Polish Yers and the Finer Structure of Output-Output Correspondence[*]

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0.   Introduction

The fundamental problem posed by Slavic alternating vowels, called yers, is represented by the three nominal paradigms in (1). In (1b) a full vowel appears throughout the inflectional paradigm; the stem is invariant. In (1c) the stem is also invariant and ends in a cluster regardless of the following inflection. The paradigm in (1a) contains the yer (underlined). This vowel is phonetically identical to [ɛ] in (1b), but unlike the vowel in (1b), the yer only appears when the following inflection is null, creating an alternation in the stem.

(1) Three Representative Paradigms

a.	Yer Vowel - 'sweater'	b.	Full Vowel - 'bicycle'	c.	Final Cluster - 'Peter'
	sfɛtɛr-Ø (nom.sg.)		rovɛr-Ø (nom.sg.)		pʲotr-Ø (nom.sg.)
	sfɛtr-a (gen.sg.)		rovɛr-a (gen.sg.)		pʲotr-u (gen.sg.)
	sfɛtr-ami (instr.pl.)		rovɛr-ami (instr.pl.)		pʲotr-ami (instr.pl.)

From these three paradigms, which are all fully productive and span both native and borrowed lexical strata in Polish, it can be seen that the stem alternation in (1a) is not due to epenthesis or deletion of regular [ɛ]. Deletion of [ɛ] in [sfɛtr-a] is excluded by the existence of [rovɛr-a] wherein the vowel is maintained in an identical context. On the other hand, epenthesis of [ɛ] in [sfɛtɛr-Ø] is excluded by the existence of [pʲotr-Ø] wherein an identical final cluster is tolerated. For these reasons previous accounts have unanimously treated yers as abstract vowels, underlyingly distinct from regular [ɛ].

This paper presents a novel, Optimality Theoretic (Prince and Smolensky 1993) analysis of yers, with focus on patterns in derived paradigms, inflectional paradigms of items that also involve derivational morphology. §1 presents a brief

sketch of previous work. §2 argues that in OT, the types of alternations exhibited by yers are predicted by richness of the base, and an analysis is proposed. §3 introduces a novel type of output-output correspondence called Contextual Identity, which accounts for the patterns observed in derived paradigms.

1.   Background

There is a large body of literature on yers in Slavic and providing a detailed review is not possible due to space restrictions (Gussmann 1980, Rubach 1984, 1985, Spencer 1986, Szpyra 1989, 1992, Piotrowski et al 1992, Yearley 1995, Rowicka 1999, Scheer in press). All previous accounts, however, treat yers as abstract vowels, differing from full vowels by the lack of a root node, melodic specification, or special feature settings. Furthermore, many of the previous accounts rely on some form of a rule called 'Lower', which vocalizes a yer when followed by another yer in the next syllable (Gussmann 1980, Rubach 1984, 1985, Spencer 1986, Szpyra 1989). Yers are deleted otherwise. For example, the input /VCECE/ (where /E/ is an underlying yer) would surface as [VCɛC], while /VCEC/ would surface as [VCC].

As noted in some authors, however, the rule of Lower is not phonologically motivated (Szpyra 1992, Yearley 1995, Rowicka 1999, Scheer in press). There is nothing particular about the presence of a yer vowel that should bring about the vocalization of a yer in a preceeding syllable, suggesting that this view is a descriptive artifact. In addition, these accounts have to postulate abstract representations in which null inflections are actually underlying yers that never surface. For example, the underlying form of the nominative case of *sweater* would be /sfɛtEr-E/; the final yer never appears on the surface. This rule was designed to account for patterns in derived paradigms, where multiple consecutive yers vocalize. These patterns will be addressed in §2.2.

2.   Yers in Simple Paradigms

This section lays out the basics of the analysis and presents the account of the paradigms in (1). Richness of the Base (RotB) implies that all languages undergo absolute neutralization of some input segments. In most cases these processes do not play an active role in the grammar; however, RotB predicts the existence of languages wherein multiple repairs of offending inputs are possible, yielding alternations. Slavic yers are one such case where repairs depend on context.

