5.3.2 **Conflation and its prevention in sonority-driven stress**

Sonority-driven stress is another vowel-related phenomenon which shows the effects of both conflation and its prevention, even within the same language. In sonority-driven stress, stress (i.e. the DTE of the prosodic word – $\Delta_w$) can deviate from its default position if a higher-sonority vowel is elsewhere (Kenstowicz 1996; de Lacy 2006). Gujarati provides a particularly striking case that is very relevant for present purposes: some sonority categories are conflated for stress, while others are not, similar to the Dutch neutralization situation. However, while Dutch conflates mid and low vowels and distinguishes them from high vowels, Gujarati conflates high and mid vowels, and distinguishes them from both schwa and low vowels.

The primary aim in this section is to provide further empirical support for the concepts of conflation and conflation-prevention. The example discussed also allows for consideration of alternative approaches, taken up in §5.4.

5.3.2.1 Description

Gujarati is an Indo-Aryan language with significant numbers of speakers in India (especially in Gujarat province), several African countries, Fiji, and New Zealand. The data presented here were elicited from one female and one male native speaker, both in their early twenties, from Ahmedabad City in Gujarat. The data and generalizations are very similar to the previous major description of Gujarati stress (Cardona 1965); differences are discussed when they arise.

Cardona (1965) and Mistry (1997) report that Gujarati has the vowels [i e e a o ɔ u ə] (also see Nair 1979; Buch 1979; Taylor 1908). Syllables can be described by the template $(C_1)(C_2)V((C_3)C_4)$. Onsets are optional, as shown by [a.pol] ‘give’ and [pi.e] ‘he drinks’. Onset clusters consist of [s]+C (e.g. [skandʰ] ‘shoulder’, [stutʃ] ‘prayer’, [sneʃ] ‘affection’, [srot] ‘stream’, and C+{v, l, r, j}). See Mistry 1997:665 for a concise overview. $C_3$ is a nasal homorganic with a following stop (e.g. [hiŋf], [tɔŋg]). Geminate consonants are allowed: e.g. [chɔɾpʰən] ‘56’, [gusːɔ] ‘anger’.

A significant influence on stress in Gujarati is sonority. The placement of primary stress is described in (33); there is no secondary stress.

The domain of stress is the root plus its affixes, excluding clitics. Even very short words can be highly morphologically complex: e.g. [aw+ˈwa+n+ə] ‘(they) will come’; however, such morphological complexity does not affect stress placement when the morphemes have the shape CV, C, or V and appear

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5 My thanks to Shimauli Dave and Varun Patel for providing native-speaker judgments on the data in this section, and to another consultant for valuable help with the data.
inside the same prosodic word (ω) as the root. The description focuses on words of up to three syllables in length. Longer words are almost always compounds; root boundaries generally coincide with ω boundaries, so compounds have as many stress domains as roots. Other long forms contain enclitics or long prefixes, neither of which count in stress placement (Cardona 1965:34–5,143ff.). A number of orthographically quadrisyllabic words turned out to be phonetically trisyllabic (e.g. [atʰmənu] ‘western’, spelt with a schwa between [tʰ] and [m]). A consultant did produce some monomorphic quadrisyllabic words: e.g. [andʰidʰundʰi] ‘choose’, [kətokəti] ‘emergency’, and [rajinəmu] ‘resignation’. Unfortunately, the status of these words is questionable: e.g. [kətokəti] may be partially internally reduplicated, perhaps explaining why my other consultant varied stress between [,kətəkəti] and [kaˈtokəti]. As with morphologically complex quadrisyllabic words, I leave this issue for future research.

(33) Gujarati Stress
(a) Stress a syllable with [a]
   (i) in the penult

   ['sada]  ‘peasants’  ['dɔaja]  ‘let’s go’
   ['same]  ‘in front’  ['tʃalo]  ‘go (imperf.)’
   ['tʃalis]  ‘40’  ['sabu]  ‘soap’
   ['ɡadʒɔr]  ‘carrot’  ['aɡə]  ‘in front’
   [aˈwːanja]  ‘(they) will come’  [apˈwana]  ‘to give’
   [dəˈmaːlo]  ‘tottering’  [aˈzadi]  ‘freedom’
   [kʰsˈkʰaro]  ‘coughing’  [ɔˈɡaɫwù]  ‘dissolve’
   [beˈtalis]  ‘42’
   [muˈbarək]  ‘congratulation’  [kiˈnaɾo]  ‘shore, bank’
   [uˈtaru]  ‘passenger’  [uˈtawəl]  ‘rush, hurry’
   [dʒɔˈwana]  ‘deathbed’  [tɔhˈmahre]  ‘you (hon.)’
   [pəˈtʃasmʊ]  ‘50th’  [laˈkʰəwət]  ‘writing’

   (ii) otherwise in the antepenult/initial syllable

   ['lajbɾeɾi]  ‘library’  ['tadʒetɔɾ]  ‘recently’
   ['pakistan]  ‘Pakistan’  ['manito]  ‘favourite’
   ['pətinj]  ‘wife’  ['dʒɔˈakdʒəməl]  ‘sparkling’
   ['brahməno]  ‘priestly caste’  ['akɾəmən]  ‘invasion’

   (iii) otherwise in the final syllable

   [həˈran]  ‘distressed’  [boˈlatʃ]  ‘is spoken’
   [ʃiˈkar]  ‘a hunt’  [nukˈsan]  ‘damage’
   [pəˈɡar]  ‘wages, salary’  [tʃərtʃa]  ‘discussion’
   [hoʃiˈjar]  ‘clever’  [sineˈma]  ‘movie theatre’
   [iʃiˈtal]  ‘hospital’  [pəheˈlə]  ‘in the past’
   [pəɾikˈfa]  ‘examination’  [dʒɔɾəˈna]  a name
(b) Otherwise stress a non-final syllable with one of [ε ɔ e o i u]

