Effects of sex and age in the Arjeplog dialect: a listening test and measurements of preaspiration and VOT

Stölten, K.

journal: Proceedings of Fonetik, TMH-QPSR
volume: 44
number: 1
year: 2002
pages: 029-032

http://www.speech.kth.se/qpsr
Effects of sex and age in the Arjeplog dialect: a listening test and measurements of preaspiration and VOT

Katrin Stölten and Olle Engstrand
Department of Linguistics, Stockholm University

Abstract
This study tested whether older speakers are ‘more dialectal’ than younger speakers, and whether men are more dialectal than women. Speech material from the Arjeplog dialect was used in a listening test and a set of durational measurements of preaspiration and VOT. In the listening test, unscripted monologues produced by 3 men and 3 women of an older generation, and 3 men and 3 women of a younger generation were presented to 19 young listeners. The younger women were judged as less dialectal than the remaining speakers, but no significant differences were observed between the remaining speaker groups. Measurement results revealed that the older speakers displayed longer preaspiration intervals than did the younger speakers but, contrary to the hypothesis, women turned out to produce longer preaspirations and VOTs than the men. No significant age-related VOT differences were observed.

1. Introduction
It is a commonly held belief that men are ‘more dialectal’ than women and that older speakers are ‘more dialectal’ than younger speakers. The clearest difference in dialect strength would thus be found between older men (‘most dialectal’) and younger women (‘least dialectal’).

Several sociophonetic differences between female and male speech have been described in the literature (Trudgill 1972, Kramer 1978, Byrd 1994). It has been suggested, for example, that the strongly retroflex lateral flap, which is characteristic of many Swedish dialects, is used to a greater extent by male than by female speakers (Elert 1981).

The idea that older speakers tend to be more dialectal than younger speakers has also been corroborated by some sociolinguistic studies. For example, Nordberg and Sundgren (2000a, b) showed that younger speakers in Eskilstuna used standard forms to a greater extent than did older speakers.

The purpose of this study was to look for effects of sex and age on the use of dialectal features in Arjeplog, a dialect community in Swedish Lappland. The Arjeplog dialect is known to be characterized by strong preaspiration. Informal observations also suggest that the dialect may have relatively short voice onset time (VOT) intervals in the voiceless stops, and a brief voice lag (rather than voice lead) in the voiced stops.

A listening experiment (experiment 1) tested the hypothesis that male Arjeplog speakers would be judged by listeners to sound more dialectal than females speakers, and that older speakers would be judged as more dialectal than younger speakers (hypothesis 1). In view of the possible influence of speaker age on dialect judgments, listeners were also asked to judge speaker age.

Experiment 2 tested whether the age and sex groups of Arjeplog speakers could be separated in terms of preaspiration and VOT. The hypothesis was that older speakers would display longer preaspiration intervals than younger speakers, and that male speakers would display longer preaspiration intervals than female speakers (hypothesis 2). Analogously, it was hypothesized that older speakers would produced longer VOTs than younger speakers, and that male speakers would produced longer VOTs than female speakers (hypothesis 3). It was further assumed that speakers who had been judged to be highly dialectal in the listening test (experiment 1) would also display longer preaspiration and VOT intervals than speakers who had been judged to be less dialectal.
2. Experiment 1

2.1 Method

Nineteen normally hearing students from the Stockholm area, 9 men and 10 women between 20 and 28 years of age (mean=22.2, std=2.3), participated in the two listening tests (dialect and age judgments). The speech material consisted of approximately 30 seconds of spontaneous monologue produced by each of 12 speakers from Arjeplog: 3 older women (age 55, 61 and 61), 3 older men (age 60, 64 and 67), 3 younger women (age 22, 24 and 26), and 3 younger men (age 23, 24 and 27). The recordings were taken from a Swedish dialect database (SWEDIA 2000; see, e.g., Björnsten et al. 1999). For each speaker, two samples were chosen, one for dialect and one for age judgments. The samples were relatively neutral stylistically as well as emotionally, and the content was as little informative as possible of the speakers’ age or occupation.