(2) Polish Vowel Inventory

	i	ɨ	u	ɛ	o	a	ɪ	ɘ
high	+	+	+	–	–	–	+	–
low	–	–	–	–	–	+	–	–
tense	+	+	+	–	–	–	–	+
back	–	+	+	–	+	+	–	+
round	–	–	+	–	+	–	–	–

Thus, like previous accounts, this account assumes an underlying distinction between [ɛ] and the yer despite their surface neutralization. In contrast to previous accounts, however, the weakness of yers is attributed here to universal markedness constraints. In particular, the feature combination [αhigh][βtense] (where α≠β) of yers is marked due to the articulatory effort associated with these antagonistic tongue height and tongue retraction positions (Archangeli and Pulleybank 1994). The full set of vowel features in Polish is shown in (2). While there are two yers in Polish, the front /ɪ/ and back /ɘ/, this paper presents an analysis of underived and suffixed forms in which only the front yer appears.[1] Both yers differ from their full vowel counterparts by the setting for the high feature, and both violate a markedness constraint against a mismatch on the high and tense features: *[αHIGH][βTENSE]. This constraint is abbreviated as *ɪ.

When /ɪ/ vocalizes, as in the case of [sfɛtɛr-Ø], the value for the [high] feature changes from [+high] to [–high], violating the standard faithfulness constraint IDENT[HIGH]. On the other hand, when the yer /ɪ/ deletes, as in [sfɛtr-a], the standard faithfulness constraint MAX-V, which penalizes deletion of vowels, is violated. In other words, the yer may never surface faithfully: it must either lower or delete entirely.[2] This means that *ɪ is ranked above the two faithfulness constraints: *ɪ >> IDENT[HIGH], MAX-V.

Whether the yer vocalizes or deletes depends on the inflectional material that follows it. In particular, vocalization occurs if and only if the following inflection is null. There is a straightforward explanation for this behavior: when the inflection is null, the vocalization of the yer prevents a complex cluster word finally: *[sfɛtr]. When, on the other hand, inflection provides a vowel, the second consonant of the cluster may syllabify with the inflection, avoiding a complex coda: [sfɛt.r-a]. Thus *COMPLEXCODA compels the vocalization of yers: that is, the violation of IDENT[HIGH]. This is shown in (3): candidate (3b) is ruled out by the *COMPLEXCODA violation, and the optimal candidate (3a) violates IDENT[HIGH].

(3) Yer Vocalization

/sfɛtɪr-Ø/	*ɪ	*CMPLXCD	ID[HI]	MAX-V
☞ a. sfɛ.tɛr			*	
b. sfɛtr		*!		*
c. sfɛ.tɪr	*!			

Yers delete when their presence is not required by syllable structure constraints; this means IDENT[HIGH] is ranked above MAX-V. (4) shows the optimi-

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[1] The back yer may be observed in prefixed verbs. Some previous accounts attribute palatalization to the presence of the front yer and lack thereof to the back yer (Rubach 1984); in the present account only surface [ɛ] is derived from underlying /ɪ/.

[2] A similar situation is described by Hyman (2001) in the African language of Gunu. Hyman proposes two vowels, U and I, which are high, lax vowels that never surface faithfully due to rounding and ATR vowel harmony.

zation of [sfɛtr-a]; here a yer that does not repair a complex coda is deleted. Note that this constraint ranking does not predict any alternations for full vowels. Although MAX-V is ranked relatively low, there are no markedness constraints penalizing full vowels, and they would always surface faithfully. In Tableau (5) the optimal candidate (5a) violates no constraints.

(4) Yer Deletion

/sfɛtɪr-a/	*ɪ	*CMPLXCD	ID[HI]	MAX-V
a. sfɛ.tɛ̲.ra			*!	
☞ b. sfɛ.tra				*
c. sfɛ.tɪ.ra	*!			

(5) Faithfulness of Full Vowels

/rovɛr-a/	*ɪ	*CMPLXCD	ID[HI]	MAX-V
☞ a. ro.vɛ.ra				
b. ro.vra				*!

