

Phonetic transcription and analysis

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1. Introduction

Phonetic transcription is the use of phonetic symbols to represent speech sounds. Ideally, each sound in a spoken utterance is represented by a written phonetic symbol, so as to furnish a record sufficient to render possible the accurate reconstruction of the utterance.

The transcription system will in general reflect the phonetic analysis imposed by the transcriber on the material. In particular, the choice of symbol set will tend to reflect decisions about (i) segmentation of the language data and (ii) its phonemicization or phonological treatment.

In practice the same data set may be transcribed in more than one way. Different transcription systems may be appropriate for different purposes. Such purposes might include descriptive phonetics, theoretical phonology, language pedagogy, lexicography, speech and language therapy, computerized speech recognition and text-to-speech synthesis. Each of these has its own requirements.

2. Phonetic symbols

For most phoneticians, the symbol set of choice is the alphabet of the International Phonetic Association, known as the **International Phonetic Alphabet (IPA)**. This is a set of about a hundred alphabetic symbols (e.g. **ŋ**, **ɔ**) together with a handful of non-alphabet symbols (e.g. the length mark **:**) and about thirty diacritics (e.g. those exemplified in **ɬ**, **ã**). They are summarized on the IPA Chart (fig. 1) and presented, together with guidelines for their use, in the IPA *Handbook* (Nolan and Esling, 1999), which replaced the earlier *Principles* booklet (Jones, 1949).

The IPA is not the only phonetic alphabet in use. Some scholarly traditions deviate in trivial particulars (e.g. by the use of š in place of IPA ʃ, or y for IPA j), others in a substantial number of the symbols used (e.g. the Danish dialect alphabet, fig. 2: Jespersen, 1890). Where the local language, or the language being taught, is written in a non-Latin script, phonetic symbols for pedagogical or lexicographic purposes may be based on the local script, e.g. Cyrillic (fig. 3) or kana (fig. 4). Even where the local language is written in the Latin alphabet, IPA symbols might be judged unfamiliar and user-unfriendly. Thus in English-speaking countries zh is often used as an informal symbol corresponding to IPA ʒ, while in Turkey ş might be used rather than IPA ʃ. Some dictionaries aimed at native speakers of English attempt to show the pronunciation of a word entirely by following the conventions of the English orthography (a practice perhaps better termed ‘respelling’ rather than ‘transcription’). In practice these conventions are insufficient: for example, English spelling does not indicate word stress, and there is no unambiguous way of indicating certain vowel qualities. So ordinary spelling conventions may be supplemented by the use of diacritics in such symbols as ī (= IPA ai), or indeed a sprinkling of IPA symbols such as ə. Other dictionaries use entire transcription systems based on ad-hoc diacritics, using such symbols as ā (= IPA ei). Between 1970 and 2000 in Britain, though not in the United States, these non-standard systems were largely supplanted in general lexicography by the use of IPA.

Until the recent development of computers able to handle large character sets, authors of printed materials who wanted to use IPA have often faced typographical difficulties, since non-specialist printers would often be unable to provide the special symbols. Since the 1990s this problem has disappeared, as first customized single-byte phonetic fonts and then multi-byte Unicode fonts have become available, together with the applications that can use them (Wells, 2003). Nevertheless, there are

many circumstances – such as email – under which the robust transmission of special symbols cannot be relied upon. There is still a place, therefore, for ways of representing phonetic symbols using nothing but the ASCII character set. One widely used ASCIIization of the IPA is SAMPA (fig. 5; Wells, 1997; www.phon.ucl.ac.uk/home/sampa).

For the remainder of this article it is assumed that transcription will be based on the IPA. As will become clear, however, there is no unique ‘IPA transcription’ for a language: rather, there may be several systems, all using the IPA alphabet and all equally scientific.

3. Impressionistic vs. systematic

On first exposure to an unknown language, or an unknown dialect of a familiar language, the fieldworker does not know what sort phonetic material is going to be encountered. Under these circumstances, a phonetically untrained observer will be likely to refer the incoming data to the known phonetic categories of her own first language, or to those of some other language with which she is familiar. The trained observer, on the other hand, can ideally refer instead to general phonetic categories. (The purpose of phonetic ear-training is precisely to establish such language-independent, general-phonetic categories in the phonetician’s mind.) This is an **impressionistic** transcription (Abercrombie, 1964: 35).

As the sound system is investigated, any impressionistic transcription is subject to revision. Characteristics that were initially ignored or overlooked may prove to be phonologically relevant; conversely, some characteristics that were noticed and notated may prove to be phonologically irrelevant. Thus for example a European producing an impressionistic transcription of an Australian language might at first overlook a distinction such as alveolar vs. retroflex place (which then

turned out to be relevant) while distinguishing voiced vs. voiceless phonation (which then turned out to be irrelevant).

As the sound system becomes clear, the analyst is in a position to replace the ad-hoc impressionistic transcription by a **systematic** transcription that reflects the structure of the language under description.

A maximally **narrow** transcription explicitly indicates all the phonetic detail that is available. A **broad** transcription implicitly states much of this detail in the **conventions** for interpreting the symbols, while keeping the transcriptions of actual language material (the **text**) less complicated. There are two main factors to be considered: the choice of characters (simple vs comparative) and the number of characters (phonemic vs allophonic). We consider these in turn.

4. Simple vs. comparative

For practical purposes it is important that a transcription system for a language be kept **simple**. The symbol **t**, part of the basic lower-case Roman alphabet, is simpler than such symbols as **t̥**, **t^h** or **t̥^h**. Therefore, when a language has only one voiceless plosive in the alveolar area, it is appropriate to symbolize it **t**, rather than to complicate the transcription by deploying the more complex symbol. Thus it is appropriate to use the same symbol **/t/** for Swedish (where the sound so denoted is typically dental and aspirated), English (alveolar, aspirated), French (dental, unaspirated) and Dutch (alveolar, unaspirated) – even though the first three could more ‘precisely’ be written **t̥^h**, **t^h**, and **t̥** respectively. It is more efficient to state these interpretative conventions once only, rather than to repeat the information every time the symbol is used. If, however, the Swedish sound is written **t̥^h**, etc., the transcription system is in this respect **comparative**.

