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Natural Phonology: Natural Classes and Processes

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Abstract

Natural phonology is a linguistic theory developed by David Stampe and Patricia Donegan that seeks to explain the phonological patterns observed in human languages. The phonological processes are seen as natural and regular reactions to the limitations of the human vocal and auditory system. A natural class refers to a combination of segments which tend to behave similarly because they have features in common.

The problem of this study is that NP heavily depends on theoretical arguments and introspection rather than empirical data. Only limited rules can categorize the natural classes and apply to features. This research aims at identifying the gist of the theory of natural phonology, clarifying its principles and processes.

This study hypothesizes that there are no regular processes and there are phonological variation across languages. The model adopted of this study is Donegan and Stampe 1979.

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This study concludes that NP supposes that the samples of speech are governed by innate and universal set of phonological processes.
Keywords: Natural Phonology, Natural Classes, Processes, Theory, Phonemes.

علم الفونولوجيا الطبيعية: الطبقات الطبيعية والعمليات

م. سعاد عبدالرحمن الطيف

المديرية العامة لتربية صلاح الدين

الـمستخلـص

ان علم الأصوات الطبيعية هو نظرية لغوية طورت من قبل ديفد ستامبي و باتريشا دونكن. تسعى هذه النظرية الى توضيح النماذج الصوتية التي لوحظت في اللغات البشرية. تعتبر العمليات الصوتية كردود افعال طبيعية ومنتظمة لقيود النظام البشري الصوتي والسمعي . يشير معنى الطبقات الصوتية الى مجموعة من اجزاء تعمل بشكل مشابه كونها تمتلك مميزات مشتركة.

تشير مشكلة البحث ان نظرية علم الأصوات الطبيعية تعتمد بشكل كبير على الحجج والأستنباطات النظرية بدلا من البيانات التجريبية . هناك مبادئ محددة قادرة على تصنيف الطبقات الطبيعية وتطبيقها على المميزات المحددة. يهدف هذا البحث الى تحديد جوهر نظرية علم الأصوات الطبيعية وتوضح مبادئها وعملياتها.

تفترض هذه البحث الدراسة ان ليس هناك عمليات منظمة وأن هناك تغير صوتي عبر اللغات . اما نموذج هذه الدراسة فهو كتاب دونكن وستامبي المؤلف في عام 1979 وعنوانه دراسة علم الأصوات الطبيعية.

ومن نتائج هذه الدراسة ان علم الأصوات الطبيعية يفترض ان النماذج الصوتية تُدار من قبل مجموعة من العمليات الصوتية الفطرية العالمية .

الكلمات المفتاحية: علم الأصوات الطبيعية، الطبقات الطبيعية، عمليات، نظرية، فونيم (صوت).

Introduction

This study investigates the theory of natural phonology (henceforth NP), natural classes and processes. The theory of natural phonology is about a phonological structure, acquisition and change. It is initiated by David Stampe (1969, 1972) and developed by Patricia Donegan (Miller 1972-1973-1979). It works with phonological processes. These processes form natural responses of the human vocal and cognitive responses of the complex matters encountered in the production and perception of speech.

NP is more closely related to European structuralism. It proposes that children's speech is administered by a large number of natural phonetic constrains.

1-1 The Statement of the Problem

NP lacks of empirical data. There is limited empirical evidence supporting this claim. It heavily depends on introspective data and lacks extensive experimental research to validate its proposed processes and constraints .NP places important emphasis on child language acquisition as the primary source of phonological patterns . While child language data is crucial . The theory may overlooks other factors, such as historical sound change or social and cultural influences, that can shape phonological systems.

1-2Aims of the Study

This study aims at clarifying the gist of this theory and its principles. To investigate the innate and universal processes, understand how these phonological processes operate and explore child language acquisition. Identifying the nature of natural classes and the way of classifying the features into natural classes.

1-3 Hypotheses of the Study

The current study hypothesizes that there are no regular processes and there are phonological variations across the languages. The languages may avoid sequences of similar elements. The natural processes may be acquired easily by children .

1-4 The Model of the Study

The model of this study is Donegan and Stampe (1979). Their book is titled (The Study of Natural Phonology).

