Chapter

One

Preliminaries

Recent research in Phonology has been focusing on the role of constraints in the overall theory of grammar. Most notable is Optimality Theory (Prince and Smolensky (1993), and McCarthy and Prince (1993 a, b)). In this approach to grammar, phonological description is achieved through constraints on phonological representation, rather than through derivational rules. The question that arises is whether or not adopting this framework will guarantee more adequate and transparent analyses of different phonological processes.

This chapter provides the preliminary material needed to look into this broad question with respect to the processes of syllabification and stress assignment in Urban Hijazi Arabic (henceforth, UHA). Section one presents the precise problems to be tackled in the study determining the main objectives I aim to achieve. Section two, summarises the basics of Optimality Theory, the main theoretical framework adopted in the study.

1.1. The Study:

Fundamentally, this study aims to investigate syllabification and footing, and some associated complexities, in UHA. This dialect of Arabic is spoken in the Hijaz province of Saudi Arabia. This province occupies the west and north-west of the

Arabian Peninsula (see the map[1] for detailed information about the location, and the important cities in the province). My main objective is to provide a thorough analysis of these essential prosodic, or suprasegmental, phonological processes. To this end, I will adopt both theoretical frameworks of Optimality Theory and Non-linear Phonology.[2] This will create a suitable ground for comparison, which is the other important objective of the study.

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[1] Downloaded form web site <http://www.pathfinder.com//travel/maps/SAUDIAF.html>
[2] Iggy Roca (p.c.) suggests the terms Multi-linear or Non-unilinear, for obvious reasons.

Previous phonological studies of UHA are scarce, when compared to research conducted on other dialects of Arabic like Cairene, Damascene, or even north African dialects. Building on his earlier thesis (1973), Bakala (1979) provided the first comprehensive phonological and morphological analysis of the language, adopting an earlier generative, *SPE*, framework. More recently, Abu-Mansour (1987) and Jarrah (1993) attempted a Non-linear analysis of Makkan and Madina Hijazi, respectively. Nothing of true substance may be added to this short list, apart from very few articles and sections or subsections in others (see Ingham (1971), Abu-Mansour (1992) and Broselow (1992)). However, there have been no attempts to analyse syllabification and/or footing in UHA employing Optimality Theory. Abu-Mansour (1995) attempted a cross-dialectal study of the process of High Vowel Deletion in Arabic. One of the dialects she analysed is Makkan. Nevertheless, this study only tackles this syllabification-related process, neglecting key interactions with other syllabification and footing processes, as we shall see in chapter three below. Therefore, the present study may be regarded as a key contributor to both Arabic Phonology and Optimality Theory.

The remainder of the study is organised into two main parts: Syllabification and Stress Assignment. Each part comprises two chapters; one analyses the data utilising a constraint-based approach and the other does the same form a rule-based viewpoint. Preceding those, chapter two introduces the study's theoretical foundation.

In chapter three, I analyse the process of syllabification adopting the proposals of Optimality Theory. In particular, I argue for the uniform distribution of the CV(X) syllable-template (where X is either a vowel or a consonant). This will be interpreted as the sole motivation of other processes triggered by syllabification, namely, epenthesis and deletion (including both vowel syncope and shortening). Accounting for the process of High Vowel Deletion within the constraint-based framework of OT will be seen to be rather problematic. Analytical plausibility will therefore prompt us to investigate the derivational alternative.

Chapter four provides a derivational account of the same set of facts discussed in chapter three. The two main derivational approaches to syllabification, viz. rule-based and template-based, are applied to UHA. This will lead to a comparison of derivational and OT syllabification. In particular, if DT is capable of providing a more elegant account of High Vowel Deletion, the question will arise whether it will also achieve the same degree of plausibility with other syllabification-related processes.

Chapters five and six follow the same line of presentation in the domain of stress. In chapter five, I discuss UHA stress from an Optimality Theory perspective, fundamentally involving the opposition between prominence-driven and rhythm-driven stress placement attested in the stress pattern of the language. Another important issue concerns the metrification of final heavy syllables. The asymmetric footing configuration of final CVC and CVV syllables will be discussed in length, revealing the key role of constraint interaction in OT. All these points will create the perfect grounds for comparison in chapter six, where I analyse stress applying three derivational approaches to footing: Halle and Vergnaud (1987), Idsardi (1992), and Hayes (1995).

Finally, in chapter seven, I attempt to give a comprehensive answer to the question of whether or not we can achieve more adequate analyses of UHA syllabification and footing employing Optimality Theory.

