January 1, 2013

Retroflex variation and methodological issues: A reply to Simonsen, Moen, and Cowen (2008)

Janne Bondi Johannessen, University of Oslo
Bert Vaux

Available at: https://works.bepress.com/bert_vaux/3/
Letter to the Editor

Retroflex variation and methodological issues: A reply to Simonsen, Moen, and Cowen (2008)

Janne Bondi Johannessen a,*, Bert Vaux b

a University of Oslo, Department of Linguistics and Nordic Studies, P. O. Box 1102, Blindern, 0317 Oslo, Norway
b King’s College, University of Cambridge, Cambridge CB2 1ST, United Kingdom

ARTICLE INFO

Article history:
Received 16 September 2011
Received in revised form
24 July 2012
Accepted 18 September 2012

ABSTRACT

We argue that the differences in the articulation of Norwegian retroflex consonants described by Simonsen, Moen, and Cowen (2008) as individual variation may instead be due to factors such as individual and dialectal background, rather than variation across a single variety. Our main argument is based on existing dialect literature and speech corpus data, which show that the phonemes involved in the retroflexion process are not present in the same linguistic contexts in all dialects. SMC’s experimental stimuli and conditions include linguistic contexts which do not necessarily induce retroflexion naturally, and therefore cannot be relied upon to provide an accurate picture of retroflexion in natural speech contexts. The peculiar retroflex pronunciation that can be heard in some of SMC’s sound files may be due to the invasive intra-oral equipment or to the unnatural retroflexion contexts introduced by their stimuli.

© 2012 Elsevier Ltd. All rights reserved.

1. Introduction

Simonsen, Moen, and Cowen (2008) (henceforth SMC) set out to provide a detailed articulatory investigation of retroflex stops in what they call “Urban East Norwegian” (UEN) 1 using electropalatography and electromagnetic articulography. This undertaking is potentially interesting to phoneticians and typologists, since the class of retroflexes displays extensive articulatory variation cross-linguistically (cf. Hamann, 2003).

We argue, however, that given the very small sample of subjects used, and problems related to the selection of these subjects and the stimuli presented, the generalisations proposed by SMC may be premature. For example, SMC claim:

“In our investigation we have registered the places of constriction in the palate and the tongue configurations and tongue movements of Urban East Norwegian /t,d/ and /ʈ,ɖ/ as evidenced by EPG and EMA measurements.” (p. 401)

“Regarding apicality, the Norwegian /ʈ,ɖ/ always have an apical articulation. This is the one single property that is stable across all speakers and contexts, and may thus be seen as a central characteristic in a prototypical definition of retroflexes in Norwegian.” (p. 402)

Both citations show that SMC generalise their findings for four speakers to an entire variety of Urban East Norwegian.

In Section 2 we present a short overview of retroflexion and the Retroflex Rule in Norwegian, and in Section 3 the data employed in SMC’s experiment. In Section 4 we show that the dialectological literature predicts that the Retroflex Rule should not always apply in all of the environments identified and employed by SMC. The literature mentions loss of word-final /r/, /r/-initial allomorphs of function words, and “split pronunciation” (i.e., non-application of the Retroflex Rule), and several authors suggest that geographical, stylistic and social factors condition these phenomena. It has been demonstrated in Johannessen (submitted for publication) that our prediction is borne out in corpora of spontaneous speech from the relevant dialects. Since some of the retroflexes elicited by SMC are in positions where spontaneous speech in the dialects of their informants should not necessarily have retroflexes, we suggest that the articulatory information garnered from

* Corresponding author. Tel.: +47 22 85 68 14; fax: +47 22 85 71 00.
E-mail address: jannebj@iln.uio.no (J.B. Johannessen).

