

**Mostly Predictable:
Cyclicity and the distribution of schwa in Itelmen¹**

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Abstract. The Itelmen language shows many instances of regular schwa/zero alternations. Even though the language permits quite extensive consonant clusters, I argue in this paper that the alternating schwas (and perhaps all instances of schwa) are epenthetic; schwa is inserted to break up a disfavoured consonant cluster. The rule which inserts schwa must apply cyclically in the verbal system, but non-cyclically in the nominal system. Apparent examples of cyclic rule application are problematic for non-derivational, constraint-based approaches to phonology, such as many versions of Optimality Theory (OT). Thus, much recent work has been devoted to reanalyzing purported examples of cyclicity from an O.T. perspective. While it may be possible to devise an account of the Itelmen data in terms of parallel constraint evaluation, current O.T. approaches are insufficient; in particular, the best candidate for an explanation of the Noun/Verb differences (Base Identity) makes exactly the wrong predictions for Itelmen.

Introduction. Itelmen (a.k.a Kamchadal) is today spoken natively by fewer than 100 people, living on the Northwest coast of the Kamchatka peninsula of Russia. Genetically, it is likely related to the geographically proximate Chukchi, Koryak, Kerek and Alutor, though it shows striking differences from these languages both in terms of the lexicon and at a typological level. Of interest for the present paper is the distribution of schwa in Itelmen. That there are many instances of schwa-zero alternations (1), suggests that these occurrences of schwa may involve epenthesis.²

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² Examples are taken primarily from notes and recordings from three trips to Kamchatka (1993-94, spring and summer 1996), supplemented with examples from Volodin 1976 and Volodin and Khaloimova 1988. When there are relevant dialect differences, forms marked (N) or (S) are from the Northern and Southern dialects, respectively. Examples are representative of the material which has been carefully transcribed and/or rechecked with speakers. Though I believe the generalizations to be true of the language generally, the reader is cautioned that not all of the recordings have been carefully transcribed.

With the following exceptions, examples are given in IPA: s,z are apical, post-alveolar fricatives (the underdot is omitted for convenience); sequences written as a glottal stop and nasal (e.g., ?n) or ?l correspond to a single, glottalized segment and not a series of two segments; words

- | | | | | | | |
|-----|----|------------------------|----------------|-----|----------------------|----------------|
| (1) | a. | ʃxəm | sable | a’. | ʃxm-əʔn | sable-PL |
| | b. | spəl | wind | b’. | spl-ank | wind-LOC |
| | c. | ^w tʃəz-xʔal | road-ABL | c’. | ^w tʃz-enk | road-LOC |
| | d. | il:-əz-in | drink-PRES-3SG | d’. | tʃzu-z:-in | stand-PRES-3SG |

The descriptive goal of this paper is to argue that the instances of schwa in the forms in the left column of (1) are inserted to break up otherwise-ill-formed consonant clusters. At first blush, such an approach might appear difficult to maintain since Itelmen regularly permits extensive consonant clusters, word-internally and at word edge (2).

- | | | | | |
|-----|-----------|---------------|---------|-----------------------|
| (2) | čkpəč | ‘spoon’ | tʃsčʃin | ‘you are carrying it’ |
| | kʃqzuneʔn | ‘they were’ | mskčeʔn | ‘I will make them |
| | sitʃpk’et | ‘with embers’ | k’ənsʃč | ‘boil it!’ |

I will show nevertheless (section 1) that these alternating schwas occur in discrete, identifiable contexts and are thus predictable. Moreover, I will show that most instances of non-alternating schwa in the language occur in the same environments as the alternating schwas and could thus be predicted by the same epenthesis rule. Though the epenthesis rule to be motivated is simple enough, in order to derive the correct forms, the rule must apply cyclically in verbs and non-cyclically in nouns. As cyclicity effects of this type are potentially problematic for non-derivational approaches to phonology (such as many current versions of O.T.), section 2 will be devoted to a discussion of the theoretical implications of the assumptions required in section 1. Finally, a brief appendix considers three classes of apparent exceptions, identifying the specific environments defining these classes and arguing that they are not true counter-examples to generalizations made here.

1. ON THE DISTRIBUTION OF SCHWA.

As a point of departure, we delineate a certain class of consonants which I will refer to as R (e.g., resonants) in what follows. These consonants are given in (3a). The remaining consonants I will group perhaps inaccurately as K (~obstruents) in (3b) for comparison. Note that there are four additional consonants which never appear in positions where their behaviour relative to schwa epenthesis is testable.³

preceded by a superscript ^w are pronounced round throughout—this rounding is morphological and cannot be tied to any particular segment or segments.

The following abbreviations are used in this paper: ADjective, ADverb, ABLative, DIMinutive, PEJORative, LOCative, ASPECT, ASP2=second aspect, FUTure, PREsent, INFinitive, IRRrealis mood, PRT=participle, NEGative suffix, SUBject, OBJect, CLitic, SG=singular, PL=plural.

