

# Response to W. J. Barry & J. Trouvain, Do we need a symbol for a central open vowel? *JIPA* 38 (2008), 349–357

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In the paper ‘Do we need a symbol for a central open vowel?’, William Barry and Jürgen Trouvain unveil possible gaps in the IPA chart while positing the need for having three basic phonetic symbols for transcribing open vowels of the world’s languages. The main point raised by the authors is that the phonetic quality of  $\text{a}$  in languages with a single open vowel is somewhere in between that of the open front and back vowels in more complex vowel systems. They exemplify this point by referring to the open vowel of the Spanish word *gata*, which is usually transcribed with the symbol [a] in spite of being more central than Cardinal Vowel 4. Several possible solutions are proposed: adding small capital A or barred  $\text{a}$  for the open central vowel to the already existing symbols [a] and [ɑ]; keeping [ɑ] for the open back vowel, moving the symbol [a] to the open central vowel position, and having either [æ] or small capital A as symbols for the open front vowel. As argued below, I do not believe that three IPA phonetic symbols are really needed for the transcription of different variants of  $\text{a}$ .

The first objection is that taking this step would result in a higher number of phonetic symbols for  $\text{a}$  than for any other vowel of the IPA chart, i.e. three for the front, central and back unrounded realizations, three for their rounded cognates, and the symbol [ɐ] for the schwa-like central variant. The authors’ claim that there is a logical need for a new phonetic symbol for the open central vowel since all closer central vowels have either one or two phonetic symbols does not seem to take into account the fact that we are dealing essentially with a single vowel exhibiting a single pharyngeal place of articulation rather than with two sets of vowels differing notoriously in constriction location such as [i]/[y] and [u]/[w]. This articulatory difference accounts for why the space allocated to open vowels in the IPA chart is smaller than that allocated to the mid and close vowels. As indicated by Jones (1972: 37), the IPA quadrilateral is articulation based in that it indicates the relative tongue position of the vowels and, therefore, reflects the fact that [i] and [a] are located further apart articulatorily than [ɑ] and [u], and that all back vowels are specified for the same retraction degree.

In view of the relatively reduced open vowel space, it seems more appropriate to have just two symbols for transcribing a more anterior variant and a more posterior variant of  $\text{a}$  differing in degree of pharyngeal constriction and of tongue dorsum raising: [ɑ] for a back variant articulated with a narrower constriction and a flat and lowered tongue dorsum, and [a] for a front variant articulated with a more advanced tongue root position and a higher and more domed tongue body. Consequently, pharyngeal constriction widening would cause [ɑ] to become [a] and [a] to become [æ] without any other vowel variant in between (see Wood 1979, 1982). This scenario is quite different from that for the closer vowel series where, in addition to lip rounding, the front and back vowel correlates are articulated with two distant palatal and velar or pharyngeal constriction locations, thus leaving much space for intermediate tongue body positions which may be considered appropriate for central vowel variants.

This argument could be extended to the acoustic–auditory domain. In this respect, Barry & Trouvain make the point that the greater perceptual distance between front and back vowels if close rather than open becomes negligible if we discard the effect of lip rounding (see also Catford 1988: 135). Thus, the perceptual distance between, let us say, [y] and [u] and between [i] and [u] is not twice as much as that between [a] and [ɑ]. The case seems to be, however, that, even if we factor out the lip rounding effect, the acoustic distance between the front and back correlates of close and mid vowels is often greater than that between open front and back vowels. Spectral data reported by Ladefoged (1967) indicate the presence of an F1 at around 900 Hz and an F2 at 1400–1750 Hz for Cardinal [a], and of an F1 at around 700 Hz and an F2 at 850–1000 Hz for Cardinal [ɑ], and, therefore, of distances of about 200 Hz for F1 and 650 Hz for F2 between the open front and back vowel variants. This F2 distance appears to be comparable to that between [ɛ] and [ʌ], i.e. 650 Hz according to data for male American English speakers (Peterson & Barney 1952), but clearly smaller than that for the pairs [y]–[u] and [ø]–[o], i.e. 800–1100 Hz for the former pair and somewhat less for the latter according to data for male speakers of German, Swedish and French (Delattre 1965, Disner 1983). Evidence in support of the claim that the perceptual distance between front and back  $\bar{a}$  is smaller than that between closer front and back vowels may also be gathered from experiments on Cardinal Vowels performed by Ladefoged (1967): in a perception experiment, 18 experienced phoneticians were far from consistent in locating Gaelic /a/ along the front–back dimension in the vowel space; on the other hand, 11 experienced phoneticians’ productions of Cardinal Vowel 4 [a] were placed somewhere between the left edge and the central area of the open vowel space, while their productions of Cardinal Vowel 5 [ɑ] were clearly located at the right extreme edge.

This leads me to suggest that many instances of supposedly open central variants of  $\bar{a}$  can, in fact, be treated as either open front or open back vowel variants. Formant frequency data for  $\bar{a}$  in a good number of language systems with a single open vowel are 1300–1450 Hz for F2 and 650–750 Hz for F1 (Spanish: Quilis 1981; Portuguese: Delgado Martins 1964–1973, Nobre & Ingemann 1987; Catalan: Recasens & Espinosa 2006; French: Delattre 1965; Italian: Ferrero, Magno-Caldogno, Vaggas & Lavagnoli 1978; Greek: Fourakis, Botinis & Katsaiti 1999). Considering the formant values for Cardinal Vowels 4 and 5 presented above, it seems that F2 (though not F1) for  $\bar{a}$  in Spanish, Portuguese, Catalan, French, Italian and Greek lies closer to F2 of Cardinal [a] than to F2 of Cardinal [ɑ]. In these circumstances, we could apply the principle that ‘in cases where the principal members of vowel phonemes are not cardinal vowels, the cardinal vowel letters . . . should be used, as far as possible, to represent vowels lying within certain areas in the vowel figure’ (Jones 1972: 52), and also that ‘languages may use vowels which are similar to, but not as peripheral as, the reference points indicated by the cardinal vowels’ (IPA 1999: 13).

Another point is that if we introduce a new symbol for the open vowel, two new symbols would be required for transcribing mid vowels which are neither too close nor too open in languages with a single mid front vowel and a single mid back vowel. Indeed, the vowels in question cannot be easily identified with either [e] or [ɛ] or with either [o] or [ɔ] since their F1 lies somewhere between F1 for the close-mid and open-mid vowel cognates of languages where these vowels are set in phonological contrast (Recasens & Espinosa 2006).

In summary, my proposal is to use [a] for the front part of the open vowel space and [ɑ] for the back part. If there is only one open vowel, either symbol could be used depending on whether the vowel is rather front or rather back (e.g. the symbol [a] should be preferred in the Romance languages and in Greek), or else [ä] or [ä̃] in narrow transcription. The symbol [ɐ] could be kept for transcribing schwa-like, centralized realizations of  $\bar{a}$ , and [æ] for realizations lying between [a] and [ɛ].

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I leave to others the argument as to whether there is sufficient justification to add a central open vowel symbol to the IPA. Rather, in this response, I would like to comment on the various proposals for what such a symbol should be outlined in Barry & Trouvain (2008). I will not be following the original ordering of suggestions in the article, but start with the proposals to redefine current symbols.

### **Redefining current symbols**

In their suggestions, Barry & Trouvain propose two solutions that would require the redefinition of existing symbols (both with and without the introduction of a new symbol). In