最適性理論と規則に基づく音韻理論：ラーディル語と現代ヘブライ語の音韻分析から

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Optimality Theory and Rule-Based Phonology : A Comparison through the Analyses of Lardil and Modern Hebrew*

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1. Introduction

The purpose of this study is to compare Optimality Theory and rule-based phonology, focusing on limited sets of data from Lardil and Modern Hebrew. In the traditional rule-based phonology, effort has been made to find a universal method of rule application. Koutsoudas, Sanders, and Noll (1974), for example, examined various types of rule interactions, and argued that there exist universal principles of rule application in phonology. However, there are known cases of phonological processes, including those found in Lardil and Modern Hebrew, that resist conforming to such a contention. Due to the existence of such processes, phonologists working in rule-based phonology generally accept the idea that the phonological theory should be equipped with the power of extrinsic rule-ordering, which cannot be replaced by some form of universal rule application.

The emergence of Optimality Theory (OT) in the 1990s, however, drastically changed the view of many linguists concerning the architecture of phonological theory (and to some extent, the architecture of linguistic theory in general). In OT, there are no rules. The theory includes constraints instead, and the differences witnessed among languages are believed to stem from the differences in ranking among those constraints. It will be interesting, then, to see whether the facts found in Lardil and Modern Hebrew can be adequately explained in OT.

The organization of this paper is as follows: Section 2 introduces a typology of rule application in rule-based phonology. Section 3 shows why extrinsically ordered rules are necessary to account for the relevant data in Lardil and Modern Hebrew. Section 4 adopts the OT framework and considers how the facts given in section 3 can be accounted for in OT. Section 5 summarizes our discussion, concluding that the relevant facts can be successfully explained by OT, and that OT has some advantage over rule-based phonology in explaining the phenomena discussed here.

2. Typology of rule application in rule-based phonology

In rule-based phonology, there are basically two ways to apply a set of phonological rules to a given underlying representation (UR). One way is called "simultaneous rule application," in which all the phonological rules applicable are applied simultaneously to the UR. The other way is called "sequential rule application," in which rules are applied one at a time in sequence. The latter type of rule application necessarily involves rule ordering, be it specified or unspecified. If specified, the rules are said to be extrinsically ordered. If unspecified, but when the rules are ordered anyway due to the nature of the rules themselves, then the rules are said to be intrinsically ordered.

The following phonological derivation in French serves to illustrate the difference between intrinsic rule ordering and extrinsic rule ordering.

(1) /bɔn/ → b ɔ̃ n → [b ɔ̃] 'good' (m.)

Hyman (1975: 130-131) demonstrates that the following rules can be set up for the derivation in (1).

(2) a. V → Ṽ / _ N$ ($ = syllable boundary)

b. $N \rightarrow \phi$ / $\tilde{V}$_ \$ (N = nasal consonant)

Since the nasal deletion rule (2b) applies only when the nasal is preceded by a nasal vowel, (2a) must apply first for (2b) to be effected. It is simply impossible for (2b) to apply before (2a), given that all vowels in French are underlyingly oral. It is in cases such as this that rules are said to be intrinsically ordered.

If, however, the relevant rules in French are as in (3), as proposed by Schane (1968), then the rules must be extrinsically ordered in order to ensure the correct derivation.

(3) a. $V \rightarrow \tilde{V}$ / _N\$

b. $N \rightarrow \phi$ / _\$

Unlike the case in (2), the nasal deletion rule (3b) can apply before (3a), because the structural description of (3b) does not require that a nasal consonant be preceded by a nasalized vowel for it to be deleted. However, if (3b) is applied before (3a), (3a) is no longer applicable, and a wrong output will result. For example, instead of (1), we will have (4), if (3b) applies before (3a):

(4) / bɔn / → * [bɔ]

To avoid this problem, the grammar must order the rules extrinsically, specifying that (3a) should be applied before (3b). Note that rule (3b) is simpler than rule (2b), but the simplification is made possible at the cost of imposing extrinsic rule ordering.