Discrete morphemes are separated by hyphens; the dot in the glosses separates distinct features expressed on a single portmanteau morpheme. Where a gloss has the form, e.g., 2pl>3pl it indicates a portmanteau agreement marker, here second person plural subject acting on third person plural object.

³ I use the terms “resonant” and “obstruent” somewhat imprecisely here, and avoid them in the general discussion, referring instead just to “R”. In standard terms, the voiced apical fricative /z/ is [-sonorant] and hence not a resonant; the contrast between /l/ ∈ R versus /ʃ/ ∉ R is also potentially curious. Note, though, that the same classification of segments relative to similar

- (3) a. R = { m, n, ŋ, l, r, z }
 b. K = { p, p', t, t', k, k', q, q', č, č', φ, x, x^w, χ, s, † }
 c. untestable = { j, β, γ^w, ? }

1.1 Nouns Taking first the alternating schwas in the nominal system (1a-c), schwa always appears in the environment ...C_RC or ...C_R#, that is, following a consonant and immediately preceding a stem-final R which in turn is followed by a consonant-initial suffix or word-end. When the R-final noun stem is followed by a vowel-initial suffix (as in the prime examples in (1a'-c')), then no schwa surfaces. This situation clearly suggests that schwa is epenthesized for reasons of syllabification: although the language permits extensive consonant clusters, consonants from R must be immediately adjacent to a vowel.⁴ The epenthesis rule is schematized in (4).⁵

$$(4) \quad \emptyset \rightarrow \text{ə} / \left\{ \begin{array}{c} \text{[C]} \\ \text{[#]} \end{array} \right\} \text{---} \text{R} \left\{ \begin{array}{c} \text{[C]} \\ \text{[#]} \end{array} \right\}$$

Confirmation for the approach taken here comes from the distribution of non-alternating, word-internal schwa in the language. Laying aside certain exceptions discussed below, word-internal schwa in Itelmen occurs in the environment proscribed by (4); conversely, there are no cases of R occurring between two consonants, unsupported by schwa (i.e., *CRC).⁶ Examples of non-alternating schwas are given in (5a): schwa occurs only when the R can not be the coda onset of a full vowel; when R can syllabify in this manner, no schwa occurs (5b).

- (5) a. əmŋəl qetit-kəŋkin isxəmt-laχ
 story freeze-NEG.PRT dull-ADJ
- b. č'amzanl-aʔn *č'aməzanəlaʔn
 person-PL

properties (i.e., syllabification) is motivated for certain Salish languages (see Matthewson 1994 on St'át'imcets, among others).

⁴ One argument that this is schwa epenthesis and not syllabic resonants (and /z/) comes from the spread of palatalization. In Itelmen, /č/ and /ʃ/ are always palatalized. In general, /n/ and /l/ contrast with palatalized /n'/ and /l'/ in all positions, but these segments are always palatalized before the inherently palatalized segments. This spreading of palatalization does not cross schwa. For example, the word for 'fish' in the Northern dialect is [nənʃč]—only the second /n/ is palatalized by /č/ even though there is no general prohibition against /n'/ in onset, cf. [n'en'eqečχ] 'child-DIM.'

⁵ There are certain complications to do with word-initial exceptions. See the appendix, below.

⁶ St'át'imcets, a Salish language in which extensive consonant clusters are also attested, likewise prohibits R from cluster-medial position, requiring epenthetic schwa. For description and analysis, see Matthewson 1994. While Itelmen is strikingly similar to the Salish languages in a number of ways, there are notable differences concerning, e.g., the interaction of epenthesis and stress, and the possibility of obstruent only words (see, e.g., Bagemihl 1991).

1.2 Verbs The verbal domain is slightly more complicated than the nominal domain for two reasons. To begin with, there are no schwa/zero alternations in verb roots. In verb roots, occurrences of final R not preceded by a full vowel are always preceded by schwa; unlike noun roots, the initial segment of the following suffix is irrelevant. This is illustrated in (6); note that the root *sp(ə)l-* 'wind' can inflect either as a noun (1b) or verb.⁷

- (6) t-zəl-čən xan-zəl-um=nən
 1SG-give-1>3SG 3.IRR-give-1SG.OBJ=CL
 'I gave it (to him).' 'She might give me (to him)'
- spəl-qzu-in spəl:-in⁸
 wind-ASP-3SG wind-3SG
 'It was windy' 'It is windy'

The left-hand examples in (6) pattern with the nouns in (1a-d): schwa surfaces before a stem-final R followed by a suffix-initial consonant. However, as illustrated in the right-hand column, this schwa does not disappear when the suffix is vowel-initial, as would be predicted by (4). In other words, schwa in the environment C_R] in verb roots never alternates with zero, even though it does so in cognate noun roots (compare the noun and verb for 'wind'). Importantly, there is no minimal requirement on the shape or size of verb stems which could motivate schwa epenthesis here; verb roots with no vowel are common:

