

All in a flap: long-term accommodation in phonology

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It is generally agreed that one of the (distant) goals of linguistics is to construct a theory which will allow us to generate linguistic output indistinguishable from that which is produced by human beings. Many if not most linguists also think that this theory should reflect the procedures which a human being applies in producing speech output. But because the production of spoken language involves mental processes, it is largely inaccessible to direct observation and experimentation. One way to theorize more confidently about the mechanisms involved is to use evidence from speech which differs in some way from the adult norm in any given linguistic milieu: evidence from child language gives us clues as to the order of acquisition of components of linguistic competence, just as evidence from language pathology tells us whether language functions are localized in the brain and whether a particular function can be lost.

Another technique for isolating language components is to place a speaker in an environment where there is some pressure to change linguistic behavior. By observing what changes, how it changes, and with what degree of difficulty it changes, we are more justified in making assumptions about the underlying structure which is generating the behavior. The research reported here uses this second technique, with significant results regarding (a) the formulation of phonological rules; and (b) the relationship between semantics and phonology.

This research was motivated by my observation when I first came to England four years ago that Americans who had been in Britain for some time had adopted certain British features of pronunciation. They sounded like Americans to British ears and like British people to Americans.¹ Moreover, these transplanted individuals appeared to have several features in common: they did not assimilate British pronunciation randomly, but changed in a similar direction. I was curious to investigate some of the characteristics of Eastern Trans-Atlantic English (that resulting from eastward migration) with a view to finding out how phonological strategies change.

It should be understood that this was a pilot experiment, designed to

test whether the subject merits further study. Shortcomings in the reported approach and ideas for improvement in further efforts hence constitute part of the results of the research and will be outlined below.

Experimental technique and analysis

Four subjects were used for the experiment. All were members of the teaching staff of the University of Essex. They were originally speakers of Midwest or Californian American accents. Two were male and two female. Their span of residence in England ranged from 8 to 27 years.

Each was recorded holding a half-hour conversation with the author (a speaker of Midwest US English) in a sound-treated room. The recording studio at Essex is not an anechoic chamber, which can be intimidating to the lay person, but appears to be a panelled, carpeted room with comfortable chairs. We sat in casual positions, each with a microphone, and discussed general topics such as students, living in England, the University, and perceptions of the USA and of American tourists. Any situation in which subjects know that their speech is being recorded is unavoidably different from totally free conversation, but the subjects seemed to be relaxed and to speak unselfconsciously.

Two subjects were recorded in 1978 and two in 1981.

The tapes were analyzed by listening many times to each three-to-four second stretch of speech and making auditory phonetic judgements about the presence or absence of the features of interest.

Results and discussion

Three phonetic/phonological differences were evident in the speech of all four subjects, relative to that of most Americans; (1) they produced a clear [ɔ] instead of [ɑ] for words spelled with an 'o' (hot, cod, often); (2) they sometimes pronounced [ow] as in 'boat' as [ɔw]; and (3) they produced /t/s and /d/s where all dialects of American English known to me have a tap or flap as it is often called. For example, the American pronunciation of 'latter' and 'ladder' is the same ([ˈlætɚ]),² whereas the distinction is maintained in Britain.

It was decided that only the third feature would be examined, since consonant features are easier to judge auditorily and because one can be surer of the subjects' original behavior in their native dialects.

Following is a rough approximation to the American flapping rule:

$$\left[\begin{array}{l} +\text{apical} \\ -\text{fricative} \\ -\text{lateral} \end{array} \right] > \left[\begin{array}{l} +\text{voice} \\ +\text{ballistic}^3 \end{array} \right] / \text{V} \underline{\quad} \text{V}$$

Examples:

sitting	['sɪtɪŋ]	had any	['hæfəni]
padded	['pæfəd]	to do	[tədu]
got a	['gətə]	go to	['gəʊtə]

This rule is very nearly obligatory in American English. A fully articulated /t/ or /d/ is heard in the environment specified above only when the speaker is attempting to show by pronunciation how a word is spelled, to correct a misunderstanding, or in other unusual circumstances requiring maximal distinctiveness.