2-Natural Phonology

The modern evaluation of the oldest exegesis theory of phonology is natural phonology. The principles of natural phonology are cognitive, phonetic, psychological , sociological etc. The phonology of a language is viewed by natural phonology as a regulation of subliminal cerebral process that in actual time intercede between unpronounceable lexical samples of speech and pronounceable surface forms. (Donegan and Stampe,1979:126)

The theory of natural phonology supposes that the samples of speech are dominated by innate and universal combination of phonological features and processes. These processes are operated as children use and regulate their phonological system. All children start with inborn samples of speech, but these samples must progress to the language – private system that identify their native language. A child inborn phonological system is constantly revised in the direction of adult phonological system. (Stampe,1969:451)

Crystal (2008:366) states that NP stresses the prominence of natural process. These processes administer the phonology of language. They are a set of universal, compulsory ,inviolate rules. According to characteristic of vocal tract, they are said to be natural because they are phonetically credible. The processes of natural phonology are inborn, and portray the chains which should be followed by the child during the period of learning a language. For these constrains, not all things can be produced but the simplest pronunciation samples in the first stages of development. After that these samples should be mended or restrained , because the child's language developed and s/he learned to produce more progressed forms.

Larahachi and Youbi (2015:110) admit that in phonological theory, there is no agreement on the place of naturalness among the phonologists. Those belong to natural phonology school , which was contrived by Stampe (1973).

As a matter of fact , NP is one of the most theories that used in developmental and clinical phonology. The development of NP is during linguists' interest of the way naturalness was treated within the generative scope.

The development of this theory started when Stampe remarks that the generative view of phonological rules as complications that should be obtained is inconsistent with the facts of language acquisition. For instance, In German (or Russia)there is devoicing of word final obstruents, but it doesn't occur in English. According to generative grammar, German children are assumed to learn the devoicing rules. This state shows the contrast of what is truly observed. What was noticed that devoicing was not learned by children, rather, they don't learn the pronunciation of voiced consonants in final position.

The implicit exemplifications of (NP) may not be abstract as those of Optimal Theory . NP and OT demand that phonology should be able of making valid predictions about any attempted enunciation and without restriction to the lexicon under description. Universals in the broad sense are the goals of NP ,generative grammar and OP . How the authentic Stampean text of NP varies is that, the real processes which are used in production and perception speech are universals not merely metagrammatical notifications of what is appropriate or favour. The term economy in the authentic Stampean text of NP is fulfilled by fewer suppressions not by simple rules (Tobin, 2009:171 and 176).

Donegan and Stmape (1979: 168) confirm that the theory operates with phonological processes that form natural responses of the human vocal and perceptual system to the difficulties confronted in the production and comprehension of speech. For example, it is more complicated to produce a voiced stop than voiceless one, as well as a voiced velar stop than an alveolar one, while a bilabial one is the easiest of the three . Phonological processes are phonetically motivated.

3-Processes

According to NP the inherent phonetic forces are arised through processes that make us able to grasp in other's speech the intentions underlying these superficial phonetic adaptability. During the period of childhood, these processes prepare tentative

pronunciations that enable to communicate with others. We progressively restrict these processes which are not also applicable in the nature language.(Donegan and Stampe, 1979:126)

The universality of processes does not mean that they can be applied in all languages, but they are motivated in all speakers. Processes get hold of substitutions in order to adjust the speaker's phonological intentions to his/ her phonetic capacities in addition to enable the listener to decipher the intentions from the flow of speech. They are either context- sensitive; assimilatory substitution(lenitions) or context free; dissimilatory ones (fortitions) (Donegan, 2002:64).

Donegaan and Stampe (1979) present the following types of processes:

-Deletion of unstressed syllable as in the word {potato}[pˈteitou] becomes [ˈteitu].

-The reduction of consonant clusters to singular segments as in fly →[fai].

-The sounds [b] ,[d] voiced stops are made voiceless [p], [t] because the demanding of airflow by voicing is broken away by the actuality of perfect closure of the vocal tract.

-production the consonants with the tongue body ,such as [k], [g] turned into the articulation with the tongue blade ,such as [t],[d] sequentially.

-Occurrence the nasal deletion is only before homorganic consonants, for example, tenth [tɛnɵ] →[tέθ] , [lamp]→ [lᵃmp]→ [lᵃp].

-Changing the sonorant to be nasalized before nasalized segments within stress group, but only optionally across syllable boundaries as in rallying [rᵃˈl.i.ĭŋ].

-Regressive nasalization is not bled [followed] by nasal.

omission as in can't [khænt]→[khæ̃t].

- flapping of intervocalic syllable-final apical stops: that apple →[ðæræpl], batted →[bærid]

batted [bᵃrid] , that apple [ðᵃrᵃpl].

-Before spirants after nasal , a stop is inserted homorganic to the nasal and the same voicing as the spirant: [sɛn(t)s] bans [bæn(d)z].