Similarly, the five vowels of Greek are represented as **i e a o u**, even though phonetically the second and fourth may well be in the areas

associated with the general-phonetic symbols **ɛ** and **ɔ** respectively. The five vowels of Japanese may also be written simply as **i e a o u**, even though the last is typically unrounded and resembles cardinal [ɯ] (Okada 1999).

Letters of the basic Latin alphabet are simpler than other letters: **d** is simpler than **ɖ** or **ɗ**, while **i** is simpler than **ɪ**. More subtly, **ʃ** is considered simpler than **ʂ** or **ʃ̣**, while **ə** is simpler than any of **ɘ ɚ ɜ ɞ ɚ**. Nevertheless, in languages where **ʃ** and **ʂ** are distinct, e.g. Polish, both symbols are required; similarly, both **ə** and **ɚ** are required in Danish.

Letters without diacritics are simpler than letters with diacritics. (See the case of Swedish **ʈʰ** above.) Consonantal diacritics are usually unnecessary in the broad transcription of a language. The Arabic *‘ayn* can reasonably be written **ʕ** even by those who believe it to be a pharyngealized glottal stop [ʕʰ] (Thelwall and Sa’adeddin, 1999). The rather wide inventory of vowel symbols furnished by the IPA means that diacritics for raising, lowering, centralizing and so on can normally be dispensed with in broad transcription. Again, diacritics may be necessary in languages where they symbolize a phonemic contrast, as in the case of French nasalized vowels, **ɑ̃** etc.

It is typographically simple to transcribe the English consonant in *red* as **r**, even though phonetically it is an approximant rather than a trill. It would be comparative to write it **ɹ**. Equally, it is comparative to write the French consonant in *rue* as **ʀ** or **ʁ**; it is simple to write it **r**, as in the specimen (fig. 6, from Passy 1958). But in an account of the contrastive phonetics of English and French the comparative symbols might be appropriate.

IPA symbols for voiceless plosives, such as **p t k**, may be regarded as unspecified with respect to possible aspiration. Diacritics are available to

show them as aspirated (**p^h t^h k^h**) or as unaspirated (**p[̄] t[̄] k[̄]**) – the latter diacritic is not part of the official IPA repertoire but of the ExtIPA supplement designed for clinical phonetics (Nolan and Esling, 1999: 187, 193). In Chinese, where there is a phonemic contrast between aspirated and unaspirated plosives, but there are no essentially voiced plosives, to write them as /**p t k b d g**/ (as in the Pinyin romanization) is simpler than to write them as /**p^h t^h k^h p t k**/ or /**p t k p[̄] t[̄] k[̄]**/ or /**p^h t^h k^h p[̄] t[̄] k[̄]**/.

Some possible simplifications are generally rejected as inappropriate except perhaps for special purposes such as email. Following the orthography, the Polish high central vowel could be written **y** rather than **ɨ** (Jones 1956: 335). The Zulu simple clicks could be written **c, q, x**, again following the orthography, rather than with explicit click symbols **ǀ, ǃ, ǂ**, (or the former IPA symbols **ɿ, ɿ̣, ɿ̤**).

5. Phonemic vs. allophonic

For many purposes it is more appropriate to use symbols that refer to **phonemes** rather than to **allophones**. The rules for the distribution of allophones can be stated once and for all in the accompanying conventions, which allows the remaining transcription to be uncluttered and less complicated. Pedagogical transcriptions in dictionaries and language-learning textbooks are usually phonemic. One of the sources of tension in the establishment of agreed transcription systems for automatic speech recognition, as successive languages were brought within the SAMPA system (Wells 1997), was between the generalist's assumption that there should be a distinct phonetic symbol for each 'sound' and the linguist's preference for a more economic notation with a distinct symbol only for each phoneme.

The Spanish voiced obstruents have both plosive and fricative/approximant allophones. Allophonically they include both **b d g** and **β ð ɣ**. Following the principle of simplicity, the phonemes are

usually written **b, d, g**. For some pedagogical purposes it may be relevant to insist on the difference between plosives and fricatives; but for lexicographic or speech-recognition purposes this difference is irrelevant (particularly since word-initial /**b d g**/ are pronounced as plosives in some contexts but as fricatives in others: *un* [d]edo ‘a finger’ but *mi* [ð]edo ‘my finger’).

The English lateral consonant varies between clear (plain) **l** and dark (velarized) **ɫ**, the conditioning factor in Received Pronunciation being the following segment: the lateral is clear before a vowel, dark elsewhere. In a phonemic transcription both are written **l** (the simpler of the two symbols in question). Phonemic notation is undoubtedly advantageous in a pronunciation dictionary, since the final consonant in a word such as *sell* is sometimes clear (*sell it*), sometimes dark (*sell them*): so it is better to leave the choice of clear or dark to be decided by reference to the general rule rather than spelt out at each entry.

However there are circumstances in which a strictly phonemic notation may be considered inappropriate. In German the fricative corresponding to orthographic *ch* is velar [x] when following an open or back vowel, but palatal [ç] elsewhere (including following a consonant and in initial position). The two sounds may be considered to be co-allophones of the same phoneme /x/, and (provided certain morphological boundaries are explicitly indicated) unambiguously so written. Nevertheless, this allophonic distinction has a high perceptual salience for speakers. The two sounds have familiar non-technical names, *Ach-laut* and *Ich-laut* respectively. The standard German pronunciation dictionary symbolizes them distinctly (fig. 7; Mangold 1990).

There are many other cases where users of phonetic transcription may feel more comfortable with a selectively narrowed (partially allophonic) transcription. An example is the symbol **ŋ** for the velar nasal in

languages (e.g. Italian) in which it is not distinctive, but arises only by assimilation before another velar. Another is Russian, where for pedagogical purposes it may be useful to narrow the transcription so as to indicate vowel allophones explicitly (fig. 8).

