Federal Republic of Iraq
Kurdistan Regional Government
Ministry of Higher Education and Scientific Research
Koya University

Local Assimilation of Consonants in English and Kurdish in the Light of Optimality Theory

A thesis submitted to the
Faculty of Humanities and Social Sciences at Koya University
as a Partial Fulfillment for the Degree of
Doctor of Philosophy in English Language and Linguistics

Rashwan Mahmood Mustafa

Master Degree was obtained in 2007 in English language and Linguistics at college of Languages/ Koya University

Supervised by: **Assist Prof. Dr. Himdad Abdul-Qahar Muhammad**
Assist Prof. Dr. Hoshang Faruq Jawad

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{Oh, My Lord grant me self-confidence, contentment and boldness. (25) And ease my task for me (26) And loose the defect in my tongue (27) That they understand my speech (28)}

Quran: Surra Ta-ha

Dedication

Dedicated:

- To the pure soul of my late father
- All my family members
- Everyone who helped me in completing this study

Supervisors' Approval

Hereby we (Assist Prof. Dr. Himdad Abdul-Qahar Muhammad and Assist Prof. Dr. Hoshang Faruq Jawad) state that this thesis as entitled (Local Assimilation of Consonants in English and Kurdish in the Light of Optimality Theory) was prepared under our supervision at the department of English and Translation, the Faculty of Humanities and Social Sciences at Koya University by Rashwan Mahmood Mustafa as a partial fulfillment for the degree of Doctor of Philosophy (PhD) in English Language and Linguistics.

We have read and reviewed this work and we confirm that it is an original work to the best of our knowledge.

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Head of Department/School Approval

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Viva Examining Committee Approval

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Abstract

This dissertation is a comparative study of Local Assimilation of Consonants in English and Kurdish in the light of Optimality Theory. The study attempts to show the way in which the two languages organize the two main constraints of Markedness and Faithfulness related to assimilation within Optimality Theory. The study will test the hypothesis that Markedness constraint dominates the Faithfullness constraint in cases of consonant assimilation in both languages.

To carry out the study, a model has been adopted to explain the cases of local assimilation of consonants in English and Kurdish within the framework of Optimality Theory. The hierarchy of the Agree(x) and the Indent IO constraints have been shown and explained within the adopted models. The first constraint asks for the agreement of sound feature for adjacent sounds, while the latter constraint asks for a total resemblance between the output form with its input form.

It has been found that both languages have the same order of the hierarchy of the Markedness and Faithfulness constraints in the cases where there is assimilation between sound segments. The study reached the point that Markedness dominates Faithfulness in all the cases of consonant assimilation in both languages.

Key to Abbreviations:

AGREE(x): two segments agree in the feature x

C: constraint

Cand: candidate

$Cand_{com}$: the competitor candidate

$cand_{n:}$ infinite number of candidates

$Cand_{Opt:}$ optimal candidate

DEP : output depends on input

Eval: evaluator

F: faithfulness constraints

Gen: generator

H: constraint Hierarchy

IDENT(x): output form must be identical with the input form

M: marked constraints

MAX: the properties of the input correspond to properties of the output

OT: optimality theory

Key to Symbols/Notations

☞: optimal candidate

*: violation of a constraint

!*: fatal violation of a constraint

~: is followed by

~\: is preceded by

>>: domination mark [a>>b] means that ‘a’ dominates ‘b’

›: more harmonic than

̪: dentalized

̥: devoiced

vls. : voiceless

+voice: voiced

○: null output

Key to Kurdish Phonetic Symbols

/p/ voiceless bilabial stop as in *pãra* ‘money’

/b/ voiced bilabial stop as in *bãrãn* ‘rain’

/t/ voiceless dental stop as in *tr*e ‘grape’

/d/ voiced dental stop as in *dãr* ‘wood’

/k/ voiceless velar stop as in *kãny* ‘spring’

/g/ voiced velar stop as in *garim* ‘warm’

/f/ voiceless labio dental fricative as in *firmesik* ‘tear’

/v/ voiced labio dental fricative as in *mirov* ‘human being’

/s/ voiceless alveo-dental fricative as in *sãrd* ‘cold’

/z/ voiced alveo-dental fricative as in *zu:* ‘soon’

/ş/ voiceless alveo-palatal fricative as in *şer* ‘lion’

/ʐ/ voiced alveo-palatal fricative as in *ʐãn* ‘pain’

/ç/ voiceless alveo-palatal affricative as in ç*iya* ‘mountain’

/ĵ/ voiced alveolar affricative as in *ĵwãn* ‘beautiful’

/m/ voiced bilabial nasal as in *mom* ‘candle’

/n/ voiced alveolar nasal as in *nãn* ‘bread’

/h/ voiceless glottal fricative as in *hawr* ‘cloud’

/ĥ/ voiceless pharyngeal fricative as in *ĥaft* ‘seven’

/l/ voiced dental lateral as in *mil* ‘neck’

/ĺ/ voiced velarized lateral as in *sãĺ* ‘year’

/r/ voiced alveolar flap as in *kar* ‘donkey’

/ř/ voiced alveolar trill as in *ka*ř ‘deaf’

/x/ voiceless velar fricative as in *xerã* ‘quick’

/ẋ/ voiced velar fricative as in *ẋãr* ‘gallop’

/q/ voiceless uvular stop as in *qa*l*aw* ‘fat’

/?/ voiceless pharyngeal stop as in *?aib* ‘shame’

/y/ voiced palatal glide as in *yãri* ‘game’

/w/ voiced labio-velar rounded glide as in *wara* ‘come’

Vowels

/a/ low central unrounded, short vowel as in *ma*r ‘sheep’
/ã/ low central unrounded, long vowel as in *mãr* ‘snake’
/ê/ mid close front unrounded long vowel, as in çêl ‘cow’
/i/ high close front unrounded short vowels, as in *firmesik* ‘tear’
/i:/ high close front unrounded long vowel, as in *ʂi:r* ‘milk’
/u/ mid open back rounded short vowel, as in *ku*ř ‘boy’
/u:/ high close back rounded long vowel, as in *du:r* ‘far’
/o/ mid open back rounded short vowel, as in *to*ř ‘net’

Key to English Phonetic Symbols

/p/	play	**/pleɪ/**
/b/	boy	**/boɪ/**
/t/	team	/tɪːm/
/d/	deal	/dɪːl/
/k/	cream	/krɪːm/
/g/	goat	/gəut/
/f/	feel	/fɪːl/
/v/	vague	/veɪg/
/θ/	thin	/θɪn/
/ð/	this	/ðɪs/
/s/	see	/sɪː/
/z/	zoo	/zuː/
/ʃ/	shy	/ʃaɪ/
/ʒ/	pleasure	/pleʒə/
/h/	have	/hæv/
/tʃ/	chain	/tʃeɪn/
/dʒ/	judge	/dʒʌdʒ/

/m/	main	/meɪn/
/n/	nine	/naɪn/
/ŋ/	sing	/sɪŋ/
/l/	like	/laɪk/
/r/	round	/raund/
/w/	white	/waɪt/
/j/	yes	/jəs/

English Vowels

/ɪ/	sit	/sɪt/
/ɪː/	seat	/sɪːt/
/ɜ/	get	/gɜt/
/ɜː/	girl	/gɜːl/
/æ/	sad	/sæd/
/aː/	part	/paːt/
/ʌ/	cup	/kʌp/
/ɔ/	dot	/dɔt/
/oː/	port	/poːt/
/u/	put	/put/

/uː/	tool	/tuːl/
/ə/	ago	/əgo/

List of Tableaux

Chapter one

Introduction

1. Introduction

Language is one of the most complicated activities that human beings have. Language, which starts from a small unit of a single word to large units of books and encyclopedias, consists of individual sounds. The combination of these sounds makes words, phrases, clauses, sentences… etc. The pronunciation of these sound combinations undergoes two important processes which are elision and assimilation. This dissertation treats only local assimilation of consonants in English and Kurdish.

The area of assimilation research is rich, but none of the studies in Kurdish adopted OT.

With the course of the advance of OT, came the realization that the differences among languages can be accounted for in terms of sets of violable constraints. A view that underlies much of the modern research on phonology within the OT framework is that languages' faithfulness to universal constraints is almost always never absolute, and variations among languages can be accounted for not by positing new or different rules as was the case under the umbrella of earlier theories of phonology, but rather by proposing a hierarchical system of both violable and ranked constraints. Language-specific rules, within OT, are "attained through the language-specific ranking of the crucially violable constraints, the substance of which is ideally conceived of as universal" (Roca and Johnson, 1999:584-585). Optimal or winner selection depends solely on satisfaction of the top-ranked

constraints whose violation results in ruling out the other candidate in question.

Local assimilation of English consonants has been tackled by Eric Bakovic in an article entitled “Local assimilation and constraint interaction” published in Cambridge Handbook of Phonology (2007). The model used in that article was instrumental in adopting the model used in this dissertation.

1.1 The Problem:

The number of comparative studies conducted in the areas of phonetics and phonology comparing phonological phenomenon between English and Kurdish is limited if compared to the studies conducted in other branches of linguistics in the universities of Kurdistan Region in Iraq. Besides, the Optimality Theory (hence forward OT) is a recent theory in the field of phonology that has not been tackled widely by Kurdish researchers in the region. These two factors make it necessary for such a research to be conducted, in addition to the fact that it may pave the way for other researchers to conduct studies about OT in phonology and other branches of linguistics.

1.2 The Aims

The study aims at clarifying local assimilation of consonants in English and Kurdish within the framework of OT by explaining the phenomenon through the constraints of Faithfulness and Markedness. It is

also intended to highlight the points of similarity and difference between the two languages in regard of local assimilation of consonants within the framework of OT. Another aim of the study will be to find out the commitment of the two languages to the universal hierarchy of the constraints that play the role in local assimilation.

1.3 The hypotheses

The study attempts to test the following hypotheses:

1- It is hypothesized that in all the cases of local assimilation of consonants the markedness constraint dominates the faithfulness constraint.
2- It is also hypothesized that this domination can be generalized to the two languages studied in this dissertation.
3- Though the two languages share this feature, it is hypothesized that there are points of differences between the two languages in what concerns local assimilation of consonants.

1.4 The procedures

The study follows a descriptive analytic approach in treating the topic under study. In the first place, a precise and detailed description of terminologies of OT and assimilation will be presented depending on the data found in the available sources. Secondly, local assimilation of English stops, fricatives, nasals, laterals and approximants will be presented explaining each case with an example or more and supplying the tableau which is used for showing the domination and hierarchy of constraints in

OT. The same procedure will be used for consonants of Central Kirmanji dialect of Kurdish language. Then, a comparative analysis of local assimilation of English and Kurdish consonants in the light of OT will be shown. Finally, the summary, conclusions and suggestions for further studies will be presented.

1.5 Delimitation

Epenthesis, compression, elision and assimilation are among the features of connected speech. The scope of a dissertation only allows conducting a study on assimilation, and more specifically here on local assimilation of consonants. That is why, all the scope of the dissertation is devoted to local assimilation of consonants in English and Kurdish in the light of OT and not any other theory or model.

1.6 Data

The data used in this dissertation are taken from books, journals, periodicals, theses, dissertations, internet articles that the researcher could get them. The examples of the Kurdish chapter are mostly the researcher's own.

Chapter Two

Theoretical Background

2. Introduction:

In order to understand the topic properly, there need to be some background issues tackled in this chapter. It falls into two main sections; the first section addresses the main concepts and trends concerned with OT. The second section deals with assimilation, its main concepts and categories.

2.1 Basic terms and concepts in Optimality Theory:

2.1.1 Basic Architecture

The goal of OT, like any other theory of linguistics, is to shed light on the process of speech production. The theories try to investigate and account for these processes from the speech sound inputs in the brain until the production of speech.

OT was first introduced by Alan Prince and Paul Smolensky in 1991 in a course delivered at the University of California, Santa Cruz. Late in 1993 they published it as an article entitled “Optimality Theory,

constraint interaction in Generative Grammar" in New Brunswick. (McCarthy, 2002:1).

The general idea of OT is that surface representations of language reflect resolutions of conflicts between competing constraints. According to the theory, a surface representation is optimal in the respect that it incurs least vital violations of a set of violable constraints that their ranking is language specific. Constraints are universal, they directly encode 'markedness principles' in order to preserve contrast. Ranking of constraints makes languages differ from one another by giving priorities to some constraints over others. This way of ranking is called "strict domination" which means if one constraint outranks another constraint; the higher ranked constraint has priority, without taking into account violations of lower ranked constraints. Such a violation must be minimal, which predicts the Economy feature of grammatical process. (Kager,1999:xi). It can be concluded that the core principle of OT lies in the interaction of constraints. The constraints are universal that are found among all the languages of the world, and the difference of their ranking makes languages to be different from each other. Constraints are also violated by candidates at different levels.

2.1.1.1 Candidate Comparison

Most of the linguistic theories can be best characterized as operational, rule based, or transformational: they take an input and apply some processes that convert it into an output. But the main action

in OT is comparative: the actual output is the optimal member of a set of candidate output forms. Interesting theoretical and analytic results in OT come from understanding the details of how candidates are compared. In OT candidates are compared by applying a hierarchy of violable constraints. The function of constraints is to evaluate the form of a candidate and its relationship to the input. In what concerns performance, candidates vary on different constraints. In the case when we have two candidates the more optimal is the one that acts better on highest ranking constraint which makes a distinction between the two candidates. (McCarthy, 2002:3)

The output characteristically contravenes at least some of the lower-ranking candidates, because constraints are violable. In the simplest situation, two candidates are under evaluation by a single constraint "C". The optimal candidate is the one that incurs less violation of C. When there is more than one constraint, the ranking is strictly respected in comparing candidates; there is no universal assessment of candidates based on their performance on the whole constraint gestalt. In fact, the optimal candidate may actually perform worse than its competitor on some constraints ranked below the decisive one. So if constraint C1 is ranked above C2 and C3 (that is C1 dominates C2 and C3) then the output may perform worse than its competitor on both C2 and C3 as long as it performs better on C1. (Ibid)

Prince and Smolensky (1993:85) give a sufficient example, the combination ‘azzzzzz’ is alphabetized before ‘baaaaa’ because alphabetical order is based on the leftmost distinguishing letter, despite of how much the letters farther to the right seem to encourage a different order. They call this property of OT ‘*strictness of strict domination*’, this property according to them is somewhat counterintuitive. Since it is quite dissimilar to the more flexible system of priorities we apply in our everyday lives.

In OT, ranking of constraints can be shown by a Tableau, this lists two (or any number of) output candidates vertically in random order, and constraints horizontally, in a descending ranking from left to right. The cells contain violation marks ‘*’ incurred by each candidate for the constraint heading the column.

A tableau for showing a simple domination

	C1	C2
a. ☞candidate a		*
b. candidate b	*!	

Tableau: 1 (Tableau used in optimality theory)

The optimal candidate is marked by the index☞. This candidate (1 a), which has no violation of the higher- ranked constraint C1, a constraint violated by its competitor (1 b) note that the optimal candidate (1a) is actually not immaculate itself: it has a violation of C2, but this flaw is inconsequential to the outcome. Although the pattern of violations for

C2 is the overturn of that for C1, this does not help candidate b. Its violation of C1 is already fatal, indicated by the accompanying exclamation mark '!' and the shading of cells whose violation content is no longer relevant. To sum up, candidate (a) is optimal as no candidate is available that fares better, satisfying constraints at the same time. A violation of C2 is taken for granted, as long as C1 can be satisfied. (Kager,1999:13)

Candidate comparison is the same when there are multiple violations, and it is not necessary to count violation-marks, since better or worse performance is all that is taken into account. Moreover, Tesar and Smolensky (2000:119) introduce the method of 'mark cancellation'. If and only if a tableau compares exactly two candidates, violation-marks that the two candidates share can be ignored or canceled, since those violation-marks contribute nothing to that particular comparison. Mark cancellation is also useful when candidates incur multiple violations: if one candidate has three violation-marks from some constraint and another candidate has five, mark cancellation reduces this to zero and two, respectively. Comparison, rather than counting, is what matters.

	C1	C2
a. ☞candidate a		**
b. candidate b	*!	

Tableau: 2 (more than one violation for one candidate)

2.1.1.2 Generator (Gen)

Kager (1999:18) states that the grammar of OT is an input–output mechanism that joins up an output form to an input form (such that each input has precisely one output). To accomplish this function, the grammar holds a division of labour between a component which maps the input onto an infinite set of candidate output forms, and another component that is burdened with evaluating the candidate output forms by a set of ranked constraints, and picking the optimal output among these. These two components are known under the names of Generator (or Gen) and Evaluator (or Eval). This grammatical organization is schematically represented in a function notation as follows:

The grammar as an input－output mechanism

Gen (input) ⇒ {$cand_1$, $cand_2$ . . . $cand_n$}

Eval {$cand_1$, $cand_2$ . . . $cand_n$}⇒ output

That is, Gen is a function that, when applied to some input, constructs a set of candidates, all of which are logically possible analyses of this input. In addition to these components, the process contains a lexicon storing all lexical forms that are input to Gen. Recapitulating, we find the following model of the process:

Lexicon: contains lexical representations (or underlying forms) of morphemes, which form the input to:

Generator: generates output candidates for some input, and submits these to:

Evaluator: the set of ranked constraints, which evaluate output candidates as to their harmonic values, and selects the optimal candidate.

Heiberg (1999:70) also states that Gen is the component of OT in charge of generating the set of candidate output representations for an input. The Gen operations suggested here formulate one simple change to the content of a representation; Gen operations are applied to the input to form candidate output representations. These output representations are then evaluated against the constraint hierarchy. According to McCarthy (2002:9) Gen has two main related functions: it constructs candidate output forms, such as phonemes, words or sentences, and it identifies a relation between the candidate output forms and the input. Despite the fact that details of the internal structure of Gen are still under development, the general principles underlying the theory of Gen are clear. Gen is universal, meaning that the candidate forms emitted by Gen for a given input are the same in every language. These candidates are also very diverse. This property of Gen has been called *inclusivity or freedom of analysis*. Precisely because

Gen is universal, it must at a minimum supply candidates varied enough to fit all of the ways in which languages can differ. For example, languages disagree in how they syllabify a consonant cluster like ‘br’ (English alge.bra vs. Arabic jab.r 'algebraic'), so Gen will present competing candidates that vary along this dimension, leaving the choice of the right one to the language-particular rankings. This freedom is limited only by primitive structural principles indispensable in every language, perhaps restricting Gen to a specific alphabet of distinctive features.