Flapping has, in fact, much more complex conditioning factors than are specified in the above simple rule: flapping of /t/ and /d/ (and /n/) can occur before /h/ or syllabic /l/, in clusters, and in a variety of stress conditions, excluding word-initial consonants receiving primary stress. Word boundaries do not inhibit flapping, as long as the stream of speech is continuous.

The rule above characterizes the configuration which was examined in this study, except that a small degree of latitude in stress conditions was allowed, i.e. sequences such as the word 'today', which receives stress on the second syllable but which shows a flapped /d/ on occasion in American English were not excluded.

Table 1 shows the results of analysis. In the first column for all four speakers are the number of underlying /t/s which occurred in a flapping environment. For a 'normal' speaker of American English, 100% of the /t/s

Table 1. *Number of underlying alveolar stops and percent flapped*

	(N) /t/	% flapped	(N) /d/	% flapped
R.S.	78	17	36	61
N.B.	90	37	24	58
K.M.	44	41	15	67
L.D.	64	50	25	72

would flap, but column two shows clearly that this behavior has been altered in all the Eastern Trans-Atlantic (ETA) speakers. One speaker flaps as few as 17% of his /t/s and the others average about 43%. The third column shows the number of underlying /d/s in a flapping environment, and the fourth

shows the percentage of these which are actually flapped. There is a strong similarity among the four speakers, with a range of 58–72% of /d/s flapped, and an average of about 65%. The change is in the same direction as the change for /t/, but less pronounced.

There is no clear relationship between degree of flap suppression and any other obvious variable such as current age, age on arrival in the UK, length of stay, or sex (but see comments below).

Results from the experimenter

Since the recording of conversations included a considerable amount of speech from the author and since the recording sessions spanned three years, it was decided to analyze her flapping behavior on the same tapes. The first recordings were made within six months of the author's arrival in England, the last three years later. Table 2 shows the results of that analysis.

Table 2. *Longitudinal results from author*

	(N) t	% flapped	(N) d	% flapped
Shockey I	x ⁴	100	x	100
Shockey II	109	66	42	77

Comparison of Shockey I and II shows that there has been a change in flapping output over time. In the original recordings, 100% of the /t/s and /d/s were flapped in the specified environments. In the second set, one sees the same tendencies as for the other ETA speakers, but to a smaller extent. These results suggest that phonological adaptation is a slow, ongoing process which is not completed for a number of years. One might visualize it as in Figure 1.

Presumably, acquisition patterns will vary from person to person, possibly based on the variables mentioned in the second paragraph of 'Evaluation of research', below. It is not known how quickly the other ETA speakers used here as subjects changed their speech habits. It would obviously be necessary to have longitudinal information for a number of subjects to form a reliable picture of change over time.

The flapping rule presented above supposes an undifferentiated apical element (produced with the tongue tip) undergoing a change in its dynamic properties: an economical rule. If it were genuinely representative of linguistic behavior, however, /t/s and /d/s would behave identically with respect to

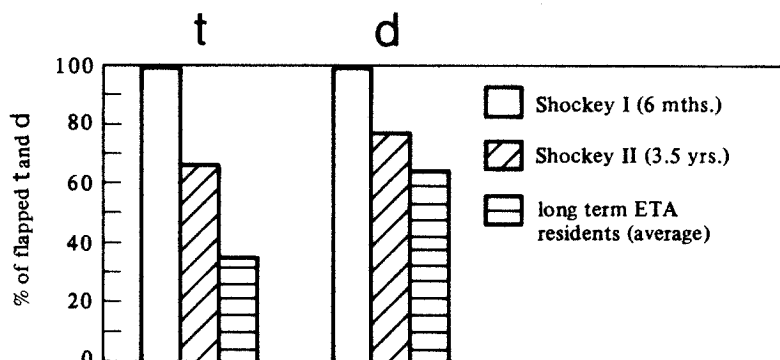


Figure 1. *Development of flap suppression over time?*

flapping, since they are indistinguishable to the rule. Obviously, this formulation of the rule does not reflect the user's competence, since all five subjects can suppress flapping differentially, depending on whether the underlying form reflects a voiced or voiceless stop. Rule simplicity here could be said to obscure insights into the process of producing spoken language.