- (7) m-sk-čeʔn k-l-qzu-kn-eʔn
 1SG.IRR-make-1>3PL PRT-be-ASP-PRT-PL
 'I will make them' 'they were'

While there are no schwa/zero alternations in verb roots in Itelmen, there are alternations in the verbal inflectional morphology. The present tense suffix has four predictable allomorphs: [-əz-], [-əs-], [-z-] and [-s-]. The choice among these involves two alternations: voiced vs. voiceless and schwa vs. zero. The voiced/voiceless alternation is a straightforward case of regressive devoicing—if the segment immediately following the tense inflection begins with a (voiceless) consonant, then the voiceless allomorphs surface, while if the following suffix begins with a vowel, then the voiced alternant is used—(8a) vs. (8b).⁹

⁷ Note that very few roots show a dual life of this sort. Most roots are uniquely nominal or verbal.

⁸ Gemination is generally predictable: R -> R: / V'___ (i.e., post-tonic, intervocallic R_s lengthen). For complications which gemination may pose, see Appendix, section A.3.

⁹ Exceptional in this regard is the behaviour of /ʃ/. When a root or affix terminating in /ʃ/ immediately precedes the present tense marker, the /ʃ/ and /z/ somehow coalesce into a single surface segment [s]. Schwa is never epenthesized before this segment, and the segment remains voiceless even if, on the surface, it comes to be between two vowels. The infinitive, past and present of the verb meaning 'come, arrive' are given in (i):

(i) k'oʃ-kas INF k'oʃ-in (PAST)-3SG k'o-s-in -PRES-3SG

Note that [ʃs] clusters are generally permitted in the language, as in q-sunʃ-sx (2.IRR-live-2PL.SUBJ).

- (8) a. t'-nu-s-kičen b. nu-z:-in
 1SG-eat-PRES-1SG eat-PRES-3SG
 'I am eating.' 'He/she is eating.'

While this voicing alternation is sensitive to the environment to the right of the present tense marker, the schwa-zero alternation is sensitive exclusively to the environment to the *left* of the tense marker. If the verb stem (including pre-tense inflectional markers, if any) terminates in a vowel, then there is no schwa (9a-c), but if the verb stem ends in any consonant—except /ʎ/, see fn. 9—including any member of R, then schwa is obligatorily present (9d-f).

- (9) a. t-χzu-s-kičen b. ʎeru-z-in c. ʎ-qzu-z-in
 1SG-stand-PRES-1SG gripe-PRES-3SG be-ASP-PRES-3SG
 'I am standing' 'she gripes' 'she is'
- d. t'-il:-əs-kičen e. il:-əz-in f. spəl:-əz-in
 1SG-drink-PRES-1SG drink-PRES-3SG windy-PRES-3SG
 'I am drinking' 'he drinks' 'it is windy'

Ignoring for a moment the devoicing of /z/, the occurrence of schwa in (9d) is predicted by (4): (underlying) R sandwiched between consonants requires epenthetic schwa for reasons of syllabification. By the same token, though, schwa in (9e-f) is unexpected; since the following segment is a vowel, /z/ should be able to syllabify as an onset, as in comparable examples from the nominal system (1a'-c'). Example (9f) is particularly striking when contrasted with (1b'): in the nominal form there is no schwa epenthesis, and in the verbal form, there are two schwas.

The correct forms are derived on the assumption that the rule of epenthesis (4) applies cyclically in verbs and non-cyclically in nouns, illustrated below.¹⁰

¹⁰ An obvious question concerns the behaviour of stems in derivations which involve category changing, such as nominalizations of verbs. Unfortunately, the language, as far as I can tell, conspires against us. One test case would require a vowel-initial nominalizer added to the R-final verb stem (i.e., if the nominalizing suffix is consonant-initial, the environment for epenthesis is met on the surface for nouns as well as verbs). I have found no such morphemes. Another case would involve a vowel-initial verbal (derivational) suffix immediately following the verb root, followed in turn by a nominalizing suffix. Again, I have been unable to construct relevant cases, due to independent properties of the language's morpheme inventory.

	cyclic	non-cyclic
a. spl 'wind' + -ank (LOC)	[[spəl] ank]	spl-ank
Cycle 1	[spəl]	
Cycle 2	[[spəl] ank]	
OUTPUT	* spəlank	splank
b. spl + PRES + 3SG	[[[spəl] z] in]	spl-z-in
Cycle 1	[spəl]	
Cycle 2	[[spəl] əz]	
Cycle 3	[[[spəl] əz] in]	
OUTPUT	spələzin	*spələzin, *spləzin

On the first cycle of a cyclic derivation, the root alone is evaluated. Since following suffixes are not visible until subsequent cycles, a root-final R will trigger epenthesis if preceded by a consonant. This is the incorrect result for nouns, but is the correct result for verbs, deriving the fact that the schwas in ...CR] verb stems such as those in (6) do not alternate.