While *COMPLEXCODA compels yer vocalization, complex codas are in general possible in Polish, as the form [pʲotr] demonstrates. To allow complex codas to surface faithfully in general DEP-V must be ranked above *COMPLEXCODA. The faithful candidate (6b) is optimal despite its complex coda. Thus, yer vocalization is a case of emergence of the unmarked: a markedness constraint that is violated on the surface still plays an active role in the grammar, acting as the driving force behind yer vocalization.

(6) Grammaticality of Complex Codas

/pʲotr-Ø/	*ɪ	DEP-V	*CMPLXCD	ID[HI]	MAX-V
a. pʲo.tɛr		*!			
☞ b. pʲotr			*		

(7) Yer Vocalization (a) and Deletion (b) in Tri-consonantal Clusters

a. /marxɪv-Ø/	*ɪ	*CMPLXCD	ID[HI]	MAX-V
☞ mar.xɛv			*	
marxv		*!		*
b. /marxɪv-a/				
mar.xɛ.va			*!	
☞ mar.xva				*

The account of syllable-driven yer vocalization presented here has the advantage of accounting for previously unexplained systematic gaps in yer vocalization patterns. All word-final yer vocalization follows the template XCC-Y ~ XCɛC-Ø, where Y is any overt inflection, and X, any vowel or consonant. In addition to

forms like [sfɛtɛ̠r-Ø] ~ [sfɛtr-a], there are many cases where the yer breaks up a sequence of three consonants, for example [marxv-a] ~ [marxɛ̠f] 'carrot'. These cases also follow straightforwardly from the proposed constraint ranking, yielding yer vocalization before null inflection (7a) and deletion otherwise (7b).

In contrast, alternations of the type CCC-Y ~ CɛCC-Ø, where a yer vocalizes between the first and second consonant of the triple, are conspicuously absent. The present analysis correctly predicts their absence: if there were an underlying yer between the first and second consonants of a stem-final cluster, it would always delete. Tableau (8) shows the optimization of hypothetical input /marɪxv-Ø/, with a yer between the first and second consonants.

(8) Yer Deletion in Tri-consonantal Clusters

/marɪxv-Ø/	*ɪ	*CMPLXCD	ID[HI]	MAX-V
a. ma.rɛ̠xv		*	*!	
☞ b. marxv		*		*

Yers vocalize to prevent complex codas, and in this case, vocalizing the yer in (8a) does not prevent a complex coda. Deletion is chosen even before null inflection (8b). The optimal candidate has a tri-consonantal word-final cluster, which is not uncommon in Polish: coda clusters up to length five are observed. In sum, this section argues that RotB not only predicts the existence of alternating vowels like yers, whose deletion and vocalization depend on syllable structure, but, in addition, its consideration in combination with a more phonologically motivated yer vocalization process explains a systematic gap in yer vocalization patterns.

3. Yers in Derived Paradigms
3.1 Yers in Suffixes

When a suffix containing a yer, the diminutive [-ɪk-], is attached to stems from paradigms (1b) or (1c), the resulting patterns are identical to those observed in simple paradigms (9). Although the morphology is more complex, the generalization remains the same: the yer of the suffix is vocalized when it prevents a complex coda [pʲotr-ɛ̠k] and deleted otherwise [pʲotr-k-a].

(9) Simple and Derived Paradigms: Stems with Full Vowels (a) and Clusters (b)

		underlying form	simple paradigm	derived paradigm
a.	'bicycle'	/rovɛr/	rovɛr (nom. sg.)	rovɛr-ɛ̠k-Ø (nom. sg.)
	(fem)		rovɛr-a (gen. sg)	rovɛr-k̠-a (gen. sg)
b.	'Peter'	/pʲotr/	pʲotr (nom. sg.)	pʲotr-ɛ̠k-Ø (nom. sg.)
	(masc)		pʲotr-a (gen. sg.)	pʲotr-k̠-a (gen. sg.)

These patterns follow from the grammar already introduced. The yer of the suffix is vocalized to prevent the *COMPLEXCODA violation caused by deletion (10a). In (10b) deleting the yer does not create a complex coda because the [r] can

syllabify with the onset of the following syllable. The next section will address in more detail the fact that the correct output contains a word-medial [trk] cluster.

