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Exceptional stress-attracting suffixes in Turkish: representations vs. the grammar

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1 Introduction

Generative phonology has wrestled since its inception with the question of whether, for some given phenomenon, that phenomenon should be handled with rules or constraints — i.e. in the grammar — or with prespecified representations — i.e. in the lexicon. The recent introduction by Prince and Smolensky 1993 of Optimality Theory provides a fresh outlook on this old question. By fundamentally changing the nature of grammar, Optimality Theory may change the answer to any given question of this kind.

The specific question to be addressed in this paper*, from the viewpoint of Optimality Theory, is how to handle exceptional patterns in Turkish stress: in the lexicon, with underlying templatic metrical structure, or in the grammar, through morpheme-specific constraints? The question is of particular interest because of recent work by McCarthy and Prince 1993b which challenges one of the strongest arguments in favor of underlying metrical structure in phonological theory.

1.1 Doing without templates in Optimality Theory

Since McCarthy and Prince 1986, reduplication has been a major source of evidence for the existence of underlying metrical structure, or templates, in lexical entries. In "classical" reduplication, the phonological representation of a reduplicative morpheme consists virtually entirely of metrical structure (usually a syllable or a foot). However, McCarthy and Prince 1993b, 1994 have argued that Optimality Theory makes templates[1] unnecessary even in the analyses of the very phenomena that originally motivated their existence.

The essential idea is that in Optimality Theory, the work of a template can be taken over by a grammatical constraint determining the type of metrical structure to which a morpheme corresponds in the surface form of the word. The particular implementation adopted in McCarthy and Prince 1993b is stated in (1): a morpheme-specific grammatical constraint specifies the exact metrical shape of each reduplicative affix.

(1) "...a classical template is really nothing more than an assertion about how some morphological category... is to be aligned with some prosodic category, such as a heavy syllable or a trochaic foot." [M&P 1993b:139]

Consider, for example, a simple case of prefixing reduplication of a light syllable. An analysis along the lines proposed by McCarthy and Prince 1993b is sketched in (2). In underlying representation, the reduplicative prefix is identified simply as being reduplicative (which any analysis must do in some fashion). The rest of the work is done by grammatical constraints.

* I would like to thank Larry Hyman, René Kager, Engin Sezer and Karl Zimmer for helpful discussion during the preparation of this paper; Cheryl Zoll and Orhan Orgun played especially heroic roles in the development of the analysis, and deserve a special tribute. The data analyzed in this paper are from Standard Istanbul Turkish. All examples have been checked with a single native speaker and thus represent a consistent idiolect. Speakers vary somewhat with respect to the particular lexical items which exhibit exceptional stress; I have made no attempt to document this variation.

[1] "Template" is becoming an ambiguous term, sometimes used to refer to any mechanism (whether lexical or grammatical) which characterizes the specific prosodic shape of a given morpheme. In this paper I use "template" specifically to refer to the use of underlying metrical structure in specifying morpheme shape.

Constraint (a) states that the reduplicant is a light syllable. Constraint (b) states that the reduplicant is a prefix; constraint (c), that the first segment of the reduplicant is identical to the first segment of the base. Constraints (d) and (e) are highly general, holding over every reduplicative morpheme. They ensure that as much of the base is copied as possible and that what is copied is a contiguous substring of the base.

(2) Nontemplatic account of prefixing CV reduplication, a la McCarthy and Prince 1993b:

Lexical entry for prefix "X": [RED(uplicative)]

Grammar:			
	a.	$X = \sigma_\mu$	Morpheme X is a light syllable (in the output)
	b.	ALIGN-X	Align(X, R, Base, L), i.e. X is a prefix
	c.	ANCHOR-X	Leftmost segment in X = leftmost segment in base
	d.	MAX	A [RED] affix is phonologically identical to the base
	e.	CONTIGUITY	A [RED] affix is a contiguous subpart of the base

Only constraints (2a) and (d) directly pertain to the issue of templates. (2a) ($X = \sigma_\mu$) states that the reduplicant consists of exactly a light syllable; by ranking (2a) above above (2d) (MAX), we ensure that the maximal light syllable (but no more than a light syllable) is reduplicated.

(3) Ranking: $X = \sigma_\mu$ >> MAX *(The reduplicant is exactly one light syllable)*

	/kapo-$X_{[RED]}$/	$X = \sigma_\mu$	MAX
a.☞	<u>ka</u>-kapo		*po
b.	<u>k</u>-kapo	*!	*apo
c.	<u>kapo</u>-kapo	*!	

In more recent work, McCarthy and Prince (1994a,b) propose doing away with morpheme-specific constraints on reduplicant shape (e.g. X=Ft or $X=\sigma_\mu$), instead invoking much simpler morpheme-specific constraints. One, X=STEM, states that the morpheme in question is a morphological stem (which the grammar ensures is minimally a foot, by "STEM=PRWD"); another, X=AFFIX, states that the morpheme is a morphological affix (which the grammar ensures is maximally monosyllabic, by "AFFIX ≤ σ"; the actual shape of X is due to the ranking of X=AFFIX in the grammar)[2]. Though the mechanics of this approach differ from what is assumed in McCarthy and Prince 1993b, the two proposals share the premise that reduplicant shape is due to the grammar (albeit via morpheme-specific constraints) — and not to the lexicon.

Of course, it is perfectly *possible* to use a template in an Optimality analysis. (4) and (5) show how this would work for the same case we have just discussed. The reduplicating prefix in question, X, is associated underlyingly with metrical structure — a monomoraic syllable template. In turn, the grammar is adjusted such that instead of stipulating that X is a light syllable, we now stipulate that underlying structure must be parsed, i.e. must surface.

[2] In deriving the phonological size of a reduplicant from its morphological category (Stem vs. Affix), McCarthy and Prince make the strong prediction that the morphological behavior — not just the phonological shape — of the two reduplicant types will differ significantly. Any word formed through foot-sized reduplication will be a morphological compound (thus expected to display all the semantic, syntactic, and phonological properties accruing to compounds in the language in question); by contrast, all syllable-sized reduplication should be on a par morphologically with affixation. McCarthy and Prince do not go into detail about the morphology of the reduplication constructions they analyze, so it is not easy to confirm the morphological predictions. Should, however, the morphological predictions turn out not to be correct, then the phonological size of a reduplicant will not be derivable directly from its morphological structure; size will have to be governed instead by constraints stating directly that a given reduplicative morpheme is a prosodic word (X=PrWd) while another is no larger than one syllable (X ≤ σ). Note that there is no principled way (as far as I know) of excluding such constraints from the theory in any case.

Reduplication is the chosen means of ensuring that the metrical structure dominates actual segmental material, a precondition for being parsed[3].

(4) A templatic account of the same kind of reduplication

Lexical entry for prefix "X":	$[\sigma_\mu]_{[RED]}$	
Added to grammar:	PARSE	"Parse (preserve) input structure in output"
	*STRUC	"Structure is prohibited"
Removed from grammar:	"X= σ_μ"	

As shown in (5), PARSE distinguishes winning candidate (a) from losing candidate (b). PARSE outranks *STRUC, ensuring that no *more* than a light syllable is copied. If it were, as in losing candidate (c), additional metrical structure would have to be assigned to the excess material.

(5) Ranking: PARSE >> *STRUC *(The reduplicant is exactly one light syllable)*

input	/ $\sigma_{\mu[RED]}$ + kapo/	PARSE	*STRUC
a.☞	ka-kapo		*σσσ
b.	< σ_μ >kapo	*!	*σσ
c.	kapo-kapo		*!σσσσ

The templatic analysis has a simpler grammar[4] than the nontemplatic one, by virtue of not requiring the morpheme-specific constraint that X is a light syllable; however, by the same token, it has a more complicated lexicon — the usual tradeoff.

In conclusion, we have seen that the same results can be achieved (here) regardless of whether the prosodic content of the reduplicative morpheme is underlying metrical structure (a template which must be PARSEd), or is encoded in the grammar (a constraint which must be satisfied). The equivalence of the two analyses shows that, at least in this simple type of example, templates are not logically necessary[5].

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[3] If, following Orgun 1994 and McCarthy and Prince 1994b, we assume that Containment (Prince and Smolensky 1993, McCarthy and Prince 1993a,b) is no longer a principle of Optimality Theory, then "PARSE" can be understood simply as the command "structure present in input is linked in the output". This is how I use PARSE throughout the paper, although I follow the notational convention of past Optimality work by showing deleted structure in angled brackets (simply to make deletions easier to observe in diagrams).

[4] Though a similar number of constraints is invoked, the templatic analysis uses fewer morpheme-specific constraints (thus only universal ones), and in that sense is simpler.

[5] McCarthy and Prince (1993b) (henceforth M&P) also argue that at least in one case, from Axininca Campa (AC), templates are insufficient to characterize reduplicant shape. In AC, reduplicant size varies according to base size, and is not capturable through a single, invariant template. The crucial data are shown below (roots are in boldface and reduplicants are underlined):

(i)

Size of input to reduplication	Output of reduplication	Size of reduplicant
a. Polysyllabic root:	**kawosi**-kawosi	3 syllables
b. Disyllabic root:	**kowa**-kowa	2 syllables
c. Prefixed disyllabic root:	noŋ-**koma**-koma	2 syllables
d. Prefixed monosyllabic root:	no-**naa**-nonaa	2 syllables
e. Unprefixed monosyllabic root:	**naa**-naa	1 syllable

The essential facts (see M&P, and references therein, for more detail) are that a root is reduplicated whole — unless it is monosyllabic, in which case a prefix, if any, is reduplicated as well. M&P's account of these data uses two constraints. R ≤ ROOT asserts that the reduplicant is no larger than the root. DISYLL states that "The left and right edges of the Reduplicant must coincide, respectively, with the left and right edges of *different* syllables" (p. 82), i.e. that the reduplicant is minimally disyllabic. By ranking DISYLL above R ≤ ROOT, M&P ensure that more than a root will be reduplicated only where needed to satisfy DISYLL.

For now, however, the goal is simply to set the stage for the analysis of Turkish stress. We have seen that there is good reason to doubt the need for underlying metrical structure in reduplication. Of course, this conclusion would be even more interesting if we could show that underlying metrical structure is unnecessary *generally* in phonological theory. From this perspective, we will examine a large body of data from Turkish stress, comparing an account which employs underlying metrical structure with one that does not. I will argue that the two types of analysis are not equivalent in explanatory power, and that the anlaysis using underlying metrical structure is superior. The conclusion will be, then, that the template-cum-object exists; it is not possible — yet — to eliminate it entirely from phonological theory.

2 Turkish

Turkish stress has been discussed in the literature for a long time. Prominent works analyzing different parts of the system are listed in (6); several have led to important theoretical claims[6]. However, none has attempted to analyze the full system. Thus one finds disparate and incompatible analyses of different aspects of Turkish stress. An aim of this paper is to fit it all together.

(6) Literature analyzing Turkish stress: Lees 1961, Swift 1963, Lewis 1967, Foster 1970, Lightner 1978, Underhill 1976, Sezer 1981, Kardestuncer 1982, Poser 1984, Kaisse 1985, Dobrovolsky 1986, Hammond 1986, Kaisse 1986, Halle and Vergnaud 1987, Barker 1989, Hayes 1991, Kiparsky 1991, Idsardi 1992

In (7) I list the stress-related phenomena of Turkish known to me. The phenomena in the right-hand column will not be treated here, either because they are too straightforward to be interesting (the case with Compound Stress and Derived Diminutive Stress) or because the data are unclear[7]. We will thus be looking only at the five phenomena in the lefthand column.

M&P argue that DISYLL — the prosodic constraint in their analysis — cannot be identified with a standard template because it imposes only a lower bound on prosodic size. Templates, according to M&P, are by nature size-invariant and lack the flexibility needed to accommodate the AC facts.