The speech samples (16 bits, 16 kHz stereo) were presented via high-quality earphones to each subject in a random order. The subjects were asked to rate the speakers’ age on a four-point scale: about 20, 40, 60 or 80 years. Dialect strength was also evaluated on a four-point scale: not dialectal, fairly dialectal, clearly dialectal or strongly dialectal.

2.2 Results

Figure 1 shows estimated age plotted against chronological age for each speaker. There is a clear separation of the speaker group judged as younger (20-40 years) from that judged as older (50-80 years), but the difference between the age groups was smaller in terms of estimated age than in terms of chronological age. A significant correlation between chronological and estimated age was found for the younger speaker group \((r=0.79)\), but not for the older group \((r=0.07)\). A strong correlation \((r=0.92)\) was found for the speaker group as a whole.

Figure 2 shows listeners’ judgments of dialect strength as a function of estimated age. The older speakers tended to be judged as more dialectal than the younger speakers, but this effect was not significant \((F(1,8)=1.926, \ p=0.203)\). The correlation between estimated age and perceived dialect strength was an almost perfect for the older generation \((r=0.99)\), but weaker for the younger generation \((r=0.62)\).

The older speakers tended to be judged as more dialectal than the younger speakers, but this effect was not significant \((F(1,8)=1.926, \ p=0.203)\). The correlation between estimated age and perceived dialect strength was an almost perfect for the older generation \((r=0.99)\), but weaker for the younger generation \((r=0.62)\).

In sum, experiment 1 has shown that listeners were able to separate younger from older speakers, and that younger women were judged as less dialectal than the remaining speakers. This partially corroborates hypothesis 1. In addition, there is a clear relationship between estimated age and estimate degree of dialect strength.
3. Experiment 2

3.1 Method

For measurements of preaspiration, two words were chosen, one with a high vowel, *typ* /typ/ 'type' and one with a low mid vowel, *lott* /lɔt/ 'lottery ticket'. VOT was measured in words with /p t k/ and /b d g/ in stressed initial position: *panna* 'forehead', *tala* 'speak', *kaka* 'cake', *bada* 'bathe', *dagar* 'days', *gata* 'street'. The test words, again taken from the SWEDIA 2000 database, were pronounced in isolation three times by the same speakers as in experiment 1.

All measurements were done using broadband spectrograms and raw waveforms generated using the Soundswell signal analys package. Preaspiration was measured as the time interval between voice offset in the pre-stop vowel and the termination of aspirative or fricative noise as seen in the spectrogram. VOT was measured as the interval between stop release and onset of voicing for the following vowel.

3.2 Results

The preaspiration results are presented in figure 3.

![Figure 3. Preaspiration duration (ms) for 3 older men (om), 3 older women (ow), 3 younger men (ym) and 3 younger women (yw) during the production of the words typ (light columns) and lott (dark columns).](image)

It can be observed that average preaspiration duration is greater in typ than in lott. An ANOVA with the factors age (older/younger) and sex (female/male) revealed that the older speakers produced *typ* with a significantly longer preaspiration (F(1,32)=12.255, p=0.001) than did the younger speakers. There was no significant age difference for the word *lott*. A significant sex difference was observed in both words in that the male speakers displayed shorter preaspirations than did the female speakers (F(1,32)=7.067, p=0.012 for *typ*, and F(1,32)=10.853, p=0.002 for *lott*).

As expected, the VOT analysis showed longer average VOT-values for the voiceless stops than for their voiced cognates (table 1). All speaker groups except the older women tended to produce increasing VOTs from front to back places of articulation.

