Phonetic Keywords in Learner's dictionaries

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Abstract

Phonetic keywords found in the pronunciation guides to five monolingual learners' dictionaries of English (OALDCE4, LDOCE3, COBUILD1, CIDE and CHAMBERS) are evaluated with respect to their familiarity, phonetic difficulty and textual frequency. It is shown that while they are more or less equivalent on the first two scores (with OALDCE4 and CIDE listing words slightly easier to pronounce than the other three dictionaries), OALDCE4's words are almost twice as frequent in running English as those of CHAMBERS. Appeal is made for more research into the phonetic structure and choice of keywords, which are supposed to assist the dictionary user in the difficult task of phonetic look-up.

1   Introduction

In the by now respectably long tradition of dictionary use studies ([Stark 1999] has a list of almost fifty substantial contributions) few had anything to say about how learners approach dictionary pronunciation: their attitudes, prejudices, problems, patterns of use. What does transpire quite forcefully from these studies is that most learners are after meaning, spelling and grammar, rather than pronunciation or etymology, and that they look these up mostly in reading and writing.

To take a few representative examples:

- In her questionnaire study of 292 tenth- to twelfth-grade American high-school students, [Kipfer 1987] found that there were (only) fourteen who claimed to have consulted pronunciation. On the other hand, and quite paradoxically it would seem, of the various components of front matter only the pronunciation key was read by the majority of the students. This is in direct contradiction to those lexicographers and educators who contend that virtually nobody ever reads dictionary front matter (see [Kirkpatrick 1985, 9], for example).

- [Battenburg 1991] devoted a part of his study to gauging the dictionary use habits of German students of English in an academic ESL setting. He found the usual pattern, where most dictionary use was for meaning (definitions) and spelling, with pronunciation consulted with frequency inversely proportional to the learners' proficiency level. Among elementary learners 50% looked up phonetics 'always' or 'often', and just as many – 'sometimes' or 'never'. Among intermediates the proportions were 40% and 60%, respectively, and among advanced students – 10% and 90%, respectively [ibidem:94]. Battenburg also found that pronunciation guides in dictionaries were used by 25% of the elementary learners, by 75% of the intermediate learners, and by 70% of the advanced ones [ibidem:99]. Battenburg does not comment on the apparent paradox whereby most advanced learners report reading the pronunciation guide which they hardly ever use later to decode phonetic representations, which they do not consult.

- In a 1998 questionnaire study of 67 first-year students at the Hong Kong University of Science and Technology, [Chi 1998] found out that half of the respondents never used their (monolingual) English dictionaries to look up pronunciation, and none referred to it "all the time" [Chi 1998, 572].

It would seem, then, that it is for the sake of the (very) few dictionary users consulting pronunciation that publishers so prominently display pronunciation keys at the very beginning of front matter, predominantly on the back side of the front cover. This is indeed surprising, considering the strenuous efforts of all dictionary makers to maximally streamline their products to the needs of the majority of their buyers. What is perhaps even more surprising is that the fruit of their efforts so proudly laid out on the very first page of the dictionary often turns out to be sadly underresearched and, as a result, much more intuitive and qualitatively haphazard, at least compared with the amount of loving care lavished on the definitions, defining vocabularies, grammar tags or collocations. The latter is of course amply documented in the dictionary front matters themselves as well as in the abundant metalexicographic literature.

To prove my point it would be enough to make a short overview of a few successive ('thoroughly revised') editions of any of the best monolingual learners' dictionaries on the market. What one finds from such an analysis is either a completely frozen phonetic keyword set with like layout continued through half a century or so, or some erratic Brownian movement in phonolexicographic space with no apparent rhyme or reason in the choice of words acting as phonetic keywords. And yet, if it is indeed true that the pronunciation guide is the element of the front matter most read by dictionary users [Kipfer], it certainly deserves to be constructed on sound scientific principles, rather than on intuition alone.

In this paper I will look at how some of such principles can be used to evaluate phonetic keyword lists found in five monolingual learners' dictionaries of English: OALDCE4, LDOCE3, COBUILD1, CIDE and CHAMBERS (*Chambers Universal Learners Dictionary*)[1]. This is a very limited study, of course, both in terms of the number of principles discussed as well as in its restriction to keywords only, with almost full disregard for other elements of pronunciation guides (explanations of diacritics, grapheme-to-phoneme and phoneme-to-grapheme rules, dialectal and phonostylistic advice, etc.). Likewise no attention is paid here at all to even wider issues which are extremely interesting and relevant in this context, such as the psycholinguistics of the dictionary pronunciation consultation process[2]. For a more general and thorough discussion of lexicographic phonetics the reader is referred to my book [Sobkowiak 1999].