Donegan and Stampe(2009:8) confirm that processes are inborn and universal. They are universal because the human vocal and cerebral apparatus are universal, not because they are part of the human brain. Processes in the point view of Generative phonology and Natural phonology: according to generative phonology , these processes are learned . In natural phonology, these processes are not learned because they represent automatic response to the nature of our vocal apparatus.

The universality of processes does not mean that they apply in all languages, but they are only motivated in all speakers. (Donegan , 2002:64)

4-Types of Processes in Natural Phonology

The expression process is used by natural phonologists to refer to a natural phonetic restriction. This restriction simplifies the articulation. There are three major processes and each one includes specific functions: a-Prosodic processes: these processes map words ,phrases and sentences onto prosodic primal samples of rhythm and intonation. As far as syllabicity, stress ,length, tone and phrasing are not given in the linguistic matter , they are identified by the prosodic mapping that can be characterized as a process in authentic –time speech processing of which setting sentences to verse or music are private states.

b-Ftortition processes: (also called centrifugal, strengthening, paradigmatic). These processes enforce the remarkable features of individual segments and /or contradict with neighbouring segments. Dissimilation ,diphthongization , syllabifications and epenthesis are fortition processes.

c -Lenition processes also called centripetal , weakening ,syntagmatic. They have a specific articulatory purpose which ease the pronunciation of segments or series of segments by lessening the articulation space between the segments or its neighbouring segments. Examples of lenition processes are(assimilation, monophthongizations , desyllabifications, reductions and deletions.

Lenition processes tend to be context sensitive and /or prosody – sensitive which can be applied weakly. The distinction of fortition/ lenition is a traditional one in diachronic phonetics. Because of its teleological feature it has no systematic role in modern phonology. But it is essential in an endeavor of explanation ,because every phonological process has a confronting process with specific opposite effect, for example,

-Before spirants, after nasals ,a stop is inserted homorganic to the nasal and of the same voicing as the spirant.

-Deletion the stops after homorganic nasals before spirants etc. as in cent [sɛn(t)s] bans [bᵃ̈n(d)z]. In these examples, there are insertion and deletion.

-Syllabification of pretonic resonants , as in prayed [preid] → [pṛeid]) emphatic (Donegan and Stampe, 1979:143:144) **.**

5-Processes and Rules: processes are "of the speaker" ; Rules are "of the language"

Some processes may govern phonological variations, but not all variations emerge from the employment of processes. If a speaker chooses without creating difficulties in pronunciation, rules can be neglected.

Processes employ across the board with no exemption, while rules apply within grammatically words. Processes are unlearnt. Rules are learnt . In NP, there is a great distinction between rules and processes. The term rule is used to refer to phonetically fully or partly unmotivated variations that are governed by the conventions of a specific language as in the alternation of [S] into /ʃ / in : express [express [iks'prəs] → expression [iks'prəʃn̩] (Bruck et al 1974 and Stampe, 1979) .

Processes are variations that are organized by universal phonetic or functional elements . Rules are idiosyncratic merits of specific language and not constitute part of humankind's general phonological inheritance. For instance, in the word (miss) , the last sound [s] is pronounced/s/ in isolation, but it can be pronounced like /ʃ / when there is the word(you) after it(miss you) (Katamba, 1989:113).

6-Phonemes are not Features

In NP , a phoneme is underlying intention shared by the speaker and the listener.

Nathn and Donegan (2011: 7) point out that in NP, phonemes can be defined as speech sounds-repeating units of realization , exemplification and intention. Phonemes are auditory/ motor images of sound, they are not abstract destinations for sounds. It is important to say how NP works that phonemes are realistic although mental sounds , completely determined phonemes are seldom pronounced as stored , but instead of are amended either to fit their environment (lentition) or in disparity to their environment (fortitions) .

Donegan and Stampe (1979:140) claim that there are constraints on process application : The different application of natural processes from language to language, from child to child, from time to time, or style to style, exposed when compared, the implicational hierarchies along that a natural process may be restricted. In spite of the universality of processes, they do not apply identically in all situations.

7- Naturalness and Markedness

The terms 'markedness' , complexity and naturalness are employed to a large scope in similar context to comprehend the need to recognize between linguistic form or features which appear to stand in contradiction with each other. Markedness expressed 'privative oppositions' as in the case of voiced vs. voiceless, nasalized vs. non-nasalized. Naturalness can be noticed at different levels of linguistic analysis such as : phonetics, phonology, morphology, syntax and semantics .At each level, naturalness is identified by the presence of regularities , samples and qualifications that are generally noticed in human languages (Rousson ,2016:1).