(10) Vocalization (a) and Deletion (b) of Yers in Derivation Suffixes

a. /pʲotr-ɪk-Ø/	*ɪ	DEP-V	*CMPLXCD	ID[HI]	MAX-V
pʲotrk			*!		*
☞ pʲo.trɛk				*	
b. /pʲo.trɪ.ka/					
☞ pʲot.rka					*
pʲo.trɛ.ka				*!	

3.2 Multiple Yers

In complex forms with multiple yers, the vocalization of yers cannot be explained by syllable structure alone. When the diminutive /-ɪk-/ is suffixed (11), multiple consecutive yers surface: underlying /sfɛtɪr-ɪk-ɪk-Ø/ surfaces as [sfɛtɛr-ɛtʃ-ɛk], with three yers vocalizing in a row. Vocalizing two of these yers would be sufficient to satisfy *COMPLEXCODA, but cases such as *[sfɛtɛr-tʃ-ɛk] are not observed. It is for these patterns that the rule of 'Lower' in previous work was designed, but as discussed earlier, this apparent simplicity was at the expense of a phonologically motivated process and abstract underlying representations for inflectional material. In other words, the previous accounts had treated the patterns in morphologically complex forms as the basic generalization and had to manipulate underlying forms of morphologically simple forms to predict their behavior. The approach taken here is the opposite: the patterns in general are viewed as driven by syllable structure, and the goal of the present section is to account for the more complex behavior in derived paradigms.

(11) Regular Derived Paradigms

	simple paradigm	diminutive paradigm	dbl diminutive paradigm
a. 'sweater'	sfɛtɛr-Ø (nom. sg.)	sfɛtɛr-ɛk-Ø (nom. sg.)	sfɛtɛr-ɛtʃ-ɛk-Ø (nom. sg.)
(masc)	sfɛtr-a (gen. sg)	sfɛtɛr-k-a (gen. sg)	sfɛtɛr-ɛtʃ-k-a (gen. sg)
b. 'pearl'	pɛrw-a (nom. sg.)	pɛrɛw-k-a (nom. sg.)	pɛrɛw-ɛtʃ-k-a (nom. sg.)
(fem)	pɛrɛw-Ø (gen. pl.)	pɛrɛw-ɛk-Ø (gen. pl.)	pɛrɛw-ɛtʃ-ɛk-Ø (gen. pl.)
c. 'bottle'	butl-a (nom. sg.)	butɛl-k-a (nom. sg.)	butɛl-ɛtʃ-k-a (nom. sg.)
(fem)	butl-i (gen. pl)	butɛl-ɛk-Ø (gen. pl)	butɛl-ɛtʃ-ɛk-Ø (gen. pl)

At first glance these patterns suggest a cyclic effect, instantiated as Base Identity (Benua 1995, Burzio 1994, Kenstowicz 1996) in Optimality Theory. The nominative singular [sfɛtɛr] seems to act as base for the derived [sfɛtɛrɛk] and [sfɛtɛrka] (11a) (see Yearly 1995 for such a proposal for Russian yers). However, upon closer inspection, Base Identity cannot be the solution. First, only one case in the simple paradigm provides the correct base; even if the appropriate case could be stipulated as nominative singular [sfɛtɛr], this would make the wrong

prediction for feminine and neuter nouns, which appear with null inflection in the genitive plural [pɛrɛ̠w] (11b). Even more problematically, this approach would fail to account for stems from inflectional paradigms with no zero-marked case whatsoever, which occurs with some feminine nouns (11c). There is no base in the simple paradigm for *bottle* that could be used to predict the appearance of a yer in the derived paradigms. None of the simple forms vocalize the yer: no matter how a base is defined, yer vocalization in the diminutive will be excluded by any cyclic OT account, including derivational OT.

