Articulatory dimensions for vowels

Vowel space is the area in the oral cavity within which the tongue can move without creating friction (i.e. without getting too close to any passive articulators, such as the palate and the pharynx). Defined by position of two extreme vowels [i] (as front and high as possible) and [a] (as back and low as possible).

This space is idealized in the **vowel quadrilateral**.

![Vowel quadrilateral](image)

**Figure 1: Vowel quadrilateral**

The vowel quadrilateral uses three dimensions. **Height** (close vs. open), tongue **backness** and lip **rounding**.

- pit /pɪt/ [ɪ] close front
- set /sɛt/ [ɛ] open-mid front
- cat /kæt/ [æ] near-open front
- pot /pɒt/ [ɑ] open back
- cut /kʌt/ [ʌ] open-mid back
- bought /baʊt/ [ɔ] rounded open-mid back
- put /pʊt/ [u] rounded close central
- suppose /sʌpəs/ [ə] central
**Acoustic correlates**

these features correlate to some degree with the first and second formants of the acoustic signal. Cf.


![Figure 2: first and second formants](image)

**Monothongs Vs. diphthongs**

Diphthongs are vowels that exhibit a change in quality within a single syllable. This change can be relatively large or small.

Large diphthongal movements:
- say [eɪ]
- play [ei]
- cow [au]

Small diphthongal movements:
- hake [eɪ]
- cobra [ou]
Your vowels, my vowels

Points on the vowel quadrilateral are not the vowels of a particular language (although they do bear an uncanny resemblance to French...) They are just reference points. Your vowels may have undergone the Northern Cities Vowel Shift.

<table>
<thead>
<tr>
<th>word</th>
<th>unshifted</th>
<th>Northern Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>stuck</td>
<td>[a]</td>
<td>[ɔ]</td>
</tr>
<tr>
<td>stalk</td>
<td>[ɔ]</td>
<td>[a]</td>
</tr>
<tr>
<td>stock</td>
<td>[a]</td>
<td>[a]</td>
</tr>
<tr>
<td>stack</td>
<td>[æ]</td>
<td>[ɛː]</td>
</tr>
</tbody>
</table>

this kind of cyclical change is a chain shift. Cf.