Let us consider next how the French fact can be accounted for under the simultaneous rule application approach. When the rules in (3) are applied simultaneously to the UR /bɔn/, the correct output [b ɔ̃] results, as illustrated in (5).

(5)	/	b	ɔ	n	/
		(3a)	↓	↓ (3b)	
	[	b	ɔ̃	ϕ	]

The derivation illustrated in (5) is more attractive than the extrinsically-ordered or intrinsically-ordered sequential rule application discussed above, since it combines the advantages of the latter two types of rule application: (i) the phonological rules necessary are the simpler ones in (3), rather than those in (2); (ii) there is no need to specify in the grammar the order of rule application. Thus, we have good reason to choose simultaneous rule application as the best way to apply rules in this particular phonological derivation.

Can the simultaneous rule application derive correct phonetic representations in all the phonological derivations? Apparently not, and the traditional rule-based phonology has depended upon extrinsic rule ordering in order to account for the phenomena that cannot be explained by simultaneous rule application. Examples of such phenomena will be presented in section 3, and the Optimality Theoretic analyses of them will be given in section 4. In order to facilitate our discussion in the following sections, the remainder of this section introduces a finer distinction found in simultaneous rule application.

The distinction concerns the following question: Can rules be reapplied to representations to which some rules have already been applied? The "direct mapping hypothesis" (DMH) says "no" to this question, while the "free reapplication hypothesis" (FRH) says "yes."[1]

Under the DMH, all the applicable rules are applied simultaneously to a

UR, and the resultant representation is the final representation, i. e., the phonetic representation (PR). Thus, only two levels are required in the mapping from UR to PR : the levels of UR and PR themselves. Hence, the term "direct mapping."

Under the FRH, rules are also applied simultaneously. However, the FRH differs from the DMH in that it allows the output of a derivation to serve as the input to another derivation. Thus, when a UR undergoes phonological changes as a result of simultaneous application of every applicable rule, the resultant representation is subject to another screening by all the rules for their applicability. If more rules can be applied, then they will, and the resultant representation undergoes screening again, and so forth, until no rules are applicable anymore. Under the FRH, there can be many intermediate representations between the UR and the PR. But at each level, rules are applied simultaneously. With this much background, let us observe in the next section some of the phenomena in which the simultaneous rule application approach (either DMH or FRH) does not work.

3. Why is extrinsic rule ordering necessary?

3.1. Lardil

Having distinguished two types of simultaneous rule application, I now turn to cases where simultaneous rule application is problematic. Kenstowicz and Kisseberth (1979: 300) argue against the DMH on the basis of, among others, data from Lardil.[2] The following rules are operative in Lardil.

(6) Apocope (AP) $V \rightarrow \phi \ / \ V\,C_1\,V\,C_1 \_\_ \#$

(7) Non-apical deletion (NAD) $\begin{bmatrix} \text{-syll} \\ \text{-apic} \end{bmatrix} \rightarrow \phi \ / \ \_\_ \#$

These rules are motivated by such facts as the following. The stem of [mayara-n] 'rainbow-ACCUSATIVE, NONFUTURE' is realized as [mayar], not *[mayara], when no suffix follows. Similarly, the stem of [ŋaluk-in] 'story-ACCUSATIVE, NONFUTURE' is realized as [ŋalu], not *[ŋaluk], when no suffix follows. The former fact can be explained by AP, and the latter, by NAD. These rules interact with each other. For example, consider the data in (8).

(8)	affixed form	uninflected form	gloss
	puṭuka-n	puṭu	'short'
	ŋawuŋawu-n	ŋawuŋa	'termite'
	murkunima-n	murkuni	'nullah'

The derivation of [puṭu] from the underlying /puṭuka/ can be accounted for if AP and NAD are applied sequentially, in that order. The other uninflected forms are also accounted for in the same manner.

On the other hand, the DMH, according to which the only input to any rule is the UR, yields wrong results for these data. The UR /ŋawuŋawu/, for instance, will be converted to *[ŋawuŋaw], as illustrated in (9).

