Opacity in *-ez*/*-eza* Suffixation

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1. Introduction

A phonologically conditioned case of allomorphy is observed in one of the Spanish nominalizing suffixes. The suffix *-ez* and its allomorph *-eza* are used to derive abstract nouns from adjectives, as (1a)-(1b) show.

(1a) *crudo* 'raw' *crud-eza*

(1b) *tímido* 'shy' *timid-ez*

The allomorph *-eza* attaches to bases with two syllables or less, while *-ez* attaches to longer bases. In some approaches to allomorphy, this sort of conditioning is accounted for by an output condition: the longer allomorph is chosen to satisfy a minimal length requirement on derived words. This type of output-oriented analysis is the staple of Optimality Theory (OT).

In this paper, however, we argue that the allomorphy in the Spanish nominalizing suffix cannot be accounted for by standard Optimality-Theoretic approaches to allomorphy as output optimization, because the interaction of allomorph selection with vowel syncope renders allomorph selection opaque. We defend instead an analysis that provides support for the input optimization approach suggested in Sprouse's (1997) treatment of opacity.

2. Basic data and empirical generalization

Lang (1990) argues that the alternation between *-ez* and *-eza* is a case of phonologically conditioned allomorphy: *-eza* attaches to adjectives that are mono- or disyllabic, while *-ez* attaches to adjectives that are trisyllabic or longer. This is shown in the contrast between the examples in (2a) and (2b).

(2)

a. 1 or 2 syllable base: *-eza*		b. 3 syllables or more: *-ez*	
vil 'vile'	*vileza*	*rígido* 'stiff'	*rigidez*
franco 'truthful'	*franqueza*	*maduro* 'mature'	*madurez*
diestro 'skillful'	*destreza*	*estúpido* 'stupid'	*estupidez*
crudo 'raw'	*crudeza*	*tímido* 'shy'	*timidez*
duro 'hard'	*dureza*	*hediondo* 'smelly'	*hediondez*
bello 'beautiful'	*belleza*	*robusto* 'robust'	*robustez*
cierto 'certain'	*certeza*	*rápido* 'fast'	*rapidez*
noble 'noble'	*nobleza*	*vívido* 'vivid'	*vividez*
triste 'sad'	*tristeza*	*pálido* 'pale'	*palidez*
bajo 'low'	*bajeza*	*escaso* 'scarce'	*escasez*
flaco 'skinny'	*flaqueza*	*tirante* 'tense'	*tirantez*
		delgado 'thin'	*delgadez*
		ávido 'avid'	*avidez*

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Suffixation of *-ez/-eza* to adjectives ending in a vowel creates a hiatus, which is resolved through deletion of the final vowel of the base. After hiatus resolution, then, a monosyllabic base requires the disyllabic allomorph (***destr****-eza*), but a polysyllabic base allows for the monosyllabic allomorph (***estupid****-ez*). The alternation between *-ez* and *-eza* can thus be captured in an output-based generalization: the longer allomorph is selected to compensate for the shorter length of the disyllabic base. In the resulting system, deadjectival abstract nouns derived with the addition of *-ez/-eza* meet an output wellformedness constraint: the total size of a derived noun must be at least three syllables.

3. A preliminary OT analysis

Cases of allomorphy driven by minimum-length requirements or other prosodic wellformedness requirements are analyzed in Kager (1996) as output optimization. Kager's analysis is framed in Optimality Theory (Prince & Smolensky 1993). In OT, a ranked set of violable constraints evaluates a set of candidate structures. The most 'harmonic' candidate (i.e., the one that satisfies the highest ranked constraints) is selected as the optimal output. This is often formalized as a function EVAL, which maps the set of candidates onto a winner. Kager's model is based on the interaction of two markedness constraints. One constraint penalizes candidates with unnecessary structure (i.e., allomorphs with additional syllables), while another constraint requires a minimal length in the output (measured in feet, syllables, or other prosodic units). In cases of quantity-driven allomorphy, the need to satisfy the higher-ranked constraint on a minimum length with shorter bases forces the choice of the longer allomorph, in spite of the violation of the constraint against superfluous structure.

For the allomorphy between *-ez* and *-eza* in Spanish, we propose the constraints in (3a)-(3b), (following Itô and Mester's 1992 Weak Layering model and Zoll's 1996 proposals) and the ranking in (4).