1.2. Optimality Theory (OT):

The advocates of this theoretical framework claim that the derivational input-output relation that involves what is usually known as *Rewrite* rules can no longer be considered adequate. A rule like A → B / C ------ D can only operate on a sequence CAD changing or transforming it to the form CBD, which in turn may be subject to a similar rule (McCarthy and Prince 1993). This calls for two independent theories: one for structural descriptions to determine forms like CAB, and another for structural changes to justify A → B. Prince and Smolensky reasonably take the view that these two theories are "loose and uninformative" (Prince and Smolensky 1993: 3). Therefore, we need a theory that provides a better interpretation of the relation between input and output forms.

Optimality Theory is claimed to be the adequate alternative. The input-output relation is much simpler. The assessment of a general (and maybe large) set of candidate analyses leads to a selection of the true transformation A → B. In particular, an independent universal principle , namely Eval, determines the candidate that best satisfies a given constraint hierarchy. To clarify these claims, I will present OT's main principles, mechanisms, and representational conventions. At the end of the chapter, I will talk about Faithfulness and the Phonology in OT.

1.2.1. Principles of OT:

According to Prince and Smolensky (1993) and McCarthy and Prince (1993, 1994), there are five fundamental principles of the theory: Violability, Ranking, Inclusiveness, Parallelism, and Universality:

(1) Principles of Optimality Theory:

a. Violability:

Constraints are violable, but violation is minimal.

b. Ranking:

Constraints are ranked on a language-particular basis; the notion of minimal violation is defined in terms of this ranking.

c. Inclusiveness:

The constraint hierarchy evaluates a set of candidate analyses that are admitted by very general conditions of structural well-formedness. There are no specific rules or repair strategies.

d. Parallelism:

Best-satisfaction of the constraint hierarchy is computed over the whole hierarchy and the whole candidate set. There is no serial derivation.

(McCarthy and Prince 1993a: 1-2)

e. Universality:

> UG provides a set of constraints that are universal and universally present in all grammars.
>
> (McCarthy and Prince 1994: 3)

The principle of Violability establishes the fact that constraints in OT are subject to being violated even by optimal analyses. This is because we are aiming for the optimal (the best achievable) rather than for the perfect. In this sense, violation must be kept minimal. The second principle, Ranking, works to achieve this minimal violation: the Universal Constraints must be ranked in a language-particular hierarchy, in which they are minimally violated by the true outputs of that language. The constraints are highly conflicting, in the sense that a certain form may satisfy a particular one and at the same time violate another. However, individual languages have a means of resolving this conflict and achieving the desired optimisation. Then, the two principles of Inclusiveness and Parallelism ensure that rules and derivation are not needed, and ideally should not exist in OT.[3] Finally, the principle of Universality establishes the cross-linguistic existence of universal constraints. Therefore, even very low ranked, and consequently frequently violated, constraints are present in any given language's hierarchy and may very well be decisive, when the conditions are right (McCarthy and Prince 1994).

1.2.2. Mechanisms of OT:

[3] Nevertheless, McCarthy (1993), McCarthy and Prince (1993a), Blevins (1997), Clements (1997), Rubach (1997), among others, question this generalisation.

In OT, the fundamental theoretical component of Universal Grammar is the set of constraints, **CON**, on representational well-formedness. These are the building blocks of individual grammars, that are rendered distinctive by language-particular rankings. Take for example Alignment constraints (McCarthy and Prince (1993b)). The focus here is centred around Categories and Edges. In other words, the edges of categories (Cat1, Cat2, ... etc.), whether prosodic or morphological, are aligned with other edges (Edge1, Edge2, ... etc.), of other prosodic or morphological categories. This will provide a formal description of a universal or a language-particular phenomenon. The general schema of such constraints looks as follows :

(2) Align (Cat1, Edge1, Cat2, Edge2)

(McCarthy & Prince 1993: 10)

This is read and understood as: Edge1 of each and every Cat1 must be aligned with Edge2 of some Cat2. This means that categories belonging to different hierarchies, either prosodic or morphological, can share, either the same or different, edges by virtue of having two categories and two edges in the schema.[4] The edges can be either left (L) or right (R).

[4]A rather similar approach is suggested by Prince & Smolensky under the name of EDGEMOST. EDGEMOST(φ; E; D), which means that item φ is situated at the edge E of domain D (cf. Prince & Smolensky 1993: 35), is the general schema of this approach. According to McCarthy and Prince (1993), there are, however, two shortcomings of this approach restricting its domain of application: it restricts the hierarchical relation of Cat1 and Cat2 to either prosodic or morphological hierarchy, and it requires that both categories should share the same edge, either left or right, meaning that the right edge of some category, for example, cannot align with the left edge of some other.