(Kager et al, 2004) believe that each output candidate generated by Gen incurs different violation(s) for individual constraints. Accordingly, candidate outputs vary from one another in their ‘harmonic’ well-formedness, that is, the degree to which they meet a set of ranked conflicting constraints – a constraint hierarchy. The evaluation function of the grammar (Eval) imposes a harmonic ranking among candidates, with the most harmonic candidate at the top and the least harmonic one at the bottom. The winning (‘optimal’) candidate is the one that best matches the overall constraint hierarchy. Hence, violations are minimised in the optimal candidate, but violations of lower ranked constraints will be tolerated in order to satisfy higher ranking ones.

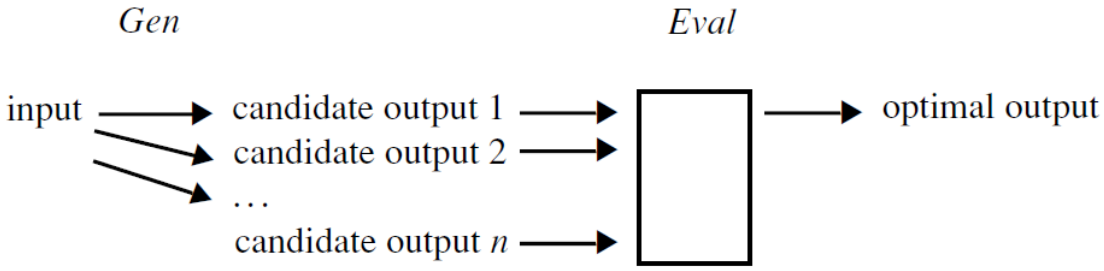

Tableau 3: from input to the optimal output

An evaluation of output candidates by a set of ranked constraints *is* displayed by a 'tableau'. The tableau shows three hypothetical output candidates (a-b-c) in competition, their relative well-formedness measured by three ranked constraints (C1-C2-C3). The optimal output is the one that is 'more harmonic' in all its pairwise competitions with other candidates; in each pairwise competition, the more harmonic candidate is the one that performs better on the highest-ranking constraint that distinguishes between them (McCarthy 2002: 3). The optimal candidate 'b' beats its competitor 'a' as it performs better on the highest-ranking constraint distinguishing between them, top-ranked C1. The winner also outperforms candidate 'c' as it has fewer violations of the highest-ranking constraint distinguishing between C2.

	Constraint 1	Constraint 2	Constraint 3
Candidate a	*!		
Candidate ☞ b		*	*
Candidate c		**!	

Tableau 4: violation types

This tableau shows that the optimal candidate ‘b’ is not the one having no or the smallest number of violation marks across columns. According to such a criterion, candidate ‘a’ would have been the winner. As an alternative, what matters is seriousness of violations, relativised to constraint ranking: Competitor ‘a’ is removed due to its single violation of a top-ranked constraint C1. Also, it is not the number of constraints violated by a candidate which matters, but rather the distribution of marks over cells: Candidate ‘c’ loses because of its double violation of a single constraint C2, even though it has no violations of C3.

2.1.1.3 Ranked Constraints and Evaluator

The specific ranking of constraints creates the grammar of a specific language. The most important way in OT for showing the differences among languages is explained by particular ranking of constraints in a languages. The hierarchy of constraints in a particular language is a total ordering of a set of universal constraints. According to Kager (1999:20) the Evaluator (Eval) is definitely the vital component of OT since it is burdened with the responsibility of accounting for all observable regularities of surface forms. Although any candidate output can be posited by Gen, the decisive role of Eval is to assess the ‘harmony’ of outputs with respect to a given ranking of constraints.

Eval is formed as a (language-specific) hierarchy of universal constraints, plus devices for evaluation. The latter include the means to assess violation marks on candidate outputs for every constraint, and the means to rank an infinite set of candidate outputs for harmony with respect to the hierarchy of constraints, and select the most harmonic one of these as optimal – the actual output.

There are just two ways of showing that C_1 dominates C_2: by a valid direct ranking argument or by a legitimate inference from valid direct ranking arguments. An example of the latter is a ranking argument based on transitivity of constraint domination, such as showing that C_1 dominates C_3 by establishing that C_1 dominates C_2 and that C_2 dominates C_3. When direct and inferred arguments for ranking are both present, they have to agree. Otherwise, the analysis or the theory is wrong. However, when there is no proof or inference available for ranking certain constraints, it is good analytic practice to report a partial order. Partial ordering in the absence of constraint conflict is not the same thing as deliberate ties between conflicting constraints. (McCarthy 2002: 6)

Ranking arguments need to be discovered and their validity checked in a context where all hypotheses about universal constraints are necessarily uncertain and changeable. Still, there are some useful heuristics to follow when positing or assessing proposed constraints. Let us suppose that *H* is the constraint hierarchy for some language. To use H to select the most harmonic member of some candidate set, OT

calls on the function EVAL, which gives meaning to the domination relation " >>, " generalizing pairwise comparison to larger (possibly infinite) sets of candidates. The function EVAL returns the candidate set as a partial order, with its most harmonic member, the actual output form, standing at the top. In theory, there is no guarantee that EVAL will always return a single most harmonic member of the candidate set. Let us suppose that two candidates incur identical violation-marks from all constraints. EVAL will be unable to decide between them, and if no other candidate is more harmonic, both will be optimal. In this case, within-language variation ought to be observed. In practice, though, this possibility might not be easy to realize; the universal constraint set is rich enough that EVAL usually returns a unique winner for any real-life H applied to any real-life candidate set. For this reason, within-language variation has usually been analyzed in other ways. Although EVAL imposes a harmonic ordering on all the candidates, the standard approach assigns no interpretation to the details of the ordering below the topmost candidate. Consider assuming that EVAL returns the harmonic ordering [[$Cand_{opt}$ › $Cand_{Comp1}$ › $Cand_{Comp2}$]] where › denotes the relation "is more harmonic than." From this, we know that $Cand_{Opt}$ is the actual output form, but nothing can be concluded from the relative harmony of $Cand_{Comp1}$ and $Cand_{Comp2}$ - only the optimum is given a linguistic interpretation. This is an important methodological point: valid ranking arguments like (1) must always involve an actual output form as one of the candidates being compared. (Ibid, 7-8) Samek-Lodovici and Prince (1999: 18) have a particularly clear and

insightful way of describing EVAL. One can think of a constraint as a function from sets of candidates to sets of candidates. Each constraint takes a set of candidates and returns the subset consisting of those candidates that perform best on that constraint. EVAL can then be understood in terms of function composition: a lower ranking constraint takes as input the set of best performers on the higher-ranking constraint. For instance, if the set of candidates {Cands} and the hierarchy [[Cl » C2]] are handed to EVAL, then the set of winners will be given by (C2 ° Cl) ({Cands}) or equivalently C2(C1({Cands})). Since a constraint can never return less than one best performer, this formalization of EVAL correctly guarantees at least one winner. It also allows for the theoretical possibility of more than one winner when the outermost constraint returns a set containing two or more candidates. This formalization conforms rather well to the usual intuitive sense of how EVAL works: first it applies the highest-ranking (or innermost) constraint, then the next highest, and then the next, downward through the hierarchy (or outward through the composed functions) until there are no constraints left.

2.1.1.4 Universality of constraints

Apart from the bare structural primitives embedded in Gen, all constraints in OT are in principle and in fact violable and universal. This statement follows from the basic architecture of the theory: constraints have nowhere else to reside except in the language-particular hierarchy H, which means that any constraint could, in some

language, be ranked below another constraint that compels it to be violated. The null hypothesis is that all constraints are universal and universally present in the grammars of all languages (Prince and Smolensky 1993,5), and so Universal Grammar incorporates a constraint component. What makes this the null hypothesis is a kind of Occamite reasoning: since language-particular ranking is in general able to account for languages where a putatively universal constraint does not hold true, it does not seem necessary to recognize a special class of language-particular constraints. Differences between languages are no barrier to constraint universality when constraints are violable.

Kager (1999:9) states constraint can be defined as a condition for structure with the possibility of being satisfied or violated by the representation of an output. In the cases when the condition of a structure satisfies a constraint, it is said to be optimal, while the forms that do not meet this requirement are said to be violating it. There might be the assumption that there is no degree of violation, that candidates are categorized as satisfying or violating a constraint. If a constraint asks for a requirement about some structural element that is not existent in a candidate, then the forms may satisfy constraints vacuously.

McCarthy (2002:12) concluded that a factorial typology is yielded in the universal constraints and the language-particular ranking, which entails that every permutation of the constraints is predicted to be a

possible human language, and the grammar of any observed human language must be one of those permutations. Some minor qualifications can be found. It is not %100 possible that every permutation will generate a clearly different human language.

OT distinguishes two types of constraints, which are markedness and faithfulness.

2.1.1.5 Markedness:

Crystal (2008: 295) defines markedness as

> ...an analytic principle in linguistics whereby pairs of linguistic features, seen as oppositions, are given different values of positive (marked) and neutral or negative (unmarked). In its most general sense, this distinction refers to the presence versus the absence of a particular linguistic feature.

This indicates that if a certain feature was found in a linguistics item, it is said to be marked and if it was not found then said to be unmarked. Furthermore, Crystal adds more to the definition and talks about the use of the term in later theories of phonology stating that:

> In later phonological theory, the notion of markedness took on a critical status. Based on the view that the unmarked value of a feature is the normal, neutral state of the relevant articulator, some approaches assert that only one value need be present in the underlying representation; the

> other can be predicted by a context-free rule which mirrors the relevant markedness statement.

This can be exemplified in the vowel sound /ɔ/ there must be the feature of lip rounding, so the unmarked case is that when it is {+ lip rounding}, in the cases when the sound loses the feature of lip rounding, as it happens in American English, then the sound is said to be marked {- lip rounding}.

In OT, the notion is dealt with in this way, as Kager (1999, 2) states that all kinds of linguistics structures can have two different values, one is ‘marked’ and the other one is ‘unmarked’. The latter is favored universally and are fundamental in almost all grammars, whereas the former is avoided universally and grammars use it for creating contrast. For example, unrounded front vowels such as /i/ and /e/ are found in all human languages, but only a small number of languages contrast these vowels with rounded front vowels as /j/. The unmarked value of the distinctive feature [round] is [−round] in front vowels.

2.1.1.6 Faithfulness

Crystal defines the term within OT as

> In optimality theory, the degree to which one form (typically the output) preserves the properties of another form (typically the input). Faithfulness constraints penalize

> differences between the input and output representations. A set of abbreviatory conventions indicate the type of constraint, such as FaithC (faithfulness of consonants between output and input) and FaithV (faithfulness of vowels). (2008, 185)

The degree to which an output form is identical to its input form is considered to be *faithfulness* in optimality theory.

Faithfulness constraints require total resemblance between the input and the output candidates, depending on the norm of input/output difference that Gen provides. The evaluation of the output candidate forms are done by the constraints of Markedness, these constraints favor a number of structural configurations (as syllables with onsets) over other issues (as syllables without onsets). (McCarthy, 2002:13)

It is certain that the two kinds of constraints Faithfulness and markedness are essential. If there would be no faithfulness constraint, all the distinctions resulted from input forms would be reduced to least-marked outputs. It will be impossible to account for language particularity in the forms that they allow without markedness constraints. A key element in OT is the on-going interaction between faithfulness and markedness constraints. (Ibid)

Archangeli (1999:535) considers faithfulness as a general property of phonological systems which is that the input, or mental illustration, and the output, or surface illustration, are in principal identical. For instance an input like /fals/ ("false"), we suppose an output that is similar, i.e. [falts], rather than something bearing little resemblance to the input(such as [kæt] or [tru:]). The resemblances are expressed in OT via a family of faithfulness constraints, constraints that necessitate correspondence between the input and the output. In principle this might be seen as a symmetric relation (input and output are identical), there is significant confirmation supporting asymmetric correspondence relations. The example of /fals/ ↔ [falts] helps to explain the matter. Every sound input has an output correspondent (f,a,l,s), but there is an output sound (t) that does not have an input correspondent. Examples illustrating the opposite asymmetry exist as well. These involve input sounds with no output correspondent, illustrated by the vowel alternation in the two pronunciations of "separate (adj.)," [sɛpərət/ sɛprət].

Faithfulness constraints characterize these correspondences. The class of faithfulness constraints that maintains that these properties of the input correspond to the properties of the output are called MAX (maximize the input) constraints. Those demanding that the output correspond to the input are dubbed DEP (output depends on input) constraints. The MAX and DEP constraint families are relativized to

every type of phonological structure-features, segments, and prosody. Ibid

McCarthy (2008, 13) makes a distinction between the two concepts stating that within OT, markedness constraints are applied on the form of the outputs to distinguish them from constraints of a very different sort, faithfulness constraints. Faithfulness constraints ban differences between input and output. He also considers faithfulness constraints as one of Prince and Smolensky's cleverest ideas. There is not any theory of language to possess something like faithfulness constraints of OT. Faithfulness constraints are only meaningful within the framework of OT which lets violation of constraints. So faithfulness constraints have to be violable if they are going to be at all useful.

2.1.1.6 Constraint Interaction:

Prince and Smolensky (1993:2) question that "How does a grammar determine which analysis of a given input best satisfies a set of inconsistent well-formedness conditions?" They propose that OT depends on a conceptually simple notion of constraint interaction whereby the satisfaction of one constraint can be designated to take complete priority over the satisfaction of another. The way that a grammar utilizes to resolve conflicts is to grade constraints in a strict

dominance hierarchy. Each constraint has total priority over all the constraints lower in the hierarchy.

De Lacy (2010:3) states that constraints fit into the overall phonological system. From the lexicon an input is drawn; the input consists of phonological material with morphological and syntactic structure. A generation process (Gen) produces many candidates. One or more candidates are chosen from the range; the selection process (EVAL) engrosses constraints generating violation marks for candidates and an algorithm that utilizes the violation marks and other factors to determine the winning candidate. EVAL refers to 'ranking' a total order on constraints. Ranking does not influence how violation marks are calculated; however, ranking is vital in finding the winning candidate. The Phonetic module then takes one of the winners and realizes it as the optimal candidate which results in rendering it into an articulatory movement that produces speech sound.

According to Kager (1999:6) there is an inherent conflict between the markedness and faithfulness constraints. In the cases when some lexical dissimilarity is being preserved, there will be some cost linked in terms of markedness since in every opposition one member is marked. For instance, let us regard the fact that English limits the possible contrasts in its vowels with respect to the dimensions of backness and rounding: no rounded front vowels can be found in contrast to unrounded front vowels. This association of rounding and

backness in vowels is not peculiar to English alone, but it is found in a great majority of the world's languages. In fact it is found in properties of the articulatory and perceptual systems.

McCarthy (2008:22) states that faithfulness and markedness constraints can interact - that is, that they deal with sufficiently similar matters as to make interaction possible. Two rankings will be possible: if faithfulness dominates markedness, then nothing happens, because violations of markedness are tolerated in the output if it is needed to stay faithful to the input; if markedness dominates faithfulness, then some inputs will be unfaithfully mapped to markedness, obeying outputs.

Let us suppose that markedness is onset, which prohibits vowel-initial syllables, and that faithfulness is DEP, which prohibits epenthesis. In a language with the ranking [[DEP >> ONSET]], and presupposing that there are no other constraints or candidates, all inputs will be mapped to faithful output candidates, as shown in *tableau 5*

5.a Input /pata/ -» Output pata

/pata/	DEP	Onset	Remarks
i. ☞ pa.ta			Faithful
ii. a.pa.ta	*	*	Gratuitous epenthesis

iii. ?a.pa.ta	**		Ever more gratuitous epenthesis

Tableau5a: mapping all the inputs to faithful output candidates

b. Input /apata/ —> Output apata

/apata/	Dep	Onset	Remarks
i. ☞ a.pa.ta		*	Faithful
ii. ?a.pa.ta	*		Epenthesis

Tableau5b: explaining ranking of DEP>>ONSET

In (5.a), no real competition can be found for the faithful candidate. Since no constraint is violated for *pa.ta,* given just the constraints and candidates shown, no language can map /pata/ onto anything except *pa.ta*, since *pa.ta* is fully faithful and has no markedness violations.

While in tableau (5.b), a remarkable competing candidate can be observed. In *a.pa.ta,* faithful analysis leads to Onset violation, while in *?a.pa.ta,* unfaithful analysis acquiesces a candidate that obeys onset. This kind of competition constructs the basis of a valid ranking argument showing that DEP dominates Onset. With input /apata/ and with only the candidates shown, either DEP or Onset must be violated by the output form. The ranking [DEP >> ONSET] ensures that DEP is obeyed and Onset violated precisely in situations where obedience to both is not possible. (Ibid, 23-24)

2.2 Assimilation terminologies :

This section deals with the most basic terminologies and concepts related to assimilation. The terminologies are treated on four different levels, the first one will be on the level of being whether local or distant, the second level will be about the direction of assimilation, the third level will be about assimilation according to feature and the last level will be about whether being total or partial assimilation.

The term assimilation has been defined differently by the linguists. Crystal (2008: 39) defines assimilation as "a general term in phonetics which refers to the influence exercised by one sound segment upon the articulation of another, so that the sounds become more alike, or identical." Crystal sees assimilation as the influence of a sound over another one. Whereas Carr (1999:16) defines assimilation as "A process whereby two, normally adjacent, sounds become more similar to each other." A critique of Carr's definition is that in this definition Carr concentrates on the closeness of the sounds which undergo assimilation, this definition can only be suitable for local assimilation but not for distance assimilation in which assimilation takes place for sounds which are not adjacent. The same thing is observed in the definition of Yule (1996:59) as he states, "When two phonemes occur in sequence and some aspect of one phoneme is taken or copied by the other, the process is known as assimilation"

2.2.1 Local Assimilation versus long-distance assimilation:

Bakovic (2007:335) assumes that the process of assimilation can be generally partitioned into two major types, local and long-distance. The cases of *local assimilation* take place rigorously between adjacent segments, such as between consonant segments within a consonant cluster. On the other hand *long-distance assimilations* occur between segments, whether consonants or vowels which are not adjacent such as consonants across a vowel.

