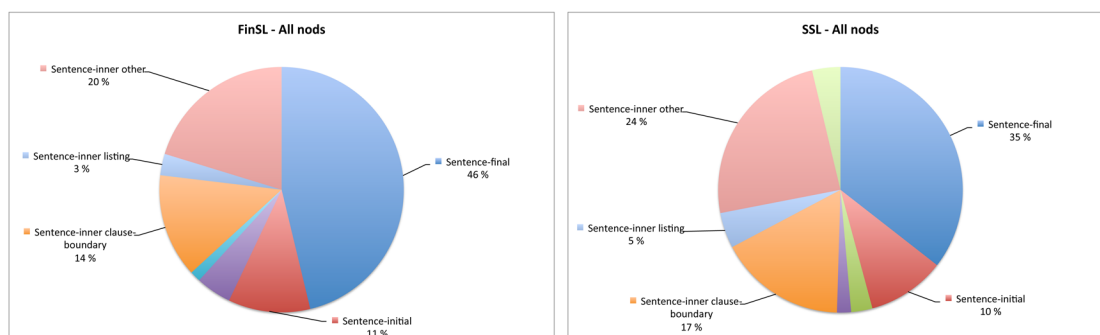


Figure 1 (above). The (main) types of nods and their percentual share of all nods in FinSL (n=212) and SSL (n=107). The nods classified as "sentence-inner other" are not counted to be associated with a syntactic boundary.

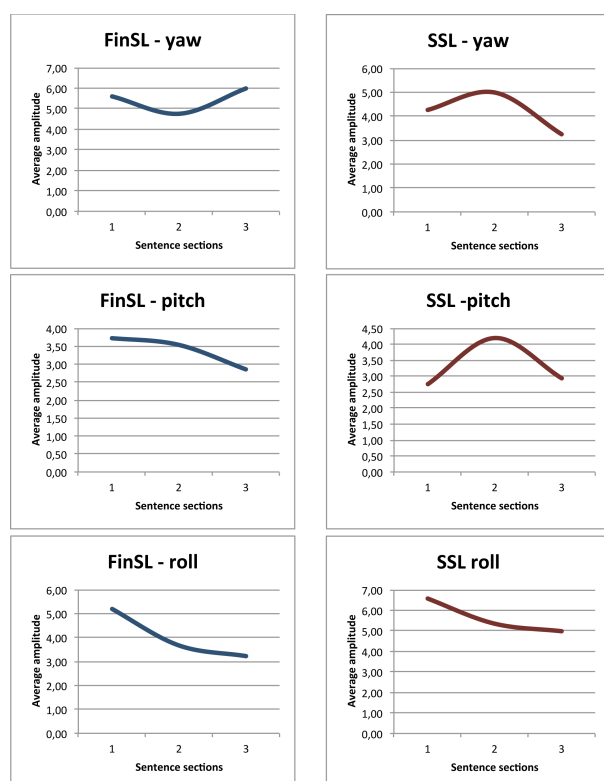
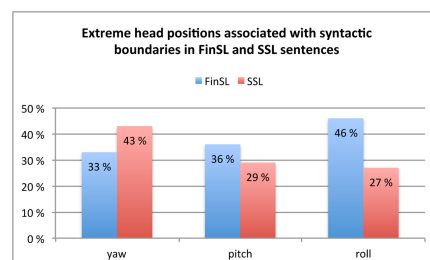


Figure 2 (left). The average amplitude (in degrees) of the head in yaw, pitch, and roll dimensions (turning-like motion, nodding-like motion, and tilting-like motion, respectively) per the beginning (1), middle (2), and end (3) sections of 8+8 semantically and structurally comparable FinSL and SSL sentences.

Figure 3 (below). The share of the extreme positions of the head in yaw, pitch and roll dimensions associated with a syntactic boundary in the domain of sentence in FinSL (n=50/146) and SSL (n=52/172).



References

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