The naturalness of specific segments and phonological systems can be caught through the concept of markedness. Markedness is one portion of distinctive features theory which looks to have more direct clinical applicability found in later theoretical constructions. Naturalness can be seen as two ends of continuum. Naturalness specifies the relative simplicity of a sound production, its high frequency of appearance in languages and earlier acquisition in multiple languages. NP proposes that marked sounds are or structures are more likely to subject phonological changes or simplifications

compared to unmarked sounds or structures. Markedness is a crucial element in shaping phonological patterns and processes.

Natural sounds are those that are considered easier to produce. Markedness refers to sounds that are comparatively more difficult to produce and are found less extremely in languages: For instance, [b] is unmarked (natural) , while [ʧ] is marked.

There are four interpretations characterized for the term 'marked':

1-Addition :something that is specified by the addition of something, e.g. / k^w/ carries lip-rounding. While /k/ does not.

2-Recurrence :the unmarked member of an opposition occurs more extremely than the

3-Neutrality: In some languages, the epenthetic vowel is marked, e.g., [ə] schwa
in French as in: Arc de Trimphe [arkə də triɔf].

4-Productivity or regularity: The unmarked (regular) sample for di-syllabic nouns is to have stress on the first syllable (e.g., climax ['klimɑ̃ks]. (Hytelstam, 1987: 143)

8-The Basic Assumptions of Natural Phonology

Natural phonology makes two basic assumptions:

The first assumption is about the psychological truth and significance of the phoneme.

a- According to American structuralists, a phoneme is considered as a structural component ,a signal in a network of discrepancy. So, phonemes were abstract components which can be characterized only in the concepts of their variance from each other. According to generative phonology , phonemes are abstract units which represent the morphs of the language. The nature of the phonemes expressed with imperfect specific signs. This is precisely the same as the structuralists definition which states that abstract items classified only according to their contradictions. NP contrasts to this view. This theory considers phonemes as mental images of the sounds of language. Phonemes are the sounds that one hears when language is spoken, and the sounds that one aims at when one is speaking . So, they are cognitive patterns and articulatory targets . Phonemes

are authentic entities. They are the sounds we hear and speak with. They are never abstract as set in generative phonology.

b- Processes seem like the rules of generative phonology. Speakers cannot learn or acquire the processes , but they represent subconscious mental substitutions of one sound or class of sounds that are natural responses to the proportional difficulties of sounds.

Processes include articulatory and cognitive demonstration. The occurrence of processes is for two main reasons: some processes represent proceed towards perceptual visibility. These processes are fortitions . The aim of these processes is to confirm that the specific words are uttered differently for their containing sounds which are different in their pronunciation and perception. The second process is lenitions which represents modification towards articulatory simplicity , eases the articulation and making our vocal apparatus to do minimal work .The two processes fortitions and lenitions turn on adverse directions .This presents a clarification for the question of why the change of language is not all unidirectional .According to many linguists that any language change is a kind of simplification. These processes are not learned by speakers in obtaining their language. There is no difference from one language to another. They are universal response to difficulties presented by the natures as human being with specific physical and perceptual limitations. (Nathan,1982,118-120).

Many phonological processes can be proved using the conceptions of strengthening(also called fortition) and weakening called lenition. These two connotations are relative to each other and not separate. (Laharch and Youbi, 2015:101)

9-Natural Phonology and Child Phonological System

A child learns to prohibit some of natural responses in order to reach at a language-specific phonology (Donegan and Stampe, 1979:168).

Wojcik(1988:644) claims that NP represents a new approach not to phonology, but to the whole linguistic system. Stampe(1969) incorporates features of naturalness theories to clarify the development of the child's phonological system. This theory supposes that the

samples of speech are governed by inborn ,universal set of phonological features and processes.

These universal natural processes are operating as children use and regulate their phonological systems. All children start with inborn samples of speech, but these samples must develop to the language-particular system which identifies their native language. The child's inborn phonological system is continuously mended towards the adult phonological system. There are common phonological processes in the development of speech of children across languages.

1-Syllable structure processes: sound changes which influence the structure of the syllable.

-Cluster reduction: (spoon[pun]).

-Reduplication (water[wawa])

-Weak syllable omission (banana[[nænə]).

-Final consonant omission (head [hɛ]).

2-Substitution and facilitation processes(street [stwit],key [ti] thumb [tʌm] or [sʌm], noon [dud]).