Crystal (2008:40) illustrates that Several classifications of assimilation can be found. One of the classifications is due to whether the segment shifting is the consequence of the effect of a neighbouring sound or of one not adjacent. The first type which is local assimilation is the common one. Crystal calls it contiguous or contact assimilation. And calls the other type non-contiguous or distance Assimilation. Lass (1984:171) gives an example of long distance assimilation in which the sound /n/ changes into /m/

open /əʊpən/ → open /əʊpəm/

Here, the sound /n/ is changed into the /m/ because of the influence of the sound /p/.

Crystal (2008:40) gives an example for *long distance assimilation* in which again the sound /n/ changes into /m/:

turn up trumps /tɛːrn̲ ʌp trʌmps/ → /tɛːrm̲ ʌp trʌmps/

The sound /n/ in *turn* has been changed into /m/ as a result of an influence of /p/ in *up*.

He further argues that *long distance assimilation* occurs in languages having *vowel harmony*, in which a vowel in one part of a word may influence other vowels to be articulated similarly, despite the fact that there are other sounds separating the assimilated vowels. Archangeli and Pulleyblank (1994:353) state that a system of harmony in general requires two or more not-necessarily adjacent segments to be alike in some way. They give no example of English, but they give examples from different languages, one of these languages is Turkish, since Turkish is a well-known representative of languages with vowel harmony system. Every dark vowel must be followed by dark vowels; every light vowel must be followed by a light vowel. Dark vowels include: /a, o, u, ı / and light vowels include:/e, ö, ü, i/.

Kiz → kizin ‘girl’
Pul → pulun ‘stamp’

It can be noted that the suffix for the first one begins with /i/ while for the second one it starts with /u/, this is due to the words that the former contains the sound /i/ that is why the suffix beings with /i/ and the same thing can be applied to the second example.

2.2.2 Regressive versus progressive assimilation

This is another form of categorizing assimilation according to the direction of assimilation. Carr (1999:16) states that in regressive assimilation the first of two sounds undergoes assimilation to a coming sound. He also considers this type as the most common type of assimilation. According to Trask (1996: 26) regressive assimilation is a phenomenon in which a phonetic attribute extends to a preceding segment, which he also calls anticipatory co-articulation. Crystal (2008: 27) believes that anticipatory assimilation is a

> A term used in phonetics and phonology as part of the classification of types of assimilation. In anticipatory (or 'regressive') assimilation, a sound changes because of the influence of the following sound. It is opposed to progressive and coalescent assimilations.

It can be summed up that anticipatory assimilation is a part of assimilation taxonomy in which a sound segment changes as a result of the influence of a following sound. This kind of assimilation is dissimilar to progressive assimilation.

As Lass (1984:171) states that the normal classification of assimilation includes direction; the effect of assimilation may work on both directions, whether to the right or the left.

Crystal (2008: 40) argues that there are three possibilities in what concerns the direction of assimilation. To him, the first one is regressive or anticipatory as explained above, the second type is progressive assimilation in which a sound changes as a result of the effect of the preceding sound. The occurrence of this type of assimilation in English is very few and it is not common. The third type is coalescent or 'reciprocal' assimilation in which there is a shared effect or mixture of the sounds on one another.

For example:

- Ten bikes /ten baɪks/ → /tem baɪks/

/n/ ⟶ /m/

The direction of assimilation here is from left to right (regressive or anticipatory assimilation) in which the sound /n/ in *ten* has been assimilated to the sound /m/ as a result of the influence of the /b/ in the word *bike*.

- Lunch score /lʌntʃ skɔː/ → / lʌntʃ ʃkɔː/

/s/ ⟵ /ʃ/

In this example the direction of assimilation is from right to left (progressive assimilation) in which the sound /s/ in *score* has been assimilated to the sound /ʃ/ as a result of the influence of the sound /tʃ/ in the word *lunch*.

- don't you /dəʊnt jʊ/ → /dəʊntʃʊ/

  In this example the two sounds /t/ in *don't* and /j/ in *you* are mixed and changed into the affricate /tʃ/. This is an example of coalescent or 'reciprocal' assimilation.

2.2.3 Assimilation types according to feature

Another taxonomy of assimilation is related to the influence of the sound features on the process of assimilation. Lass (1984:173) states that the process of assimilation greatly influences almost all the sound segments. The above classifications of assimilation can be according to two major parameters, *place* and voice. In place assimilation the assimilating segment spreads the feature of place onto the assimilated sound. If the assimilating segment is bi-labial, as a result of the assimilation process the assimilated sound will copy the place feature bi-labial from the assimilating segment as:

- Ten bikes /ten baɪks/ → /tem baɪks/

Here the sound /n/ in *ten* is an alveolar sound, while the sound /b/ in *bike* is bi-labial, that is why the sound /n/ has been assimilated to a bi-labial sound which is /m/.

The other type is voice assimilation, Carr (1999: 16) explains that voice assimilation is a common kind of the process in which the

assimilated segment takes voice feature from the assimilating sound. Katamba (1989:81) explains that the plural marker ‘s’ in English is a fine example of *voice assimilation*; for instance:

-pet /pet / → pets /pets /

The word ends in a voiceless sound which is /t/ that is why the pronunciation is the voiceless form of the segments which is /s/.

- bed /bed / → bells /bedz /

The word ends with the sound /d/ which is a voiced sound, that is why the suffix ‘s’ will be made voiced and pronounced as /z/.

2.2.4 Total versus partial assimilation:

The last point about the classification of assimilation will be about whether the assimilated sounds are totally assimilated or partially. Crystal exemplifies the case by stating that in an instance like:

- ten bikes /ten baɪks/ → /tem baɪks/

the sound /n/ is assimilated to the sound /b/ only in the place feature not in both features of place and voice, that is why the assimilation is partial not total. But in the example:

- ten mice /ten maɪs/ → /tem maɪs/

The sound /n/ in the word *ten* is changed to the sound /m/. Here the assimilated sound is totally similar to the assimilating sound that is why the assimilation is total.

Chapter Three

Local Assimilation of Consonants in English in the light of OT

3. Introduction:

This chapter deals with local assimilation of consonants in English. A model will be adopted to include the constraints inferred in the process of local assimilation within the framework of OT. Then, all English consonants: stops, fricatives, nasals, liquids and glides will be tested according to the adopted model respectively for identifying the dominating constraints governing the process of local assimilation in English.

English consonants can be divided into two main types, obstruent and sonorant. The airstream mechanism is either completely closed or in close approximation for the obstruent sounds, while for the sonorant sounds the articulators do not make such a closure as for the obstruent sounds or the nasal cavity is open with no closure for the air to pass. The obstruent sounds are sub-divided into stops and fricative sounds while the sonorant sounds are divided into nasals, liquids and glide consonants. A distinction can be made between obstruent consonants and sonorant consonants which is that the subtypes of obstruent consonants have pairs of voiced and voiceless sounds while the most of the sonorant consonants are voiced. (Davenport and Hannahs: 2005,25)

O'Connor (1980: 38) states that there are eight stop consonants in English which are /p/, /b/, /t/, /d/, /k/, /g/, /tʃ /, /dʒ/, and the number of fricatives are nine which are /f/,/v/,/θ/,/ð/,/s/,/z/, /ʃ/, /ʒ/, /h/. While Katamba (1989: 6) classifies /tʃ /, /dʒ/ out of stops and describes them as affricates. Lass (1984: 83) states that liquids include the lateral consonants with the 'r' type sounds. Odden (2005:145) states that nasal consonants are a sub-type of sonorant consonants in which the air passes through the nasal cavity freely, and the sounds are /m,n,ŋ/. He also states that the glides or the semi vowels /w/ and /j/ are also classified under consonants. The total number of consonants in English is 24 consonants, six stops, nine fricatives, two affricates, three nasals, one lateral, one retroflexive and two semi vowels.

	Bilabial	Labio-dental	Dental	Alveolar	Post alveolar	palatal	Velar	Glottal
Plosive	p b			t d			k g	
Fricative		f v	θ ð	s z	ʃ ʒ			h
Affricate					tʃ dʒ			
Nasal	m			n			ŋ	
Lateral				l				
Approximant	w				r	j		

3.1 Local Assimilation within Optimality Theory:

Baković (2007:336) states that

> A phonological process is called an assimilation if, as a result of its application, two or more segments in a form agree in their value for some phonological feature(s) or feature class(es)…. When there is assimilation, a segment surfaces with the same value(s) for some feature or feature class as an adjacent segment. Assimilation is subject to a variety of restrictions.

While dealing with the assimilation phenomenon within OT, there will be the involvement of a crucial violation of a faithful constraint when any change happens to an underlying form (input) to a surface form (output). Such kind of violation should be compelled by a number of higher ranked markedness constraint that is satisfied by the surface form but violated by a competing output candidate in which the relevant change is not made.

McCarthy and Prince (1999:16) indicate that in the case of assimilation in terms of a feature (x), the faithfulness constraint is Ident(x) which performs the duty of regulating identity in terms of x between input segments and their output correspondents.

X can be a feature such as: voice feature or place feature of a sound segment.

1. IDENT(X)

Corresponding input and output segments have the same value of the feature x.

This is the first constraint to be dealt with regarding the treatment of assimilation in OT. According to this constraint all the output forms of the segments should be identical with their corresponding input forms. Lombardi (1999:272) believes that in assimilation the markedness constraint which crucially compels violation of Ident (x) is Agree(x) which adjusts agreement in terms of x between adjacent output segments. An example in which the output form is identical with the input form is the consonant sound /t/ in *that* which has an identical form with its input when the word is pronounced alone without the influence of nieghbouring sounds:

- that /ðɑt/

2. AGREE(x)

Adjacent output segments have the same value of the feature x.

According to Baković (2007:337) the need for ranking Agree(x) above Ident(x) for the sake of guaranteeing assimilation will be shown in a tableau. Tableau (6) explains the case in which an input that contains adjacent segments that disagree in their value of x, with an output in which those segments have been changed to agree in terms of

x that works better than input-faithful substitute in which no change has been made. The format of the tableau is based on the models used by (Prince 2002) and (McCarthy 2002) to show the ranking of the constraints. Each row of the tableau is a comparison between the optimal candidate and the sub-optimal one which is known as the loser. These are arranged in this order (winner-loser). Each cell in the tableau from the column of the constraints indicates whether that constraint prefers the winner 'the optimal candidate' or the loser or sometimes neither member of the pair.

/+x -x/ → /+x +x/	AGREE(x)	INDENT(x)
/+x +x/ ~ /+x -x/	Optimal (winner)	!* (loser)

Tableau: 6(the model used for showing assimilation)

The direction of assimilation cannot be shown by the ranking of constraints, rather the constraints can only tell if there is assimilation or not.

3.1.1 Local Assimilation of Stops

English stop consonants are /p/, /b/, /t/, /d/, /k/, /g/, /tʃ /, /dʒ/, as mentioned above.

/p/ is a voiceless, bilabial stop, that can occur initially, medially and finally: **p**ur**p**le /pɛpəl/, pump /pʌmp/

/b/ is a voiced, bilabial stop, that can occur initially, medially and finally: baby /beibi/, rub /rʌb/

/t/ is a voiceless, alveolar stop, can occur initially, medially and finally: treatment /trɪ:tmɛnt/

/d/ is a voiced, alveolar stop, can occur initially, medially and finally: dead /dɛd/, middle /mɪdl/

/k/ is a voiceless, velar stop, can be found initially, medially, and finally: cricket /krɪkət/, cake /keɪk/

/g/ is a voiced, velar stop, can be found initially, medially, and finally: great /greɪt/, figure /fɪgə/, big /bɪg/

Total and partial assimilation of consonants in English can be found. Gimson (1970:285) states that the most common phonemic changes at word boundaries deal with changes of place of articulation, predominantly concerning de-alveolarization. By de-alveolarization, we mean that sound loses the feature ‘alveolar’. Native speakers are not aware of such changes though they make it during colloquial speech. Gimson (Ibid) mentions that the word-final stops /t/ and /d/ will assimilate to the place of the following word-initial consonants, at the same time keeping the feature voice. The stops /t/ and /d/ will totally

assimilate to bi-labial consonants before bi-labials, and to velar consonants before velars which contain a palatal feature.

/t/ assimilates to /p/ before /p,b,m/

- that pin /**ðæt pɪn**/ → /**ðæp pɪn**/
- that boy /**ðæt boɪ**/ → /**ðæp boɪ**/
- that man /**ðæt mæn**/ → /**ðæp mæn**/

/t/ assimilates to /k/ before /k,g/

- that candle / **ðæt kændl** / → / **ðæk kændl** /
- that girl / **ðæt gɜl** / → / **ðæk gɜl** /

/d/ assimilates to /b/ before /p,b,m/

- good pen /**gud pɜn**/ → / **gub pɜn** /
- bad boy /**bæd boɪ**/ → / **bæb boɪ**/
- good man /**gud mæn**/ → / **gub mæn** /

/d/ assimilates to /g/ before /k,g/

- good concert /**gud konsət**/ → /**gug konsət** /
- bad game /**bɑd geɪm**/ → /**bɑg geɪm**/

/d/ assimilates to /n/ before /n/

- good night /**gud naɪt**/ → /**gun naɪt** /

/d/ assimilates to /dʒ/ before /j/

- could you /**kud jʊː/** → / **kud**ʒ **jʊː/**

/t/ assimilates to /**tʃ**/ before /j/

at your risk **/ət jə rɪsk/** → **/ətʃ jə rɪsk /**

-

There are other cases of assimilation which are less common than the previous ones. It is manner assimilation and it is only found during rapid casual speech, the type is regressive and the change of manner will be toward ease of articulation, a consonant which makes less obstruction to the airflow. Such cases in English involve the assimilation of the consonant stop /t/ that changes into a fricative consonant such as /s/. The progressive assimilation of manner can also be found, when a word ending in a stop that precedes a word beginning with /ð/ the consonant, both sounds become identical in manner but with a dental place of articulation, as in (read this /rɪd dz/). Roach (1991: 125)

/t/ assimilates to /s/

- that side/ **ðæt saɪd/** → / **ðæs saɪd** /

/ð/ assimilates to /d/

- read this /rɪd ðz/ → /rɪd dz/

Now, it is time to examine each of the above cases by ample examples within the framework of OT. The final voiceless alveolar plosive /t/ may be changed to the word-initial voiceless bilabial stop /p/, this can be shown below:

- /t/ → **/p/**

  that pin

  /ðæt pɪn/ → /ðæp pɪn/

that pin	AGREE(place)	IDENT(place)
a. /ðæt pɪn/	*!	
b. /ðæp pɪn/ ☞		*

Tableau: 7(assimilation of stop/t/→/p/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/p/

  The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the stop /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

  Another example of the same case in which the stop consonant /t/ is totally assimilated to the stop /p/:

- /t/ → **/p/**

might play

/maɪt pleɪ/ → /maɪp pleɪ /

might play	AGREE(place)	IDENT(place)
a. /maɪt pleɪ/	*!	
b. /maɪp pleɪ / ☞		*

Tableau: 8 (assimilation of stop/t/→/p/)

The final stop consonant /t/ will also assimilate to /p/ when it is followed by word-initial /b/,

- /t/ → **/p/**

  that boy

  /ðat boɪ/ → / ðap boɪ /

that boy	AGREE(place)	IDENT(place)
a. / ðat boɪ /	*!	
b. / ðap boɪ / ☞		*

Tableau:9 assimilation of stop/t/→/p/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/p/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the stop consonant /b/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following is another example of the same case:

- /t/ → /**p**/

  might be

  /**maɪt bi**/ → / **maɪp bi** /

might be	AGREE(place)	IDENT(place)
a. / **maɪt bi** /	*!	
b. /maɪp bi/ ☞		*

Tableau:10 assimilation of stop/t/→/p/)

Other cases are found in which the word-final stop consonant /t/ will be totally assimilated to /p/ when followed by word-initial nasal consonant /m/.

