Stress and vowel reduction in English

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unstressed syllable contains [ə]

meaner [miːnə]   marine [məriːn]

data [deɪtə]   today [tədeɪ]

stylus [staɪləs]   July [dʒəlaɪ]

rebel (n) [rɛbəl]   rebel (v) [rəbɛl]

Arab [ærəb]   Japan [dʒəpæn]

yoghourt [jɔgət]   baroque [bərɔk]

abacus [æbəkəs]   Caracas [kərækəs]

is vowel quality predictable from stress?

- ► **barómeter** → [bərɔ́mətə]
- ► **bárométric** → [bǽrəmɛ́trɪk]

or is stress predictable from vowel quality?

- ► [bərɔmətə] → [bərɔ́mətə]
- ► [bærəmɛtrɪk] → [bǽrəmɛ́trɪk]

stress/full vowel not rhythmic?

- contáin [kəntem] *vs* tormént [tɔːmɛnt]
- párrot [pærət] *vs* róbot [roʊbɔt]
- kángaróo [kæŋgəruː]
  vs áddressée [ædrɛsiː]
  vs escápée [əskeɪpiː]
- séparate (a) [sɛpərət]
  vs séparàte (v) [sɛpəreɪt]
  vs órgasm [ɔːgæzəm]
  vs démarcàte [diːmɑːkeɪt]

excursus: possible relations between two properties

1. independent:

   both needed
   4 classes

	$+A$	$-A$
$+B$	✓	✓
$-B$	✓	✓

2. "codependent":

   one unnecessary
   2 classes

	$+A$	$-A$
$+B$	✓	✗
$-B$	✗	✓

3. partly dependent:

   graduality
   3 classes
   (Clements 1990, 1991)

	$+A$	$-A$
$+B$	✓	✗
$-B$	✓	✓

translated to our case we should find

1. both full and reduced vowels in both stressed and unstressed syllables
2. only full vowels in stressed, and only reduced vowels in unstressed syllables (or the other way around)
3. only full vowels in stressed, but both full and reduced vowels in unstressed syllables (or the other way around)

reduced vowel in stressed syllable?

- [ʌ]=[ə]?
- [ɜː]=[əː]?

vowels in unstressed syllables

- [ə]
- [ɪ]: trick [trík] *vs* barometric [bǽrəmétrɪk]
- [iː]: seat [síːt] *vs* city [sítiː],
  European [jʊ̀ərəpíːən] *vs* Utopian [juːtóʊpiːən]
- [ʊ]: put [pʊ́t] *vs* deputy [dɛ́pjʊtiː]
- [uː]: new [njúː] *vs* continue [kəntínjuː]
- [oʊ]: toe [tóʊ] *vs* motto [mɔ́toʊ]

how can we tell if a syllable is stressed?

- prosodic/rhythmic considerations
- segmental considerations

prosodic/rhythmic considerations:
stress clash, stress shift (Burzio 1994, 2007)

- *papyri* [pəpáɪraɪ]: stress would shift if the ult were stressed (*pápyrí)
- *personify* [pəsɔ́nəfaɪ]: stress would not shift if the ult were stressed (*pérsonifý, cf. *óxygen–óxygenáte*)
- *explanation* [ɛ́ksplənéɪʃən]: the middle vowel shortens and consequently reduces (cf. *explain* [əkspléɪn]) to avoid the medial clash, but no clash is detected in *expectation* [ɛ́kspɛktéɪʃən], hence the middle [ɛ] cannot be stressed

the aftermath of SPE thinking about stress

- ▶ [bərɔ́mətə] and [bǽrəmɛ́trɪk] are PHONOLOGICALLY related, i.e., the two forms have a common underlier
- ▶ all vowels are lexically full ([bærɔmɛt-])
- ▶ stress is assigned first, unstressed vowels reduce
- ▶ vowel reduction is a phonological process
    - ▶ $\begin{bmatrix} -\text{stress} \\ -\text{tense} \\ \text{V} \end{bmatrix} \rightarrow ə$
    - ▶ **A**, **I**, and **U** are unlicensed in unstressed position
- ▶ Burzio's task is to inhibit vowel reduction in some UNSTRESSED syllables (*papýri, persónify, éxpectátion*)

vowel reduction is lexical in English (cf. Kaye 1995)

- ▶ a full vowel in a phonological domain never reduces
  - ▶ postlexical affixes (*-ing, -ness, un-*, etc.) never cause vowel reduction
  - ▶ full vowels of content words are never reduced in context (e.g., *Joe robs banks* *[. . . rəbz. . .])
  - ▶ function words may have two forms (e.g., *can* [kæn] or [kən]), but this is not predictable (e.g., *on* [ɔn], but *[ən])
- ▶ a reduced vowel in a phonological domain never becomes full
- ▶ the vowels of [bərɔmətə] are NOT phonologically related to the vowels of [bærəmɛtrɪk] (the phonological relationship of the two words is established only by the consonants [b. . . r. . . m. . . t], like in the case of *sing—sang, keep—kept*)

SPE/Burzio's approach

barometer → barómeter → [bərɔ́mətə]
(find stress, reduce unstressed vowels)

"Kaye's" approach

[bərɔmətə] → [bərɔ́mətə]
(reduced vowels are lexical, stress full vowels)

how can we tell if a vowel is reduced ($\overset{?}{=}$unstressed)?

