ON ELIMINATING DIRECTIONAL FOOT PARSING

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In rule-based versions of metrical theory (Hayes 1981, Halle and Vergnaud 1987), foot parsing is a directional (rightward or leftward) process, starting at a specified word edge. Parsing is subject to general constraints (a) *Maximality*: "build the largest possible feet", and (b) *Exhaustivity*: "parse all syllables of a word" (excluding extrametrical syllables and those which cannot be parsed because of foot well-formedness, e.g. *binarity*).

Aiming at a purely representational theory, McCarthy and Prince (1993) try to eliminate directionality. They redefine 'directional' foot distribution by constraints which require that 'any foot lie as near to the designated edge of the Prosodic Word as possible'. This edge-attraction is achieved by a constraint ALIGN-FOOT:

(1) ALIGN-FOOT: Foot edges must align with the left (right) Prosodic Word edge.

Under optimalistic interpretation, ALIGN-FT may be violated gradually. Feet, whether peripheral or not, are placed as *close as possible* to the specified edge, so that syllables which cannot be parsed by binary feet are cornered at the opposite edge. This produces a 'directionality' effect. (2a) exemplifies 'left-to-right' Pintupi, (2b) 'right-to-left' Warao:

(2) a. ALIGN-FT (Left) [Wd (yú.ma)(rìng.ka)(mà.ra)(tjù.ra).ka]Wd
b. ALIGN-FT (Right) [Wd e.(nà.ho)(rò.a)(hà.ku)(tá.i)]Wd

In this paper I will generalize the representational view of directionality to *ternary* and *quantity-sensitive* systems. These involve edge-oriented parsing of constituents of *variable size*, and therefore challenge representational theory more than the strictly binary, quantity-insensitive systems discussed by McCarthy and Prince. In the directional analysis of ternary systems, for example, construction of maximal ternary feet starts at some edge and proceeds until remaining syllables can no longer be parsed by ternary feet, and a binary or unary foot is built. This automatically restricts the distribution of non-maximal feet to the opposite edge. See (3):

(3) a. Left-to-right: Chugach Yupik, iamb plus righthand adjunct

(ta.qú.ma)(lu.ní)
*(ta.qú)(ma.lú.ni)

b. Right-to-left: Cayuvava, trochee plus lefthand adjunct, extrametricality

(cà.a)(di.rò.bo)(ßu.rú.ru)<ce>
*(ca.à.di)(rò.bo)(ßu.rú.ru)<ce>
*(ca.à.di)(ro.bò.ßu)(rú.ru)<ce>

For a representational theory, the challenge is how to refer to the word edge. Such reference cannot be based on ALIGN-FT, which would have the adverse effect of attracting non-maximal (rather than maximal) feet to the specified edge. I propose that ternary alternation is due to a constraint which is the logical opposite of ALIGN-FT, namely REPULSE-FT:

(4) REPULSE-FOOT: Foot edges must not align with the left (right) Prosodic Word edge.

Analogously to ALIGN-FT, REPULSE-FT may be violated gradually. The optimal parse is the one in which the constraint is violated minimally. In systems which have exhaustive foot parsing (due to a high rank order of PARSE SYLLABLE), foot edges are placed *as far as possible* from the specified edge. (This is the left edge in Chugach, the right edge in Cayuvava). In the optimal parse, feet stretch to their maximal ternary size, while non-maximal feet are cornered at the opposite word edge.

In Cayuvava, which allows unparsed syllables at word edges (PARSE SYLLABLE is lower-ranked than REPULSE-FT), REPULSE-FT has the additional effect of extrametricality: it

forces the rightmost foot away from the word edge at the maximal distance allowed: one unparsed syllable (cf. NONFINALITY in Prince and Smolensky 1993). REPULSE-FT thus relates extrametricality to ternarity, while avoiding non-peripheral unparsed syllables, which weaken the theory of peripherality (Hammond 1990).

I assume that the ternary foot is a complex constituent (Rice 1992, Hewitt 1992), formally identical to the *Loose Minimal Word* of McCarthy and Prince (1991). Ternary feet are composed of a *head* (a binary foot) plus a light syllable *non-head*, adjoined to the right or the left of the head. Heads are strictly binary (Kager 1993a,b): *moraic* or *syllabic trochee*, *moraic* or *syllabic iamb*. This theory of ternarity differs from the *weak local parsing* theory of Hayes (forthcoming) and Kager (1993a). The motivation for this theory was to avoid powerful *binary restructuring* of ternary strings (Estonian *[ó.sa.va].ma* => *[ósa][vàma]*, Chugach *[a.kú.ta].mek* => *[akú][tamék]*). This motivation simply disappears under a representational theory, where the double-binary parse is the single one satisfying PARSE SYLLABLE (ordered here above REPULSE-FT).

With these result in mind, we identify the difference between binary and ternary systems no longer in foot inventories, but rather in the relative order of ALIGN-FT vs. REPULSE-FT in a language-specific constraint hierarchy. If ALIGN-FT > REPULSE-FT, binarity results, and if REPULSE-FT > ALIGN-FT, ternarity. We thus avoid a redundancy, by which ternary and binary systems differ both in parsing foot *inventory* and in parsing *mode*.

Moreover, by permuting the side-of-adjunct to the foot with the word edge specified in ALIGN-FT, the difference between 'unidirectional' and 'bidirectional' binary systems is captured elegantly. In both types, words with an odd number of syllables have a single ternary foot at the word edge opposite to that specified in ALIGN-FT. The unifying idea is that in 'unidirectional' systems (Warao, Pintupi) the adjunct syllable in the ternary foot is peripheral in Word, and in 'unidirectional' systems (Garawa, Piro) non-peripheral.

(5)

	Language	ALIGN-FT	*Adjunct-Side*	*Example*
a.	Warao	Right	Left	(e.nà.ho)(rò.a)(hà.ku)(tá.i)
b.	Garawa	Right	Right	(ná.ri.ngin)(mù.kun)(jì.na)(rì.ra)
c.	Piro	Left	Left	(kàx.ru)(kàk.hi)(mà.na)(tat.ká.na)
d.	Pintupi	Left	Right	(yú.ma)(rìng.ka)(mà.ra)(tjù.ra.ka)

Finally, two nice results emerge for quantity-sensitive systems. The first is a new explanation for Hayes' (forthcoming) observation that iterative quantitative trochees do not include unbalanced (HL). In my theory this is a complex type (H+L), which may occur only in systems which have (LL+L) as well. Indeed (H+L) only occurs in ternary and semi-ternary systems such as Germanic (Dresher and Lahiri 1991). The second is a new account of the iambic directionality asymmetry (Kager 1993a: iambic systems are rightward). Again, the explanation is based on the fact that (L+H) would imply the highly marked ternary (L+LL).

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