The accurate generalization is that base selection favors a certain phonological shape for the base, and is independent of the base's morphological properties and its existence as an independent word. This behavior suggests a second possible solution, Paradigm Uniformity or Uniform Exponence (Kenstowicz 1996, McCarthy 2005), which requires inflectional stems remain constant throughout a paradigm. As McCarthy argues, this approach allows for stem uniformity and overapplication of some process, in this case yer vocalization. However, the standard definition of Paradigm Uniformity does not apply here because it is not the inflectional stem that remains invariant. In fact, the inflection stem varies between [sfɛtɛrɛk-] and [sfɛtɛrk-] depending on the inflection. It is the derivational stem [sfɛtɛr-], the morpheme to which the diminutive is attached, that remains uniform: [[sfɛtɛ̠r]-ɛ̠k] and [[sfɛtɛ̠r]-k-a].

(12) Raising in Simple Paradigms and Leveling in Derived Paradigms

	nom. sg.	gen. sg.	instr. sg.	gen. pl.
a. simple paradigm – 'hole' (masc)	duw	do.wu	do.wɛm	do.wuf
b. simple paradigm – 'cow' (fem)	kro.va	kro.vɨ	kro.võ	kruf
c. derived paradigm – 'little hole' (masc)	do.wɛk	dow.ka	dow.kʲɛm	dow.kuf
d. derived paradigm – 'little cow' (fem)	kruf.ka	kruf.ki	kruf.kõ	kru.vɛk

There is a second process, raising, that provides further support for this observation. Raising of [o] to [u] occurs in closed syllables. This process applies regularly in simple paradigms with [o] occurring in open syllables [do.w-u], [krov-a] and [u] in closed syllables [duw], [kruf] (12a-b). In derived paradigms the raising either uniformly overapplies (feminine nouns (12d)) or uniformly underapplies (masculine nouns (12c)). Previous authors have accounted for the choice of [o] or [u] in the derived paradigm by appealing to the privileged status of the nominative singular case, but they have provided no explanation of why there is leveling in the derived paradigms and regular application in the simple paradigms (Kraska-Szlenk 1995, Kenstowicz 1996). This phenomenon mirrors that of the overapplication of yer vocalization: yer vocalization applies regularly in simple paradigms, vocalizing to prevent complex codas, and uniformly overapplies in the stems of derived paradigms, vocalizing even when no complex codas would be created by their deletion. Standard Paradigm Uniformity cannot account for the discrepancies observed between simple and derived paradigms.

These phenomena suggest that the typology of output-output correspondence is finer grained than just the disjunction of Base Identity and Paradigm Uniformity. The stems of derived paradigms exhibit a stronger leveling effect than those in simple paradigms. To account for this effect, this analysis proposes a novel type of output-output correspondence called **Contextual Correspondence**:

(13) **Contextual Correspondence**: Two surface forms x and x′ are in Contextual Correspondence if both conditions (a) and (b) hold:
a.   x and x′ are surface realizations of some morpheme /X/, and
b.   x and x′ are each part of morphologically complex representations, [[([z])x]y] and [[([w])x′]y′] (or [y[x([z])]] and [y′[x′([w])]]) respectively, where y and y′ are surface realizations of a single morpheme /Y/.

(13a) identifies Contextual Correspondence as a surface to surface correspondence relation. (13b) requires that the surface realizations of the morphemes in correspondence, x and x′, occur in identical morphological contexts. In particular, the morpheme exterior to /X/ in both structures must be /Y/. The optional morphemes [z] and [w], written ([z]) and ([w]), indicate that /X/ itself may be an affix attached to the (possibly complex) morphemes [z] and [w] and need not be a root.

This definition is exemplified in (14). The two realizations of A, in (14a) and (14b), are in Contextual Correspondence due to the presence of B in both structures. The two Bs in (14a) and (14b) are not in Contextual Correspondence because the outer morphological material varies between C and D.