(i) in the penult

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ˈbeɪs]</td>
<td>‘sit(s) down’</td>
<td>[ˈkʰeɖut] ‘farmer’</td>
</tr>
<tr>
<td>[ˈʃewək]</td>
<td>‘servant’</td>
<td>[ˈnirbʰel] ‘absolute’</td>
</tr>
<tr>
<td>[ˈdʒʊni]</td>
<td>‘old’</td>
<td>[ˈdiwas] ‘day’</td>
</tr>
<tr>
<td>[eˈkoter]</td>
<td>‘71’</td>
<td>[moˈdɛtʰi] ‘late’</td>
</tr>
<tr>
<td>[tʃuˈmoter]</td>
<td>‘74’</td>
<td>[kʰisˈkoli] ‘squirrel’</td>
</tr>
<tr>
<td>[pɔnˈtʃoter]</td>
<td>‘75’</td>
<td>[pɔ碴ˈhelu] ‘first’</td>
</tr>
<tr>
<td>[prəˈfesər]</td>
<td>‘professor’</td>
<td>[hɔˈʃilu] ‘ardent, eager’</td>
</tr>
<tr>
<td>[mjuˈzəm]</td>
<td>‘museum’</td>
<td>[nəˈmuno] ‘sample’</td>
</tr>
<tr>
<td>[maˈʃʃʊ]</td>
<td>‘we will meet’</td>
<td>[kaˈbutar] ‘pigeon’</td>
</tr>
</tbody>
</table>

(ii) otherwise in the initial syllable

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ˈoʊwəːkət]</td>
<td>‘overcoat’</td>
<td>[ˈoʃkʰwʊ] ‘know’</td>
</tr>
<tr>
<td>[ˈkojəldi]</td>
<td>‘little cuckoo’</td>
<td>[ˈkudɾəti] ‘natural’</td>
</tr>
<tr>
<td>[ˈvɪsməɾən]</td>
<td>‘forgetfulness’</td>
<td></td>
</tr>
</tbody>
</table>

(c) Otherwise stress a penult [a]6

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ˈkəɾe]</td>
<td>‘does, do’</td>
<td>[ˈnəwo] ‘new (masc.)’</td>
</tr>
<tr>
<td>[ˈdʒəmin]</td>
<td>‘land’</td>
<td>[ˈʃəru] ‘beginning’</td>
</tr>
<tr>
<td>[ˈʃaɾəŋ]</td>
<td>‘kite’</td>
<td>[pɔˈɾabdi] ‘water-dispensing shed’</td>
</tr>
<tr>
<td>[ɾaˈmɑkḍʊ]</td>
<td>‘toy’</td>
<td>[pɔˈɾəntu] ‘but’</td>
</tr>
<tr>
<td>[pɔˈdʒiɾi]</td>
<td>‘method’</td>
<td>[vəˈkʰaɾəɾ] ‘on time’</td>
</tr>
</tbody>
</table>

The stress description can be informally described in terms of two interacting preference hierarchies, one relating to sonority, and one relating to position. Stress is always attracted to the highest sonority vowel — [a]. If a word contains an [a], it always ends up stressed: e.g. [ˈtadʒətəɾ] ‘recently’, [sineˈma] ‘cinema, movie theatre’. Similarly, stress tends to avoid schwa for higher sonority vowels: e.g. [ˈoʃkʰwʊ] ‘to know’, [ˈkojəldi] ‘little cuckoo’. However, stress does not avoid [a] entirely: when the final syllable does not contain [a] and the

6 Cardona (1965:34) disagrees with this description. He reports that stress only falls on a penult schwa in trisyllabic words if it is closed: e.g. [pəˈɾaβə.d̪i], [ɾaˈmɑ�d̪ʊ]. If the penult is open, stress falls on the antepenult: e.g. [pɾaˈtʃə.lit] ‘current, popular’ (the only example given — he notes that ‘items of the type /pɾatʃəlit/ are rare’). I suspect that a process of schwa deletion is responsible for the disagreement between Cardona’s account and my own. In my consultants’ speech, medial [a] was usually deleted as long as the result was an acceptable consonant cluster: e.g. [ˈʃægʰəɾu] ‘difficult’, [ˈʃærəpstəɾ] ‘mutual’, [ˈʃærəpʰi] ‘equal’, [əɡənʃi] ‘19’, [bʊkəɡ] ‘to [bʊkəɡ]’, [tʃəkəɾa] ‘[tʃəkəɾa] ‘boys’; /pɾatʃəli[t] was pronounced [pɾatʃli[t]. It is generally the case, then, that /CaCaCV/ will surface as [CaCCCV]. However, [a] deletion is blocked when it would create an illicit consonant cluster (e.g. [ˈakɾəmaŋ] ‘invasion’, *[akɾəmaŋ], [ˈvɪsməɾən] ‘forgetfulness’, *[ˈvɪsməɾəŋ]). In such words with an initial syllable with [a], stress falls on the penult as predicted by the present description: e.g. [pəd̪.dʰə.ti] ‘method’, *[pəd̪dʰə.ti], *[pəd̪dʰə.ti]; [səmˈma.ti] ‘consent’, *[səmˈma.ti], *[səmˈma.ti]; [nəɾˈpəti] ‘king’, *[nəɾpəti]. Cardona (1965:49–50) also reports this process (e.g. /mokələ/ → [mokələ] ‘send(s)’), and Mistry (1997:66ff.) provides a discussion along the same lines.
antepenultimate syllable has a [ə], stress remains on a penultimate schwa (e.g. [ˈʃərv] ‘beginning’, [pəˈrəntu] ‘but’).

Of present interest is the fact that stress does not prefer mid peripheral vowels over high peripheral vowels. For example, stress falls on the penult in [hɔˈfilu] ‘ardent, eager’, and not on the more sonorous mid vowel: *[ˈhɔjilu]. In other words, the mid and high peripheral vowels are conflated for stress purposes in Gujarati.

The other preference hierarchy relates to position. The penult is clearly the most unmarked stress position as the penult is stressed in words where all vowels are identical: e.g. [aˈwːana] ‘(they) will come’, [vəˈkʰətsəɾ] ‘on time’. The next most favoured position is the antepenult (or pre-penultimate syllable — as noted above, word length prohibits a more general statement), as is evident from words with both an antepenultimate and final [a]: e.g. [ˈpaːksənə] ‘Pakistan’.

The final syllable is clearly the least desirable position for stress. Stress only falls on an ultima [a] if there are no other [a]’s present: e.g. [səˈma] ‘cinema, movie theatre’. In fact, this is the only situation in which the ultima is stressed: e.g. [ˈkəɾə] ‘does, do’, [pəˈɾəbdʒi] ‘water-dispensing shed’.

In summary, Gujarati stress can be described informally as resulting from two interacting preference hierarchies: the sonority hierarchy of {a, e, o, i, u} and the position hierarchy of penult → antepenult → ultima. The following section expresses these hierarchies and their interaction in terms of the theory proposed here.