(9) / ŋ a w u ŋ a w u /
↓ (AP)
[ŋ a w u ŋ a w ϕ]

NAD as formulated in (7) cannot apply in (9) since the UR does not meet the structural description of NAD. Similarly, the other uninflected forms in (8) cannot be derived by the DMH, either.

Let us next consider the FRH, which allows rules to reapply whenever possible. The derivation of the above example /ŋawuŋawu/ will proceed as follows, according to the FRH.

(10) / ŋ a w u ŋ a w u /
↓ (AP)
ŋ a w u ŋ a w ϕ
(NAD) ↓
ŋ a w u ŋ a ϕ ϕ

In the UR, both AP and NAD are checked simultaneously for their applicability. Only AP is applicable at this level. After the application of AP, the resultant representation is again checked for applicability of any rules. This time NAD is applicable, since the second [w] is word-final at this point. NAD therefore applies, yielding *ŋawuŋa*. If the derivation stopped here, the FRH would successfully account for the data. However, under the FRH, derivations must continue until no more rules are applicable. And since *ŋawuŋa* satisfies the structural description of AP, it applies, yielding **ŋawuŋ*. To this representation, NAD can and will apply again, yielding **ŋawu*. At this point, the derivation finally stops, but with the wrong output. Thus, the FRH as defined above does not render the correct result, either.

In order to confirm that the extrinsically ordered sequential rule application renders the correct result, consider (10) again. Under this approach, AP is stipulated to apply before NAD. Thus, the derivation proceeds exactly as in (10). Crucially, when the two rules have been applied, they are no longer employed for further derivations. Thus, the output for /ŋawuŋawu/ will be [ŋawuŋa], correctly.

3.2. Modern Hebrew

Another example that indicates the need for extrinsic rule-ordering can be found in Modern Hebrew, as pointed out by Kenstowicz and Kisseberth

(1979: 310f.). In Modern Hebrew, there are several suffixes indicating person and number that begin with *-t*. They are added to imperfective verb stems. If the stem ends in *t* or *d*, the suffixes may be optionally separated from the stem by an epenthetic vowel *e*:

(11)	a.	kišat-eti	~	kišat-ti	'I decorated'
		kišat-et	~	kišat-t	'you (f. sg.) decorated'
		kišat-etem	~	kišat-tem	'you (pl.) decorated'
	b.	yarad-eti	~	yarat-ti	'I descended'
		yarad-et	~	yarat-t	'you (f. sg.) descended'
		yarad-etem	~	yarat-tem	'you (pl.) descended'

Notice that the stem-final obstruent in (11b) is voiced if the epenthetic *e* is present, but voiceless if it is not present. Modern Hebrew has a rule that assimilates voicing of an obstruent to a following obstruent.[3] Underlyingly, then, the stem of (11b) should be /yarad/ rather than /yarat/. The stem of (11a) is underlyingly /kišat/, obviously. Two rules are needed to account for the paradigm in (11), and they should be ordered in the following manner:

(12) i. Epenthetic *e* Insertion (optional)

$\phi \rightarrow$ e / [+stop, +alveolar] __ t

ii. Voicing Assimilation

/ d / $\rightarrow$ t / __ t

The order given in (12) is crucial: if Voicing Assimilation were to apply before Epenthetic *e* Insertion, we would have forms like *[yarat-eti] instead of [yarad-eti].

As illustrated in (13), both the DMH and FRH incorrectly derive * [yarat-eti] from /yarad-ti/, although they can correctly derive an alternative form [yarat-ti] from the same UR if the optional rule of Epenthetic *e* Insertion does not apply.

(13) / y a r a d t i /   / y a r a d t i /
(12ii) ↓ ↓ (12i)   ↓ (12ii)
*[y a r a t e t i] ~ [y a r a t t i]

Thus, the data from Modern Hebrew argues against simultaneous rule application (DMH or FRH), forcing us to opt for extrinsically ordered sequential rule application.

4. Optimality Theoretic Accounts

4.1. Lardil

Let us consider the data from Lardil once again.