2 Data

As this is an empirical investigation, some presentation of the data base is in order here. The complete listing of the phonetic keywords in the five dictionaries is given in Table 1.

Notice that COBUILD's vowels and diphthongs are originally illustrated with three keywords each, unlike the other dictionaries, which offer only one keyword. For completeness of data, and because I believe that users would seldom go further than the first illustrative item[3], I decided to include in my tabulation only the first COBUILD's keyword for these phonemes.

sound	OALDCE4	LDOCE3	COBUILD	CIDE	CHAMBERS
p	*pen*	*pen*	*pay*	*pen*	*page*
t	*tea*	*ten*	*talk*	*town*	*table*
k	*cat*	*key*	*king*	*cat*	*kick*
b	*bad*	*back*	*bed*	*book*	*ball*
d	*did*	*day*	*done*	*day*	*dog*
g	*got*	*get*	*good*	*give*	*get*
f	*fall*	*fat*	*fit*	*fish*	*feet*
θ	*thin*	*thing*	*thin*	*think*	*thing*
s	*so*	*soon*	*soon*	*say*	*safe*
ʃ	*she*	*ship*	*ship*	*she*	*ship*
h	*how*	*hot*	*hat*	*hand*	*half*
v	*voice*	*view*	*van*	*very*	*voice*
ð	*then*	*then*	*then*	*the*	*though*
z	*zoo*	*zero*	*zoo*	*zoo*	*zoo*
ʒ	*vision*	*pleasure*	*measure*	*vision*	*measure*
w	*wet*	*wet*	*win*	*we*	*wait*
j	*yes*	*yet*	*yellow*	*yes*	*young*
l	*leg*	*let*	*lip*	*look*	*lake*
r	*red*	*red*	*run*	*run*	*race*
m	*man*	*sum*	*mat*	*moon*	*mad*
n	*no*	*sun*	*nine*	*name*	*name*
ŋ	*sing*	*sung*	*sing*	*sing*	*bang*
ʤ	*June*	*jump*	*joy*	*jump*	*jacket*
tʃ	*chin*	*cheer*	*cheap*	*cheese*	*cheese*
e	*ten*	*bed*	*met*	*head*	*head*
æ	*hat*	*cat*	*act*	*hat*	*bag*
ɑː	*arm*	*father*	*heart*	*farm*	*bath*
ɔ	*got*	*dog*	*lot*	*sock*	*box*
oː	*saw*	*four*	*more*	*horse*	*hall*
ʊ	*put*	*put*	*could*	*foot*	*foot*
uː	*too*	*boot*	*you*	*shoe*	*blue*
ə	*ago*	*about*	*butter*	*above*	*ribbon*
əː	*fur*	*bird*	*turn*	*bird*	*first*
ʌ	*cup*	*but*	*but*	*cup*	*love*
iː	*see*	*sheep*	*feed*	*sheep*	*feel*
I	*sit*	*bit*	*fit*	*ship*	*milk*
aI	*five*	*lie*	*dive*	*eye*	*fine*
aʊ	*now*	*now*	*out*	*mouth*	*loud*
ɔI	*join*	*boy*	*boy*	*boy*	*join*
eI	*page*	*make*	*say*	*day*	*pain*
əʊ	*home*	*note*	*note*	*nose*	*go*
Iə	*near*	*peculiar*	*near*	*ear*	*here*
eə	*hair*	*hair*	*fair*	*hair*	*hair*
ʊə	*pure*	*actual*	*sure*	*pure*	*poor*

Table 1: Phonetic keyword lists in the five dictionaries

A casual scan through the five lists will reveal an amazing variety of lexical choices on the one hand as well as some general organising principles on the other. As far as the former is concerned, notice that there is no single phoneme which would be illustrated with the same keyword across the five dictionaries (although some come close: *then, zoo, boy*). Questions could also be raised about the choice of some words: (1) why use the bisyllabic *table* to key /t/ or *father* for /ɑː/?, (b) why use inflected forms (*got, feet, sung, met, saw*[4]) where basic ones could do?, (c) is it OK. to key one difficult phoneme (/θ/) with keywords containing another one (/ŋ/)?, (d) ... or with keywords grapho-phonemically opaque (*though*)?, (e) what are the pros and cons of using proper names (*June*), (f) are *butter* and *ribbon* the best choices to illustrate the schwa[5]?, finally (g) are *peculiar* and *actual*, with their possibly compressed unstressed centring diphthongs (see [Wells 1990, 152-3]) such a good idea to key these two diphthongs, popularly regarded as ones of the most difficult English sounds for foreign learners?