Conversely, there are cases where users want a transcription that reflects phonemic neutralizations. In many languages the vowel system in unstressed syllables is less complex than in stressed syllables. In a **polysystemic** transcription different vowel systems are identified as operating in different structural positions or different phonetic environments. In French, for example, the oppositions **e - ε**, **a - α**, **ø - œ**, **o - ɔ**, **ẽ - œ̃** are typically neutralized in non-final syllables, and it is possible to use special (non-IPA) cover symbols to reflect these neutralizations: **E, A, Ø, O, Ë**.

In contemporary English speakers tend to be aware of the glottal stop **ʔ** as something distinct from **t**, and students learning phonetic transcription see it as natural to distinguish the two. In terms of classical phonemics, the status of **ʔ** is odd in that in some positions it behaves as an allophone of **/t/** (e.g. *a[ʔ]mosphere*), but in other positions (notably word-initially) it realizes no underlying phoneme but if used merely signals emphasis (optional hard attack, as in *an [ʔ]egg*).

6. Analysis and transcription: the English vowels

There are often several possible phonological treatments of the same phonetic data. Naturally, different competing phonemicizations may be reflected in different phonemic notations; however, the two do not necessarily go hand in hand, and it is possible for analysts who disagree on the phonological treatment to use the same transcription system, or conversely for analysts who agree on the phonology to use different notations.

Furthermore, the shortcomings of classical phonemic theory now generally acknowledged by phonologists mean that many are unhappy with the notion of a phonemic transcription, despite its convenience in practice.

The notation of English vowels (in RP and similar varieties) has been a particularly difficult area. One view is that pairs such as *sleep* – *slip* contain the same vowel phoneme, but under different conditions of length (length being treated as a separate, suprasegmental, feature). This view is reflected in the notation **slɪ:p** – **slɪp**, widely used in EFL work in the first three-quarters of the twentieth century. Thus the first twelve editions of Daniel Jones’s pronouncing dictionary (Jones, 1917) the English monophthongs were written as follows, in what was then widely known as **EPD transcription**. (They are exemplified respectively in the keywords *fleece*, *kit*, *dress*, *trap*, *start*, *lot*, *thought*, *foot*, *goose*, *strut*, *nurse*, *comma*, *face*, *goat*, *price*, *mouth*, *choice*, *near*, *square*, *force*, *cure*.)

i: i e æ a: ɔ ɔ: u u: ʌ ə: ə ei ou ai au ɔi iə eə ɒə uə

Since this set of symbols is not maximally simple (section 4 above), a **simplified transcription** also came into use, and was popular in EFL work in the middle of the twentieth century. Unconfirmed hearsay has it that Jones would have liked to switch to this transcription for EPD, but that the book’s publishers refused to allow it.

i: i e a a: o o: u u: ʌ ə: ə ei ou ai au oi iə eə ɒə uə

In these **quantitative** transcription systems, the length mark is crucial, since it alone represents the distinction between several pairs of phonemically distinct vowels: not only *sleep* – *slip* but also, in the simplified transcription, *cat* – *cart*, *spot* – *sport*, *put* – *boot*, and *insert* (n.) – *concert*.

Another possible analysis of the English vowels is that the long and diphthongal ones consist of a short vowel followed by a glide identified with one of the semivowels **j** (non-IPA notational variant: **y**) or **w** or, in the case of a non-high final tendency, **h** (Trager and Smith, 1951). This type of analysis enjoyed considerable support among adherents of structural linguistics. Applied to RP (which it rarely was), it would look like this:

iy i e æ ah o oh u uw ə əh i ey əw ay aw oy ih eh uh

The notation used by Chomsky and Halle in *SPE* (1968) builds on this by retaining the off-glide analysis while adding a macron to symbolize **tenseness** in the vowels previously analysed as long, yielding a system of the type

īy i e æ āh ɔ ōh u ūw ə əh i ēy ōw āy āw ōy

However, a long-established rival view saw vowel quality, rather than quantity (length) or off-glides as the feature distinguishing *slip–sleep* and similar vowel pairs. Differences in quantity (and perhaps of off-glides) could be treated as predictable once the quality was known. From about 1920 phoneticians working on English also made use of a **qualitative** transcription system, in which length marks were not used:

ɪ ɪ ɛ æ ɑ ɒ ɔ ʊ u ʌ ɜ ə eɪ ou aɪ aʊ ɔɪ ɪə ɛə ɔə ʊə

(or a variant of this in which the symbol shapes **ɪ** and **ʊ** were replaced by **ɪ** and **ʊ** respectively).

In the United States, a system of this type was used by Kenyon and Knott (1944). They analysed the vowels of *face* and *got* as essentially monophthongal, and wrote them **e** and **o** respectively:

ɪ ɪ ɛ æ ɑ ɒ ɔ ʊ u ʌ ɝ ə ɝ̣ e o aɪ aʊ ɔɪ

(The hooked symbols are for the rhotacized vowels in *nurse* and *letter* respectively. American English does not have phonemically distinct

centring diphthongs.) This notation gained wide popularity in some American circles, so much so that the expression ‘IPA’ is often understood as meaning this transcription of English. It is often used in American-oriented EFL work.

The view that eventually prevailed in Britain was that the vowels of *sleep* and *slip* are phonemically distinct, based on a complex distinction of length, quality and tensity. The rivalry between quantitative and qualitative transcription systems was resolved by A.C. Gimson (q.v.), whose notation system (Gimson, 1962) symbolized both quantity and quality differences, redundantly but conveniently:

i: ɪ e æ ɑ: ɒ ɔ: ʊ u: ʌ ɜ: ə eɪ əʊ aɪ ɔʊ ɔɪ ɪə eə ʊə

(By this time the quality of the diphthong in *goat* had changed and the diphthong **ɔə** had merged with **ɔ:**.)