(14)	affixed form	uninflected form	gloss
	puṭuka-n	puṭu	'short'
	ŋawuŋawu-n	ŋawuŋa	'termite'
	murkunima-n	murkuni	'nullah'

In order to account for the uninflected forms in (14), the following rules were postulated.

(15) Apocope (AP) $V \rightarrow \phi \, / \, V \, C_1 \, V \, C_1 \, \_\_ \, \#$

(16) Non-apical deletion (NAD) $\begin{bmatrix} \text{-syll} \\ \text{-apic} \end{bmatrix} \rightarrow \phi \, / \, \_\_ \, \#$

As a first step to account for the Lardil data within OT, let us consider the nature of Apocope in (15). What the rule expresses is the fact that the deletion of a final vowel occurs only if it is preceded by at least two syllables. This restriction can be confirmed by comparing the data in (17) with those in (18).[4]

(17)	affixed form	uninflected form	gloss
	mela-n	mela	'sea'
	wanka-n	wanka	'arm'
	kuNka-n	kuNka	'groin

(18)	affixed form	uninflected form	gloss
	yalulu-n	yalul	'flame'
	mayara-n	mayar	'rainbow'
	wiwala-n	wiwal	'bush mango'

The affixed forms in (17) consist of two syllables, and those in (18), three syllables. The uninflected forms in (17) retain the final vowels that are present in the affixed forms, but those in (18) do not. Hence, the Apocope rule in (15).

This restriction of Apocope expressed in rule (15) can be nicely explained by OT. Let us assume that the following constraints are at work to yield Apocope.

(19) $^*[\ \sigma\ ]_{word}$

A word must contain more than one syllable.

(20) $^*V_{uwf}\#$

A word must not end with an underlyingly word-final vowel.

To this we add a general constraint of faithfulness in (21), which is included in any OT phonology in one way or another.[5]

(21) FAITH (FULNESS)

The output must be identical to the input.

Assume that the constraints in (19) - (21) are ranked in that order, namely, * [σ]$_{word}$ ≫ *V$_{uwf}$ # ≫ FAITH. This will explain why the uninflected forms are the way they are in (17) and (18). Take, for example, the uninflected forms [mela] in (17) and [yalul] in (18). The correct form is chosen in each case, as illustrated in the following tableaus.

(22)

/mela/	* [σ]$_{word}$	*V$_{uwf}$#	FAITH
☞mela		*	
mel	*!		*

(23)

/yalulu/	* [σ]$_{word}$	*V$_{uwf}$#	FAITH
yalulu		*!	
☞yalul			*

In (22), [mela] comes out as the optimal output, since the alternative [mel] violates the higher-ranked constraint that prohibits a monosyllabic word. In (23), on the other hand, [yalul] is the winner, since it violates only the lowest ranked constraint, FAITH.

The superiority of the OT analysis given in (22) - (23) over the analysis in terms of the Apocope rule (15) becomes apparent when we consider the data in (24).

(24)

affixed form	uninflected form	gloss
ṭer-in	ṭera	'thigh'
yak-in	yaka	'fish'
ṛelk-in	ṛelka	'head'

The affixed forms in (24) contain the suffix *-in*, which is expected after consonant-final stems. The uninflected forms, however, end with a vowel.[6] This fact makes sense, given that Lardil prohibits monosyllabic words. The tableau in (25) illustrates why [ṭera] is preferred over [ṭer].

(25)

/ṭer/	* $[\sigma]_{word}$	$*V_{uwf}\#$	FAITH
ṭer	*!		
☞ṭera			*

We see that the constraint in (19), which was needed to explain the data in (17), is also working to yield the uninflected forms in (24). The Apocope rule (15), on the other hand, has nothing to say about the data in (24). To account for the data in (24), rule-based phonology has to make another rule that inserts a vowel word-finally if the underlying form of the stem happens to be monosyllabic. The OT analysis, in contrast, adds nothing to the already needed constraints: The data in (17), (18), and (24) have all been accounted for by the same constraints, as shown in the tableaus (22), (23), and (25). The beauty of OT lies in its capacity to directly express general constraints that are at work behind various surface phenomena.