For the verb (10b), the present tense suffix /z/ is added on a subsequent cycle (the third line in (10b)). When this morpheme is added to a consonant-final stem, the environment for epenthesis is met—/z/ is a member of R, it is preceded by a consonant, and is followed by nothing (i.e., since the next suffix is added on the next cycle).

As shown in (10), the cyclic derivation makes the wrong prediction for nouns, predicting no alternation of schwa with zero before stem-final R. A single, non-cyclic application of (4) correctly predicts the alternations seen in the noun system. However, the inverse situation obtains for verbs. The non-cyclic derivation would, for instance, incorrectly predict the schwas in (6) to alternate with zero. Moreover, the cyclic derivation not only correctly predicts the alternations in the present tense marker, but it also correctly predicts the lack of alternation in verb roots.

An additional piece of evidence, alluded to above, also points to the cyclic nature of Itelmen verbal derivations. Recall from (8) that the devoicing of the present tense morpheme is essentially predictable from the nature of the following segment. Note moreover that schwa is epenthesized before the present tense marker (after consonant-final stems) regardless of whether or not the present tense marker is devoiced by a following consonant (see, e.g., (9d)). What is important about this observation is that the voiceless apical fricative, /s/, is not a member of R—that is, devoicing should bleed the application of epenthesis. This can be seen word-internally: while /z/ is not permitted between consonants, /s/ does not trigger epenthesis and occurs freely in clusters:

- (11) **k-sk-kna-ʔn** əŋqs-q-aʎ-iʔn k-ənsxt-iʔn
 PRT-do/make-PRT-PL hurt-ASP2-FUT-3PL PRT-bear-PRT.PL
 'they appeared' 'they will hurt' 'they bore them'

Crucially, regressive devoicing must apply *after* schwa epenthesis. This follows straightforwardly on the cyclic derivation: the environment for schwa

epenthesis is met at the point when the present tense suffix is added; the environment for devoicing does not arise until the subsequent cycle.

To summarize, three generalizations emerge from consideration of the Itelmen data considered here.

- (12) a. Most instances of schwa are in the environment: $\left\{ \begin{smallmatrix} C \\ \# \end{smallmatrix} \right\} _ R \left\{ \begin{smallmatrix} C \\ \# \end{smallmatrix} \right\}$.
- b. There are no surface sequences $\left\{ \begin{smallmatrix} C \\ \# \end{smallmatrix} \right\} R \left\{ \begin{smallmatrix} C \\ \# \end{smallmatrix} \right\}$.
- c. All instances of schwa not described by (12a) are in verbs and are in the environment C__R-V (where “-” indicates a morpheme boundary)

For each of these generalizations, there is a corresponding class of exceptions. These are considered in turn in the Appendix; there, I will show that these do not constitute counter-examples to the characterization of the facts as presented here, but do motivate some refinement. In brief, one class of apparent exceptions involves schwa which is inserted as a last resort in words with only obstruent consonants—a sort of minimal word effect. The other two classes of exceptions involve the left periphery of the word: while certain root-initial Rs fail to trigger epenthesis, we see that root-initial consonants behave specially in other respects as well; finally, a conflict arises with certain cases of stressed schwa before geminate, intervocalic R—the schwa epenthesis is predictable if the geminate is underlying, but the gemination would be predictable if schwa is underlying, an uncomfortable state of affairs for the theory, but not a crucial counter-example. Again, there are clear considerations involved for each of the classes of apparent exceptions to (12), and discussion of these is postponed until the appendix.

Throughout this section, I have argued that the observed generalizations motivate a simple analysis of the distribution of schwa in Itelmen, whereby schwa is always epenthetized for reasons of syllabification, as given in (4). A crucial assumption is that syllabification and epenthesis work cyclically in verbs and non-cyclically in nouns (recall the derivations in (10)). Further motivation for the cyclic nature of verbal derivation comes from the interaction of epenthesis and devoicing, particularly the failure of devoicing to bleed epenthesis in the present tense marker (9d).

Examples of apparent cyclic rule application of this sort pose a significant problem for non-serial, constraint based approaches to phonology such as many current versions of O.T. For instance, the environment for schwa epenthesis in verb stems and in the present tense marker obtains only at an intermediate level of representation, and is not met in either the underlying form or an output string which would lack epenthesis, yet it is exactly these intermediate levels which certain versions of O.T. explicitly deny. These facts must be captured in some different manner. In the next section, I will show that approaches to this problem in the current O.T. literature do not suffice for the Itelmen cases, lending support to proponents of cyclic derivations in phonology.