Minor modifications were subsequently introduced, leading to the system now used by the nearly all British phoneticians (Wells, 1990).

i: ɪ e æ ɑ: ɒ ɔ: ʊ u: ʌ ɜ: ə eɪ əʊ aɪ aʊ ɔɪ ɪə eə ʊə i u

The important change here is the addition of two symbols for weak vowels, **i** (as in *happy*) and **u** (as in *situation*). Although sometimes viewed as an abbreviatory convention, meaning ‘either **i:** or **ɪ**’ and ‘either **u:** or **ʊ**’, these additional symbols really reflect a dissatisfaction with classical phonemics. In weak-vowelled syllables English has a neutralization of the phonemic contrasts **i:–ɪ** and **u:–ʊ**, and the symbols **i** and **u** stand for what some would call archiphonemes, others underspecified vowels. Speakers may be inconsistent in whether the vowel of *happy* or *glorious* is more like the **i:** of *sleep* or the **ɪ** of *slip*, and it may often be impossible for the listener to categorize it with certainty as one or the other. There are no pairs of words distinguished by this distinction in this position.

7. Segments and digraphs

English long vowels are not the only area in which it is possible for different views to exist over the number of successive segments into which the phonetic material should be analysed. This question tends to arise whenever diphthongs or affricates are to be transcribed.

There are also certain types of ‘single sound’ that are conveniently written as a **digraph**, i.e. as two successive letters. The IPA does this for voiced and nasalized clicks, e.g. **ɡɺ**, **ŋɺ**, and for consonants with double articulation, e.g. **kp**. (Exceptions are the approximants **w** and **ɥ** and the Swedish velar-palatoalveolar fricative **ɣ**, for which single symbols are available). If necessary, the fact that these digraphs stand for single segments can be made explicit by the use of a tie bar: **ɡɺ̄**, **ŋɺ̄**, **kp̄**.

In general, diminuendo (‘falling’) **diphthongs** may be regarded either as unitary phonemes or as sequences of vowel plus semivowel. The corresponding decision has to be made in transcription. Thus in some languages – Polish, for example – a diphthong of the type [eɨ] is best analysed as the vowel **e** followed by the consonant **j**. In others – English, perhaps – it may be regarded as an unanalysable whole. English orthography follows the latter approach, given such spellings as *basic* **'beɪsɪk**, and the unitary analysis is reflected in the respelling notation **ā**. But IPA users, even those who consider the diphthong phonologically unitary, mostly write it with two letters, **eɪ**. The use of this digraph does not carry any necessary implication that the diphthong consists of **e** (as in *dress*) and **ɪ** (as in *kit*).

In principle the IPA writes **affricates**, too, as digraphs, as in the examples **pʃ**, **dz**, **tʃ**, **kx**. To emphasize their unitary status the tie bar can be used: **pʃ̄**, **dz̄**, **tʃ̄**, **kx̄**. (In 1976 the IPA withdrew recognition from a number of affricate symbols that had featured in earlier versions of the

phonetic alphabet but had never been widely used, e.g. **ʑ** for **dz**. (Wells, 1976))

However the symbols **c** and **ɟ** are sometimes pressed into service to represent what might otherwise be written **tʃ** and **dʒ**. (Alternatively, the non-IPA **č** and **ǰ** may be used.) This is particularly convenient where the affricates occur contrastively aspirated and unaspirated, as in Hindi. Contrastive aspiration itself raises the question of whether it should be symbolized by a diacritic (**p^h** vs. **p**) or using digraphs (**ph** vs. **p**). In the case of an aspirated affricate, as in Hindi *Jhelum*, there is a transcriptional choice between diacritics alone (**ɟ^h**), a digraph (**dʒ^h** or **ɟ^h**), or a trigraph (**dʒɟ^h**). (More simply, the diacritic ^h or the letter **h** could be used instead of ^h, **h**.) Ohala, 1999, chooses a digraph with a diacritic, **dʒ^h** (fig. 9).

In a transcription system that includes digraphs it is important to maintain **parsability**, avoiding possible confusion between the single sound symbolized by the digraph and the sequence of sounds symbolized by the two symbols separately. In a language where affricates are in contrast with clusters (or sequences) of the corresponding plosive plus fricative, either the affricates must be written with a tie bar or the cluster (sequence) must be written with a separator symbol. Thus Polish *czy* and *trzy* must be written either as **tʃi** *czy* and **tʃi** *trzy* or (more conveniently) as **tʃi** *czy* and **t-ʃi** *trzy*. Some fonts provide ligatured symbols such as **tʃ** (= **tʃ**), so that one can write **tʃi** and **tʃi** respectively. In non-IPA notation, **či** and **tš** can be used. (Another view of the Polish cluster represented by orthographic *trz* takes it as **tʃʃ**, i.e. affricate plus fricative. With this analysis, the problem of parsability does not arise.)

Problems of segmentation also arise in the annotation of spectrograms or other physical records of the speech signal. The latter tends to be

continuously variable, rather than reflecting the neatly discrete segments implied by a phonetic transcription, which means that the stretch of speech corresponding to a given transcription symbol is not easily delimited. For example, the moment of silence in the middle of **apa** corresponds to the voiceless plosive identity of **p**; but its labiality can be inferred only from the formant transitions in the adjacent portions of the vowels and from the characteristics of the plosive burst at the release.

8. Dictionary entries

The pronunciation entry in a dictionary will usually relate to the **citation form** of the word in question. This may differ in various respects from the forms to be expected in connected speech, sometimes referred to as **phonotypical forms**.

The notion of a phonotypical transcription arises from the work of speech technologists working on French, a language in which many final consonants that may appear in running speech are absent in the citation form – the well-known phenomenon of liaison. Thus the citation form of the pronoun *vous* ‘you’ is **vu**, but the liaison form, used before a word beginning with a vowel, is **vuz**. The phonotypical transcription of the phrase *vous avez* ‘you have’ is **vuzave**. Pronunciation dictionaries of French must include these liaison forms, because the identity of the liaison consonant, if any, cannot be predicted from the citation form. Certain vowel-initial words block the activation of the liaison consonant (those spelt with ‘*h aspiré*’ and certain others, e.g. *onze* ‘eleven’): this, too, must be shown in the pronunciation dictionary (usually by an asterisk or some other arbitrary symbol).

In English, on the other hand, forms with final liaison **r** (linking **r**, intrusive **r**) may not need to be listed in the dictionary, since this possibility applies to every word whose citation form ends in a non-high vowel. As with the simple/comparative and phonemic/allophonic

distinctions, it is more efficient to state a rule once rather than to repeat the statement of its effects at each relevant dictionary entry.

