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Glides and Vowels in Romanian

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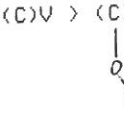
1.1. Introduction

This paper is part of an investigation of the process whereby strings of segments are assigned syllabic structure. The facts considered below concern primarily the distribution of high vowels and glides in Romanian and will be used as evidence in the discussion of the following issues: (a) the relative order of syllabification operations such as the rule creating core CV syllables and the rule responsible for complex onsets; (b) the proper cross-linguistic formulation of the latter process, the Onset rule; (c) the format of rules that change already assigned syllable structures: in particular the format of rules that merge two syllables into one. I need not point out that there is no necessary connection between these aspects of the theory of syllabification: simply, a complete discussion of the Romanian evidence on (a) is impossible without a preliminary answer to the remaining questions.

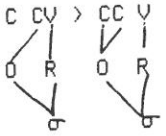
The question of ordering distinct syllabification operations does not arise in every theory of syllabic parsing. If syllabic parsing is viewed as the matching of complete syllabic templates (like CCVCC, in languages in which complex codas and onsets exist) against the segmental string, there cannot be any sense in which the CV part of the syllable is derivationally prior to the CCV part. I will refer to such a view of syllabification, advocated or assumed in Kiparsky 1979, Lowenstamm 1981, Cairns and Feinstein 1982, as the template approach. An alternative view, originated by Kahn 1976 and resurrected in Steriade 1982, holds that syllabic organization is the result of a series of structure building rules in the same sense in which metrical organization (foot and word level structures) is the result of an ordered series of rules that build metrical structures. In the context of such a view of syllabic parsing, which I will dub the rule based approach, the issue of ordering syllabification operations can arise. In fact, if simply ordering two syllabification rules provides otherwise unavailable answers to fundamental questions about syllabic parsing, the rule based approach scores an advantage over the template approach.

The present paper is a step in the demonstration that CCV syllables are formed by two distinct and ordered rules in all languages in which they occur:

(1) The CV rule: (C)V > (C)V, where C=[-syll] or [0syll], V=[+syll] or [0syll], O=Onset, R=Rime; operates left-to-right.



(2) The Onset rule: C CV > CC V may be subject to language-specific adjacency restrictions on the CC clusters it creates and/or to the sonority sequencing restrictions.



The results presented below are derived from the assumptions (a) that universally the CV rule precedes and, sometimes, bleeds the Onset Rule and (b) that universally the CV rule operates from left-to-right.

For reasons of space, I will not provide an explicit comparison between the analysis of Romanian syllabification available in a template-based format and the analysis proposed here. The significance of the results presented below for a comparison between syllabic parsing models should, however, be obvious throughout.

1.2. Glide/vowel alternations in Latin

A pattern of glide/vowel alternations similar but not identical to the one found in Romanian is that of Latin. I begin with a brief discussion of the Latin system, for two reasons. First, the surface distribution of glides and high vowels is closer in Latin to that produced by the initial layer of syllabification and more transparent than it is in Romanian. Second, the facts of Romanian are significant only to the extent that they represent a recurring pattern: the similar facts of Latin suggest that they do.

In what follows the term <u>vowel</u> is used for any [-consonantal] segment, regardless of syllabicity; <u>glide</u> is used for [-syllabic, -consonantal] segments; [-consonantal, +syllabic] elements are referred to as <u>syllabic</u> <u>vowels</u> or <u>syllabics</u>.

The distribution of Latin high vowels and glides is outlined below:

(3)

Glides:	
# __ V	iecur [ye.kur] 'liver'; venio [we.ni.o:] 'I come'; via [wi.a] 'road'; iungo [yun.go:] 'I join'.
V __ V	aio [ay.yo:] 'I say'; ovis [o.wis] 'sheep'; avus [a.wus] 'grandfather'; avia [a.wi.a] 'grandmother'; huius [huy.yus] 'his'.
Vowels:	
elsewhere	mulier [mu.li.er] 'woman'; dies [di.e:s] 'day'; tenuis [te.nu.is] 'thin'; mutuus [mu.tu.us] 'mutual'; pius [pi.us] 'pious'; piissimus

[pi.is.si.mus] 'the most pious'.

(4)

Sequences of three high vowels:
avius [a:.wi.us] 'off the road'; huius [huy.yus] 'his'; iuvenis [yu.we.nis] 'young'.[1]

Several aspects of this system are noteworthy. Latin disallows two types of hiatus: V.V.V, where the medial V is [+high]; and #V.V, where the first V is [+high]. Note that all other types of hiatus are attested: forms like tueor [tu.e.or] 'I consider' indicate that V.V.V hiatus is tolerated when the medial vowel is not high; and all forms in (3.b) indicate that postconsonantal high vowels cannot be glides, even when they precede a vowel[2]. The second point of interest is that when sequences of several high vowels occur in the string (as in via wi.a, avius a:.wi.us) it is the leftmost eligible high vowel that becomes a glide, in accordance with the distributional rules in (3). It is this Leftmost wins principle that explains why via is not syllabified *[u.ya] and why avia does not surface as *[au.ya] or *[a.u.ya].

The challenge to any theory of syllabic parsing is to have both the peculiar restrictions on hiatus and the Leftmost wins principle follow from general properties of the syllabification mechanism. There is also a further mystery lurking in the vowel/glide distribution outlined: to become aware of its existence we need to look into the Latin onset system.

