Solution to Korean coalescence

Part 1: basic generalizations

a. Sequences of [-cons][-cons] segments dispreferred.
b. All such sequences coalesce into a single V
c. The result preserves [+round], [-back], [-high], [+low] values of the original sequence and the mora count of the input.
d. Two types of V's that are disallowed in Korean ([y] and [ø]) are created by coalescence, to maintain input [+round], [-back], [-high] values.
e. However, coalescence cannot create a third type of V: low front rounded [æ̈]. To avoid coalescing into [æ̈] or losing input [+round], [-back], [+low], coalescence is blocked and /tojaci/ becomes [twæci] rather than [tæ̈ci] or [tæci], [tøci], [tyci].

Part 2: constraints and rankings

We attempt first to account for the generalizations in a-c. Considering first the simplest case (uə -> o:), we note that we need to split Ident [aF] constraints into Ident [aF] and Ident [-aF]. To observe what happens if we don't, we start by assuming a constraint *VV and the ranking *VV >> Ident [±round], [±back], [±low] (abbreviated as Ident F), Linearity, and use subscript letters to indicate intended correspondence relations between input and output segments.

Definition of *VV. We will need to distinguish two versions of this constraint:

> *[-cons, +syllabic][-cons, +syllabic] (*VV):
> prohibits two V's in a row, but not Glide//V
>
> *[-cons][-cons] (*Voc-Voc)
> prohibits two vocoids in a row, including Glide//V and V//V.

In the first part of the problem, we don't need to distinguish between the two constraints: assume that by *VV I mean the more general one.

$u_i ə_i$	*VV	MAX segment	Ident F	Uniformity
$u_i ə_i$	*!			
u_i		*!		
☞ o_{ij}			*[±high] u-o *[±round] ə-o	*

The tableau contains annotations in the Ident F column representing which pairs of corresponding output-input vowels (in this order) are mismatched for their features.

Next we observe that at least two candidates tie with the winner, given the constraints named.

$u_i ə_i$	*VV	MAX segment	Ident F	Uniformity
☞$ə_{ij}$			*[±high] ə-u *[±round] ə-u	*
☞u_{ij}			*[±high] u-ə *[±round] u-ə	*
☞ o_{ij}			*[±high] u-o *[±round] ə-o	*

We don't want the tie to be resolved by lower ranked markedness constraints, since there is no guarantee that these constraints will favor the desired candidate [o]. And in fact we know they will not, if there is a preference for high over mid vowels.

We rectify the problem by making the minimal modification: splitting the Ident constraints. I do this below for three features. Below the reformulations, I illustrate how this allows the proper candidate to emerge as winner in the present case.

    a. Ident [+round]:
        the Output correspondent of an Input [+round] segment is [+round]
    b. Ident [-back]:
        the Output correspondent of an Input [-back] segment is [-back]
    c. Ident [+low]: as above, mutatis mutandis

$u_i ə_j$	*VV	MAX	Ident [-hi]	Ident [+rd]	Ident [+hi]	Ident [-rd]
$u_i ə_j$	*!					
$ə_j$		*!				
u_{ij}			*! u-ə			
$ə_{ij}$				*! ə-u		
☞ o_{ij}					* o-u	* o-ə

To extend this kind of analysis to other vowel pairs, further rankings must be added.

Ident [+low] >> Ident [-low]

$æ_i e_i$	*VV	MAX	Ident [+low]	Ident [-low]
$æ_i e_i$	*!			
$æ_i$		*!		
☞$æ_{ij}$				* æ-e
e_{ij}			*! e-æ	

Ident [-back] >> Ident [+back]
(or Ident [+front] >> Ident [+back], if central V's are [-front, -back])

$a_i e_j$	*VV	MAX	Ident [-back]	Ident [+back]
$a_i e_j$	*!			
a_i		*!		
☞ $æ_{ij}$				* æ -a
a_{ij}			*! a-e	

The case of pja -> [pæ] suggests that coalescence is indifferent to the order of vocoids: j-a and a-e (and presumably i-a and a-i, also) both yield surface [æ].

Let's discuss now the datum *tojak -> twæ:k*. This form suggests a difference between the *VV and *Voc-Voc. We see this if we assume that some constraint blocks the creation of one vowel that combines [+low], [+round] and [-back], i.e. [æ̊]. Since [æ̊] cannot be created, nor can MAX or Ident [+low], [+round], [-back] be violated, this sequence can't be fully resolved: the question though is why can't it be turned into some other sequence of two vocoids, e.g. [$o_k æ_{ij}$].

$o_k j_i a_j$	*[æ̊]	*VV	*Voc-Voc	Uniformity
$æ̊_{kij}$	*!			***
$o_k æ_{ij}$		*!		*
☞$w_k æ_{ij}$			*	*

The question that arises now is why we don't get (C)ojak -> (C)jɒ:k (with low rounded ɒ) rather than (C)wæ:k. The next three tableaux provide a full comparison of these candidates. The first two tableaux show that the higher ranked constraints don't differentiate them.

$o_k j_i a_j$	*[æ̊]	*VV	*Voc-Voc	Uniformity
(a) $w_k æ_{ij}$			*	*
(b) $j_i ɒ_{kj}$			*	*

$o_k j_i a_j$	MAX	Ident +lo	Ident +rd	Ident -ba
(a) $w_k æ_{ij}$				
(b) $j_i ɒ_{kj}$				

$o_k j_i a_j$	Ident [-low]	Ident ±syllabic	Ident -rd	Uniformity
(a) $w_k æ_{ij}$	*æ-j	*w-o, *æ-j		*
(b) $j_i ɒ_{kj}$	*ɒ-o		*ɒ-a	*

$o_k j_i a_j$	Linearity
(a) $w_k æ_{ij}$	*aj -> æ
(b) $j_i ɒ_{kj}$	*oj -> jɒ
	*oa -> ɒ

Both candidates create a vowel that cannot occur in careful speech. We could derive a preference for (a) over (b) by ranking *ɒ >> *æ or by ranking Ident –rd >> ±Ident syllabic or *VV >> Linearity >>Ident ±syllabic .

My guess is that this class of answers is too stipulative and that the real answer is to be found in looking carefully at Linearity violations: (a) – and all forms of coalescence - violate Linearity in the weak sense that two segments that stand in some precedence relation in the input change that relation because they become simultaneous. That certainly happens in every one of the cases considered. However , in the change of $o_k j_i a_j$ to $j_i ɒ_{kj}$ something more serious happens: the underlying precedence relation between j and o becomes reversed rather than simply neutralized. I can't really prove that since the data is so sparse and open to so many interpretations. Note that if Linearity (appropriately formulated and split between No Reversal and Linearity proper versions) is adopted, then Uniformity itself becomes unnecessary.

The last part of the analysis is the ranking MAXμ >> *V:, which insures that long vowels are created only if the input contained two nuclei. This process (which can be called compensatory lengthening) argues for moraic representations that keep track of whether a vocoid is moraic or not. An alternative is to look for representations that keep track of subphonemic duration (given that a glide is normally shorter than a vowel). This alternative is not formalized here.