Morphological Constraint Perspectives in Optimality Theory

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Abstract

In the early 1990s, Optimality Theory emerged to show the extent to which constraints rather than rules play a vital role in reordering word sounds. This paper aims to trace and explore whether there are morphological constraints similar to that are found in phonology or not, i.e. this paper is different from that application of phonological perspectives, it studies the impact of constraints not from a phonological viewpoint, but a morphological one. It is hypothesized that there is an existence of universal morphological constraints govern word formation. This paper traces the underlying forms (input) and the surface forms (output) of morphological constraints. In parallel with this, the existence of proved linguistic concepts, principles, and parameters, support the judgment of the universality of linguistic constraints, particularly those that belong to morphology. According to this theory, the principal idea is that output constituents of language reproduce and redirect resolutions of encounters between rival and challenging constraints. That means a

morphological surface candidate is an optimal one in terms of it acquires the minimum violations of a collection of violable constraints taking into account that these morphological constraints are categorized and tiered in a language-specific grading. Ranking among morphological constraints differs among languages and it gives primacies to some constraints at the expense of others. The findings show the validity of the research hypothesis that morphological constraints control and regulate the morphological processes required for filling grammatical slots in spoken or written language.

Keywords: *Optimality Theory, Constraints, Underlying Forms, Surface Forms, Violation, Candidates*

المُلخّص

ظهرت في بداية   التسعينات نظرية المفاضلة لتُبيّن إلى أي مدى تلعب القيّود دوراً حيوياً في إعادة ترتيب أصوات الكلمات. هذا البحث يختلف كونه يدرس تأثير القيود ليس مـــن وجهـــة نظر صوتية، بل من وجهة نظر صرفية وتقتفي الدراسة أثر الصيغ العميقـــة (المـــدخلات) والصيغ الظاهرة (المخرجات) للقيود الصرفية. وضمن نفس السياق، فـــإن وجـــود مفـــاهيم ومبادئ ومعايير لغوية مبرهنة يدعم الحُكم على شمولية (عالمية) القيود اللغويـــة خصوصـــا ضمن السياق الصرفي. ووفقًا لهذه النظرية، فإن الفكرة الرئيسية هي أن مُكوّنات مخرجات اللغة، تُعيد إنتاج وتوجيه مخرجات القيود المتنافسة، ذلك يعني، إن إختيار المرشح الصـــرفي

الأمثل يكون عندما يكتسب الحد الأدنى من الأنتهاكات لمجموعة من القيود مع الأخذ بنظــر الأعتبار أن القيود الصرفية يمكن أن تُصنّف وتُرتّب إلى درجات حسب نوع اللغة. ويختلف ترتيب القيود الصرفية بين اللغات، حيث يعطي أولوية لبعض القيود على حســـاب الـبعض الآخر. الهدف من هذه البحث هو تتبع وإستقصاء فيما لو كان هناك قيود صرفية مماثلة لتلك الموجودة في علم الأصوات. تفترض الدراسة أن هناك قيودًا صرفية شـمولية تـتحكّم فـي تكوين الكلمات. وتوضح النتائج صحة فرضية البحث القائلة بأن القيود الصرفية تتحكّم وتُنظّم العمليات الصرفية المطلوبة لملء الفراغات النحوية في اللغة المنطوقة أو المكتوبة

Introduction

Morphological constraints, part of the affixation process, bring to light that affixed morphemes indicate not the identical stages of decomposability and that the point to which a word is decomposable which can be predicted by common truths about speech processing. Affixation, as explained by Gerlach (2002: 62), is typically bound morphemes that may be inserted to a root to derive different words in a specific order based on morphological rules. Affixation is a morphological process that attaches and increases phonological elements to a word to change its sense, syntactic characteristics, or both

(Stranzy,2005:11). Crystal (2008: 12) defined affixation as a morphological process in which a syntactic or lexical material is attached to a root to shape and create: prefixation, suffixation, and infixation. Also as stated by Robert (1993:11), affix is a bound morpheme that assigns to root, it is a common expression for the categories of the constitution that may be applicable when added to another morpheme (the root or stem), e.g. *uncertain* or *certainty*, etc.

Even though this seems to be an understandable and unambiguous definition, there are to some certain degree two considerable problems. Robins (1971: 196) discussed these two problems arguing that it is not so readily apparent to say whether such a particular morpheme is a free or a bound one; the second problem, it can be said it is not constantly understandable whether such an actual morpheme ought to be treated as an affix or a root. A bound morpheme is one that must emerge less often than another morpheme. It is one that can only present itself if it is taken with more or less far morphemes. When we apply this meaning and description to the affixes *-wards, -free*, *-able*, *-less* and in morphemes

like *backwards, context-free*, *understandable*, *doubtless*, it proves that all four morphemes also come about their identifiable and specific form, and should for that reason be categorized as not free affixes but free morphemes.