1.3. Onset inventories

Metrical scansion and stress patterns converge in showing that clusters of obstruent followed by liquid (TL) can form complex onsets in Latin; and that no other consonant sequences can (cf. Devine and Stephens 1977). This type of onset inventory, a common one, can be easily accounted for along the lines suggested by Harris (1983) for Spanish:

(5) Latin Onset Adjacency Condition

> On a sonority scale of the form Obstruents > Nasals > Liquids any cluster whose members are separated by more than one interval is a possible onset[3].

The appeal of this account of the Latin onset system stems from the fact that its format is universal. In describing the Latin facts we need to set only two parameters: what features enter in the composition of its sonority scale; and what is the minimal number of sonority intervals that must separate the members of a tautosyllabic cluster.

The analysis of onset types outlined above faces however a serious problem. Latin has glides in onset position. Any sonority scale, no matter how constructed, will rank at least y, if not also

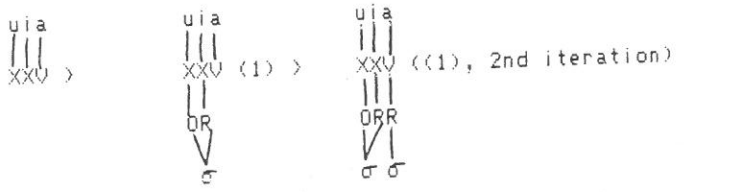
w, as highly as or higher than the liquids. It seems then that glides should be allowed as second members in any complex onset whose first member is an obstruent: the TL onsets imply at least the Ty onsets. Nonetheless Ty onsets as well as most C-glide sequences cannot be found in Latin. The success of our project to specify onset inventories by rule, rather than to simply list their members, depends on our answer to this mystery: why is dies syllabified [di.e:s] rather than [dye:s]; why is pius syllabified [pi.us] rather than [pyus]. We may point out that sequences of C-glide are generally absent from Latin, regardless of whether the sonority index of C would allow it to form a complex onset with a following glide: this suggests that the absence of C-glide onsets is part of a more general phenomenon and does not directly disconfirm rule (5). But, even if indirectly related to the issue of onset inventories, the absence of postconsonantal glides in Latin must be explained before (5) is adopted.

1.4. The rules of syllabification

Our analysis of Latin glide/vowel alternations must answer then three questions: (a) why are only certain types of hiatus permitted; (b) what is the nature of the Leftmost wins principle; (c) why are Ty, Tw onsets absent from Latin.

The answer to these questions is provided by the rules of syllabification introduced in section 1.1. I assume that a single class of segments underlies the surface pairs i/y and u/w: this class is specified as [-consonantal, +high, 0syllabic]. It is the absence of underlying specifications for [syllabic] that allows high vowels to occupy either nucleus or onset positions. [+consonantal] segments are excluded from the nucleus because they are underlyingly [-syllabic]; non-high vowels, on the other hand, may occur only in the nucleus because they are underlyingly [+syllabic]. I adopt below Levin's (1983) X-notation for the skeleton units whose associated segments are unspecified for the feature [syllabic]. I reserve however the C and V notation for skeleton slots associated to segments specified as [-syllabic] and [+syllabic] respectively. We can consider now the derivation of a few interesting cases: avia and via will illustrate how the left-to-right operation of the CV-rule produces the Leftmost wins effect; avia will also illustrate how intervocalic high vowels become glides; the derivations of tueor and pius show how the bleeding order between the CV-rule and the Onset-rule prevents the occurrence of C-glide onsets.

(6)a.



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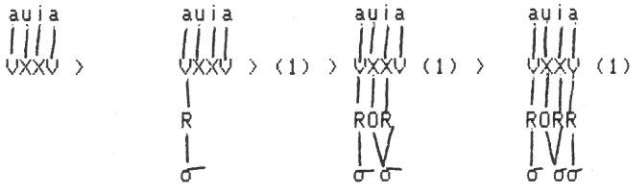
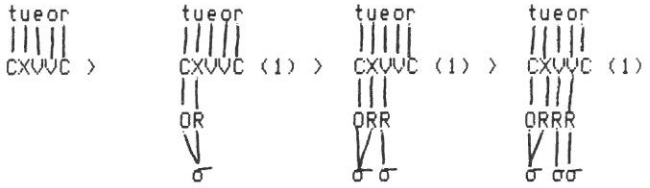
uia
XXV ((1), 2nd iteration)
ORR

b.



c.



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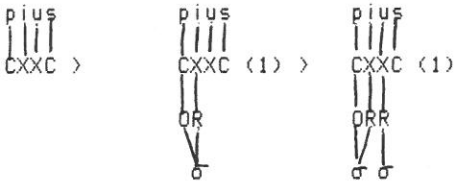


A further step is needed in the derivations of tueor and pius: the final consonant is incorporated into the rime of the last syllable by a Coda Rule which, for present purposes, we can assume as simply a mirror image process to the Onset Rule.

The Onset Rule (2) has been inapplicable in all four derivations above: since (1) will turn any CX sequence into an OR syllable, no C preceding an X remains unaffiliated in the output of (1). Since (2) follows (1) and, like (1), applies to unaffiliated segments only, no CX sequence will undergo (2). More generally, no CX sequence will fail to undergo (1), which accounts for the absence of postconsonantal glides, regardless of syllabic division.