However, all that is clear from this example is that a *single* template would not by itself be sufficient. What makes this case of reduplication special is that it has distinct upper and lower prosodic bounds. A single template would fail in just the same way that a single constraint would fail: note that M&P themselves rely on *two* morpheme-specific constraints, not the usual single constraint, on reduplicant size. A comparably enriched templatic account would work fine. Suppose, for example, we alter M&P's account minimally by eliminating the constraint DISYLL in favor of an underlying disyllabic foot in the lexical representation of the reduplicative affix. PARSE will ensure that this foot is preserved — guaranteeing a disyllabic lower bound — and the rest remains the same. In fact, since PARSE is independently needed while DISYLL is (so far) not motivated outside this example, the templatic analysis is arguably superior. (Note also that, by virtue of relating nonadjacent elements of the representation, DISYLL is nonlocal and requires an Alignment constraint outside of the bounds of Generalized Alignment theory (McCarthy and Prince 1993a, more reasons to try and eliminate it.)

[6] For example, Poser 1984 proposed nonperipheral extrametricality; Barker 1989 proposed that pre-stressing suffixes are extrametrical and that stress is assigned cyclically; Kiparsky 1991 and Kager 1992b proposed catalexis; Hayes 1991 proposed foot extrametricality.

[7] In compounds, the first word of the compound retains its stress and the second does not. Derived diminutive stress is strictly initial (e.g. *íǰne-ǰik* 'very thin'), consistent with a fixed initial trochaic foot. Both phenomena are perfectly compatible with the analysis proposed in the paper.

The stress of adverbs in *-en/an* is discussed in Sezer 1981, who describes stress as being penultimate if the penult is heavy (e.g. *ik.ti.sá:.d-en* 'economically') and antepenultimate otherwise (*te.kéf.fü.l-en* 'by surety'). As Hayes 1991 observes, this pattern can be analyzed with a moraic trochee (and final syllable extrametricality). However, the construction is apparently not productive in Turkish, and the data are not consistent across speakers. For these reasons I have chosen not to analyze the pattern here. Vocative stress is mentioned by Swift 1963:180-81, Lewis 1967:22-23 and Foster 1970:252; however, I have so far been unable to confirm the pattern with a native speaker. Given that, as Swift observes (p. 181), vocatives have a distinctive intonation, one would also want to confirm instrumentally that their stress (not just pitch) is actually different

(7)

Phenomena accounted for in this paper:	Phenomena not dealt with in this paper:
•Final stress	•Compound stress
•“Sezer” stress	•Stress of derived diminutive adjectives
•Pre-stressing suffixes	•Stress of adverbs in *-en/an*
•Stressed suffixes	•Vocative stress
•Stressed roots	•Secondary stress

3 Two productive patterns

Turkish exhibits two distinct and productive patterns of stress assignment. Each has its own morphological domain, and each is assigned by a different subgrammar, or cophonology, of Turkish. One pattern, imposed by the word-level cophonology, assigns Final stress. The other, imposed by a stem-level cophonology, assigns a pattern of nonfinal stress termed here the “Sezer” pattern, after its discoverer, Engin Sezer (Sezer 1981). I will present each in turn.

(8) a. “Sezer” stress — assigned by “Sezer stem” cophonology
b. Final stress — assigned by Word cophonology

(For recent discussion of cophonologies (“subgrammars”) in Optimality Theory see Itô and Mester 1993 and Inkelas, Orgun and Zoll 1994.)

3.1 Sezer (stems)

The Sezer pattern is imposed on place names and some borrowings. It is unfailingly nonfinal:

(9) “Sezer” stress pattern: if the antepenultimate syllable is heavy *and* the penultimate syllable is light, stress the antepenultimate syllable; otherwise, stress the penultimate syllable (Sezer 1981)

The pattern is illustrated in (10) on monomorphemic Sezer stems, grouped according to the weight of their antepenultimate and penultimate syllables. (The weight of the final syllable is irrelevant to the placement of stress). Note that the Sezer pattern is imposed on names from other languages even when the stress in the source language is on a different syllable, as in the italicized *Ar.kán.sas* (from *Árkansas*) and *Santamoní ka* (from *Santa Mónica*).

(10) ...H H́ σ Is.tán.bul, An.tál.ya, Hak^{y}.k^{y}á:.ri, Ay.zɨn.hó:.ver, Kil.man.yá:.ro, *Ar.kán.sas*
...H́ L σ Án.ka.ra, š̆a.mán.dɨ.ra ‘buoy’, Ka.li.fór.ni.ya, Mér.ǰi.mek, Ból.va.din, mán.dɨra ‘farm’
...L H́ σ E.dír.ne, Va.šínk.ton, Ha.li.kár.nas, Mon.tá:.na, Ka.díl.lak
...L Ĺ σ A.dá.na, In.di.ya.na.pó.lis, Pa.pa.do.pú.los, Ke.né.di, O.ré.gon, *Santamoníka*

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from that of nonvocatives.

Secondary stress in Standard Turkish is controversial; it exists according to some sources (Lees 1961, Foster 1970, Underhill 1976, Barker 1989) but not according to others (Swift 1963, Lewis 1967), and where it is described, descriptions conflict. Those reporting secondary stress hear it on closed syllables (Lees 1961:49), or on final syllables in words with nonfinal main stress (Underhill 1976:19, Barker 1989), or on heavy syllables which precede potentially pre-stressing suffixes and occur near the end of long verbs with main stress near the beginning (Lees 1961:45). The most liberal transcription of nonprimary stress is found in Foster 1970:244-246, though Foster reports (p. 248) that the stresses he transcribes “do not always show up”. To be on the safe side, I choose not to analyze secondary stress (why I myself do not hear) until better, preferably instrumental, evidence for it is found. Note, however, that none of the reported secondary stress patterns poses any serious problem to the analysis to be developed.

The productivity of the Sezer stress pattern is revealed by its applicability to derived stems. As shown in (11), derived words which don't normally exhibit Sezer stress do shift to the Sezer pattern when used as place names (Sezer 1981:67; Inkelas, Orgun and Zoll 1994):

(11) Derived adjective Used as place name

	(final stress)			(Sezer stress)
...H H σ	kan.dil.-lí	'candle-with (=lamp)'	>	Kan.díl.li
	ay.ran-ǰɨ	'yogurt drink-Agentive (=y.d. seller)'	>	Ay.rán.ǰɨ
	kuz.gun-ǰúk	'raven-Dim.'	>	Kuz.gún.ǰuk
...H L σ	sir.ke-ǰí	'vinegar-Agentive (=vinegar seller)'	>	Sír.ke.ǰi
	tor.ba-lí	'bag-with'	>	Tór.ba.lɨ
...L H σ	ka.vak-lɨ́	'poplars-with'	>	Ka.vák.lɨ
	ku.lak-sɨ́z	'ear-without'	>	Ku.lák.sɨz
...L L σ	o.va-ǰɨ́k	'valley-Dim.'	>	O.vá.ǰɨk
	bo.ya-ǰɨ́	'paint-Agentive (=painter)'	>	Bo.yá.ǰɨ

3.2 Final (words)

The other productive pattern, Final stress, exemplified in (12), is found in monomorphemic and suffixed words (not containing Sezer stems). Regardless of the number of suffixes, stress is unfailingly final. Because we will later see morpheme-specific perturbations in this pattern, let us refer to the morphemes in words showing final stress as "neutral".

(12) Final stress: words containing only "neutral" morphemes

a.	elmá	'apple'	b.	patlɨǰán	'eggplant'
	elma-lár	'apple-Pl'		patlɨǰan-ɨ́m	'eggplant-1sg.poss'
	elma-lar-dán	'apple-Pl-Abl'		patlɨǰan-ɨm-á	'eggplant-1sg.poss-Dat'
c.	gít	'come'	d.	yap	'do'
	gid-ér	'come-Aorist'		yap-sɨ́n	'do-3sg.imp'
	git-melí	'come-necess.'		yap-tɨ-nɨ́z	'do-Past-2.pl'
e.	gél	'come'	f.	tekmé	'kick (n.)'
	gel-eǰék	'come-Fut'		tekme-lé	'kick-Vbl (v.)'
	gel-eǰek-lér	'come-Fut-Pl '		tekme-le-dí	'kick-Vbl-Past'
	gel-elím	'come-1pl.subj'			

3.3 Sezer stems in longer words: Sezer stress prevails

The Word-level and Sezer stem cophonologies are not independent; in fact, Sezer stems can be included in longer words. When this occurs, the word as a whole inherits the stress of its Sezer stem. (13) shows Sezer stems combining with neutral suffixes which normally take stress when word-final. Here, however, the suffixes are unstressed; stress surfaces on the Sezer stem.

(13) Sezer stem + 1 neutral suffix: Sezer stress prevails

a.	[mándɨra]-da	'farm-Loc'	cf.	araba-dá	'car-Loc'
	[Ánkara]-dan	'Ankara-Abl'	cf.	araba-dán	'car-Abl'
	[Kandíl-li]-ye	'Kandilli-Dat'	cf.	araba-yá	'car-Dat'

Sezer stem + 2 neutral suffixes:

b. [mándɨra]-lar-da 'farm-Pl-Loc'

Sezer stem + 4 neutral suffixes:

c. [Ánkara]-lɨ-laš-tɨr-dɨ 'Ankara-of-become-Causative-Past (=caused to become ones from A.)'

In sum, it appears that Final stress is a default, imposed at the Word level on strings not possessing stress from another source. The Sezer stem cophonology is one such source. Later, we will see other sources for nonfinal stress.

The diagram in (14) illustrates the interaction between the Sezer and Word level cophonologies (assuming the model of Monotonic Cyclicity, following Orgun 1993). As shown in the lefthand example, the output of the Sezer stem level is the input to the Word level. In words not containing a Sezer stem, such as the example on the right, the entire string is input directly to the Word level cophonology for purposes of stress assignment.[8]

(14) Output of Sezer cophonology = input to Word cophonology:

[Ánkaradan] $_{\omega}$	←Final stress imposed as default on Word→	[arabadán] $_{\omega}$
[Ánkara] $_{\Sigma}$	←Sezer stress imposed on stem	
/Ankara/ /dan/	←UR→	/araba/ /dan/
Ankara Abl		'car' Abl
'from Ankara'		'from (the) car'

There is one important systematic exception to the generalization that Sezer stems block final stress in words containing them. As observed by Kaisse (1985:204) and illustrated in (15), monosyllabic Sezer stems never retain stress when suffixed, instead permitting a following neutral suffix to receive final stress at the Word level.

(15)

Bon-dán	'Bonn-Abl'	(cf. Adána-dan)
Of-tá	'Of-Loc'	(cf. Istánbul-da)
Kars-á	'Kars-Dat'	(cf. Kuláksɨz-a)

This is an important fact to keep in mind. We will return to it later.

4 Analyses of regular patterns

We turn now to Optimality analyses of the two patterns we have just seen, starting with the Sezer stem cophonology.

4.1 Sezer stem cophonology

The Sezer stress pattern has the properties in (16): each stem has one stress, stress is normally penultimate, and stress is antepenultimate in case the penult is light and the antepenult, heavy.

(16) Properties of Sezer stress to be captured:

- One stress per stem
- Nonfinality: Stress is "normally" penultimate
- Quantity-sensitivity: Stress "shifts" to antepenult in /... H L σ/ stems

Stress occurs in window

[8] Actually, as argued in Inkelas and Orgun 1994, Turkish has four lexical levels in addition to the Sezer level; these are omitted from the diagrams in (21) in order to save space. As no unique stress patterns are associated with any of these levels, they are irrelevant to the issues at hand. Note that the interaction among cophonologies is determined by the morphological constituent structure of the relevant word.

The first property is easily captured using standard constraints in Optimality Theory, shown in (17). HAVE-FT requires the domain to contain at least one foot; *STRUC, which militates against structure in general, ensures that the domain will contain at *most* one foot[9].