One step further, from a historical viewpoint, Aronoff and Fudeman (2011: 82) affirmed that one divergence has emerged out of work related to two distinct fields, morphology and phonology. This distinction takes into account the *primary* and *secondary affixes*, also identified as two levels, these levels can be realized respectively as *level 1* and *level 2 affixes,* or can be categorized as two different classes, *class 1* and *class 2 affixes*. In languages, such as English, this dissimilarity is closely appropriate to the historical perspective of language. So from a historical viewpoint, in English, primary and second affixes are regularly and respectively of Latin-Romance and native Germanic starting or source. The primary–secondary difference is an existing process, without regard to its times past, in all languages (including English), it cannot be clarified away as an etymological element.

1. Types of Constraints

Constraints, as part of fundamental linguistic processes, can be classified into three types: (1) phonological constraints: in this kind, Katamba and Stonham (2006: 77) raised awareness off the view that the segmental phonology can regulate and govern the extension of the affixes. To make Katamba and Stonham's perspective clear, the "-ly", (/-li/), suffix of making an adverb supposed to be excluded once an adjective finalizes in "-ly"; while it is used without restrictions with no "-ly" final adjective, as an illustration, *quiet → quietly* but not *chilly → *chillily*. (2) Syntactic constraints: for this type, lieber (2010: 188) highlighted that the extension of the derivational affixes can be governed and controlled by the stem to which they are linked keeping in mind that derivational affixes be liable to be accompanied by a certain syntactic class. In conformity with that, there are some of those affixes that can be added to adjectives, verbs, or nouns. As a result, this choice is connected with the definite syntactic components, to be clear, the suffix "-*ize*" can be attached to both adjectives and nouns such as *social → socialize*,

human → humanize; "-ful" to nouns such as doubtful; "-ive" to a verb to create an adjective such as create → creative; "-ity" and "-ness" are derivational suffixes which are attached to adjectives to derive different nouns such as active (Adj) - activity (N^1) and activitiness (N^2). (3) Semantic constraints: in the third type of constraints, Nagy and Gentner (1990: 173) emphasize that there are at least three kinds of constraints that adult native speakers might use about word meanings: (a) language-universal constraints compared to impossible concepts; (b) language-general constraints; and (c) language specific-constraints reproducing familiarity of consistencies.

Parallel with that, Hay (2003: 13) pointed out that affixes, represented by many highly decomposed forms, will have higher triggering stages than affixes that are represented by many forms which are gain access to via a straight, non-decomposed direction. Some characteristics that are fundamentals to the affixes themselves when they prefigure the step to which words that cover them will be decomposable. One such feature is the point to which the affix has the arrangement of a

conceivable word, the probable word constraint will make words encompassing the suffix *-th* hardly probable to be decomposed than words covering a more word like suffix like *-less*.

2. Possible Word Constraint

It is possible to say that the independence and construction of words are confirmed through the number of its constraints. Herein, constraints work as lexical restrictions or lexical appearance authorizing the idea to what extent one more affixes can be attached to a specific word. In 1970, Bloomfield stated that a universal principle, there is a great possibility that there will be a combination between roots and affixes bearing in mind the learned type uses more prefixes (p. 252). An example of this, in line with Bloomfield's theory which is concerned with the phonological and morphological representation, the condition in which stress is shifted, there are some affixes constrain on their stem, whereas other affixes do not have such features. Based on Chomsky and Halle's view (1968: 364), this variation was linked strictly with double boundaries, the morpheme or strong boundary '#' and the other kind is

the morpheme or weak boundary '+'. '#' -, i.e. they are separate from the area of cyclic (recurring) phonological representation of rules which are similar to stress representation, while '+' -affixes do not impede the implementation of such realization of phonological rules. To illustrate the difference:

    a. grammar – grammar +al (grammatical) – grammar + al + ity (grammaticality)

    b. grammar – grammar #less – grammar #less#ness

Consistent with this, Siegel (1974: 111) debated that each suffix is connected with one (no more than one) boundary and creates what well along turned out to be identified as a process which is also known as the Affix Ordering Generalization. In this morphological sense, Selkirk (1982: 77) declared that, in Siegel's terms, *class1* affixes or + -affixes are permanently connected already, and *class2 affixes, or it could be said that* #-affixes, are normally after stress assignment. This overview indicates that definite amalgamations of affixes are excluded on dependable grounds. Words that are formed from other words such as

grammar # ness+ity certainly will make a violation to the Affix Ordering Generalization because it violates grammatical rules.

