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Derivational generative phonology:

underlying representation

ordered rules, each one applying to the output of the previous rule

output of the last phonological rule: the phonetic form.

Optimality Theory:

input (\approx underlying representation)

infinite number of candidate outputs (created by the “generator” module GEN)

evaluation procedure (EVAL) to pick the correct candidate

universal **violable** constraints with language-specific ranking (CON) used by EVAL

In British English, the low back vowel is rounded, while in American English it is unrounded. This means that in British English the constraint BkRD is ranked higher than LOUNRD, while in American English the ranking is the opposite. A higher ranked constraint is said to “dominate” a lower ranked constraint. Domination is expressed using the symbol \gg .

British English: BkRD \gg LOUNRD

American English: LOUNRD \gg BkRD



The evaluation is shown graphically by means of a tableau (plural: tableaux). A violation of a constraint is shown by an asterisk (*). A “fatal” violation, one which excludes a particular candidate, is marked “*!”. And the winner is marked “”.

Tableau for American English, assuming the input is /ɔ/.

/ɔ/	LOUNRD	BkRD
1. ɔ	*!	
2.  a		*

The hierarchies of vowel height and consonantal articulators can be implemented as universally ranked constraints:

*MID \gg *HI \gg *LO

*DORS \gg *LAB \gg *COR

How do we derive the vowels of Hebrew? The low vowel is [a] is derived by Hebrew having the same ranking as American English. But how are high and mid vowels allowed despite the constraints *HI and *MID? ANSWER: Markedness isn’t everything.

Markedness is the enemy of expressiveness. If the input is /i/, /e/, and /a/ and the output is only [a], you lose expressive power. The way this is formalized in OT is to say that in addition to markedness conditions you have **faithfulness** conditions, which say that you want the input

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and output to be the same. One kind of faithfulness condition is input-output feature identity: IO-IDENT_{FEAT}. These faithfulness constraints are ranked along with the markedness constraints.

Hebrew: IO-IDENT_{hi}, IO-IDENT_{lo} >> *MID >> *HI >> *LO
 Standard Arabic: *MID >> IO-IDENT_{lo} >> IO-IDENT_{hi} >> *HI >> *LO

Hebrew tableau:

/o/	IO-IDENT _{hi}	IO-IDENT _{lo}	*MID	*HI	*LO
1. u	*!			*	
2. ⵝ o			*		
3. ɔ		*!			*

Standard Arabic tableau:

/o/	*MID	IO-IDENT _{lo}	IO-IDENT _{hi}	*HI	*LO
1. ⵝ u			*	*	
2. o	*!				
3. ɔ		*!			*

Anything can be in the input (**richness of the base**). This means that there is no such thing as an underlying phoneme inventory.

What about the French vowels?

If we just take the oral vowels into account, we get the following ranking:

BKRD, LOUNRD, SHORT >> IO-IDENT_{feat} >> FTUNRD, LOBK, *NAS, *MID >> *HI >> *LO

Now consider nasal vowels. The extra markedness of being nasal is compensated for by the requirement that they be low, which is the unmarked vowel height. A vowel like [ĩ] would violate both *NAS and *HI. Individually, these are both relatively low-ranked constraints in French. Nasal vowels and high vowels are perfectly grammatical. However, markedness constraints often have an additive effect. (This is obvious in both the vowel and obstruent inventory charts.) This is achieved by what is called “local conjunction.” In this case, *NAS is conjoined with the height hierarchy, resulting in the following partial hierarchy of constraints:

*NAS&*MID >> *NAS&*HI >> *NAS&*LO

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Unlike the individual constraints, *NAS&*MID and *NAS&*HI are ranked high enough to force the lowering of vowels like /ĩ/ (e.g., the stem /fin/, when not suffixed, is pronounced [fẽ], not [fĩ]). The idea is that violating two constraints simultaneously is worse than violating either one individually.

BKRD, LOUNRD, SHORT \gg IO-IDENT_{feat}, *NAS&*MID \gg FTUNRD, LOBK, *NAS, *MID, *NAS&*HI \gg *HI, *NAS&*LO \gg *LO

Here is a (partial) tableau showing why *fin* (assuming an underlying /fĩ/) surfaces as [fẽ] rather than [fĩ], [fẽ], or [fã]. To simplify, we are assuming an input (underlying representation) /fĩ/ instead of the more probable /fĩn/.

/fĩ/	IO-IDENT _{bk}	*NAS&*MID	*NAS&*HI	*NAS&*LO
a. fĩ			*!	
b. fẽ		*!		
c. ↻ fẽ				*
d. fã	*!			