Stress does not prefer CVC syllables over CV ones. Stress does not fall on a final CVC in preference to a penult CV: e.g. [ˈdʒəmɪn], *[dʒəˈmɪn]. It does not fall on an antepenult CVC in preference to a penult CV: e.g. [səm.ˈma.ti] ‘consent’, *[ˈsəm.mə.ti].

### 5.3.2.1.1 Evidence for stress

Both speakers realize stress as increased duration, and raised pitch (F₀) for the female speaker.

Phonological evidence that stress is located as described above comes from intonation and allophony. Stressed syllables are the locus for the pitch accents of intonation melodies. Allophonic alternations between tense [i u] and lax [ɪ u] vowels and [ə] and [ə] are conditioned by stress (Cardona 1965:20–1).\(^7\) The allophones [ɪ u] appear in non-final unstressed open syllables (e.g. [m.ˈfəl])

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7 Nair (1979) describes the high-vowel distinction as being one of duration while Cardona (1965) describes it in terms of a height distinction. In my consultant’s data, the vowels differed in length and height, so I treat this as a tense-lax distinction here.
Conflation in reduction

'school', [gə.'dʒra.ti] 'Gujarati'). In contrast, [i u] appear in final syllables (e.g. [a'zadi] 'freedom', [o'taru] 'passenger'), closed syllables (e.g. [suː.'tältis] '47', [sit.'to.ter] '77'), and — importantly — in stressed open syllables (e.g. ['dʰi.mo] 'slow', ['dʒu.1əm] 'tyranny'). Because high vowels are tense in open syllables only when stressed, they can be used to support the stress description above. For example, the form [nɪ.'ʃəl] 'school' shows that stress is not on the penult, otherwise it would be *[nɪʃə]; this allophony therefore supports the claim that stress avoids a penult high vowel for a final [a]. The form ['mənito] makes a similar point: if the penult bore stress, it would be *[ma'niito]. Similarly, that stress falls on the penult in [hə.'ʃi.ʃu] 'ardent' is supported by the fact that it is not *[həʃiʃu]. The form ['bukə] is not *[bukə], showing that stress falls on the initial syllable here.

The allophones [ə]~[ʌ] are also conditioned by stress. While [ə] appears in unstressed open syllables (e.g. [pə.'ɡar] 'wages'), [ʌ] appears in closed syllables (e.g. [sar.'kar] 'government') and in open stressed syllables (e.g. ['ʃə.ru] 'beginning'). Evidence for the stress described above can be seen in the [ə]~[ʌ] allophony in open syllables. The forms ['dʒə.min] 'land', ['ʃə.ru] 'beginning', and ['pa.təŋ] 'kite' show that stress is on the first syllable in these words, and that stress prefers a penultimate central vowel instead of a final high vowel (cf. *[ʃə.ru], *[dʒə.min]). The forms [pəd.'də.ti] 'method' and [rə.'mək.ʃə] 'toy' show that stress falls on the penult, and not on the initial or final syllable (cf. *[pəd.də.ti], *[rə.mək.ʃə]).

5.3.2.2 Sonority-driven stress I: attraction to [a]

The default position of stress in Gujarati is the penult, as shown by words where all syllables have vowels of the same sonority: e.g. [a'wənə], [e'koter], [va:kətsər]. This follows if Gujarati has a trochaic (i.e. left-headed) foot aligned with the right edge of the word (e.g. [e'koter]). A standard analysis of such a pattern is adopted here, using the constraints in (34) (cf. Prince & Smolensky 1993; McCarthy & Prince 1993a,b). The constraints' effect is illustrated in tableau (35).

(34)
alignFTR ‘The right edge of every foot must be aligned with the right edge of a prosodic word.’ (McCarthy & Prince 1993a)
ftbin ‘Every foot is binary at the syllabic or moraic level.’ (McCarthy & Prince 1986)
trochee ‘Every foot is left-headed’ (i.e. align -L(σ,Ft) — McCarthy & Prince 1993a)
5.3 Conflation prevention and vowel sonority

(35) Gujarati I: Right-aligned trochees

<table>
<thead>
<tr>
<th>/ekoter/</th>
<th>ALIGNFTR</th>
<th>FTBIN</th>
<th>TROCHEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ('eko)ter</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) eko('ter)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) e(ko'ter)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) e('koter)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stress does not appear on the penult when it contains a non-low vowel and some other syllable contains [a]. Two different types of penult-avoidance can be identified. ‘Foot retraction’ is when stress appears on an antepenult [a] to avoid a penult of lower sonority: e.g. [('lajbre)ri] ‘library’, [('tadże)təɾ] ‘recently’, [('manijto] ‘favourite’, [('akra)məɾ] ‘invasion’. For stress to avoid the penult in favour of stressing an [a], two conditions must be met: (i) some constraint must favour stressed [a] over all other stressed vowels, and (ii) that constraint must outrank ALIGNFTR. The latter ranking is crucial, since stress on antepenultimate [a] means that the foot is not aligned with the ω’s right edge: e.g. [('tadze)təɾ]. The relevant constraint is $^*\Delta_{Fr} \leq \{e,o\}$ ‘Assign a violation to the head of a foot if it contains a vowel with less sonority than a low vowel.’ Only [‘a] avoids violating this constraint, as shown in tableau (36).

(36) Gujarati II: Foot retraction

<table>
<thead>
<tr>
<th>/tadże$təɾ/</th>
<th>$^*\Delta_{Fr} \leq {e,o}$</th>
<th>ALIGNFTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ta('dʒe$təɾ)</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>(b) ('tadże)təɾ</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

While candidate (a) is most harmonic in terms of foot alignment, it fatally violates $^*\Delta_{Fr} \leq \{e,o\}$ by containing a stressed mid vowel [e]. In contrast, its competitor (b) contains a stressed low vowel, so avoiding violations of $^*\Delta_{Fr} \leq \{e,o\}$; its violation of ALIGNFTR is rendered irrelevant by the ranking.

The other possible response to $^*\Delta_{Fr} \leq \{e,o\}$ is to change the feature content of the penult to [a] — i.e. *[ta('dʒa$təɾ)] (for examples, see §7.3.2.1). To avoid this possibility in Gujarati, faithfulness constraints on vowel features (e.g. IDENT[low]) outrank the $^*\Delta_{Fr}/x$ constraints.