(14) Contextual Identity Schema and Example
a. $[[[A] - B] - C]$ $[[[sf\varepsilon t\text{ɪ}r]_A \text{ -ɪk}]_B \text{ -Ø}]_C$
b. $[[[A] - B] - D]$ $[[[sf\varepsilon t\text{ɪ}r]_A \text{ -ɪk}]_B \text{ -a}]_D$
c. $[[[E] - B] - D]$ $[[[krat\varepsilon r]_E \text{ -ɪk}]_B \text{ -a}]_D$

Contextual Correspondence holds between all morphemes, not just roots. It holds between affixes in identical morphological contexts as well: the realizations of B in (14b) and (14c) are in Contextual Correspondence due to the identical morphological context D in both words. Thus, Contextual Correspondence is a contextual version of Uniform Exponence (Kenstowicz 1996): it applies to all morphemes but only under uniformity of context. **Contextual Identity** is the constraint requiring identity between morphemes in Contextual Correspondence. Contextual Identity should be viewed as a family of constraints, separable into different constraints for different types of morphemes. Whether these effects may be collapsed into one constraint in general, as they may in Polish, is an empirical question that must be determined by examination of other languages.

In addition to the empirical evidence supporting Contextual Correspondence, the framework of Burzio (1998, 2002, 2005) provides theoretical support. Under Burzio's Representational Entailments Hypothesis, each aspect of the representation (phonological, morphological or semantic) entails each of the other aspects.

Higher order entailments, induced by higher similarity of representations, imply stronger faithfulness between related forms. This applies directly in the case of Contextual Correspondence; the higher dimensional similarity imposed by the presence of identical outer morphological material implies stronger faithfulness.

    To complete the analysis of derived paradigms, one final constraint is required in addition to Contextual Identity. The latter requires that the base be uniform. However, for an input paradigm such as /butɪl-ɪk-X/ there remain two possibilities: uniformly selecting [butl-] or uniformly selecting [butɛl-]. In the present grammar [butl-] would be the optimal choice because vocalizing yers comes at a higher cost than deleting them. This is not the correct output, however; [butɛl-] is chosen as the stem. The paradigms in (15) (repeated from 9b and 11c) demonstrate that the constraint responsible for ruling out [butl-] must be a faithfulness constraint. In particular, a word medial tri-consonantal cluster is not problematic in [pʲotr-k-a] (15b) although this cluster could be repaired by vocalizing the yer: *[pʲotr-ɛ̲k-a]. The only difference between the two forms that could predict the vocalization of the yer in (15a) is the presence of a stem yer in the input. The constraint employed here is MAX-V^2, which prohibits the deletion of two consecutive vowels.[3] Thus, while [pʲotr-k-a] involves deletion of only one vowel, MAX-V^2 excludes [butlk-a] due to the deletion of both yers.

(15) Simple and Derived Paradigms: Stems with Yers (a) and Final Clusters (b)

		underlying form	simple paradigm	derived paradigm
a.	'bottle'	/butɪl/	butl-a (nom. sg.)	butɛ̲l-k-a (nom. sg.)
	(fem)		butl-i (gen. pl)	butɛ̲l-ɛ̲k-Ø (gen. pl)
b.	'Peter'	/pʲotr/	pʲotr (nom. sg.)	pʲotr-ɛ̲k-Ø (nom. sg.)
	(masc)		pʲotr-a (gen. sg.)	pʲotr-k-a (gen. sg.)

    (16) shows the interaction of Contextual Identity, MAX-V^2, and the other constraints in selecting the correct base and diminutive allomorph. Contextual Identity requires uniformity of the root within the paradigm as well as consistency of the diminutive across roots within the same inflectional category. These Contextual Correspondence relations are explicitly indicated on the second line of the input. The term 'NOUN-ɛ̲k-Ø' refers to other classes of nouns with the diminutive and nominative singular case inflection, exemplified by [rovɛr-ɛ̲k-Ø] and [pʲotr-ɛ̲k-Ø] in (9). This correspondence requires that the diminutive surface as [ɛk] when followed by zero inflection. Likewise, 'NOUN-k-a' refers to the genitive counterparts of these other nouns (also in (9)) and requires that the diminutive surface as [k] in the genitive singular case. Thus, there are three identity criteria at work: one requiring the root to be invariant; the second requir-

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[3] While there are a number of possible alternative faithfulness constraints, evidence that this is the correct constraint comes from alternations that occur with prefixed verbs. In these cases, there are two consecutive yers, for example /zɪ-bɪraw/ 'he collected', and two grammatical outputs, differing in aspect: *zɛ̲braw*, *zbʲɛ̲raw*. Max-V^2 prevents the deletion of both yers.

ing surface [ɛk] in the nominative singular case; and the third requiring surface [k] in the genitive singular case.