Many English function words have distinct **strong** and **weak** forms, e.g. *at*, strong form **æt**, weak form **ət**. The strong form is used when the word is accented and in certain syntactic positions (*what are you looking at?*). A few words have more than one weak form, context-dependent, as in the case of *the*: **ði** **eg** *the egg*, prevocalic, but **ðə** **mæn** *the man*, preconsonantal. A phonotypical transcription of connected speech would select the appropriate form for the context.

Aside perhaps from such special-context forms, for pronunciation in a general-purpose dictionary it may be sufficient to state only the citation form of a word. Some dictionaries, though, and particularly specialist pronunciation dictionaries, will go further; and this may impact on the form of transcription chosen, e.g. in the use of abbreviatory conventions.

- First, the word may have several competing citation forms, used by different speakers of the standard form of the language and differing unpredictably from one another. Thus in British English *again* may rhyme with *pen* or with *pain*; *controversy* may be stressed on the initial syllable or on the antepenultimate; *schedule* may begin with **ʃ-** or **sk-**. (For statistics on speaker preferences in these words, see Wells, 2000.) In English there is great intra-speaker and inter-speaker variability in the choice between **ɪ** and **ə** in weak syllables (*reduce*, *aspiration*, *horses*). LDOCE (2003) uses a special symbol **ɨ** to show this.
- Secondly, the dictionary may wish to cover more than one form of the language, e.g. American and British English, or American and European Spanish. Rather than transcribe each relevant word separately for each variety of the language, dictionaries may use **abbreviatory conventions** to show such variability. For example, the English word *start* might be transcribed **sta:(r)t** or **sta:^rt**, with

the convention that the **r** is to be pronounced in AmE but not in BrE.

- Thirdly, there may be predictable (rule-governed) variability. For example, in certain positions in a word, where some English speakers have the cluster **ns** others pronounce **nts**, e.g. **prns** or **prints** *prince*. This may be shown by an abbreviatory convention such as **prn's** or **prn(t)s**. (The rule of plosive epenthesis is more general than this: it also affects other clusters of nasal plus voiceless fricative. It also applies in German, thus **han(t)s** *Hans*, but is ignored in Mangold 1990.) As a second example, English words with more than one lexical stress are pronounced in isolation with an accent on the last such stress (**siks'ti:n** *sixteen*) but in connected speech, under certain surrounding accent conditions, with the accent on the first such stress (**'sɪkstɪ:n** *'pi:pl sixteen people*). Particularly in dictionaries aimed at speakers of EFL, this too may be explicitly indicated. As a third example, in both English and German the syllabic consonants **ɹ** and **ŋ** alternate with the sequences **əl**, **ən**: words may be pronounced with either the first or the second, depending on a combination of phonetic-environment, stylistic and speech-rate factors: thus German *Gürtel* **'gyrtɹ** or **'gyrtəl**, English *hidden* **'hɪdŋ** or **'hɪdən**. Although the Duden dictionary mentions the alternation only in the foreword (1990: 32), English dictionaries often make it explicit at each relevant entry, using abbreviatory devices such as **'hɪd^ən**, **'hɪd(ə)n**.

9. Pedagogical transcription, dictation and reading exercises

In phonetic training of the kind associated with the Daniel Jones and Kenneth Pike traditions, those studying the phonetics of a particular language (including their own) practise the skills of transcribing phonetically from orthography, transcribing from dictation, and reading aloud from a phonetically transcribed text. In these exercises words are transcribed not in their citation form, but phonotypically. In particular,

great attention is paid to the possibility of connected-speech processes such as assimilation, elision, liaison, and weakening (including vowel reduction). In the case of English, instead of the lexical stress-marking of words, the student may be required to produce a full mark-up of accentuation (sentence stress) and intonation.

For example, in the English phrase *bread and butter* the word *and* would most probably be pronounced not **ænd**, but rather **ən** or **əm** or **ŋ** or **ɱ**. The transcriber from orthography should be able to predict this, the transcriber from dictation should be able to hear which of them was used, and the student reading from transcription ought to be able to reproduce whichever form is in the written text.

The transcription used for these exercises is often referred to as ‘phonemic’. However, if we follow current ideas in regarding phonemes as being mental entities, part of the speaker’s competence, then this term is not really accurate. The word *bad* presumably always has the mental representation **bæd**, even though under assimilation in a phrase such as *bad man* it may be pronounced with a final bilabial, nasally released, thus **bæb mæn**. This form of transcription is better referred to as a **reading transcription**.

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THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

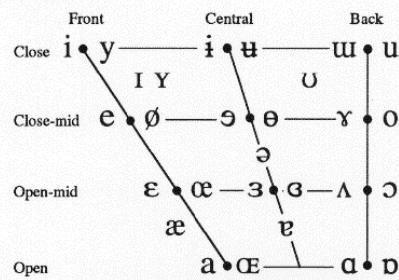
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			ʀ					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌ ɸ	ɓ Bilabial	ʼ as in:
◌ ɮ	ɗ Dental/alveolar	ɓ' Bilabial
◌ ɠ	ɟ Palatal	t' Dental/alveolar
◌ ɥ	ɣ Velar	k' Velar
◌ ʄ	ʛ Uvular	s' Alveolar fricative

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

ɱ	Voiceless labial-velar fricative	ɕ ʑ	Alveolo-palatal fricatives
ʋ	Voiced labial-velar approximant	ɺ	Alveolar lateral flap
ɰ	Voiced labial-palatal approximant	ɥ	Simultaneous ʃ and x
ħ	Voiceless epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.	
ʕ	Voiced epiglottal fricative		
ʡ	Epiglottal plosive		
		kp̚	ts̚

SUPRASEGMENTALS

SUPRASEGMENTALS		TONES & WORD ACCENTS	
		LEVEL	CONTOUR
ˈ	Primary stress	ˈ	ˈ
ˌ	Secondary stress	ˌ	ˌ
ː	Long	ː	ː
ˑ	Half-long	ˑ	ˑ
ˑ̥	Extra-short	ˑ̥	ˑ̥
·	Syllable break	·	·
ˌ̥	Minor (foot) group	ˌ̥	ˌ̥
ˌ̥̥	Major (intonation) group	ˌ̥̥	ˌ̥̥
◌̥	Linking (absence of a break)	↓	↗
		↑	↘