(3a) FOOT+: Output must be longer than two syllables.
(3b) *STRUC$_x$: Avoid superfluous structure of type *x*.

(4) FOOT+ >> *STRUC$_\sigma$

We assume that in Spanish feet are bisyllabic, built from left to right. Degenerate feet (feet with only one syllable) are allowed at the right edge of the word.[1] This allows us to use the foot as the prosodic unit to formulate the minimal word length constraint: three syllables are the shortest number that can be accommodated in two feet. Forms with longer bases satisfy the higher-ranked FOOT+, so *STRUC$_\sigma$ forces the choice of *-ez*, the allomorph with the least amount of structure (i.e., the one with only one syllable). This is shown in Tableau 1. Choice of *-eza* violates *STRUC$_\sigma$, but with monosyllabic bases it is the one that satisfies FOOT+. Given the ranking in (4), the candidate with *-eza* is the winner. This is shown in Tableau 2.

estúpido + *ez/eza*	FOOT+	*STRUC$_\sigma$
☞ (estu)(pidez)		****
(estu)(pide)(za)		*****!

Tableau 1: Selection of *–ez*

[1] As in Poser's (1984) study of Japanese, we assume that morphological counting feet may be independent of prosodic or stress-assigning feet.

crudo + *ez/eza*	FOOT+	*STRUC$_\sigma$
(crudez)	*!	**
☞ (crude)(za)		***

Tableau 2: Selection of *–eza*

4. A problem for output optimization: opacity

The constraints in (2) apply to the output forms that result from the addition of the nominalizing suffix and also from the reduction of the vowel hiatus this creates. The output-oriented nature of the constraints is one of the hallmarks of classic OT. The analysis we have proposed, however, encounters a problem when some consonant-final adjectives are considered. They select *-eza*, violating the surface generalization. This is shown in examples (5a)-(5c).

(5a) *gentil* 'gentle' *gentileza*
(5b) *real* 'royal, regal' *realeza*
(5c) *sutil* 'subtle' *sutileza*

The predicted forms are **gentilez*, **realez*, and **sutilez*. These forms satisfy the minimal foot constraint, since three syllables can form two feet. There is no violation of a higher constraint that would therefore force the selection of the longer allomorph, against *STRUC$_\sigma$. This is shown in Tableau (3).

gentil + *ez/eza*	FOOT+	*STRUCσ
💣 (genti)(lez)		***
(genti)(leza)		****!

Tableau 3: Selection of wrong allomorph

Clearly, the output-based generalization about the *-ez/-eza* allomorphy, and the classic OT analysis of it, has to be re-worked. The reason this analysis fails is that hiatus reduction in VV sequences renders allomorphy opaque. Vowel syncope neutralizes the contrast between disyllabic and trisyllabic bases in the surface forms of the derived nouns. Thus, a trisyllabic base ending in a vowel (i.e., *rígido* 'rigid') will appear as a bisyllabic base after suffixation and hiatus reduction (***rigid**-ez*), while a bisyllabic base ending in a consonant (i.e., *gentil* 'gentle') will not experience any changes (***gentil**-eza*). If the foot structure of the derived word after hiatus reduction is considered, then the selection of *-ez* or *-eza* seems arbitrary. But if one looks at the foot structure of the derived word BEFORE hiatus reduction applies, then a clear generalization emerges: *-ez* is selected if the form before vowel syncope is at least four syllables. This is shown in the contrast between (6a) and (6b).

(6)

a. Syllable count w/*-ez*

estúpido-ez	5
rígido-ez	4
**crudo-ez*	3
**gentil-ez*	3

b. Syllable count w/*-eza*

**estúpido-eza*	6
**rígido-eza*	5
crudo-eza	4
gentil-eza	4

Allomorph selection, then, must be checked before hiatus reduction takes place. The prosodic constraint is that derived words must be at least two bisyllabic feet in length. A special case is presented by the monosyllabic base *vil*. In this case, the allomorph selection tries to approximate the minimal

length by choosing the longer allomorph. This shows that degenerate feet are tolerated, but dispreferred when bisyllabic feet can be formed.