2. THEORETICAL IMPLICATIONS

One thread of recent work within the O.T. paradigm has focussed on attempts to capture apparent examples of cyclic effects in a non-serial, single-level model. Within this body of research, two families of approaches have emerged: one which appeals to alignment constraints requiring morphological and phonological

constituents to match up (see, among others, McCarthy & Prince 1993, Kenstowicz 1994, and references therein); and one which develops forms of output-output correspondence constraints (see Benua 1995, Burzio 1995, Kenstowicz 1995). In this section, I will evaluate to what degree selected proposals from these families are able to handle the Itelmen syllabification data. We will see that, where the predictions of current models are clear, they are wrong for Itelmen. For some proposals, it is not clear that no account could in principle be available, and I will only discuss what hurdles an account would have to overcome to be descriptively adequate for the syllabification data presented above. Since the focus of this section is to consider alternatives to cyclic models, I will have nothing to say about serial models, whether derivational or representational (such as multi-stratal O.T.).

2.1 Base Identity Of the various alternatives to cyclicity in the mono-stratal O.T. models, the only approach I am aware of which seeks to explain and predict differences between nouns and verbs is the Base Identity approach proposed by Kenstowicz 1995. Hence, we begin the discussion with this model. Kenstowicz’s formulation of the relevant constraint is given in (13).

- (13) Base Identity: Given an input structure [X Y] output candidates are evaluated for how well they match [X] and [Y] if the latter occur as independent words. (Kenstowicz 1995:8)

The function of this constraint is to promote some candidate on the basis of its similarity to an independently occurring word in the language, even though some other output candidate would otherwise be more favourable given the constraints operative in the language. This is perhaps best explicated by means of Kenstowicz’s examples. Consider first the various forms of a noun (14a) and verb (14b) from a conservative dialect of Korean, given in (14)

- | | | | | | |
|---------|----------|------------|----|-----------|---------------------|
| (14) a. | /kaps/ | ‘price’ | b. | /Eps/ | ‘not have’ |
| | kap | citation | | — | no uninflected form |
| | kaps-i | nominative | | Eps-Ess-E | past-informal |
| | kap-k’wa | N-’and’ | | Ep-t’a | non-past-formal |

The noun and verb each have a final consonant cluster in their underlying representations; this cluster surfaces before a vowel-initial suffix (third line of each example). Before a consonant-initial suffix (fourth line), or word-finally (second line), the cluster simplifies—the final consonant is left unparsed.

Consider now the corresponding forms from the speech of younger speakers, given in (15).

- | | | | | | |
|---------|----------|------------|----|-----------|---------------------|
| (15) a. | /kaps/ | ‘price’ | b. | /Eps/ | ‘not have’ |
| | kap | citation | | — | no uninflected form |
| | kap-i | nominative | | Eps-Ess-E | past-informal |
| | kap-k’wa | N-’and’ | | Ep-t’a | non-past-formal |

The difference between the two dialects surfaces in the third line—the vowel-initial suffixes. For the more conservative speakers, the underlying consonant clusters in both nouns and verbs surface in exactly this environment. However, for the younger speakers, the underlying cluster surfaces only in the verbs; in the nominal system, the underlying cluster fails to surface regardless of

phonological environment.¹¹ Thus, there is an apparent difference in syllabification between nouns and verbs. Base Identity gives a straightforward account of this difference: even though the stem-final /-s/ in the noun in (15a) is in principle syllabifiable before the vowel-initial nominative suffix (third line), Base Identity prefers an output without this /-s/ since such an output (i.e., *kapi*) corresponds more closely to the citation form *kap*, an independently occurring lexical item.¹² The crux of the account comes from the observation that verb stems, unlike noun stems, cannot occur in their bare form. Since there is no corresponding, uninflected form of the verb, Base Identity is irrelevant in the verbal system in Korean. In this way, differences of behaviour for syllabification between the nominal and verbal system are explained in terms of Base Identity since in only one case (the nouns) does the base correspond to an independent lexical item.

Since the noun stem may stand alone, Base Identity predicts that syllabification throughout the nominal paradigm should be uniform; the verbal paradigm should show sensitivity to the first segment of the following suffix, since there is no independent word corresponding to the bare verb stem. In Itelmen, as in Korean, noun stems may surface in their uninflected form (for Itelmen, subjects and direct objects surface thus), while verb stems may not surface without inflectional affixes. Thus, Base Identity should have the same effect in Itelmen as it does in Korean, predicting invariance in the nominal system—the stem form should not change regardless of the following suffix—and variability in the verbal system. This is the opposite of what we have seen above to be the case. This is illustrated in the following tableaux.