3-Assimilation processes (dog [gɑg], yellow [lɛlow]).According to the theory of (NP) , phonological processes are strides in the progressive articulatory adjustment of children's speech to the adult principle norm. It alludes the chronology of phonological processes, particular ages at which the processes can be employing and when it should be repressed.

10- Natural Classes

In Phonology, one of the most important generalizations that only specific sets of sounds combine together in phonological processes . These sets are natural classes. A natural class is a combination of sounds described by a minimal number of identified features. The application of phonological rules is often to natural classes. (Flemming, 2015:2) and (Szczegielniak, 2006: 201)

Flemming (2015:3) notes that one of the most main generalizations in phonology that only specific combinations of sounds gather only jointly in phonological processes . These combinations can be identified in terms of combined phonetic properties. The sets [p, t, k] , [m, n, ɳ,ŋ] and [i,e,ä] are classes of sounds show up jointly in rule after rule in any language. While the existence of [e,x,n] ,[ʔ,r,f,w] or [a,s,b] are seldom (if ever) located in any rules in any language. These certified sets are natural classes. The criterion theoretical consideration of this natural class generalization is constituted within a rule based frame work.

1- $\begin{bmatrix} -\text{cont} \\ -\text{son} \end{bmatrix} \rightarrow$ [+ voice] / [+ nasal] -

In this structure , the natural class generalization is considered for by limitations rules to refer only to natural classes of sounds. On the left of the arrow , there is a combination of sounds that submit to the rule that must be a natural class, and any combination of sounds pointed out in the environment of the rule must be natural classes. According to feature theory, the sets of sounds are specified to form natural classes and this is one of the major roles of feature theory. A conjunction of feature values of a combination of sounds can be characterized as a natural class. In rule (1), there are three signals for natural classes: the assumption of a set of segments to the rule is the set of stops which represents a natural class. Because two feature specifications can be specified , which are [-continuant] and [-sonorant], the environment points out the natural class of nasal sounds which specified by the feature[+nasal] and the feature [+voice] is added by the change of structure. So the segments which submit to the rule are schemed on to a natural class. In this state, the voiced stops ,[+continuant,-sonorant ,+ voice].

A natural class cannot be formed by sounds combine features specifications, the class must include all the sounds that have those feature specifications. In the model (2), the combination [i ,e, o,u] is a natural class in accordance with the based in definition as it can be characterized by the feature[-low]. It is not possible for the vowels [e, u] which carry the feature [-low] to form a natural class. The participation of the vowels [e,u] with the [i,o] with the feature[-low] prohibits the first set from constitution a natural class.

The basic criterion of the natural class generalization is the identification of phonological rule to class[i,e,o,u] not to such classes [e,u] or [i ,u,a]

[+ high] i u

[- high] e o [- low]

a [+ low]

In English, the set of [p, t, k] forms the natural class of voiceless stops [- sonorant, - continuant, - voice], while natural classes cannot be constituted by pairs of stops like [p, t] , [p,k], [t,k] because there are no features which gather these pairs of place of articulation.

[anterior] p t k

+ + -

[coronal] - + -

P t k

[labial] [coronal] [dorsal] .

According to natural class generalization that just specific classes of sounds can submit to the same structural change in the same ambience, or condition a specific structural change. In a language, [i, a, u] (with mid vowels) and [e, x,n) do not form natural classes since they never gather jointly in submission of conditioning processes. The set of vowels [i, e] do form a natural class in the system (2) since there are processes in which these sounds gather jointly. McCarthy (2002:92) explains that not all natural class generalization sets up on standard features systems are proper constituted in this way. There are many cross linguistic generalizations of this type and a theory of natural classes must consider for.

Hays(2009: 74-76) says that there are natural classes which are wider than IPA categories. The most intelligible example of such wider categories are those defined by

the feature [sonorant]. They are as follows: stops, fricatives and affricate are [- sonorant], while the other sounds are[+ sonorant].

The following explanation presents some of the proofs that the feature values[+sonorant] and [- sonorant] define natural classes. In Spanish, Japanese, Swahili and multiple languages, a class of stops, fricatives and affricate which are (- sonorant sounds) can carry a phonemic converse for voicing. The estimation of [voice] in [+ sonorants] is usually[+ voice]. It can be said that in phonology, the class of stops , affricate, fricatives and its complement class should be accounted natural classes, and a feature combination should contain a feature [sonorant] which allows them to be specified like that.

There are natural classes in phonological rules which comprise of some adjoining set of manner types drawn from the hierarchy like[vowels, glides, liquids] or [liquids, nasals]. While the set like [glides, nasals] is non –contiguous which rarely group as natural classes. Natural classes cannot be expressed by noncontiguous groups of manner like (stops, liquids). Such groups do not exist in phonological rules.