DIACRITICS

Diacritics may be placed above a symbol with a descender, e.g. ɲ̥̚

◌̥	Voiceless	◌̚	Breathy voiced	◌̠	Dental	◌̡	Dental
◌̜	Voiced	◌̝	Creaky voiced	◌̣	Apical	◌̤	Apical
◌̥̥	Aspirated	◌̦	Linguolabial	◌̧	Laminal	◌̨	Laminal
◌̙	More rounded	◌̘	Labialized	◌̜̞	Nasalized	◌̝̞	Nasalized
◌̟	Less rounded	◌̠̠	Palatalized	◌̡̡	Nasal release	◌̢̢	Nasal release
◌̣̣	Advanced	◌̤̤	Velarized	◌̥̥̥	Lateral release	◌̦̦̦	Lateral release
◌̥̥̥	Retracted	◌̦̦̦	Pharyngealized	◌̧̧̧	No audible release	◌̨̨̨	No audible release
◌̥̥̥̥	Centralized	◌̦̦̦̦	Velarized or pharyngealized	◌̧̧̧̧			
◌̥̥̥̥̥	Mid-centralized	◌̦̦̦̦̦	Raised	◌̧̧̧̧̧			
◌̥̥̥̥̥̥	Syllabic	◌̦̦̦̦̦̦	Lowered	◌̧̧̧̧̧̧			
◌̥̥̥̥̥̥̥	Non-syllabic	◌̦̦̦̦̦̦̦	Advanced Tongue Root	◌̧̧̧̧̧̧̧			
◌̥̥̥̥̥̥̥̥	Rhoticity	◌̦̦̦̦̦̦̦̦	Retracted Tongue Root	◌̧̧̧̧̧̧̧̧			

Fig. 1.

The IPA chart. From <http://www.arts.gla.ac.uk/IPA/fullchart.html>.

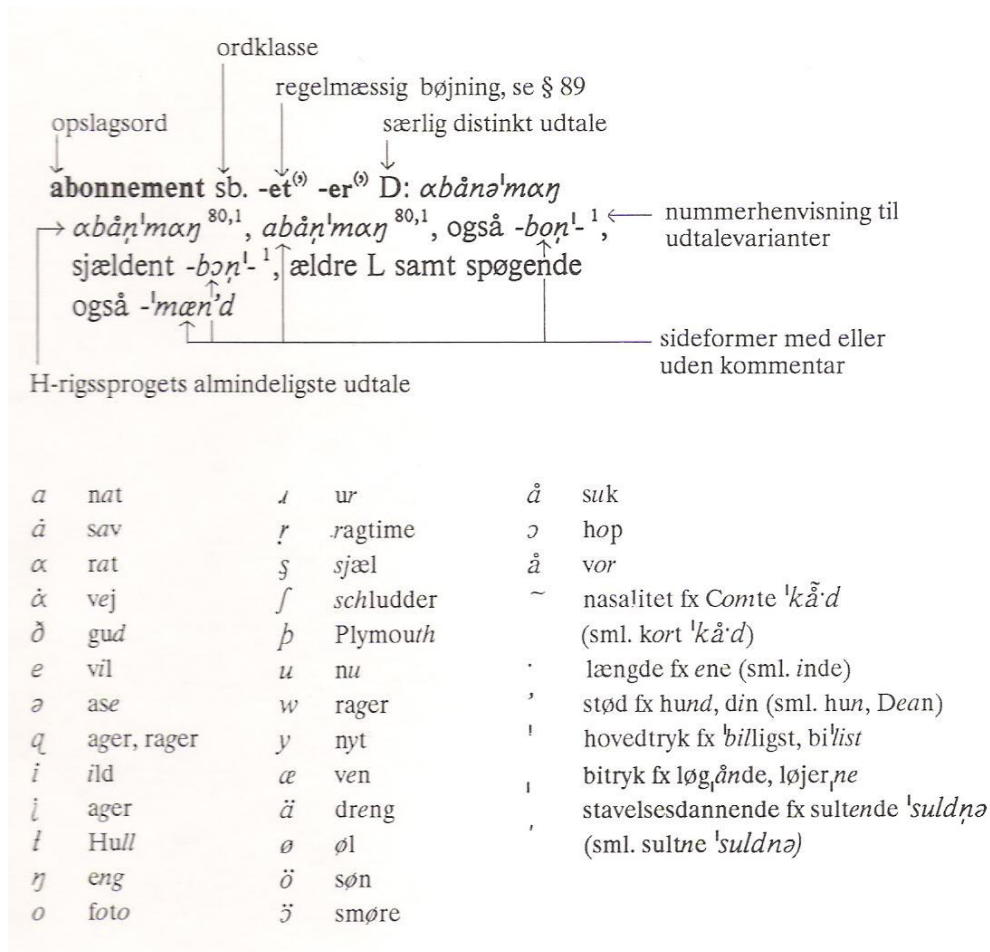


Fig. 2.

The Dania phonetic alphabet, as used in *Den store danske udtaleordbog*.

<i>Hard consonants before vowels</i>	<i>Soft consonants before vowels</i>
рад /рат/ ' (is) glad'	ряд /ръат/ 'row'
тэ name of the letter т	те /тьэ/ 'those'
ток '(electric) current'	тёк /тьок/ 'flowed'
лук 'onion'	люк /льук/ 'hatch', 'hatchway'

Fig. 3.

Transcription of Russian citation forms in Cyrillic respelling. From Smirnitsky 1975.