Our analysis of the Latin paradigm does not rule out, as it should not, postconsonantal glides in other languages. Languages other than Latin may have a different distribution of the [Osyllabic] specification: in particular, they may have [-consonantal, -syllabic] segments, which Latin lacks. Such segments will be treated by (1) like all other C's and may give rise to CC onsets. An alternative source of postconsonantal glides may be contraction rules of a variety which does not occur in Latin: CiV, CuV sequences may contract, as they do in Sanskrit (Kiparsky 1971) and French (Dell 1973), giving rise to CyV, CwV. One such case will be investigated below. We predict, however, that in languages where contraction rules of this sort operate they will be responsible for the postconsonantal glides but not for the intervocalic and initial prevocalic glides, which derive from the prior operation of (1). It will then be necessary to look for

properties that differentiate, in such languages, "early derived" glides (#yV, VyV) from "late derived" glides (CyV). One hint that we are on the right track in making this distinction is provided by the following observation[4] about the co-occurrence of glides and vocalic length in Luganda: as in Latin, the syllabicity of high vowels in Luganda is predictable from context. Prevocalically, high vowels surface as glides, elsewhere as syllabics. Postconsonantal glides, however, are systematically followed by long vowels: in contrast, intervocalic and morpheme-initial pre-vocalic glides may be followed by long or short vowels, depending on the lexical item. Significantly, morpheme initial prevocalic glides may be followed by short vowels even when the preceding morpheme ends in a consonant (cf. [musomye] below):

(7) a./N-kuale/	'partridge'	[ŋkwa:le] (K239)
/mu-luan-i/	'fighter'	[mulwa:ni] (K132)
/ku-li-a/	'to eat'	[kulya:] (K234)
/mi-oio/	'souls'	[myo:yo] (K223)
b./a-ial-a/	'he spreads out'	[ayala] (K128)
/a-iogel-a/	'he talks'	[ayogela] (K128)
/e-iak-a/	'it burns'	[eyaka] (K128)
/ki-eia/	'drought'	[ce:ya] (K225)
/mi-oio/	'souls'	[myo:yo] (K223)
/lu-ieio/	'broom'	[lwe:yo] (K212)
/mu-som-ie/	'you have read'	[musomye] (K25)

(Data from Katamba 1974; parenthesized numbers give the page reference.)

This distribution has suggested to other investigators (Katamba 1974, Clements 1978) that postconsonantal glides derive from a rule of contraction, whose consequence is compensatory lengthening (for details see Clements 1978). But the analysis is not complete unless provisions are made for the glides that do not induce compensatory lengthening (cf. (7.b)). These are not underlying glides, since their occurrence is predictable. The short vowels that may follow them are not shortened vowels, since long vowels can also occur (cf. [-yuu] 'house' K198). The morpheme-initial and intervocalic glides are the glides derived by the cyclic operation of the CV rule: they do not induce compensatory lengthening because the CV Rule which derives them, unlike Contraction, does not change already assigned syllabic structure and does not create empty V slots. Within each morpheme, then, initial and intervocalic glides pattern differently from post-consonantal glides: this is exactly what the cyclic operation of the CV Rule predicts.

In the pages that follow, we will encounter a similar case: we will see that the Romanian postconsonantal instances of y are derived at a later stage in the derivation than the initial and the intervocalic y's.

2.1. Romanian syllable structure: a first approximation

Like Latin and Spanish, Romanian defines its onset inventory according to rule (3): possible onsets are restricted to obstruent-liquid clusters. Word-initially, a larger class of clusters occurs, which includes but is not limited to s-stop sequences. Surface rimes consist of single vowels or diphthongs followed optionally by up to two consonants. Word-internal coda clusters are generally restricted to sonorant-obstruent sequences: žert.fa 'sacrifice', v+rs.ta 'age', skulp.ta 'to sculpt', punk.tu.al 'punctual'. Word-final clusters consist of codas, which may be followed by any one consonant, which may in turn be followed by a y. Some suitably complex examples of word-final clusters are listed in (8):

(8) lemn 'wood', ritm 'rhythm', zv+rl 'hurl-1sg', kalzy 'warm-pl', aš.terny 'spread-2sg', bi.lingvy 'bilingual-pl', žertfy 'sacrifices', zv+rly 'hurl-2sg'.

The surface distribution of glides and vowels is considerably more complex than in Latin. This paper will deal with only two sources of difference between the patterns of glide/vowel alternations in the two languages: (a) unlike Latin, Romanian has postconsonantal glides in both prevocalic and word-final position; (b) unlike Latin u, Romanian u fails to alternate with w in the expected environments. One aspect of the surface glide/vowel distribution that the two languages share is the absence of initial prevocalic and intervocalic i: in both contexts, like Latin, Romanian exhibits y:

(9) a. yú.ni.ye 'June'; yú.te 'rapid'; yé.se 'exits'.

b. /rəzboiu-l/ 'the war' > rəz.bó.yul (cf. /rəzboi-re/ > rəz.bo.í.re 'doing war'); /m+ntui-am/ 'I redeemed' > m+n.tu.yám (cf. /m+ntui-re/ > m+n.tu.í.re 'redeeming'); /oi-eru/ 'shepherd' > o.yér (cf. /oi-le/ 'the sheep-pl' > ó.i.le).