Returning to our original problem, we now consider the interaction of the following rules.

(26) Apocope (AP) $V \rightarrow \phi$ / V C_1 V C_1 __ #

(27) Non-apical deletion (NAD) $\begin{bmatrix} \text{-syll} \\ \text{-apic} \end{bmatrix} \rightarrow \phi$ / __ #

In section 2, we saw that in rule-based phonology, these rules must be extrinsically ordered, because their simultaneous application yields the wrong result. Let us now consider how OT will explain the same data, repeated in (28).

(28)	affixed form	uninflected form	gloss
	puṭuka-n	puṭu	'short'
	ŋawuŋawu-n	ŋawuŋa	'termite'
	murkunima-n	murkuni	'nullah'

The Non-apical deletion rule in (27) is needed because no word in Lardil may end in a non-apical consonant. Let us put this observation in the form of a constraint in (29).

(29) $*C_{[\text{-apic}]}$ #

No word may end in a non-apical consonant.

We can now construct a tableau to explain why the uninflected forms in (28) are as they are. By way of example, let us consider the tableau for /ŋawuŋawu/:

(30)

/ŋawuŋawu/	$*[\sigma]_{word}$	$*C_{[apical]}\#$	$*V_{uwf}\#$	FAITH
ŋawuŋawu			*!	
ŋawuŋaw		*!		*
☞ŋawuŋa				**
ŋawuŋ		*!		***
ŋawu				****!

Although [ŋawuŋa] violates FAITH twice, it wins the competition since it does not violate any higher-ranked constraints. The candidate [ŋawu] does not violate any constraints other than FAITH either, but it loses to [ŋawuŋa] due to the more serious FAITH violations than [ŋawuŋa]. Thus, as far as the output candidates given in (30) are concerned, tableau (30) gives the correct result.

If we consider more candidates than those given in (30), however, we notice that a modification is in order concerning one of the constraints assumed.[7] Consider the following tableau.

(31)

/ŋawuŋawu/	$*[\sigma]_{word}$	$*C_{[apical]}\#$	$*V_{uwf}\#$	FAITH
☹ ŋawuŋawur				*
ŋawuŋa				**!

Here, the candidate [ŋawuŋawur], in which an underlyingly absent apical consonant is inserted word-finally, is incorrectly chosen as the optimal output.

This problem can be solved by recognizing two aspects of FAITH, as is a common practice in the literature. Thus, we replace FAITH with the following constraints.[8]

(32) MAX-IO

Input segments must have output correspondents.

(33) DEP-IO

Output segments must have input correspondents.

To paraphrase, MAX-IO says "no deletion," and DEP-IO says "no insertion." Returning to tableau (31), the fact that [ŋawuŋa] must be preferred over [ŋawuŋawur] indicates that insertion is more costly than deletion. This means that DEP-IO should be ranked higher than MAX-IO. Consider (34).

(34)

/ŋawuŋawu/	* $[\sigma]_{word}$	DEP-IO	$*C_{[-apic]}\#$	$*V_{unr}\#$	MAX-IO
ŋawuŋawu				*!	
ŋawuŋaw			*!		*
☞ŋawuŋa					**
ŋawuŋ			*!		***
ŋawu					****!
ŋawuŋawur		*!			

As (34) demonstrates, by decomposing FAITH into MAX-IO and DEP-IO, with DEP-IO higher than MAX-IO in ranking, the desired result follows.[9]

4.2. Modern Hebrew

The data from Modern Hebrew contained another instance of phenomena that cannot be adequately explained without recourse to extrinsic rule-ordering in rule-based phonology. The relevant data and the rules needed are repeated below for convenience.