(17) Constraints governing one-stress-per-domain (all standard constraints; see P&S1993):

HAVE-FT (cf. LEX≈PR; P&S 1993)	"The domain must contain a foot"
*STRUC	"Structure is prohibited"
PARSE-SYL	"Syllables must be parsed into feet"

By ranking HAVE-FT above *STRUC and PARSE-SYL, as illustrated in (18), we ensure that exactly one foot occurs in each Sezer stem.

(18) Sezer stem cophonology: HAVE-FT >> *STRUC >> PARSE-SYL

	[Papadopulos]$_{\Sigma}$	HAVE-FT	*STRUC	PARSE-SYL
a.☞	(x□□□□.) Pa.pa.do.pu.los		*	***
b.	(x□□(x)□□□(x) Pa.pa.do.pu.los		**!*	
c.	Pa.pa.do.pu.los	*!		******

There are numerous equally adequate ways to capture the nonfinality and quantity-sensitivity of Sezer stress. One approach would be, following Kiparsky 1991, to assume that the stress foot implicated in Sezer stress is iambic. This is consistent with its apparent quantity-sensitivity, a hallmark of iambic feet. On such an account, the final syllable would be "extrametrical" (perhaps by virtue of a NONFINALITY constraint on stress feet, along the lines of Prince and Smolensky 1993) and an iambic foot would be built over the antepenultimate and penultimate syllables. Exactly when the antepenult is heavy and the penult light, however, the iambic foot would be disfavored by virtue of the complete mismatch between syllable weight and foot headedness. In this case, foot reversal is the preferred option; a trochaic foot is built instead. The resulting antepenultimate stress pattern is seen in words like *šamandɨra*.

(19) IAMBIC ANALYSIS:

□	(.□□□□x)	(.□□□□□x)	(.□□□x)
Iambic□foot:	In.di.ya.na.po.lis	Ay.zɨn.ho:.ver	E.dir.ne
□	(x□□□□□□.)		
Trochaic□foot	ša.man.dɨ.ra		

A closely related analysis would assign a ternary, left-headed foot to words like *šamandɨra*, rather than displacing the binary foot leftward; I see no way to choose between the two analyses.

The alternative analysis considered — and adopted here — is trochaic, fitting better with the trochaic foot used elsewhere in the system. As summarized in (20), a trochaic foot is assigned at the right edge of the stem, capturing the fact that most Sezer stems have penultimate stress. Exactly when a final trochee would be headed by a light syllable and preceded by a heavy syllable, however, the foot occurs one syllable to the left — gaining a heavy syllable for its head.

9 I'm assuming that PARSE-SYL, together with FT-BIN, is what ensures that feet are minimally disyllabic (instead of being minimally bimoraic). Note that HAVE-FT is being used instead of the more standard LEX≈PR; this is in order to allow the constraint to apply in different domains (namely the Sezer stem and the word, which are distinct), rather than holding only in the "prosodic word".

(20) TROCHAIC ANALYSIS:

□	(x□□□.)	(x□□□□.)	(x□□□□.)
Final□trochee:	In.di.ya.na.po.lis	Ay.zɨn.ho:.ver	E.dir.ne
□	(x□□□□.)		
Penultimate□trochee:	ša.man.dɨ.ra		

Implementing the trochaic analysis requires three additional constraints. The first two are stated in (21). TROCHAIC requires stress feet to be trochaic. The second constraint, FINAL-FT, requires the stem to end in a foot.

(21)

♦TROCHAIC	Align(σ́ , L, Foot, L)	"Feet are trochaic"
FINAL-FT	Align(Domain, R, Foot, R)	"The domain end coincides with a foot end"

The diamond preceding the trochaic constraint in (21) signifies that the constraint is never violated in the cophonology under discussion, here the Sezer cophonology. I will use this convention throughout the paper.

(22) Convention: diamonded constraints are unviolated in the cophonology under discussion.

Together, the constraints in (21) enforce penultimate stress in Sezer stems, as illustrated in (23).

(23) ♦TROCHAIC, FINAL-FT together enforce penultimate stress:

	$[\text{Adana}]_{\Sigma}$	♦TROCHAIC	FINAL-FT
a.☞	□(x□□.) A.da.na□□		
b.	(x□□.) A.da.na		*!
c.	(.□□□x) A.da.na□□	*!	

To capture the fact that stress appears on the antepenultimate syllable of a Sezer stem exactly when the penult is light and the antepenult is heavy, we introduce a new constraint, named CONTOUR, which baldly prohibits a sequence of heavy unstressed syllable followed by stressed light syllable. (CONTOUR can be stated in terms of Alignment (McCarthy and Prince 1993a) if, extrapolating from precedents in Prince and Smolensky 1993:40,43,52,57, we permit negative Alignment constraints.)

(24) Constraint enforcing (local) quantity-sensitivity:

CONTOUR $*\sigma_{\mu\mu}\ \acute{\sigma}_{\mu}$ "No heavy syllable may immediately precede a stressed light syllable"

[i.e. NO-ALIGN($\sigma_{\mu\mu}$, R, $\acute{\sigma}_{\mu}$, L)

As illustrated in (25), CONTOUR outranks FINAL-FT, thus allowing a foot to be "displaced" leftwards whenever doing so prevents the violation of CONTOUR. This is illustrated in the tableau with respect to *šamandɨra*, a Sezer stem with a light penult and heavy antepenult. Candidate (b), with a final trochaic foot, violates CONTOUR, and thus is rejected; candidate (a) violates only the lower-ranked FINAL-FT, and therefore wins.

(25) Sezer cophonology: CONTOUR >> FINAL-FT

	[šamandɨra]$_{\Sigma}$ [... H L σ]	CONTOUR	FINAL-FT
a.☞	□ □(x□□□□□.) šamandɨra [... H́ L σ]		*
b.	(x□.) šamandɨra□□ [... H Ĺ σ]	*!H Ĺ	

The CONTOUR constraint correctly predicts that stress can only depart by one syllable from its expected penultimate position. To see this, consider the word *Indiyanapólis*. Its initial syllable, five removed from the right edge, is heavy, while all other nonfinal syllables are light. The actual pronunciation of this Sezer stem has penultimate stress — not initial stress, even though an initial trochee would have a heavy syllable for its head. Feet cannot shift leftward indefinitely to gain a heavy head:

(26) a. final foot (x□□□.)
In.di.ya.na.po.lis

b. very left-shifted foot cf. □(x□□□□.)
* In.di. ya.na.po.lis

As illustrated in the tableau in (27), our analysis correctly generates this result. Because the antepenultimate syllable (*na*) of *Indiyanapolis* is light, penultimate stress poses no threat to CONTOUR; hence there is no motivation for the stress foot to dislocate[10]. Even though the left-shifted trochaic foot in candidate (b) has a heavy head, it does not fare any better than the final stress foot interms of CONTOUR; it simply gratuitously violates FINAL-FT, and is thus rejected.

(27) If antepenult is light, then a final foot cannot violate CONTOUR: no stress "shift"

	[Indiyanapolis]$_{\Sigma}$	CONTOUR	FINAL-FT
a.☞	(x□□□ In.di.ya.na.po.lis [... L Ĺ ...]		
b.	(x .) In.di.ya.na.po.lis [H́ ...]		*!

Stress shift is also correctly blocked when the penult is heavy, as in the Sezer stem *Istánbul* in (28). Here again, penultimate stress does not violate CONTOUR. Like the stem in (27), *Istánbul*, in (28), has penultimate stress.

(28) If penult is heavy, then a final foot cannot violate CONTOUR: no stress "shift"

	[Istanbul]$_{\Sigma}$	CONTOUR	FINAL-FT
a.☞	(x .) Is.tan.bul [... H H́ ...]		
b.	(x .) Is.tan.bul [H́ ...]		*!

There is one fact not yet accounted for on this analysis, however, namely that a stress foot can displace only in the leftward direction. Consider the Sezer stem *Mérǰimek,* in (29), which has a heavy-light-heavy syllable sequence and antepenultimate surface stress. If penultimate stress were assigned, as in candidate (d), CONTOUR would fatally be violated; hence, stress clearly must

10 By contrast, if we had used WSP (the Weight-to-Stress Principleof Prince and Smolensky 1993), which is context-free, we would be unable to explain why the stress foot can shift only one syllable away from the right edge.

occur elsewhere. What we want is for it to shift one syllable to the left; *Mérǰimek* has antepenultimate stress. However, our constraints incorrectly predict it to displace *rightward* to the final syllable. Candidate (b), with a final degenerate foot, is the only candidate to satisfy both CONTOUR and FINAL-FT in this tableau. The candidate that we *want* to win, namely (a), not only loses to (b), but also ties with (c), a catalectic candidate with unwanted final stress.

(29) CONTOUR >> FINAL-FT incorrectly predicts final stress on ...H-L-H Sezer stems:

	[Merǰimek]$_\Sigma$	CONTOUR	FINAL-FT
a.	(x .) Mer.ǰi.mek		*!
b. ☞	(x) Mer.ǰi.mek		
c.	(x .) Mer.ǰi.mek [σ]		*!
d.	(x .) Mer.ǰi.mek	*!H Ĺ	

[This one *should* win: *Mérǰimek]*

To solve this problem, we must somehow reject candidates (29b) and (c). This means ruling out both degenerate feet, as in (b), and catalexis, as in (c), in the Sezer cophonology. To do so, we invoke the quite standard constraints (both from Prince and Smolensky 1993) in (30). ♦FILL prohibits null syllables, effectively prohibiting catalexis, while ♦FT-BIN requires feet to be binary, effectively prohibiting degenerate feet[11]. Both are unviolated in the Sezer cophonology.

(30) ♦FILL "Syllables dominate segmental material"
♦FT-BIN "Feet are binary"

(31), which is parallel to (29), illustrates the effects of making both constraints inviolable: no stress foot may be headed by the final syllable in the Sezer cophonology. This new constraint set correctly rejects candidates (b) and (c), leaving (a) as the clear winner.

(31)

	[Mer.ǰi.mek]$_\Sigma$	♦FILL	♦FT-BIN	CONTOUR	FINAL-FT
a.☞	(x .) Mer.ǰi.mek				*
b.	(x) Mer.ǰi.mek		*!		
c.	(x .) Mer.ǰi.mek [σ]	*!			*
d.	(x .) Mer.ǰi.mek			*!H Ĺ	

A pleasing consequence of ranking ♦FT-BIN and ♦FILL so highly is that we can now explain the puzzling behavior of monosyllabic Sezer stems. Recall, as shown in the data in (32) (repeated

[11] A final foot in *Mérǰimek* might appear to be bimoraic, hence in satisfaction of FT-BIN; either we stipulate that FT-BIN refers to the syllable, or we rely on final consonant extrametricality (known anyway to be motivated in Turkish; see Inkelas and Orgun 1994) to ensure that the final syllable counts as monomoraic. (Of course, the latter solution works only for closed syllables.)

from (15), that monosyllabic Sezer stems do not retain stress when combined with neutral suffixes. Instead, stress surfaces in word-final position[12].

(32) Bon-dán ‘from Bonn’ (cf. Istánbul-dan)

This fact follows automatically from the inviolability of ♦FILL and ♦FT-BIN in the Sezer cophonology. Because these stems are monosyllabic, the only foot that could possibly be built on them would either be catalectic or degenerate; since neither option is available in the Sezer cophonology, these stems leave the Sezer cophonology without any stress at all. This is shown by the following tableau. The winning candidate, (a), is the one with no stress foot.

(33) Sezer cophonology: ♦FILL, ♦FT-BIN >> HAVE-FT

	$[\text{Bon}]_{\Sigma}$	♦FILL	♦FT-BIN	HAVE-FT
a. ☞	Bon			*
b.	(x) Bon		*!	
c.	(x .) Bon [σ]	*!		