Laharch and el Youbi (2015:101-103) state that the series of the segments [m, n, ɲ, ɳ) that get the place of articulation of the next consonant is regular. These segments represent a consistent class of phonetically identical sounds. They form a natural class. Only the natural class composing of nasal consonants is influenced by homorganic nasal assimilation rule. The segments that submit to a phonological process contribute in each pattern of some phonetic property. Therefore , palatalisation of velar consonants takes place in the state of front vowel particularly high ones ,such as [i]. They are produced with the tongue approximating the hard palate. In many languages, the process labialisation takes place in the nearness of labial vowels, such as [u] are produced with rounded lips . Many of natural phonological processes require some kind of assimilation and less widespread dissimilation . These two processes are insufficient in terms of which naturalness can be studied.

Nasalization of vowels takes place when they contiguous to nasal consonants .The contiguity of voice-less consonants with inveterate voiced segments makes them getting

some voicing. Examples of voiced segments are vowels or sonorants (such as nasals), and so on.

In English, the suffixes of (-s,-z,-Iz,-t, -d,-Id) to the consonant figure voice assimilation are either fricative or stops. This is not a coincidence . In multiple languages, a combination of fricatives and stops jointly with affricates constitute a natural class. These sounds partake the phonetic properties of including considerable hindering in the oral tract and of being commonly voiceless. In addition to that, they exhibit similar phonological action.

A-	B-	C-	D
bat	tab	pat	tap
goal	log	coal	lock
vine	safe	fine	safe
zoo	as	sue	ass
gin	edge	chin	etch

In English, the position of obstruents determines their features of voiced and voiceless. At the beginning of a word, obstruents are more heavily than they are at the final of a word. The phenomenon of lengthening the vowel that precedes a voiced consonant is more important than discrimination between 'voiced' and 'voiceless' obstruents at the end of a word. obstruents can be voiceless is natural. There is no voiced obstruent phonemes in some languages, as in many Australian languages. While , many languages include voiced obstruents less than voiceless ones.

Bharati (2012:13 and 18) points out that natural classes and the fact that allophonic variations are constant in the expressions of distinctive features. Because doing phonology requires the use of distinctive features and how a rule is very naturally contrast in using distinctive features. It means that conditioning segments form a natural class and the changes that are created about forming a natural change. Allophonic variation is not the exchange of one allophone for another, but a circumferential exchange of one feature or features.

11-The Application of Processes

The application of processes ways follows from their nature and teleologies. Processes can be described as responses to phonetic difficulties, they can carry this merit if a specific difficult representation subjects a substitution. So, the rest of all representations with the same difficult will subject to the same substitutions process. This explanation clarifies the reason of operating the processes on natural classes of segments. Natural classes cannot be considered as a case of descriptive simplicity, but the truth: the application of nasalization is to novel sonorants and before novel nasals, as in the pronunciation of [y] French(lune)and the vowel before [ⁿ]in Spanish caṅon.

Natural classes cannot be clarified as a matter of cognitive simplicity, but they are a process works on having a natural connection. The application of nasalization is not limited just before non-nasals, or before aspirates, or in alternate syllables. Phonetic teleology of the process is the natural connection.

The application of each natural processes to a natural class of representations (which means each all representations that participate a widespread articulatory cognitive, or prosodic difficulty to popular degree, and each one of these processes makes substitutions by changing a single phonetic feature to treat the difficulty. In each state, since the substituted sound should be cognitively like the authentic target as possible, it follows that changes processes make will be lesser: only one feature can be changed by a process . This indicates that obvious two- feature changes happen in two steps . For example,[U]→[ʌ] is in fact [U]→[i]→[ʌ] or [U] → [ɔ]→[ʌ]. The sequences of simple changes are modified into single substitutions by a procedure called 'rule telescoping' , so that (sequential A→B and B→C are collapsed to A→ C

(Dongegan and Stampe ,1979: 136-137).

Naturally pronounceable in NP means derivable by intermediary of phonological processes. Processes mark themselves in all kinds of phonological behavior of language users: in normal performance, in child language, in second language acquisition, in aphasia, other types of disorders, in casual speech, in emphatic speech, in slips, errors, language games, whispered and silent speech, as well as in the changing phonological behavior resulting in sound change. Processes count all these kinds of behavior and more: They also take into consider the implicational universal by replacing the implying sound by the implied one. The duty of NP is a continual search for processes in the languages of the world (Donegan, 2002:64).