The other type of penult-avoidance involves stress falling on the ultima to avoid a penult non-low vowel (e.g. [ʃi'kar] ‘a hunt’, [sin'e'ma] ‘cinema’,
These forms violate FTBIN since the foot is monosyllabic: [ʃi(‘kar)], [sine(‘ma)]. This response to the sonority condition is called ‘foot degeneration’ here, as the result is a degenerate (mono-moraic) foot. To account for foot degeneration, \( *\Delta_{Fr} \leq \{e,o\} \) must outrank FTBIN, shown in (37).

(37) Gujarati III: Foot degeneration due to avoidance of non-[a]

<table>
<thead>
<tr>
<th>/sinema/</th>
<th>( *\Delta_{Fr} \leq {e,o} )</th>
<th>FTBIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) si(‘nema)</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(b) ‘(sine)ma</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(c) sine(‘ma)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The tableau shows that there is no way for the foot to be both binary and have a high-sonority head. The inevitable result is a violation of FTBIN.

The final point of this section is that foot retraction is preferred over degeneration. This is evident from forms like [‘pakis)tan] ‘Pakistan’: if foot degeneration was preferred over retraction, the output should be *[pakis(‘tan)]. In ranking terms, the anti-degeneration constraint FTBIN must outrank ALIGNFtR, as shown in tableau (38).

(38) Gujarati IV: Foot retraction beats degeneration

<table>
<thead>
<tr>
<th>/pakistan/</th>
<th>( *\Delta_{Fr} \leq {e,o} )</th>
<th>FTBIN</th>
<th>ALIGNFtR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) pa(‘kistan)</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) pakis(‘tan)</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) (‘pakis)tan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To summarize, the ranking \( ||*\Delta_{Fr} \leq \{e,o\} \gg \text{FTBIN} \gg \text{ALIGNFtR}|| \) accounts both for the fact that stress avoids syllables without [a] and for the preferences regarding stress position: the constraints determine that the most harmonic position is the penult, then the antepenult, then the ultima. In conflation terms, Gujarati prevents conflation of the sonority category ‘low vowels’ with all the other sonority categories. Such prevention is achieved by having

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8 The foot could instead be iambic in this situation: i.e. [ʃi(‘kar)]. In this case, it would be TROCHEE that is violated and not FTBIN. In either case, the ranking arguments presented below would be the same. I have found no evidence that weighs in favour of either analysis, so I will assume that FTBIN is violated here.
5.3 Conflation prevention and vowel sonority

an active constraint that favours low stressed vowels over all others – i.e. *Δₐ ≤ {e, o}.

5.3.2.3 Sonority-driven stress II: avoidance of [a] Attraction of stress to [a] is not the only visible effect of sonority-stress interaction in Gujarati. Stress also avoids the lowest sonority vowel [a]: e.g. ['pustakne] ‘to the book’, ['vismaɾan] ‘forgetfulness’, ['kojəldi] ‘little cuckoo’. Schwa is not ‘unstressable’. Stress falls on [ə] in two situations: (i) when there are no other non-[ə] vowels (e.g. ['pətaɾɡ] ‘kite’, ['vəkʰətsəɾ] ‘on time’), and (ii) when the only other option is final stress on a non-low vowel (e.g. ['kəɾe] ‘do’, ['nəwə] ‘new’, ['ʃəɾu] ‘beginning’, [pə'ɾəbdəɾ] ‘water-dispensing shed’). This latter situation contrasts with the influence of [a] on stress: Gujarati prefers a final stressed [a] over a penult of lower sonority, but it does not prefer a final higher-sonority stressed vowel over a penultimate stressed [ə]. To put this in different terms, the only way that Gujarati allows avoidance of penult [a] is through foot retraction; foot degeneration in response to penult [ə] is not allowed. This restriction will prove significant in evaluating alternative theories of hierarchies below. For the moment, the focus will be on presenting an account that employs the DTE-sonority constraints.

For [ə] to force stress retraction the constraint *Δₐ ≤ {ə} must outrank ALIGNFr, following the same reasoning as for non-[a] vowels in the previous section. Tableau (39) illustrates this ranking with the word [('kojəl)di] ‘little cuckoo’.

(39) Gujarati v : Foot retraction to avoid stressed [ə]

<table>
<thead>
<tr>
<th>/kojəlʊdi/</th>
<th>*Δₐ ≤ {ə}</th>
<th>ALIGNFr</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ko('jəl)di</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>ᴡ (b) ('kojəl)di</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next issue is foot degeneration. Gujarati does not avoid stressing a penult [ə] if doing so will result in stress on the ultima, or – in present terms – a degenerate foot. For example, kəɾe ‘does, do’ is stressed as [('kəɾe)], not *[kə('re)]. Similarly, ‘but’ is [pəɾ(ɾəntu)], not *[pəɾən(tu)]. The lack of foot

9 Cardona (1965:33) reports free variation in stress with words of the shape [Cə.CV(C)] where V is notə (e.g. ['dʒəmin]~['dʒəmin], ['vədə]~['vədə], etc.). Neither of my consultants exhibited this variation – stress was invariably on the initial syllable, so I will not discuss an analysis here (see de Lacy 2002a:§3.4.1.4). Cardona also reports that words with the shape [Cə.C.CV] invariably have stress on the initial syllable, which is in agreement with the present description.
Degeneration is explained straightforwardly using the present constraints: the degeneration-banning constraint $\mathbf{FTBIN}$ must outrank $\mathbf{\Delta_F} \leq \{\circ\}$, as shown in tableau (40).

(40) Gujarati vi: No foot degeneration to avoid stressed schwa

<table>
<thead>
<tr>
<th>/kare/</th>
<th>FTBIN</th>
<th>$\mathbf{\Delta_F} \leq {\circ}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) kə('re)</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>(b) (kə're)</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

To recap, penult stressed [ə] can only be avoided through stress retraction in Gujarati, not degeneration. These facts are captured through the ranking $\mathbf{\| FTBIN \rightarrow \mathbf{\Delta_F} \leq \{\circ\} \rightarrow \text{ALIGNFtR} \|}$. The position of $\mathbf{\Delta_F} \leq \{\circ\}$ contrasts with the sonority-stress constraint $\mathbf{\Delta_F} \leq \{\varepsilon, o\}$; this latter constraint outranks both $\mathbf{FTBIN}$ and $\text{ALIGNFtR}$ as it can motivate both foot retraction and degeneration. As an interim summary, the previous sections have provided evidence for the ranking in (41).