We will see shortly that as a consequence of acquiring no foot at the Sezer level, monosyllabic Sezer stems are stressed only at the Word level, where the Final pattern prevails.

(34) summarizes the constraints invoked in the analysis thus far:

(34)

Unviolated	Violable (ranked where relevant)
♦TROCHAIC	HAVE-FT >> *STRUC >> PARSE-SYL
♦FILL	FINAL-FT
♦FT-BIN	
CONTOUR	

We have now captured the pattern of stress within Sezer stems in a relatively simple fashion, using only trochaic feet. The next target is the Word-level pattern, final stress.

4.2 Word cophonology

One thing the Word and Sezer patterns have in common is that only one stress is permitted within each domain. The Word cophonology thus requires the same constraint ranking seen earlier to achieve the “one stress per domain” pattern.

(35) Word cophonology: ♦HAVE-FT (>> FT-BIN, *STRUC)

In the Word cophonology, however, ♦HAVE-FT is never violated: each word has a stress.

The Word cophonology differs from the Sezer cophonology in imposing a pattern of fixed final stress. There are myriad ways to generate word final stress, and virtually all of them

---

12 There are “exceptional” place names, such as *Anadolú*, which have final stress. However, it is easy to show that what is exceptional about these roots is simply that they are stressed as Words, rather than as Sezer stems: when *Anadolu* is combined with neutral suffixes, stress appears at the end of the word, e.g. *Anadolu-dán* ‘Anadolu-Abl’. As Sezer 1981 notes, the Sezer cophonology contains some members which are not place names; it seems that the converse is also true, and that not all place names are subject to the Sezer cophonology. See Inkelas and Orgun 1994 for some discussion of how morphemes exceptionally avoid or undergo given cophonologies.

have been proposed in the literature. A variety are listed in (36). Any of these would work reasonably well for Turkish.

(36) Some ways to generate final stress:
   a. Right-headed unbounded iambic foot (Kaisse 1986, Halle and Vergnaud 1987)
   b. Final binary iambic foot
   c. Final grid mark (no foot) (Barker 1989, Hayes 1991)
   d. Final binary trochee + catalexis (Kiparsky 1991, Kager 1992b)

Of these analysis, (d) is optimal — and not merely because the trochaic foot it employs is useful elsewhere in the system. The iambic analyses (a,b) are highly disfavored in their own right because of the many final-stressed words in Turkish with a heavy penult. In the case of a word like *elma* 'apple', for example, such an analysis would have to posit the undesirable "anti-iamb", with maximal mismatch between syllable weight and foot headedness.

As before, I choose to implement the trochaic analysis (d), on the grounds that the trochee is the only foot which can capture the entire stress system of Turkish. A word with final catalexis and final stress is illustrated below:

(37) (x .)
araba [σ]   [arabá]   'car'

The analysis of final stress is fairly simple, and I will not dwell on the details. The essential idea is that an alignment constraint, FINAL-STR, requires the word-final syllable to be stressed.

(38) FINAL-STR   Align(Domain, R, σ́ , R)

This constraint, when combined with the inviolable ♦TROCHAIC and ♦FT-BIN constraints seen earlier, requires catalexis, the existence of a phonetically null syllable or grid beat to the right of the word. Catalexis has been proposed, for Turkish and other languages, by Kiparsky 1991 and Kager 1992a,b, 1993[13]. It permits a disyllabic trochee to be headed by the word-final syllable. In order to achieve catalexis, FILL, the constraint against null syllables, must be ranked low at the word level.

(39) Word cophonology: FINAL-STR >> FILL

The chart in (40) shows how this constraint ranking selects the proper outcome for a neutral root in combination with a neutral suffix. The winning candidate, (a), violates FILL once by possessing a single catalectic syllable, but it satisfies all the higher ranked constraints: its foot is trochaic, binary, and is headed by the word-final syllable.

13 Actually, Kager 1992b (the first version) discusses Turkish but Kager 1993 (the second version) does not; however, both versions propose catalexis for monomoraic words in languages like Turkish. Kiparsky 1991 and Kager 1992a,b, 1993 have argued that the existence of monomoraic words (e.g. Turkish *su* 'water') provides further motivation for catalexis. However, see Inkelas and Orgun 1994 for an alternative account of such forms.

(40)

	[araba-da]$_\omega$ 'car-Loc'	◆TROCHAIC	◆FT-BIN	FINAL-STR	FILL
a.☞	(x .) a.ra.ba.da.[σ]				*
b.	(. x) a.ra.ba.da	*!			
c.	(x) a.ra.ba.da		*!		
d.	(x .) a.ra.ba.da			*!	

The FINAL-STR constraint should not be confused with the FINAL-FT constraint, which we saw was highly ranked in the Sezer cophonology. (41) compares the two and (42) gives their respective rankings in the two cophonologies[14]:

(41) FINAL-STR Align(Domain, R, σ́ , R)
FINAL-FT Align(Domain, R, Ft, R)

(42) Word cophonology: FINAL-STR >> FINAL-FT *(Stress is final, not penultimate)*

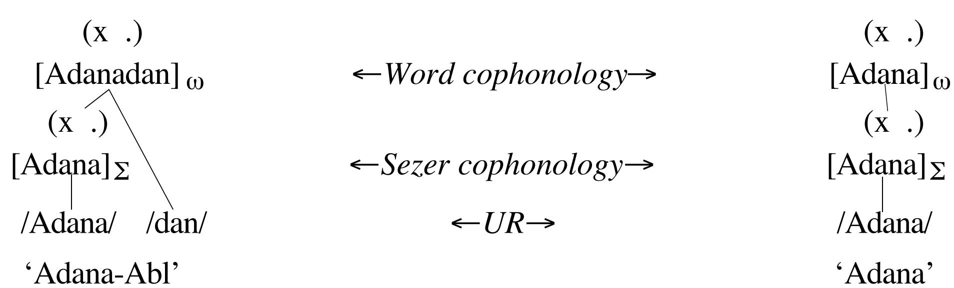
	[araba]$_\omega$	FINAL-STR	FINAL-FT
a.	(x□□.) a.ra.ba□	*!	
b.☞	(x .) a.ra.ba [σ]		*

	[Adana]$_\Sigma$	FINAL-FT	FINAL-STR
a.☞	(x .) A.da.na		*
b.	(x .) A.da.na [σ]	*!	

4.3 Sezer stems in words: "input wins"

As stated earlier, and reschematized below, the output of the Sezer stem cophonology serves as input to the Word level cophonology. Thus any interaction between Sezer stress and the Final pattern is to be captured in the Word level cophonology.

(43) Output of Sezer cophonology = input to Word-level cophonology



14 FINAL-STR must also outrank CONTOUR in the Word cophonology, as shown by forms like *patlɨǰan-dá* 'eggplant-Loc'.

The generalization is that any Sezer stress existing in the input to the Word level is preserved in the output. To capture this, we invoke the familiar constraint PARSE, here localized to the foot[15].

(44) PARSE-FT "Preserve, in the output, any stress feet that are in the input"

In the Word cophonology, PARSE-FT outranks the FINAL-STR constraint, such that it is more important to parse an input foot than to build a new foot whose head is word-final. The option of doing both is, of course, ruled out by the constraints enforcing one stress per word[16].

(45) Word cophonology: PARSE-FT >> FINAL-STR

The chart in (46) illustrates the retention of stress on an unsuffixed Sezer stem, *Adána*, in the Word cophonology: PARSE-FT forces the retention of the input foot, and the word-final syllable goes unstressed inthe winning candidate.

(46)

	(x .) $[[\text{A.da.na}]_{\Sigma}]_{\omega}$ 'Adana'	PARSE-FT	FINAL-STR
a.☞	(x .) A.da.na [Adána]		*
b.	‹(x .)›(x .) A.da.na [σ] [Adaná]	*!	

The chart in (47) illustrates the same phenomenon, this time with a suffixed Sezer stem. Again, due to PARSE-FT, Sezer stress prevails over final stress.

(47) Stress is retained on a Sezer stem under "neutral" suffixation (see (15), (33)):

	(x .) 'Adana-Abl' $[[\text{A.da.na}]_{\Sigma}\ \text{-dan}]_{\omega}$	PARSE-FT	FINAL-STR
a.☞	(x .) A.da.na.dan [Adánadan]		*
b.	‹(x .)› (x .) A.da.na.dan [σ] [Adanadán]	*!	

In summary, input feet always prevail over "default" constraints on foot placement in the Word cophonology. The constraint ranking guaranteeing this result is summarized below:

(48) Word cophonology: "input wins"

◆HAVE-FT >> *STRUC *(The word must have one foot)*

PARSE-FT >> FINAL-STR *(Preserve an input (i.e. a Sezer) foot rather than assign final stress)*

This view of the Sezer-Word level interface explains why monosyllabic Sezer stems, such as those in (49) and (50), permit the Word-final stress pattern in words containing them. Recall that (due to FT-BIN and FILL) monosyllabic Sezer stems do not acquire a stress foot in the Sezer

15 This is the same conceptualization of PARSE employed earlier in the discussion of reduplication.

16 An alternative to FINAL-STR would be to propose, as suggested by René Kager (p.c., 6/94), that catalexis results from a misalignment between grid and string: under catalexis, the grid extends one beat beyond the right edge of the string. Assuming that stress feet are constructed on the grid, then the same FINAL-FT constraint (Align(Domain, R, Foot, R)) would handle word-final stress as well as Sezer stress. There would be no need for FINAL-STR, which has the aesthetic disadvantage of referring directly to stressed syllables.

cophonology. Because they are input to the Word-level cophonology without metrical structure, PARSE-FT is inapplicable and thus does not hinder the imposition of final stress (by FINAL-STR).

(49)

	$[[\text{ Of }]_{\Sigma}]_{\omega}$	♦HAVE-FT	PARSE-FT	FINAL-STR
a.☞	(x .) Of [σ]			
b.	Of	*!		*

Both the unsuffixed monosyllabic Sezer stem in (49) and the suffixed one in (50) receive final stress.

(50)

	$[[\text{Of}]_{\Sigma}\text{-tan}]_{\omega}$	♦HAVE-FT	PARSE-FT	FINAL-STR
a.☞	(x .) Of.tan [σ]			
b.	Of.tan	*!		*
c.	(x .) Of.tan			*!

In summary, Sezer stems disrupt the normal Word-final stress pattern by virtue of possessing a stress foot in the input to the Word cophonology. Only those Sezer stems not possessing such a foot allow the Final stress pattern to emerge.

Let us summarize the analysis arrived at so far. We have invoked 10 constraints altogether, and they are ranked differently in the two cophonologies we have motivated. The constraints, and their respective rankings, are given below:

(51) List of all constraints invoked so far, and their rough definitions (diamonded constraints are violated in neither cophonology):

♦FT-BIN	"Feet are binary"
♦TROCHAIC	"Each foot must have initial stress"
CONTOUR	$*\sigma_{\mu\mu}\,\acute{\sigma}_{\mu}$
FILL	"Syllables aren't null, i.e. no catalexis"
FINAL-FT	"The right edge of the domain coincides with the right edge of a foot"
FINAL-STR	"The domain-final syllable is stressed"
HAVE-FT	"The domain must have a foot"
PARSE-FT	"Each foot in the input must be present in the output"
PARSE-SYL	"Each syllable must belong to a foot"
*STRUC	"No structure (only evaluated here with respect to feet)"

(52) Summary of constraint ranking in Sezer cophonology:

<u>Unviolated</u> <u>Crucially ranked:</u>

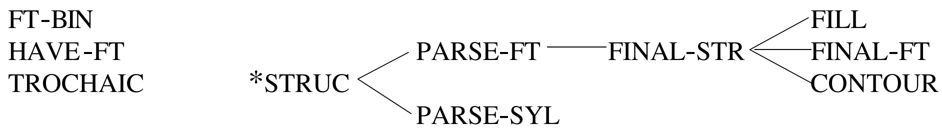
FILL
FT-BIN
TROCHAIC

HAVE-FT —— *STRUC —— CONTOUR —— FINAL-FT < PARSE-SYL / FINAL-STR

<u>Irrelevant (so far):</u>
PARSE-FT

(53) Summary of constraint ranking in Word cophonology:

<u>Unviolated</u> <u>Crucially ranked:</u>



5 Exceptions: morphemes which interrupt Sezer and/or Final patterns

We now turn to exceptional, or "nonneutral", morphemes. These disrupt the regular patterning we have seen thus far. As stated in (54), both suffixes and roots occur in this category. Pre-stressing suffixes, some of which are listed in (54a), place stress on the immediately preceding syllable. These can be monosyllabic, disyllabic or trisyllabic. Initially-stressed suffixes, listed in (b), are, by contrast, always disyllabic. There are no initially-stressed monosyllabic suffixes. Finally, some examples of irregularly-stressed roots are listed in (c) and (d)[17]. Those in (c) have fixed penultimate stress; those in (d), fixed antepenultimate stress. All speakers have exceptional roots of this kind, though exactly which roots are exceptional varies across speakers.