- /t/ → /**p**/

  that man

  /**ðæt mɑn**/ → /**ðæp mɑn**/

might be	AGREE(place)	IDENT(place)
a. / **ðæt mɑn** /	*!	
b. / **ðæp mɑn** / ☞		*

Tableau:11 assimilation of stop/t/→/p/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/m/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the nasal consonant /m/. The Agree(place) entails that

the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Another example of the same case in which the stop consonant /t/ assimilated to /p/ when followed by /m/ will be the following:

- /t/ → /**p**/

  bat man

  /**bat mɑn**/ → /**bap mɑn**/

bat man	AGREE(place)	IDENT(place)
a. / **bat mɑn** /	*!	
b. /bap mɑn/ ☞		*

Tableau:12 assimilation of stop/t/→/p/)

There are other cases in English language in which a stop can be totally assimilated to an adjacent sound. The stop /t/ when occurs finally and followed by a word starting with /k/or /g/, there will be a total assimilation. For example:

- /**t**/ → /**k**/

  that candle

  / **ðæt kændl** / → / **ðæk kændl** /

That candle	AGREE(place)	IDENT(place)
a. / ðæt kændl /	*!	
b. / ðæk kændl / ☞		*

Tableau: 13 (assimilation of stop/t/→/k/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/k/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the stop /k/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Another example of the same case in which the sound /t/ totally changes into /k/when followed by /k/ is:

- **/t/ → /k/**

white colour

/ **waɪt kʌlɑ**/ → / **waɪk kʌlɑ** /

White colour	AGREE(place)	IDENT(place)
a. /waɪt kʌlɑ/	*!	
b. /waɪk kʌlɑ/ ☞		*

Tableau: 14(assimilation of stop/t/→/k/)

The word-final stop consonant /t/ will assimilate to /k/ when followed by stop word-initial /g/ as in:

- **/t/ → /k/**

  that girl

  / ðæt gɜl / → / ðæk gɜl /

that girl	AGREE(place)	IDENT(place)
a. /ðæt gɜl /	*!	
b. /ðæk gɜl/ ☞		*

Tableau: 15(assimilation of stop/t/→/k/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/g/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the stop /g/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Here is another example of the case mentioned above:

- **/t/ → /k/**

  that garden

  / ðæt gædən/ → / ðæk gædən /

that girl	AGREE(place)	IDENT(place)
a. /ðæt gædən /	*!	
b. /ðæk gædən / ☞		*

Tableau: 16(assimilation of stop/t/→ /k/)

The voiceless alveolar stop /t/ may also totally assimilate to the voiceless fricative /s/, in the cases when /t/ occurs finally and followed by a word starting with /s/. In this case, it is assimilation of manner as stated by Roach (1991:124). For example:

- /**t**/ → /**s**/
  that side
  / **ðæt saɪd**/ → / **ðæs saɪd** /

that side	AGREE(manner)	IDENT(manner)
a. / ðæt saɪd /	*!	
b. / **ðæs saɪd /** ☞		*

Tableau: 17(assimilation of stop/t/→ /s/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/s/

The constraint Agree(manner) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word

beginning with the fricative consonant /s/. The Agree(manner) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Another example of the same case is:

- /**t**/ → /**s**/

  night scene

  / **naɪt siːn**/ → / **naɪs siːn** /

night scene	AGREE(manner)	IDENT(manner)
a. / naɪt siːn/	*!	
b. / **naɪs siːn** / ☞		*

Tableau: 18(assimilation of stop/t/→ /s/)

In English there are cases in which the stop consonant /d/ is assimilated totally to /b/ when it occurs finally and the following word starts with a bi-labial stop /b/. for example:

- /**d**/ → /**b**/

  good boy

  / **gʊd boɪ**/ → / **gʊb boɪ** /

good boy	AGREE(manner)	IDENT(manner)
a. /gʊd bɔɪ/	*!	
b. /gʊb bɔɪ / ☞		*

Tableau: 19(assimilation of stop/d/→/b/)

- Agree(place)>>Ident IO, when COD/d/ ~ONS/b/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the stop /b/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In this example in tableau19, the alveolar stop /d/ has been totally assimilated to the bi-labial stop /b/. Roach (1991: 125) calls this type of assimilation as manner assimilation, because the consonant changes to a sound similar in the manner of production, but still the case can be considered as an assimilation of place, because the stop consonant /b/ becomes identical to the sound /d/ in the entire feature including place feature too. Whether we consider the case as manner or place assimilation, still its treatment within OT will be the same, because OT deals with interaction of the constraints in treating the assimilation phenomenon. The two candidates are listed under the two constraints Agree(manner) and Ident(manner), one can notice that the optimal candidate which wins the competition is the one incurring the least violation under the Agree(manner) constraint which is /gʊb bɔɪ/ while

the loser candidate is the one which incurs a fatal violation of the high ranked constraint Agree(manner)/ **gʊd boɪ**/. Another example of the samecase is the following:

- **/d/ → /b/**
  bed blanket
  / bed blæŋkət/ → / beb blæŋkət /

bed blanket	AGREE(manner)	IDENT(manner)
a. / bed blæŋkət /	*!	
b. / beb blæŋkət / ☞		*

Tableau: 20(assimilation of stop/d/→/b/)

The final-word consonant /d/ will also assimilate to the word initial bilabial /b/ when the stop /d/ comes at the end of a word and followed by a word starting with /p/.

- **/d/ → /b/**
  good pen
  / gʊd pɜn/ → / gʊb pɜn /

Good pen	AGREE(manner)	IDENT(manner)

a. / gʊd pɜn /	*!	
b. / gʊb pɜn / ☞		*

Tableau: 21(assimilation of stop/d/→/b/)

Agree(place)>>Ident IO, when COD/d/ ~ONS/p/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the stop /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Another example which explains the previous case more:

- **/d/ → /b/**

  good play

  / gʊd pleɪ/ → / gʊb pleɪ /

Good pen	AGREE(manner)	IDENT(manner)
a. / gʊd pleɪ /	*!	
b. / gʊb pleɪ / ☞		*

Tableau: 22(assimilation of stop/d/→/b/)

The stop consonant /d/ will totally assimilate to /b/ when the alveolar stop /d/ occurs finally and followed by a word starting with the nasal consonant /m/. as in:

- **/d/ → /b/**

  good man

  /gʊd mæn/ → /gʊb mæn/

Good man	AGREE(manner)	IDENT(manner)
a. / gʊd mæn /	*!	
b. / gʊb mæn / ☞		*

Tableau: 23(assimilation of stop/d/→/b/)

Agree(place)>>Ident IO, when COD/d/ ~ONS/m/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the stop /m/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is another example of the same case:

- **/d/ → /b/**

  good melody

  /gʊd melədi/ → /gʊb melədi /

Good melody	AGREE(manner)	IDENT(manner)
a. / gʊd melə**di/**	*!	
b. / **gʊb mel**ə**di/** ☞		*

Tableau: 24(assimilation of stop/d/→/b/)

The stop consonant /d/ will totally assimilate to the stop velar /g/ when /d/ occurs finally and followed by a word starting with /g/, as stated by Gimson (1970:285). The type of assimilation here is place assimilation. For example:

- /**d**/ → /**g**/
  bad guys
  /**bæd gaɪz**/ → /**bæg gaɪz** /

bad guys	AGREE(place)	IDENT(place)
a. /bæd gaɪz /	*!	
b. /bæg gaɪz /☞		*

Tableau: 25(assimilation of stop/d/→/g/)

- Agree(place)>>Ident IO, when COD/d/ ~ONS/g/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the stop /g/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following is another example of the above mentioned case:

- /**d**/ → /**g**/

  red garment

  /**red gɑːmənt**/ → /**reg gɑːmənt** /

red garment	AGREE(place)	IDENT(place)
a. /red gɑːmənt/	*!	
b. /reg gɑːmənt /☞		*

Tableau: 26 (assimilation of stop/d/→ /g/)

The stop consonant /d/ will also assimilate to the stop velar /g/ when /d/ occurs finally and followed by a word starting with /k/, for example:

- /**d**/ → /**g**/

  red colour

  /**red kələ**/ → /**reg kələ**/

red colour	AGREE(place)	IDENT(place)
a. /red kələ/	*!	
b. /reg kələ /☞		*

Tableau: 27 (assimilation of stop/d/→ /g/)

- Agree(place)>>Ident IO, when COD/d/ ~ONS/k/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the stop /k/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following is another case like the one mentioned above:

- **/d/ → /g/**

  good concert

  /gud konset/ → /gug konset/

good concert	AGREE(place)	IDENT(place)
a. /gud konset/	*!	
b. /gug konset /☞		*

Tableau: 28 (assimilation of stop/d/→/g/)

The final cases of assimilation of stops is the case in which the word final stop consonant /d/ will be assimilated to the word initial nasal consonant /n/. for example:

- **/d/ → /n/**

  bad news

  /bad nju:z/ → / ban nju:z /

bad news	AGREE(place)	IDENT(place)
a. / **bad nju:z** /	*!	
b. / **ban nju:z** /☞		*

Tableau: 29 (assimilation of stop/d/→/n/)

- Agree(place)>>Ident IO, when COD/d/ ~ONS/n/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the nasal consonant /n/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Another example of the same case is:

- /**d**/ → /**n**/

  good night

  /**gʊd naɪt**/ → / **gʊn naɪt** /

good night	AGREE(place)	IDENT(place)
a. / **gʊd naɪt** /	*!	
b. / **gʊn naɪt** /☞		*

Tableau: 30 (assimilation of stop/d/→/n/)

Katalin and Szilard (2006:96) state that the word final consonants /d/ and /t/ will be assimilated to /dʒ/ and /tʃ/ respectively. For example:

- /**d**/ → / dʒ/

  could you

  /**kʊd** jʊː/ → / **kʊdʒ** jʊː/

could you	AGREE(place)	IDENT(place)
a. /**kʊd** jʊː/	*!	
b. / **kʊdʒ** jʊː /☞		*

Tableau: 31 (assimilation of stop/d/→/ dʒ /)

The alveolar stop consonant /d/ has been assimilated to the post alveolar affricate /dʒ/.

- Agree(place)>>Ident IO, when COD/d/ ~ONS/j/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /d/ comes finally and followed by a word beginning with the semi consonant /j/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

One more example of the same case is the alveolar stop consonant /d/ in *mind your head* is assimilated to the post alveolar affricate / dʒ / because of the influence of the semi consonant /j/ in *you*.

- /**d**/ → / dʒ/

mind your head

/maɪnd jə hed/ → / maɪndʒ jə hed /

mind your head	AGREE(place)	IDENT(place)
a. /maɪnd jə hed/	*!	
b. /maɪndʒ jə hed /☞		*

Tableau: 32 (assimilation of stop/d/→ / dʒ /)

In English, there are cases in which the alveolar stop consonant /t/ is assimilated to the post alveolar consonant /tʃ/ when the /t/ occurs finally and followed by a word starting with the semi consonant /j/. For example in *'don't you like':*

- **/t/ → / tʃ /**

don't you like

/dəʊnt jʊ laɪk/ → /dəʊntʃ jʊ laɪk /

don't you like	AGREE(place)	IDENT(place)
a. /dəʊnt jʊ laɪk /	*!	
b. /dəʊntʃ jʊ laɪk /☞		*

Tableau: 33 (assimilation of stop/t/→ / tʃ/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/j/

The constraint Agree(place) dominates the Ident IO constraint when the stop consonant /t/ comes finally and followed by a word beginning with the semi consonant /j/. The Agree(place) entails that the place feature of

onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following is another example of the same case mentioned above:

- /**t**/ → / **tʃ** /

at your risk

/ət jə rɪsk/ → /ətʃ jə rɪsk /

at your risk	AGREE(place)	IDENT(place)
a. /**ət jə rɪsk** /	*!	
b. /**ətʃ jə rɪsk** /☞		*

Tableau: 34(assimilation of stop/t/→ / tʃ/)

The candidate 'a' in tableaux 19-34 satisfy the low ranked constraint IDENT(x), but it fails to satisfy the high ranked constraint Agree (place). The constraint IDENT(x) imposes that the input must be entirely identical with its output form. While the constraint Agree (x) illustrates that the neighbouring sounds must agree in features such as place, voice or sometimes manner. The constraint Agree(x) is only applicable when assimilation is possible between the neighbouring segments. That is why in all the cases mentioned above in the tableaux 19 to 34, one can notice that the candidate 'b' best satisfies the high ranked constraint Agree(x) though it incurs violation of the low ranked

constraint Ident (x). The ranking of constraints one above another is language particular, though the existence of constraints is a universal linguistics phenomenon. In OT, the candidate which incurs the least violation is the one considered to be optimal. Violations made to the low ranked constraints, within OT, will not rule out a candidate, but making violations to the high ranked constraints are considered to be fatal which results in ruling out a candidate. That is why candidate 'a' in tableaux 19-34 loses the competition against candidate 'b' because the latter candidate can best satisfy the high ranked constraint.

3.1.2 Local Assimilation of Fricatives

English fricatives are /f/,/v/,/θ/,/ð/,/s/,/z/, /ʃ/, /ʒ/, /h/.

/f/ is a voiceless, labio-dental fricative, can be found initially, medially, and finally: five /faɪv/, riffle /raɪfl/, leaf /li:f/

/v/ is a voiced, labio-dental fricative, can be found initially, medially, and finally: very /very/, liver /lɪvə/, five /faɪv/

/θ/ is a voiceless, dental fricative, can be found initially, medially, and finally: thin /θɪn/, method /mɛθəd/, death /dɛ:θ/

/ð/ is a voiced, dental fricative, can be found initially, medially, and finally: the /ðə/, weather /wɛðə/, /breathe (v.) /bɾɪːð/

/s/ is a voiceless, alveolar fricative, can be found initially, medially, and finally: sister /sɪstə/, insists /ɪnsɪsts/

/z/ is a voiced, alveolar fricative, can be found initially, medially, and finally: zoo /zʊː/, dazzle /dazəl/, breeze /bɾɪːz/

/ʃ/ is a voiceless, palato-alveolar fricative, can be found initially, medially, and finally: she /ʃɪː/, mansion /manʃən/, fish /fɪʃ/

/ʒ/ is a voiced, palato-alveolar fricative, it is only found medially in English native words: vision /vɪʒən/

/h/ is a voiceless glottal fricative, it can be found initially and medially: hose /həus/, behave /bɪheɪv/

The voiceless alveolar fricative /s/ will totally assimilate to the voiced alveolar /ʃ/, when /s/ comes at the end of a word followed by a word starting with /ʃ/.

- /**s**/ → / **ʃ** /

  nice shoes

/naɪs ʃuːz/ → / naɪʃ ʃuːz/

nice shoes	AGREE(place)	IDENT(place)
a. / **naɪs ʃuːz** /	*!	
b. / **naɪʃ ʃuːz** /☞		*

Tableau: 35(assimilation of fricative/s/→/ʃ/)

- Agree(place)>>Ident IO, when COD/s/ ~ONS/ʃ/

The constraint Agree(voice) dominates the Ident IO constraint when the fricative voiceless alveolar consonant /s/ comes finally and followed by a word beginning with the fricative voiced alveolar consonant /ʃ/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following tableau is another example like the previous case:

- **/s/ → / ʃ /**

this shirt

/ðɪs ʃɛːt/ → /ðɪʃ ʃɛːt/

this shirt	AGREE(place)	IDENT(place)
a. / **ðɪs ʃɛːt** /	*!	
b. / **ðɪʃ ʃɛːt** /☞		*

Tableau: 36(assimilation of fricative/s/→/ʃ/)

Other cases of the assimilation of /s/ into /ʃ/ can be found, when /s/ is followed by a word starting with the semi vowel /j/ (Katalin and Szilard ,2006:97):

- /**s**/ → / ʃ /
- this year

  /ðɪs jɪə/ → / ðɪʃ jɪə/

this year	AGREE(place)	IDENT(place)
a. /**ðɪs jɪə**/	*!	
b. /**ðɪʃ jɪə**/☞		*

Tableau: 37(assimilation of fricative/s/→/ʃ/)

- Agree(place)>>Ident IO, when COD/s/ ~ONS/ʃ/

The constraint Agree(place) dominates the Ident IO constraint when the fricative voiceless alveolar consonant /s/ comes finally and followed by a word beginning with the semi vowel /j/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The alveolar voiceless fricative /s/ will be voiced when followed by the voiced velar stop consonant such as /g/ as in:
dis- /dɪs/ + guise /gaɪz/→ disguise /dɪzgaɪz/ (Jansen, 2007:275)

- /**s**/ → /z/

dis- + guise → disguise

/dɪs gaɪz/ → /dɪzgaɪz/

disguise	AGREE(voice)	IDENT(voice)
a. / **dɪsgaɪz** /	*!	
b. / **dɪzgaɪz** /☞		*

Tableau: 38(assimilation of fricative/s/→/z/)

- Agree(voice)>>Ident IO, when COD/s/ ~ONS/z/

The constraint Agree(voice) dominates the Ident IO constraint when the fricative voiceless alveolar consonant /s/ comes finally within a prefix, and followed by a word beginning with a voiced consonant such as the velar voiced stop /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The regular plural ending (s) in English has got different pronunciations. It is written as (s), but in reality is pronounced as [-s] as in [pet-s] pets, or as [-z] as in [bel-z] bells or even as [-iz] as in [rauz-iz] roses. The choice is not random. The principle that determines the shape of the suffix is voice assimilation: this suffix must be in agreement in voicing with the preceding sound. (Katamba, 1989:81)

For example,

dogs /dɔgz/

docks /dɔks/

Is Pete going? /ɪs pit gouɪŋ/

The alveolar voiced fricative /z/ will assimilate totally to the alveolar voiceless fricative /s/, when /z/ comes finally and followed by a word starting with /s/, as in:

- /**z**/ → /s /
- his signature

  /hɪz sɪgnɪtə/ → /hɪs sɪgnɪtə/

his signature	AGREE(voice)	IDENT(voice)
a. /hɪz sɪgnɪtə/	*!	
b. /hɪs sɪgnɪtə/☞		*

Tableau: 39(assimilation of fricative/z/→/s/)

- Agree(voice)>>Ident IO, when COD/z/ ~ONS/s/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced alveolar fricative consonant /z/ comes finally and followed by a word beginning with the voiceless alveolar fricative /s/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In English, there are cases in which the voiced alveolar /z/ will assimilate to /ʒ/, when /z/ comes finally and followed by a word starting with the semi vowel /j/ Katalin and Szilard (2006:97):

- /**z**/ → /ʒ /
- ease your pain

  /iːz jə peɪn/ → /iːʒ jə peɪn/

ease your pain	AGREE(voice)	IDENT(voice)
a. /iːz jə peɪn/	*!	
b. /iːʒ jə peɪn/☞		*

Tableau: 40(assimilation of fricative/z/→/ʒ/)

- Agree(place)>>Ident IO, when COD/z/ ~ONS/ʒ/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced alveolar fricative consonant /z/ comes finally and followed by a word beginning with the fricative /ʒ/. The Agree(place) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The voiced labio dental fricative /v/ will totally assimilate to the voiceless labio dental fricative /f/, when /v/ comes finally and followed by a word starting with a voiceless sound. As in:

- /**v**/ → /f/

have to

/hæv tʊ/ → /haf tʊ/

have to	AGREE(place)	IDENT(place)

a. /hæv tʊ /	*!	
b. /hæf tʊ /☞		*

Tableau: 41 (assimilation of fricative/v/→/f/)

- Agree(voice)>>Ident IO, when COD/v/ ~ONS/f/

The constraint Agree(voice) dominates the Ident IO constraint when the fricative voiced labio dental consonant /v/ comes finally, and followed by a word beginning with a voiceless stop consonant such as the alveolar voiceless stop /t/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The word-initial fricative (ð) would assimilate to the word-final plosive /d/. (Roach, 1991: 125), for example:

- /ð/ → /d/

read these

/rɪːd ðɪːz/ → /rɪːd dɪːz/

read these	AGREE(manner)	IDENT(manner)
a. /rɪːd ðɪːz /	*!	
b. rɪːd dɪːz/☞		*

Tableau: 42 (assimilation of fricative/ð/→/d/)

- Agree(manner)>>Ident IO, when ONS/ð/ ~\COD/d/

The constraint Agree(manner) dominates the Ident IO constraint when the fricative voiced labio dental consonant /ð/ comes initially , and preceded by a word ending with a voiced stop consonant such as the alveolar voiced stop /d/. The Agree(manner) entails that the manner feature of onset of one segment moves to the coda of the preceding word. While Ident IO entails that the input form of a segment must be identical with its output.