(41) Interim Gujarati Ranking

```
TROCHEE
  *\Delta_F \leq \{\varepsilon, o\}
  FTBIN
  *\Delta_F \leq \{\circ\}
  ALIGN-Ft-R
```

Analogous to the Dutch ranking, the ranking of $\mathbf{\Delta_F} \leq \{\circ\}$ and $\mathbf{\Delta_F} \leq \{\varepsilon, o\}$ illustrates a fundamental way in which the stringency theory and the Fixed Ranking theory differ. Section 5.3.2.4 completes the ranking by identifying the position of $\mathbf{\Delta_F} \leq \{i, u\}$.

5.3.2.4 Conflation

The final question to ask is why Gujarati ignores the sonority distinction between mid and high vowels for stress purposes. In purely constraint terms, this section deals with the issue of where the remaining foot-DTE constraint — $\mathbf{\Delta_F} \leq \{i, u\}$ — is ranked in the grammar of Gujarati.

Examples showing that stress does not retract from a high peripheral vowel when a mid vowel is available in another syllable are provided in (42).
5.3 Conflation prevention and vowel sonority

(a) Antepenult mid vowels do not attract stress away from penult high
vowels

[hɔ'ʃɪlʊ] ‘ardent, eager’ [o'tʃɪntʊ] ‘unexpected’
[ɔ'ʃɪkʊ] ‘pillow’ [ʊ[kʰɪtʊ] ‘familiar’
[lok'priʃə] ‘famous’ [oɡ'ɲɪsmʊ] ‘nineteenth’
[ɔ'kuwi] ‘get vomited’

(b) Final mid vowels do not attract stress away from penult high
vowels

[ˈjurop] ‘Europe’ [nạ'numo] ‘sample’
[ˈpio] ‘drink’ [ˈsɪtər] ‘70’
[ˈdʒue] ‘looks’ [ˈnɪrbbɛl] ‘absolute’

c) High vowels do not attract stress away from penult mid vowels

[su'telʊ] ‘lying down’ [kʰis'koli] ‘squirrel’
[tʃu'mːoter] ‘74’ [ˈkedi] ‘prisoner’
[sɪ'tʃːoter] ‘77’ [kʰedʊt] ‘farmer’
[mus'keli] ‘difficulty’ [tʃʃwis] ‘24’
[aŋ'ɡredʒi] ‘English’ [ˈmədʊ] ‘delay’

Allophony provides evidence for the stress marking above: e.g. [hɔ'ʃɪlʊ] is not *[hɔʃɪlʊ].

As the data in (42a) is central to the theoretical point made here, some further
discussion is necessary. Forms with the shape [C{e,e}C{i,u}CV] proved
to be difficult to find, so none are reported here. One near-example was [vɛ'tiʃʊ]
‘dwarffish’, but my consultants almost always pronounced this as [ˈvɛʃtjʊ]. This
elimination of [i] is not sporadic: a number of forms with orthographic [ij]
sequences were stressed on the antepenult: e.g. ‘nɔrijo’ ‘mongoose’, ‘dʰotijʊ’
‘dhotis’, ‘kɔlijo’ ‘morsel’, ‘motjo’ ‘cataract’. However, the orthographic ‘ij’
sequence was pronounced as just [j] in my consultants’ speech; the same is
reported by Gajendragadkar (1974) for Parsi-Gujarati. Therefore, these cases
do not disobey the reported generalizations: they are [ˈnɔrjo], [ˈmotjo], and so on.
Significantly, the [i] could not delete when doing so would produce an inadmis-
sable consonant cluster: e.g. [lok'priʃə], *[lɒkprɪʃə] and [o'tʃɪntʊ],*[ɒtʃɪntʊ] —
in these cases, the [i] bore the stress as predicted. It is also significant that stress
appeared on the antepenult in [CVCijV] words even when it was not a mid
vowel: e.g. ‘tʃipijo’ ‘pair of tongs’ (my consultants: [tʃipjo]). This general-
ization was true for two consultants; the other reported that /ij/ was realized as
[i] only in normal speech, while the [ij] is retained in careful speech.

A further set of apparent exceptions involves variation in clusters consisting
of [i] and the coronal fricatives [s] and [ʃ]: orthographic ‘si’, ‘shi’, ‘is’, and ‘ish’
were occasionally realized as just [ʃ]. This variation is tied to speech rate, with
deletion happening in rapid speech. An example is with the word for ‘pillow’,
which was realized variously as [ɔʃ'kʊ], [ɔʃɪkʊ], and [ɔsɪkʊ] by my consultants
(similarly for [hō'jīlū]~['hōjilu]). Cardona (1965:34) reports it as [ɕ'jikū], but one of my consultants did not stress the first syllable if the [i] was present: i.e. [ɕ'jikū]~['ɕjikū]. Cardona also reports the form [mə[ʃũ]~[mə[ʃũ] (p.34) and variation between -[ʃũ]~[ʃũ] for the first person plural future ending, which one consultant reported as stylistic variants. The variants without [i]-deletion have been reported here as they are the most relevant ones for the stress description.

Finally, loanwords often retain the source language’s stress in defiance of the stress rules: e.g. ['telifon] ‘telephone’, ['petikot] ‘petticoat’, ['redjijo] ‘radio’, ['ɕfisar] ‘officer’ (also note the telltale retention of the source language’s [f], which is not found in native words).

In short, all apparent exceptions can be put down to retention of source-language stress, or independent processes of deletion of [i] when adjacent to [j] or [ʃ]. As a final note, [u] does not delete like [i], agreeing with Cardona’s (1965:34#3) description.

The situation illustrated in (42) is conflation of high and mid peripheral vowels. The Dutch analysis in §5.3.1 showed that mid and high peripheral vowels constitute separate sonority categories, yet they are treated the same in Gujarati stress. As with Kashaya, it is a straightforward matter to account for category conflation using the stringent constraints. Two categories are conflated they incur the same violations of active constraints. Mid and high vowels are indistinguishable for stress purposes in Gujarati, so every output constraint that assigns different violations to the two categories must be inactive — i.e. the constraint must not make a crucial decision in competitions involving stress. The constraint $*ΔFL\leq\{i,u\}$ distinguishes between stressed high vowels and stressed mid vowels, so it must be inactive. Sonority-stress constraints are rendered inactive by ranking them below an appropriate metrical constraint, which happens to be ALIGNFTR in Gujarati, as illustrated in tableau (43).