(54) Nonneutral (stress-affecting) morphemes (uppercase letters indicate harmonic vowels):

a. *Pre-stressing suffixes:*

1 syllable	-mE	(Negative)
	-mI	(Interrogative)
	-(y)lE	('with')
	-(y)In	(2 plural imperative)
	-ǰE	(adverbial)
	-ǰE	(adjectival)
2 syllables	-leyin	(adverbial)
3 syllables	-ǰEsInE	(adverbial)

b. *Initially-stressed suffixes*

2 syllables	-Iyor	(Progressive)
	-ErEk	('by')
	-InǰE	('when')

c. *Sample penult-stressed roots (contents of this set vary across speakers)*

ab.lú.ka	'blockade'	Pom.pé.i	(Pompeii)
Af.rí.ka	'Africa'	šev.ró.le	(Chevrolet)
Av.rú.pa	'Europe'	tar.há.na	'dried curd'
Mek.sí.ka	'Mexico'	Üs.kǘ.dar	(place name)
pen.ǰé.re	'window'		

d. *Sample antepenult-stressed roots (contents of this set vary across speakers)*

Ér.zin.ǰan	(place name)
Kas.tá.mo.nu	(place name)
pénaltɨ	'penalty kick'
Zón.gul.dak	(place name)

[17] Note: I am not considering any attempt to abstractly manipulate the syllable structure of these words so that Sezer stress would correctly be assigned to them. For example, it could be claimed that there is a catalectic mora in the second syllable of *üskǘdar*, leading to the assignment of penultimate stress; the same could be said for the stressed syllable of *Kastámonu.* In general, if underlying structure is to be used to capture exceptionality, then I would only use surface-true structure, since otherwise there are few constraints on what can be done.

The effect of these morphemes on the patterns we have seen is straightforward: the stress of nonneutral morphemes overrides both Sezer and Final stress. To see this, we will carefully examine all possible contexts in which nonneutral morphemes occur:

(55) a. Nonneutral morpheme within Sezer stem
b. Nonneutral morpheme within Word (no Sezer stem)
c. More than one nonneutral morpheme within Word (no Sezer stem)
d. Sezer stem + one nonneutral morpheme
e. Sezer stem + more than one nonneutral morpheme

The generalization is relatively simple:

(56) Generalization: within a domain (Word or Sezer stem), stress of leftmost nonneutral morpheme prevails; however, stress of Sezer stem prevails within Word.

Let us now look at the data, case by case. We start with Sezer stems containing a nonneutral morpheme.

5.1 Nonneutral morphemes within Sezer stems: “nonneutral wins”

Sezer stems can be monomorphemic, composed of a single nonneutral root, as illustrated in (57). In such cases, the stress of the nonneutral root overrides the expected Sezer stress.

(57) Nonneutral roots as place names: Sezer stress is overridden

Af.rí .ka	‘Africa’	*Áfrika
Av.rú.pa	‘Europe’	*Ávrupa
Kas.tá.mo.nu	(place name)	*Kas.ta.mó.nu
Zón.gul.dak	(place name)	*Zon.gúl.dak

The same is true of derived place names containing nonneutral morphemes. As shown in (58), adjectives formed by the prestressing suffix *-ǰe/-ǰa* can be used as place names, meaning they can form Sezer stems.

(58)

Derived adjective		>	used as place name (i.e. as Sezer stem)		
čam-lɨ́-ǰa	‘kind of piney’		Čamlɨ́ǰa	(place name in Istanbul)	(*Čamlɨǰa)
süt-lǘ-ǰe	‘kind of milky’		Sütlǘǰe	(place name in Istanbul)	(*Sǘtlüǰe)
kan-lɨ́-ǰa	‘kind of bloody’		Kanlɨ́ǰa	(place name in Istanbul)	(*Kánlɨǰa)

Each derived adjective in (58) has a heavy antepenultimate syllable and light penult, such that antepenultimate Sezer stress would be expected in the place name. However, these forms retain the penultimate stress dictated by the prestressing suffix they contain. Compare the adjectives-cum-Sezer stems in (58) to the derived adjective with all neutral morphemes in (59) which, as we have already seen in (11), does shift to the Sezer pattern when used as a place name:

(59) Derived adjective with only neutral morphemes *does* shift to Sezer stress as place name:
torba-lɨ́ ‘with a bag’ > Tórbalɨ (place name) (*Torbalɨ́)

From these data we can conclude that in the Sezer cophonology, the source for morpheme-specific stress outranks the constraints crucial to establishing the Sezer pattern (specifically CONTOUR, FINAL-FT):

(60) Sezer cophonology: Morpheme-specific stress prevails over Sezer stress

5.2 Nonneutral morpheme within Word: "nonneutral wins"

When a word contains one nonneutral morpheme — and no Sezer stem — the stress associated with that morpheme overrides the expected Final stress. This is illustrated in the data in (61a,b). Compare the words in the lefthand data column, which contain a nonneutral suffix, to those in the righthand column, which contain only neutral morphemes. The words in the righthand column display the expected final stress pattern, but those in the lefthand column show the stress dictated by their nonneutral suffix.

(61) a. prestressing suffixes override Final stress in Word cophonology:

Suffix	Example	gloss	Compare: same root with neutral suffix	
-mE	tekmelé-me	'kick-Neg'	tekmele-dí	'kick-Past'
-mI	arabá-mɨ	'car-Interr'	araba-lár	'car-pl'
-(y)lE	kedí-yle	'cat-with'	kedi-lér	'cat-pl'
	patlɨǰán-la	'eggplant-with'	patlɨǰan-lár	'eggplant-pl'
-(y)In	yáp-ɨn	'do-2pl.imp'	yap-tɨ́	'do-Past'
	tekmelé-yin	'kick-2pl.imp'	tekmele-dí	'kick-Past'
-ǰE	güzél-ǰe	'nicely'	güzel-lík	'beauty'
	insán-ǰa	'humanly'	insan-lík	'humanity'
-ǰE	tat-lɨ́-ǰa	'kind of pretty'	tat-lɨ-lɨ́k	'sweetness'
-leyin	akšám-leyin	'at evening'	akšam-lár	'evening-pl'
-ǰEsInE	hayván-ǰasɨna	'animal-like'	hayvan-lár	'animal-pl'

b. stressed suffixes override Final stress in Word cophonology:

Suffix	Example	gloss	Compare: same root with neutral suffix	
-Íyor	yap-ɨ́yor	'do-Prog'	yap-malɨ́	'do-Necess'
	gid-íyor	'go-Prog'	gid-eǰék	'go-Fut'
-ÉrEk	gid-érek	'go-by (=by going)'	git-melí	'go-Necess'
	yap-árak	'do-by (= by doing)'	yap-aǰák	'do-Fut'
-ÍnǰE	gel-ínǰe	'go-when'	gel-eǰék	'come-Fut'
	yap-ɨ́nǰa	'do-when'	yap-malɨ́	'do-Necess'

The nonneutral suffix needn't be final to have an effect on stress; (62) and (63) show that the stress of a nonneutral suffix prevails even if neutral suffixes follow in the word. In each of these examples, the nonneutral morpheme is underlined:

(62) Prestressing suffix (underlined) + neutral suffix: prestressing suffix prevails

a.		okú-ma-aǰak	[okúmayaǰak]	'read-Neg-Fut'
	(cf.	oku-aǰák	[okuyaǰák)]	'read-Fut')
b.		gít-me-meli		'go-Neg-Necess'
	(cf.	git-melí		'go-Nec.')

(63) Stressed suffix (underlined) inside neutral suffix: stress of stressed suffix prevails

a.		gel-ɨ́yor-sa	'come-Prog-Cond'
	(cf.	gel-sé	'come-Cond')
b.		gel-ɨ́yor -sa-nɨz	'come-Prog-Cond-2pl'
	(cf.	gel-se-níz	'come-Cond-2pl')
c.		gel-ɨ́yor -du	'come-Prog-Past'
	(cf.	gel-dí	'come-Past')
d.		gel-ɨ́yor -du-nuz	'come-Prog-Past-2pl'
	(cf.	gel-di-níz	'come-Past-2pl')

As expected, nonneutral, i.e. stressed roots work the same way that nonneutral suffixes do. In (64), several stressed roots are shown alone and in combination with a neutral suffix, the Ablative; in all cases, the expected Word-final stress is overridden by root stress.

(64) Stressed roots (underlined) alone or inside neutral suffixes: root stress prevails

a. tarhána ‘dried-curd’ (cf. arabá ‘car’)
tarhána-da ‘dried-curd-Locative’ (cf. araba-dá ‘car-Locative’)

b. Kastámonu ‘Kastamonu’
Kastámonu-dan ‘Kastamonu-Ablative’

c. Üskǘdar ‘Üsküdar’
Üskǘdar-a ‘Üsküdar-Dative’

d. penǰére ‘window’
penǰére-ler-i ‘window-Plural-3.poss’

The fact that prestressing suffixes, stressed suffixes and stressed roots all manage to override the word-final stresspattern tells us that, at the Word level, the compelling force behind these morpheme-specific stresses must overpower the constraint forcing word-final stress.

(65) Word cophonology: Morpheme-specific-stress prevails over final stress

5.3 Sezer stem + nonneutral morpheme: “input wins”

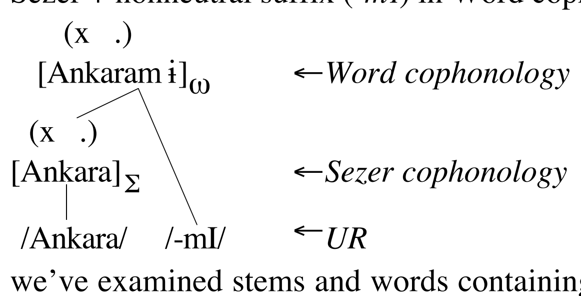
We’ve looked at what happens when a nonneutral morpheme is contained within a Sezer stem or within a word. What happens when a Sezer stem is suffixed with a nonneutral suffix? In (66) we see two Sezer stems followed by nonneutral suffixes — in (a), the prestressing negative suffix, and in (b) the initial-stressed progressive, three suffixes away from the stem. In both cases, the Sezer stem stress prevails.

(66) a. Sezer stem + prestressing suffix: “input (i.e. Sezer stress) wins”
Ánkara ‘Ankara’
Ánkara-mɨ ‘Ankara-interr’ (cf. elmá-mɨ ‘apple-interr’)

b. Sezer root + neutral suffixes + initial-stressed suffix: “input wins”
Ánkara-lɨ-laš-ɨyor ‘Ankara-of-become-prog (=becoming ones from Ankara)’

These facts suggest a pattern of *“input wins”*, illustrated graphically in (67), a diagram of (66a). In the output of the Sezer level, the stem *Ánkara* possesses a stress foot. This foot is input to the Word-level cophonology, which evaluates the Sezer stem together with the potentially pre-stressing interrogative suffix. The Sezer stress is preserved.