<table>
<thead>
<tr>
<th>Talare</th>
<th>/p/</th>
<th>/t/</th>
<th>/k/</th>
<th>/b/</th>
<th>/d/</th>
<th>/g/</th>
</tr>
</thead>
<tbody>
<tr>
<td>om</td>
<td>40</td>
<td>60</td>
<td>57</td>
<td>15</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>ow</td>
<td>46</td>
<td>46</td>
<td>64</td>
<td>36</td>
<td>15</td>
<td>36</td>
</tr>
<tr>
<td>ym</td>
<td>44</td>
<td>51</td>
<td>63</td>
<td>-30</td>
<td>-17</td>
<td>34</td>
</tr>
<tr>
<td>yw</td>
<td>54</td>
<td>54</td>
<td>63</td>
<td>27</td>
<td>43</td>
<td>43</td>
</tr>
</tbody>
</table>

The female speakers tended to produce longer average VOT than did the male speakers, except for the voiceless stop /t/. An ANOVA showed that the effect of sex was highly significant for the voiced stops (F(1,104)=15.396, p=0.000), whereas just a weak such tendency was found for the voiceless stops (F(1,104)=3.454, p=0.066). However, a significant age effect was found for the voiceless stops (F(1,104)=4.079, p=0.046) with longer average VOTs for the younger than for the older speakers. For the voiced stops, no significant age effect was noticed (F(1,104)=0.910, p=0.338).

In sum, experiment 2 has provided evidence for a sex differences in that women produced longer VOTs in the voiced stops than did the men. Age differences were observed in the preaspiration measurements such that the older speakers produced longer preaspirations than did the younger speakers. An effect of sex was also observed in that the male speakers displayed shorter preaspirations than did the female speakers.

4. Discussion

The hypothesis that men tend to be heard as more dialectal than women, and that older speakers tend to be heard as more dialectal than younger speakers (hypothesis 1) was partly supported by experiment 1. Confirming hypothesis 1, the younger women were judged as less dialectal. Within the younger speaker
group, men were thus perceived as more dialectal than women of the same generation. These findings are in agreement with results presented by Nordberg and Sundgren (2000a, b) in so far as these authors have found that younger women tend to use more standard forms than men.

With respect to dialect strength, however, no significant difference was found between the older and the younger speaker groups. In this part, then, hypothesis 1 was not corroborated by the data.

The age judgment test showed that listeners were able to differentiate the older from the younger speaker group. The fact that there was a better correspondence between chronological and estimated age for the younger speakers may be due to listeners having more experience of speakers of the same age (Huntley et al., 1987).

In Experiment 2, the hypothesis was that degree of preaspiration and VOT would be indicative of dialect strength and, thus, that male sex and old age would lead to longer preaspiration (hypothesis 2) and longer VOT (hypothesis 3). In contrast to this expectation, however, men did not show either stronger preaspiration or VOT. On the contrary, it was the women who produced longer preaspirations and VOTs. This result might be due to physiological differences between the sexes (Fant et al. 1991) or sex-related differences in speaking rate (Byrd 1994, Helgason 1999).

The possible effect of speaking rate on preaspiration and VOT could not be clarified in this study. Complementary measurements were made of vowel durations and silent intervals, but these intervals were probably too short to work as reliable indicators of speaking rate. The duration of the whole word may have been more revealing.

The expectation that older speakers would display longer preaspirations than would younger speakers (hypothesis 2) was supported for one of the test words (typ) but not for the other test word (lott).

Hypothesis 3, assuming that older speakers would produce longer VOTs than younger speakers could not be confirmed. The younger speakers showed longer VOTs for the voiceless stops than did the older speakers, which contradicts hypothesis 3. For the voiced stop cognates, no significant age difference was found.

Finally, the question remains whether listeners’ judgment of dialect strength was, in fact, conditioned by actual dialect features or to what extent it was influenced by the same listeners’ judgment of speaker age. Technical manipulation of speakers’ voices could perhaps help to test this possible effect. Also, additional dialect features should be studied to further clarify the relationships between age, sex and dialect strength.

Acknowledgment

This work was supported by the Bank of Sweden Tercentenary Foundation [Riksbankens Jubileumsfond], grant 1997-5066 to the projekt Phonetics and phonology of the Swedish dialects around the year 2000 (SWEDIA 2000).

References