A possible clue to the phonological process whereby /t/ is flapped was observed in the speech of subject L.D., who showed several cases of /t/ becoming voiced but not flapping in a flapping environment. This strongly suggests that rather than a $\left[\begin{smallmatrix} t \\ d \end{smallmatrix} \right] > f$ rule, we have a $t > d > f$ progression.

Suppression environments

We have seen that what was once a virtually obligatory rule for these American speakers has become optional or, more probably, has become a variable rule, with the probability of its application depending on some suprasegmental or nonphonological condition. In a preliminary attempt to discover the factors influencing flap suppression, I reanalyzed the data from speaker L.D., the longest-term American resident in England among my subjects. Using four *ad hoc* categories which assumed that speech rate, stress, and redundancy are salient variables,⁵ an impressionistic decision was made as to the circumstances associated with each underlying /t/ or /d/ in the flapping environments investigated above. (The categories used do not exhaust the combinatorial possibilities of the three variables.) Results are shown in Table 3.

This table suggests, at least for /t/, that rate and redundancy play an active role in flap suppression: /t/ will be much less likely to flap if (a) it is in a relatively slow phrase; or if (b) it has high information content. Both /t/ and

/d/ show a strong tendency to flap in fast, unstressed, highly redundant speech, with the tendency being much stronger for /d/ than for /t/.

Table 3. *Effect of rate, stress, and redundancy on flapping*

	% slow unstressed high redundancy	% fast unstressed high redundancy	% stressed high redundancy	% stressed low redundancy
/t/	11	5	5	22
Flapped /t/	3	33	2	11
/d/	10	0	10	10
Flapped /d/	0	71	0	0

Why accommodate?

Why should a change in phonological patterns of this sort occur? One set of answers comes from accommodation theory. Giles and Smith (1979) suggest causes such as seeking approval of the group toward whose speech you are changing, or wishing to avoid negative discrimination due to speech patterns. Herman (1961) suggests that a person changes his/her language when that person wishes to identify with or be identified with a reference group or desires or feels obliged to conform to the norms of a reference group.

I, as a resident American in Britain, have felt some pressure to conform linguistically and derive no particular pleasure from sounding different from my colleagues or from being identified as foreign in every encounter involving speech. This is certainly even more true of the other four subjects, three of whom have English spouses and another three of whom have children who were born and brought up in England. But I think there is a stronger pressure which, though hinted at in the guise of 'communicational efficiency' (Thakerar et al. 1982) and put forward as one potentially important cause of accommodation (Giles 1980), has not been adequately investigated as a factor in accommodation theory: that of intelligibility.

American and British English are reputed to be mutually intelligible; certainly films for TV and cinema pass freely across the Atlantic in both directions and are, in general, understood. But I would contend that not all the individual words are understood in this cross-dialect situation, even if the overall plot is. One does encounter situations in real life where every word

needs to be decoded, and a large portion of my intelligibility problems have arisen from flapping /t/s. English people will not recognize such words as 'litre', 'matting', 'heating', 'putty' if they are pronounced with a flapped /t/ unless there is sufficient context for disambiguation. The American speaker has no such problem with /d/: everyone understands when one asks for 'pudding' [ˈpʊdɪŋ] or 'haddock' [ˈhæfɔk], presumably because (a) /d/ and flap are very similar phonetically and (b) /d/ is occasionally flapped by the English themselves.

The result is that there are different pressures on a speaker of ETA with regard to flapping of /t/ and /d/: flapped /t/ in the new milieu is alien and impedes comprehension, flapped /d/ causes no problem. This is almost certainly one principal explanation of the figures presented above. The fact that /t/ occurs in a flapping environment more often than /d/ may also be a factor, since /t/ then offers more opportunities for confusion.