(67) Sezer + nonneutral suffix (*-mɨ*) in Word cophonology: Sezer (=input) wins



So far, we’ve examined stems and words containing at most one nonneutral morpheme. In such cases, the stress pattern of the nonneutral morpheme (if any) prevails over final stress.

(68) Word-level cophonology: morpheme-specific stress prevails over final stress (though is itself prevailed over by Sezer stress)

But what happens when there is more than one nonneutral morpheme? We turn next to such cases, and uncover a scenario of “leftmost wins”.

5.4 Nonneutral morphemes in combination: “leftmost nonneutral wins”

In (69)-(72) we see several examples of words containing more than one nonneutral morpheme (and no Sezer stem). In each case, the leftmost nonneutral morpheme, be it suffix (69)-(71) or root (72), determines the stress of the word as a whole. Nonneutral suffixes to the right have no effect on the stress pattern.

(69)	Prestressing suffix < pre-stressing suffix: leftmost prestressing suffix prevails					
	a.	gél	‘come (imper.)’			
		gél-me	‘come-Neg (imp.)’	(cf.	gel-dɨ́	‘come-Past’)
		gél-me-sin	‘come-Neg-3sg.imp’	(cf.	gel-eǰék-sin	‘come-Fut-3sg.imp.’)
	b.	arabá	‘car’			
		arabá-yla	‘car-with’	(cf.	araba-lár	‘car-Pl’)
		arabá-yla-mɨ	‘car-with-Interr’	(cf.	araba-lár-mɨ	‘car-Pl-Interr’)
(70)	Prestressing suffix < initial-stressed suffix: prestressing suffix prevails					
	a.	bɨrák	‘leave’			
		bɨrák-ma	‘leave-Neg’			
		bɨrák-ma-ɨyor [>bɨrákmɨyor]	‘leave-Neg-Prog’	(cf.	bɨrak-ɨ́yor	‘leave-Prog’)
	b.	gél	‘come’			
		gél-me	‘come-Neg’			
		gél-me-inǰe [>gélmeyinǰe]	‘come-Neg-Adv’	(cf.	gel-ínǰe	‘come-Adv’)
(71)	Initially-stressed suffix < pre-stressing suffix: initial-stressed suffix prevails					
	a.	gel-ɨ́yor	‘come-Prog’	(cf.	gel-eǰék	‘come-Fut’)
		gel-ɨ́yor-mu	‘come-Prog-Interr’	(cf.	gel-eǰék-mi	‘come-Fut-Interr’)
	b.	yap-árak	‘do-Adv’	(cf.	yap-malɨ́	‘come-Necess.’)
		yap-árak-mɨ	‘do-Adv-Interr’	(cf.	yap-malɨ́-mɨ	‘come-Nec.-Interr’)
(72)	Stressed root < prestressing suffix (< prestressing suffix): root stress prevails					
		penǰére	‘window’	(cf.	patlɨǰán	‘eggplant’)
		penǰére-yle	‘window-with’	(cf.	patlɨǰán-la	‘eggplant-with’)
		penǰére-mi	‘window-Interr’	(cf.	patlɨǰán-mɨ	‘eggplant-Int.’)
		penǰére-yle-mi	‘window-with-Interr’	(cf.	patlɨǰán-la-mɨ	‘eggplt-with-Interr’)

5.5 Sezer stem + more than one nonneutral morpheme: “leftmost wins”

The forms in (72), in which a stressed root surfaces with stress despite being combined with potentially prestressing suffixes, are of particular interest when compared to the data in (73). Here we find words composed of a Sezer stem plus two prestressing suffixes. In each case, the Sezer stem stress prevails — and neither suffix has an effect on the stress pattern of the word. It is significant that roots, with idiosyncratic stress, as in (72), are behaving like Sezer stems, whose stress is predictable.

(73) In words with Sezer stem + two pre-stressing suffixes, stress on Sezer stem prevails
  a. Adána-yla-mɨ ‘Adana-with-Interr’
  b. mándɨra-yla-mɨ ‘farm-with-Interr’

5.6 Summary

In summary, the interactions among nonneutral morphemes and productive stress patterns suggest the following: while an input foot prevails over any nonneutral morphemes within the same domain, if there is no input foot, then the leftmost nonneutral morpheme prevails.

(74) Generalization: within a domain (Word or Sezer stem), stress of leftmost nonneutral morpheme prevails over the pattern normally assigned to that domain; however, stress of Sezer stem prevails within Word.

Notice that it is the stress of the leftmost nonneutral morpheme, rather than the leftmost potential stress, which prevails in the domain. To bring this point home, reconsider the examples in (75), also seen earlier. These are Sezer stems which contain nonneutral morphemes. The examples have been carefully selected such that the noneutral stress, which surfaces, is actually linearly to the right of where the Sezer stress would be if assigned. However, the data are consistent with the generalization in (74). The leftmost nonneutral morpheme in the Sezer stem is the one which dictates where stress goes.

(75)

Actual stress (nonneutral morpheme underlined)	Outcome if Sezer stress were assigned
[Kan-lɨǰa]	*[Kánlɨǰa]
[Üskǘdar]	*[Ǘsküdar]

It should be noted here that “leftmost wins” is an attested pattern in Turkish even outside of irregularly stressed morphemes: in compounds, we also find that the first, or leftmost, word is stressed. Thus, the generalization in (80) is not entirely unexpected.

We will now examine two approaches to the data we have seen so far. One approach utilizes underlying metrical structure to characterize the nonneutral morphemes. The other uses morpheme-specific grammatical constraints. We turn first to the grammatical approach.

6 A purely grammatical account: exceptionality by grammatical constraints

The exceptionality of the nonneutral morphemes of Turkish has to do with where stress is located in the word. Since stress is always located in the immediate vicinity of the relevant morpheme, the most suitable grammatical account is the theory of Generalized Alignment, developed by McCarthy and Prince 1993a.

6.1 Alignment

Alignment constraints take the form shown below, in which one edge of some category (morphological or phonological) is aligned with some edge of another category. In the Alignment constraints we will invoke for exceptional stress, a morphological category — really, a specific morpheme — is aligned with a foot or stressed syllable.

(76) Generalized Alignment (McCarthy and Prince 1993a):

Align(Cat1, Edge1, Cat2, Edge2)

Variety of alignment constraint needed here:

Align(morpheme$_i$, Edge$_i$, σ́/Foot, Edge$_j$)

(77) illustrates how various nonneutral morphemes can easily be characterized in terms of Alignment[18]. Prestressing suffixes are left-aligned with the right edge of a stressed syllable. Initially-stressed suffixes are left-aligned with the *left* edge of a stressed syllable — or, alternatively, left-aligned with the left edge of a foot, assuming we can guarantee that the foot is a trochee. Some guarantee of that sort is needed anyway for penult-stressed roots, as in (77c); these must be right-aligned with the right edge of a foot, and that foot had better be a trochee.

[18](77) exemplifies only the *metrical* alignment constraints on stress-affecting morphemes; to each suffix in Turkish (regardless of its effect — or lack thereof — on stress) there will also correspond a constraint of the form Align(suffix$_i$, L, base, R), which specifies the linear order of suffix and base.

(77) a. Pre-stressing suffix /-mE/: Align(*mE*, L, σ́, R)
b. Initial-stressed suffix /-Iyor/: Align(*Iyor*, L, σ́, L) *or* Align(*Iyor*, L, Foot, L)
c. Penult-stressed root /penǰere/: Align(*penǰere*, R, Foot, R)

A problem arises with the fourth class of exceptional morpheme, namely the roots with irregular antepenultimate stress. There is no way to align a trochaic foot with the right edge of such a morpheme to achieve antepenultimate stress. In the case of three-syllable words, such as *Zónguldak*, of course the trochee could be aligned with the left edge of the root. However, this still leaves words like *Kastámonu* unaccounted for. I can imagine two possible solutions. Either *Kastámonu* requires an iamb to be aligned with its left edge, in which case alignment constraints must mention the type of foot involved; or, *Kastámonu* is subject to two alignment constraints, one of which requires its final syllable to be nonaligned with a foot.

(78) Problem: antepenult-stressed roots
a. Zónguldak Align(*Zonguldak*, L, Foot, L)
b. Kastámonu Align(*Kastamonu*, L, Iamb, L) *or*
[No-Align(*Kastamonu*, R, Foot, R) >> Align(*Kastamonu*, R, Foot, R)]

Let us assume that at least one of these options is chosen; we now have descriptively adequate constraints for all the known types of exceptional stress placement. Let us now see how the constraints must be ranked in the Sezer and Word cophonologies in order to achieve the generalization in (74).

6.2 Ranking

We know that within the Sezer cophonology, morpheme-specific stress prevails over the Sezer stress pattern, and that within the Word cophonology, morpheme-specific stress prevails over the Final stress pattern. Therefore the following rankings must obtain:

(79) Sezer cophonology: Alignment constraints >> CONTOUR, FINAL-FT
Word cophonology: Alignment constraints >> FINAL-STR

These rankings are illustrated in (80) and (81). In (80) we see the pre-stressing adjectival /-*ǰa*/ embedded within a Sezer stem; its stress pattern, manifested in winning candidate (a), prevails over that of the Sezer pattern, manifested in losing candidate (b). CONTOUR is the only relevant Sezer stress constraint in this example, and thus the only one shown in the tableau.

(80) Sezer cophonology: Align(*ǰE*, L, σ́, R) >> CONTOUR

	[Kan-lɨ-ǰa]Σ	'kind of bloody (place name)'	ALIGN-*ǰE*	CONTOUR
a. ☞	(x .) Kan.lɨ.ǰa	[Kanlɨ́ǰa]		*
b.	(x .) Kan.lɨ.ǰa	[Kánlɨǰa]	*!	

(81) illustrates a word composed of the neutral root /bɨrak/ and the pre-stressing negative suffix /-ma/. Because the prosodic alignment needs of the negative suffix outrank FINAL-STR, the word surfaces with stress preceding the negative suffix, as in winning candidate (a).

(81) Word cophonology: Align(*mE*, L, ´σ , R) >> FINAL-STR

	[bɨrak-ma]$_{\omega}$ 'leave-Neg'	ALIGN-*mE*	FINAL-STR
a.☞	(x .) bɨ.rak.lma [bɨrákma]		*
b.	(x .) bɨ.rak.lma [σ] [bɨrakmá]	*!	

To capture the fact that a Sezer stem keeps its stress when followed by a nonneutral morpheme, we must also ensure that the constraint responsible for Sezer stress, namely PARSE-FT outranks each morphemic prosodic alignment constraint.

(82) Within the Word, Sezer stress prevails over stress of a nonneutral suffix (or suffixes)
Word cophonology: PARSE-FT >> Alignment constraints (>> FINAL-STR)

This is illustrated in the tableau in (83), where the Sezer stem /Adana/ combines with the prestressing interrogative, which has an associated alignment constraint of the type in (77a). In (83), only the winning candidate in (a) satisfies PARSE-FT, at the expense of violating the Alignment constraint for the prestressing negative suffix.

(83)

	(x .) 'Adana-interr' [Adana]$_{\Sigma}$ -mɨ]$_{\omega}$	PARSE-FT	ALIGN-*mI*	FINAL-STR
a.☞	(x .) A.dá.na.lmɨ [Adánamɨ]		*	*
b.	‹(x .)›(x .) A.da.na.lmɨ [Adanámɨ]	*!	*	*
c.	‹(x .)›(x .) A.da.na.lmɨ [σ] [Adanamɨ́]	*!		