Along with this, Stump (2001: 2) differentiated between *lexical* and *inferential* approaches. In a lexical approach, affixes are permitted by a lexicon of bound morphemes, while in an inferential approach they are authorized by syncategorematic rules, i.e. rules which generate morphemes that lack meaning or content (lack semantic independence) like *im-* in *impossible*. Based on this, Bonami and Crysmann (2016: 609) proposed that the term "constraint-based lexicalism" stands for a collection of linguistic theories having regard to two central design properties. These two central design properties are firm and rigid lexicalism wherein morphology and syntax are detached and isolated scopes of language, demonstrated by disconnected constituents of a theory of grammar. Simply put, the word is the connection between morphology and syntax: words are fragments of syntactic representation, while morphology labels associations between words and/or associations between words and more abstract lexical units (stems, lexemes, affixes,

roots, morphophonological processes, etc.). An elementary hypothesis of constraint-based lexicalism is that suggestive and powerful lexical explanations arrange for many of the constraints that a particular word sets on its syntactic context. This puts a definite load on the lexical constituent, a rich and clear lexicon needs to be accompanied by authoritative mechanisms to exclude repetitiveness. The second property, Constraint-based construction by which grammar is highly indicated as a convention of constraints on likely linguistic objects as well as throughout the application of all formal grammatical theories, phrases, clauses, and other linguistic forms are constructed from mathematical structures. What aims to constraint-based approaches is the application and conditions of a grammatical constraint that should be identical with a model.

3. Affixes Constraints and Optimality Theory

Optimality Theory grasps that a grammar is a hierarchy of universal well-formedness (markedness) constraints. Regarding this, there is a language-ranking of the constraints against which a collection of

candidate outputs is generated and evaluated. In the morphological process, similar to a phonological one, the candidate production that best-fulfills the ranking, by violating the smallest number and lowest-ranked constraints, is selected as the best and optimal form. Morphologically speaking, it is possible to argue that Optimality Theory (McCarthy & Prince 1994: 336) has the following core principles:

a. Universality: in conformity with Universal Grammar Theory, UG is responsible for a set of constraints that are universal (inviolate,) i.e. here they are morphologically universal.

b. Violability: morphological constraints have the features of violability bearing in mind such a type of violability is minimal.

c. Ranking: all languages are not equal in their ranking process. Founded on the ranking process, dissimilarities in ranking are the foundation of cross-linguistic variation, higher-ranked morphological constraints have the main concern over lower-ranked ones.

d. Inclusiveness: the role of morphological constraint hierarchy is a process of evaluating a collection of candidate analyses that are known by very broad aspects of structural well-formedness. There are no definite rules or repair strategies.

e. Parallelism: the optimal morphological candidate, the candidate that minimally violates the morphological constraint hierarchy, the process of best satisfaction of such a type is related to the hierarch of constraint which can be calculated over the entire constraint hierarchy and the complete set of candidates.

From morphological viewpoint, in Optimality Theory, it is assumed that Universal Grammar minimally provides the following:

a. CON: a set of morphological constraints based on which grammars are constructed.

b . GEN: a function that generates the morphological candidate sets (potential surface forms) for each possible input I, applied for underlying forms.

c. EVAL: the preferred morphological form, the surface morphological

candidate, is selected through the evaluation process (evaluates the well-formedness of the candidate set).

GEN (input) $\rightarrow$ (C_1, C_2, C_3, …. C_n) $\longrightarrow$ C_1 ….C_n is a candidate

EVAL (C_1, C_2, C_3, …. C_n) $\rightarrow$ (output) $\longrightarrow$ C_1 ….C_n is a candidate

This pair, GEN and EVAL, introduce a two-step process: generating a countless set of candidates; and selecting one of the candidates as the most harmonic. More explicitly, a derivation can be realized as in Figure (1):
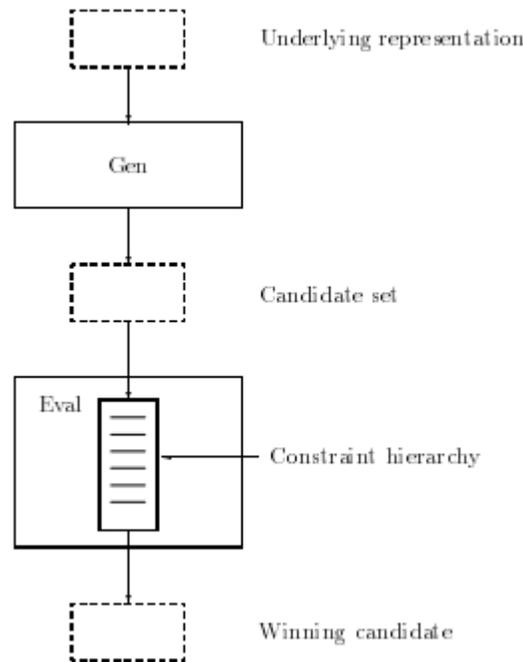
Figure. 1 Constraint Representation (Adapted from Russell, 1995: 4)

Based on Russell's (1995: 133), dealing with constraint representation, whether it is phonological or morphological, as a declarative statement tells us what features a representation of a particular type should or should not have. In this regard it seems that the output constraints play an essential role in morphology; morphological output constraints regularly give the impression to be construction or language-specific.