	唇	舌先	前舌・奥舌
閉じる音	m	n	ŋ
	p	t tʃ	k
	b	d dʒ	g
擦る音	f	θ s ʃ	h
	v	ð z ʒ	
近づく音		l	
	w	r	j (w)

表4 子音3・3四角形で示した英語の子音表

	唇	舌先	前舌・奥舌
閉じる音	ム	ンヌ	ンゲ
	プ	トゥ チュ	ク
	ブ	ドゥ ギュ	グ
擦る音	ウ [°]	ス ス シュ	フ
	ヴ	ズ ズ ジュ	
近づく音		ヌル	
	ウウ	ウル	ユイ

表5 子音3・3四角形で示した英語の子音表

Fig. 4. IPA symbols for English consonants and their kana transcription equivalents. Note the use of diacritics with the kana equivalents of **l** and **r**. From Shimaoka, 2004.

SAMPA		IPA		Unicode		label and exemplification
symbol	ASCII			hex	dec.	
Vowels						
A	65	ɑ	script a	0251	593	open back unrounded, Cardinal 5, Eng. <i>start</i>
{	123	æ	ae ligature	00E6	230	near-open front unrounded, Eng. <i>trap</i>
6	54	ɐ	turned a	0250	592	open schwa, Ger. <i>besser</i>
Q	81	ɒ	turned script a	0252	594	open back rounded, Eng. <i>lot</i>
E	69	ɛ	epsilon	025B	603	open-mid front unrounded, C3, Fr. <i>même</i>
@	64	ə	turned e	0259	601	schwa, Eng. <i>banana</i>
3	51	ɜ	rev. epsilon	025C	604	long mid central, Eng. <i>nurse</i>
l	73	ɪ	small cap i	026A	618	lax close front unrounded, Eng. <i>kit</i>
O	79	ɔ	turned c	0254	596	open-mid back rounded, Eng. <i>thought</i>
2	50	ø	o-slash	00F8	248	close-mid front rounded, Fr. <i>doux</i>
9	57	œ	oe ligature	0153	339	open-mid front rounded, Fr. <i>neuf</i>
&	38	ɶ	s.c. OE lig.	0276	630	open front rounded
U	85	ʊ	upsilon	028A	650	lax close back rounded, Eng. <i>foot</i>
}	125	ʉ	barred u	0289	649	close central rounded, Swedish <i>sju</i>
V	86	ʌ	turned v	028C	652	open-mid back unrounded, Eng. <i>strut</i>
Y	89	ʏ	small cap Y	028F	655	lax [y], Ger. <i>hübsch</i>

Fig. 5.
Vowel symbols, in SAMPA and IPA. From
<http://www.phon.ucl.ac.uk/home/sampa/>.

8. ā pā'sjō.

1. ā'ri s e mi ā 'rut, | avək la 'listə d a'dres¹ | kə 'zā lɔi a dɔ'ne, | pur ʃer'ʃe yn fa'mi:j | u i pɔis 'prā:drə pā'sjō.²

2. il a deza vizite 'dø me'zō, | me l 'yn nə lɔi a pa 'ply, | e l 'otr ete trɔ 'ʃe:r.

3. mēt'nā, | il a pri l me'tro | pur a'le a nœ'ji | u 'zā lɔi a ēdi'ke | la fa'mi:j dy'kro.

4. i de'sā dy me'tro | a la sta'sjō d la pɔrt ma'ljo.

5. la ba'rje:r n e pa 'lwē ; | i la 'pa:is,³ | sɔi œ mɔ'mā | l avny d nœ'ji, | 'pɔi prā a 'drwat la ry d 'ʃartr, | e 'tɔ:b dā la 'ry d sablō'vil.

6. il a'ri:v o trāt 'set, | e 'sɔn ; | ō 'vjē lɔi u'vri:r.

7. " es kə madam dy'kro⁴ | et a la me'zō ? es kə ʒ 'pø lɔi par'le ? "

8. " 'ā:tre | mə'sjø, | 'vwala ma'dam."

9. " ma'dam, | ō m 'di k vu prəne ʃe 'vu | de pāsjo'nœ:r etrā'ze ; | ʒə vjē 'vwa:r | si vu m prādri'e."

10. " sa pø s 'ʃe:r, | mə'sjø, | pur 'kɔbjē d 'tā ? "

11. " pur œ 'mwa u 'dø | ʒ 'pā:is ; | nu dirjō 'œ 'mwa | pur kɔmā'se."

12. " 'bjē | mə'sjø ; | vule vu 'vwa:r la me'zō ? "

13. " es kə ʒə s're lə 'sœl⁵ etrā'ze ʃe 'vu ? "

14. " 'nō | mə'sjø ; | nuz avō œ sɔe'dwa | e yn dəmwa'zɛl ru'men. me ō n 'parl kə frā'se."

¹ la 'lis d a'dres. ² wi pɔis 'prā:d pā'sjō ('prān pā'sjō).

³ il la 'pa:is. ⁴ mam dy'kro. ⁵ es kə ʒ s're l 'sœl.

Fig. 6.

Pedagogical transcription of French. From Passy 1958. The French **r** is written simply, as r.

Bucephalus bu'tse:falʊs
Bucer 'bʊtʂə
Buch bu:x, **Bücher** 'by:çə
Buchan[s] *engl.* 'bʌkən[z]
Buchanan *engl.* bju:'kæənən
Buchara bu'xa:ra, *russ.*
 buxa'ra
Buchare bu'xa:rə

Fig. 7.

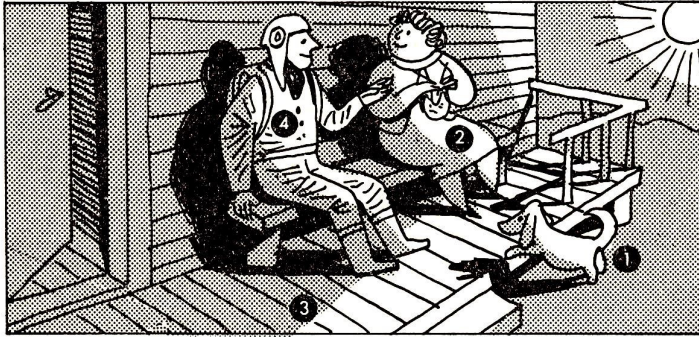
From Mangold 1990. Note the switch from **x** in the singular of the word *Buch* to **ç** in the plural *Bücher*. In the singular this consonant is preceded by the back vowel **u:**, but in the plural by the front **y:**.