(43) Gujarati VII: Conflation

<table>
<thead>
<tr>
<th>/oʧǐntû/</th>
<th>ALIGNFTR</th>
<th>$*ΔFL\leq{i,u}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) ('oʧi)n)tû</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>(b) o('ʧi)nû</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
</tbody>
</table>

10 Other cases of sonority-driven stress distinguish between high and mid peripheral vowels. For example, in Nganasan stress usually falls on the penult (e.g. [ku'hum] ‘our (dual) skin’), but retracts to the antepenult if it contains a mid vowel while the penult contains a high vowel: e.g. ['jembif] ‘dressing’, ['hɔdy?ɔ] ‘writing’ (Eugene Helinski 1998, p.c.; Olga Vaysman p.c.; de Lacy 2004). Similarly, Kenstowicz (1996) reports that the usually penultimate stress in Chukchi retracts from high vowels to mid vowels: e.g. ['weni-wen] ‘bell’, cf. [nu'tenut] ‘land’.
Tableau (43) shows how $\Delta_F \leq \{i,u\}$ is rendered inactive: ALIGNFrT effectively quashes all competition based on difference in stress placement because it favours a candidate with penultimate stress.

The same point can be made for the constraint $\Delta_F \leq \{e,o\}$. This distinguishes mid-low vowels from all others. If it were active in Gujarati, /ʃiːkʊ/ would surface as *[ʃiːkʊ] instead of the attested *[ʃiːkʊ].

To summarize, Gujarati has the ranking in (44).

(44) Final Gujarati Ranking

\[
\begin{array}{c}
\text{TROCHEE} \\
\text{FTBIN} \\
\text{ALIGN-Ft-R} \\
\hline
\end{array}
\]

\[
\begin{array}{c}
*\Delta_F \leq \{e,o\} \\
*\Delta_F \leq \{e,o\} \\
*\Delta_F \leq \{i,u\} \\
\end{array}
\]

As argued for Kashaya, the stringency constraints' free ranking allows them to produce both conflation and lack of conflation in the same system. Gujarati conflates mid and high peripheral vowels for stress purposes by ensuring that $\Delta_F \leq \{i,u\}$ is inactive. However, low vowels are kept distinct by having $\Delta_F \leq \{e,o\}$ active.

Schwa is particularly interesting because it is conflated with other sonority levels in some environments but not others. When schwa is in the penult and the only non-schwa vowel is in the final syllable, the vowels are effectively conflated and so stress ends up on the penult. This conflation is due to the fact that TROCHEE renders $\Delta_F \leq \{e,o\}$ inactive. However, when the choice is between the penult and antepenult, $\Delta_F \leq \{e,o\}$ is active, so schwa is not conflated with high and mid vowels. Consequently, stress retracts to an antepenultimate non-[ə].

In short, Gujarati presents an extremely complex situation of conflation (stressed high and mid vowels), lack of conflation (stressed low vowels vs. the others), and environmentally sensitive conflation (involving schwa). The stringent constraints were shown to be able to deal with this mixture of conflation types.
5.4 Alternatives

There are several imaginable alternatives to the proposals made in the preceding sections. One involves referring to representational distinctions rather than using constraint form. Another is to reduce multi-valued hierarchies to binary ones. These alternatives are discussed here and shown to be inadequate in dealing with conflation.

The conflation typology of sonority-driven stress, presented in table 45, will provide a useful background to the discussion (de Lacy 2004, 2006). The typology of sonority-driven stress is very revealing for conflation and conflation-prevention. Almost every possible contiguous conflation in stress-sonority interaction is attested. Categories are marked as conflated if they are grouped inside the same oval. For example, the mid and low vowels are conflated in Pichis Ashéninca, but the central and high vowels are not.

For ease of presentation the table uses ‘a’ to stand for any central vowel due to the rarity of contrast between /a/ and /i/ (e.g. Pichis Ashéninca has [i], not schwa). Similarly ‘e o’ stands for all mid vowels, including [e o e ə] even though [e o] are demonstrably less sonorous than [e ə].

Table (45) also shows that almost every imaginable conflation of vowel sonority categories is attested. I have not found a system that conflates [e o] and [i ‘u] but distinguishes mid from low vowels. In such a language, stress would first seek out a low vowel and otherwise a mid vowel; if there were only high and central vowels, stress would fall on the default position. Given that there are languages in which stress favours low vowels over mid vowels (e.g. Gujarati) and languages in which high peripheral vowels and schwa are conflated (e.g. Nganasan), I assume that this gap is accidental.

There is one systematic gap: no language conflates non-contiguous categories. An example would be a language which conflates low and high vowels,
but not mid vowels: stress would fall on the leftmost [a], [i], or [u], and skip over intervening mid vowels [e] and [o]. The stringent constraints predict that such a language cannot exist. It would require a constraint that favoured stressed high vowels over stressed mid vowels and there is no such constraint in the theory.11

5.4.1 Representational approaches
The conflation typology is useful in showing why representational approaches cannot deal with conflation. To explain, a number of authors have proposed that schwa has a ‘degenerate’ representation – i.e. it lacks subsegmental features, or a mora, or both (see, e.g., Hayes 1995:ch.7; Oostendorp 1995; Crosswhite 2004).

This representational idea could be integrated into a theory of schwa-avoidance. After Oostendorp 1995, if a constraint bans moras on featureless vowels, no higher prosodic structure – including prosodic heads – could be built over schwas. Consequently, schwas would be unstressable, except perhaps when no other vowel is available. This approach effectively makes two distinctions: between schwa on the one hand and peripheral vowels on the other. In fact, it conflates distinctions between peripheral vowels: as they all have one mora, they are all equal for stress purposes.