Associated with that, in the constraint domain, Booij (1997: 28) referred to a certain relationship between phonology and morphology. He stated that morphology undoubtedly works together with phonology. To clarify this point, in prosodic morphology, for example, the content of the morphological processes is regulated and controlled by prosodic characteristics of the root to which they relate. Correspondingly, the selection of a specific affix from a category of opposing ones is often bounded and indicated by the phonological properties of the root to which they belong. Whether a bound morpheme is prefixed or infixed, it

may be governed by what the phonologically most optimal form will be. Even the difference between prefix or suffix prominence of a bound morpheme may have to do with phonology. In this regard, Russell (1995: 1) argued, within linguistics, particularly phonological domains, there have been three general approaches associated with the area of morphemes: i) morphemes are representations and realizations; ii) morphological rules; and iii) morphological constraints. Most important to this study is the third approach (morphemes are governed by constraints). It grasps that the phonological influence on morphological representations is best determined through morphological constraints. Such morphological constraints identify what characteristics a phonological acting would have to be related with definite kinds of syntactic and semantic content.

Formerly, Baybee and Moder (1983: 263) discussed such relational equations that cannot represent definite established analogical adjustments and that we, as a result, need to identify a category of morphological output constraints which might be known as a 'product-

oriented schema'. As a case in point to clarify, in infixes, the class of irregular English verbs that are viewed as having the vowel /ʌ/ in the past tense and participle. They pointed out that the original group of this type all had the vowel /I/ in the present tense (sling, spin, cling, etc.). This suggests that the group is well-defined by a declarative constraint that says 'the vowel of the past tense/participle is /ʌ/'. Here it seems there is a certain emphasis on the process of an alternation. Such a process is defined by Crystal (2008: 21) as a process that refers to the relationship which is present between the alternative forms or variants of a linguistic unit. Phonological alterations /ʌ/ to /I/ that occur in morphological and syntactic (present, past, participle) environment (phonological alterations: each of the different realizations is known as an alternant). More to the point, such a type of morphological constraint seems natural, i.e. output constraints play an arbitrary vital role. The arbitrariness of morphological constraints is not universal for all types of morphemes, alternatively stated, it is not possible to generalize one particular constraint on all types of morphemes simply because there is a

very limited number of morphological constraints (specific phonetic alterations) for a specific group of lexemes, but it is essential to say that such morphological constraints are patterned.

Similar to phonological alternations, there is also some morphophonological alternations, for instance, in English, the presence or absence of vowels or diphthongs [ϕ], [ϕ], [ai] and [u:] alternate with the short vowels [ə], [i æ], [I] and [ə] when followed by two syllables the first of which is unstressed.

[ϕ] emotion   *[ə]* emotional

[ϕ] confidential   *[i æ]* confidentiality

[ai] divine   *[I]* divinity

[u:] molecule   *[ə]* molecular

4. Person and Number Constraints

Trommer (2003: 283), in the mainstream of the languages, examined person markers are common prefixes while number signs are frequently suffixes. He stated that the order is Person >> Number as attached

person/number markers share the situation of the person marker. His illustration of the Georgian language is difficult to be understood. So it is necessary to use English examples instead. The hierarchy of constraints can be seen as follows:

V- **root**	**V – root – t**	**root – s**	**root – en**
rewrite	**rewritten**	**writes**	**written**

Combining simple and big units, merging stem to inflectional morphemes, would verify the representation of affixes whether they are prefixes such as (*v-*) or suffixes such as (*-t, -d,-en*). Interrelatedness as such which represents a common rule and an exception can be regularized by the process of ranking which is commonly realized as violable constraints as in (1), where (1b) can only be a form of application if (1a) cannot be applied:

(1)   a. *v-* is a kind of morphological prefix

        b. Morphological agreement affixes are suffixes

The reason behind ranking (high-ranked) the above constraint (1a) is a result of the conflict situation, and *violable* because (1b) is then violated. In this regard, it is also possible to realize the cause why *v-* is a prefix but not *-s* or *-en*. Without a doubt, one can recognize a common dimension for number and person arrangement through the replacement of the above rules, i.e. rule (1) can be replaced by (2):

(2) a. Rightwards ⟶ Number agreement

     b. Leftwards ⟶ Person agreement

Constraints as such need a slight space between boundaries in (2a) between the right limit of number affixes and of the word, in (2b) between the left boundary of person affixes and of the word, are known as "alignment constraints" in the OT-literature and are unconventionally inspired by putting on a large number of other linguistic areas, the constraints shaping affix order are alignment constraints (*alignment* refers to the process in languages for definite linguistic components to agree, i.e. predictable). The constraints in (2) noticeably foresee the arrangement in *v-write-t*, since *v-* indicates only person (1st pserson) and

-t marks only number (plural). Other affixes such as *-en* and *–s* are also categorized as sign person and number, both morphological constraints are applicable. What is more, because (2a) is realized as a high-ranked level than (2b), both are applied toward the right. Here it is clear that the initial position of *v-* appeared to be a distinctive point about a particular morphological affix.