(16) Noun
'wind'+ LOC

Base Identity	* _{#} [C] _{#} R _{#} [C] _{#}	Fill
spəl 'wind'		

spl-ank <--correct form	★!		
spəl-ank WRONG ! ☞			★

¹¹ Kenstowicz (1995) does not discuss the motivation for including the cluster in the underlying representation in (15), as opposed to an alternative whereby the younger speakers have reanalysed the underlying forms as having no cluster. As the present purpose is merely to exemplify the mechanics of Base Identity, this question is academic in this context.

¹² The relevant constraints and their ranking are: *Complex >> Base Identity >> Parse-C, where *Complex bars complex onsets or codas, and Parse-C says that a consonant in the input form must show up in the output. I have omitted tableaux for reasons of space; see Kenstowicz 1995.

(17) Verb
'be windy'+ PRES + 3SG

Base Identity	* _{#} [C] _{#} R _{#} [C] _{#}	Fill
n/a		

spl-z-in		★!	
spəl-z-in WRONG ! ☞			★
spl-əz-in WRONG ! ☞			★
spəl-əz-in <-- correct			★★!

In these tableaux, the rule in (4) is translated as two constraints, one against unsyllabifiable R, the other, *Fill*, disfavouring epenthesis. Obviously, *Fill* must be the lower ranked of the two or there would be no epenthesis regardless of environment. Similarly, in order to have any effect whatsoever, Base Identity must be ranked above *Fill*; its ranking with respect to the *CRC constraint is irrelevant. As can be seen clearly from the tableaux, this approach predicts that schwa epenthesis which is not motivated by surface environment should only be motivated to conform with an independent stem, exactly the wrong prediction for both verbs and nouns.¹³

Kenstowicz's (1995) Base Identity is the only approach which attempts to derive verb vs. noun contrasts of this sort. Unfortunately, we have seen that the approach is not able to provide an account of the Itelmen data. Recent literature includes other output-output correspondence approaches, including *Uniform Exponence* (Kenstowicz 1995) or *Anti-Allomorphy* (Burzio 1995). Informally, these constraints require "minimiz[ing] the differences in the realizations of a lexical item (morpheme, stem, affix, word)" (Kenstowicz 1995:20). Issues of complexity aside (Itelmen verbs inflect for 2 moods, 3 tenses, 2 conjugation classes, and agreement in person and number with subject, direct and indirect object, in addition to a rich array of productive derivational morphology) such approaches have nothing to say about the systematic difference between nouns and verbs. More conclusively, *Anti-allomorphy* would have to be relativized to the verb root by stipulation. Recall that noun roots do show allomorphy, and in the verb system there are four allomorphs of the present tense marker: [-əz-], [-əs-], [-z-] and [-s-]. Given the cyclicity effects, separate constraint rankings would be necessary in order to drive the differences in environments for epenthesis between noun stems and the present tense marker. Moreover, relativizing an anti-allomorphy or a similar constraint to apply only to the verb root would reduce to a restatement of the descriptive observation which cyclicity explains, and is thus unsatisfactory.

2.2 Generalized Alignment. The second family of approaches for dealing with apparently cyclic phenomena in a monostratal O.T. model captures the effects of morpheme boundaries by requiring, e.g., that some edge of a morphological

¹³ I have used the verb and noun from the root *spl* 'wind' for purposes of exposition. Most roots in Itelmen are solely verbal or solely nominal and cannot inflect across categories in this way. Hence, an appeal to Base Identity between the verb stem and the bare noun will work accidentally in the case of (17), but cannot work as a general property of the system since most verbs do not have a cognate bare noun.

constituent coincide with the edge of a phonological constituent, a family of constraints originating in McCarthy & Prince (1993). One could imagine an appeal to Generalized Alignment which would handle the cases which the output-output correspondence theories failed to handle, in particular, the case of multiple epenthesis of schwa as in (17). Saying nothing about the nouns, some constraint (referred to below as GA) requires that the right edge of verbal roots and of the present tense marker—but mysteriously of no other suffix—coincides with the right edge of a syllable. Moreover, though complex codas are allowed, some Coda constraint prohibits CR codas. If both of these constraints are ranked above the constraint disfavouring epenthesis, then the correct candidate in (17) is predicted.

(18) Verb 'be windy'+ PRES + 3SG

CODA * CR	GA +V],R , σ,R	FILL
--------------	-------------------	------

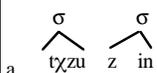
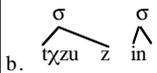
a. spl-z-in	★!	★★	
b. spəl-z-in		★! (-z-)	★
c. spl-əz-in		★! (stem)	★
d. spəl-əz-in	☞		★★!