1 SMC define UEN as “the variety spoken in and around the larger cities in Eastern Norway.” There are no large cities in Eastern Norway apart from Oslo, and there is no reason that the towns in the area should share features of retroflexion with each other but not with the surrounding rural areas. We therefore interpret SMC to mean Southeast Norwegian generally. (Retroflexion is found in most of Norway, excluding a belt in the south and west of the country, Sandøy, 1985:74–75).
these tokens should at best be interpreted with caution. In Section 5 we focus on methodological challenges that may influence SMC’s experimental results.

2. Retroflex stops in Norwegian

Most Norwegian dialects possess a series of laminal consonant phonemes /d t s l n/ that contrasts with a series of apical retroflex consonants /t s l n/ as in ‘kot’ ‘closet’ [kɔːt][] vs ‘kort’ ‘short’ [kɔr̩t]. Although minimal pairs such as this show that the contrast is phonemic, most surface tokens of retroflexes are the product of a phrase-level Retroflex Rule. This rule (Brekkie, 1981 [1981]; Hovdhaugen, 1971; Endresen, 1974 [1981]; Fretheim, 1974 [1981]; Kristoffersen, 2000a:4.3.6, etc.) merges underlying /r/ with a following coronal across a word or morpheme boundary into the apical counterpart of the coronal consonant, as in the examples in (1a–e) (adapted from Kristoffersen, 2000a:96–97 and Rinnan, 1969 [1981:276]).

(1) environment orthography pronunciation gloss

| a. root+inflectional affix | sur-t | [ˈsʊr̩t]| sour-Neuter.SG. |
| b. root+derivational affix | kjær-sel | [ˈkjær̩sɛl]| drive-Nominalizer |
| c. word+clitic | spør-n | [ˈspør̩n]| ask-him |
| d. endocentric compound | vár-tegn | [ˈvɑːr̩tægn]| spring-sign |
| e. verb+object | har tid | [ˈhɑr̩tɪ̝d]| has time |

Although a proper formal characterisation of the Retroflex Rule is not the goal of this paper, it may be useful for our present purposes to formulate the rule explicitly. (2).


X

[+son] [−son]

[−anterior] [−distributed]

coronal

coronal

While retroflexion usually applies in monomorphemic contexts as well as in the sandhi positions we have seen, there are some well-known exceptions with the sequence /rd/ as in [ˈɡɔːr̩də] ‘guard’. We return to the issue of non-application of the Retroflex Rule in Section 4.

3. The data in Simonsen et al. (2008)

Having briefly reviewed the basis of Norwegian retroflexion, we turn now to the investigation by SMC (2008), whose aim was to investigate the articulation of Norwegian retroflex stops using electropalatography (EPG) and electromagnetic articulography (EMA), “with extensive and detailed data from four informants” (SMC, 2008, p. 385). Their search for variation in the articulation of retroflex stops was mechanical rather than socio- or psycholinguistic in nature; there is no discussion in their article of the naturalness of their data, or of whether the retroflexes would naturally occur in the contexts they used.

The stimuli read aloud by the test subjects are presented in (3); we have highlighted the word(s) containing the laminal+stop sequence in bold type. Two of the sentences (3 d and 3 h) had stress marked on them in SMC’s original presentation to the test subjects; we have indicated naturally occurring stress for the remaining stimuli, after having listened to SMC’s sound files.5

(3) a. det var ˈtaːn a vet du
   ‘It was he, then, you know.’

   b. han har ˈflirt a vet du
   ‘He has smiled, then, you know.’

---

2 There is some debate in the literature concerning the description of these consonants. We follow Kristoffersen (2000a), who labels both the retroflex and non-retroflex series on the basis of their active articulator; thus the non-retroflex series is ‘laminal’ (rather than ‘alveolar’ or ‘dento-alveolar’) on the basis of its passive articulator and the retroflex series is ‘apical’ (rather than supra-dental, cacuminal, or post-alveolar). To denote stress we follow the usual conventions (see e.g. Endresen, 1991:148–153) in employing the numbers 1 and 2, reflecting the toneme distinction that accompanies stressed syllables in Norwegian.