The one case we haven't yet looked at is a word with two nonneutral morphemes. In such a situation, of course, only one of the morphemes successfully imposes its required stress pattern on the word. One means of implementing this competition would be to rank the morphemic alignment constraints, such that only one can be satisfied[19]. An illustration of this method is shown in (84). Here, a neutral root combines with the prestressing negative followed by the stressed progressive. If we suppose that the Alignment constraint for the negative — which must follow a stressed syllable — outranks the Alignment constraint for the progressive — which must initiate a foot — then we achieve the desired outcome: the candidate satisfying the Alignment constraint for the negative suffix wins. (84b) shows the same root, this time with the progressive followed by a prestressing interrogative. Again, ranking the Alignment constraint for the progressive above that for the interrogative achieves the desired result.

[19] McQuown and Koylan 1944:864-5 provide a list of suffixes in order of "strength" from which to determine the stress of a word with multiple suffixes. While of course not conceptualized within Optimality Theory, the list serves the same purpose as ranking alignment constraints.

(84) a. Word cophonology: Align(*mE*, L, σ́, R) >> Align(*Iyor*, L, σ́, L)

	[bɨrak-ma-ɨyor]$_ω$ 'leave-Neg-Prog'	ALIGN-*mE*	ALIGN-*Iyor*	FINAL-STR
a. ☞	(x .) bɨ.rak.|ma-|ɨ.yor [bɨrákmɨyor]		*	*
b.	(x .) bɨ.rak.|ma-|ɨ.yor [bɨrakmɨ́yor]	*!		*
c.	(x .) ɨ.rak.|ma-|ɨ.yor [σ] [bɨrakmɨyór]	*!	*	

b. Word cophonology: Align(*Iyor*, L, σ́, L) >> Align(*mI*, L, σ́, R)

	[bɨrak-ɨyor-mu]$_ω$ 'leave-Prog-Interr'	ALIGN-*Iyor*	ALIGN-*mI*	FINAL-STR
a. ☞	(x .) bɨ.rak.|ɨ.yor.|mu [bɨrakɨ́yormu]		*	*
b.	(x .) bɨ.rak.|ɨ.yor.|mu [bɨrakɨyórmu]	*!		*

Of course, this type of constraint ranking works only if the linear ordering properties of the morphemes happen to coincide with the ranking of their prosodic Alignment constraints. Constraint ranking is only an indirect method for capturing "leftmostness"; it is an accident that the morpheme whose alignment constraint is ranked highest occurs to the left of the morpheme with the lower-ranked alignment constraint. This approach would fail if, for any pair of suffixes with competing stress requirements, order was shown to vary according, e.g., to semantics.

One way of overcoming this problem would be to suppose that, in the Word cophonology, *all* morphemic Alignment constraints are satisfied, and that "leftmost wins" is a constraint on foot parsing imposed at a later (possibly phrasal) level.

(85) "Leftmost wins" in Alignment account: add another cophonology
Word cophonology: Morphemic Alignment constraints >> *STRUC
Phrase cophonology: ♦HAVE-FT >> *STRUC >> PARSE-FT >> STR-INITIAL

An illustration is provided in (86)-(87). Here we see a word composed entirely of nonneutral morphemes: a stressed root and two prestressing suffixes. (86) shows all three feet being imposed in the Word cophonology; (87) shows how, at a later level (probably the phrase), all but the leftmost of these feet fail to be parsed.

(86)

	[penǰere-yle-mi]$_ω$	ALIGN-*penǰere*	ALIGN-*(y)lE*	ALIGN-*mI*	*STRUC
a. ☞	(x) (x) (x .) pen.ǰe.rely.le.|mi				***
b.	(x) pen.ǰe.rely.le.|mi		*!	*	*

(87)

	(x) (x) (x .) [pen.ǰe.rely.le.|mi]$_φ$	♦HAVE-FT	*STRUC	PARSE-FT	STR-INIT
a. ☞	(x)‹(x)›‹(x .)› pen.ǰe.rey.le.mi		*	**	*
b.	(x)(x)(x .) pen.ǰe.rey.le.mi		**!*		*

Note that this analysis is also undesirable. The Word level cophonology creates unwieldy, ill-formed representations, which must be cleaned up on a later, otherwise unmotivated level.

7 A lexical account: exceptionality as prespecification

Having seen roughly how a grammatical account of the exception facts would work, let us develop a prespecification account with which to contrast it. On a prespecification account, an exceptional morpheme is affiliated in underlying representation with a stress foot, which interacts with constraints in the grammar to determine the stress pattern of the word containing it. I will argue that all of the exceptional stress in Turkish can be handled by prespecifying a trochaic foot — a foot of the same type that the grammar normally assigns.

(88) shows the lexical entries that would be required. For inherently stressed morphemes, whether root or suffix, the trochee dominates material in the morpheme. For prestressing suffixes, the head of the trochee is unfilled, and must unify with material in the base for which the suffix selects. The difference between stressed and prestressing suffixes is merely a difference in the distribution of underlying structure; it is the presence of this underlying structure which distinguishes all nonneutral morphemes from neutral ones.

(88) "Nonneutral" stress = prespecified (disyllabic) trochee

Stressed root:	e.g.	(x .) penǰere		
Initial-stressed suffix:	e.g.		(x .) -Iyor	
Pre-stressing suffix:	e.g.	(x .) -mI	(x .) -leyin	(x .) -ǰEsInE

As part of the underlying representation of nonneutral morphemes, the trochaic template is subject to the PARSE-FT constraint of the Word-level cophonology.

7.1 The grammar: "Leftmost input wins"

On the prespecification account, the generalization about about the interactions of various sources for stress in Turkish words, repeated below, is easy to capture:

(89) Generalization: within a domain (Word or Sezer stem), stress of leftmost nonneutral morpheme prevails over the pattern normally assigned to that domain; in addition, stress of Sezer stem prevails within Word.

The basic insight on the prespecification account is that the leftmost prespecified foot (in any given domain) wins. In the Sezer cophonology, the only source for prespecified feet are the morphemes themselves; in the Word cophonology, another potential source is the Sezer stem, which (unless monosyllabic) always has a stress foot. All that either cophonology has to do to generate the correct surface stress is identify the leftmost input foot — and parse it. This is illustrated in the following example, which shows the various sources for stress (Sezer stems, nonneutral morphemes) in their possible combinations. Within each bracketed domain, the leftmost input foot wins.

(90)	Nonneutral morpheme within Sezer stem:	(x□□□.) Kan lɨ-ǰE	□ →□	(x□□□.) [□Kanlɨ̤ǰE]$_{\Sigma}$
	Sezer stem as Word:	(x□□.) [□Kanlɨǰa]$_{\Sigma}$	□ →□	(x□□.) [□Kanlɨǰa]$_{\omega}$
	Sezer stem + nonneutral morphemein Word:	(x□□.)(x□.) [□Kanlɨǰa□]$_{\Sigma}$□-mI	□ →□	(x□□.) [□Kanlɨǰamˆ□]$_{\omega}$

Two nonneutral morphemes in Word:

(x□.)(x□□.) □ (x□)
penǰere□-mI → [penǰeremɨ]$_{\omega}$

(x□□(x)□.)□□□ (x□□.)
yap□-mE□□-sIn → [yapmasɨn]$_{\omega}$

We already know how to guarantee that an input foot prevails over the “default” stress pattern in any given cophonology: PARSE-FT is highly ranked in both Sezer and Word cophonologies. To fully implement the analysis we need only to formalize “leftmost wins”. To this end, I invoke a new constraint, STR-INITIAL:

(91) STR-INITIAL Align(σ́ , L, Domain, L) “Each stressed syllable is initial in the domain”

STR-INITIAL plays an observable role only when there are multiple stress feet in the input. Consider the tableau in (92). Here we see a neutral root in combination with two nonneutral suffixes, each of which has an underlying stress foot. We know independently that the output word must have exactly one stress foot; PARSE-FT tells us that the output foot must be one of the input feet. The role of STR-INIT is to tell us which input foot surfaces. The winning candidate, (a), is the one in which the leftmost input foot is parsed. Losing candidate (b) preserves the rightmost of the two input feet, incurring a greater violation of STR-INIT; losing candidate (c) satisfies STR-INIT but violates PARSE-FT. STR-INIT must, therefore, be ranked below PARSE-FT.

(92) Word-level cophonology: PARSE-FT >> STR-INIT

	(x .) (x .) ‘leave-Neg-Prog’ [bɨrak -mE -Iyor]$_{\omega}$	PARSE-FT	STR-INIT
a.☞	(x .)‹(x .)› bɨ.rak.lmalɨ.yor [bɨ́rákmɨyor]	*	*
b.	‹(x .)› (x .) bɨ.rak.lmalɨ.yor [bɨ́rakmɨyor]	*	**!
c.	(x .)‹(x .)›‹(x .)› bɨ.rak.lmalɨ.yor [bɨ́rakmɨyor]	**!	

An advantage of the proposed account is that, in the Word cophonology, Sezer feet, derived in the Sezer cophonology, look just like lexically prespecified feet. As a result, STR-INIT treats them alike, selecting the leftmost to parse. This is illustrated in the following tableau, where the Word cophonology preserves the stress foot present in the input Sezer stem *Adána*:

(93)

	(x .) (x .) ‘Adana-Interr’ [[Adana]$_{\Sigma}$ -mI]$_{\omega}$	PARSE-FT	STR-INIT
a.☞	(x .) ‹(x .)› A.da.na.mɨ [Adánamɨ]	*	*
b.	(x .) ‹(x .)› ‹(x .)› A.da.na.mɨ [Ádanamɨ]	**!	

STR-INITIAL has no role to play when the input has less than two stress feet. Because it is outranked by PARSE, in any form with just one input foot, that foot prevails regardless of its location, as shown below:

(94) If there is only one input foot, PARSE-FT always prevails:

i. a prespecified foot within the Sezer stem:

	(x .) [Kan-lɨ-ǰ a]$_\Sigma$	PARSE-FT	STR-INIT
a.☞	(x .) Kan.lɨ.ǰ a [kanlɨ́ǰ a]		*
b.	(x .)‹(x .)› Kan.lɨ.ǰ a [kánlɨ̀ǰ a]	*!	

ii. a prespecified foot within the Word domain:

	(x .) [penǰ ere]$_\omega$	PARSE-FT	STR-INIT
a.☞	(x .) pen.ǰ e.re [penǰ ére]		*
b.	(x .)‹(x .)› pen.ǰ e.re [pénǰ ere]	*!	

Similary, STR-INITIAL is ineffective in forms containing absolutely no prespecified stress feet. In both Word and Sezer cophonologies, STR-INIT is dominated by the constraints governing where an inserted stress foot should be located. (95) shows that STR-INIT is ranked below FINAL-FT in the Sezer cophonology (I) and below FINAL-STR in the Word cophonology (ii):

(95) If there is no input stress foot, then the constraints on stress assignment prevail:

i. Sezer cophonology: FINAL-FT >> STR-INIT

	[Adana]$_\Sigma$	FINAL-FT	STR-INIT
a.☞	□(x□□.) A.da.na [Adána]		*
b.	(x□□.) A.da.na [Ádana]	*!	

ii. Word cophonology: FINAL-STR >> STR-INIT

	[araba-lar-ɨ]$_\omega$ 'car-Pl-Acc'	FINAL-STR	STR-INIT
a.☞	(x .) a.ra.ba.la.rɨ [σ] [arabalarɨ́]		***
b.	(x .) a.ra.ba.la.rɨ [árabalarɨ]	*!	

A summary is provided, below, of the constraint ranking needed to implement the templatic, prespecification account of exceptionality. Note that all the constraints are highly general and independently needed.

