Production and perception during a Parisian French vowel change

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1. Production and perception in sound change

How are production and perception related during a merging process in sound change?

- Does the ability of distinguishing disappear from a speaker’s perceptual device before he has lost it completely in his own production (Labov 1994:355)? OR
- Does the perceptual distinction capability stay intact for some time after the speaker has himself lost the distinction in production (Janson 1983:25)?

Why look at the Parisian vowel merger /a/–/a/ (pâte–patte)?

Hansen & Juillard (2011) compared young Parisian speakers recorded in 1972-74 and 2001-2004 respectively, and found that loss of distinction between two /a/ qualities was further advanced than ongoing loss of other vowel distinctions (Europa, -a/-o, aO/aP, a–æ/).

2. Production: /a/-/a/ merge

Production of /a/ in text-reading (25 Parisian speakers, 2012)

2a. Age 70+
2b. Age 40-55
2c. Age 18-25

Age-grading in production shows progression of the merger. Senior speakers keep /a/-/a/ apart phonetically with some consequence. Middle-aged speakers only have a slight hint of the distinction. Young speakers have completely lost it. Who can still perceive the traditional difference?

Main research question: How do young as opposed to middle-aged listeners react to a word identification test in which isolated words with /a/ or /a/ are read aloud by a senior (conservative) speaker?

3. Design of perceptual task

Word identification test:

Stimuli: isolated words read aloud, by a senior reader (74 y) and a young reader (21 y) (in different orders), for written identification by 18 listeners.

The words (a total of 26 per reader after the introduction):

- Introductory words (3) to assure comprehension of the test
- Dummy words (5, poulet, manger, kilos..., mixed in the lists)
- Real test words with /a/ or /a/ (21, pâte, patte, hâler, aller..., mixed in the lists)

Evaluation of the test design (I):

Total of 990 responses ((3+2x26 words) = 55 x 18 listeners).

Missing responses: 15/990 = 1.5% → The comprehension of the test task was fine.

Evaluation of the test design (II):

<table>
<thead>
<tr>
<th>Word type</th>
<th>Correct word identification</th>
<th>Correct vowel phoneme identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory words</td>
<td>91% (49/54)</td>
<td>-</td>
</tr>
<tr>
<td>Dummy words</td>
<td>99% (178/179)</td>
<td>-</td>
</tr>
<tr>
<td>Real words with /a/ or /a/</td>
<td>94% (344/355)</td>
<td>97% (360/355)**</td>
</tr>
</tbody>
</table>

**Missing answers as well as a few test stimuli (pâtes/pâtes, las in one of the readings) are removed from the calculation basis. "Wrong perception of consonants rather than of vowel phoneme disregarded here (Janson noted "messe" for instance), which makes the result for phoneme identification better than that for word identification.

→ The test results reveal that words with the /a/ phoneme are harder to identify correctly than other words.

Type of identification error on /a/ | Errors on id. of /a/: N = 275 |
<table>
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<tbody>
<tr>
<td>Confusion between /a/ and /a/ (pâte noted “pate” or vice versa)</td>
<td>96% (265/275)</td>
</tr>
<tr>
<td>Double answer (pâte noted “pate/pate”)</td>
<td>2% (7/275)</td>
</tr>
<tr>
<td>Other error</td>
<td>1% (3/275)</td>
</tr>
</tbody>
</table>

→ The test results reveal that identification errors on /a/ are of the expected type (confusions between /a/ and /a/).

4. Perception and age

General – not surprising – results for all listeners together:

- Recoding phoneme /a/ provokes fewer correct identifications than /a/ (51% (+/-3%) vs 61% (+/-3%) (due to direction of merger)
- /a/ phonemes of the senior reader are better identified than those of the young one (61% (80/134) vs 43% (60/146)) – due to his distinct production

But what is the role of listener age in the recognition of /a/ in the senior voice?

<table>
<thead>
<tr>
<th>Senior reader (listeners by age group)</th>
<th>Correct pronunciation identifications of words with /a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young (18-24 years)</td>
<td>87% (205/238)</td>
</tr>
<tr>
<td>Middle-aged (25-44 years)</td>
<td>78% (254/326)</td>
</tr>
<tr>
<td>Senior (45-75 years)</td>
<td>67% (141/209)</td>
</tr>
</tbody>
</table>

1. Young and middle-aged listeners react differently to the /a/-phonemes of the senior reader (a success rate of only 53% correct identifications vs 72%).
2. Age of listener does not seem to affect recognition of the /a/-phonemes of the reader (57% vs 61% correct identifications).

5. Conclusion

What is the relation between production and perception during this sound change?

Young listeners, who have lost the /a/-/a/ difference in production, have great difficulties in identifying words in the senior voice that include the recoding phoneme /a/, i.e. they have almost entirely lost the ability of decoding phonetic nuances that still make (some) sense for middle-aged listeners.

It seems that if listeners perception device stays intact for some time after they have themselves engaged in a process of losing a clear phoneme distinction in production (cf. Janson 1983 and the middle-aged listeners here), it weakens quickly and lasts no more than a few generations.

This study is limited – identification tests include a risk of bias through relative frequency of tested words. Further evidence will be drawn from a differentiation test (Hansen in progress).

References


Janson, T. (1983), Sound change in perception and production, Language 59, 1, p. 18-34.


[Diagram of vowel merger frequency]