3 In this paper we follow SMC in not dealing with the fricative /ʃ/, which spans a wide phonetic range from [ʃ] to something approaching [ʃ], as in ‘skjær’ ‘skirt’ ↔ [ʃɛt], etc. We have transcribed this phome with the IPA symbol [ʃ] for the sake of parallelism with the other members of the retroflex series. We also do not deal with [l] and [n], as they are not directly relevant to the points made here.

4 Our formulation differs in several respects from that of Kristoffersen (2000a:97–99), but the differences are not relevant for the purposes of this paper.

5 SMC’s recordings from their experiments are available at http://tekstlab.uio.no/is.php?id=rCe5Tg9.
The test stimuli were designed to elicit pronunciations containing apical stops, as highlighted in bold print in (4):

(4) [\text{\textipa{\text{n}}}], [\text{\textipa{\text{i}}}], [\text{\textipa{\text{a}}}], [\text{\textipa{\text{e}}}],[\text{\textipa{\text{a}}}], [\text{\textipa{\text{e}}}], [\text{\textipa{\text{a}}}], [\text{\textipa{\text{e}}}], [\text{\textipa{\text{e}}}], [\text{\textipa{\text{a}}}], [\text{\textipa{\text{e}}}]

It is unfortunate that SMC employed the frame det var ‘it was’ in five of their eight sentences, especially insofar as in four of them (3a, c, f, g), the retroflexion would be triggered by the /r/ at the end of that sequence. The problem is that the frame det var typically introduces a focussed, stressed, clefted constituent, while the expletive subject, and importantly the verb, are left unstressed. Since word-final /r/ can be deleted in unstressed function verbs such as var ‘was’ (see Section 4.1), this context often does not retroflect a following consonant in natural speech. For the Norwegian varieties spoken by SMC’s talkers, the expected pronunciation of (3f) could just as well be [\text{\text{de v\text{\text{a}}}n}], as [\text{\text{de v\text{\text{i}}}n}].

The choice of the unstressed adverb da ‘then’ in (3d, h) raises another problem. This adverb belongs to a class of function words with strong and weak forms in many dialects, where the strong forms are pronounced with word-initial [d-] and the weak forms with [-]. In the latter case there should be no retroflexion, since there is no stop with which to assimilate. We would then expect (3h) to be pronounced as [\text{\text{ha}m 1\text{\text{b}l\text{i}}}a], not the [\text{\text{ha}m 1\text{\text{b}l\text{i}}}a] desired by SMC.

In Section 4 we show that the dialect literature suggests that the geographical areas where SMC’s four informants are from have precisely the features just discussed, loss of word-final /r/ in function words and /r/-initial allomorphs. It follows that since the test words in so many cases could have been pronounced with non-retroflex target phonemes, the articulation of apicals may not be the same as that performed in more natural linguistic contexts and spontaneous situations. It is possible moreover that the competing non-retroflex phonemes might have influenced the pronunciation of the intended phonemes.

4. The retroflex rule has exceptions

In this section we will see that the literature leads us to expect certain exceptions to the Retroflex Rule based on geographical, stylistic and social variation in Norwegian. We focus on loss of word-final /r/, /r/-initial allomorphs for some function words, and split pronunciation.

4.1. Loss of word-final /r/ in some contexts

Loss of word-final /r/ is a well-known phenomenon in Norwegian dialects. One can debate whether it involves a synchronic process of /r/-deletion or rather morphological alternations between rhotic and non-rhotic allomorphs. We follow traditional practice in assuming single rhotic underlying forms that can be targeted by a lexically-conditioned process of /r/-deletion. 7

The fact that /r/ can delete before consonants is important for the Retroflex Rule. Cases where original /r/ deletes prior to application of the rule, either historically (which in synchronic terms would typically involve selection of a non-rhotic allomorph) or synchronically (via a rule of /r/-deletion ordered before retroflexion in the phonological derivation), are of course cases where the Retroflex Rule cannot apply. Any study that elicits apical pronunciations should therefore take care not to employ this kind of data.

