DEVELOPING PHONETIC SKILLS

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In popular usage, when someone is said to be a good phonetician, it usually means that they can hear and describe small differences among speech sounds, and that they can produce a large number of different articulatory gestures. This is rather like saying that a good biologist is someone who is skilled at using a microscope. It would be better to think of a good phonetician as someone who has a good grasp of phonetic principles and understands the issues in speech production, perception and acoustics. But, be that as it may, it is undoubtedly useful for anyone in the field to have at least the basic phonetic skills in this popular sense, just as it is useful for most (but not all) biologists to be proficient users of microscopes.

What are the sounds that a student of phonetics should be able to produce and distinguish? There is an easy answer for those aspiring to be known as fully competent general phoneticians. They should be able to produce and distinguish all the sounds represented by the symbols of the International Phonetic Alphabet. There are two advantages in this answer. Firstly, the IPA symbols and their associated diacritics can be used to describe the vast majority of sounds in every known language and every known dialect. Secondly the organization of the symbols on the set of IPA charts constitutes, on a single page, a complete theory of phonetic description. It is not a theory with which I entirely agree, but it is a working, and fairly universally accepted, set of classificatory terms, arranged in a hierarchical structure. Each symbol stands for a certain combination of these terms. Knowing the sounds represented by all these symbols enables one to communicate to the widest possible phonetically trained audience.

Learning all the sounds represented by IPA symbols is probably an unnecessarily exotic goal for those who are, or hope to be, concerned with a more particular aspect of phonetics, such as the pronunciation or synthesis of a particular language. A suitable goal for students of phonetics of this kind (and a first goal for more general phoneticians) is to become skilled observers of their own language. This might well begin by their being taught to make a broad transcription of their own speech. Instructors might begin by asking students to transcribe lists of words that present points for discussion (*Chocolate*. 'Do you have three vowels or two? What is the quality of the last vowel?'). Then move on to short phrases with possible assimilations (*In this shop*. 'Do you have a dental nasal in the first word? Does anything happen to the consonant at the end of the second word?'). The next step is to transcribe other voices; and from a pedagogical point of view it is best to try to transcribe an instructor's speech rather than a recorded utterance. An instructor can give instant feedback, peering over what the student has written and making comments such as: 'You wrote ['ɪnpʊt] whereas I said ['ɪmpʊt]; can you hear the difference? How do you say the word *input*?' The aim is always to get people to become good observers, first of their own speech, and then of others.

In general, as instruction proceeds, students should be asked to use a progressively more narrow transcription. But there are many difficult decisions to be made concerning the level of detail required. Students transcribing field tapes need different preparation from those transcribing mother/child speech. Those evaluating speech synthesis systems have yet another task.

Whenever possible, students need to be told to look as well as to listen while transcribing speech. The importance of visual clues can be demonstrated by what happens when observers see a picture of a person saying one thing while a recording of another utterance is played; for some utterances they report that they heard what they saw rather than what the sound that was actually reproduced. In normal utterances, watching what people say gives information not only about simple things, such as whether they are saying ['ɪnpʊt] or ['ɪmpʊt], but also about the substitution of velar consonants for alveolar consonants in phrases such as *I can go* pronounced as ['aɪ kn̩ 'goʊ].

Part of teaching is a matter of breaking presuppositions. People expect to hear words pronounced more or less as they know they themselves would say them, and they are often influenced by the way they are spelled. One way of avoiding both these sources of expectations is to use nonsense words in dictation exercises. Asking students to write down a form which is a possible English word such as [skɑnzɪm] trains them to listen in an objective fashion. It can also lead to interesting discussions of why people tend to write down [skɑnzɪn], and of the voicing status of the velar stop.