In this system, violations of the coda constraint can be avoided if, e.g., in (18b) the /z/ syllabifies as an onset to the agreement suffix, or in (18c) if the final /l/ of the verb root syllabifies as an onset to the syllable headed by an epenthetic schwa. However, in each case a violation of the GA constraint would be incurred. Only by epenthesis more than once could both the Coda and GA violations be avoided. Technically, this provides an account of the forms which Base Identity could not account for, but such an approach raises other questions. One implication is that the morpheme-final consonants, even intervocalically, are not syllabified as onsets; in (18d) or structurally parallel examples with full vowels, the syllables are VC and lack onsets.¹⁴ There also remains the question of why it is only these suffixes which must be listed in the formulation of GA. More importantly, this approach may run into problems with vowel-final verb stems, as illustrated in (19):

¹⁴ Though it is often assumed that onsets are preferred over codas universally, evidence that at least some languages are best analysed as having VC syllables is given in Breen & Pensalfini, to appear.

(19) Verb Vowel-Final stem
'stand'+ PRES + 3SG

CODA * CR	GA +V],R , σ,R	FILL
--------------	-------------------	------

a. 		★! (-z-)	
b. 		★! (stem)	
c. tʃzu-əz-in	Wrong ☞		★

The problem which this appears to pose is that when the present tense marker is intervocalic, syllabification of /z/ as an onset (19a) incurs a GA violation since the present tense suffix is not aligned with the right edge of a syllable. Avoiding this by syllabifying the present tense marker as a coda (19b) likewise incurs a GA violation since the verb stem is not aligned to the right edge of a syllable. The winning candidate in such cases would appear to be the one with schwa epenthesis, contrary to fact.¹⁵

A final problem for the GA approach is the failure of regressive devoicing to bleed schwa epenthesis (see the discussion above (11)). On the surface, /s/ should not trigger epenthesis—indeed, /-s/ in root-final position or in suffix initial position never forces schwa epenthesis. Both facts are illustrated in (20):

(20) qomsqzuβumsx < /q-oms-qzu-βum-sx/
2.IRR-abandon-ASP-1SG.OBJ-2PL.SUBJ
'Leave me (here)'

3. Conclusion. The descriptive goal of this paper has been to show that the distribution of schwa in Itelmen is predictable from simple considerations of syllabification, considerations which are familiar from other languages. The caveat 'mostly' in the title refers to a certain case of potential exceptions, discussed in the appendix below. In particular, the Itelmen epenthesis data—and its relationship to a rule of devoicing—points to the role of the cycle in providing a concise account of Itelmen phonological processes.

Since apparent cyclic behaviour of this sort is potentially problematic for mono-staratal approaches to phonology, such as many versions of O.T., the second half of the paper was devoted to an exploration of the implications of the Itelmen data for current theories. Two families of recent non-serial alternatives to O.T. were considered: output-output correspondences, and Generalized Alignment. For the first group, the one analysis which attempts to derive noun versus verb asymmetries of exactly the sort examined here (Base Identity, Kenstowicz 1995), makes the wrong predictions for both the verbs and the nouns. While I am aware of no particular analysis of similar data invoking Generalized Alignment, in section

¹⁵ Edward Flemming suggests that a highly ranked constraint against vowel-schwa sequences, for instance, may allow one or both of (19a,b) to win.

2.2 I sketched what such an analysis might look like. Like the Output-Output Correspondence approaches, GA appears to face significant problems which do not arise on a cyclic approach. As always, this type of argument runs the risk of setting up an implausible account and then pointing out the flaws in it, failing to understand the true potential of a given theory. Even with this in mind, I hope to have shown that there may be a more general problem with the GA account.

On an account which embraces a cycle (including serial versions of O.T.), it remains unexplained why nominal derivations are non-cyclic and verbal derivations cyclic. Nevertheless, from this one assumption, the facts presented above follow straightforwardly: schwa in verb roots never alternates with zero, alternating schwa in nouns is sensitive to both preceding and following segments while the alternating schwa in the present tense suffix is sensitive only to the preceding segment, and regressive devoicing of the present tense suffix fails to bleed schwa epenthesis. The GA approach likewise has no account of the difference between nouns and verbs; however, there is no equivalent assumption to cyclicity, and this clustering of properties can no longer be seen to constitute a natural class with a unified explanation. Each must be derived by different combinations of constraints.

It is undoubtedly the case that some account in a mono-stratal approach will mechanically derive the facts presented here; the challenge for such an approach is to capture at the same time the observation that the cycle expresses a generalization, unifying a range of phenomena as the result of a single aspect of the phonological component. To the extent the descriptive generalizations are true, one would hope that they fall out of the theory.

APPENDIX: THE EXCEPTIONS

For the sake of completeness, I will briefly consider here the apparent exceptions to (12) and argue that these are not counter-examples for the analysis presented here, but rather form clearly delineable classes of principled exceptions, which for the most part find plausible explanation from general considerations. At the very least, the fact that the exceptions all concern the left edge of the word or the first syllable suggests that they are not accidental by any means.

A.1 CəC The first class of exceptions concern (12a), and involve occurrences of schwa between two consonants not from R. Some examples are given in (21).