6 When the talkers did pronounce retroflected consonants, the reason could be that they either (a) knew or guessed the intended realisation, or (b) were told to repeat the elicited sentence. (The experimenters were present at the recordings and intervened when they thought it necessary, as can be heard on the tapes.)

7 The traditional literature (e.g. Arne Torp (1998)’s Nordiske språk i nordisk og germansk perspektiv [Nordic languages in a Nordic and Germanic perspective]) typically frames the phenomenon as \text{\textipa{\text{r}}}-bortfall ‘loss of \text{\textipa{\text{r}}}’.
Rykkvin (1946 [1981]) mentions that /r/ often disappears completely in unstressed present tense verb suffixes. He describes a dialect from the county of Østfold, but says that the generalisations probably extend across Southeast Norwegian, though not as far north as Trøndelag. Haugen (1948 [1981:240]) specifically adds the verb var ‘was’ to the list of common /r/-deletion cases. (5) illustrates the interplay between stress and /r/ deletion. We have chosen to use Rykkvin’s examples although two of his examples have retroflexion with /s/ rather than a stop. They illustrate the point nicely, and retroflected stops would show the same possibility for variation.

(5)

a.  

[ham  

b̥tsina]

han blir sinna

he becomes angry

‘He becomes angry.’

b.  

[de  
b̥b̥t  

saint ikvel]

det blir seint i kveld

it becomes late tonight

‘It really is getting late tonight’

c.  

[han  

hvr  

hætæ pæ hagen]

han har tre hester på hagen

he has three horses on the field

‘He has three horses in the field.’

(Adapted from Rykkvin (1946 [1981:235])

It is well known, then, that there is variation with respect to /r/ deletion, and thus where retroflexion may apply. Johannessen (submitted for publication) shows that there is indeed variation in retroflexion due to loss of /r/. In the sandhi sequence /r t/ in the subcorpus studies reported there, there were more non-retroflected than retroflected sandhi products: 15 laminals, /t/, and 12 apicals, /t/. Any general study of the pronunciation of apicals should take this dialectal point into account with respect to choice of stimuli and informants. Four out of SMC’s eight test sentences have unstressed verbs that we know can undergo /r/ deletion. The informants are from the relevant dialect areas, as shown in Section 5.

4.2. Variation between word-initial /d/ and /r/ in some function words

A similar problem is raised by SMC’s use of pronouns and adverbs which in many dialects of Southeast Norwegian have full and clitic doublets, beginning with /d-/ and /r-/ respectively. This phenomenon is relevant here because with an /r/ realisation of function words, there is of course no basis for apical assimilation to a preceding /t/.

We find /r/-initial allomorphs of pronouns and function words mentioned in the dialect literature for Grenland, Østfold and Oslo, all of which are relevant since they represent the home areas of SMC’s test subjects. (6a, b, c, d) illustrate these dialects in the order just given.

(6)

a.  

/no mo  

ru  

jic  

rae/

nå må du gi deg

now must you give yourself

‘Now that’s enough. Give it up!’

(Adapted from Roksund 1997:32)

b.  

/var  

hannem  

du  

ætaa etter

var han du leite etter

was it him you looked for?

(Adapted from Lundeby 1995:37)

c.  

Ska  

ru  

leva i daf  

ru  

væra miljonær

skal du leve idag så må ru være millionær

shall you live today then must you be millionaire

‘If you are going to live today, you must be a millionaire.’