Another way of highlighting aspects of utterances that often go unremarked is by asking students to say a phrase backwards. Many ways of recording an utterance onto a computer include a provision for playing back the recorded utterance either forwards as normal, or backwards. If an utterance that has been said backwards is recorded and then played backwards, it should come out forwards. But as students quickly find out, reversing 'Mary had a little lamb' ['mɛəɹɪ hæd ə 'lɪtl 'læm] and saying ['mæl l'tɪl ə dæh ɪ'ɹɜɛm] does not work out. The differences between initial and final allophones, the allophonic duration differences, and the stress and intonation all have to be taken into account.

Implicit in much of what has been said above is the notion that a student of phonetics must be able to produce as well as to hear small differences among speech sounds. The links between perception and production are very tight, so that, as Johnson, Ladefoged and Lindau (1993) have noted, we need an auditory theory of speech production just as much as a motor theory of speech perception. Training students to produce sounds is an important part of getting people to be good phonetic observers. It is certainly true that if you can produce a difference between two similar sounds, then you find it easier to hear the difference.

As part of their listening technique, many phoneticians try to repeat the utterance they are listening to. On first hearing a new phrase, I personally find it useful to try to say as much of it as possible immediately afterwards. Similarly, in fieldwork situations, when one cannot quite decide between two alternative possibilities, it is often advisable to repeat them both, asking the language consultant, for example, 'Did you say [kʰa] or [k!a]?' (The English phrase can often be avoided by simply holding up one finger and saying the first possibility, and then two fingers and saying the second, while looking questioning.)

This leads us to consider how to teach people to make sounds that are not in their normal repertoire. When teaching phonetic performance skills, the first thing to remember is that some people are naturally good phonetic performers and others are not; but everyone can get better with practice. It is probably like singing. Some people say that they can't sing at all, and that they never sing to themselves, even when alone in the shower or bathtub. These are likely to be people who were brought up in non-musical households, in which singing was never considered a necessary or even an appropriate thing to do. But with lots of practice (and encouragement) they could still learn to sing, perhaps not like Pavarotti, but with the possibility of performing "Happy birthday to you" without embarrassment.

Learning to be an accomplished phonetician is like learning to sing professionally; it takes a great deal of work. Most beginning students of phonetics need to spend at least an hour a day for a year or two, listening to sounds and producing them. In addition, they need to work for as much time as possible with a teacher who can correct them. If a skilled teacher is not available, then working with another student is the next best thing. An outside observer, even one with no more skills than one's own, will often be able to spot performance errors and offer feedback. Another good technique is to work with speakers of another language, provided that they are willing to be sharply critical of one's attempts to produce the sounds of their language. In fieldwork situations I have often found working with teen aged children to be especially profitable. They enjoy the role reversal implicit in

their being the strict teacher and the outsider being the student.

There is no simple way of learning to produce a set of articulatory gestures that are not part of one's native tongue. Often one just has to try things such as moving the tongue a little bit closer or further from the roof of the mouth, adding more voicing, or removing nasalization. This is where an experienced teacher is invaluable in being able to direct one appropriately. Speakers of other languages can often do little more than shake their heads in despair as one vainly tries to imitate them. Then one has to remember all the phonetic possibilities, and ask one's self 'Is the degree of voicing correct? Have I got exactly the right place of articulation? Does this speaker distinguish between apical and laminal sounds? Should it be more or less fricative? And so on, through the whole set of features in one's phonetic theory (including, of course, suprasegmental features such as tone and length to which the speaker might be sensitive).

When it comes to learning to produce what are (for most speakers of Indo-European languages) more exotic sounds such as ejectives, implosives and clicks, help from an instructor is particularly valuable. But teachers have to learn to moderate their own performance. For example, when teaching ejectives I have heard instructors produce loud, ringing examples of [p'a, t'a, k'a] which their students find confusing. Unskilled students who hear these sounds and try to produce something that sounds to them similar often produce an energetically pronounced stop with a great deal of aspiration. It is far better for the instructor to proceed more gently, making less forceful ejectives. A good technique is to start from a glottal stop in a known word such as *butter* [bʌʔə] in some forms of British English, or *button* [bʌʔən] in most forms of American English, and then superimpose an alveolar stop articulation, without building up much oral pressure. Once students get the idea of making and releasing a stop closure while making an intervocalic glottal stop, they can usually extend this gesture into one in which the glottis moves upwards (even if only slightly) and compresses the air in the oral cavity.