A personal anecdote which might contribute to a theory of the process which people undergo in altering their output rules: I have recently noticed a tendency in myself toward hypercorrection. Two notable examples were: '... the botty of the tongue', and '... Mittle English'. Both were said during lectures to non-native speakers of English, for whom I normally try to articulate quite clearly. I think this shows that suppression of flapping is related to a desire to be understood. It may provide evidence for the theory that /t/ flaps through a progression $t > d > f$. My exotic pronunciations could, under that assumption, be regarded as an 'overshoot' in an attempt to suppress my inclination to flap (see Platt and Weber, this issue).

It may well be that the 'intelligibility' hypothesis sheds light on why these ETA speakers show no signs of modifying their pronunciation of postvocalic /r/, as in *cart*, *more*, *beer*. The American pronunciation of postvocalic /r/ does not cause confusion, hence even though the American 'car' [kɑː] is an obvious and constant mismatch with the British [kɑ:], the ETA speaker does not feel pressure to change. Of course, the fact that West Country and Irish dialects show postvocalic /r/ probably reduces the need to conform.

Evaluation of research⁶

As mentioned earlier, this study was a preliminary one. Too few subjects were used to make secure generalizations, and in a more definitive experiment, a larger corpus from each subject should be collected and more phonological processes investigated.

In future research of this type, attention might profitably be paid to discovering personality traits which might influence a subject with respect to accommodating his or her pronunciation toward that of the foster country.

It would be interesting to compare each subject's personal judgement of how much he or she has changed with actual quantification of phonological variables and also to investigate whether *degree* of convergence alters depending upon the nationality of the hearers. The subjects in this experiment were confronted with an American accent in the experimenter, therefore their flap suppression might have been less extreme than it would have been had the interlocutor been British.

As observed above, the experimenter's speech altered during the course of this experiment. While this change provided additional data, it unfortunately caused one factor which was intended to be a constant – the accent of the experimenter – to be a variable. This fluctuation should obviously be eliminated in future work.

All analysis was done by ear and by the author. Though I attempted to be objective, it is possible that some bias was introduced in the latter stages by the fact that I had begun to formulate the hypothesis presented here. Using an instrumental analysis (spectrograms or oscillograms) in addition to auditory analysis would reduce the probability of bias, as would soliciting judgements from an independent observer unfamiliar with the point of the research.

Other considerations which arose and which must be dealt with in future efforts are

(a) an exact determination of the number of flaps from underlying /d/ is difficult to make using only auditory judgements. A few tokens could be judged as either very short /d/s or as flaps. For subject L.D., for example, there were three ambiguous cases out of 25. A more rigorous procedure for determining the /d/ / boundary must be established, perhaps based on duration and amplitude measurements.

(b) when an attempt was made to determine the environments in which flaps occurred in ETA English, use was made of terms such as rate, stress, and semantic content (redundancy). But these variables were judged on an impressionistic basis. A standard for determining the relative values of these features should be devised if possible.

(c) in the same work referred to in (b), variables which were assumed to affect flapping were not sufficiently isolated and examined individually.

Granted that improvements can be made, this method of research promises to provide insight into phonology as argued above. With the suggested modifications, it could also help us to understand the social and psychological role of speech accommodation.

Notes

1. I reluctantly use 'American' to refer to natives of the US, with apologies to the citizens of the other Americas.
2. Some evidence suggests that the first vowel in 'ladder' is longer than that in 'latter', hence the distinction is maintained. How general or regular such differentiation is is not clear.
3. The feature 'ballistic', while not commonly in use, describes nicely the change from a closure and release sequence to a more symmetrical, continuous articulation.
4. Totals were not recorded for the older data, since no variability was observed.
5. Other research (Shockey, in preparation) suggests that these factors are important in conversational speech processes.
6. I am grateful to H. Giles for his suggestions of possible improvements to the approach reported.

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