- ▶ consonant lenition
- ▶ vowel syncope
- ▶ high vowel gliding
- ▶ preceding palatal consonant
- ▶ yod dropping
- ▶ U tensing
- ▶ applicability of stress shift (the Rhythm Rule)

data from Wells 1990 and 2008

consonant lenition

- bétter [bɛʔə], [bɛɾə], [bɛθə] *vs* detér *[dɪʔɜː], *[dɪɾɜː]
- áttic [æʔɪk], [æɾɪk], Brítish [brɪʔɪʃ], [brɪɾɪʃ]
- elítism [əliːɾɪzəm], ábsolutism [æbsəluːɾɪzəm]
- cíty [sɪʔiː], [sɪɾiː], fortieth [fɔ˞ɾiːəθ] (only __# or __V)
- mótto [mɔʔoʊ], [maɾoʊ], quárto [kwɔ˞ɾoʊ] (only __#)
- note the quite exceptional *potáto* [pəɾeɪɾoʊ]!

no lenition

- áutism *[ɔːɾɪzəm], égotism *[iːgəɾɪzəm]
- mánatee *[mænəɾiː] (SSBE [mǽnətíː])
  súttee *[sʌɾiː] (also *suttée*)
- vibráto *[vɪbraːɾoʊ], íncogníto *[ɪnkɑgniːɾoʊ]

syncope

- separate (a) [sɛp(ə)rət] *vs* separate (v) [sɛp*(ə)reɪt], Lancelot [lɑːns(ə)lət], [lɑːns*(ə)lɔt]
- acreage [eɪk(ə)rɪʤ], maverick [mæv(ə)rɪk], preterite [prɛt(ə)rɪt], Benjamin [bɛnʤ(ə)mɪn]
- family [fæm(ə)liː], company [kʌmp(ə)niː], compulsory [kəmpʌls(ə)riː], luxury [lʌgʒ(ə)riː]
- hetero [hɛt(ə)roʊ]

no syncope

- amphorae [æmf*(ə)riː], lingerie [lænʒ*(ə)riː]
- bungalow [bʌŋg*(ə)loʊ], piccolo [pɪk*(ə)loʊ]

high vowel gliding

- radian [reɪdjən] *vs* radiate *[reɪdjeɪt]
- foliage [foʊljɪʤ], lineage [lɪnjɪʤ], verbiage [vɜːbjɪʤ]
- folio [foʊljoʊ], intaglio [ɪntɑːljoʊ]

no high vowel gliding

- atheist *[eɪθjɪst], nereid *[nɪərjɪd]
- radio *[reɪdjoʊ], polio *[poʊljoʊ]

stressed and unstressed [ʊ]

- ▶ stressed [ʊ] is rare, and very rare after a palatal consonant (only *shook, should, shush, sugar* and *brook, Burundi, crook, rook*)
- ▶ unstressed [ʊ] almost always follows a palatal consonant (exceptions *influence, superfluous, plurality,* etc.: Cl＿)
- ▶ there's near complementary distribution: [ʊ] in stressed, [jʊ] in unstressed syllables (the [j] represents the preceding palatal context)

yod dropping

- Lúke [l(j)uːk] *vs* válue [væl*(j)uː] *vs* cúrlew [kɜːl(j)uː]
- núke [n(j)uːk] *vs* contínue [kəntɪn*(j)uː] *vs* sínew [sɪn(j)uː]
- túbe [t(j)uːb] *vs* pústule [pʌst*(j)uːl] *vs* cóstume [kɔst(j)uːm]
- dúne [d(j)uːn] *vs* módule [mɔd*(j)uːl] *vs* míldew [mɪld(j)uː]
- ábsolute [æbsəl(j)uːt], ávenue [ævən(j)uː]

U tensing

- stimulate [stɪmjuːleɪt] vs stimulus *[stɪmjuːləs]
  modularity [mɔdjuːlærətiː] vs modular *[mɔdjuːlə]
- amulet [æmjʊlət, -lɪt], *[æmjuːlət, -lɪt], [æmjuːlɛt]
- botulism [bɔtjuːlɪzəm] vs botulin *[bɔtjuːlɪn]
- modulus *[mɔdjuːləs], moduli [mɔdjuːlaɪ], modulo
  [mɔdjuːloʊ]

stress shift

- *thìrtéen,* but *thírtèen mén*
- *retúrn, *réturn tícket* (*re-* has reduced vowel)
- *direct debit* [dərékt débɪt] or [dáɪrɛkt débɪt]
- *prìncéss,* but *príncèss Káte* (*prin-* has full vowel)
- *sincére, *síncere thánks* (*sin-* has reduced vowel)

the stress shift rule

- *anàchronístic,* but *anáchronìsticców*
- *Pìccadílly,* but *Píccadìlly Círcus*
- *Septémber,* **Séptember cónference* ([sɛp-] reduced?)
- STRESS SHIFT
    1. XX́#X́ → X́X#X́ (cf. *thírtèen mén*)
    2. XxX́(x)#X́ → X́xX(x)#X (cf. *anáchronìsticców*)
    3. but XX́x ↛ X́Xx#X́ (cf. *Sèptémber cónference*)
- *September* (XX́x) is not an input
- *Bahréini* (XX́x), *Báhreini Dínar
- *Bahréin* (XX́), but *Báhrein Ísland*

conclusions

1. vowel reduction is not a phonological process in English, reduced vowels are lexically given

2. the full/reduced status of some vowels (notably [ɪ], word-final and prevocalic [iː], word-final [oʊ], and [juː]) is ambiguous, but segmental processes (consonant lenition, syncope, high vowel gliding, yod dropping, U tensing) and stress shift may disambiguate their status

3. the full/reduced status in some words still remains ambiguous (e.g., *basic* [beɪsɪk], *Eskimo* [ɛskɪmoʊ])

4. the lexical prominence of stress cannot always be determined (e.g., *séparàte* vs *lèmonáde, rábbì* vs *Shànghái, Sèptémber* vs *órgàsm*)

5. because of (3) and (4) at least in some cases stress must also be lexically given

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stressed manatee lenites!