Unfortunately, such a representational approach faces insurmountable problems. One is that it cannot adequately account for languages which distinguish more than two categories for stress purposes. For example, the featureless/non-moraic schwa approach could be used to deal with schwa’s stress avoidance in Gujarati. However, stress also seeks out [a] over [e o i u]. Following the representational approach through to its logical conclusion, it would be necessary to assume that Gujarati [a] has no moras, [a] two, and the other vowels one (see, e.g., Hayes 1995:ch.7); preference for stressed syllables with greater moraic content would produce the observed stress system. In such an approach

11 Trommer & Grimm (2004) propose that Albanian is a counter-example. Stress usually falls on final syllables (e.g. [njɛ′ri] ‘human’, [parrpa’rim] ‘progress’). However, when the final vowel is [e], [o], or [a], it falls on the penultimate syllable: e.g. [‘aŋa], [‘faqe], [‘prɔŋa]. In contrast, stress does not avoid a final high vowel: e.g. [bu’ri], *[‘bari], [qer’fi], *[‘qerfı]. Although it seems at first glance that Albanian prefers to stress [i u] over [e o] (so reversing the sonority relation between high and mid vowels), it is clearly not sonority that forces avoidance of final stress in many words: e.g. [‘hɔnা], [‘ɔn.dje], [‘golle], [‘neto]. In these words, stress does not end up on a more sonorous vowel; for [‘an.dje], the result is a less sonorous stressed vowel. It is not possible to say that [a] is treated as more sonorous than [e] in Albanian because the complementary type of attraction exists: [‘eŋa]. In every other case of sonority-driven stress, deviation from the default stress position only occurs if there is a more sonorous vowel elsewhere.
Conflation in reduction

Conflation is a side-effect of mora assignment — it is the fact that high and mid vowels have the same moraic content that results in their conflation.

In effect, the moraic approach to sonority-driven stress outlined above converts moras into little more than a language-specific diacritic device that is almost synonymous with sonority. However, there is a difference between the sonority and moraic approaches. As moras represent duration, they make undesirable predictions for phonetic realization. In Gujarati, low vowels should be appreciably longer than high and mid vowels, and all should be longer than schwa. This is not so — there is no significant difference between [a]’s duration and the other vowels’ in Gujarati. The same point can be made for other languages. For example, Nganasan distinguishes two groups of vowels for [i e o] and [a e o]. The former group cannot have fewer moras than the latter because there is no significant durational difference between the two sets (de Lacy 2004:§2.6.3).

Representational theories also make strong predictions about other processes in the grammar. Proposing that low vowels have more moras than other vowels predicts that they can — and perhaps must — be treated differently for other mora-refering processes. This prediction is criticized at length by Gordon (1999).

Another popular representational theory relates specifically to the opposition between schwa and peripheral vowels, and relies on the idea that schwa lacks phonological features (e.g. Oostendorp 1995 and references cited therein). With additional theoretical devices, this fact makes schwas ‘weak’, and consequently unable to bear stress. This theory is one of a class that considers schwa to be fundamentally phonologically different from all other vowels. In contrast, the approach to stress proposed here denies that schwa is significantly different from other vowels in phonological terms — the only difference is that schwa is lower on the sonority hierarchy than (most) other vowels.

A problem with relating lack of features to stress avoidance arises in languages in which schwa is conflated with other vowels. In Nganasan, [i], [e], and [i y u] repel stress equally — they are conflated for stress purposes. If lack of features is the reason that schwa repels stress, then all of [i e i y u] must be featureless in Nganasan. However, if all vowels are featureless, then they are phonologically indistinguishable. At the very least, it is clear that featurelessness is not sufficient on its own to account for stress repulsion.

In the theory presented here, there is no appeal to lack of features or any other representational degeneracy. Schwa is not fundamentally different from other vowels in terms of its representation. It is simply low on the sonority hierarchy; its behaviour in phonological processes follows from its sonority level, not from
its lack of features. Attempts to approach the conflation problem by appealing to representational differences among vowels leads to unsupported predictions regarding duration, mora-sensitive phonological processes, or difficulties in accounting for vowel contrasts.

For further critiques of representational theories of stress and conflation, see Gordon 1999, de Lacy 2002a:§3.3.4, and 2004:§2.6.3. For a general critique of representational theories of markedness, see §8.4.

5.4.2 Binary features
The typology of conflation discussed above allows examination of an alternative to the stringency approach. The alternative relies on decomposing every hierarchy into a series of two-member hierarchies, or binary features. If every hierarchy consisted of just two elements, conflation could be implemented through fixed ranking.

Of present relevance is the idea that the sonority hierarchy can be decomposed into several sub-hierarchies, each consisting of just two members. Such an approach has a precedent in Clements’ (1990:292) account of consonant sonority; Clements proposed that the consonant sonority hierarchy | obstruent \ nasal \ liquid \ glide | could be decomposed into the four features, as shown in table (46). This approach contrasts with the assumption made here that there is a single unitary sonority hierarchy with several different values.

(46) Clements’ (1990) consonant sonority decomposition

<table>
<thead>
<tr>
<th>Obstruents</th>
<th>&lt; Nasals</th>
<th>&lt; Liquids</th>
<th>&lt; Glides</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
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<td>-</td>
<td>+</td>
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<td>+</td>
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</tbody>
</table>

0 1 2 3 rank (relative sonority)

Such a ‘binary’ approach could in principle be extended to vowel sonority. Table (47) illustrates a binary feature approach to vowel sonority. The features are named as ‘F’, ‘G’, ‘H’, ‘I’ here; discussion of whether they can be identified with commonly accepted features is given below.

(47)  | i | o | i,u | e,o | a |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
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<td>F</td>
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<td>+</td>
<td>+</td>
<td>H</td>
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<tr>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>I</td>
</tr>
</tbody>
</table>
In constraint terms, the relation of the features above to heads could be implemented through four hierarchies, with the form (a) \( \star H_d F_t /-I \rightarrow \star H_d F_t /+I \),
(b) \( \star H_d F_t /-H \rightarrow \star H_d F_t /+H \), (c) \( \star H_d F_t /-G \rightarrow \star H_d F_t /+G \), and (d) \( \star H_d F_t /-F \rightarrow \star H_d F_t /+F \). Conflation is a straightforward matter. For example, to conflate central and high peripheral vowels (as in Nganasan), \( \star H_d F_t /-I \) would be inactive. Importantly, \( \star H_d F_t /-I \) does not imply the inactivity of \( \star H_d F_t /-H \); if \( \star H_d F_t /-H \) is active, then a distinction between high and mid peripheral vowels can be maintained. In this way, the binary feature approach seems to achieve the same ends as the stringent constraints; however, the theories make different predictions in other areas.