All the examples in the tableau 35 to tableau 42 show assimilation of fricatives in English, it can be noticed that the optimal candidate in all the examples is candidate 'B' since it incurs the least violation of the high ranked constraint Agree(x). While the candidate which loses the competition with 'B' is candidate 'A' since it cannot satisfy the high ranked constraint Agree(x). In the cases when there is assimilation between two segments of two different words, the coda of one with the onset of the other one, whether in a regressive of progressive way, Agree(x) constrains dominates the IdentIO constraint.

3.1.3 Local Assimilation of Affricates:

In English, there are two affricate sounds which are /tʃ/ and /dʒ/.

/ tʃ / is a voiceless palato-alveolar affricate that can be found initially, medially and finally: church /tʃɛːtʃ/, creature /krɪtʃə/, catch /kætʃ/

/dʒ/ is a voiced palato-alveolar affricate that can be found initially, medially and finally: just /dʒʌst/, region /rɪdʒən/ judge / dʒʌdʒ/

Clark and Yallop (1990), (Katamba (1989), Gimson (1970). and Jansen (2007) do not refer to any case of assimilation of affricate consonants in English.

3.1.4 Local Assimilation of Nasals:

The nasal consonants in English are three, /m/, /n/ and /ŋ/:

/m/ is a voiced bilabial nasal that can occur initially, medially, and finally: man /mæn/, reminder /rɪmaɪndər/, cream /krim/

/n/ is a voiced alveolar nasal that can be found in all positions of a word: nail /neil/, pencil /pɛnsəl/, sin /sɪn/

/ŋ/ is a voiced velar nasal, it never occurs initially, but can occur medially and finally: anger /æŋgə/, sing /sɪŋ/

The alveolar nasal consonant /n/ would totally assimilate to the bilabial nasal consonant /m/ when /n/ is followed by any of the

voiceless bilabial stop /p/, or voiced bilabial stop /b/ or bilabial nasal /m/. Gimson (1970:286)

- /**n**/ → /**m**/

ten pen

/ten pen/ → /tem pen/

ten pen	AGREE(place)	IDENT(voice)
a. /ten pen /	*!	
b. /tem pen/☞		*

*Tableau: 43 (assimilation of nasal/*n*/→/m/)*

- Agree(place)>>Ident IO, when COD/n/ ~ONS/p/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar nasal consonant /n/ comes finally , and followed by a word beginning with the voiceless stop bilabial consonant /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is another example of the case mentioned above:

- /**n**/ → /**m**/

Who can pay?

/hʊ kan peɪ/ → /hʊ kam peɪ/

who can pay?	AGREE(place)	IDENT(place)

a. / **hʊ kan peɪ** /	*!	
b. / **hʊ kam peɪ** /☞		*

*Tableau: 44 (assimilation of nasal/*n*/→/m/)*

The nasal consonant /n/ will also totally assimilate to /m/ when /n/ comes finally and followed by /b/:

- /**n**/ → /**m**/

can be

/kan bɪ/ → /kam bɪ/

Can be	AGREE(place)	IDENT(place)
a. / **kan bɪ** /	*!	
b. / **kam bɪ** /☞		*

*Tableau: 45 (assimilation of nasal/*n*/→/m/)*

- Agree(place)>>Ident IO, when COD/n/ ~ONS/b/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar nasal consonant /n/ comes finally , and followed by a word beginning with the voiced stop bilabial consonant /b/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Here is another example:

- /n/ → /m/

Ten bikes

/ten baɪks/ → /tem baɪks/

Ten bikes	AGREE(place)	IDENT(place)
a. /ten baɪks /	*!	
b. /tem baɪks /☞		*

*Tableau: 46 (assimilation of nasal/*n*/→ /m/)*

The word-final nasal consonant /n/ totally assimilates to word initial /m/ when it is followed by a word starting with /m/:

- /n/ → /m/

Phone me

/fəʊn mɪ/ → /fəʊm mɪ/

Phone me	AGREE(place)	IDENT(place)
a. /fəʊn mɪ/	*!	
b. /fəʊm mɪ/☞		*

*Tableau: 47 (assimilation of nasal/*n*/→ /m/)*

- Agree(place)>>Ident IO, when COD/n/ ~ONS/m/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar nasal consonant /n/ comes finally , and followed by a word beginning with the voiced nasal bilabial consonant /m/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is another example of the previous case:

- /**n**/ → /**m**/

Thin men

/θɪn men/ → /θɪm men/

Thin men	AGREE(place)	IDENT(place)
a. /θɪn men/	*!	
b. /θɪm men /☞		*

*Tableau: 48 (assimilation of nasal/*n*/→ /m/)*

The voiced alveolar nasal consonant /n/ totally assimilates to /ŋ/ when followed by /k/, /g/ Gimson (1970:286)

Let us first take examples for the case when the voiced alveolar nasal /n/ comes finally in a word and followed by a word starting with the voiceless velar stop /k/:

- /**n**/ → /**ŋ**/

can clean

/kæn klɪːn/ → /kæŋ klɪːn/

can clean	AGREE(place)	IDENT(place)
a. /kæn klɪːn/	*!	
b. /kæŋ klɪːn/☞		*

*Tableau: 49 (assimilation of nasal/*n*/→ /ŋ/)*

- Agree(place)>>Ident IO, when COD/n/ ~ONS/k/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar nasal consonant /n/ comes finally , and followed by a word beginning with the voiceless velar stop consonant /k/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is another example of the case when /n/ assimilates to /ŋ/:

- /**n**/ → /**ŋ**/

brown colour

/braʊn kələ/ → /braʊŋ kələ/

brown colour	AGREE(place)	IDENT(place)
a. /braʊn kələ/	*!	
b. /braʊŋ kələ/☞		*

*Tableau: 50 (assimilation of nasal/*n*/→/ŋ/)*

Below are the examples of the case when the voiced nasal alveolar /n/, comes finally in a word, assimilates to /ŋ/ when followed by a word beginning with the voiced velar stop /g/:

- **/n/ → /ŋ/**

Western gate

/westən geɪt/ → /westəŋ geɪt/

Western gate	AGREE(place)	IDENT(place)
a. /westən geɪt/	*!	
b. /westəŋ geɪt /☞		*

*Tableau: 51 (assimilation of nasal/*n*/→/ŋ/)*

- Agree(place)>>Ident IO, when COD/n/ ~ONS/g/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar nasal consonant /n/ comes finally , and followed by a word beginning with the voiced velar stop consonant /g/. The Agree(place) entails that the place feature of onset of one segment

moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is another example of the case when the nasal consonant /n/ assimilates to /ŋ/ because of the influence of the stop velar consonant /g/:

- /n/ → /ŋ/

Persian Gulf

/pɛʒən gʌlf/ → /pɛʒəŋ gʌlf/

Persian Gulf	AGREE(place)	IDENT(place)
a. /pɛʒən gʌlf /	*!	
b. /pɛʒəŋ gʌlf /☞		*

*Tableau: 52 (assimilation of nasal/*n*/→ /ŋ/)*

The instances in tableaux 44-52 show the assimilation of English nasal consonants and they are all represented in OT tableaux. Within an OT analysis of assimilation, the candidate which is considered to be the optimal is the one which can best satisfy the high ranked constraint. The organization and arrangement of the constraints in the tableau starts from the high ranked constraint on the left to the lower ranked ones on the right side. Candidate 'a' commits a fatal violation of the high ranked constraint Agree(x), that is why it loses the competition

with candidate ‘b’, because it can satisfy the high ranked constraint though it incurs a minor violation of the low ranked constraint Ident IO.

3.1.5 Local Assimilation of Lateral Consonant:

In English there is only one lateral consonant which is /l/. The sound has two allophones, clear/light and dark. The first one is chosen when the sound comes initially or followed by a vowel, while the latter is chosen when the sound comes finally or after a consonant.

No case can be found in which the sound would assimilate totally to any other sound in English language. But, there are cases in which the sound can be influenced by neighbouring sounds and it will be pronounced dentally instead of its alveolar place of articulation. For example when the lateral sound /l/ occurs finally and will be followed by a word starting with a dental sound such as /ð/, /l/ will become dental:

- /l/ → /l̪/

Will they?

/wɪl ðeɪ/ → /wɪl̪ ðeɪ/

Will they?	AGREE(place)	IDENT(place)
a. /wɪl ðeɪ/	*!	
b. /wɪl̪ ðeɪ/☞		*

Tableau: 53 (assimilation of lateral/l/→ l̪/)

- Agree(place)>>Ident IO, when COD/l/ ~ONS/ð/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar lateral consonant /l/ comes finally , and followed by a word beginning with the voiced dental fricative consonant /ð/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The optimal candidate here is candidate ‘b’ because it can satisfy the Agree(place) constraint, though it incurs a minor violation of the low ranked constraint Ident IO. Agree(place) is the high ranked constraint in the cases when there is assimilation between two neighbouring sounds. Candidate ‘a’ cannot win the competition since it cannot satisfy the high ranked constraint by committing a fatal violation of this constraint.

There are other cases in which the voiced lateral consonant /l/ will be devoiced /l̥/ when preceded by voiceless consonants. For example:

- /l/ → /l̥/

bright light

/braɪt laɪt/ → /braɪt l̥aɪt/

bright light	AGREE(voice)	IDENT(voice)
a. /braɪt laɪt/	*!	
b. /braɪt l̥aɪt/☞		*

Tableau: 54 (assimilation of lateral/l/→ l̥/)

- Agree(voice)>>Ident IO, when COD/l/ ~\ONS/vls. consonants/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced alveolar lateral consonant /l/ comes initially, and preceded by a word ending with a voiceless consonant. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

3.1.6 Local Assimilation of Approximants:

English language has three approximants which are /r/, /w/ and /j/ (Katamba:1989,7)

/r/ is a voiced alveolar approximant, it can be found initially and medially in British English, and this study deals with British English, while in American English it can be pronounced finally. retreat /rɪtrɪːt/, creature /krɪːtʃə/.

/w/ is a bilabial approximant that can be found only initially and medially : win /wɪn/ , quick /kwɪk/

/j/ is a palatal approximant, it occurs initially and medially: you /jʊː/ tune /tjʊːn/

The voiced alveolar approximant /r/ may be devoiced when preceded by any of the voiceless stops /p/, /t/ or /k/. For example:

- /ɹ/ → /r̥/

up right

/ʌp ɹaɪt/ → /ʌp r̥aɪt/

up right	AGREE(voice)	IDENT(voice)
a. /ʌp ɹaɪt/	*!	
b. /ʌp r̥aɪt /☞		*

Tableau: 55 (assimilation of approximant/ɹ/→/r̥/)

- Agree(voice)>>Ident IO, when COD/r/ ~\ONS/p/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced alveolar approximant /r/ comes initially, and preceded by a word ending with the voiceless stop consonant /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is an example for /r/ preceded by the voiceless alveolar stop/t/:

- /r/ → /r̥/

at risk

/ʌt risk/ → /ʌt r̥isk/

at risk	AGREE(place)	IDENT(place)
a. /ʌt risk /	*!	
b. /ʌt r̥isk /☞		*

Tableau: 56 (assimilation of approximant/r/→/r̥/)

The following is an example for illustrating the case when the voiced approximant /r/ come initially and preceded by a word ending in the voiced velar stop /k/:

- /r/ → /r̥/

take rest

/teɪk rest/ → /teɪk r̥est/

take rest	AGREE(place)	IDENT(place)
a. / teɪk rest /	*!	
b. /teɪk r̥est/☞		*

Tableau: 57 (assimilation of approximant/r/→/r̥/)

Assimilation of different types may occur simultaneously: e.g. the plosives /t, d/ merge with word-initial palatal approximant /j/ in the

process of reciprocal assimilation of place and manner, and the fricatives /s, z/ have similar reciprocal assimilation with /j/. The resulting single articulation is a post-alveolar sound, i.e. about halfway between alveolar and palatal. (Cruttenden, 2001: 286):

/t/ + /j/ → /ʧ/
What you want /wɒtʃuː wɒnt/

/wɑt juː wɒnt/ → /wɑtʃuː wɒnt/

what you want	AGREE(place)	IDENT(place)
a. /wɑt juː wɒnt/	*!	
b. /wɑtʃuː wɒnt/☞		*

*Tableau: 58 (assimilation of /*t+ j */→/*ʧ*/)*

- Agree(place)>>Ident IO, when COD/t/ ~\ONS/j/

The constraint Agree(place) dominates the Ident IO constraint when the approximant consonant /j/ comes initially, and preceded by a word ending with the voiceless alveolar stop consonant /t/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

/s/ + /j/ → /ʃ/
In case you need it

/ɪŋ keɪs juː nɪːd ɪt/ → / ɪŋ keɪʃuː nɪːd ɪt /

in case you need it	AGREE(place)	IDENT(place)
a. /ɪŋ keɪs juː nɪːd ɪt /	*!	
b. /ɪŋ keɪʃuː nɪːd ɪt/☞		*

Tableau: 59 (assimilation of / s+ j */→ʃ/)*

The cases in tableaux 55-59 show assimilation of approximant sounds in English as a result of their interaction with neighbouring sounds. These cases involve competition of two constraints which are Agree(x) and Ident IO. Since all the cases deal with assimilation, the Agree (x) constraint dominates the Ident IO constraint, that is why the candidate which can best satisfy the Agree(x) is the optimal candidate. Candidate 'b' does not violate the high ranked constraint, that is why it is the optimal one, while candidate 'a' incurs a fatal violation of the high ranked constraint, this leads to its failure in satisfying the high ranked constraint.

Chapter Four

Local Assimilation of Consonants in Kurdish in the light of Optimality Theory

4. Introduction:

In this chapter local assimilation of consonants in Kurdish will be treated within the framework of OT. The model used in the previous chapter will be adopted here for explaining the constraints inferred in the process of local assimilation of Kurdish consonants. Then, all Kurdish consonants: stops, fricatives, nasals, laterals and approximants will be tested according to the adopted model respectively for identifying the dominating constraints governing the process of local assimilation in Kurdish.

The consonants of Central Kirmanji dialect, what is known as Sorani, will be studied in this chapter. This dialect is one of the official languages of Kurdistan Regional Government in Iraq. It is the language of media and journalism in the area.

There is a controversy among Kurdish scholars over the number of consonants in Central Kirmanji dialect of Kurdish. To avoid this controversy, the model adapted by Fattah 1997 will be used here. Twenty eight consonants can be identified on the basis of their function

within a syllable that can occur in the positions of onset and coda. (Fattah, 1997:18)

	Labial	Labio-dental	Alveo-dental	alveolar	Alveo-palatal	Velar	Post-alveolar	Uvular	pharyngeal	Glottal
Stops	p b		t d			k g		Q		
Affricate					ç ĵ					
Fricatives		f v	s z		ş ẓ		x ẋ		ĥ ?	H
Nasal	m		n							
Laterals			l	Ĺ						
Approximant	w			r ř	j					

4.1 Local Assimilation of Stops:

Kurdish has seven stop sounds, which are:

/p/ is a voiceless bilabial stop, it can occur initially, medially and finally: pãr /paːr/ ‘last year’, çapĺa /tsʌplʌ/ ‘applause’ , qãp /qæp/ ‘plate’

/b/is a voiced bilabial stop, it can be found in all positions of a word: bãrd /bærd/ ‘stone’, rêbãz /rɛbæz/ ‘method’, tareeb /tʌrɪːb/ ‘parallel’

/t/ is a voiceless dental stop, it can be found initially, medially and finally: trê /trɛ/ ‘grape’, sarkawtin /sʌrkautən/ triumph, hãt /hæt/ ‘came’.

/d/ is a voiced dental stop, it can occur initially, medially and finally: dam /dʌm/ ‘mouth, deedar /dɪːdær/ ‘interview’, merd /mɛrd/ ‘husband’

/k/ is a voiceless velar stop, it can be found in all positions of a word: kotir /kotər/ ‘pigeon’, krêkãr /krɛkær/ ‘worker’, pãk /pæk/ ‘clean’.

/g/ is a voiced velar stop, it can occur initially, medially and finally: grê /grɛ/ ‘knot’, ãgir /ægər/ ‘fire’, jarg /dʒærg/ ‘liver’

/q/ is a voiceless uvular stop that can be found initially, medially and finally: qalaw /qʌlʌu/ ‘fat’, şiqãta /ʃəqætʌ/ ‘match’, fãq /fæq/ ‘snare’.

Fattah (1997:22) points out that there are two kinds of voicing in the stop consonants of Kurdish language. The first type is that the voiced stops are devoiced when followed by voiceless stops. For example the last sound in *bãb* is voiced /b/, but when we add the suffix *tãn* to it , it becomes voiceless and turns into /p/:

- /b / → /p/
bãbtãn? ‘your father’

/bab tan/ → / baptan/

Bãbtãn	AGREE(voice)	IDENT(voice)

a. /bæb tæn/	*!	
b. / bæp tæn /☞		*

Tableau: 60 (assimilation of /b/→/p/)

- Agree(voice)>>Ident IO, when COD/b/ ~\ONS/vls consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless stop consonant /t/ comes initially, and preceded by a word ending with the voiced bilabial stop consonant /b/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

- /g / → /k/

Sãgtãn hãya? 'Do you have dog?'

