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Neutralization in English phonology

A B S T R A C T

In English phonology, neutralization can be considered a process which incorporates a phonemic distinction's elimination in a complete context of phonology. The classic example of neutralization is the neutralization of a word-final voicing contrast. If there is phonetically complete neutralization occurs, then there should be phonetically identical two surface forms. In the present study, the main aim is focusing on phonological neutralization while considering the role of phonetic and phonological representations in the perception and production of human speech. The study finds out that there is neutralization, but not always all word-final voice contrast can be neutralized (despite the devoicing rule's operation). Moreover, the study finds out that all the rules of phonology can be applied in such a way that where neutralization can be seen and allowing underlying distinctions since, neutralized word can to be preserved or recovered.

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التحييد في علم الأصوات الانجليزية

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الخلاصة

في علم الأصوات الإنجليزية ، يمكن اعتبار التعادل عملية تتضمن حذف التمييز الصوتي في سياق كامل من علم الأصوات. يعد تحييد تباين التعبير النهائي للكلمة مثالاً كلاسيكياً. إذا حدث تحييد صوتي كامل ، فيجب أن يكون هناك شكلان متطابقان صوتياً للسطح. الهدف الرئيسي في هذه الدراسة ، هو التركيز على المعادلة الصوتية مع الأخذ في الاعتبار دور التمثيلات الصوتية وكذلك التمثيلات الصوتية

في إدراك وإنتاج الكلام. توصلت الدراسة إلى أن هناك تحييدًا ، ولكن لا يمكن دائمًا تحييد كل تباين الصوت النهائي للكلمة (على الرغم من عملية القاعدة الفاسدة). تنتهي الدراسة مع التأكيد على أنه يمكن تطبيق جميع قواعد علم الأصوات بطريقة يمكن فيها رؤية التحييد مع السماح بالتمييزات الأساسية حيث سيتم تحييدها أو استردادها. علاوة على ذلك ، هو مثل تفاعل القاعدة أو القاعدة يتم تحفيزها لتجنب أو التعويض عن تحييد محتمل.

1. Introduction

phonological context incorporates a phonemic distinction's elimination. Neutralizing word final voicing can be regarded as the classical example of phonemic distinction. However, there is difference of the underlying representation in case of Rad and Rat in the context of final consonant's voicing (Walsh, 1977, p.2).

There are identical surface forms in order to end alveolar stop (voiceless) as per phonological analysis. Many attempts have been made by phonetic researchers in the past 20 years for documenting when and how neutralization is completed phonetically. There should be phonetically identical two surface forms. Moreover, if there is incomplete neutralization and two surface forms, they don't differ but it is important to note that should be different in a predictable way (O'Dell and Port, 1983, p. 14). It is said that there should also be the same quality of acoustic correlation when the time of the distinction is maintained completely.

The focus of a plethora of research on neutralization has been on the concentration of word final devoicing through neutralization, especially in languages like Catalan, German and Polish (Charles-Luce, 1985, p.78; Fourakis and Iverson, 1984, p.22; Jassem and Richter, 1989, p.5; Port and Crawford, 1989, p.34). It has been reported by few studies that there was incomplete neutralization while others reported complete neutralization. There are some factors which are known for influencing neutralization and they are also responsible for all the differences among researches including orthography, even if the underlying distinction is not being represented in spelling along with semantic expectancy (Charles-Luce, 1993, p.2; Port and Crawford, 1989, p.10; Fourakis and Iverson, 1984, p.3)

In phonology, there is a fundamental distinction between non-neutralizing and neutralizing rules; while all phonology theories have appealed to make distinction in grammatical principles, explanation of properties of rules and phonological description.

Neutralization is viewed as a crucial phenomenon in English phonology, there are many problems can be raised among speakers of English language all over the world. As it is clear neutralization can create vagueness or suspicion to the speakers, especially when the words introduced outside the text, that is due to the types of overlapping a word can have. However, phoneticians attempted to find a suitable solution for neutralized word that is by introducing the term archiphoneme, which is considered the only solution to get rid of the problem of neutralization.

