How to describe mouth patterns in the Danish Sign Language Dictionary

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The Danish Sign Language dictionary project aims at creating an electronic dictionary of the basic vocabulary of Danish Sign Language. One of many issues in compiling the dictionary has been to analyse the status of mouth patterns in Danish Sign Language and, consequently, to decide at which level mouth patterns should be described in the dictionary: That is either at the entry level or at the meaning level.

1.0 Mouth patterns in Danish Sign Language

Mouth patterns in Danish Sign Language comprise two different kinds of mouthings¹ (mouth patterns derived from spoken language) and two kinds of mouth gestures (mouth patterns with no relation to the surrounding spoken language).

1.1 Mouthings

1.1.1. Imitations of Danish equivalents of the sign

Some signs in Danish Sign Language can be or must be accompanied by one or more mouthings of the Danish equivalents of the sign:

The sign DRENG has two semantically related meanings: ‘boy’ and ‘son’

The manual part of DRENG has two possible mouth patterns: either /dreng/² ‘boy’ (figure 1) or /son/ ‘son’(figure 2).

¹ The issues of a clear terminology in the area of mouth patterns is still to be solved. In this paper we use the terminology chosen by Rachel Sutton-Spence and Penny Boyes Braem in The Hands and the Head of the Mouth (2001) p 2-3
² We use phonemic slashes around Danish phonemes that represent either a Danish word imitated in the mouthing or the sound that is imitated in the mouth gesture.
The mouth imitates the Danish equivalent of the sign that has the same semantic content. It is not a demand that the mouth exactly reflects the pronunciation of the equivalent.

1.1.2. Imitations of Danish words not equivalent to the sign

Some signs can or must be accompanied by a mouthing imitating a Danish word that is not (anymore) an equivalent to the sign:

The sign STJÆLE ‘steal’ (figure 3) has the mouthing /tyv/ that imitates the Danish word *tyv* ‘thief’, but the sign do not carry the meaning ‘thief’.
In a dictionary of Danish Sign Language from 1907 the sign STJÆLE has two meanings: ‘steal’ and ‘thief’, and even though the sign has lost one of its meanings over the last 100 years, the mouthing imitating the lost meaning ‘thief’ must still accompany the sign.

1.2 Mouth gestures

1.2.1. Imitations of sounds that do not constitute Danish words

Some signs are accompanied by a mouth gesture which can be described as a sound, using the Danish phonetics, but which does not relate to any Danish word. The sign GAVN ‘great’, ‘advantage’ (figure 4) has a mouthing that can be described as an imitation of the sound sequence /tøp/, using Danish phonemes:

Figure 4: GAVN/tøp/

While producing the manual part of the sign GAVN, the mouth imitates the sound sequence /tøp/, which does not constitute a Danish word.

In our research we have found 35 different mouth patterns of this kind. They are listed in table 1. They are all described using Danish phonemes.

| /æds/ | /blabra/ | /if/ | /ord/ |
| /aj/ | /bo/ | /im/ | /paf/ |

3 Jørgensen, Johs. (ed.), De døvstummes Haandalfabet og 280 af de almindeligste Tegn [The Handalphabet of the Deaf and Dumband 280 of the most common sign]

4 ø is a Danish rounded front vowel that is the rounded counterpart to [e] in IPA’s alphabet
Table 1: The inventory of mouth gestures that do not imitate Danish words, but can be described using Danish phonemes

<table>
<thead>
<tr>
<th>/ar/</th>
<th>/bom/</th>
<th>/jar/</th>
<th>/søl/</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ärh/</td>
<td>/bombom/</td>
<td>/lala/</td>
<td>/tata/</td>
</tr>
<tr>
<td>/beed/</td>
<td>/bus/</td>
<td>/m/</td>
<td>/tøp/</td>
</tr>
<tr>
<td>/bar/</td>
<td>/do/</td>
<td>/o/</td>
<td>/væd/</td>
</tr>
<tr>
<td>/bi/</td>
<td>/faw/</td>
<td>/øde/</td>
<td>/vasvas/</td>
</tr>
<tr>
<td>/bif/</td>
<td>/fi/</td>
<td>/øf/</td>
<td>/y/</td>
</tr>
<tr>
<td>/bip/</td>
<td>/i/</td>
<td>/oiy/</td>
<td></td>
</tr>
</tbody>
</table>

1.2.2. Mouth patterns with no relation to Danish Language

Finally signs can be accompanied by mouth patterns that can not be analyzed as imitating neither sounds nor words from Danish. They can not be described by Danish phonemes, but must have a description in prose of the exact movements made in the mouth area.

As producing the manual part of the sign EKSISTENS meaning ‘existence’, ‘possession’ and ‘location’ (figure 5), the mouth performs a quick side to side movement of the tongue.

Figure 5: EKSISTENS <a quick side to side movement of the tongue>⁵

⁵ We use brackets around descriptions of the mouth gesture that can not be described by Danish phonemes
In our research we have found 18 different mouth patterns of this kind. They are listed in table 2.