(Adapted from Lundeby 1995:37)

d.  

ja  

ha  

ra  

vaetfal  

sakt  

dej

ja jeg har da hvertfall sagt det

yes I have then at least said that

‘Well, I think I have at least said that...’ (Informant a35 from the TAUS Oslo corpus, 1970s)

One reviewer points out that the analysis of /d/ and /r/ in these function words may not be correct for all dialects. In some dialects, especially in Østfold, where the function words without /d/ must always follow a verb ending in /r/, a likely solution is that the function word has instead lost the initial /d/ in one of its allomorphs. This is the analysis offered by both the authors that we have cited here who have written about dialects of Østfold: Lundeby (1995) and Hoff (1946). However, this is not a possible analysis for dialects that do not depend on a verb ending in /r/, and we have chosen to use the term “/r/-initial” for all here. However, whichever analysis is chosen is irrelevant for the main point here: function words with no initial /d/ cannot undergo retroflexion.
The /r/-initial function words are found across southern Norway. While /r/ function words seem to be socially neutral in many dialects, in the Oslo area they belong to a non-standard variety and are often used deliberately to convey a certain atmosphere or a person’s social status. The song lyrics in (6c) illustrate the perspective of a lower social class.

It is clear that there is geographical variation and variation as to social acceptability. There is also geographical variation in the extent to which /r/ forms are related to assimilation. Some dialects allow /r/-initial function words only after words with underlying form ends in /t/-, like the Østfold dialect (6b), while others are not that strict, as shown in (6a,c).

In Johannessen (submitted for publication), in the subcorpus (of the Oslo dialect) investigated there, six cases of /r/-initial function words are found, out of 63 hits for the combination of words ending with /r/ and the following beginning with /d/. This illustrates the problem with using these function words in an experimental test for retroflexion.

The existence of /r/-initial function word forms is important, since these of course are not expected to undergo the Retroflex Rule. It is unfortunate that in two of their eight test sentences SMC have included words that have /r/-initial variants. The non-/r/- forms required by the experimenters may be forced or unnatural in this context.

4.3. Split pronunciation

Having looked at two linguistic phenomena involving /r/ deletion and /r/-initial allomorphs respectively that problematise SMC’s test sentences, we now turn to a third concern, split pronunciation. Since retroflexion in Norwegian is often the product of merging /r/ with a following laminal, the option of not undergoing this assimilation is an alternative possibility. The literature (e.g. Rinnan, 1969 [1981], Kristoffersen, 2000a, 2000b) mentions split pronunciation as a possibility for monomorphemic words, e.g. for the word sverd ‘sword’ [sværð], as seen in Section 2, since there are some lexical exceptions that are standardly produced with a split pronunciation in some parts of Norway. Surprisingly the literature does not mention split pronunciation as an option at morpheme boundaries. Johannessen (submitted for publication) shows that split pronunciation is not a rare phenomenon at morpheme boundaries in spontaneous speech. There, eight occurrences of split pronunciation are found, out of 63 hits for the sequence /r/ + /d/. We include this information here to show that there are more reasons why retroflexion may not apply to a given orthographic sequence.

4.4. Geographical variation


Hoff (1946:216) shows for three dialects of Østfold (home county of one of SMC’s informants) that for the same sandhi sequence one can find a distinction between no retroflexion due to /r/-initial function words, reflex flaps and apical stops. Thus, the underlying /far din/ ‘father yours’ can be pronounced [ˈfɑːɾsn], [ˈfɑːɾsn], or [ˈfɑːɾsn].

The dialect literature thus reveals extensive variation in retroflexion, some of it geographical. More examples are given in Johannessen (submitted for publication). It is a problem that SMC’s speakers are from four different areas, given that any variation surfacing in their investigation could easily be dialectal, rather than idiolectal.

4.5. Social and stylistic variation

Not all linguistic variation concerning retroflexion has regional conditioning; some is due to social and stylistic factors. It may be a mistake to assume that apical sounds have the same social value across social groups or settings.