All these questions and many others could now be tackled in depth, but it is certainly more instructive to look at the other side of the coin, the general organising principles, which, although never explicitly stated, are clear enough upon short critical inspection of the lists.

Phonetic keyword lists appear to obey the following principles (listed here in particular order):

- as far as morphology is concerned, basic uninflected wordforms are preferred, with the proportion of (concrete) nouns clearly enlarged, compared to the standard English lexicon,
- words should be monosyllabic as far as possible (keywords for /ʒ/ and schwa are an obvious exception), preferably of CVC structure,
- words should be 'easy' to learners, which presumably reduces to: textually frequent, reasonably familiar, semantically and grapho-phonemically transparent, phonetically unproblematic, etc.,
- the illustrated consonants should come first in the keywords (again with the obvious exception of /ʒ/ and /ŋ/), while the illustrated vowels should be bound by the consonantal onset on the left and coda on the right,
- no attempt should be made to construct lists of minimal pairs.

These principles are not quite categorical, of course: there are vowel-initial keywords in the list as well as words with an open monosyllable. There is even a short streak of keywords, sported by LDOCE3, which succeeds in breaking quite a few of these constraints at the same time: *sum, sun, sung*, illustrating the three nasals. But on the whole most English dictionaries obey these general principles quite closely. In what follows I will look at how the five dictionaries chosen for analysis fare with respect to three selected principles from the above list, those which are perhaps the most relevant from the point of view of the learner: familiarity, phonetic ease/difficulty and textual frequency.

3 Analysis

3.1 Familiarity

It is beyond any doubt that compilers of phonetic keyword lists try to make them as 'easy' to learners as possible. It would, after all, be of (almost[6]) no use to find an unfamiliar word keying

an unfamiliar phonetic character, this in turn keying (a part of) an unknown pronunciation. There are potentially very many parameters of 'easy' in this context, and few of them are well understood at present, both in lexicography and foreign language teaching generally. Familiarity is unquestionably one of the many (and of the few).

For reasons of space, I will not go into the analysis of the concept of familiarity itself, which has got a rich psycholinguistic literature, but relatively little bibliography in the EFL context. As I am not aware of any substantial EFL word-familiarity rating (which would have to be L1-sensitive anyway), to evaluate the five keyword lists I used the existing native-based Paivio norms of printed familiarity, which I got in an edited and computer-readable form from the MRC2 psycholinguistic database (see [Coltheart 1981] and [Wilson 1988] for details and references). While the applicability of such norms to the EFL vocabulary is not demonstrated here, it is at least prima facie reasonable.

Only 9392 words of the MRC2's over one hundred and fifty thousand words are familiarity-rated, but in the five keyword lists under scrutiny here there were only very few words unrated (as was to be expected). The largest number occurred in COBUILD, which can itself be interesting for lexicographers in charge: *pay, fit, run, joy, cheap, met, lot, feed, fit* and *say*. The number of missing data items can be gleaned from Table 2 for each dictionary; they have not been used in counting the means.

So how do the five dictionaries compare with respect to the Paivio-familiarity ratings? Surprisingly perhaps, the five means are almost identical, as can be seen in Table 2.

	OALDCE4	LDOCE3	COBUILD	CIDE	CHAMBERS
familiarity	580.4	577.5	578.2	583.1	580.5
N	40	39	34	40	42

Table 2: Paivio-familiarity means for phonetic keywords in the five dictionaries

With the MRC2-provided familiarity mean of the 9392 words equalling 488 (potential range of 100-700, standard deviation 99), the five dictionary means are all well into the statistically highly significant area of almost six standard deviations away from chance (standard error of means around 15), which simply means that compilers of all the five dictionaries used keywords much more familiar than the language norm. Not terribly surprising so far. What I find rather exciting is that they all managed (intuitively, no doubt) to home in on almost exactly the same familiarity range, around 580. Clearly, no one wins out here.

To close this topic, for the sake of illustration, here are some of the most familiar: *bed, you, could, good*, and the least familiar: *mat, dive, king, van*, keywords among the COBUILD's thirty-four. As can be seen, familiarity appears to be highly related to frequency. This does not mean, however, that the two produce identical results, as will be seen below.