12- Features are Means in Defining Natural Classes

Bharati(2012:4-6) admits that phonologists state the phonemes are formed of smaller units called distinctive features .Phoneme is no longer the smallest peculiar part of sound. The smallest unit of sound is the feature. Feature symbolizes one of the portions of speech production .They are used to describe the sounds, such as[round], [labial],[anterior],[consonantal] . They are used to describe the place and manner of

articulation. The destination of features is represented in binary terms ('+' or '-' value). It indicates that the presence or absence of the feature both the groups form natural classes. An example of binary feature, the feature[+,- consonantal],[+,- voice] and [+,- continuant].The specializations of features specify natural class of segments in languages.

Bharati (Ibid.:8-9) explain that human languages require natural sets or natural classes. For a combination of sounds to form a natural class, they must all share one or more features. In addition to that, there should be no other sounds that include this feature or groups of features. English has a voice-voiceless disparity that the phonemes /p,t,k/, /b,d,g/ can be recognized by the feature [voice] alone. The description of a natural class requires fewer features than the description of any one of its members. So, the random sets of sounds do not form a natural class. For example, [p, d, k].

According to feature theory, natural classes are determined in phonological generalizations. It is impossible to describe unnatural sets exactly because they are never be considered as part of any generalization in any language. Because features are means of defining natural classes. The whole class of voice stops contradicts with the voiceless stop not the single phoneme, such as /p/ and /b/ or /d/ that contradict in English. The feature [voice] is the contradictory not the single segment. [Voice] is a feature of English because it is individual feature that demanded in this voice/ voiceless contrast. The organization of features in a column is called a feature matrix.

Szczegielniak (2006:201) claims that the recognition of one phoneme from another is a distinctive feature or a phonemic feature.

13-Classes of features classification

The features are classified into the following natural classes

13-1 Major class features: in this class the segment types such as

'vowel' and 'obstruent'

13-2 place features (these features symbolize the place of articulation.

13-3 Laryngeal features (this class identifies glottal characteristics of the segments.

13-4 Manner features (this type determines the manner of articulation.

- Major class features

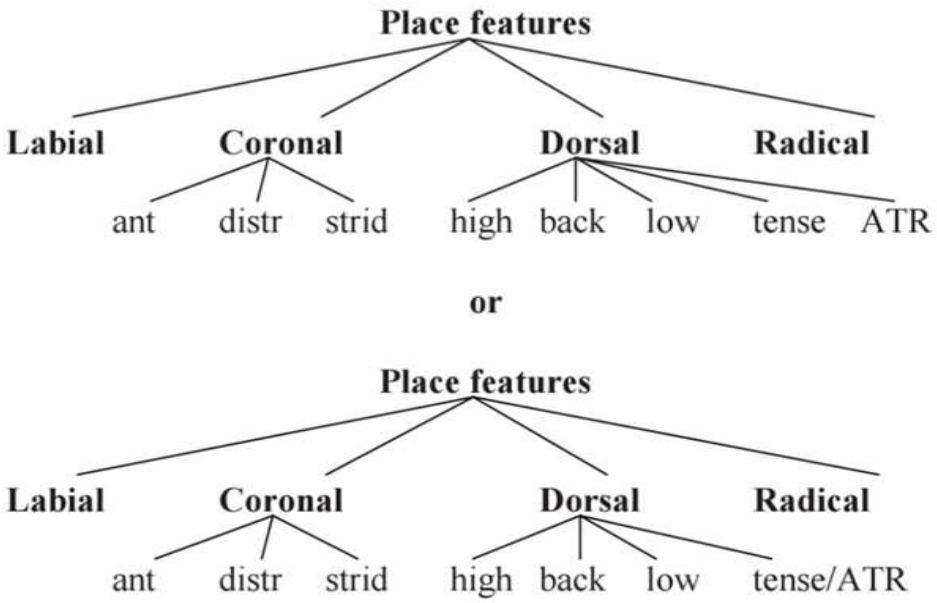
There are only two main class features :consonantal and sonorant. The fundamental class features are related with the manner of vocal tract. The process of closing and opening the vocal tract (vibration and no vibration) cause the production of voiced and voiceless sounds. All major class features are binary in nature.

- consonantal / non consonantal[+,- cons]: The production of consonantal sounds occurs with a hindering in the flow of air stream ,while the production of non consonantal sounds is with no such hindering. The feature of [+cons] is involved for all plosives, affricates, fricatives ,nasals and liquids such as[l] and [r].