Postconsonantal prevocalic i surfaces syllabic in most cases:

(10) fí.e 'let be' (cf. fi 'to be'); sá.bi.a 'the sword', sá.bi.i.le 'the swords'; h+r.tí.a 'the paper', h+r.tí.i.le 'the papers'; sf+.ší.á 'to tear'.

There are, however, seemingly idiosyncratic as well as predictable exceptions to this rule. First, lexical items like mié.re 'honey', fiér.be 'boils', a.mié.ze 'noons', fié.re 'gall', pié.re 'perishes', byet 'poor' show postconsonantal glides in contrast with the regular behavior of fí.e 'let be', in.fi.é.re 'adoption', a.tro.fi.é.re 'atrophy', a.pro.pi.é.re 'nearness', etc. Significantly, this class of postconsonantal y's occurs only after a labial or labiodental consonant and only before e: we can

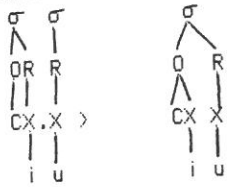
therefore account for the fyé.re : in.fi.é.re, pyé.re : a.pro.pi.é.re contrasts by positing a rule of post-labial pre-e y-insertion, which turns underlying /fere/, /pere/ into fyere, pyere.

Second, there are numerous postconsonantal instances of y before u, as in (11):

(11) a. /studi-u/ 'study' > stú.dyu (cf. /studi-i-le/ 'the studies' > stú.di.i.le); /propri-u/ 'proper' > pró.pryu (cf. própri-i-le 'the proper-pl'); /imperi-u/ > im.pé.ryu 'kingdom' (cf. /imperi-i-le/ > im.pé.ri.i.le 'the kingdoms').
b. /zg+ri-u/ 'scratch-1sg' > zg+.ryu (cf. /zg+ri-am/ 'scratch-1sg-impf' > zg+.ri.ám); /sf+ši-u/ 'tear-1sg' > sf+.šyu (cf. /sf+ši-am/ 'tear-1sg-impf' > sf+.ši.ám); a.pró.pyu (cf. /apropi-am/ > /apropi-u/ 'come near-1sg') > a.pro.pi.ám).
c. kyu.lí 'cut classes'; /uni-une/ 'union' > u.nyú.ne (cf. /uni/ 'unite' > u.ní); /krea-ți-une/ 'creation' > kre.a.tyú.ne (cf. /krea-ți-e/ 'creation' > kre.á.ți.e).

The alternations recorded above suggest a contraction rule whereby a disyllabic sequence Ci.u becomes monosyllabic Cyu. A preliminary statement of this rule appears below:

(12) Contraction



Condition: i is unstressed

In fact, the only analysis of the Cyu syllables compatible with the model of syllabification presented in section 1.4. requires that a disyllabic pre-contraction stage Ci.u exist, and thus indirectly supports (12): any underlying sequence /Ciu.../ will be turned into Ci.u by the first syllabification operation, rule (1). We need however to consider the alternative possibility that the Cyu syllables are created in the initial stages of the syllabification process and that no intermediate disyllabic stage exists. As a potential difficulty for our views on syllabification, this alternative analysis merits discussion. At the same time, we need to explain how our proposed Contraction rule is compatible with the fact that minimal pairs Cyu: Ciw exist in Romanian. Nouns like stúdyu, impéryu, potásyu 'potassium' stand in minimal contrast to nouns like skatíw 'bird', sikríw 'coffin', pardesíw 'overcoat'; a verb like sf+šyu 'tear' contrasts with štiw 'know'. The two issues, disyllabic origin of the postconsonantal yu sequences and problematic iw diphthongs, turn out to be related. As we see below, an analysis of the full paradigm lends

support to the syllabification model presented here. We must first however look briefly into the stress pattern of the language.

2.2. Romanian stress

Stress is limited to the last three syllables of the word. Final stress is uncommon in polysyllables and generally restricted to idiosyncratically stressed suffixes. The choice between penult and antepenult stress is in part rule-governed, in part a lexical property. The main generalizations are formulated and illustrated below:

(13)a. V-final forms
(i) antepenult stress: fór.fo.tə 'agitation', lés.pe.de 'stone', ré.pe.de 'fast', ká.u.tə 'seeks', kúm.pa.rə 'buys'.
(ii) penult stress: če.tá.te 'fortress', a.dú.če 'brings', re.pé.de 'rebukes', se.ní.nə 'serene', u.čí.de 'kills'.
(iii) obligatory penult stress if penult is closed: al.bás.tru 'blue', a.prín.de 'lights up', as.kún.de 'hides', po.rún.kə 'order'.

b. C-final forms
(i) penult stress: bí.vol 'buffalo', ku.trémur 'quake', l+n.ced 'soft', de.sí.gur 'certainly'.
(ii) final stress: və.táf 'supervisor', re.zul.tát 'result', u.súk 'dry-1sg', a.dún 'gather-1sg'.
(iii) obligatory final stress if final in -CC(C)#: as.fált 'asphalt', as.kúlt 'listen-1sg', deš.tépt 'awake', a.də.póst 'shelter'.

This paradigm shows considerable similarity to the one described by Harris (1983) for Spanish. Our analysis can be modeled on his. Individual lexical items may have the property of segment extrametricality, which means that the stress rule will ignore the final segment of such items either in determining syllable weight or in actually counting syllables. The stress rule itself can then be given informally as in (14):

14.a. Stress a heavy final syllable.
b. If the final is light, stress the penult.