3.2 Phonetic ease/difficulty

Like with familiarity, no empirical ratings of phonetic difficulty of English words in the EFL context exist. As a makeshift measure in the calculations below I use my own phonetic difficulty

index, which I elaborated as part of the Multi-Access Dictionary (MAD) project, described in detail in chapter three of [Sobkowiak 1999]. Briefly, the idea of the index is that it is a global numerical measure of the phonetic difficulty of the given English lexical item for Polish learners. The measure combines (a) the most salient grapho-phonemic difficulties such learners are known to have reading English, i.e. mostly spelling pronunciation, (b) some commonest phonemic L1-interference problems known from the literature and my own teaching experience, finally (c) some of the notorious developmental L2-interference pronunciation errors observed in all learners of English regardless of their L1 background. The index was derived automatically from a phonemically transcribed list of English words, with the range of scores between zero and ten, with zero assigned to the easiest items. The following is a short selection of the difficulty points counted[7].

As far as phonetic interference from Polish is concerned, certainly the richest source of pronunciation difficulty, the algorithm counted one point each for (among others):

- the three centring diphthongs,
- the mid central lax vowels,
- the velar nasal,
- the word-final voiced obstruents,
- the /-VnC-/ sequence (prone to end up as /ṼC/ in Polish English),
- and two points each for the interdentals.

The problems in one way or another motivated by spelling and scored by the algorithm were (among others):

- grapho-phonemically troublesome spellings, like <ur>, <our>, <ou>, <ow> (two points each) or <ei>, <eo>, <au>, <aw> (one point each),
- word-final <-mb>, <-mn>, <-gh>, <-ght>, <-ey>and word-initial <ps->, <mn->.

As can be seen, this phonetic difficulty index is heavily L1-sensitive, as indeed should unavoidably be the case: no phonetic problem of English is equally difficult or error-prone to all foreign learners. Thus, the results presented in Table 3 are not definitive in any sense, especially considering the still prototypical state of the algorithm assigning difficulty rates, but they are certainly suggestive. All forty-four keywords have their phonetic difficulty scores.

	OALDCE4	LDOCE3	COBUILD	CIDE	CHAMBERS
phonetic difficulty	1.05	1.27	1.25	1.09	1.23

Table 3: Phonetic difficulty means for phonetic keywords in the five dictionaries

Unlike with familiarity, the five keyword lists do differ in terms of phonetic ease, with OALDCE4 clearly the winner, CIDE close behind, and the other three coming last. This means that (Polish) learners using OALDCE will find its phonetic keywords the easiest to pronounce,

which is certainly a plus in the process of looking up unknown IPA symbols in the pronunciation guide.

As it turns out, however, the differences between the dictionaries are not statistically significant, with the highest Z-score (that between OALDCE4 and LDOCE3) reaching only 0.7832. Any statistically significant comparisons with the English general vocabulary are very difficult, of course, because phonetic keywords are rather special on all linguistic levels (phonetically, morphologically, semantically, pragmatically), but it may be of some preliminary interest that the mean phonetic difficulty rating of the 6316 monosyllabic lemmas in my lexical database of English comes out at 1.10 (other structural features of keywords than monosyllabicity were not aligned, however, as they would have to be painstakingly weighted). With rather high standard deviations on all these lists one should not expect that these differences in difficulty scores should be statistically significant. But they are certainly thought-provoking.

3.3 Frequency

Finally, frequency. This is of course the most tangible criterion of evaluation, with hard corpus figures available for different modalities (spoken vs. written), dialects/accents (British vs. American), styles/genres, etc. For the purposes of this calculation I used the lemmatised sublist of words derived from the British National Corpus by Adam Kilgarriff[8]. This consists of 6318 lemmas, POS-differentiated, covering almost 86 million of the original BNC tokens, those with textual frequency of 800 or more.

	OALDCE4	LDOCE3	COBUILD	CIDE	CHAMBERS
frequency	16175.5	10862	9314	9901	8522
N	36	40	39	43	42

Table 4: Median frequencies for phonetic keyword lists in the five dictionaries

Median frequencies of the five keyword lists are shown in Table 4. Medians rather than means were taken to avoid the skewing effect of such notorious outliers as *the* in CIDE, for example, which completely invalidates meaningful statistical comparison. Like with familiarity scores, almost all keywords actually appeared on Kilgarriff's list. The most deficient keyword list in this respect is that of OALDCE4, which lacks seven frequency scores for: *did, got, zoo, June, ten, saw, ago, five*, three of them being inflected, and thus outside Kilgarriff's list by definition. To have some idea about the two frequency-wise extremes of the OALDCE4 keyword list, here are the most frequent keywords: *she, see, so, then*, and the least frequent ones: *fur, chin, pen, wet* (not counting the seven from outside Kilgarriff's list).

