Newstalk: reductions in careful, scripted speech

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Abstract.
The area of articulatory reductions in spontaneous connected speech has been studied for a number of languages, and has contributed to important knowledge about speech communication, production and perception of speech. The work presented here concerns the domain of connected speech, but instead of spontaneous speech, scripted speech is in the focus of attention. The point of interest is to see to what degree (if any) articulatory reductions appear in a formal context with high demands for intelligibility as in news programs.

Read speech from the national Swedish TV-news is analyzed. Reduced forms are viewed more carefully, and related to existing theories on connected speech. Some patterns for reductions are found, and compared to findings in spontaneous speech.

1 Outline
In contexts, such as in national TV news broadcasts, clarity and intelligibility is crucial. Newscasters are trained to read from a text prompted manuscript in such a way that maximal intelligibility is believed to be achieved. This method of speaking may impact upon speech planning and reduction behavior.

Reduction has been investigated with regard, among other things, to speech tempo, utterance length and speaking style. The majority of the research conducted to date has dealt with spontaneous, or casual speech (e.g. Duez 2003; Kohler 1999; Swerts et al. 2003). This paper investigates whether the findings and theories based on spontaneous speech can be generalized to carefully scripted speech, or if totally different patterns of reduction are used. Comparisons will be made to findings in spontaneous speech (e.g. Engstand & Krull 2001a, 2001b).

This paper uses both acoustic and auditory analyses to examine the patterning of reduction in Swedish newscast speech. The patterns are compared and contrasted with those found in spontaneous speech.

For example, if, as predicted by H&H theory (Lindblom 1990) and discussed in Jensen et al. (2003), speakers tend to preserve the most informative parts of speech unaffected by reduction phenomena, a similar situation should be found in newscast speech.

1.1 Material
The material consists of recordings of newscasters on Swedish national television. Recordings were made on standard stereo VHS, and digitized using Ulead DVD MovieFactory SE software at 16 bit, 44 kHz. The sound was separated from the pictures using Virtual Dub 1.4.13 and the spectrogram analysis was made using Wavesurfer software.

Speech from three different speakers, 2 male and 1 female, has been used. The material consists of about 5 minutes of speech.

Only sequences containing read speech have been used; the parts containing interview- or questions / answers have been omitted.

1.2 Method
As the phenomena studied do not form a distinctively segmental level and are, thus, not easily quantifiable in time or any other comparable unit of measure (see: Kohler 1991) the approach adopted is qualitative. It also entails a degree of subjectivity as auditory analysis is dependant upon the listeners’ judgment.

After an auditive analysis of the recordings, the fragments of speech containing reductions were extracted. These were then analyzed in more detail, using spectrograms and lower level phonetic listening. The analyzed parts of speech were not segmented in the traditional way, as many of the reduction phenomena, such as nasalization and glottalization, appear on a level above the segmental (e.g. Kohler 2001).

2 The analyzed parts of text
The studied fragments of speech are presented in section 2.1, placed in short contexts. The analyzed parts are written in SMALL CAPITALS, the contextual setting in normal font and the phonetic transcription of the target words in
IPA-alphabet. The first transcribed form is the non-reduced, and after the arrow the reduced form is to be found.

2.1 Short context

1. Detta menar NÄRINGSMINISTER Leif Pagrotsky
   [næːrɪŋsminɪster] \(\rightarrow\) [næːrɪŋsminɪstər]

2. Nye NÄRINGSMINISTERN Leif Pagrotsky
   [næːrɪŋsminɪstərn] \(\rightarrow\) [næːrɪŋsminɪstən]

3. anser att POSTENS STYRELSE gjorde
   [poːstɛnс styːrɛlsɛ] \(\rightarrow\) [poːstɛnstɛrɛsə]

4. i Bengtsfors FÖR TRE år sen
   [før tre: oc sən] \(\rightarrow\) [føtɾeːəʊsən]