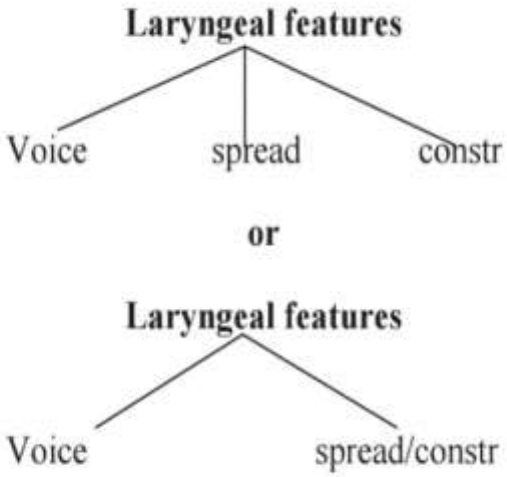
-sonorant /obstruent: the production of sonorant sounds occurs when the vocal tract is in open position . So that the automatic voicing is possible. Vowels, glides like [w,j] liquids and nasals are [+son] sounds. [-son] sounds are also considered as obstruent which are plosives, affricate and fricative. [h,ʔ] are [-son] because the vocal tract does not contain the larynx.

-place feature

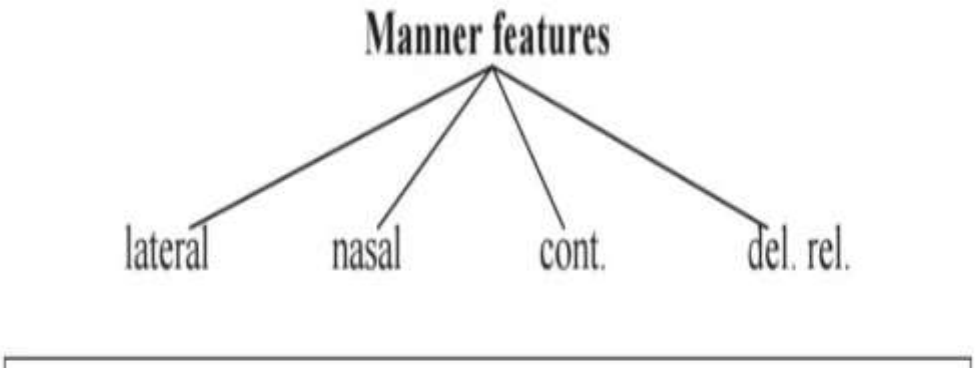
These features symbolize the place of articulation. There are four private features characterizing the main area of articulation. They are [coronal] , [dorsal],[labial] and [radical]. All place features are private in nature. This indicates that a segment may or may not include the feature.



- **Laryngeal features** :These features characterize states of the larynx. (Bharati,2012 and Hays, 2009).



- **Manner features** : These features represent manner of articulation. They are lateral, nasal, continual and delayed release.



Nasal [nasl] :Nasal sounds are nasal consonants and nasalized vowels. The process of lowering the velum and passing the air outward through the nose produce nasal sounds. This feature is also privative.

- Lateral [+,-lat] lateral sounds are produced when the tongue be in a position that forbids the stream of air to flow outward through the centre of the mouth .The purpose of using [+,- lateral] is to recognize [l] and [r] that share all other specifications of feature.(Bharati,2012 and Hays ,2009) .

14-Conclusions

This study concludes the following

1-Phonological processes are innate and universal. Natural phonology suggests that there are specific universal processes that shape the sounds of language. These processes are seen as natural and occur across different languages. Assimilation, nasalization, palatalization, deletion and epenthesis are examples of these processes.

2- According to NP the phonological processes are innate and part of the language acquisition process. Children are thought to have a set of innate phonological processes

that they apply as they learn a language. Over time, children's phonological systems become more adult-like as they acquire the phonological rules of their language .

3-Phonological processes can vary across languages: While NP suggests that there are universal processes, it also acknowledges that there can be variation across languages. Different languages may have different set of phonological processes in different ways. This variation is attributed to language specific constraints and patterns.

4- In this approach, the recognition is drawn between rules and processes. Rules refer to phonetically unmotivated replacements governed by the forms of a specific language. Processes are replacements that are arranged by universal phonetic or functional factors. Unlike processes, rules are features of specific languages.

5-Natural classes contribute to determining the sound inventory of a language. By categorizing sounds into natural classes. Understanding natural classes can shed light on language acquisition processes.

6-Natural classes reveal the existence of phonological processes such as assimilation, dissimilation, or deletion. These processes require the modification or elimination of sounds based on their interactions with neighbouring sounds.

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