Brekke (1881 [1981:31]) says about apical phonemes that “this r has completely taken over in every day speech, but is mostly rejected by the cultivated language.” Western (1889 [1981:88]) adds that “The other sound sequences are often pronounced separately, especially in formal speech, where [ɾ, t, l] would be seen as vulgar.” Alnaes (1925 [1981:116–117]) advises that such consonant clusters should be pronounced with care; although the separate pronunciation of these clusters is not “natural” for East Norwegian and Northern tongues, the “inverted” (retroflex) sounds should be avoided. Rinnan (1969 [1981:275]) mentions that there are stylistic subsystems, exemplifying with variation between [ˈjær] and [ˈjær] hjerte ‘heart’. Kristoffersen (2000b) finds that in stage language (using a recording from 1969) as opposed to everyday language, older actors tend to have less retroflexion (i.e., more split pronunciation) than younger actors. Torp (2007, p. 79) says that non-retroflex forms are only found in elevated poetry. He gives an example from a popular TV show to illustrate that whenever an ordinary character uses split pronunciation is not a rare phenomenon at morpheme boundaries in spontaneous speech. There, eight occurrences of split pronunciation are found, out of 63 hits for the sequence /r/ + /d/. We include this information here to show that there are more reasons why retroflexion may not apply to a given orthographic sequence.

4.6. Conclusions on variation in retroflexion

We have seen that the literature identifies a number of linguistic and extra-linguistic factors that might condition the Retroflex Rule. Much dialect literature since at least Brekke (1881 [1981]) shows that there is geographical, social and stylistic variation concerning the extent to and the conditions under which retroflexion takes place across word boundaries. The dialect literature referred to covers well over a century, and it is not known whether all of the factors mentioned here are valid in the same way today. However, the systematic variation described in the literature suggests that one should be cautious about ignoring these factors when choosing experimental data and informants.

We refer to Johannessen (submitted for publication) for empirical research using three corpora (Hanssen, Hoel, Jahr, Rekdal, & Wiggen, 1978; Johannessen & Hagen, 2007; Johannessen, Hagen, Priestley & Nygaard, 2007; Johannessen, Priestley, Hagen, Åfarli, & Vangsnes, 2009) that confirms much of the variation we have reported here, and also points to more systematic variation. Variation (within the Oslo dialect) is confirmed in Olsen (2011). This means that the individual variation in the production of retroflexion concluded by SMC might well be systematic.
dialectal variation triggered by differences in the dialects as to which contexts allow retroflexion or lack thereof. If SMC’s informants had to produce retroflexion in contexts unnatural for them, it is only to be expected that not all retroflexes would be produced in the same way.

5. Other methodological problems

5.1. Introduction

The present authors are not experimental phoneticians, but general phonologists and linguists. We therefore see experiments and their design in a slightly different perspective. This view is, we hope, relevant for phoneticians. We believe it is important to consider methodological practice explicitly in order to avoid pitfalls and be able to judge scientific results. Here we present some reactions to SMC involving issues other than the linguistic context of the test data.

5.2. Experimenter and linguists as test subjects

SMC’s data were collected from four speakers, two male and two female, of whom the latter two were the authors Simonsen and Moen themselves (as mentioned in SMC) and the former two were linguist colleagues of theirs. One of the colleagues is a phonetician with a special interest in retroflexion and whose works (Endresen, 1985, 1988, 1991) are standard for teaching phonetics and phonology. Though using the experimenters themselves and their colleagues as test subjects occasionally happens in the field of linguistics, it violates the double blind methodology that one hopes to see practiced in the experimental sciences. This methodology is required for good reason: knowing the purpose of a study can have significant effects on test subjects’ performance and on experimenters’ labelling and interpretation of their raw data, and thereby render the results of the experiment unreliable. Gravetter and Forzano (2011, p. 99) observe, for example, that “experimenter bias in science is generally seen as a basic methodological problem that should be avoided, by for example blind or double-blind experiments, i.e., where both participants or experimenters are ignorant of the expected results.” Expected experimental results could be regarded as norms, and sociolinguistic research since Labov (1972) has shown that informants have strong preferences in favour of such norms. With three out of four informants being skilled phonologists and phoneticians, one cannot rule out the effect of experimenter bias. Experimental linguistic researchers usually try to avoid such effects (cf. for example Corrêas & Poletto, 2005).

