Handout 3
Cardinal Vowels. English and Polish Vowels

1 Cardinal vowels and vowel quadrilateral

- Vowel quadrilateral was invented by Daniel Jones (1887-1967) to represent the positions of the highest point of the tongue during the production of the vowel;
- It was later found to more exactly reflect some acoustic properties of vowels: the frequencies of two high energy bands in a vowel sound spectrum, i.e. the first and second vowel formant;
- It includes cardinal vowels - sounds produced when the tongue is in extreme positions, either front or back, high or low, with lips being either rounded or unrounded. Cardinal vowels define the space for all the other vowels.
- In the vowel chart diagram below (cf. Wells 2000), the circled symbols represent primary cardinal vowels (i.e. without lip-rounding; their rounded counterparts are called secondary cardinal vowels; not included in the diagram), the shaded symbols represent Polish vowels, the remaining symbols represent English vowels.

2 Vowel qualities

Simple vowels (i.e. pure vowels or monophthongs) can be described with the following criteria

2.1 Position of the body of the tongue: vertical and horizontal

Tongue vertical position: high (=close), mid, low (=open) vs. tongue horizontal position: front, central, back. Sometimes the mid region is divided into: high-mid (=half-close) and low-mid (=half-open) regions.

2.2 Lip position: rounded and unrounded

In English, the high back and mid back vowels (/ʊ/, /ø/, /ɔ/) are rounded. Low back /ʌ/ gets slight rounding as well. The remaining vowels are unrounded. Additionally, unrounded lip shapes are divided into neutral e.g. for /ɜ/ and spread e.g. for /i:/ and /ɪ/.

2.3 Length and tenseness

Long/short distinction is replaced by vowel tenseness, with the “long” vowels being tenser than the “short” vowels, because

- American equivalents of the RP short/lax vowels are not always so short - in many American accents, all vowels can become lengthened for emphasis
- Both in RP and GA, vowels are long before voiced consonants in the coda of a syllable (i.e. before voiced consonants of a syllable that follow the vowel). For example, the vowel /æ/ in ‘bat’ /baːt/ is short, because /t/ is unvoiced, while the same vowel in ‘bad’ /baːd/ is long, because /d/ is voiced.
- Vowel stress in English also makes vowels longer, as English is a stress-timed language (in English time intervals between stressed syllables are equal; in Polish, as a syllable-timed language, all syllables are of approx. equal length)

3 English simple vowels

There are some differences between the vocalic system of GA and RP. Crucial differences are

- no /ʌ/ in GA;
- rhotacized /ɹ/ and /s/ are absent from RP;
- GA has /æ/ in most words where RP has /æ/, e.g. /ɡæd/ /læt/ vs. /ɡɒd/ /lʌt/. However, in some of those words GA has /æ/, e.g. /kɒs/ vs. /kroʊs/;
- RP has /æ/ in some words where GA has /æ/, e.g. /dæm/ /pæst/ /læf/ vs. /dɑːm/ /pɑːst/ /lɑːf/. But notice /kɑːm/ /fɑːdɑː/ for both.
In the table below, all GA and RP vowels are listed with their appropriate vowel quality descriptions.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Symbol name</th>
<th>Example</th>
<th>Tongue position</th>
<th>Lips</th>
<th>Length/Tenseness</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:</td>
<td>script i (with triangular colon)</td>
<td>beat</td>
<td>high (close)</td>
<td>front</td>
<td>spread</td>
</tr>
<tr>
<td>i</td>
<td>script i</td>
<td>roses /rəʊzɪz/</td>
<td>high (close)</td>
<td>front</td>
<td>spread</td>
</tr>
<tr>
<td>t</td>
<td>small capital i</td>
<td>bit</td>
<td>high (close)</td>
<td>front</td>
<td>spread</td>
</tr>
<tr>
<td>e</td>
<td>script e</td>
<td>bet</td>
<td>mid</td>
<td>front</td>
<td>neutral</td>
</tr>
<tr>
<td>æ</td>
<td>ash, digraph a-e</td>
<td>bat</td>
<td>low (open)</td>
<td>front</td>
<td>neutral</td>
</tr>
<tr>
<td>A</td>
<td>caret, wedge, turned v</td>
<td>cut</td>
<td>low (open)</td>
<td>central</td>
<td>neutral</td>
</tr>
<tr>
<td>ɔː</td>
<td>reversed epsilon, reversed open e</td>
<td>nurse</td>
<td>mid</td>
<td>central</td>
<td>neutral</td>
</tr>
<tr>
<td>ɔː (GA)</td>
<td>rhotacized reversed epsilon</td>
<td>nurse</td>
<td>mid</td>
<td>central</td>
<td>neutral</td>
</tr>
<tr>
<td>ø</td>
<td>schwa</td>
<td>about /aˈbaut/</td>
<td>mid</td>
<td>central</td>
<td>neutral</td>
</tr>
<tr>
<td>ø (GA)</td>
<td>rhotacized schwa, schwa with hook</td>
<td>color /ˈkɔlə/</td>
<td>mid</td>
<td>central</td>
<td>neutral</td>
</tr>
<tr>
<td>ə</td>
<td>script a</td>
<td>palm /pæm/</td>
<td>low (open)</td>
<td>back</td>
<td>neutral</td>
</tr>
<tr>
<td>ə (RP)</td>
<td>turned script a</td>
<td>lot</td>
<td>low (open)</td>
<td>back</td>
<td>rounded</td>
</tr>
<tr>
<td>ɔ</td>
<td>open o</td>
<td>caught /kaʊt/</td>
<td>mid</td>
<td>back</td>
<td>rounded</td>
</tr>
<tr>
<td>θ</td>
<td>epsilon</td>
<td>put</td>
<td>high (close)</td>
<td>back</td>
<td>rounded</td>
</tr>
<tr>
<td>u:</td>
<td>script u</td>
<td>boot</td>
<td>high (close)</td>
<td>back</td>
<td>rounded</td>
</tr>
</tbody>
</table>

4 English complex vowels

English complex vowels include diphthongs and triphthongs.

**Diphthong** – a sequence of two vowels pronounced together, the two vocalic elements being members of the same syllable. In English we have **centring diphthongs** and **rising diphthongs**.

RP centring and rising diphthongs are the following:

- **Front**
  - High
    - i: bear
  - Mid
    - e: beer
  - Low
    - æ: bear

- **Central**
  - High
    - ø: poor
  - Mid
    - ø: poor
  - Low
    - ø: poor

- **Back**
  - High
    - u: poor
  - Mid
    - u: poor
  - Low
    - u: poor

GA has only rising diphthongs:

In GA there are no centring diphthongs because GA is a **rhotic** accent and /ɔː/, /œː/, /ʊə/ become /r/, /r/, /r/. In rhotic accents /r/ can occur without a following vowel. RP is a non-rhotic language so /r/ does not occur unless a vowel follows.

**Triphthongs** – only in RP; they occur before the /r/ when the non-centring diphthongs are followed by schwa. Thus /ɑːʊ/, /ɔː/, /æʊ/, /æw/ become /ɑːʊr/, /ɔːw/, /æw/, /æw/ in ‘fire’, ‘employer’, ‘layer’, ‘mower’, ‘power’.

References


http://www.hi.is/~peturk/KENNSLA/02/TOP/VowelsDiphth.html