

24.962 Features-2

Flemming gives contrast a formal role in shaping sound patterns.

The markedness of a segment can be effected by the sounds it contrasts with in a given system/context.

e.g. central vowels are more marked than peripheral vowels (*i,* >> *,i,u) but when the peripheral contrast is suspended then central vowels are preferable on grounds of articulatory economy.

1. Formalization:

- i. maximize distinctiveness of contrast
- ii. minimize articulatory effort
- iii. maximize the number of contrasts

2. Application to vowels: organized into three-dimensional acoustic space (7).

Mindist = F1:1 >> Mindist = F1:2 >> ... >> Mindist = F1:4

(ranks binary oppositions from worse to best on scale of distance in acoustic space)

Maximize contrasts: number of contrasting vowels

(9) shows that if we rank MaxContrasts low then Mindist will favor greater dispersion of vowels. As the number of contrasts increases they must be crowded into a fixed articulatory-acoustic space entailing loss of distinctiveness: under such pressure there are various outcomes: accept narrower space, enhance the contrast by reinforcing maneuvers, lose a contrast. These are modeled by different constraint rankings in an OT grammar.

Considerations of vocabulary size and perceptual limitations discourage grammars with extreme rankings: many-fine grained contrasts or just a couple of broad contrasts.

3. Exemplification:

Tuscan Italian: [e,ɛ,o,ɔ] contrast neutralized to [e,o] in unstressed syllables

F states that in unstressed syllables less duration is available so that maximally open articulations requiring greater effort/duration are eliminated. If the Min-Dist constraint ranking is maintained with respect to Maximize Contrasts then *short low V forces [a] to be realized as [ɜ]. The space is now too crowded to maintain a four-way contrast in F1 with a min-dist of 2 and so the number of contrasts is reduced minimally.

Mindist=F1:2 MaxContrasts Mindist=F1:3

-> [i,e,E,a] ##### **
[i,e,a] ####!
[i,a] ##!

*short-low Mindist=F1:2 MaxContrasts Mindist=F1:3

[i,e,E,a] *! ##### **
[i,e,a] *!
[i,e,E,3] *! ##### ***
-> [i,e,3] ### **

S. Italian [i,u,e,o,a]; in unstressed position, mid vowels become high

In stressed position, min-dist threshold set at F1:3: Mindist=F1:3 >> MaxContrasts

Mindist=F1:2 Mindist=F1:3 MaxContrasts

[i,e,E,a] **!
-> [i,e,a] ###
[i,a] ##!
*short-low Mindist=F1:2 Mindist=F1:3 MaxContrasts
[i,e,E,a] *! *** #####
[i,e,E,3] *!*** #####
[i,e,a] *!
[i,e,3] *!* ###
-> [i,3] ##
[i,a] *!

4. Vertical vowel systems of Marshallese and Kabardian lack articulatory/acoustic specifications on F2 dimension—value determined by transitions from surrounding consonants. In Kabardian these vowels are also shorter than full vowels (phonemicized with glides): 58 ms. for [i], 84 for schwa, vs. 140 for full vowels.

5. Vowel reduction in Dutch and English suspends F1 and F2 contrasts; result is an F1 that is comparable to high vowels—low F1 reflecting the constrictions of surrounding consonants (see Kondo).

6. Enhancement and reinforcement strategies: articulatory effort expended to maintain a contrast

Pre- and post-oralized nasals consonants shield the oral vowel from contextual nasalization: found only in languages that contrast oral and nasal vowels (Herbert '86)

Voiced stops replaced by implosives or prenasalized consonants only when in contrast with voiceless stops.

Analysis: VOT $\frac{0}{d} \quad \frac{1}{t} \quad \frac{2}{th}$ Voice $\frac{0}{t} \quad \frac{1}{d} \quad \frac{2}{D, ^nd}$

*implosive, prenasal >> *voiced stop

	Mindist-VOT-1+ Voice:1	#Contrasts	*implosive	Mindist-VOT-2+ Voice:2
->	t-d	##		*
	t-D	##	*!	
	t	#!		
	Mindist-VOT-1 Voice:1	Mindist-VOT-2 Voice:2	#Contrasts	*implosive
->	t-d	*!	##	
	t-D		##	*
	t		#!	

Implosives and prenasals only enhancements; not found in position of neutralization;

Walker's typology of nasal harmony:

Vowels, laryngeals, > glides > liquids > fricatives > obstruent stops

Broadly derives markedness scale for nasalizable segments: m > ~a > ~l > ~z; but nasalized glottal stop does not arrest nasal harmony yet is never the site of a contrast. So *~? should be high ranked but then this is incompatible with harmony.

Fl: block where nasalization would endanger contrast with nasal stops [m,n,N]