Linguists can often divine rapidly what is at stake in a linguistic experiment. It is therefore generally not advisable to use linguists as test subjects. Schütze (1996, p. 187) observes, for instance, that “linguists simply ought to be excluded [as informants]” Cowart (1997, p. 60) adds that “although it might be that sustained practice can sharpen an individual’s ability to give reliable judgments, there are also reasons to suspect (as has often been suggested) that training can produce some theory-motivated bias”. Even if complex neurological and motor activity are involved in goal-directed speech motor control, as one reviewer points out, there is no reason to think that phoneticians would be unable to adapt their speech production according to consciously or subconsciously desired targets.

5.3. Lack of distractors

SMC’s procedure began with two word lists, one containing laminal stops and the other apical stops (SMC, 2008, p. 389). SMC visually presented a set of eight sentences in conventional orthography, each containing a single word in a sandhi position either word-initially or word-finally. There were no distractor sentences or randomisation of stimuli, eschewing standard experimental protocol (cf. Schütze, 1996, chap. 6). Thus the subjects could fully concentrate on the task. Distractors could have helped against the possible bias mentioned in Section 5.2.

5.4. Invasive methods

Having listened to a selection of the relevant sound files (cf. footnote 5), we believe that SMC did manage to elicit apical stops or something like them. The relevant sounds are closer to apicals than to laminals. However, for the most part, they sound slurred and highly unnatural. This could be due to impairment of the speech of several of the speakers by the instruments placed on their tongue and palate. After the lips, the tongue has more tactile nerve endings than any other part of the body, and thus markers attached to the tongue tip can be significantly annoying to test subjects. Artificial palates are known to result in articulatory errors, apparently due to problems with the precise positioning of the tongue relative to the palatal surface (for this point, see Baum & McFarland, 1997 and references therein).

Given the serious articulatory impairment caused by the instruments employed in SMC’s study, one cannot help but wonder what they actually measure. This may not be retroflex stops as they are normally produced, but rather compensatory adjustments made to achieve similar acoustic effects when for the range of reasons documented here normal articulation is not possible. Gravetter and Forzano (2011:94–95) warn against this sort of methodology: “the presence of monitoring devices creates an unnatural situation that may cause participants to react differently than they would under normal circumstances. A more important concern with physiological measures is whether they provide a valid measure of the construct.” They conclude that “there is always the risk that the conditions of an experiment are so unnatural that the results are questionable” (2011:201). It furthermore does not follow, even for those sounds that can be perceived as more normal, that their articulation is that which is used in speech under natural conditions. The famous bite block experiments show that many talkers can employ alternate articulatory strategies to achieve perceptual effects strikingly similar to those performed under natural conditions, even when their articulators are obstructed. Fowler and Turvey (1980) show that not only do the talkers achieve the same perceptual targets, but they do so with virtually no time delay after the obstruction is introduced. Baum and McFarland (1997) report several studies that show that compensation for a structural change to the oral environment, e.g., an artificial palate, may require a significantly longer...

---

Footnote 5: SMC (2008:389) say that the words were read in random order, but the sound files from their study (cf. footnote 5) suggest that this was not the case. They also appear to have tested each sound type on its own, rather than mixing each with the other types. Thus retroflexes are tested with retroflexes, lateral flaps with lateral flaps, and so on.
period of adaptation than do bite blocks. However, they conclude that speech compensation to the presence of an artificial palate can occur quickly during a relatively brief, target-specific period of practice.