5. när ny SYSSELSPÅTTNING skulle skapas
   [sysːɛlspɔːtntɪŋ] \(\rightarrow\) [sysːɛlspɔːtnɪŋ]

6. OCH SÅ GICK DET SOM DET GICK
   [ɔːsɪkde somdʒɪk]

7. ledare FÖR DOM danska socialdemokraterna
   [før dom] \(\rightarrow\) [fɔɾdʊm]

8. fall av ALKOHOLFÖRGIFTNING bland ungdomar
   [alkʊholfɔːrgjɪftnɪŋ] \(\rightarrow\) [alkʊholfɔːrifjɪftnɪŋ]

9. undersökninGAR VISAR ATT Nästan hälften
   [ɔndəsɛːknɪŋar visər at nɛstən] \(\rightarrow\) [ɔndəsɛːknɪjavɪsərət]

10. SÅ HAR trenden
    [sɔː hær] \(\rightarrow\) [sɔːːəɾ]

11. en vecka EFTER DET ATT EN tretonnårig
    ficka [efter detː at en] \(\rightarrow\) [efɛɾeː atʰn]

12. OCH FÖR ATT värna
    [ɔːk fœɾ at] \(\rightarrow\) [ɔʃfrat]

13. kvarts miljon i SKADESTÅNDSANSPRÅK
    [skɑːdestɔːndeɪnsprɔːk] \(\rightarrow\) [skɑːdestɔːndsɛnsprɔːk]

14. upphandlingar UNDER DOM senaste fyra
    årens [ɔndər dəm] \(\rightarrow\) [ɔndɹəm]

15. ledningen HOPPADES kunna

16. rengöra stränderna EFTER DET STORA oljeutsläppet
   [efter detː stuːra] \(\rightarrow\) [efstrəstuːra]

17. UTANFÖR DEN SPANSKA atlantkusten.
   [ʊtːanfɔːr  den spanskə] \(\rightarrow\) [ʊtːanfrɛn spəska]

18. det FÖRLISTA tankfartyget
    [fɔrlɪːsta] \(\rightarrow\) [fɛlɪːsta]

19. som i september KÖRDE IHJÄL en vägarbetare
    [kœːrdɛ iːjəːl] \(\rightarrow\) [kœːrdjɪːl]

20. OCH FÖR ATT HAN smet från olycksplatsen
    [ɔːk fœɾ at han] \(\rightarrow\) [ɔʃfrat ən]

21. i STOCKHOLMSFÖRORTEN Bagarmossen
    [stɔːkholmsfɔːʁuːtən] \(\rightarrow\) [stɔːkholmsfɔːrutʃɛn]

2.2 Reductions in context

The reduced forms found are of different kinds. A first analysis shows that the frequency of reductions is substantially lower, and reduced forms not as deviant from the canonical forms as those found in spontaneous speech. In other words, the reduction process would, most probably, in spontaneous speech be driven further (c.f. Kohler 2001 or Engstrand & Krull 2001a). It also appears as if the reduced forms tend to appear in certain positions, such as;

- In compound words with complex, or more than 5 opening / closing gestures (e.g. NÄRINGSMINISTERN, SYSSELSPÅTTNING) /The Minister of Trade, employment/;

- In lexicalized expressions and idiomatic expressions (OCH SÅ GICK DET SOM DET GICK, KÖRDE IHJÄL) / and then it all happened, with his car hit and killed/;

- In combinations of function words with adverbial and attributive function (e.g. EFTER DET STORA, UTANFÖR DEN) / after the huge, off the/;

2.3 Types of reductions

The most common types found in the material (21 samples) are:
• vowel reduction, where a vowel is strongly reduced, or totally deleted (13 occurrences)
• consonant reductions where consonants are totally deleted (13 occurrences).
• deletion of laterals, with 4 occurrences of /r/-deletion and 3 occurrences of /l/-deletion.

Nasalization of vowels, often in combination with reduction of a nasal consonant is another frequent observation.