(35) a.	kišat-eti	~	kišat-ti	'I decorated'
	kišat-et	~	kišat-t	'you (f. sg.) decorated'
	kišat-etem	~	kišat-tem	'you (pl.) decorated'
b.	yarad-eti	~	yarat-ti	'I descended'
	yarad-et	~	yarat-t	'you (f. sg.) descended'
	yarad-etem	~	yarat-tem	'you (pl.) descended'

(36) i. Epenthetic *e* Insertion (optional)

$\phi \rightarrow$ e / [+stop, +alveolar] _ t

ii. Voicing Assimilation

/ d / → t / _ t

Let us consider first the forms that do not involve epenthesis (the forms in the right-hand side in (35)). We have to explain the voicing assimilation found in (35b). Assume the following constraints:[10]

(37) ICC [voi] (ICC = Identical Cluster Constraints)

A sequence of consonants must be identical in voicing.

(38) FAITH [suf]

Every segment/feature of the suffix of the input has an identical correspondent in the output.

Now, consider the tableau for [yarat-ti]:

(39)

/yarad-ti/	ICC [voice]	FAITH [suf]
yarad-ti	*!	
☞yarat-ti		
yarad-di		*!

This accounts for the voicing assimilation found in the forms without epenthesis.

Let us next consider the forms that involve epenthesis. The existence of epenthesis between alveolar stops suggests that a constraint of the following kind are at work in Modern Hebrew.[11]

(40) *AS-AS

Two alveolar stops cannot be adjacent.

In addition, the following constraints are necessary.[12]

(41) IDENT [voi]

The specification for the feature [voice] of an input segment must be preserved in its output correspondent.

(42) MAX-IO

Input segments must have output correspondents.

(43) DEP-IO

Output segments must have input correspondents.

Assuming these constraints together with (37) and (38), we can construct the tableau in (44):

(44)

/yarad-ti/	MAX-IO	*AS-AS	ICC [voi]	FAITH [suf]	DEP-IO	IDENT[voi]
yarad-ti		*!	*			
yarat-ti		*!				*
yarad-di		*!		*		*
☞yarad-e-ti					*	
yarat-e-ti					*	*!
yara-ti	*!					
yarad-i	*!					

With the ranking assumed in (44),[yaradeti] wins the competition, correctly. Notice that the output candidates [yara-ti] and [yarad-i], which avoid the *AS-AS violation by deleting one of the alveolar stops, is excluded due to the presence of MAX-IO, which is ranked higher than DEP-IO.[13]

Although the forms that involve epenthesis can be accounted for in the manner of (44), we also have to account for the alternative forms that do not involve epenthesis. Here, we face an important issue in OT phonology: How can OT handle the phenomena that were handled by optional rules in rule-based phonology? In this study, I will follow the "free ranking" approach to optionality advocated by a number of researchers.[14] Specifically, I adopt the following conception of free ranking offered by Kager (1999: 406).

(45) *Interpretation of free ranking of constraints C1, C2*
Evaluation of the candidate set is split into two subhierarchies, each of which selects an optimal output. One subhierarchy has

C1 ≫ C2, and the other C2 ≫ C1.

Among the ranking hierarchy expressed in (44), the crucial one is the following:

(46) *AS-AS ≫ ICC [voice], FAITH [suf], DEP-IO

Reversing the order of these two sets of constraints, we obtain:

(47) ICC [voice], FAITH [suf], DEP-IO ≫ *AS-AS

Adopting (47), the tableau in (48) can be constructed with the desired result.

(48)

/yarad-ti/	MAX-IO	ICC [voi]	FAITH [suf]	DEP-IO	*AS-AS	IDENT[voi]
yarad-ti		*!			*	
☞yarat-ti					*	*
yarad-di			*!		*	*
yarad-e-ti				*!		
yarat-e-ti				*!		*
yara-ti	*!					
yarad-i	*!		*			

Thus, the data from Modern Hebrew conforms to the claim that variation among grammatical forms can be explained in OT by appealing to free ranking of the relevant sets of constraints.

5. Summary

My goal in this paper has been to find out whether the facts that were claimed to require extrinsic rule-ordering in rule-based phonology can be successfully explained by Optimality Theory. For this purpose, I have examined data from Lardil and Modern Hebrew, which required extrinsic rule-ordering in rule-based phonology. In each case, it has been shown that setting up appropriate constraints with an appropriate ranking can yield the desired results in OT. Furthermore, it has been shown that an OT analysis can be more satisfactory than a rule-based analysis, since the former may capture the generalization that the latter may miss.