У нас в большóм дóме,
 u 'nas v bl'ʃom 'domɨ,
 удóбно-простóрно,
 u'dobnə-prɨ'stornə,
 ёж живёт.
 jəʃ zɨ'vot.



Чёрный кот рбётся
 'tʃornɨ(j) kot 'ro(j)ɨtsə
 под высóкой ёлкой,
 pəd vt'sokəj 'jolkəj,
 а вóрон смóтрит на него́.
 a 'vorən 'smotʃɨt nə nɨ'vo.



- 1 пёсик
'pʲosɨk
- 2 тётя
'tʲotʲa
- 3 на припёке
nə pʲɨ'pʲokɨ
- 4 лётчик
'lʲotʃɨk



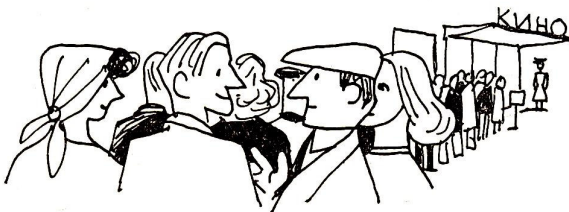
вóрон на берёзе
 'vorən nə bɨ'rʲozɨ



тётя с ребёнком
 'tʲotʲa s rʲɨ'bɨnkəm



Вы пóздно встáёте.
 vt 'pozdnə vstɨ'lʲjotʲe.



Вы идёте в кино́?
 vt i'dʲotʲɨ f kɨ'no?
 - Да, идём в кино́.
 - da, i'dom f kɨ'no.
 Вы тóже идёте в кино́?
 vt 'tozɨ i'dʲotʲɨ f kɨ'no?

Fig. 8.

Narrow transcription of Russian (Ward, 1966). The symbol ö represents a centralized allophone of /o/. (In 1989 the IPA withdrew recognition from the palatalization diacritic seen here, replacing it with a raised j, thus **dʲ** in place of **d̟**; and from the symbol **ɨ**, an alternative to **ɪ**.)

Transcription of recorded passage

This translation of 'The North Wind and the Sun' is a modified version of that presented in the 1949 version of the *Principles of the International Phonetic Association*.

ʊt̪əri hæʋɑ ɔr surədʒ ɪs bɑt̪ pər dʒʰəgət̪ rəhe t̪ʰe ki həm ɖonō mē zjɑɖɑ
 bəlʋɑn kən he. ɪt̪ne mē gərəm tʃogɑ pəhne ek musafɪr ʊd̪ʰər a nɪklɑ. hæʋɑ
 ɔr surədʒ ɖonō ɪs bɑt̪ pər rɑzi ho gəje ki ɖonō mē se dʒo pəhle musafɪr kɑ
 tʃogɑ ʊt̪ərʋɑ degɑ vəhi zjɑɖɑ bəlʋɑn səmdʒʰɑ dʒɑjega. ɪs pər ʊt̪əri hæʋɑ
 əpnɑ pʊrɑ zor ləgəkər tʃəlne ləgi lekɪn ʋo dʒese dʒese əpnɑ zor bət̪ʰɑt̪i gəji
 vese vese musafɪr əpne bədən pər tʃoge ko ɔr bʰi zjɑɖɑ kəs kər ləpet̪tɑ gəjɑ.
 ənt̪ mē hæʋɑ ne əpni kɔʃɪʃ bənd̪ kər ɖi. pʰɪr surədʒ t̪ezi ke sɑt̪ʰ nɪklɑ ɔr
 musafɪr ne t̪urənt̪ əpnɑ tʃogɑ ʊt̪ɑr ɖɪjɑ. ɪs lije hæʋɑ ko mɑnnɑ pət̪ɑ ki ʊn
 ɖonō mē surədʒ hi zjɑɖɑ bəlʋɑn he.

Orthographic version

उत्तरी हवा और सूरज इस बात पर झगड़ रहे थे कि हम दोनों में ज़्यादा बलवान
 कौन है। इतने में गरम चोगा पहने एक मुसाफ़िर उधर आ निकला। हवा और सूरज
 दोनों इस बात पर राज़ी हो गये कि दोनों में से जो पहले मुसाफ़िर का चोगा उतरवा
 देगा वही ज़्यादा बलवान समझा जायेगा। इस पर उत्तरी हवा अपना पूरा ज़ोर लगाकर
 चलने लगी लेकिन वह जैसे जैसे अपना ज़ोर बढ़ाती गई वैसे वैसे मुसाफ़िर अपने बदन पर
 चोगे को और भी कस कर लपेटता गया। अन्त में हवा ने अपनी कोशिश बन्द कर दी। फिर
 सूरज तेज़ी के साथ निकला और मुसाफ़िर ने तुरन्त अपना चोगा उतार दिया। इस लिये
 हवा को मानना पड़ा कि उन दोनों में सूरज ही ज़्यादा बलवान है

Fig. 9.

Transcription of Hindi. From Ohala, 1999.

Abstract

In phonetic **transcription** phonetic symbols are used to represent speech sounds.

Different transcription systems may be appropriate for different purposes. A transcription may be **impressionistic** (narrow) or **systematic** (broad), depending on whether the symbols are (i) simple or comparative, and (ii) phonemic or allophonic.

Some sounds are conventionally written as digraphs (e.g. double-articulation obstruents, voiced clicks). Diphthongs and affricates may be written with two symbols or sometimes with one.

Words in connected speech are often pronounced differently from words in isolation. A **phonotypical** transcription shows their pronunciation in context. Dictionary entries often involve special abbreviatory conventions. In language teaching, a hybrid **reading** transcription may be appropriate.

Keywords

phonetic symbol, transcription, transcribe, IPA, International Phonetic Association, International Phonetic Alphabet, diacritic, SAMPA, ASCII, impressionistic, systematic, narrow transcription, broad transcription, simple transcription, comparative transcription, allophonic, phonemic, ich-laut, ach-laut, neutralization, quantitative transcription, qualitative transcription, digraph, affricate, click, diphthong, parsability, citation form, phonotypical, ear training, reading transcription