Transparency Homework: Menomini

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Menomini summary: iterative regressive (right-to-left) assimilation of long high [-ATR] vowels ([I:] and [U:]) with following high [+ATR] vowel ([i], [i:], [u], and [u:]). Short high [-ATR] vowels ([I] and [U]) and long or short low [-ATR] vowels ([A] and [A:]) are transparent; low [+ATR] vowels ([a] and [a:]) are opaque.

As a first attempt at a constraint system, we consider only the assimilation process, ignoring opacity and transparency. We assume that the assimilation is driven by AGREE[ATR] ≫ IDENT[ATR]. Since low, short, or [+ATR] vowels are never altered by assimilation, but long high [-ATR] vowels are, we have:

ID[+ATR], ID[LOW], ID[SHORT-V] ≫ AGREE[ATR] ≫ ID[HIGH], ID[LONG-V], ID[ATR]

The lowest-ranked constraints will occasionally be omitted from tableaus. Note that because Vowel Place is never altered in order to obtain agreement, we also have an undominated IDENT[V-PLACE] constraint in the ranking, which we will also omit from tableaus.

In order to enforce an assimilation directionality, we could consider using a constraint such as AGREE-R[ATR], which specifies that a vowel must agree in ATR feature with the vowel on its right. However, we can do better—and account for the non-triggering behavior of low vowels—by using the conjunction

$$*[\text{HIGH}]\ \&_{\mathcal{D}}\ \text{AGREE-L[ATR]}$$

where the domain $\mathcal{D}$ of the conjunction is single consonants.

These constraints alone are sufficient for short examples.

/sI:pi:-ah/	ID[+ATR]	ID[LOW]	ID[SHORT-V]	*[HIGH] & AGREE-L[ATR]
a. sI:pI:-ah	*!			
b. sI:pi:-ah				*!
►c. si:pi:-ah				

Note how the Id[+ATR] constraint is needed here to decide between fully vowel-harmonic candidates (a) and (c) when assimilation is triggered by a long high vowel.

These constraints explain the opacity of low vowels (because of the high ranked Ident[low]), but do not explain the transparency of (short) [I] and [U]. We attempt to address this deficiency using triggered constraints. Following Bakovic, our triggered constraints are those which are creating the undesired opacity: since only [+ATR] vowels are opaque, we make the Id[low] and Id[short-V] constraints triggered. We will call the new constraints ⊙Id[low] and ⊙Id[short-V].

The following tableau shows that [a] is still properly opaque.

/sU:wA:nahki:qsIw/	Id [+ATR]	⊙Id [low]	⊙Id [short-V]	*[high] & Agree-L[ATR]	Ident
►a. sU:wA:nahki:qsIw				*	
b. su:wA:nahki:qsIw				*	*
c. sU:wa:nahki:qsIw		$a > c$		*	*
d. su:wa:nahki:qsIw		$b > d$		*	**
Cumulative		$a > c$ $b > d$			$a > \{b, c\} > d$

However, [A:] is now transparent.

/nIcI:pA:hkim/	Id [+ATR]	⊙Id [low]	⊙Id [short-V]	*[high] & Agree-L[ATR]
a. nIcI:pA:hkim				*
►b. nIci:pA:hkim				**
c. nIci:pa:hkim		$b > c$		*
d. nici:pa:hkim		$f > d$	$c > d$	
e. nIcI:pA:hkIm	*!		$a > e$	
f. nici:pA:hkim			$b > f$	*
Cumulative	$\{a, b, c, d, f\} > e$	$b > \{c, f\} > d$ $\{a, d\} > e$		$b > \{c, f\} > d > a > e$

Note, though, that the previous tableau also points to a serious deficiency in the theory of targetted constraints. If the high-ranked non-targetted Ident[+ATR] constraint were not present, the cumulative ordering after the targetted constraints would be

$$a > e$$

$$b > \{c, f\} > d$$

with no ordering between $\{b, c, f, d\}$ and e. The total ordering introduced by the *[HIGH] & AGREE-L[ATR] conjunction is:

$$\{d, e\} > \{a, c, f\} > b$$

We cancel out components of this relation which contradict the current cumulative ordering, as follows (shaded orderings are cancelled):

$$d > a$$
$$d > c$$
$$d > f$$
$$e > a$$
$$e > c$$
$$e > f$$
$$a > b$$
$$c > b$$
$$f > b$$

The remaining relations lead to an inconsistency: if $a > e$ and $b > \{c, f\} > d$, clearly we cannot incorporate both $d > a$ (which would produce the cumulative order $b > \{c, f\} > d > a > e$) and any one of $e > c$, $e > f$ or $a > b$. Which one do we adopt? Wilson's "priority of the faithful" principle might seem to[1] direct incorporating the constraint which "favors the more faithful candidate" — this would be $a > b$ as candidate a is perfectly faithful to the input. But where Wilson defines this principle, he (in the spirit of the original formulation of OT) does not extract an ordering relation between single and multiple violations of a single constraint. So $a > b$ isn't a valid relation for him to extract. Among the other options, candidate e seems to be more faithful to the input than candidate d. But incorporating $e > c$ or $e > f$ can't be said to "favor the more faithful candidate", as adding either relation leaves the ranking of a (the "faithful candidate") indeterminate with repect to b.[2]

Bakovic's formulation states that we should add orderings consistent with the complete ordering expressed by the constraint in question. In other words, we should start with the "best candidate" of the constraint (least violations) and move towards the "worst candidate" (most violations). But d and e are *both* the best candidate of the AGREE conjunctive constraint! Neither d nor e incurs any violations, so the decision between $d > a$ and $e > c$ or $e > f$ is still undetermined.

[1] It is not possible to be certain, because Wilson's definition is somewhat vague.
[2] Which begs the question: what exactly *did* Wilson mean?

Perhaps in these cases we should simply not accept *any* of the conflicting ordering relations, or perhaps a situation like this simply indicates that the tableau is ill-formed. We saw before that adding a single high-ranked constraint eliminated the ambiguity. But then there must be some subtle underlying restrictions on the composition of constraints in the targetted-constraint OT framework to ensure that tableaus are well-formed.

In any case, this example serves to indicate that the theory of targetted constraints is currently incomplete. Work must be done to provide an adequate and definitive means for resolving or interpreting circularity problems, or for restricting the class of targetted constraints and their rankings such that ambiguous candidate orderings never appear.