The stress rule alone accounts for cases (13.a.ii-iii) and (13.b.ii-iii) above: in a.dún and deš.tépt, the final is heavy, therefore stressed; in ce.tá.te and a.prín.de, the final is light and clause (b) of (13) takes effect. Extrametricality explains the remaining two classes, (13.a.i) and (13.b.i). In ré.pe.de, the final segment e is extrametrical: since onsets are irrelevant for the stress rule, the extrametricality of e eliminates the entire final syllable de from consideration. Stress is then computed on

the remaining string re.pe.(de) and, in the absence of a heavy final, the penult syllable receives stress. In de.sí.gur, segment extrametricality turns the heavy final gur into a light syllable gu(r) and thus justifies the penultimate stress. For classes (13.a.iii) and (13.b.iii)the assumption of extrametricality has no effect on stress placement: this is why these are the only types of strings that do not exhibit lexical variation in the location of stress. Thus as.kún.de could be analyzed either as as.kún.(de), in which case it illustrates clause (a) of the stress rule, orelse as as.kun.de, in which case it illustrates clause (b). A form like deš.tépt will be stressed by clause (a), whether one assumes extrametricality (deš.tép(t)) or not.

2.3. Desyllabification Rules

We have seen in the preceding section that the option of segmental extrametricality accounts for the variation between penult and antepenult stress in words whose last two syllables are light (répe(de) 'fast' vs. repéde 'rebukes'). Consider now the contrasts that we set out to explain: skatíw vs.stúdyu, pardesíw vs. potásyu. Inspection of a larger selection of skatíw-type nouns reveals that they are invariably stressed on their final syllable:

(15) muš.te.ríw 'customer', t+r.zíw 'late', če.nu.šíw 'grey', han.gíw 'inn-keeper', miž.lo.cíw 'middle'.

Our analysis will be that the syllabification contrast between skatíw and stúdyu is due to an underlying difference in stress pattern. Rule (1) predicts that both types have an initial syllabification that includes hiatus: ska.ti.u, stu.di.u. On such representations, the option of segmental extrametricality turns stu.di.u into stu.di.(u). Rule (14) applies to both types, assigning a de facto antepenult stress to stú.di.(u) and penult stress to ska.tí.u by clause (b). Two desyllabification rules, discussed below, apply now, both subject to the condition that stressed syllables cannot be affected. The first rule, (12) or Contraction, turns C.i.u sequences into C.yu syllables. This rule affects stú.di.u; but the stress on tí in ska.tí.u blocks it. The second rule, High Vowel Desyllabification, turns an unstressed word-final high vowel into a glide, subject to the condition that the preceding onset, if any, may not be branching: this rule can apply to ska.tí.u to derive ska.tíw but is blocked, by the branching onset condition, from applying to stú.dyu. We can proceed to motivate this analysis.

Several observations indicate that the factor differentiating skatíw from stúdyu is stress, not syllable structure. A look at the Inverse Dictionary of the Romanian Academy shows that the 233 forms ending in (orthographic) -Ciu cited there divide into two classes where stress and syllabification correlate: penult stressed -V́C$_{\phi}$Cyu forms and final-stressed -Cíw forms. Intermediate types in -Cyú or -V́C$_{\phi}$Ciw do not occur and register as ill-formed with native speakers. A further significant fact in this connection is that

monosyllables ending in an -iu sequence are systematically of the C$_0$íw type: the C$_0$yú class of monosyllables is uniformly unattested and judged as ill-formed.

(16) šťíw 'know-1sg'; plíw 'fold'; víw 'alive'; fíw 'son'; fíw 'be-1sg-subj'; ťíw 'hold-1sg'; žíw a hydronym.

Finally, the stress of the stúdyu-class is consistently on the penult: a stress pattern like *pótasyu is, again, unattested and ungrammatical.

All three facts recorded follow from our proposed analysis. Antepenult stressed forms like *pó.ta.syu do not exist because, at the stage in the derivation when Stress applies, the form is po.ta.si.u and cannot be stressed further to the left than the antepenult. *Pótasyu is then impossible for the same reason that *ràz.bo.i.re is: (14) was misapplied. Monosyllables ending in -iu belong exclusively to the skatíw class because they are disyllables when stress applies: viw, for example, originates as /vi-u/, is initially syllabified by (1) as vi.u, stressed on the penult, according to (14.b), and subjected to High Vowel Desyllabification, which produces the surface víw. Extrametricality in cases like this has no visible effect, since both vi.(u) and vi.u will receive initial stress. Ill-formed *vyú is also ruled out. The two alternative derivations of *vyú are each blocked by one of the assumptions of our analysis: on the one hand, *vyú could result from intermediate vi.ú, whose stress pattern is deviant; on the other hand, *vyú could be derived from ví.u but only in violation of the condition on rule (12) that requires an unstressed i. Further evidence for that condition comes from forms like ki.u.ye 'whoop-3sg', pi.u.ye 'chirp-3sg', ti.u.ye 'buzz-3sg' from /kiui-e/, /piui-e/, /tiui-e/, syllabified (see below) ki.u.ye, pi.u.ye, ti.u.ye and stressed on the antepenult. In these cases as well the stress on the initial i blocks rule (12). Finally, the consistent end-stress of the skatíw-class is explained as follows: forms like *ská.tiw could only come from intermediate ská.ti.u. Such a form should however undergo the obligatory rule of Contraction (12) and become ská.tyu. *Skátiw is then ill-formed because an obligatory rule has failed to apply in its derivation.