/sʌgtæn haɪə/ → /sʌktæn haɪə/

Sãgtãn hãya?	AGREE(voice)	IDENT(voice)
a. /sʌgtæn haɪə/	*!	
b. /sʌktæn haɪə/☞		*

Tableau: 61 (assimilation of /g/→/k/)

- Agree(voice)>>Ident IO, when COD/d/ ~\ONS/vls consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless stop consonant /t/ comes initially, and preceded by a word ending with the voiced velar stop consonant /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

- /d / → /t/

Sad kas 'one hundred persons'

/sʌd kʌs/ → /sʌt kʌs/

Sad kas	AGREE(voice)	IDENT(voice)
a. / sʌd kʌs /	*!	
b. / sʌt kʌs /☞		*

Tableau: 62 (assimilation of /d/→/t/)

- Agree(voice)>>Ident IO, when COD/k/ ~ONS /vls consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless stop consonant /k/ comes initially, and preceded by a word ending with the voiced dental stop consonant /d/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The other point that Fattah tackles is the case in which voiceless stops are voiced when they are followed by voiced stops. For example:

- /p / → /b/

Kip boon 'being silent'

/kəp buːn/ → / kəb buːn /

Kip boon	AGREE(voice)	IDENT(voice)
a. /kəp buːn/	*!	
b. /kəb buːn/☞		*

Tableau: 63 (assimilation of /p/→/b/)

In this example, the voiceless stop /p/ has been assimilated to /b/ because of the influence of the neighbouring sound which is /b/. The two sounds here share the feature of voice.

- Agree(voice)>>Ident IO, when COD/p/ ~ONS/voiced consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless bilabial stop consonant /p/ comes finally , and followed by a word beginning with the voiced bilabial stop consonant /b/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following example shows how the voiceless dental stop /t/ will be totally assimilated to the voiced dental stop /d/:

- /t / → /d/

Nat bird? 'Have not you taken it?'

/nʌt bərd/ → /nʌd bərd/

Nat bird?	AGREE(voice)	IDENT(voice)
a. / **nʌt bərd** /	*!	
b. / **nʌd bərd** /☞		*

Tableau: 64 (assimilation of /t/→ /d/)

- Agree(voice)>>Ident IO, when COD/t/ ~ONS/voiced stop consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiced bilabial stop consonant /b/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This example illustrates the case in which the voiceless velar stop /k/ assimilates totally to the voiced velar stop /g, when /k/ comes finally and followed by a voiced stop consonant:

- /k / → /g/

Pêk dãdãn? 'collision'

/pɛk dædæn/ → /pɛg dædæn/

Nat bird?	AGREE(voice)	IDENT(voice)
a. /pɛk dædæn/	*!	
b. /pɛg dædæn/☞		*

Tableau: 65 (assimilation of /k/→ /g/)

- Agree(voice)>>Ident IO, when COD/k/ ~ONS/voiced stop consosnant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless velar stop consonant /k/ comes finally , and followed by a word beginning with any voiced stop consonant such as /b/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

There are cases in Kurdish language when the dental stop /t/ will assimilate totally to /p/, when /t/ comes finally and followed by a word starting with the bilabial voiceless stop /p/, as in:

- /t / → /p/

çĭt *paida kird? 'What did you get?*

/çi:t pʌɪdæ kərd/ → /çi:p pʌɪdæ kərd/

çĭt *paida kird?*	AGREE(place)	IDENT(place)
a. / **çi:t pʌɪdæ kərd**/	*!	
b. / **çi:p pʌɪdæ kərd**/☞		*

Tableau: 66 (assimilation of /t/→ /p/)

- Agree(place)>>Ident IO, when COD/t/ ~\ONS/p/

The constraint Agree(place) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiceless bilabial stop consonant /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The case of /t/ assimilation totally to /s/ can also be found in Kurdish languages when the former follows the latter sound. for example:

- /t / → /s/

çãwt sãɨ̇ bê! 'Thank you!'

/çæwt sæɨ̇ bɛ/ → /çæws sæɨ̇ bɛ/

çãwt sãɨ̇ bê!	AGREE(manner)	IDENT(manner)
a. /çæwt sæɨ̇ bɛ/	*!	
b. /çæws sæɨ̇ bɛ/☞		*

Tableau: 67 (assimilation of /t/→/s/)

- Agree(manner)>>Ident IO, when COD/t/ ~ONS/s/

The constraint Agree(manner) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiceless alveolar fricative consonant /s/. The Agree(manner) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The voiceless dental stop /t/ will totally assimilate to /z/, /n/, and /l/ when /t/ occurs in the final position within a word and followed by mentioned sounds. For example:

- /t / → /z/

Bãznakat zeřa? 'Is your bracelet gold?'

/bæznʌkʌt zɛrʌ/ → /bæznʌkʌz zɛrʌ/

Bãznakat zeřa?	AGREE(place)	IDENT(place)
a. /bæznʌkʌt zɛrʌ/	*!	
b. /bæznʌkʌz zɛrʌ/☞		*

Tableau: 68(assimilation of /t/→ /z/)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/z/

The constraint Agree(place) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiced alveolar fricative consonant /z/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In the following example, the consonant sound /t/ totally assimilates to /n/, because the first word ends in /t/ and the following one starts with /n/:

- /t / → /n/

Kasit nãrd ba dwai? 'Did you send anyone after him?'

/kʌsət nærd bʌ dwaɪ/ → /kʌsən nærd bʌ dwaɪ/

Kasit nãrd ba dwai?	AGREE(place)	IDENT(place)
a. / kʌsət nærd bʌ dwaɪ /	*!	
b. / **kʌsən nærd bʌ dwaɪ** /☞		*

Tableau: 69 (assimilation of /t/→ /n/)

- Agree(manner)>>Ident IO, when COD/t/ ~ONS/n/

The constraint Agree(manner) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiced dental nasal consonant /n/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This example illustrates the case when the final /t/ is followed by the lateral /l/, in which /t/ totally assimilates to /l/:

- /t / → /l/

Gwêt lêma? 'Do you hear me?'

/dʒwɛt lɛmʌ/ → /dʒwɛl lɛmʌ/

Gwêt lêma?	AGREE(place)	IDENT(place)
a. /dʒwɛt lɛmʌ/	*!	
b. /**dʒwɛl lɛmʌ**/☞		*

Tableau: 70 (assimilation of /t/→ /l)

- Agree(place)>>Ident IO, when COD/t/ ~ONS/l/

The constraint Agree(place) dominates the Ident IO constraint when the voiceless dental stop consonant /t/ comes finally , and followed by a word beginning with the voiced lateral consonant /l/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The word-final voiced dental stop consonant /d/ in Kurdish language undergoes the process of assimilation as observed by Jubrail (1997:54) as he states that it will totally assimilate to the following word-initial voiceless dental fricative /s/, lateral /l/ and voiced post dental affricate /ĵ/. For example:

- /d/ → /s/

Çand sãĺi? 'How old are you?'

/çʌnd sæli/ → /çʌns sæli/

Çand sãĺi?	AGREE(place)	IDENT(place)
a. / çʌnd sæli /	*!	
b. / çʌns sæli /☞		*

*Tableau: 71 (assimilation of /*d*/→ /*s*)*

- Agree(place)>>Ident IO, when COD/d/ ~ONS/s/

The constraint Agree(place) dominates the Ident IO constraint when the voiced dental stop consonant /d/ comes finally , and followed by a word beginning with the voiceless dental fricative consonant /s/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In the following example, the word-final voiced stop consonant /d/ totally assimilates the to the word-initial lateral /l/, as in:

- /d/ → /l/

Ãzãd lãwa. 'Azad is young.'

/æzæd læwʌ/ → /æzæl læwʌ/

Ãzãd lãwa.	AGREE(place)	IDENT(place)
a. /æzæd læwʌ/	*!	
b. /æzæl læwʌ/☞		*

*Tableau: 72 (assimilation of /*d*/→ /*l*/)*

- Agree(place)>>Ident IO, when COD/d/ ~ONS/l/

The constraint Agree(place) dominates the Ident IO constraint when the voiced dental stop consonant /d/ comes finally , and followed by a word beginning with the voiced lateral consonant /l/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This example illustrates the case in which the word-final /t/ assimilates to /ĵ/, as in:

- /d/ → / ĵ /

Çãnd jwãna. 'How beautiful it is!'

/çænd ĵuanʌ/ → /ʃæj juanʌ/

Çãnd ĵwãna.	AGREE(place)	IDENT(place)
a. /çænd ĵuanʌ/	*!	
b. /**çænĵ ĵuanʌ**/☞		*

*Tableau: 73 (assimilation of /*d*/→/*ĵ*/)*

- Agree(place)>>Ident IO, when COD/d/ ~ONS/ĵ/

The constraint Agree(place) dominates the Ident IO constraint when the voiced dental stop consonant /d/ comes finally , and followed by a word beginning with the voiced affricate consonant /ĵ/. The

Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Muhammad (1999:32-33) states that the word-final /k/ will totally assimilate to word-initial /g/, word initial /q/, and word-initial /x/. for example:

- /k/ → /g/

Lêk gaeştin. 'Understanding one another'

/lek gaɪʃtən/ → /leg gaɪʃtən/

Lêk gaeştin.	AGREE(voice)	IDENT(voice)
a. /lek gaɪʃtən/	*!	
b. /leg gaɪʃtən /☞		*

Tableau: 74 (assimilation of /k/→ /g/)

- Agree(voice)>>Ident IO, when COD/k/ ~ONS/g/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless velar stop consonant /k/ comes finally , and followed by a word beginning with the voiced velar stop consonant /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following example illustrates the case in which the word-final /k/ totally assimilates to the word-initial consonant /q/:

- /k/ → /q/

Yak qãp. 'one plate

/yʌk qæp/ → /yʌq qæp/

Yak qãp.	AGREE(voice)	IDENT(voice)
a. /yʌk qæp/	*!	
b. /yʌq qæp/☞		*

Tableau: 75(assimilation of /k/→/q/)

- Agree(voice)>>Ident IO, when COD/k/ ~ONS/q/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless velar stop consonant /k/ comes finally , and followed by a word beginning with the voiced velar stop consonant /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Here is the case in which the velar word-final voiceless consonant /k/ totally assimilates to word-initial voiceless velar fricative /x/, as in:

- /k/ → /x/

Rêk-xrãw ‘organized’

/rek xrau/ → /rex xrau/

Rêk-xrãw	AGREE(place)	IDENT(place)
a. /rek xrau/	*!	
b. /rex xrau/☞		*

Tableau: 76 (assimilation of /k/→/x/)

- Agree(place)>>Ident IO, when COD/k/ ~ONS/x/

The constraint Agree(place) dominates the Ident IO constraint when the voiceless velar stop consonant /k/ comes finally , and followed by a word beginning with the voiceless velar fricative consonant /x/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The examples from tableau 60 till tableau 76, show the instances of the assimilation related to stop sounds in Kurdish language. There is an interaction between two constraints; Agree(x) and IdnetIO. The former constraint asks for the agreement of sound features such as place, voice and manner between the neighbouring sounds within word boundaries. While the latter constraint demands the intactness of an input form with its output form. Candidate ‘a’ which is a representation of the items preserving their feature without undergoing any change, is in competition with candidate ‘b’ which is a representation of the candidates undergoing changes in sound features. The loser candidate which fails to satisfy the high ranked constraint is candidate ‘a’ since it incurs a fatal violation of the high ranked constraint. In this case, candidate ‘b’ wins the competition by satisfying the high ranked constraint, though it incurs a minor violation of the low ranked constraint. Candidate ‘b’ is the optimal candidate marked by the index symbol ☞.

4.2 Local Assimilation of Fricatives:

There are eleven fricative consonants in Kurdish language; they are:

/f/ is a voiceless labio dental fricative, it can be found in all positions of a word: firoka ‘plane’, bafir ‘snow’, kaf ‘foam’

/v/ is a voiced labio dental fricative, found rarely in CK, it can be found in initial, middle and final position: Vĩn ‘love’, Tãvga ‘waterfall’, mirov ‘human’.

/s/ is a voiceless alveo-dental fricative, it can be found in all positions of a word: sãda ‘simple’, pãsãw ‘pretext’, kirãs ‘shirt’.

/z/ is a voiced Alveo-dental fricative, it can be initially, medially and finally: zírak ‘clever’, bãzin ‘hand ring’, pyãz ‘onion’.

/ʃ/ is a voiceless Alveo-palatal fricative: it can be found in all positions of a word: ʂer ‘lion’, piʂila ‘cat’, řaʂ ‘black’

/ʒ/ is a voiced Alveo-palatal fricative: it can be found in all positions of a word: ʐin ‘woman’, řêʐa ‘rate’, lêʐ ‘slope’.

/x/ is a voiceless post-velar fricative, it can be found initially, medially, and finally: xwê ‘salt’, saxt ‘difficult’, ʂãx ‘mountain’.

/ẋ/ is a voiced post-velar fricative, it can be found initially, medially, and finally: ẋãrdãn ‘running’, daẋĺ ‘grass’, bãẋ ‘garden’.

/ĥ/ is a voiceless pharyngeal fricative, it can be found initially, medially, and finally: ĥaft ‘seven’, maĥãĺ ‘impossible’, gwnãĥ ‘sin’.

/?/ is a voiced pharyngeal fricative, it can be found only in initial and middle positions of some load words: ?aeb ‘shame’, sa?ãt ‘watch’.

/h/ is a voiceless glottal fricative: it can be found only in initial and middle positions of words: hãwrê ‘company’, bahãr ‘spring’

(Fattah,1997:24)

According to Fattah, all voiced fricatives are devoiced in case when they come before voiceless consonants (Ibid).

For instance, the word-final fricative /z/ will totally assimilate to the word-initial fricative /s/, as in:

- /z/ → /s/

mêz siřenawa ‘table-cleaning’

/mɛz səri:nʌwʌ/ → / mɛs səri:nʌwʌ/

mêz sirenawa	AGREE(voice)	IDENT(voice)
a. / mɛz səri:nʌwʌ/	*!	
b. / mɛs səri:nʌwʌ/ ☞		*

Tableau: 77 (assimilation of /z/→/s/)

- Agree(voice)>>Ident IO, when COD/z/ ~\ONS/s/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced fricative /z/ comes finally , and followed by a word beginning with the voiceless fricative consonant /s/. The Agree(voice)

entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In the following example, the word-final voiced fricative /v/, totally assimilates to the word-initial voiceless fricative /f/, as in:

- /v/ → /f/

Mirov-firoş 'human-seller'

/mɛrɔv frɔʃ/ → /mɛrɔf frɔʃ/

Mirov-froş	AGREE(voice)	IDENT(voice)
a. /mɛrɔv frɔʃ/	*!	
b. /mɛrɔf frɔʃ/ ☞		*

Tableau: 78 (assimilation of /v/→ /f/)

- Agree(voice)>>Ident IO, when COD/v/ ~\ONS/f/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced fricative /v/ comes finally , and followed by a word beginning with the voiceless fricative /f/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Here, in this example, the word-final Alveo-palatal fricative /ʒ/ assimilates to word-initial Alveo-palatal fricative /ʃ/, as in:

- /ʒ/ → /ʃ/

sãřêʐ-kirdin ‘wound treatment’

/særɛʒ kərdən/ → /særɛʃ kərdən/

sãřêʐ-kirdin	AGREE(voice)	IDENT(voice)
a. /særɛʒ kərdən/	*!	
b. /særɛʃ kərdən/ ☞		*

Tableau: 79 (assimilation of /ʒ/→ʃ/)

- Agree(voice)>>Ident IO, when COD/ʒ/ ~\ONS/k/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced fricative /ʒ/ comes finally , and followed by a word beginning with the voiceless stop /k/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The word-final voiced post velar fricative /ɤ̇/ totally assimilated to the word initial /x/, as in the following example:

- /ɤ̇/ → /x/

Qarãɤ̇ xãnw ‘beside home’

/qʌraɤ̇ xanuː/ → /qʌrax xanuː/

Qarãẋ daryã	AGREE(voice)	IDENT(voice)
a. /qʌraẋ xanuː/	*!	
b. /qʌrax xanuː/ ☞		*

Tableau: 80 (assimilation of /ẋ/→ /x/)

- Agree(voice)>>Ident IO, when COD/ẋ/ ~\ONS/x/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced post-velar fricative /ẋ/ comes finally , and followed by a word beginning with the voiceless post-velar fricative /x/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

On one hand, all the above mentioned examples from the tableau 77 to 80 show the cases in which the voiced fricatives are totally devoiced as a result of occurring adjacent to voiceless consonants. On the other hand, the voiceless fricatives will be voiced when they are followed by voiced consonants when occurring within a syllable or word boundary.

The above explanation can be applied as follows, the word-final voiceless fricative /f/ will be totally voiced when comes before a word-initial voiced consonant. For example:

- /f/ → /v/

Ĥaft da ‘seventeen’

/ĥʌft dʌ/ → /ĥʌv dʌ/

Ĥĥaft da	AGREE(voice)	IDENT(voice)
a. /ĥʌft **dʌ/**	*!	
b. /ĥʌv dʌ/☞		*

Tableau: 81 (assimilation of /f/→/v/)

- Agree(voice)>>Ident IO, when COD /f/ ~ONS /voiced consonant/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced labio-dental fricative /f/ comes finally , and followed by a word beginning with the voiced dental stop /d/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In this example, another process takes place before the assimilation. The voiceless stop /t/ in “Ĥaft” is elided during the addition of ‘da’. After the completion of the process of /t/ elision, then the process of assimilation takes place between /f/ and /d/. This is a phenomenon which lies beyond the scope of this study, that is why it is not tackled in detail.