Along with, Harley and Ritter (2002: 504), according to viewpoint related to persons, argued that constraints on the expression of gender should be taken into account. They adopt that gender is contained within the feature composition of a pronoun when the figure takes account of a triggered category node. They assume that the morphological category is a subject of individuation (the process by which an individual becomes different). However, they have not debated the inside structure of this most important forming node. The reason for this is that gender (or class) features show a discrepancy more broadly in the world's languages than either person or number. To clarify, Table. **1**, illustrates

the following: in English, gender morphological constraints do not play

a vital role, while in Arabic is the opposite:

Table. 1 Morphological Verb Alignment Constraints in English and Arabic

Gender Type	English Verb Morphology		Arabic Verb Morphology		Gender Effect
Male	He writes	(**root – s**)	Yaktob	(**v – root**)	• No Gender effect in English
Female	She writes	(**root – s**)	taktob	(**v – root**)	• Gender Effect in Arabic
Male	They write	(**root**)	Yaktobon	(**v – root – t**)	• No Gender effect in English
Female	They write	(**root**)	Yaktbn	(**v – root – t**)	• Gender Effect in Arabic

Here it is clear that affixes merge in a language principally correspond

with the account of constraints on word-formation rules. Focusing on

affixation, these constraints may spread over just one affix (Ex. *writes*

(*root – s*)) (individual constraint) or be effective for a set of affixes

(*Yaktobon* (*v – root – t*)), to the safe point of a constraint that could

constitute all the affix amalgamations in the language. It is necessary to

be mentioned that the root morpheme /k-t-b/ is "discontinuous" because

vowels can be intermingled between those consonants; however, those

consonants must constantly be existing and be in the same arrangement:

first /k/, then /t/, then /b/.

Related to this issue, Plag (2001: 285), in particular of English suffixes, mentioned the standards and procedures work together to limit the combinatorial characteristics of affixes. Following these notions, it is possible to clarify the difficulty of combinatorial boundaries:

(3)   a. create, create-ive, create-ív-ity

      b. create, creative-less, creative-less-ness

      c. *create-less-ity

Through these different examples, it is possible to notice the probability and impracticality of constraint amalgamation. In (3a) and (3b) morphological suffixes –ic, -ity, -less and -ness opportunely combine, the merging of morphological suffixes –less and -ity is not possible. Plag identified the level-ordering as an approach in Lexical Phonology. TO clarify more, according to Plag's level-ordering assumption, a number of English suffixes and prefixes belong to the following categories or levels:

(4)   Class ₁ suffixes: +ize, +ible, +esque, +ical, +ish, +ive, +less, +en, +ance, +er

Class _I prefixes: anti+, en+, co+, ex+, extra+, fore+, il+, in+, macro+, mis+, semi+

Class _{II} suffixes: #ize, #ible, #+esque, #ical, #ish, #ive, #less, #en, #ance, #er

Class _{II} prefixes: anti#, en#, co#, ex#, extra#, fore#, il#, in#, macro#, mis#, semi#

The suffixes apply to one level share several characteristics that make them distinct from the suffixes of the other layer.

Pertaining to this, Fabb (1988: 530) confirmed that there are a number of other central phonological, morphological, and even semantic, syntactic boundaries, actually, work effectively in English suffixation. Here it can be said that all these boundaries are part of the optimality theory arena. About these boundaries, level arranging does not give or take anything. Through his work, Fabb found that the **43** morphological suffixes he examined were confirmed in no more than **50** amalgamations, even though layer boundaries would permit **459** as a number out of the **1849** conceivable ones. He substitutes stratal

limitations by specific selectional boundaries and put forward four categories of morphological suffixes:

(5) Fabb (1988): "4 classes of morphological suffixes:

   a. Group $_1$: suffixes that do not attach to already suffixed words (28 out of 43)

   b. Group $_2$: suffixes that attach outside one other suffix (6 out of 43)

   c. Group $_3$: suffixes that attach freely (3 out of 43)

   d. Group $_4$: problematic suffixes (6 out of 43)"

In addition to that, Fabb (1988: 534) affirmed that there are suffixes that attach unconnected one other suffix. To clarify this viewpoint, there are several affixes that each give the impression to be approved to assign outside only one definite affix. For example, *-ary* can be added just outside *-ion* such as in *expeditionary*, and adjectival *-y* can be added outside *-ent* as in *interdependency*. If the affixes in this group truly do not come about separate from any affix other than that enumerated, then these affixes show a wide-ranging not preferred for connecting to forms with inside structure. It is an ordinary matter to accept that they can take place outside precise affixes if those affixes are not vastly broken down.