It has always been assumed that the rules of neutralization phonetically obliterate and merge between various segments that are contrastive phonologically in other representations and contexts (Fourakis and Iverson, 1984, p.35). It is a surprise to note that there is no or very little empirical evidence available over the rules of neutralization; despite the fact that analysis' instrumental techniques are available. In fact, if there is availability of evidence of the analysis of neutralization. Therefore, the present study aims to explore and see the impact of neutralization in English phonology. Because those phonetic differences correspond to the underlying distinctions are regarded to be non-neutralizing (Chen, 1970, p.135).

2. Neutralization

According to Schane (1973, p.23), "it is a process whereby phonological distinctions are reduced in particular environment. Hence, segments which contrast in one environment have the same representation in the environment of neutralization." Kohler (2007, p.45) shared the same notion and argued that a phonemic distinction is involved by phonological neutralization in a specific phonological context. One of the classical examples of neutralization is the neutralization of a word-final voicing contrast. He further argued that "If neutralization is indeed phonetically complete, the two surface forms should be phonetically identical." There has always been a neutralization distribution as well. If two classes of sounds are in contrastive distribution then they are in

neutralization distribution. But if the situation is completely opposite then one class occurs while the other class doesn't (Röttger, Winter and Grawunder, 2011, p. 1722).

2.1 Consonant of Neutralization

According to Trubetzkoy (1969, p.167) "neutralization is just as characteristic of the phonemic system of the individual languages and dialects as are the differences in the phonemic inventory." It can be referred to the environment in which there is neutralization of contrast between different phonemes. For example, vowels neutralization, but the neutralization of consonant cannot be ignored too. In these three words "drama," "opera," and "sofa," possess low or high unrounded vowel. According to Fourakis and Iverson, "on the basis of data from orthographic vs. free elicitation of relevant words, that the phonetic differences were caused by hypercorrection of isolated words in a reading task, and that there were no grounds for postulating incomplete neutralization in the phonology of English."

2.2 Loss of interdental fricative

In some dialects of British English /θ/ changes to /f/, Ruth → /ruf/ , and /ð/ changes to /v/, brother → /brʌver/. In cockney English /θ/ becomes /f/, where /θ/ is not a phoneme in the dialect, for instance "think" is pronounced as /fink/. For instance, in African American English the initial /ð/ becomes /d/, as in words this → /dis/, that→/dat/, these→/di:s/, those→/dos/ (McCarthy and Prince, 1995, p.124).

2.3 Neutralization and assimilation

A link can be found between neutralization and assimilation. For instance, good morning /gud mo:niŋ/. In rapid speech, it becomes "goob morning" /gub mo:niŋ/. It can be seen that /d/ is changed to /b/, because it is near to /m/ in which they have the same place of articulation which is bilabial (Prince and Smolensky, 1993, p.187). Such type of assimilation is called regressive assimilation, because /m/ affected /d/. since the place of these two segments' articulation are neutralized, there would be no contrast in meaning, i.e. though /d/ is changed to /b/, there is no change in the meaning of the word, good morning is still good morning. In English language, there can be seen

neutralization as a classical example of assimilation. In this language, nasal consonant is followed by a consonant which gets assimilated to this consonant.

2.3.1 Vowel Neutralization

Russian vowels are the best example about vowel neutralization. In Russian, stressed vowels system is five in number. In case these vowels appeared in an unstressed position the role of the vowels will be reduced, and each two vowels appear as one vowel (Steriade, 2000, p.20).

2.3.2 Neutralization of [i] and [e] before nasal consonant

If someone takes an example of African American English dialect (AAE), one can find that there is no distinction between [i] and [e] as they occur before a nasal consonant. The AAE pronounce pin/pen, tin/ten identically so, in these words the vowel sounds between [i] and [e], therefore the two vowels are neutralized before a nasal consonant (Wilson, 2000, p.121).

2.3.4 Diphthong neutralization in AAE

In AAE the diphthong /oi/ becomes a pure vowel /o/, when it occurs before [i], so the only pronunciation for (boil) and (boy) is [bo]. AAE has a rule this kind of neutralization, which says the diphthong /oi/ becomes /o/ in the environment before [i], [oi] → [o] I → [i]. There can be found many internal factors which greatly affect vowel's duration as well several internal factors that we know affect the duration of the vowel (Holt et al. 2016, p.12), including:

- Vowel Tenseness
- Vowel diphthongality
- Vowel Height
- Utterance Position
- Tenseness, utterance position and height
- it doesn't include Vowel diphthongal.