The contribution of constraints to linguistic analysis has always been appreciated in earlier theoretical disciplines. However, two other important universal mechanisms, namely GEN and EVAL, distinguish OT as a theory of parallel input-output relation. GEN (short for "generator") is a function which operates on inputs to generate a set of possible candidate analyses. These analyses are the material which the language-particularly ranked CON evaluates utilising the other function EVAL (short for evaluator). The formal relation between the input and the output in the light of these two functions is summarised as follows:

(3) a. Gen (In_k) $\rightarrow$ {Out_1, Out_2,...}

b. H-eval (Out_i, $1 \leq i \leq \infty$) $\rightarrow$ Out_{real}

(Prince and Smolensky 1993: 4)

The schema above says that EVAL operates on the output of GEN to optimise the most harmonious candidate, the one that best satisfies the language-particular ranking of CON. The parameter determining this harmony is twofold. The highest constraints violated by the optimal analysis should be lower than the constraints violated by other candidate analyses, and violation of that particular constraints should be minimal.

1.2.3. Representational Conventions in OT:

The "tableau" is OT's fundamental means of representation. It is very simple, yet capable of providing a rather comprehensive exposition of the facts. Once understood, the researcher and the reader may see it as an adequate means of summarising the analysis. Its main conventions are presented below:

(i) Solid lines separating constraints indicate crucial ranking while doted ones mean that the constraints on either sides are not mutually ranked. Left-to right arrangement of constraints indicates dominance: the leftmost constraint is the highest in the hierarchy, and the rightmost is the lowest.

(ii) The asterisk (*) means that the relevant constraint is violated.

(iii) A blank cell means that the relevant constraint is satisfied

(iv) The exclamation mark (!) points to the fatal violation. It tells us that a certain violation is responsible for ruling out a certain candidate.

(v) The pointing finger (☞) is used to distinguish the most harmonious, i.e. the optimal, form.[5]

(vi) Shading represents the irrelevance of the constraint or constraints in evaluating the harmony of a certain candidate analysis, as this harmony has been determined earlier by the higher constraints.

The following tableau summarises all these points:

(4)

/input/	CON 1	CON 2	CON 3	CON 4

[5] In a certain tableau, the most harmonious candidate may not be the true output. Throughout the study, I indicate that by the conventional asterisk printed to the left of that false output, and a question mark to the left to the actual true output.

☞ Can 1				*
Can 2			*!	
Can 3		*!		
Can 4	*!			

Therefore, Can 1 > Can 2, Can 3 > Can 4 ("a > b" means that "a" is more harmonious than "b", and the comma indicates equal harmony).

1.2.4. Faithfulness vs. the Phonology:

In OT, there are two main types of constraints, constraints on Faithfulness and constraints on the Phonology. The Faithfulness constraints maintain perfect correspondence between the input and the output. This means that the more similarities depicted between these two representations the less Faithfulness violations incurred. On the other hand, the constraints on the Phonology drive any input towards the perfect phonological representation. This might be the syllable [pa], for example, whose onset and nucleus represent the very extremes of sonority (cf. Chomsky (1994)). Obviously, these two groups of constraints are highly conflicting.[6] The following tableaux demonstrate the effects of the opposite rankings on the interaction results.

(5)(i)

/input/	Faithfulness	Phonology
a. ☞ [input]	√	*
b. [pa]	*!	√

(ii)

/input/	Phonology	Faithfulness
a. ☞ [pa]	√	*
b. [input]	*!	√

[6] The only exception to this generalisation is the input /pa/, that obviously satisfies both.

Obviously, something must fight the Phonology, otherwise all optimised outputs will be like (5 ii a). Similarly, something must fight Faithfulness, if we are to allow for any phonological processes that may affect the underlying representation. To achieve these two seemingly contradictory objectives, a decomposition of these two general groups of constraints is in order. Having two different sets of individual constraints would allow for different mutual rankings of constraints on Faithfulness and constraints on the Phonology. As we shall see in subsequent chapters, ranking ONS higher than both MAX and DEP, and ranking these higher than -COD will achieve the desired compromise, when evaluating an input like /VC/ in UHA. The optimal candidate will violate a Faithfulness constraint to satisfy a constraint on the phonology, and *vice versa*. Consider the following tableau:

(6)

/VC/	ONS	MAX	DEP	-COD
a.☞ /CVC/			*	*
b. /CV/		*!	*	
c. /VC/	*!			*

Candidate (6 b) violates the two constraints on Faithfulness to satisfy the constraints on the Phonology. Similarly, (6 c) violates the constraints on the Phonology to achieve perfect Faithfulness. Therefore, both of them are ruled out. On the other hand, the optimal candidate (6 a) violates the Faithfulness constraint DEP to satisfy a constraint on the Phonology, i.e. ONS. Also, it violates -COD, which is a constraint on the phonological representation, to satisfy the Faithfulness constraint MAX. This is because it is a “Question of priorities” (Sherrard 1997).

Basically, this is the essence of any OT analysis. The possibilities attained by this decomposition of the constraints on Faithfulness and on the Phonology, assuming the principles of Ranking and Violability, creates the suitable ground for a richer grammatical description. In subsequent chapters, we will see many examples demonstrating this claim.