5. Morphological Representation and Optimality Theory

Optimality Theory is a broad framework for demonstrating and shaping human linguistic competence (development of generative phonology). It has been implemented principally to phonology, then it has been applied to a different branch of linguistics such as syntax, and pragmatics. Besides such a theory, it can be applied to morphology with due regard for the idea that morphological inputs have the same possibility of occurrence that it is possible to be found in phonological inputs. The first component of Optimality Theory is "Generator" (GEN), others are Constraint (CON), Evaluator (EVAL), and Candidates (CAN), which deals with all inputs and then generate possible candidates (outputs). GEN can function in morphological inflections look like this:

Input {**create**} ⟶ GEN

[create] ~ [**created**]

[create] ~ [**creating**]

[create] ~ [**creator**]

[create] ~ [**creative**]

[create] ~ [**creation**]
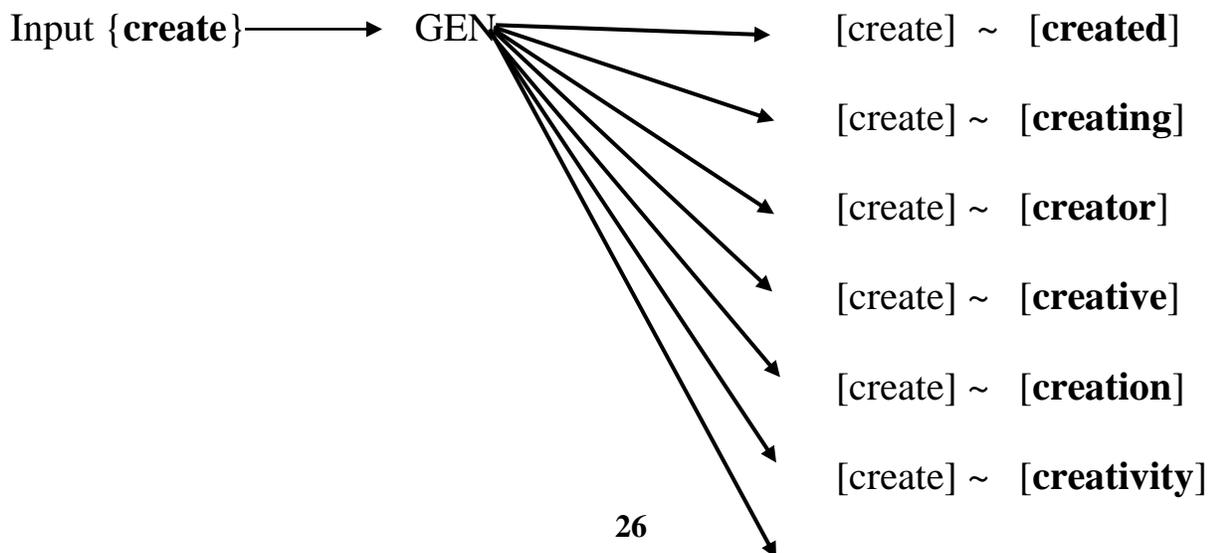
[create] ~ [**creativity**]

[create] ~ [**creates**]

All *seven* candidates are given to EVAL to select the optimal candidate (output) that fulfills the requirement of syntactic constraints (needs). So the syntactic requirement needs an *–ing* morphological inflection as in **He is *creating* a sympathy**. In such a case, in morphology, Optimality Theory can work as: since *creating* is the best and the optimal output (surface) for the input (underlying) composing of the lexical entity *create*, it seems clear that output of *creating* is identified with *six* separate inputs, more precisely: *created*, *creator*, *creative*, *creation*, *creativity*, *creates*. Concerning this, the syntactic position constraints make *creating* blocks the representation of other inflected or derivational forms.

Now, it is possible to trace the operation of GEN (generating optimal suffix), whether it is derivational or inflectional. The operation starts, for example, progressive *'creating'*, order comes from the brain to generate a set of candidates of one lexical item is *'create'*. Second, the role of CON activates whose main role is the governing and controlling of the

selection of optimal outputs from definite inputs. Constraints are violated in the direction of ranking, for that reason, the optimal candidate will fulfill one kind of constraint (faithful or markedness constraint). The faithfulness of constraints confirms that there is a resemblance of representations between the underlying and the surface (input and output). The definite constraint MAX needs that all suffixes be parsed. If the input *'creating'*, the output should be *'creating'* too; but if the output *'create'*, here there will be a violation of the constraint MAX for the reason that the suffix *'ing'* of the underlying representation is not parsed into the surface representation. Also the definite constraint DEP prevents insertion. To clarify, the surface form *'creativity'* would be in violation of DEP since the *-ivity* in the surface representation is not part of the underlying representation. Besides, definite faithfulness constraints impede a word such as *'creating'* from surfacing as *abating* since such a surface form does not bear a resemblance to the underlying form *'creating'* except in certain segments. This category of constraint is

called IDENT constraint where the underlying segments must surface in the matching segments in the output.