(96) Constraint rankings needed to implement prespecification (templatic) account:

Sezer: ♦HAVE-FT >> *STRUC >> PARSE-FT >> CONTOUR >> FINAL-FT >> STR-INIT

Word: ♦HAVE-FT >> *STRUC >> PARSE-FT >> FINAL-STR >> STR-INIT

8 Comparing the two accounts at the explanatory level

We have now seen two accounts, one purely grammatical and one using prespecification, of exceptional stress in Turkish. Both are descriptively adequate. In this section, I compare the two on explanatory grounds, giving three arguments for the superiority of the prespecification account on explanatory grounds:

(97) a. Under prespecification account, the generalization is simpler; Sezer stress, exceptional stress form natural class, explaining their identical behavior in Words
b. Prespecification account treats exceptions as natural class
c. Prespecification account is more economical, using only one foot type

8.1 Generalization is simpler on prespecification account

Compare the generalizations reached about the Word level on the two different analyses. On the grammatical account, the generalization is that in both cophonologies, the leftmost nonneutral morpheme prevails; however, in the Word cophonology, Sezer stress takes precedence even over nonneutral morpheme stress.

(98) Grammatical account: Sezer wins (Word cophonology), else top-ranked Alignment constraint wins (both cophonologies)
Prespecification account: leftmost input foot wins (both cophonologies)

Notice that it is only an accident on the Grammatical account that the constraint enforcing preservation of Sezer stress and the Alignment constraints all happen to be ranked in the same position relative to FINAL-STR. On this analysis, Sezer stress and morpheme-specific stress have nothing in common that would lead us to expect this similar behavior.

On the prespecification account, by contrast, Sezer stress and morpheme-specific stress are formally identical in the Word cophonology. Thus there is no need to distinguish them. The generalization becomes simpler — "leftmost wins" — and holds of both cophonologies. In providing a neater generalization over the data, the prespecification account is at an advantage.

8.2 Exceptions form natural class

The second advantage of the prespecification account is that it provides a unitary representation for all exceptions, providing a further generalization over exceptions. In particular, all exceptional morphemes have a prespecified disyllabic trochee. This generalization correctly predicts that certain exception types will be unattested. In particular, we expect no post-stressing morphemes, as shown in (99a), since to represent these an iambic foot would be required. Similarly, we predict the absence of underlying morpheme-final iambs or degenerate feet, with resulting fixed morpheme-final stress (b)[20].

(99)	a.	(.□□□x *ara ba□□□	(.□□□ *[[□□□m]]□□	No iambs
	b.	□(.□□x) *a raba	(.□□□□□□ *[[□□□]□ml	No iambs
		 *ara ba	□□(x) *[[□□]□□mI]	No degenerate feet

By contrast, the Grammatical account can make no such predictions. Each nonneutral morpheme is, to be sure, affiliated with an Alignment constraint — but there are many more logically possible ways to align morphemes with stress and stress feet than are attested in the inventory of exceptional morphemes in Turkish, and there is no obvious way in which to narrow

[20] Of course, the possibility of fixed morpheme-final stress still exists; it could be generated by means of an underlying trochaic foot headed by the morpheme-final syllable. This possibility is discussed later in the text.

down the expected possibilities. To see why, examine the range of Alignment constraints it was necessary to invoke to capture the types of exceptionality displayed.

(100) Attested Alignment constraints (assuming independent guarantee of trochaic foot shape)

Align(sfx, L, ´σ , R)	(=pre-stressing suffix)
Align(sfx, L, ´σ /Ft, L)	(=stressed suffix)
Align(root, R, Ft, R)	(=penult stressed root)
Align(root, L, ´σ /Ft, L)	(=*Zónguldak* etc.)
NoAlign(*Kastamonu*, R, Ft, R) ∩ Align(*Kastamonu*, R, Ft, R)	(=*Kastámonu* etc.)

Leaving aside the troublesome *Kastámonu*, each Alignment constraint invoked in the analysis is of the same overall format shown in (101): a morphological category is aligned with a prosodic category. In the Alignment account of Turkish developed above, the set of morphological categories referred to includes root and suffix. The set of prosodic categories referred to includes stress and foot. Both left and right edges of morphological and prosodic categories are referred to. In short, we have four binary choices, which leads us to expect 16 possible alignment constraints.

(101) Four binary choices available in the overall format of Align(Mcat, Edge1, PCat, Edge2):

MCat ∈ {sfx, root}

PCat∈{´σ , Foot}

E_1∈{L, R}

E_2 ∈ {L, R}

Yet certain of these are clearly unattested in the system, as illustrated in (102). In particular, the alignment constraints that would generate post-stressing behavior are not utilized in Turkish; nor are those which would generate fixed morpheme-final stress.

(102) Why not the the unattested:

Align(sfx, R, ´σ , R)	(=fixed suffix-final stress)
Align(sfx, R, ´σ , L)	(=post-stressing suffix)
Align(sfx, R, Foot, L)	(=post-stressing suffix)
Align(sfx, L, ´σ , L)	(=initial-stressed monosyllabic suffix)
Align(sfx, L, Foot, L)	(=initial-stressed monosyllabic suffix)
Align(root, R, ´σ , R)	(=fixed root-final stress)
Align(root, R, ´σ , L)	(=post-stressing root)
Align(root, R, Foot, L)	(=post-stressing root)

The basic problem is that the attested Alignment constraints don't form a natural class to the exclusion of the unattested ones. No generalization about exceptionality is captured here; the analysis is not explanatory[21].

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[21] Alan Prince pointed out at the workshop that if the theory of Alignment were modified to exclude morpheme-specific Alignment constraints of the type in (100) (not to mention those in (102)), the prespecification account might be the *only* descriptively adequate one.

It is hard to see how exactly to restrict the theory, however; as long as relations between metrical and morphological structure (e.g. the currently pivotal Lex≈PrWd (Prince and Smolensky 1993) and Stem=PrWd (McCarthy and Prince 1993b, 1994a,b)) exist, and as long as Alignment constraints exist, there can be no principled reason *not* to align morphological entities with metrical ones. It is certainly worth pursuing ways in which the power of alignment could be pared down to just the needed level. However, I think there is a more general point to be made here, which is that the grammar is generally able to describe more types of exceptions than actually exist, and that, therefore, the theory must always locate exceptionality in the lexicon, which has

8.3 Grammar constrains prespecification

A common criticism of prespecification accounts is that they predict too many types of underlying representations. For example, one could criticize the account proposed here by observing that in principle, any sort of weird metrical structure — such as a degenerate foot, or an iambic foot, or a ten-syllable foot — could be prespecified, and could have its own weird effects on the grammar. However, there is a simple response to this criticism, which is that prespecified structure is constrained by the grammar — in a way that other approaches to exceptionality are not.

For example, the proposed prespecification analysis of Turkish employs only disyllabic trochees. Exceptional words differ from regular words only in the location of the trochaic foot they all possess. It is easy to guarantee that no other type of foot can be used in the system. All we need is the statement in (103): ♦FT-BIN and ♦TROCHAIC, both unviolated in Sezer and Word cophonologies, dominate PARSE-FT. Note that this is a constraint ranking that we already arrived at, completely independently of exceptions: ♦FT-BIN and ♦TROCHAIC were found to be unviolable (hence undominated by any of the other constraints we discussed), while PARSE-FT was found to be dominated by *STRUC (see (17)).

(103) The guarantee that all, even prespecified (exceptional), feet are binary trochees:

♦FT-BIN, ♦TROCHAIC >> PARSE-FT

The location of the prespecified stress foot is another matter. As far as I know, there are no morphemes prespecified for final stress[22]. The generalization about roots is easy to handle. According to Inkelas and Orgun 1994, Turkish requires a root level of phonology (on which syllabification takes place and a bimoraic minimality condition is imposed). In order to prohibit root stress on final syllables, we need only assume that in the Root cophonology, FILL and ♦FT-BIN are as highly ranked as they are in the Sezer cophonology. This will prohibit catalexis and degenerate feet — thus making it impossible for a final prespecified stress to survive[23].

Consider, by comparison, how we would implement the generalization about foot form in exceptional words on the Grammatical account. All along, I was assuming that the feet referred to in the Alignment constraints would all somehow be guaranteed to be disyllabic trochees. But the relevant guarantee is of course simply the stipulation that each and every Alignment constraint is outranked by a constraint to the effect that the foot in Turkish is trochaic.

(104) The guarantee that feet imposed by all Alignment constraints are binary trochees:

♦FT-BIN, ♦TROCHAIC >> ALIGNMENT CONSTRAINT #1

♦FT-BIN, ♦TROCHAIC >> ALIGNMENT CONSTRAINT #2

♦FT-BIN, ♦TROCHAIC >> ALIGNMENT CONSTRAINT #3

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fewer options. See Inkelas, Orgun and Zoll 1994 for amplification of this point.

22 There also appear to be no roots prespecified for stress outside of the final 3-syllable window. However, since there are few roots this long in this first place, the generalization is not very striking. I have chosen not to account for it. However, it could be accounted for by the Root cophonology; see Kager 1993, 1994 for discussion of the implementation of stress windows.

23 Note, however, that I have no way of enforcing a similar ban on final-stressed suffixes. Turkish levels are noncyclic (Inkelas and Orgun 1994), thus eliminating the possibility of banning degenerate feet/catalexis on each suffixation cycle. Orhan Orgun (p.c.) notes that there is one suffix, the Necessitative /-mElI/, whose final syllable is always stressed (e.g. *git-melí* 'go-Necess', *git-melí-ler* 'go-Necess-3pl'). It may just be a coincidence that this suffix never precedes a neutral suffix; its combinatory possibilities are rather limited. However, it might also be the case that /-mElI/ has fixed final stress.

It is just an accident that the Alignment constraints are all ranked in this fashion.

To summarize, prespecification is inherently constrained by the grammar, for which nonexceptional words provide independent motivation. But a grammatical analysis of exceptionality cannot be inherently constrained by the grammar in a similar way, because it *is* the grammar.

9 Conclusions

In conclusion, I have argued that the prespecification, template-based account of exceptional stress in Turkish is superior on explanatory grounds to the proposed Alignment account. Note that both analyses have been formulated within Optimality Theory; the two approaches differ only on the theory-neutral issue of how much complexity should be allocated to the lexicon as opposed to the grammar. In fact, the prespecification analysis is perfectly suited to Optimality Theory, which avoids the rampant stress deletion processes that would be required on a rule-based, derivational account.

If it is generally agreed that the prespecification analysis of Turkish stress is superior to the one which does not use templates, then we must acknowledge some role for templates in phonological theory. This conclusion may be perfectly compatible with the claims about templates by McCarthy and Prince (1993, 1994a,b), who were discussing only reduplication and infixation. Perhaps templates play a role in exceptional stress patterns but not in the more canonical types of prosodic morphology (though see Zoll 1993 for arguments that templates in Yawelmani prosodic morphology are referred to by the grammar and thus must be prespecified structure, and Itô and Mester 1994 for the proposal that a German suffix consists underlyingly of an empty mora). However, true this can only be an accident, given the equivalence we saw earlier between the templatic and nontemplatic accounts of simple CV reduplication. There is no principled reason not to use templates, and in at least some cases they clearly improve analyses.

10 Implications: the role of exceptions in analysis

In closing, I would like to explore one further implication of the study of Turkish, namely the role that exceptions can play in phonological analysis. It has become increasingly clear to me that the common methodology of basing one's analysis on the "core" phenomena of a language and only gradually, if ever, extending the analysis to the more "marginal" phenomena can be misleading. It is not always the case that the study of regular patterns logically precedes and informs the study of exceptional patterns.

Working on Turkish stress has shown me that the direction of influence can, at least sometimes, be the reverse: in this case, the careful study of exceptions actually illuminates the analysis of the regular patterns by showing the predominance of the trochaic foot. Thus regardless of the details of the analysis, I hope that at least one implication of this study will be that exceptions should play a more central role in, rather than function as a footnote to, theoretical analysis.

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