The problem with the binary feature theory is that it makes several false predictions in relation to natural classes. It relies on the existence of the features [I], [H], [G], and [F], and these features should therefore have effects on other processes. For example, the features can be expected to participate in dissimilation, assimilation, harmony, coalescence, and other relevant phonological processes. Certainly, some of the features fit with current feature theories. For example, [F] can be identified with [low], and is therefore a reasonable feature because it participates in assimilation and dissimilation (e.g. Kera – Suzuki 1998), and in vowel harmony (van der Hulst & van der Weijer 1995:519ff.).

However, feature [G] poses a problem. If [G] exists, it should participate in vowel harmony where every vowel must be either one of \{a i u\} or one of \{e o ε a\}. Likewise, feature [H] predicts vowel harmony where every vowel is either central or peripheral. Such vowel harmonies are not reported in surveys such as Baković’s (1999a). In short, the binary feature approach to vowel sonority inevitably relies on spurious features.

The same problem arises for the PoA hierarchy. For a binary approach to work for PoA, there would have to be a feature [F] where dorsals and labials were [+F] and coronals and glottals were [-F], and \( \| \star +F \rightarrow \star -F \). If there is such a feature, it should be able to assimilate, producing unattested assimilations like /atka/ \( \rightarrow \) [apka] because [p] and [k] are both [+F], and the output [kk] can be blocked for other reasons (e.g. a ban on geminate consonants).

Of course, the result above raises the question of whether the multi-valued feature approach makes similar incorrect predictions. The [Sonority] feature seems to treat central and high peripheral vowels as a class, so does it also make incorrect predictions regarding assimilation and harmony?

There is a principled way for the multi-valued feature approach to avoid the problems just described. There are two different senses of ‘natural class’ for multi-valued features. One sense of ‘natural class’ relates to feature-value
identity: $\alpha$ and $\beta$ are part of the same class if they have identical feature values. From the feature-value identity sense of ‘natural class’, [i] and [u] form a natural class because both have the feature value $xxxxx$ for [Sonority] (see §2.3.3.1.1).

The other sense of ‘natural class’ is the ‘string inclusion’ sense: $\alpha$ and $\beta$ are part of the same class if the $x$’s (or $o$’s) in $\alpha$ and $\beta$’s feature-value strings form a substring of a certain specified $x$ string. In this sense, [ə] and [i] are part of the same natural class because both segments have feature values that contain a substring of $xxx$.

Different types of constraints refer to these different types of natural class. The processes identified above – assimilation, dissimilation, and harmony – and their related constraints (e.g. AGREE or the constraints in chapter 4, the OCP) all require agreement of feature values. Since [ə] and [i u] do not form a natural class in terms of feature-value agreement, no harmony process will ever require that all vowels be either [ə] or [i u]. In contrast, constraints that ban certain features outright (e.g. *\(\Delta F_l/x\)) refer to string-inclusion. Thus, such constraints refer to the ‘feature-value inclusion’ type of natural class.

5.5 Summary

This chapter has argued that distinctions between markedness categories can be collapsed or ‘conflated’. In Kashaya, the distinctions between dorsals, labials, and coronals are conflated for neutralization purposes – because there is no distinction, there is no motivation for dorsals and labials to become the less-marked coronals when they are blocked from becoming glottals. The same effects were seen in vowel reduction in Dutch and sonority-driven stress in Gujarati and other languages.

It was also shown that languages must be able to prevent conflation – i.e. maintain distinctions between markedness categories. Conflation is not all-or-nothing: it is possible for some categories to be conflated while others are kept distinct in the same language. For example, Kashaya uvulars are not conflated with other PoA categories; similarly, while Gujarati mid and high peripheral vowels are conflated for stress purposes, low vowels are not.

In order to adequately produce conflation, it was argued that output constraints that refer to markedness hierarchies must be freely rankable and formulated stringently. The two properties necessarily go together: if constraints can be ranked freely, the only way to maintain hierarchical relations is for the constraints to directly encode those relations. For example, if the non-stringent
Conflation in reduction

constraints *{dorsal} and *{coronal} could be ranked in any way, there would be no way to establish that dorsals are more marked than coronals. In contrast, the stringent PoA constraints express the hierarchical relations by having no constraint that favours dorsals over coronals. Consequently, no matter how they are ranked, the stringent constraints will never reverse the markedness relations for PoA.

The stringent constraints were shown to produce conflation through ‘inactivity’. If the constraint *{dors,lab} is dominated in a language so that it is not decisive in competitions involving a particular process, dorsals and labials will not be distinguished in that process. For example, *{dors,lab} is dominated by \textsc{ident}\{dors,lab\} in Kashaya, so the PoA neutralization process is not sensitive to the dorsal-labial distinction. The stringent theory can conflate any set of contiguous markedness categories in a hierarchy.

In contrast, a theory with a universally fixed ranking of constraints cannot allow all attested conflations. The fixed ranking \|*{dorsal}\| \gg *{coronal}\| ensures that dorsals cannot be conflated with coronals in a language if *{coronal} is active. For example, *{coronal} would have to outrank PoA-faithfulness constraints in Kashaya to force /t/\rightarrow[?] neutralization. If *{coronal} is active, *{dorsal} must be active as well, so dorsals and coronals cannot be conflated. The empirical effect is that, when neutralization to glottal is blocked, neutralizing to coronal would always be a better option than remaining faithful to dorsal PoA. Kashaya shows this prediction to be incorrect.

The constraints can also prevent conflation. Every member of the PoA hierarchy incurs a unique set of violations of the stringent PoA constraints, allowing each element to be distinguished. In Kashaya, for example, *{uvular} is active and so places stronger demands on uvulars than all other elements. It was demonstrated for Kashaya, Dutch, and Gujarati that a mixture of active and inactive constraints can both prevent and cause conflation in the same language. This contrasts with approaches which require conflation; for example, in the conceptually simplest representational theory of neutralization, PoA neutralization is simply deletion of PoA features. However, this approach predicts that conflation should always take place – there should be no reduction to the ‘next least-marked’ segment.

In informal terms, this chapter aimed to show that it is not correct to say ‘x is more marked than y’. Such a statement implies that conflation can never happen: if feature x is blocked from surfacing with the least-marked value, it should then take the next least-marked value. Instead, it is correct to assert
that ‘y is never more marked than x’, so allowing for a situation in which the markedness distinction between x and y is conflated. So, for PoA coronals are never more marked than dorsals. In Kashaya, they happen to be treated as having the same degree of desirability.

The next step in arguing for the stringent form of constraints is to make the same argument for faithfulness constraints that refer to markedness hierarchies; this is the aim of the next chapter.