The third constituent of Optimality Theory is EVAL. The EVAL controls and regulates the *winner* by referring to the constraint included in CON and their language-specific ranking. The optimal is transmitted to the appropriate interpretive element (Lacy, 2007: 10). GEN provides EVAL with a set of the candidate, the role of EVAL is to evaluate it using some constraint hierarchy, and picks out its best and superior harmonic or optimal candidate. To make this process clear, let us assume that the hierarchy formed from the constraints *C1*, *C2*, and *C3*, and the candidate set is {*cand*$_1$, *cand*$_2$, *cand*$_3$}. If *cand*$_2$ violates most highly ranked C_1 to a lesser degree than both *cand*$_1$ and *cand*$_3$ violate it, then *cand*$_2$ is optimal. If, instead, *cand*$_1$ and *cand*$_2$ in cooperation violate C_1 in the same way, and if they break up C_1 to a lesser degree than *cand*$_3$ does, then *cand*$_3$ is out of the picture and the selection between *cand*$_1$ and *cand*$_2$ is present at C_2.

The fourth component of Optimality Theory is CAN where the well-formedness of a linguistic expression is identified and established, i.e. the best candidate surrounded by a set of challenging expressions (more harmonic). Figure **2** illustrate the process of the optimal morphological candidate:
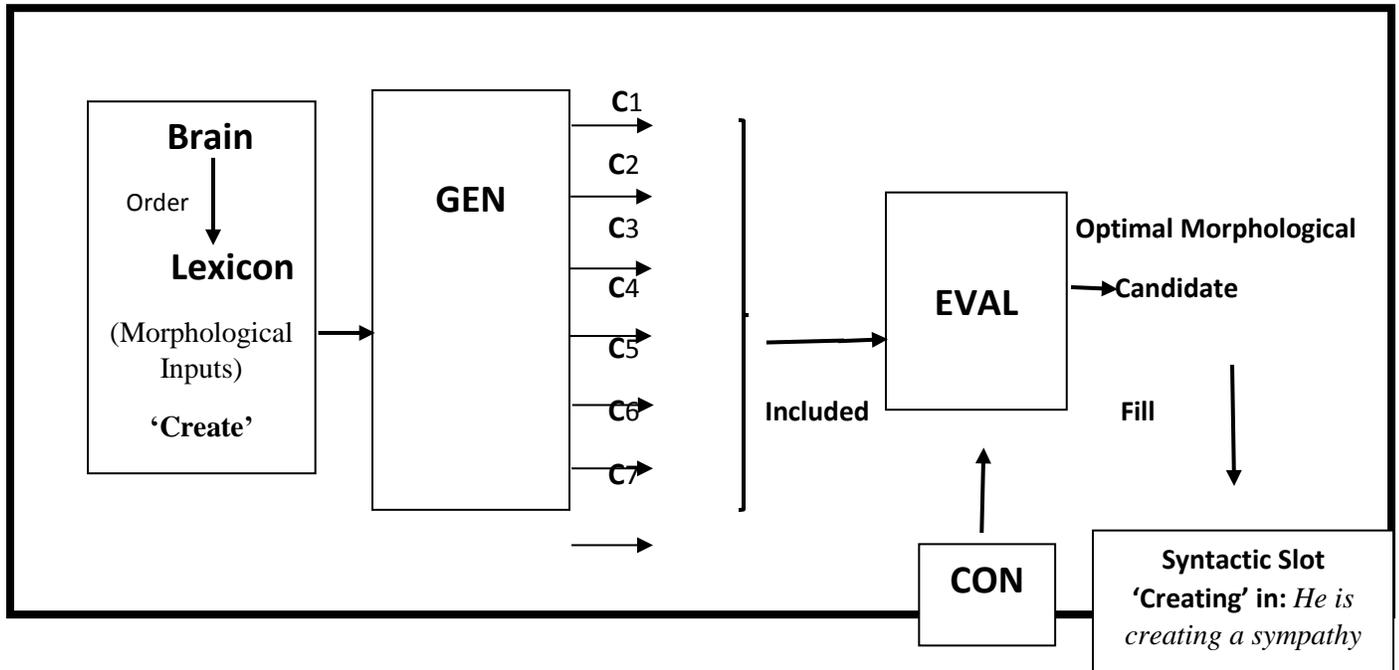
Figure 2. 'Creating' Optimal Morphological Candidate Process