5. An OT analysis with input constraints

In the previous section we have shown that output optimization cannot derive the *-ez/-eza* allomorphy in Spanish nominalization. Within OT, a previous argument that phonologically conditioned allomorphy may be sensitive not to the ultimate word form but some other lexical representation has been made by Dolbey (1996). He shows that allomorphy in Sámi needs to refer crucially to a morphologically derived bound stem.[2] In our example, reference is made not to a bound stem, but to the input to the nominalization process itself. Reference to the input as a means for dealing with phonological opacity has been proposed by Sprouse (1997). In his Enriched Input model, candidate selection includes a set of input candidates and output candidates corresponding to each input candidate. We use this framework in our analysis of Spanish *-ez/-eza* alternations, where allomorphy is conditioned by the syllable count of the input.

As in Sprouse's (1997) proposal, the input candidates include the base adjective combining with each available allomorph. EVAL selects the optimal input-output candidate pair, which in effect determines both the selected allomorph and the resulting output form. In this framework, each constraint needs to be specified as applying to the input or the output. We present the new input constraints below.

(7) New constraints:
a. FOOT-2^{input}: The input form has 2 feet or more (it replaces FOOT+).
b. FOOT-FORM^{input}: Form disyllabic feet.

FOOT-2^{input} must outrank *STRUC$_\sigma$ for *-eza* to contribute an extra syllable when needed. The new constraint ranking is presented in (8), and the competitions in Tableaux 4-6. The requirement for foot count must outrank the foot binarity constraint, so that degenerate feet will be allowed as a last resort. Tableau 7 shows that degenerate feet are forced for a monosyllabic base like *vil* by FOOT-2^{input}, even though FOOT-FORM^{input} penalizes them.

(8) New Ranking: FOOT-2^{input} >> FOOT-FORM^{input} >> *STRUC$_\sigma$

crudo + *ez/eza*	FOOT-2^{input}	FOOT-FORM^{input}	*STRUC$_\sigma$
(crudo)ez	*!		***
(crudo)(ez)		*!	***
☞ (crudo)(eza)			****

Tableau 4: *-eza* preferred with short form

[2] Dolbey's approach is presented as an alternative to Benua's (1997) Output-Output constraint analyses of similar phenomena. In Benua's approach, candidates favored by constraints comparing them to morphologically related outputs become unexpected winners. The problem we analyze in this paper, however, makes crucial reference to the input, and this is why it is outside the intended scope of Benua's work. Moreover, Benua's approach is not designed to handle opacity, but to explain 'hyperfaithfulness,' which is traditionally attributed to cyclicity.

gentil + *ez/eza*	FOOT-2^{input}	FOOT-FORM^{input}	*STRUC$_{\sigma}$
(genti)lez	*!		***
(genti)(lez)		*!	***
☞ (genti)(leza)			****

Tableau 5: *-eza* preferred with C-final adjective

maduro + *ez/eza*	FOOT-2^{input}	FOOT-FORM^{input}	*STRUC$_{\sigma}$
☞ (madu)(roez)			****
(madu)(roe)za			*****!
(madu)(roe)(za)		*!	*****

Tableau 6: *-ez* preferred with longer form

vil + *ez/eza*	FOOT-2^{input}	FOOT-FORM^{input}	*STRUC$_{\sigma}$
(vilez)	*!		**
(vile)za	*!		***
☞ (vile)(za)		*	***

Tableau 7: *-eza* preferred with monosyllabic bases

6. Exceptions

The enriched input analysis of the *-ez/-eza* alternation is motivated by the existence of exceptions to the generalization that the shortest allomorph is selected when the output satisfies a two-feet minimum length constraint. These exceptions are represented by derived nominals like *sutileza*, the bases of which are bisyllabic adjectives ending in a consonant. We want to distinguish these exceptions, which we ultimately analyzed as a case of opaque interaction between vowel syncope and allomorph selection, from true lexical exceptions which have a historical origin.

One group of lexical exceptions is represented by derived nominals that refer to stages or conditions in the human development process. Some examples are shown in (9a)-(9b).