High Vowel Desyllabification (HVD) is illustrated below:

(17)	Word-final	Word-medial
a.	ska.tíw 'bird' ska.tiy 'bird-pl' fla.kə́w 'young man' fla.kə́y 'young man-pl'	ska.tí.ul 'the bird' ska.tí.i.lor 'the bird-pl-DAT' fla.ká.ul 'the young man' fla.ká.i.lor 'young man-pl-DAT'

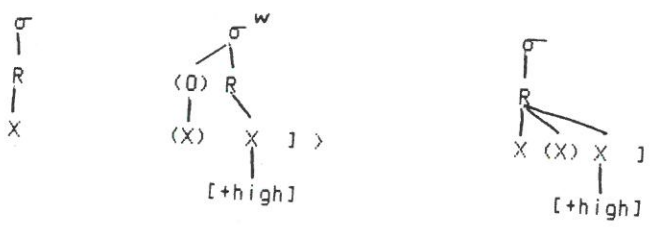
b.	bí.vol 'buffalo' va.táf 'supervisor' lemn 'wood' zv+rl 'hurl-1sg' kuy 'nail' m+n.tuy 'redeem-1sg'	bí.vo.lul 'the buffalo' va.tá.ful 'the supervisor' lém.nul 'the wood' kú.yul 'the nail'
c.	va.táfy 'supervisor-pl' vezy 'see-2sg' istmy 'isthmus-pl' zv+rly 'hurl-2sg'	va.tá.fi.lor 'supervisor-pl-DAT' vé.zil 'see-IMP-him' íst.mi.lor 'isthmus-pl-DAT'
d.	á.flu 'find out-1sg' á.kru 'sour' zím.bru 'buffalo' kús.kru 'in-law'	á.krul 'the sour' zím.brul 'the buffalo' kús.krul 'the in-law'
e.	á.fli 'find out-2sg' á.kri 'sour-pl' zím.bri 'buffalo-pl'	á.kri.lor 'sour-pl-DAT' zím.bri.lor 'buffalo-pl-DAT'
f.	fə.kú 'do-PERF-3sg' vor.bí 'speak-INF' ku 'with' tu 'you' ši 'and'	fə.kú.rə 'do-PERF-3pl' vor.bí.re 'speak-INF-NOM'

The left-hand column contains forms that end underlyingly in a high vowel. The morphemes giving rise to alternations are: (a) the

masculine singular u (as in zimbru, vətaf from /vataf-u/, flakəw from /flaka-u/); (b) the plural suffix i (as in zimbri, flakəy from /flaka-i/, vətafy from /vataf-i/); (c) the 1st person singular suffix u (as in á.flu, zv+rl from /zv+rl-u/); (d) the 2nd singular suffix i (as in afli, zv+rly from /zvirl-i/, vezy from /ved-i/). The right-hand column shows how these forms surface when one more morpheme, a clitic, is added after the high vowel. (17.a) illustrates the case of underlyingly postvocalic high vowels. Word-finally these surface as glides, otherwise as syllabics, with hiatus preserved even in a sequence of identical vowels (ska.tí.i.lor). (17.b) illustrates the behavior of postconsonantal u: word-finally, it is desyllabified and deleted, word-medially it is preserved. (17.c) shows that final i is desyllabified but, unlike u, does not delete postconsonantally. HVD fails to affect syllables with branching onsets: the forms in (17.d-e) show this. HVD also fails to desyllabify stressed vowels (17.f), whether their final stress is a lexical idiosyncracy, as in the case of the perfect suffix u and of the infinitive i, or the predictable final stress of monosyllables (ku, tu, ši).

The facts in (17) indicate that a rule of considerable generality is responsible for the final glides in forms like skatíw. Our account of the skatíw: stúdyu contrast was, in part, based on the hypothesis that HVD fails to apply to stúdyu because the complex onset dy of the final syllable blocks it. This is exactly what a comparison between forms like áflu and zv+rl reveals: both of these contain the 1st singular suffix -u in unstressed word final position. The difference is that u is preceded by an onset sequence fl in one case, and by a heterosyllabic cluster rl in the other: /zv+rl-u/ is syllabified as zv+r.lu (cf. surface zv+r.lí 'hurl-INF') and qualifies for HVD; /afl-u/ becomes á.flu and, like stú.dyu, stays intact. HVD is formulated below as a rime-adjunction rule that operates in structure-changing fashion. The branching-onset condition is incorporated into the statement of the rule, which applies to syllables whose onset contains at most one segment. Since no adjacency or relative sonority conditions are imposed, the rule freely derives coda clusters like stmy (istmy), rly (zvirly), etc. The right bracket on the CV tier indicates word-final position. X's are used as variables over skeleton slots.

(18) High Vowel Desyllabification



We may at this point consider the full derivations of some of the central forms discussed so far. The rules are ordered as follows:

(19) a. Cyclic: CV Rule (1) > Onset Rule (2) > Stress (14) > Contraction (12)

b. Postcyclic: High Vowel Desyllabification (18)

The underlying forms given below enclose in brackets the word-level cycle, the only constituent with provable cyclic properties. Morphemes lying outside the brackets are clitics added postlexically[5]. Some irrelevant details, such as the status of initial sK-, st- clusters, are left out.