3. Overlapping

In phonology, overlapping is used as a term which refers to possibility that there can be allocation of phone to a single or more than one phoneme. The present study has assumed the phoneme's conceptual view as a conceptual category in which different sounds are assigned to speakers within cognitive phonology's framework, while dealing with phenomena of "neutralization" and

“overlapping” (Wilson, 2000, p.12). Basically, there are two types of overlapping as follows.

3.1 Partial Overlapping

Phonemes in partial overlapping would be overlapped partially, when a given sound is used to represent two different contexts. Many American speakers pronounce the English /t/ and /d/ as an alveolar tap /r/, when /t/ and /d/ occur in the mid position of word they become /r/. For example, bedding and betting are pronounced identically as [berɪŋ]. So /r/ is the shared allophone for both phonemes /t/ and /d/ in the intervocalic position (Fleischhacker, 2000, p.111).

3.2 Complete Overlapping

In complete overlapping, phonemes would be overlapped completely if a given sound is used, sometimes to A and sometimes to B in the same context. Most of the stressed vowels in English become /ə/ when they occur in unstressed positions. For example, “telegraph” /télɪɡraf/, “telegraphy” /təlegrəfi/, first and third vowel reduced to /ə/ (Wilson, 2000, p. 34).

4. Crystal’s another viewpoint concerning overlapping

A specific viewpoint is given by Crystal about overlapping. He argues that there is a link between overlapping and language acquisition studies. According to Crystal overlapping, refers to one type of relationship between the child and adult meaning. Sometimes the child’s meaning of a lexical item is not alike with that for adult. For example, one child used “door” to mean “walk”. According to (Wilson, 2000, p. 35), “Another feature of minimal pairs is overlapping distribution. Sounds that occur in phonetic environments that are identical are said to be in overlapping distribution. The sounds of [m] from pin and bin are in overlapping distribution because they occur in both words.”

5. Problems, biuniqueness and overlapping

Overlapping creates problem, because it lacks biuniqueness, which means “any sequence of phonemes will be represented by a unique sequence of phones” (Crystal, 1985, p.15). That is to say, there is no correspondence between phonemes and phones, for example, in a word like “mat”, the phone [m] represents the phoneme **m** and the phone [æ] represents the phoneme **a**. But a word like [berɪŋ], is regarded a problematic one, because one can’t be able to

decide whether [berɪŋ], either stands for “bedding” or “betting”. There is no correspondence between phone and phoneme, because one phone represents more than one phoneme, as [r] is the allophone for both [t] and [d]. we can come to an end that there is no place of biuniqueness in overlapping.

According to (Lass, 1984; p.27), biuniqueness can’t be achieved unless a given phone in a given phonological environment is always an allophone of particular phoneme. Hearers often face a problem especially with many varieties of English that have option rule, which create the following variants.

Morpheme	Form 1	Form 2
Bat	Bæt	bæ?
Butter	bʌtə	bʌ?ə
Cap	k ^h æp	k ^h æ?
Back	Bæk	Bæ?

What can be seen is that /p,t,k/ are optionally realized as /?/ in the final position of word, /t/ can be realized as /?/ also intervocally. But /?/ can’t be considered as allophone of /p/ and /k/ intervocally, the word “baker” can’t be transcribed as [bæ?ə]. but this analysis is impossible under biuniqueness, if [?] is an allophone of /t/ as in [bat] [ba?], it is also can be realized as allophone of /p/ and /k/, if so how would one can be able to differentiate between /k/ in “back” and /t/ in “bat”, as both /k/ and /t/ can be represented by [?] ? here we face a problem, because it would be difficult to decide whether [?] in [bæ?] stands for /k/ in word “back” or it stands for /t/ in “bat”. So, the biuniqueness treatment is defective precisely the way allomorph listing is. Due to the reason that there can be found no correspondence between phonemes and phones, since [?] can represent more than one phoneme, therefore the biuniqueness faces failure in such cases.