- | | | | | | | |
|------|----|--------|----------|-----|----------|-----------|
| (21) | a. | ˠqəsχ | dog | aˠ. | ˠqsχ-aj | dog-PEJOR |
| | b. | čkəp | fungus | bˠ. | čkp-əʔn | fungus-PL |
| | c. | čkpəč | spoon | cˠ. | čkpč-əʔn | spoon-PL |
| | d. | čət | gun, bow | dˠ. | čt-əʔn | gun-PL |
| | e. | kəpkəp | tooth | eˠ. | kp-əʔn | tooth-PL |

In each of these examples, the schwa alternates with zero in suffixed forms, e.g., with the plural or pejorative. More importantly, in the forms on the left, there are no vowels other than schwa, nor are there any consonants from R in the word. And, with the exception of reduplicated forms such as (21e), each form involves only one schwa. The data thus points to a “last resort epenthesis”—a requirement that all words have at least one syllable. In this way, the forms in (21) would count as a principled exception to the approach advocated here and are not problematic.

A.2 #RC Another class of exceptions consists of Rs which are not adjacent to vowels (and thus cannot be syllabified) but nevertheless fail to trigger epenthesis, violating (12b). Some of these are listed in (22)

- | | | | | |
|------|-------------|----------|------------|------------------------|
| (22) | lq-laχ | cold-ADJ | mč'emč | rowan berry |
| | lq-aq | cold-ADV | msetenəŋ | stick used for digging |
| | zlatumx (N) | sibling | ŋrepe-z-in | sing-PRES-3SG |

In all cases which I have found of this sort, the unsyllabified R is the initial consonant of a root. While no explanation springs immediately to mind, the fact that all of the cases involve a root-initial R suggests that the direction to an explanation lies with other edge-phenomena such as extrametricality. Of possible relevance here is a historical split between the Northern (Sedanka) and Southern (Khairuzovo) dialects of Western Itelmen, first noted by Moll 1960. While both dialects maintain a voiced-voiceless contrast for fricatives in root-initial position (23b-c), there are certain mismatches where a voiced fricative in the Northern dialects correspond to a voiceless fricative in the Southern dialects (23d-e).

(gloss)	North	South
a. thimble	βolβol	βolβol
b. give	zəl-	zəl-
c. which	saq	saq
d. seal	βitβit	φitβit
e. live	zunł-	sunł-

These idiosyncratic voicing mismatches between the dialects occur only in the initial position of certain roots, the same position that the idiosyncratic extrasyllabic Rs occupy.¹⁶ Hence, the exceptions form a discrete class, with some independent plausibility in the context of the language, even if no account is forthcoming.

A.3 əR:V The final class of exceptions involve schwa before R which, it would appear, could syllabify as the onset to a full vowel, as in (24).

- | | | | | |
|------|-----------|-------------|---------------|-------------|
| (24) | kəm:a (S) | 1sg pronoun | səl:atumx (S) | sibling |
| | əz:o-s | put-INF | qəl:al | snow |
| | əl:e-kas | get-INF | əz:-ank | outside-LOC |

One point of regularity about these cases is that they all occur in the first syllable of the word. As Itelmen has initial stress, these schwas all receive word stress. Moreover, in all of these cases, the R following the schwa is geminate. In

¹⁶ That the correct characterization of the position in question is root-initial, as opposed, e.g., to word-initial, can be seen when inflectional prefixes are added, thus:

- | | | |
|-------|-------------------|----------------------|
| (i) | k'-ŋrep-qzu-knen | PRT-sing-ASP-PRT.3SG |
| (ii) | t-zun-s-kičen (N) | 1SG-live-PRES-1SG |
| (ii') | t-sun-s-kičen (S) | --same-- |

this fact, however, lies the root of a paradox. One could propose that the geminates are underlyingly two segments, in which case the appearance of schwa in (24) would be predicted (i.e., by (4)). On the other hand, gemination in Itelmen is otherwise fully predictable: post-tonic, intervocalic R is always geminate, and this environment is the only position in which geminates are attested. Cases such as (24) would be no exception to the rule of gemination if the schwa is underlying. And thus, the paradox. If it were not for cases like (24), both gemination and the distribution of schwa would be entirely predictable, but in cases like (24), it appears that either gemination or epenthesis, but not both, is predictable.

To summarize, the generalizations in (12) are not without exceptions. However, what I have shown in this section is that the exceptions fall into three classes, each clearly delimitable and thus understandable in terms of other aspects of the grammar. The first class is easily explained by appeal to a minimality constraint on words motivating a last resort epenthesis. The two remaining classes of exceptions both involve the left periphery of the word: extrasyllabic root-initial consonants, and exceptionally marked geminates or first syllable schwas. While an appealing account is not readily forthcoming, the fact that we can so clearly delineate the classes of exceptions suggests that an account can be found.

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