(20)	[skati-u]	[studi-u]	[kui-u]	[skati-u]-l	[studi-u]-l
(1)	ska.ti.u	stu.di.u	ku.yu	ska.ti.u	stu.di.u
(2)	n/a	n/a	n/a	n/a	n/a
(14)	ska.tí.u	stú.di.(u)	kú.yu	ska.tí.u	stú.di.(u)
(12)	n/a	stú.dyu	n/a	n/a	stú.dyu
Postcyclic (18)	s ka.tíw	n/a	kuyw	n/a	n/a
Surface	ska.tíw	stú.dyu	kuy	ska.tí.ul	stú.dyul

The mismatch between kuyw and the actual surface form, kuy, seems to indicate that one more rule is needed: the elimination of postconsonantal w's resulting from HVD. We will return to this question.

2.4. Early and late y's

The preceding section has presented the basis for our analysis of Cyu syllables. We have observed that several arguments based on the contrast between -Cyu and -Ciw establish the fact that both types of finals are derived by stress-dependent rules. This completes our demonstration that the postconsonantal, prevocalic glides of the language are not the result of the initial syllabification: they are either the result of a glide insertion rule (in cases like pyére, fyére) or the result of Contraction.

The model of syllabification adopted here predicts, however, not only a late derivational origin for postconsonantal glides but also an early one for initial prevocalic and intervocalic glides: since the latter category is derived by the first rule of syllabification, rule (1), one expects that subsequent processes, like stress assignment, will have no access to representations in which these segments are anything other than onset glides. We investigate this prediction here.

Consider the forms in (21)

(21) verbs		nouns	
/m+ntui-u/ >	m+n.tuy	/plai-u/ >	play
'redeem-1sg'		'plane'	

/piui-u/ > pí.uy
'chirp-1sg'
/kiui-u/ > kí.uy
'whoop-1sg'
/milui-u/ mí.luy
'have pity-1sg'

/malai-u/ > ma.láy
'corn'
/holtei-u/ > hol.téy
'bachelor'
/kukui-u/ > ku.kúy
'head bump'

Both classes of forms in (21) contain an underlying final sequence Viu. The predicted initial syllabification is m+n.tu.yu, pi.u.yu, pla.yu, ma.la.yu, etc. The verbs are recessively stressed, with the final (underlying) syllable counted as extrametrical: hence intermediate forms should be m+n.tu.yu, pi.u.yu, etc. The nouns of this form happen not to make use of extrametricality. Stress should then produce intermediate ma.lá.yu, ku.kú.yu, hol.té.yu, forms which surface intact when the definite article is added: ma.lá.yul, hol.té.yul, ku.kú.yul. HVD should then derive verbs like m+n.tuyw, nouns like ma.láyw, whose final w is eventually deleted. Thus even though intermediate yu sequences must be assumed in forms like m+ntuy and holtéy, rule (12) has not been invoked in these derivations. The same remark holds for the surface yu sequences of holteyul, malayul, kukuyul: these are not the result of Contraction.

Suppose now that, contrary to our hypothesis, all sequences in yu derive from Contraction. Given that Contraction follows Stress, the input representations to Stress should be uncontracted m+n.tu.i.u, ki.u.i.u, hol.te.i.u, ma.la.i.u, etc. Stress has two options now: it may count the final u as extrametrical and derive intermediate:

(22) min.tú.i.u, ki.ú.i.u, hol.té.i.u, ma.lá.i.u

or it may derive, without extrametricality, forms like:

(23) min.tu.í.u, ki.u.í.u, hol.te.í.u, ma.la.í.u.

The surface counterparts of (22) should be *m+n.túy, *ki.úy, hol.téy, ma.láy. Those of (23) should be *m+n.tu.íw, *kyu.íw, *hol.te.íw, *ma.la.íw. One obvious problem for such an analysis is that it cannot sanction the stress pattern of the verbal forms: m+ntuy can be derived from m+n.tu.i.u only by assuming an illegitimate application of (14). A less obvious but equally damning difficulty is the prediction that forms like *hol.te.íw, *ma.la.íw, *ku.ku.íw will occur. Another look at the Inverse Dictionary reveals that all forms recorded there as ending in orthographic -Viu are archaic pronunciations corresponding in the contemporary language to -Vy, as in ma.láy: no forms like *ma.la.íw exist now or can be attributed to earlier stages of the language. The [-iw] finals occur only after consonants. A third problem is that, alongside forms like yú.te 'fast', yú.da 'Judas' one should also expect *i.u.te, *i.u.da from antepenult-stressed forms whose stressed i blocks Contraction.

The conclusion is then that postvocalic and initial yu sequences are derived before rather than after the application of the stress rule (14). The natural hypothesis is that they are derived by the same rule which accounts more generally for the absence of initial prevocalic or intervocalic i: rule (1). In contrast, the earliest syllabified stage recoverable for Ciu sequences is hiatus Ci.u.