Similar problems arise in teaching people to make voiced implosives. When instructors make a too emphatic voiced implosive, students often respond by producing a prenasalized stop, which sounds similar to them. In this case I usually begin by trying to get students to feel the downward movement of the glottis that occurs in a fully voiced stop, and then move on to the implosive. It also helps to show them the pressure changes that occur. An ordinary drinking straw can be held with one end between the lips and the other just below the surface of a colored soft drink. It is then possible to see the pressure in the mouth decreasing and sucking liquid up into the straw when an implosive is produced.

Producing clicks in real words provides further challenges, which will be considered in the oral presentation of this paper. Most people can pronounce clicks in isolation—they are used as non-linguistic vocal gestures in a wide variety of cultures. The first difficulty that most people have in using these sounds in a language is in integrating them into the stream of speech. Next, and what is probably more difficult for many people, is to ensure that each click has what is technically known as the correct accompaniment. To understand this point it is necessary to realize that all clicks involve multiple articulations. As is shown in figure 1, there is a velar closure and another closure further forward in the mouth (on the alveolar ridge in the click illustrated). The release of the forward closure produces the sound of the click. Accompanying it is the sound associated with the velar closure, which may be, among other things, voiced or voiceless, oral or nasal, and plosive or affricate. In the oral presentation of this paper I will try to teach people to produce the Xhosa words shown in Table 1 below.

Of course, spending a few minutes in a Congress session is not enough time to learn to become a good practical phonetician. But I hope I have encouraged all of you to go home and spend some time every day, listening to recordings and producing each of the sounds on the IPA chart.

Table 1. Words illustrating contrasting clicks in Xhosa.

	DENTAL	ALVEOLAR	LATERAL
VOICELESS	**ukúk|ola** 'to grind fine'	**ukúk!oɓa** 'to break stones'	**úk‖olo** 'peace'
ASPIRATED	**úkuk|ʰóla** 'to pick up'	**ukúk!ʰola** 'perfume'	**ukúk‖ʰoɓa** 'to arm oneself'
BREATHY VOICED	**úkug|o͡ɓa** 'to be joyful'	**ukúg!oba** 'to scoop'	**ukúg‖oba** 'to stir up mud'
VOICED NASAL	**ukúŋ|oma** 'to admire'	**ukúŋ!ola** 'to climb up'	**ukúŋ‖iɓa** 'to put on clothes'
BREATHY VOICED NASAL	**ukúŋ|ola** 'to be dirty'	**ukúŋ!ala** 'to go straight'	**ukúŋ‖oŋ‖a** 'to lie on back knees up'

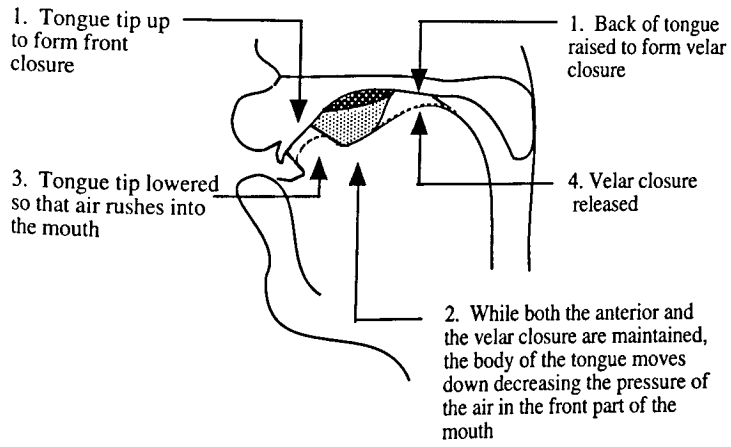

Figure 1. The actions required for producing a click.