Despite the descriptive success, it remains a major challenge for the OT analyses presented here to take into account whether some of the proposed constraints can be replaced by deeper, more plausibly universal constraints. This is an important task, since Optimality Theory has boldly claimed that the constraints used in the theory are all universal. Only time will tell whether this claim can be sustained, but it is clear that empirical investigations like the one reported here serve as the foundation upon which such a question can be pondered.

Notes

* With admiration, I would like to dedicate this paper to Professors Kentoku Yogi and Hiroichi Kawahira on the occasion of their retirement. I am grateful to Takeo Kurafuji and Masahide Ishihara for their valuable comments, some of which improved the quality of this paper greatly. As always, I am thankful to Gaylene Levesque for carefully checking my English.

1 The terms DMH and FRH are adopted from Kenstowicz and Kisseberth (1979).

2 Lardil is an Australian language spoken on Mornington Island in the Gulf of Carpentaria. It was studied by Hale (1973), and Kenstowicz and Kisseberth's (1979) analysis of Lardil closely follows Hale's (1973) analysis.

3 See Kenstowicz and Kisseberth (1979: 310) for evidence.

4 See Kenstowicz and Kisseberth (1979: 111f.) for more data.

5 FAITHFULNESS is a general constraint that can be decomposed into numerous finer constraints. Shortly, we will replace this constraint with MAX-IO and DEP-IO, which are examples of sub-constraints that comprise the FAITHFULNESS constraint family.

6 Some uninflected forms end with *-ta*, instead of *-a*. In this study, we are considering only the forms that end with *-a*.

7 I am indebted to Takeo Kurafuji for pointing out to me that such forms as [ŋawuŋawuC], where an extra (apical) consonant is inserted word-finally, will pose a problem for the analysis given in (30).

8 (32) and (33) are taken from Kager (1999). MAX-IO stands for Maximality-Input/Output, and DEP-IO stands for Dependence-Input/Output.

9 Notice that the ranking of $*[\sigma]_{word}$ ≫ DEP-IO given in (34) is crucial in order to account for the data in (24).

10 The constraint in (37), ICC [voice], has been taken from Pulleyblank (1997).

11 Whether or not (40) can be replaced by a constraint that is more likely to be universal remains to be seen.

12 The constraint in (41), which has been taken from Kager (1999), is called IDENT-IO (voice) in Kager (1999). For expository reasons, the shorter term IDENT [voi] is employed here.

13 I am grateful to Takeo Kurafuji for prompting me to consider the candidate [yara-ti], which was problematic for my earlier analysis.

The problem has been fixed by including MAX-IO in the tableau.

14 See the references in Kager (1999: 406).

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論文要旨

最適性理論と規則に基づく音韻理論：ラーディル語と現代ヘブライ語の音韻分析から

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本稿の目的は、ラーディル語と現代ヘブライ語の特定の音韻データに関する最適性理論による分析を提示し、規則に基づく音韻理論による分析と比較してみることである。規則に基づく音韻理論では、これらのデータを説明するためには音韻規則の外在的な順序づけが必要であるとされてきた。そのような規則は個別言語的であり、音韻理論において普遍性を探る際の大きな障害になっていたように思われる。

一方、１９９０年代に台頭してきた最適性理論は音韻論においても普遍性を前面に押し出し、各言語に見られる様々な音韻現象は普遍的な制約とその適切なランクづけによって説明することができると主張している。そこで、規則の外在的順序づけが必要とされていたラーディル語や現代ヘブライ語のデータを最適性理論の枠組みの中でうまく説明できるかどうか考察してみた。

その結果、最適性理論ではそれらのデータが正しく記述できるばかりではなく、規則に基づく音韻理論では捕えることのできない一般的性質が捕えられることもあることが示された。しかしここで提案された制約のいくつかは普遍的であるとは考えにくく、それらをより普遍的な制約で置き換えることができるかどうかは今後の課題である。