Using stress and the more general observation that stressed syllables are never desyllabified in Romanian, we can make similar observations for other sequences involving i. Thus postvocalic i loses its syllabicity in forms like náy.ba 'devil', púy.ka 'young hen', kúy.ne 'dog' but not in a.í.do.ma 'entirely similar', ga.í.na 'hen', ru.í.na 'ruin', where it carries stress. We can analyze forms like púy.ka as instances of (intermediate) antepenult stress and thus reduce the apparent syllabification contrast between púy.ka and ru.í.na to the familiar difference between segmental extrametricality and lack thereof: pú.i.(ka) vs. ru.í.na. This analysis would permit us to recover another type of hiatus predicted by (1): the hiatus underlying surface VyC sequences. In contrast, no initial prevocalic or intervocalic i's ever surface as syllabics: there are no forms like *o.í.er, *la.í.et^{s} next to o.yer 'shepherd' from /oi-er-u/^{o}, la.yét^{s} 'long-haired' from /lai-et^{s}-u/; there are also no forms like *í.a.ta next to yá.ta 'look'. Such gaps can only be interpreted as effects of rule (1).

2.5. Latin and Romanian u

It was mentioned in section 1.2. that in Latin intervocalic and initial prevocalic u, like i, surfaces as a glide. In sequences of the form VuiV or #uiV, where, in principle, either high vowel could become a glide it is the leftmost one that does: hence a.wi.a, wi.a.

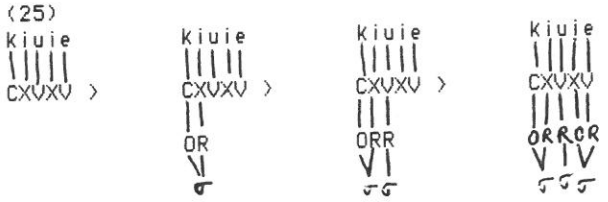
None of these rules holds for Romanian: initial prevocalic w is not found, intervocalic w occurs only when the second vowel is a and is provably epenthetic, as for intervocalic or initial sequences of ui, those are syllabified as shown below:

(24) a. ki.u.í 'whoop-INF'; pi.u.í 'chirp-INF'.
b. kí.u.ye 'whoops', pí.u.ye 'chirps' from /kiui-e/, /piui-e/.

The Latin syllabification of such forms would have to be ki.wi, pi.wi, ki.wi.e, pi.wi.e. The Latin syllabification of forms like úy.ta 'forget-3sg' would have to be wi.ta.

All these facts can be uniformly accounted for on the assumption that Romanian u is an underlying [+syllabic] segment, like the non-high vowels. The left-to-right iteration of (1) in kiuye would proceed as follows:

(25)



The idea that Romanian u is underlyingly syllabic rather than unspecified can also account for the hitherto unexplained fact that HVD may create postconsonantal y's but not w's. We have operated so far on the tacit understanding that segments unspecified for syllabicity are realized as syllabic in rime-initial position, as non-syllabic elsewhere. The postconsonantal y's created by HVD are thus in the elsewhere category. An explicit assumption has been that of the two segments paired off by the CV rule (1) the first may not be [+syllabic], the second may not be [-syllabic]. This provision is however insufficient in its present form. We note that syllabic mergers of the type effected by HVD and Contraction never result in placing [+syllabic] segments in onset or coda position. Thus, while contractions of Ci.V sequences to CyV do occur in languages where other alternations establish the [0syllabic] specification of i, such contractions are not found in languages which, like Attic Greek, have exclusively [+syllabic] i's. For the same reason, the syllabic mergers of hiatus sequences like ae, ao, ea, oa, when attested, never position the first vowel in the onset of the resulting syllable. The same principle seems to be at work in all these cases, whether syllabification or resyllabification processes are involved:

(26) [+syllabic] segments cannot occur except in rime-initial position or immediately preceded by a rime-initial segment.

Principle (26) can now supersede the segmental conditions on rule (1). It can also explain the disappearance of postconsonantal w, in forms like kuy derived by HVD from ku.yu, min.tuy from min.tu.yu, bi.vol from bi.vo.lu: HVD cannot incorporate the final u, a syllabic segment into the coda of the preceding syllable.

Notes

1. In general, the synchronic grammar of Classical Latin provides few examples of intervocalic y, all of them geminated, as in [ay.yo:]. I assume that a separate gemination rule is responsible for this phenomenon.
2. I am ignoring here, for the sake of brevity, a number of complications. See Devine and Stephens 1977 for the relevant facts.
3. An investigation of the properties of sonority scales necessary for such statements, along with more complex examples, is found in Steriade 1982.
4. I am grateful to Larry Hyman for pointing out to me the relevance of the Luganda facts.
5. The decision to consider definite articles like -l 'the-sg' as clitics rather than cyclic affixes is based on two sets of facts: (a) the failure of these morphemes to affect stress, as seen when one compares stúdyu with stúdyul 'the study', stú.di.i.le 'the studies' or stú.di.i.lor 'to the studies'; (b) the fact that the actual location of the definite

articles is the result of a syntactic rule which positions an underlyingly NP-initial determiner after the first NP constituent, noun or adjective: compare bivolul bun 'the good buffalo' (lit. 'buffalo-the good') with the alternative bunul bivol 'id.' (lit. 'good-the buffalo').

6. Note the related form o.i.ʦa 'little sheep' from /oi-ʦa/, showing regular stressed i.
7. For example, the definite form of feminine nouns like zi 'day' is zi.wa from /zi-a/, where /-a/is the feminine form of the definite article.

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