In Kurdish, examples of assimilation process in which /s/ changes to /z/ can also be noticed, as in:

- /s/ → /z/

Pirs ga ‘reception’

/pirs gʌ/ → /pirz gʌ/

Pirs ga	AGREE(voice)	IDENT(voice)
a. /pirs gʌ/	*!	
b. /pirz gʌ/☞		*

Tableau: 82 (assimilation of /s/→/z/)

- Agree(voice)>>Ident IO, when COD /s/ ~ONS /z/

The constraint Agree(voice) dominates the Ident IO constraint when the voiced alveo-dental fricative /s/ comes finally , and followed by a word beginning with the voiced uvula stop /g/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The following instance illustrates the case in which the Alveo-palatal fricative /ʃ/ totally changes into /ʒ/, as in:

- /ʃ/ → /ʒ/

Pêŋ-gir ‘prefix’

/pɛʃ gər/ → /pɛʒ gər/

Pêŋ-gir	AGREE(voice)	IDENT(voice)

a. /pɛʃ gər/	*!	
b. /pɛʒ gər/☞		*

Tableau: 83 (assimilation of /ʃ/→/ʒ/)

- Agree(voice)>>Ident IO, when COD /ʃ/ ~\ONS /+voice/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless alveo-palatal fricative /ʃ/ comes finally , and followed by a word beginning with a voiced consonant such as /g/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The post velar voiceless /x/ also totally changes into its counterpart post velar voiced /ɣ̇/, as in the following case:

- /x/ → **/ɣ̇/**

ʂãx - dãr ‘ungulate, hoofed mammal’

/ʃæx dær/ → / ʃæɣ̇ dær/

ʂãx – dãr	AGREE(voice)	IDENT(voice)
a. /ʃæx dær/	*!	
b. /ʃæɣ̇ dær/☞		*

Tableau: 84 (assimilation of /x/→/ɣ̇/)

- Agree(voice)>>Ident IO, when COD /x/ ~\ONS /+voice/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless post velar fricative /x/ comes finally , and followed by a word beginning with a voiced consonant such as /d/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The voiceless pharyngeal fricative /ĥ/ will assimilate to its voiced counterpart/?/, when the former is followed by a voiced consonant. As in:

- /ĥ/ → /?/

gunãĥ - bãr 'sinner'

/gunæĥ bær/ → /gunæ? bær/

Gunãĥ – bãr	AGREE(voice)	IDENT(voice)
a. /gunæĥ bær/	*!	
b. /gunæ? bær/☞		*

Tableau: 85 (assimilation of /ĥ/→/?/)

- Agree(voice)>>Ident IO, when COD /ĥ/ ~\ONS /+voice/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless pharyngeal fricative /ĥ/ comes finally , and

followed by a word beginning with a voiced consonant such as /b/. The Agree(voice) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

There are cases in Kurdish language, in which the assimilation can take place within one word. The voiced Alveo-dental fricative /z/ in the word ‘zistãn’ “winter” will be pronounced as the affricate /dz/ in rapid speech. This can be explained in the following way with OT treatment:

- /z/ → /dž/

zstãn ‘winter’

/zstæn/ → /džstæn/

Zstãn	AGREE(place)	IDENT(place)
a. /zstæn/	*!	
b. /džstæn/☞		*

Tableau: 86 (assimilation of /z/→ /dž/)

- Agree(place)>>Ident IO, when /z/ ~\ /s/ in the word ‘zstãn’.

The constraint Agree(place) dominates the Ident IO constraint when the voiced Alveo-dental fricative /z/ comes initially , and followed by /s/ within a word, more specifically in ‘zstan’ . The Agree(place) entails that the place feature of the onset moves to the

following sound. While Ident IO entails that the input form of a segment must be identical with its output.

The assimilation examples shown from tableau 77 to tableau 86 are all instances of a change in a sound feature of fricatives in Kurdish. Each case is explained within the framework of OT. As it is known that OT deals with the interaction of constraints. In the cases of assimilation, a number of constraints are involved, the two main constraints are Agree(x) and IdnetIO. The former constraint asks for the agreement of sound features such as place, voice and manner between the neighbouring sounds within word boundaries. While the latter constraint demands the intactness of an input form with its output form. Candidate ‘a’ which is a representation of the items preserving their feature without undergoing any change, is in competition with candidate ‘b’ which is a representation of the candidates undergoing changes in sound features. The loser candidate which fails to satisfy the high ranked constraint is candidate ‘a’ since it incurs a fatal violation of the high ranked constraint. In this case, candidate ‘b’ wins the competition by satisfying the high ranked constraint, though it incurs a minor violation of the low ranked constraint. Candidate ‘b’ is the optimal candidate marked by the index symbol ☞. The following section deals with assimilation of nasals.

4.3 Local Assimilation of Affricates:

There are two affricates in Kurdish language which are: /ç/ and /ĵ/:

/ç/ is a voiceless post-dental affricate that can be found in all positions of a word: çãw ‘eye’, biçuk ‘small’, mãç ‘kiss’

/ĵ/ is a voiced post-dental affricate that can be found initially, medially and finally: ĵwãn ‘beautiful’, anĵuman ‘council’, bãĵ ‘tax’

Like the fricatives, the voiceless affricate /ç/ will be voiced when followed by a voiced consonant, as in the following example:

- /ç/ → /ĵ/

Puç-garãy ‘absurdizm’

/puç gʌrajɪ/ → /puĵ gʌrajɪ/

Puçgarãy	AGREE(voice)	IDENT(voice)
a. /puç gʌrajɪ/	*!	
b. /puĵ gʌrajɪ/☞		*

Tableau: 87 (assimilation of /ç/→ ĵ/)

- Agree(voice)>>Ident IO, when COD /ç/ ~ONS /+voice/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless post-dental affricate /ç/ comes finally , and followed by a word beginning with a voiced consonant such as /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The case is reversed when the voiced affricate /ĵ/ is followed by voiceless consonant, in this case the voiced sound becomes voiceless, as shown in the following case:

- /ĵ/ → /ç/

Bãĵ kokirdinawa ‘tax-collecting’

/bæĵ kɔkərdənʌwə/ → /bæç kɔkərdənʌwə/

Bãĵ kokirdinawa	AGREE(voice)	IDENT(voice)
a. /bæĵ kɔkərdənʌwə/	*!	
b. /bæç kɔkərdənʌwə/☞		*

Tableau: 88 (assimilation of /ç/→ /ĵ/)

- Agree(voice)>>Ident IO, when COD /ç/ ~ONS /+voice/

The constraint Agree(voice) dominates the Ident IO constraint when the voiceless post-dental affricate /ç/ comes finally , and followed by a word beginning with a voiced consonant such as /g/. The Agree(voice) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

4.4 Local Assimilation of Nasals:

Kurdish language possesses two nasal consonants which are:

/m/ is a voiced bilabial nasal that can be found in all positions of a word, mãĺ ‘home’, pamo ‘cotton’, mãm ‘uncle’.

/n/ is a voiced Alveo-dental nasal that can be found initially, medially and finally in a word as in: nwê ‘new’, kanãr ‘shore’, nãn ‘bread’.

Jubrail (1997:55) notices that the word-final nasal consonant /n/ totally assimilates to word-initial /l/, /r/ and /m/, as explained in the following examples:

- /n/ → /l/

Zmãn lêdãn ‘betraying’

/zmæn lɛdæn/ → / zmæl lɛdæn/

Zmãn lêdãn	AGREE(manner)	IDENT(manner)
a. /zmæn lɛdæn/	*!	
b. /zmæl lɛdæn/☞		*

Tableau: 89 (assimilation of /n/→ l/)

- Agree(manner)>>Ident IO, when COD /n/ ~ONS /l/

The constraint Agree(manner) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiced lateral consonant /l/. The Agree(manner) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

This is an example for the case when the word-final /n/ is followed by the trill /r/, as in:

- /n/ → /r/

Min řãm ĵiyawãza ‘I have a different opinion’

/mən ræm ĵjɑwɑzʌ/ → /mər ræm ĵjɑwɑzʌ/

Min řãm ĵiyawãza	AGREE(manner)	IDENT(manner)
a. / mən ræm ĵjɑwɑzʌ/	*!	
b. /mər ræm ĵjɑwɑzʌ/☞		*

Tableau: 90 (assimilation of /n/→/r/)

- Agree(manner)>>Ident IO, when COD /n/ ~ONS /r/

The constraint Agree(manner) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiced trill consonant /r/. The Agree(manner) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The case of the assimilation of word-final /n/ to word initial /m/ is exemplified in the following instance:

- /n/ → /m/

Xãwan mãĺ ‘home-owner’

/xæwʌn mæl/ → /xæwʌm mæl/

Xãwan mãĺ	AGREE(place)	IDENT(place)
a. /xæwʌn mæl/	*!	
b. /xæwʌm mæl/☞		*

Tableau: 91 (assimilation of /n/→ /m/)

- Agree(place)>>Ident IO, when COD /n/ ~ONS /m/

The constraint Agree(place) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiced bilabial nasal /m/. The Agree(place) entails that the voice feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

Mohammad noticed that word-final voiced the Alveo-dental nasal /n/ may totally assimilate to the bilabial nasal /m/ in case when followed by the word-final plosive /p/ or /b/. (1982:291).

In this example, the case is explained in which the word-final /n/ assimilates to /m/ when followed by the voiceless bilabial stop /p/ as in the following example:

- /n/ → /m/

Nãn paidakrdin ‘making a living’

/næn pæɪdækərdən/ → /næm pæɪdækərdən/

Nãn paidakrdin	AGREE(place)	IDENT(place)

a. /næn pæɪdækərdən/	*!	
b. /næm pæɪdækərdən/☞		*

Tableau: 92 (assimilation of /n/→/m/)

- Agree(place)>>Ident IO, when COD /n/ ~ONS /p/

The constraint Agree(place) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiceless bilabial plosive /p/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

In this example, the other case is exemplified in which the word-final /n/ assimilates to /m/ when followed by word-initial /b/, as shown in this tableau:

- /n/ → /m/

Bãrãn bãri:n 'raining'

/bæræn bærɪːn/ → /bæræm bærɪːn/

Bãrãn bãren	AGREE(place)	IDENT(place)
a. /bæræn bærɪːn/	*!	
b. / bæræm bærɪːn /☞		*

Tableau: 93 (assimilation of /n/→/m/)

- Agree(place)>>Ident IO, when COD /n/ ~ONS /b/

The constraint Agree(place) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiced bilabial plosive /b/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

4.5 Local Assimilation of Laterals:

There are two lateral sounds in Kurdish:

/l/ is a voiced alveo-dental lateral that can be found initially, medially and finally in a word, loka ‘cotton’, hêlka ‘egg’, pol ‘class’.

/Ĺ/ is a voiced velarized alveolar lateral, it does not occur initially, it only occurs medially and finally in a word, pêĹãw ‘shoes’, guĹ ‘flower’.

Whether the dark or the light one, the word-final /l/ will assimilate to word-initial /n/, as exemplified below:

- /l/ → /n/

Çil nãn ‘forty pieces of bread’

/çəl næn/ → /çən næn/

Çil nãn	AGREE(place)	IDENT(place)
a. / çəl næn/	*!	
b. /çən næn/☞		*

Tableau: 94 (assimilation of /l/→/n/)

- Agree(place)>>Ident IO, when COD /l/ ~ONS /n/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveo-dental lateral /l/ comes finally , and followed by a word beginning with the voiced alveo-dental nasal /n/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

4.5 Local Assimilation of trills:

There are two trills in Kurdish language:

/r/ is a voiced alveolar trill, it only occurs medially and finally, it cannot be found initially in a word: mirov ‘human being’, kãr ‘work’

/ř/ is a voiced alveolar trill, that can be found in all positions in a word: řêgã ‘wat’, fřêdãn ‘throwing away’, kař ‘deaf’.

The cases of assimilation here are concerned with examples in which the trill sound completely become identical to the features of the

coming sound. The word final /r/ changes into word initial lateral /n/ (Jubrail, 1997:54):

- /r/ → /l/

La kãr lãdãn ‘sack’

/lʌ kær lædæn/ → /lʌ kæl lædæn/

Çil nãn	AGREE(place)	IDENT(place)
a. /lʌ kær lædæn/	*!	
b. /lʌ kæl lædæn/☞		*

Tableau: 95 (assimilation of /r/→/l/)

- Agree(place)>>Ident IO, when COD /r/ ~ONS /l/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar trill /r/ comes finally , and followed by a word beginning with the voiced alveo-dental lateral /l/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

The word-final /r/ will also assimilate to word-initial /n/, the following example will illustrate this case:

- /r/ → /n/

Dur nya? ‘Isn’t it far?’

/duːr njiɑ/ → /duːn njiɑ/

Dur nya?	AGREE(place)	IDENT(place)
a. /duːr njiɑ/	*!	
b. /duːn njiɑ/☞		*

Tableau: 96 (assimilation of /r/→/n/)

- Agree(place)>>Ident IO, when COD /r/ ~ONS /n/

The constraint Agree(place) dominates the Ident IO constraint when the voiced alveolar trill /r/ comes finally , and followed by a word beginning with the voiced alveo-dental nasal /n/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

4.6 Local Assimilation of approximants:

Kurdish language possesses two approximants /w/ and /j/:

/w/ is a voiced labiovelar rounded glide, that can be found in all positions in a word: wara ‘come’, bãwař ‘belief’, çãw ‘eye’.

/y/ is a voiced palatal glide, that can be found initially medially and finally (Fattah, 1997:26), yãri ‘game’, çyã ‘mountain’, řoy ‘he went’.

No case is observed in which the approximant sounds undergo the assimilation process.

4.7 A general note about assimilation within OT:

In general, OT treats all the linguistic phenomena on the basis of constraint interaction, not on the basis of rules like other linguistic theories. With the advance of OT came the realization that the differences among the languages can be accounted for in terms of sets of violable constraints. A view that underlies much of the modern research on phonology within the OT framework is that languages' adherence to universal constraints is almost always never absolute, and variations among varieties can be accounted for not by positing new or different rules as was the case under the umbrella of earlier models, but rather by proposing a hierarchical system of both violable and ranked constraints. Language-specific rules, within this model, are "attained through the language-specific ranking of the crucially violable constraints, the substance of which is ideally conceived of as universal" (Roca and Johnson,1999:584-585). Optimal or winner selection depends solely on satisfaction of the top-ranked constraints whose violation results in ruling out the other candidate in question.

All the assimilation cases treated throughout Chapter three and Chapter four are analyzed on the bases of two constraints; Agree(x) and IdentIO. For each case only two candidates are taken, while for each of the cases more than two candidates can be taken, because the Gen produces a large number of candidates, all the candidates will be in competition until the optimal candidate will be chosen. The optimal one

is the one which best satisfies the high-ranked constraint. Let's take the example from tableau 93 which shows the assimilation of the alveo-dental nasal /n/ to the bilabial nasal /m/.

- /n/ → /m/

Bãrãn bãri:n 'raining'

/bæræn bærɪːn/ → /bæræm bærɪːn/

Bãrãn bãren	AGREE(place)	Agree (voice)	IDENT(place)
a. /bæræn bærɪːn/	*!	*	
b. / bæræm bærɪːn /☞			*
c. /bæræl bærɪːn/	*		*!
d. /bæræp bærɪːn/		*	*

Tableau: 93 (assimilation of /n/→/m/)

- Agree(place)>>Ident IO, when COD /n/ ~ONS /b/

The constraint Agree(place) dominates the Ident IO constraint when the voiced post-dental nasal /n/ comes finally , and followed by a word beginning with the voiced bilabial plosive /b/. The Agree(place) entails that the place feature of onset of one segment moves to the coda of the previous word. While Ident IO entails that the input form of a segment must be identical with its output.

If one looks at the tableau deeply, she/he can notice that after taking into account more than two candidates, more than two

constraints will involve in the competition. Still another constraint, Agree (manner), can participate in the competition process. All the candidates fail to satisfy the high ranked constraint except candidate ‘b’. So if we add more candidates, and having more constraints, still the optimal candidate will be only one candidate. That is why throughout the study only two candidates with two constraints have been taken into account for the analysis of assimilation cases. Consequently, taking only two candidates makes the analysis clearer and easier to be understood. Having a large number of candidates will not change the outcome of the competition of the constraints, it will only lead to the complication of the analysis.

Chapter Five

Comparative analysis

5. Introduction

Comparative analysis is a significant element within linguistics. Crystal refers to the fact that the first use of the term 'comparative' was used to denote the key branches of linguistics, in which the principal concern was for elaborating the process of comparing the distinctiveness of different languages, or different historical conditions of a language. The comparative analysis solely focused on the historical aspect of languages, as the scholars during the nineteenth century studied the relationships between such families of languages as Sanskrit, Greek, Latin, their hypothetical antecedents, and the successive processes that resulted in the emergence of the present day language groups. (2008:91)

This type of study became known as ***comparative philosophy*** or ***philology*** or sometimes referred to as ***comparative grammar***. The phrase comparative method refers to the standard comparative philological technique of comparing a set of forms taken from cognate languages in order to determine whether a historical relationship connects them. In the case of the existence of connections like that, then the purpose of using this analysis would be for construing the characteristics of the ancestor languages from which they were assumed to be derived. The shift form diachronic to synchronic analysis happened in early twentieth century. Nowadays, comparative

linguistics deals with the historical and practical analysis of the structural connection among the existing languages, neglecting their history, for the purpose of instituting the general types of languages and the universal characteristics of human language. (ibid)

The following is a presentation of a comparison made between the studied cases of assimilation of consonants in English and Kurdish within the framework of OT.

5.1 Stops

The stops are found in both languages, but their number and place of articulation for some of the sounds differ. The sounds /p/, /b/, /t/, /d/, /k/, /g/ are found in both languages, while there is /q/ in Kurdish that its counterpart is not found in English. The sounds /t/, /d/ are alveolar in English, while in Kurdish they are dental.

For what concerns assimilation within OT, the stops in both languages undergo the assimilation process. There is one general case in Kurdish that voiced stops are devoiced when followed by voiceless stops, whereas such generalization is not found in English, this case is illustrated by this constraint and the examples from tableau 60 to 65 explain this case:

1-- Agree(x)>>Ident IO: +voice Stop → devoiced when ~ vls. Stop.

In English, the word-final alveolar stop /t/ assimilates to word initial /p/ when followed by any of /p,b,m/ as explained from tableau 7 to 12:

2-- Agree(x)>>Ident IO: /-t/ → /p-/ when ~ /p,b,m/

In Kurdish, this case is only found when the stop /t/ is followed by /p/ as exemplified in tableau 66.