Furthermore, Munhall, Løfqvist, and Kelso (1994) show that the degree of adaptation to dynamic articulatory perturbation is subject-dependent and indicative of individual compensatory strategies. The variation shown between the individuals in SMC’s study could therefore be due to individual reactions to the EPG and EMA oral perturbations.

While it clearly may be necessary to carry out invasive experiments for some studies, there are severe attendant methodological challenges. It is therefore necessary that the other factors should be as homogenous as possible. If there is variation involving variables such as dialect, social class, or linguistic target phonemes, and the subjects consist of a very small group of researchers, then the results will be almost impossible to interpret with any hope of generalisation.

5.5. Mixture of dialectal and sociological variables

It is essential in scientific methodology to control for all but a single independent variable. SMC mix dialect, age, gender and social variables in their four informants: The two female authors, HS and IM, have a middle class Oslo background, from two different areas in Oslo; RE is male with a working class background from the Grenland area, while the other male linguist, AN, has a middle class background from Østfold county. The first three were born in the 1940s, while the fourth was born in the 1970s.

As a result, some of the attested variation may be attributed to dialect differences. In Johannessen (submitted for publication) it is shown that there is a clear dialect difference between the areas of informants RE and AN with respect to at least one of the possible problems (namely distribution of /r/-initial allomorphs). This is potentially problematic for SMC’s conclusion that there is considerable individual variation in the pronunciation of apicals resulting from physical differences (shape and size of the vocal tract, and flexibility of the tongue) between the speakers.

If the variation is dialectal or sociocultural, it is not surprising that there is variation between the informants, who come from different regions and social groups. Any scientific argument for individual variation should exclude the possibility that the observed variation is caused by such external factors.

6. Conclusion

Simonsen et al. (2008) set out to measure the articulatory details of apicals resulting from the Retroflex Rule, which converts /r+d/ and /r+t/ into [l] and [t] respectively. We have shown that six of their eight test sentences involve contexts in which we might not expect retroflexes in spontaneous speech. Four of the sentences have the target sequence in a stressed, focussed position, following the unstressed verb ‘was’, which is known from the literature to display /r/-deletion, which should bleed the Retroflex Rule. Two of their eight test words are unstressed grammatical function words, and such words are known from the linguistic literature to have /r/-initial allomorphs. These allomorphs, having no initial stop, should of course not take part in retroflexion. It is therefore questionable to what extent the elicited versions of these six sentences reflect natural phonetic implementation or variation.

Our review of the dialectological literature suggests moreover that the phenomena of /r/ deletion, /r/-initial allomorphy and split pronunciation vary along not only linguistic dimensions, but also geographical, stylistic and social ones. It is therefore debatable whether SMC’s data show individual variation, as they claim, or whether the variation is actually due to supra-individual variation, be it dialectal or sociolectal, given that the talkers employed in their study have different geographical and social backgrounds.

We have also suggested that methodological issues other than the selection of sentences, viz. the use of experimenters and linguists as test subjects, lack of distractor sentences, invasive intra-oral equipment, and mixing dialectal and sociological variables, compromise the reliability of SMC’s findings.

Future studies – and we would welcome new studies on lingual articulations – should control for the problems identified here. Experiments testing one phenomenon should not contain constructions that have known, competing target phonemes. Test sentences should be interspersed with distractor sentences. Test subjects should be controlled for relevant dialectal and sociological variables. To ensure that the data are naturalistic, the test subjects should not be the principal investigators, and preferably not linguists at all. Finally, if possible, spontaneous speech should be used, even in experimental settings. For studies not requiring articulatory experiments, good speech corpora can be consulted. These not only provide data in their own right, but can also be used to check test suites before other experiments are undertaken.

Acknowledgement

We would like to thank Joe Salmons for very constructive comments on an earlier version of this paper.

References


Johannessen, J.B. Variation in retroflexion of Norwegian stops, submitted for publication.


**URLs:**


Sound files from SMC’s experiments: <http://tekstlab.uio.no/lvs.php?id=bc65G9>. 