Candidate (16a) violates CI three times: once because the root varies; once because an inconsistent allomorph is used before nominative case inflection; and finally, once because an inconsistent allomorph is used before genitive case inflection. (16b) vocalizes the diminutive yer in the genitive case, violating Contextual Identity, and (16c) deletes two consecutive vowels, violating MAX-V^2. The winning candidate (16d) has a uniform root and selects the same allomorph of the diminutive as other nouns with the same inflection do (9).

(16) Yer Vocalization in Paradigm with Multiple Consecutive Yers

{/sfɛtɪr-ɪk-Ø/, / sfɛtɪr-ɪk-a/} CC: NOUN-ɛk-Ø, NOUN-k-a	*CMPLXCD	CI	MAX-V^2	ID[HI]	MAX-V
a. sfɛtɛr-k, sfɛtr-ɛk-a	*!	***		**	**
b. sfɛtr-ɛk, sfɛtr-ɛk-a		*!		**	**
c. sfɛtr-ɛk, sfɛtr-k-a			*!	*	***
☞ d. sfɛtɛr-ɛk, sfɛtɛr-k-a				***	*

In sum, while yer vocalization in general is driven by principles of syllabification, patterns in derived paradigms reveal additional factors at work. Both the distribution of yers and the uniform over or underapplication of raising in derived paradigms support a more fine-grained model of output-output correspondence, including Contextual Correspondence. While Contextual Identity is never violated in Polish, further work in other languages is needed to determine whether it should be considered a single constraint or a family of related constraints.

4.   Discussion

This paper has extended the scope of previous work on Polish yers by providing an Optimality Theoretic analysis of yer vocalization patterns in both morphologically simple as well as complex environments. Syllable structure conditions, although often obscured by the seemingly inexhaustible size of the Polish syllable, are responsible for the basic vowel-zero alternations found in morphologically simple words. Thus, although these constraints are not ranked high enough to eliminate complex clusters in Polish altogether, the effect of these constraints can nonetheless be observed when yers allow unmarked structures to surface. In addition, n this work, yers neutralize with zero due to their marked feature combination rather than some abstract structural deficiency.

As a result of these two choices, both the neutralization process itself as well as the distribution of vowel-zero alternations follow from language-universal principles rather than from Slavic specific (or even Polish specific) rules like Lower. Assuming Richness of the Base, all languages necessarily exhibit neutralization of vowels. The Slavic yer neutralization differs only in the fact that two repairs are systematically observed for a vowel, with deletion as default and

vocalization occurring when syllable complexity is at stake. Otherwise, the distribution of yer vocalization follows from the usual universal syllabification properties. This allows abstract representations of words to be eliminated: there is no longer a need to postulate unobserved yers just to force vocalization of preceding yers. In addition, Richness of the Base allows further restrictions on syllable structure to be identified, and in OT these restrictions can account for the lack of certain types of vowel-zero alternations in Polish, namely alternations in sequences of three or more consonants.

The patterns of yer vocalization in morphologically complex words follow from a new type of output-output correspondence called Contextual Correspondence. Cyclicity cannot account for the patterns in question due to the difficulty, both theoretical and empirical, in defining a morphological base. In this analysis, the observed cyclic effects are due to Contextual Identity, which selects a morphological base for a derived paradigm using independent preferences of the grammar. Contextual Identity applies to stems within derived paradigms due to the consistent morphological contexts in which they occur. Contextual Identity is also shown to be crucial in the selection of affix allomorphs that occur in identical morphological contexts. Under this view, affixes can also form a type of 'paradigm,' depending on the morphological contexts in which they occur. Contextual Identity applies to affixes, just as it does to stems, when they occur in the context of identical morphemes. In addition, Contextual Identity is motivated by the noted vowel-raising patterns, in which derived paradigms level while simple paradigms apply raising regularly. While the Polish yer and raising patterns provide a nontrivial testing ground for the development of Contextual Identity, further work in other domains and languages will be needed to fully understand its (universal) effects, limits, and scope of application.

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