The word final /t/ , in English, also assimilates to word initial /k/ when followed by /k,g/, as illustrated from tableau 13 to 16:

3--Agree(x)>>Ident IO: /-t/ → /k-/ when ~ /k,g/

In both languages, the word-final stop /t/ totally assimilates to word initial fricative /s/ when followed by a word starting with /s/, the tableaux 17 and 18 show the case in English, and the tableau 67 show the case in Kurdish:

4--Agree(x)>>Ident IO: /-t/ → /s-/ when ~ /s/

In Kurdish, the word-final /t/ totally assimilates to /z/ when followed by a word starting with /z/ as exemplified in tableau 68:

5--Agree(x)>>Ident IO: /-t/ → /z-/ when ~ /z/

The word-final /t/ in Kurdish also assimilates to word initial /n/ as shown in tableau 69:

6--Agree(x)>>Ident IO: /-t/ → /n-/ when ~ /n/

The example in tableau 70 shows the case in which the word-final /t/ in Kurdish totally assimilates to /l/:

7--Agree(x)>>Ident IO: /-t/ → /l-/ when ~ /l/

The examples in the tableaux 33 and 34 illustrate the case in which the word-final /t/ is changed into /tʃ/ when followed by the approximant /j/:

8--Agree(x)>>Ident IO: /-t/ → /tʃ-/ when ~ /j/

In English, the word-final voiced alveolar stop /d/ totally assimilates to word initial voiced bilabial /b/ when followed by /p,b,m/as shown from tableau 19 to 24 :

9-- Agree(x)>>Ident IO: /-d/ → /b-/ when ~ /p,b,m/

In English, the word-final voiced alveolar stop /d/ also undergoes a total assimilation to word-initial /g/ when followed by /k,g/as the examples from tableau 25 to 28 illustrate the case:

10--Agree(x)>>Ident IO: /-d/ → /g-/ when ~ /k,g/

While in Kurdish, the word-final dental stop /d/ assimilates to word initial /s/ as shown in tableau 71:

11--Agree(x)>>Ident IO: /-d/ → /s-/ when ~ /s/

The word-final /d/ in English also assimilates to word initial /n/ as shown in examples in tableaux 29 and 30:

12--Agree(x)>>Ident IO: /-d/ → /n-/ when ~ /n/

While the cases in Kurdish are different, the word-final /d/ assimilates to the word-initial fricative /s/ when it is followed by a word beginning with /s/ as exemplified in tableau 71:

13--Agree(x)>>Ident IO: /-d/ → /s-/ when ~ /s/

The word final stop /d/ in Kurdish also assimilates to the word initial lateral /l/ as show in tableau 71:

14--Agree(x)>>Ident IO: /-d/ → /l-/ when ~ /l/

In both languages the word-final /d/ changes into /dʒ/, but in English when it is followed by /j/ and in Kurdish when it is followed by

/dʒ/, the English examples are shown in the tableaux 31 and 32 and the Kurdish example is shown in tableau 73:

15--Agree(x)>>Ident IO: /-d/ → / dʒ -/ when ~ /j/ in English, and ~ /dʒ/ in Kurdish.

In English there is no case of the assimilation related to the /k/, whereas the word final stop /k/ in Kurdish assimilates to word initial /g/ when followed by a word starting with /g/ as shown in tableau 74:

16--Agree(x)>>Ident IO: /-k/ → /g-/ when ~ /g/

The word final /k/ also assimilates to word initial fricative /x/ in Kurdish as shown in tableau 75:

17--Agree(x)>>Ident IO: /-k/ → /x-/ when ~ /x/

The case in tableau 76 shows the total assimilation of word final /k/ to word initial /q/ in Kurdish:

18--Agree(x)>>Ident IO: /-k/ → /q-/ when ~ /q/

5.2 Fricatives:

The fricative sounds are found in both languages, but Kurdish possesses four more fricative consonants than English which are /x,ẋ, ĥ, ?/.

Just like the stops, in Kurdish, all the word-final voiced fricatives are devoiced when followed by voiceless consonants, whereas such a case is not found in English, the examples from tableau 77 to 80 explain this case:

19--Agree(x)>>Ident IO: /+voice fricative/ → /vls./ when ~ /vls. consonant/

In English, only word final /v/ is devoiced when followed by a voiceless consonant, the example in tableaux 42 shows the case:

20--Agree(x)>>Ident IO: /v/ → /vls./ when ~ /vls. consonant/

The word-final /s/ in English totally assimilates to /ʃ/ when followed by a word starting with /j/ as shown in tableau 38:

21--Agree(x)>>Ident IO: /s/ → /ʃ/ when ~ /j/

The word-final /s/ in English also assimilates to /ʃ/ when followed by a word starting with /ʃ/ as shown in the example in tableaux 36 and 37:

22--Agree(x)>>Ident IO: /s/ → /ʃ/ when ~ /ʃ/

For what concerns the fricative voiceless consonants in Kurdish, all of them will become voiced when followed by voiced consonants as explained from tableau 81 to 84

23-- Agree(x)>>Ident IO: /vls. fricative/ → /+voice cons./ when ~ /+voice cons./

English does not possess such a kind generalization, but there are cases in which word-final voiceless fricatives are voiced, for example, the word-final voiceless fricative /s/ totally assimilates to the voiced fricative /z/ when followed by a word beginning with /g/ as shown in tableau 40:

24--Agree(x)>>Ident IO: /s/ → /z/ when ~ /g/

The word final fricative /z/ in English assimilates to word initial fricative /s/ as shown in tableau 39:

25--Agree(x)>>Ident IO: /z/ → /s/ when ~ /s/

In English, the word-final /z/ also assimilates to /ʒ/ when it occurs before a word starting with /j/ as exemplified in tableau 41:

26--Agree(x)>>Ident IO: /z/ → /ʒ/ when ~ /j/

Whereas the voiced fricative /z/ in Kurdish assimilates to /dʐ/ when followed by the voiceless fricative /s/ within a word boundary as explained in tableau 86:

27--Agree(x)>>Ident IO: /z/ → /dʐ/ when ~ /s/

The word final /ĥ/ in Kurdish assimilates to /?/ when followed by voiced consonants as shown in tableau 85:

28--Agree(x)>>Ident IO: /ĥ/ → /?/ when ~ /+voice cons./

The word-initial /ð/ in English assimilates to /d/ when preceded by a word beginning with /d/ as shown in tableau 42:

29--Agree(x)>>Ident IO: /ð/ → /d/ when ~\ /d/

5.3 Affricates:

As it was mentioned in chapter three that the English affricates do not undergo any assimilation process, while the affricates in Kurdish undergo this process.

The word-final voiceless affricate /ç/ in Kurdish assimilates to the voiced word initial affricate /ĵ/ when followed by a word starting with a voiced consonant, as shown in tableau 87:

30--Agree(x)>>Ident IO: /ç/ → /ĵ/ when ~ /+voice consonant/

The voiced affricate /ĵ/ in Kurdish assimilates to /ç/ when followed by a word starting with a voiceless consonant as explained in tableau 88:

31--Agree(x)>>Ident IO: /ĵ/ → /ç/ when ~ /vls. consonant/

5.4 Nasals:

The nasal consonants are found in both languages, with the exception that /ŋ/ is not found in all verities of Kurdish.

In both languages the word-final /n/ assimilates to /m/ when followed by a word starting with /m/, the tableaux 47 and 48 show the English examples and tableau 91 explains the case in Kurdish:

32--Agree(x)>>Ident IO: /n/ → /m/ when ~ /m/

In both languages, the word-final /n/ also assimilates to /m/ when followed by a word starting with /p/ or /b/ as the English cases are explained from tableau 44 to 46 and the Kurdish examples are shown in tableaux 92 and 93:

33--Agree(x)>>Ident IO: /n/ → /m/ when ~ /p,b/

In Kurdish, the word final /n/ assimilates to /l/ when followed by a word starting with /l/ as shown in tableau 89, but this case is not found in English:

34--Agree(x)>>Ident IO: /n/ → /l/ when ~ /l/

The example in tableau 90 shows the case in which the word-final /n/ assimilates to word initial /r/:

35--Agree(x)>>Ident IO: /-n/ → /r-/ when ~ /r/

In English, the word final /n/ assimilates to /ŋ/ when followed by a word starting with /k,g/ as shown in tableaux from 49 to 52:

36--Agree(x)>>Ident IO: /n/ → /ŋ/ when ~ /k,g/

5.5 Laterals:

The lateral sounds are found in both languages. In English the sound has two allophones, while in Kurdish they are considered as two different phonemes as they make difference in meaning in a number of words. The assimilation of /l/ in English is limited to two cases; one of them is the dentalization of the sound when it is followed by dental sounds as explained in tableau 53:

37--Agree(x)>>Ident IO: /l/ → /l̪/ when ~ /dental cons./

The second case is related to the devoicing of the sound when it is followed by voiceless consonants as shown in tableau 54:

38--Agree(x)>>Ident IO: /l/ → /l̥/ when ~ /vls. cons./

Whereas in Kurdish, there is only one case of assimilation of word final /l/ to word initial /n/ as shown in tableau 94:

39--Agree(x)>>Ident IO: /l/ → /n/ when ~ /n/

5.6 Approximants:

The approximants are found in both languages. The sound /r/ is a flap in English, while it is a trill in Kurdish.

The word-final /r/ in English is devoiced when before word-initial /p,t,k/ as exemplified throughout tableaux 55-57:

40--Agree(x)>>Ident IO: /**r**/ → /**r̥**/ when ~ /p,t,k/

In Kurdish the word final /r/ assimilates to word-initial /l/ as shown in tableau 95:

41--Agree(x)>>Ident IO: /**r**/ → /**l**/ when ~ /l/

The example in tableau 96 shows the case in which the word-final /r/ assimilates to /n/ in Kurdish:

42--Agree(x)>>Ident IO: /**r**/ → /**n**/ when ~ /n/

In English, the combination of the word-final stop /t/ with the word initial approximant /j/ produces the affricate /tʃ/ as shown in tableau 58:

43--Agree(x)>>Ident IO: /**t**/+/j/ → /tʃ/

The case which has been explained in tableau 59 shows the case in which the combination of the word final fricative /s/ with the word initial approximant /j/ produces the fricative /ʃ/ in English:

44--Agree(x)>>Ident IO: /**s**/+/j/ → /ʃ/

The following constraints can be drawn as results from these analyses:

i. Constraint #1: Agree(x)>>Ident IO: +voice Stop → devoiced when ~ vls. Stop. {In Kurdish}
ii. Constraint #2: Agree(x)>>Ident IO: /-t/ → /p-/ when ~ /p,b,m/. {In English}while in Kurdish this will be applicable in only one case when the stop is followed by /p/.
iii. Constraint#3: Agree(x)>>Ident IO: /-t/ → /k-/ when ~ /k,g/. {In English}
iv. Constraint#4: (x)>>Ident IO: /-t/ → /s-/ when ~ /s/. {Both languages}
v. Constraint #5: Agree(x)>>Ident IO: /-t/ → /z-/ when ~ /z/ {In Kurdish}
vi. Constraint #6: Agree(x)>>Ident IO: /-t/ → /n-/ when ~ /n/. {In Kurdish}
vii. Constraint #7: Agree(x)>>Ident IO: /-t/ → /l-/ when ~ /l/. {In Kurdish}

viii. Constraint #8: Agree(x)>>Ident IO: /-t/ → /tʃ-/ when ~ /j/. {In English}

ix. Constraint #9: (x)>>Ident IO: /-d/ → /b-/ when ~ /p,b,m/. {In English}

x. Constraint #10: Agree(x)>>Ident IO: /-d/ → /g-/ when ~ /k,g/. {In English}

xi. Constraint #11: Agree(x)>>Ident IO: /-d/ → /s-/ when ~ /s/ {In Kurdish}

xii. Constraint #12: Agree(x)>>Ident IO: /-d/ → /n-/ when ~ /n/. {In English}

xiii. Constraint #13: Agree(x)>>Ident IO: /-d/ → /s-/ when ~ /s/. {In Kurdish}

xiv. Constraint #14: Agree(x)>>Ident IO: /-d/ → /l-/ when ~ /l/. {In Kurdish}

xv. Constraint #15: Agree(x)>>Ident IO: /-d/ → / dʒ -/ when ~ /j/ in English, and ~ /dʒ/ in Kurdish.

xvi. Constraint #16: Agree(x)>>Ident IO: /-k/ → /g-/ when ~ /g/. {In Kurdish}

xvii. Constraint #17: Agree(x)>>Ident IO: /-k/ → /x-/ when ~ /x/. {In Kurdish}

xviii. Constraint #18: Agree(x)>>Ident IO: /-k/ → /q-/ when ~ /q/. {In Kurdish}

xix. Constraint #19: Agree(x)>>Ident IO: /+voice fricative/ → /vls./ when ~ /vls. consonant/. {In Kurdish}

xx. Constraint #20: Agree(x)>>Ident IO: /v/ → /vls./ when ~ /vls. consonant/ {In English}

xxi. Constraint #21: Agree(x)>>Ident IO: /s/ → /ʃ/ when ~ /j/. {In English}

xxii. Constraint #22: Agree(x)>>Ident IO: /s/ → /ʃ/ when ~ /ʃ/. {In English}

xxiii. Constraint #23: Agree(x)>>Ident IO: /vls. fricative/ → /+voice cons./ when ~ /+voice cons./ {In Kurdish}

xxiv. Constraint #24: Agree(x)>>Ident IO: /s/ → /z/ when ~ /g/. {In English}

xxv. Constraint #25: Agree(x)>>Ident IO: /z/ → /s/ when ~ /s/. {In English}

xxvi. Constraint #26: Agree(x)>>Ident IO: /z/ → /ʒ/ when ~ /j/. {In English}

xxvii. Constraint #27: Agree(x)>>Ident IO: /z/ → /dz̨/ when ~ /s/. {In Kurdish, within a word}

xxviii. Constraint #28: Agree(x)>>Ident IO: /ĥ/ → /?/ when ~ /+voice cons./. {In Kurdish}

xxix. Constraint #29: Agree(x)>>Ident IO: /ð/ → /d/ when ~\ /d/. {In English}

xxx. Constraint #30: Agree(x)>>Ident IO: /ç/ → /ĵ/ when ~ /+voice consonant/. {In Kurdish}

xxxi. Constraint #31: Agree(x)>>Ident IO: /ĵ/ → /ç/ when ~ /vls. consonant/. {In Kurdish}

xxxii. Constraint #32: Agree(x)>>Ident IO: /n/ → /m/ when ~ /m/. {Both languages}

xxxiii. Constraint #33: Agree(x)>>Ident IO: /n/ → /m/ when ~ /p,b/. {In both languages}

xxxiv. Constraint #34: Agree(x)>>Ident IO: /n/ → /l/ when ~ /l/. {In Kurdish}

xxxv. Constraint #35: Agree(x)>>Ident IO: /-n/ → /r-/ when ~ /r/. {In Kurdish}

xxxvi. Constraint #36: Agree(x)>>Ident IO: /n/ → /ŋ/ when ~ /k,g/. {In English}

xxxvii. Constraint 37: Agree(x)>>Ident IO: /**ɭ**/ → /**ɭ̪**/ when ~ /dental cons./ {In Kurdish}

xxxviii. Constraint 38: Agree(x)>>Ident IO: /**ɭ**/ → /**ɭ̥**/ when ~ /vls. cons./. {In Kurdish}

xxxix. Constraint #39: Agree(x)>>Ident IO: /l/ → /n/ when ~ /n/. {in Kurdish}

xl. Constraint #40: Agree(x)>>Ident IO: /**ɾ**/ → /**ɾ̥**/ when ~ /p,t,k/. {In English}

xli. Constraint #41: Agree(x)>>Ident IO: /**ɾ**/ → /**ɭ**/ when ~ /l/. {In Kurdish}

xlii. Constraint #42: Agree(x)>>Ident IO: /**ɾ**/ → /**ɳ**/ when ~ /n/. {In Kurdish}

xliii. Constraint #43: Agree(x)>>Ident IO: /**t**/+/j/ → /tʃ/. {In English}

Constraint #44: Agree(x)>>Ident IO: /**s**/+/j/ → /ʃ/. {In English}

Chapter Six

Conclusions and Suggestions for further studies

6. Introduction

This chapter is divided into two sections, in the first section all the conclusions found throughout this study are shown, and in the second section suggestions for further studies have been made.

6.1 Conclusions

From the current comparative study about assimilation in the perspective of OT in English and Kurdish, the following conclusions can be drawn:

1- The first hypothesis is validated that in all the assimilation cases the markedness constraint dominates the faithfulness constraint. As this is one of universal features of marked constructions. In all the marked constructions, markedness constraint dominates faithfulness constraint.

2- The second hypothesis is also validated, since the two languages under study have a similar ranking of the faithfulness and markedness constraints in the cases of consonant assimilation. The hierarchy of the two constraints; Agree(x) and Ident IO which have been discussed throughout the study is according to the universal hierarchy of these two constraints. In the non-marked cases the Ident IO constraint dominates the Agree(x)

constraint. While in the marked cases, as assimilation cases in this study, the domination is reversed, the Agree(x) dominates Ident IO constraint.

3- The third hypothesis is validated too, because number of assimilation cases within a word boundary can be observed in Kurdish, while the occurrence of such cases is very rare if not unavailable in English.

6.2 Suggestions for further studies:

This study is one of the first attempts to tackle OT in Kurdish. OT is a rich area for conducting other studies in all the scopes of linguistics. In general, doing further studies on Kurdish phonology will be of a great benefit, in particular studies dealing with the syllable structure in Kurdish. This is due to the fact that there are unanswered questions about the syllable structure in Kurdish, especially in what concerns the nucleus of some words. As it is known that in OT, a consonant can become the nucleus of a syllable, and this can be applied on a number of Kurdish words to check if OT can solve the case or not. Some examples of these controversial words are sik ‘abdomen’, mil ‘neck’, min ‘I’…etc

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