(9a) *niño* 'child' *niñez*
(9b) *viudo* 'widower' *viudez*

In these examples, the shorter form *-ez* is selected, in spite of the fact that the bases are bisyllabic. These examples represent an unmotivated violation of the two feet constraint. These forms, however, are derived from nouns rather than adjectives. We conclude that the suffix *-ez* that appears in these examples is not an allomorph of *-eza*, but rather a separate morpheme.

A different group of exceptions are adjectives that select the longer form in spite of being longer than two syllables. Examples are given in (10a)-(10e).

(10a) *ligero* 'light' *ligereza*
(10b) *extraño* 'strange' *extrañeza*
(10c) *agudo* 'sharp' *agudeza*
(10d) *áspero* 'rough' *aspereza*
(10e) *delicado* 'delicate' *delicadeza*

These exceptions are historically motivated. The allomorphy of *-ez/-eza* represents a case of morphological merger (Malkiel & Tuttle 1991). The two allomorphs were originally different morphemes: *-ez* descended from Latin -ITIES, while *-eza* descended from Latin -ITIA. In Old Spanish, *-ez* was used to derive abstract nouns referring to an individual's social status (i.e., *niñez* 'childhood'), or to physical or mental defects (i.e., *memez* 'stupidity,' from *memo* 'stupid'). Nouns in *-eza* were always derived from adjectives, and were used to refer to abstract or concrete qualities (i.e., *riqueza* 'wealth,' *ancheza* 'width').

Several developments forced a merger of the two nominalizing morphemes. First, most derived nouns in *-eza* which referred to more concrete qualities were replaced by nouns in *-ura* (cf. *ancheza* > *anchura*) (Dworkin 1989).[3] Second, in the sixteenth century the productivity of nouns derived in *-eza* was curtailed. New derived forms could only be formed with *-ez*. Since new coinages tended to be cultisms, the preference for *-ez* with longer bases (i.e., *languidez* 'languor') was established. Finally, many Old Spanish derived nouns that selected *-eza* started conforming to the new pattern, selecting *-ez* instead (i.e., OSp. *escasseza* > Sp. *escasez* 'scarcity'). At this point, the merger was almost complete. The affix *-ez* that derived nouns referring to social condition was re-analyzed as a separate morpheme, exempt from the prosodic constraint that guided the allomorphy of *-ez/-eza*, and these allomorphs became syntactically and semantically specialized to derive abstract nouns from adjectives. Only a few polysyllabic forms in *-eza* resisted the encroachment of *-ez*, and these are the ones presented in (10a)-(10e).[4]

7. Conclusions

We have shown that the *-ez/-eza* allomorphy in Spanish can be analyzed in OT as a result of competition between three wellformedness constraints. The first constraint, *STRUC, penalizes excessive structure. All else being equal, it will cause the shorter of two competing forms to be optimal. In the Spanish case, this makes *-ez* the default allomorph. The longer allomorph *-eza* will be used only if its use allows satisfying some higher-ranking constraint. In our case, the relevant constraints are foot count (minimum of two) and foot form (disyllabic), which together may force a *STRUC violation. We have shown, in addition, that these constraints must crucially be enforced on the input to *-ez/-eza* suffixation and not on the output. This is because input vowels that are absent in the surface form due to vowel deletion in hiatus nonetheless count towards satisfying the minimum foot count requirement. Our analysis thus provides support for Kager's (1996) claim that phonologically conditioned suppletion should be seen as optimization (though we show that it is not always the output that is optimized), Dolbey's (1996) claim that allomorph optimization does not always apply to the surface word form (he presents a case where an intermediate stem is optimized; in our case it is the input form that is subject to optimization), and Sprouse's (1997) Enriched Input model whereby input candidates are in competition and an optimal input-output pair is chosen by EVAL, which includes, in addition to faithfulness constraints, wellformedness constraints on the input and on the output. A version of Optimality Theory in which opacity may be caused by constraints that are enforced directly on the input, and may therefore be sensitive to input contrasts that are neutralized in the output, is the smallest departure from the ideal of an output-oriented theory which still preserves the requirements of globality and parallelism inherent to the theory.

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[3] This gave rise to many doublets, like *alteza* 'highness, majesty' vs. *altura* 'height.'

[4] Notice, however, that some of these forms alternate in the speech of many speakers with forms in *-ez* (*ligerez*, *agudez*, *delicadez*), a possible indication that the merger is in the process of being completed.

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