Following Samek-Lodovici's viewpoint (2005: 707 -11), the morphological constraints can be traced to some extent in a way similar to that of Samek-Lodovici's. The converting from an input component to an output one, a *'winner'*, is portrayed through a *'tableau'*, as in Figure **3**. The upper left column holds the underlying components. The remaining of the left cell covers candidate outputs. The optimal is

characterized by the 'pointing hand'. The Vertical line is used to show the range of ranking, i.e. C_1 is higher in ranking than C_2, C_2 is higher in ranking than C_3, C_3 is higher in ranking than C_4, etc. Go further, morphological candidates can be eliminated if they face and bear more violations, where violations are marked by an asterisk (*). As soon as a candidate is not as good as another candidate on the highest-ranking constraint distinguishing them, it acquires a serious violation. Once a candidate gains a serious violation, it cannot be optimal. For example, Cand1 is optimal if it does better than $Cand_2$, $Cand_2$, $Cand_3$, etc. on the highest-ranking constraint which assigns them a different number of violations. Cand4 bears more violations than the others on C_1, so it is removed from the competitors, marked by '!'. C_2 as well excludes $Cand_3$. While $Cand_4$ bears less violations of C_3 than $Cand_1$, it has been excluded, so its violations are inappropriate (marked by shading). C_3 marks no difference between the continuing candidates as they both face the identical number of violations; it is satisfactory for the optimal to

violate a constraint, on condition that no further candidate violates the constraint less.

Tableau 1. Range of Candidate and Violations

/input/	create		C_1 **Operator-Candidate Agreement**	C_2 **Verb Phrase Subject Concord**	C_3 **Appropriate Syntactic Slot**
Creating	**Cand$_1$**	[Creat**or**]	*!		
	Cand$_2$	[Create**s**]	*!		
	Cand$_3$	[Creat**ed**]		*!	
	Cand$_4$	[Creat**ion**]	*!		
	☞ **Cand$_5$**	[Creat**ing**]			
	Cand$_6$	[Creat**ive**]			*!
	Cand$_7$ [Creat**ivity**]		*!		

The first constraint rules out Cand$_1$, Cand$_2$, Cand$_4$, Cand$_7$; the second constraint rules out Cand$_3$, while the third constraint violates Cand$_6$, Cand$_5$ is not violated by C$_1$, C$_2$, **and** C$_3$ because it is the optimal one fulfills the syntactic slot of *He is creating a sympathy.*

Applying all the above constraints on "Creating', Figure **4** clarifies the complex process of 'Creating' as an optimal candidate:

Tableau 2. 'Creating' as an Optimal Candidate

Input	Create + ing	Contextual INFLECTION	Contextual DERIVITION	IDENT

	Create	*!	*!	*!
	Creates		*!	*!
	Created		*!	*!
Creating	☞ **Creating**		*	
	Creator	*!		*!
	Creative	*!		*!
	Creativity	*!		*!
	Creation	*!		*!

In tableau **2**, contextual inflection or contextual derivation is a kind of inflection or derivation that is dictated by syntactic slot. First, there are contextual inflections in *creates, created, and creating,* while there are inflectional violations in *create, creator, creative, creativity, and creation*. Second, there are contextual derivations in *creator, creative, creativity, and creation*, while there are derivational violations in *creates, created, and creating*. Third, the input *creating* is totally identical (IDENT) to the optimal output *creating* in the syntactic slot '**He is *creating* a sympathy**'; but there is no correspondence (**I**DENT) (fatal violation) between the input *creating* and the output *create*, *creates*, *created*, *creation*, *creator*, *creative*, and *creativity*.

Conclusion

It seems that there is a possibility to apply optimality theory, as a grammatical architecture, on morphology successfully. Its application is based on the idea that this theory includes a set of morphological

constraints (simple and universal constraints) that evaluate the superiority of candidate construction without taking any account of how these candidate constructions are produced. From this point of view, the morphological description, according to this theory, is attached with input constituents. In this paper, it has been proved that morphological inputs are sets of morphemes (in morphology) similar to that sets of sounds (in phonology) or sets of predicate-argument constructions (in syntax). Morphological constraints are accountable and liable to a *GEN* factor that produces the morphological candidate collection in virtue of the input by universal morphological procedures. The set of morphological candidates are released and conveyed to the EVAL factor that is responsible for picking out the optimal morphological candidate in agreement with the sentence grammatical slot. From these perspectives, optimality theory is fundamentally considered as a development of generative morphology similar to generative phonology or generative syntax. Therefore, it sustains the core distinction between

the underlying morphological candidates (competence) and the surface

morphological candidates (performance).

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