3. Discussion

The reductions in the multi-syllabic words were the ones immediately noticed during the first listening. In these words, high vowels between nasals, and laterals between open, unrounded vowels tended to reduce to, or close to, nothing, as in [nærŋɪnsɪstɛr] → [nærŋɪnsɪstɛr] and [postɛnstɪlsɛs] → [postɛnstɪlsɛs].

This is in accordance with Lindblom's H&H theory (Lindblom 1990), as the realization is sufficiently clear to perceive, but with reduced motor effort in the production phase.

The same was found for lexicalized expressions that, from a cognitive or perceptual viewpoint, do not have to be clearly articulated to be perceived correctly. [ɔk soː jik det som det jɪk] → [ɔsjɪkde somdɪjɪk] is a good example.

The speaker (J.A.) is widely regarded as a very articulate and clear speaker. The fact that he can allow himself this kind of hypo-articulation, or undershoot, also agrees with Lindblom's statement “speakers have a choice” and illustrates that very careful speech is not the same as hyper-articulated speech.

The reductions in function words with adverbial and attributive functions could also be clearly perceived in an auditory analysis. Instances of such phenomena are found in e.g. [ʊtːtænfɛːr den] → [ʊtːtænfɛːr] and [sɔː hɑːr] → [sɔːhɑːr]. This can be explained both from a reduced motor-effort- and a cognitive angle. The effort in producing the reduced form is considerably smaller than in producing the canonical form, (c.f. Lindblom 1983) but perceptually the reduced form, placed in its context, is fully sufficient. However, out of context or in isolation, the realization would probably have to be closer to the canonical form in order to be correctly perceived by a listener. This again illustrates the difference between continuous speech and isolated words.

Similar findings have been made in studies where speech tempo is the crucial parameter (Janse et al. 2002). They conclude that function words, such as articles and auxiliaries, tend to get heavily reduced or almost completely absent in fast speech. This seems to be a general property of reductions, as a similar pattern of occurrence is found in the material used for this article. This, and other findings could, according to Janse et al. point to that reductions have not so much to do with assisting the listener to perceive fast speech but rather are more an issue of production.

As expected, following (Engstrand & Krull 2001a and 2001b), examples of co-articulation where nasalization spreads into the preceding consonant were also found in the material. Engstand & Krull in their comparison of careful and casual pronunciations and noticed that reductions sometimes resulted in the total deletion of the nasal, and only traces of it could be found in the preceding vowel. For example as in [anæːs] → [ɑːs].

Such extremes are found in the newscast material too, and tendencies in this direction, where the nasal gesture includes the preceding vowel are also evidenced in the material. A clear example from the newscast material can be seen in the compound [skæːdestɔnɔnsproːk] → [skæːdstɔnsɔnsproːk]. In this example this process occurred twice: in the first V+nas+C combination, the nasal is not much shortened in duration, but in the second combination it is reduced almost to the point of deletion. The nasalization itself is present, both perceptually and acoustically, but lies mainly in the preceding vowel. This also suggests that the phenomena itself is on a higher level than the segmental. (Kohler 1991)

Another, more elaborate example of the same phenomenon is [ʊtːtænfɛːr den spanska] → [ʊtːtænfɛːr spæska] where [n] is deleted in [spæska], but the nasality is preserved and clearly audible in the [ɑː]. The phonemic V+nas+C structure is identical to the one in the previous example, and could possibly indicate a more general pattern in action.

4. Concluding remarks

The primary finding is that reductions occur in scripted, carefully read newscast speech. The extent of the reductions, both quantitatively and qualitatively, is lower than in casual speech. The general impression of the read speech is that it is close to the canonical forms. Some expressions are stylistically more like written lan-
language than spoken language, and would not occur in a casual dialogue. Reductions, however, occur in these more bookish formulations, but to a more limited degree than in the rest of the newscast recordings.

References


Kohler, K. J. (2001) Articulatory dynamics of vowels and consonants in speech communication. JIPA 31, 1-16