6. Consonant and Neutralizable Oppositions

Trubetzkoy (1969: p. 54) draws a distinction between consonant and neutralizable oppositions. In standard German, there is a contrast between voiceless consonants /p,t,k,f,s/ and voiced consonants /b,d,g,v,z/ in some positions of word, for instance Tier [ti:r] “animal” vs dir [di:r] “to you” , /t/ and /d/ are two different phonemes and they have two different pronunciations in initial environment .on the other hand /t/ and /d/ have the same pronunciation (neutralization) in the final positions of words. For example, the singular form for both Rat “advice” and Rad “wheel” is [ra:t]. The opposition between /t/ and

/d/ is therefore realized phonetically only in certain position, the opposition is said to be neutralized, where only [t] is found phonetically. The contrast between /t/ and /d/ appear once again, since these consonants are, with the plural suffixes **-e** and **-er**, no longer at the end of the word, the plural form of Rat is Rá**t**e [rɛ:tə] “advices” and the plural form of Rad is Rad**e**r [rɛ:dər] “wheels”. We can conclude that /t/ and /d/ are neither contrast nor neutralizable absolutely. They are neutralizable only in final position, while they contrast in other positions. On the other hand, when the two members of an opposition can occur in all positions, there is no neutralization. Instead, the opposition is said to be contrast.

7. Neutralization types and archiphoneme “representatives”

There are five basic types definable by implementation of the archiphoneme.

The commonest type is the one where one member for the neutralized opposition appear to the complete exclusion of the other: (Lass, 1984, p.21)

In German, Dutch, Afrikaans, Polish and Russian, the contrast between voiced stops and voiceless fricative will be lost in final environment /p,t,k/ are used as the allophone for /p,b,t,d,k,g/ , i.e. [p] is used as the allophone for /p/ and /b/ , and [t] is the allophone of /t/ and /d/, and [k] is used as the allophone of /k/ and /g/. so any form ending in phonetic [p t k] in this type of language will be represented with a final archiphoneme: German [t^ho:t] “death”, Dutch [do:t] would be /to:**T**/, /do:**T**/. the diagram for this type is as follow:

Phoneme



Archiphoneme

A

In Neutralization

a

In French language /e/ and /ɛ/ are two different phonemes, when they occur in the final position of words, for example:

Les /l**e**/

aller /al**e**/

lait /l**ɛ**/

allait /al**ɛ**/

but /e/ and /ɛ/ are no longer contrast as they occur in the initial and medial positions of words, so, an archiphoneme /E/ is used for both /e/ : /ɛ/ , as in words:

laide /L**E**d/

été/**E**te/

maître/m**E**tr/

étais /**E**tɛ/

this type can be schematized this way:

Phoneme

Archiphoneme

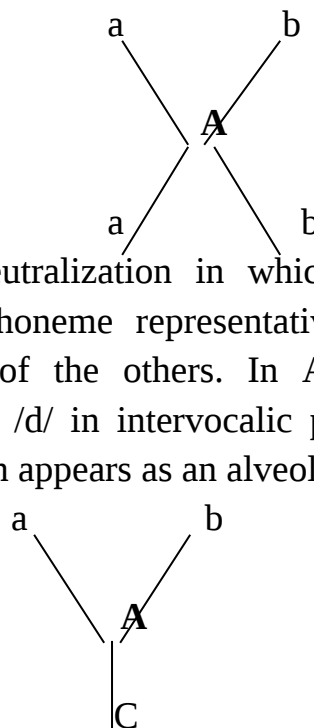
In Neutralization

There is another type of neutralization in which neither member of the opposition appears as archiphoneme representative, but the third segment appears as sharing features of the others. In American English there is neutralization between /t/ and /d/ in intervocalic position, for instance /t/ in bedding, and /d/ in betting, both appears as an alveolar tap /ɾ/ , [berɪŋ].

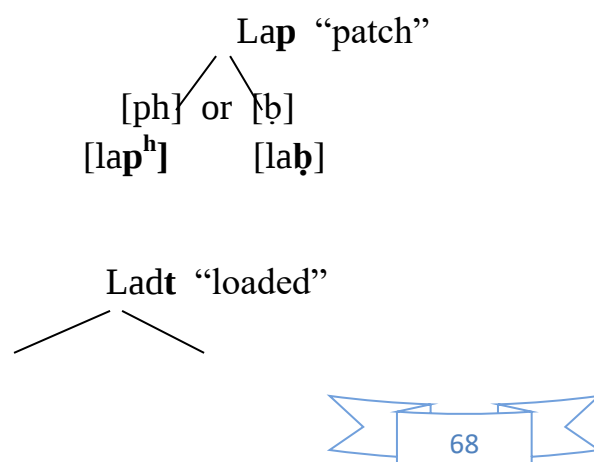
Phonemes

Archiphoneme

In neutralization



The fourth type of Neutralization is found in the Danish Language, in which both members of the opposition in the same neutralization position, obviously differently, but still non-contrastively. In Danish, the oppositions /p/ : /b/, /t/ : /d/ are neutralized in final position, which either member appearing thus:



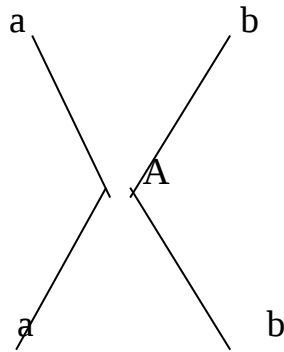
[t^h] or [ɖ]
[lat^h] [laɖ]

The diagram for this type is as follow:

Phonemes

Archiphoneme

In neutralization



The fifth type is considered as a more complex one, because it is not possible to come up with a reasonable archiphonemic representation. And it is hard to draw a diagram for this type. “commonly this type found in the case of gradual oppositions, where only “extreme” member appear (Prince, A. & P. Smolensky, 1993, p.45). For example old English had a phonemic short vowel system like this

i	u
e	o
æ	ɔ

But, only high vowels and low back vowels appear before nasal consonant, so the contrasts between high vs. mid, low, front vs. low, back are neutralization the six vowels reduced to three vowels, as follow:

A Feynman diagram showing the decay of a select quark ($\tilde{q}$) into a quark (q) and a gluon (g). The select quark line enters from the left and splits into a quark line and a gluon line.

A diagram illustrating a merge operation. On the left, there are two separate lines. The top line is labeled 'u' and the bottom line is labeled 'o'. These two lines converge towards a single line on the right, which is labeled 'u'.

$$\mathfrak{a} \begin{array}{c} \diagup \\ \diagdown \end{array} 0$$

9. Neutralization problem and the Archiphoneme solution

Archiphoneme is “a term used in phonology referring to a way of handling the problem of neutralization” (Crystal, 1985, p.23). Archiphoneme is considered as a solution for neutralization problem and it is suggested by the Prague School phonologist, Nikolai Trubetzkoy (1890-1939) who set up a new category for such cases, which he called an archiphoneme, a capital letter used to show the position of Neutralization (Steriade, 2000). For example, in German [T] appears as a neutralizable allophone for both /t/ and /d/ word finally. Rat “advice” vs. Rad “wheel” have the same pronunciation which is [ra:t], Trubetzkoy used an archiphoneme [T]→[ra:T], to tell us that this final [T] implies /t/ and /d/. In English the initial /s-/ precedes plosives as in “skin”. If we take /g/ as a counter part of /k/ , it doesn’t occur after /s/ and this due to language specific and to the possible constraints cluster in English, so there is no “sign” contrast with “skin” (Steriade, 2000). The phonologist faces a problem with regard to how can analysis of these words’ second segment is done in terms of choosing the voiced one or voiceless one. This problem is solved by writing a capital /k/ (i.e. archiphoneme) after /s/ , [skin]. The aim of using archiphoneme is to tell us that /k/ is not the only consonant can follow initial /s-/, but it is possible for other consonants to occur after /s-/ (Trubetzkoy, 1969, p.33).

10. Conclusions

To sum up in a nutshell, it can be concluded that although there is neutralization, but not all word-final voice contrast can be neutralized always (despite the devoicing rule’s operation). In addition to this, it also requires a greater characterization, which breaks away from phonology’s standard conception. Under the standard view, word-final devoicing rule will be neutralized under standard view if there is no interaction of other rules with it. Moreover, in phonological terms the observation is that a rule is applied despite of the fact that there is no phonetic conditioning. Therefore, the aim of the paper can be justified while contending that all the rules of phonology can be applied in such a way that where neutralization can be seen while allowing underlying distinctions since it would be

neutralized to be preserved or recovered. Moreover, it is like rule interaction or rule gets motivated for avoiding or compensating to potential neutralization.

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