As can be seen in Table 4, this, for one, is a rating where clear differences are visible, so clear indeed that no statistical significance testing is necessary. OALDCE4's keywords are almost twice as frequent, on average, as those of CHAMBERS, with the other three dictionaries ranked in between, but decidedly closer to Chambers than the winning OALDCE4. While I did not compare the five medians statistically for difference significance, it may be interesting to know that the grand median for the whole Kilgarriff's list is 2335, and for the subset of monosyllables

— 3253. All five keyword lists are of course high above this level, but they clearly differ among themselves, not only in terms of the global median. For example, while in OALDCE4 there are only three words with BNC frequency less than the BNC median for monosyllables (3253), there are as many as ten such words in Chambers: *bang, feel, ribbon, half, head, kick, go, loud, cheese, mad*.

Thus, if word frequency is an important criterion to be used in the choice of phonetic keywords (and there is little doubt about it), the good old *Oxford Advanced* is still in the lead. This does not mean that that there could be no improvements even here. For example, why is there such insistence on *pen* as a keyword for /p/ if there are as many as 74 /p/-initial monosyllables more frequent than *pen* on the Kilgarriff's list, some of them apparently obeying all the standard keyword principles mentioned above, such as *put, part, point, pay, pass*, to take just a few of the most frequent? Similar frequency-related questions could be asked about many other keywords from the five lists.

4   Conclusions

I will close with the somewhat trite appeal for more research in this so far pristine nook of metalexicography. A number of questions were left hanging in the air throughout this short contribution. Some assumptions were made with no substantial empirical support. A very narrow choice of dictionaries was selected for closer scrutiny, leaving (a) native-directed monolingual, (b) bi- and multi-lingual, (c) pronunciation-oriented and (d) terminological dictionaries outside the picture[9]. The unashamedly preliminary nature of research presented here is of course partly due to the poor state of metalexicographic phonetics as a field of study, as I amply demonstrated in my book [Sobkowiak 1999]. The phonetic keyword issues are but a splinter from a thick log of problems which wait to be picked up: the place of phonetics in dictionaries generally, and in learners' dictionaries in particular, its role in the composition of the macro- as well as the microstructure of the dictionary, the wonder and challenge of multimedia in machine-readable dictionaries, the psycholinguistic issues of pronunciation look-up, and many others are all waiting to be researched. It would be a shame, both scientifically and practically, if the currently thriving metalexicography turned a blind eye on them.

Notes

[1]This last choice was motivated by (a) the desire to have at least one such dictionary from outside the magic circle of the 'big four' and (b) the fact that one major 'bilingualized' EFL dictionary for Polish learners ([Schwartz *et al.* 1990]; second edition 1996) was derived from it.

[2]"Has anyone ever asked informants to read aloud the pronunciation of words represented by alternative transcriptions, to see whether speed, accuracy and other factors are influenced?" [Crystal 1986, 77].

[3]Yet another unresearched assumption!

[4]This last choice was probably motivated by the laudable attempt to weaken learners' graphophonemic association of the long tense /ɔː/ with the graphemic string <or>. Graphophonemic transparency is one of the important issues in the context of phonetic keywords, one which willl not be discussed here for reasons of space.

[5]In rhotic accents there is no schwa in *butter*, and in *ribbon* the nasal is normally syllabic, of course.

[6]A grapho-phonemically word could presumably still be useful, even if not understood.

[7]This is of course only a small selection of pronunciation problems facing a Polish learner. Notice that only phonemic substitutions, deletions and insertions were accounted for in the algorithm, with allophonic problems left out. Thus, there is no score for aspiration, for example, which is expectedly one of the main allophonic troublemakers in the phonetics of Polish learners. Lateral velarisation, vowel length/timbre variation or palato-alveolar articulations are other examples of error-prone areas which are not accounted for.

[8]See [Kilgarriff 1997] and `ftp://ftp.itri.bton.ac.uk/pub/bnc/lemma.doc` for details.

[9]See, for example, how [Trask 1996] phonetic keyword list compares to those discussed here: *pop, tot, cook, bib, did, gag, fife, think, sauce, shush, hay, verve, either, zoos, measure, way, you, lull, ray, mum, nun, sing, judge, church, bet, bat, bard, pot, bawd, put, boot, banana, bird, but, beat, bit, bite, bout, boy, bayed, boot, beard, bare, poor.*

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