<table>
<thead>
<tr>
<th>&lt;bite one’s tongue’&gt;</th>
<th>&lt;lick one’s lips&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;munch&gt;</td>
<td>&lt;pout&gt;</td>
</tr>
<tr>
<td>&lt;nothing&gt;</td>
<td>&lt;tongue expands the cheek&gt;</td>
</tr>
<tr>
<td>&lt;chattering teeth&gt;</td>
<td>&lt;tongue out&gt;</td>
</tr>
<tr>
<td>&lt;short puff of air&gt;</td>
<td>&lt;tip of tongue out&gt;</td>
</tr>
<tr>
<td>&lt;long puff of air&gt;</td>
<td>&lt;a quick back and forth movement of the tongue&gt;</td>
</tr>
<tr>
<td>&lt;puffy cheeks&gt;</td>
<td>&lt;a quick up and down movement of the tongue&gt;</td>
</tr>
<tr>
<td>&lt;puffy cheek&gt;</td>
<td>&lt;a quick side to side movement of the tongue&gt;</td>
</tr>
<tr>
<td>&lt;puffy lower jaw&gt;</td>
<td>&lt;vibrating lips&gt;</td>
</tr>
</tbody>
</table>

Table 2: The inventory of mouth gestures that cannot be described by Danish phonemes

2.0 Dealing with mouth patterns in the dictionary

Lemmatisation in the Danish Sign Language dictionary is based partly on meaning, partly on phonological shape:

- Semantically, we make a synchronous semantic analysis of the meanings covered by a sign, allowing only related meanings and transparent figurative uses to occur together in one entry.
- Phonologically, two forms that differ in their manual features are described as two entries, except for variants which we define as forms with identical semantic content with manual variation in no more than one of the categories number of hands, handshape, orientation, location, and movement (with the exception of repetition). Consequently, signs with the same meaning and with variation in two categories will be split into two entries and described as two synonymous signs.

Mouth patterns are an integral part of Danish Sign Language and must be described in a Danish Sign Language Dictionary. One possibility is to classify mouth patterns as part of the phonological description, located on the dictionary entry level, and allowing for variation within this category. Another possibility is to locate the mouth pattern description at the meaning level.
Some of the signs in Danish Sign Language has more than one possible mouth pattern that can be regarded as free variation that do not contribute to the meaning of the sign. The sign MASSER-AF meaning ‘many’ can be accompanied by four different mouth patterns: two mouthings: /mange/ ‘many’ (figure 6) and /masser/ ‘lots [of]’ (figure 7) and two mouth gestures: /i/ (figure 8) and <long puff of air> (figure 9).

If mouth patterns in the dictionary were described as part of the phonological description, signs like MASSER-AF would according to our phonological principles for lemmatising have one entry with four variants – each with different mouth pattern but all with the same manual part of the sign. If mouth patterns were to be described at the meaning level, the sign would have one variant and one meaning with four possible mouth patterns.

The manual part of the sign HUS ‘house’ has many possible mouthings, all imitating Danish equivalents:
/hus/ ‘house’
/bolig/ ‘home’
If mouth patterns were described as a part of the phonological description, signs like HUS would be split into seven different signs. If, however, mouth patterns were described at the meaning level, the sign HUS would be treated as one sign.

Some signs have different mouth patterns due to the fact that the two languages have different ways to separate concepts in real life. The sign HISTORIE (figure 10) means ‘real or made up story’. Danish has at least 20 different words for this meaning, all of them meaning ‘story’, but each individually or in synonym pairs covering a part of the concept, e.g.: *vittighed* and *vits* ‘joke’, *novelle* ‘short story’, *roman* ‘novel’, *historie* meaning both ‘history’ and ‘story’ etc.

![Figure 10: HISTORIE ‘real or made up story’](image)

Danish Sign Language has one sign covering the complete concept. There are – at least – eleven different mouth pattern for this sign, all mouthings of Danish words.

If mouth patterns were described as a part of the phonological description, signs like HISTORIE would be split into eleven different signs. If, however, mouth patterns were described at the meaning level, the sign HISTORIE would be treated as one sign.

Other signs in Danish Sign Language have different mouth patterns that contribute to the meaning of the sign. The sign OMTALE (figure 11-13) meaning both ‘slander’ and ‘subject of conversation’ can
be accompanied by at least three mouth patterns, one mouthing: /omtale/ ‘subject of conversation’ (figure 11) and two mouth gestures: <long puff of air> (figure 12) and <tongue out> (figure 13). The meaning of the sign changes depending on the changes in the mouth pattern accompanying the sign. Thus, /omtale/ and <long puff of air> accompany the meaning ‘subject of conversation’, and <tongue out> accompany the meaning ‘slander’.

If mouth patterns were included as part of the phonological description, a sign like OMTALE would be split into two entries: OMTALE is polysemous according to our semantic principles for lemmatising, and the phonological principles only allow signs that differ in one phonological feature to be treated as two variants of the same sign if the two variants are identical in their semantic content. One of the two entries would have two variants, the other would have one variant. If mouth patterns were described at the meaning level, the sign OMTALE would formally have one articulation, as the variation is exclusively non-manual. Hence the sign OMTALE would be treated as one sign with two meanings, one having two possible mouth patterns, the other having one possible mouth pattern.
The Danish Sign Language dictionary project has established a group of deaf consultants – all native signers. The group consists of 0.5% of the deaf community in Denmark. The consultants consider both HISTORIE as one sign and OMTALE as one sign.

We have decided to locate the description of mouth patterns at the meaning level, thus obtaining the possibility of describing these without being forced to add new entries to the dictionary in cases like OMTALE and HISTORIE. Consequently, an entry in the Danish Sign Language dictionary is phonologically established solely by the headword’s manual expression, that is with no reference to oral (or other non-manual) features.

Some signs that have more than one Danish equivalent can not be accompanied by all the Danish equivalents. For example, the manual part of the sign BAGVED ‘behind [in schedule/ in sports etc.]’ may be translated into two Danish synonyms: bagefter or bagud, but the sign can only be accompanied by the mouthing /bagud/, not the mouthing */bagefter/. The dictionary aims to show which Danish words the individual signs can be accompanied by. Every Danish equivalent is marked in case the imitation of the equivalent is an acceptable mouthing accompanying the sign.

References:
Jørgensen, Johs. (ed.). *De døvstummes Haandalfabet og 280 af de almindeligste Tegn* [The Handalphabet of the Deaf and Dumb and 280 of the most common sign]. Copenhagen, 1907.

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