CONSONANT ASSIMILATION IN ISINDEBELE: A DISTINCTIVE FEATURE APPROACH

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Abstract

The article discusses consonant assimilation on isiNdebele nouns, and examines that within the parameters of the Distinctive Feature approach. The main submission in this study is that consonant assimilation is local, homorganic and that it is found in the construction of class 9 and class 10 nouns. The terminal alveolar nasal consonant [n] of classes 9 (iN-) and 10 (iziN-) merges with the initial consonant of the following noun stems to give a homorganic sound. Consonant assimilation is threefold; place assimilation, manner assimilation and phonation assimilation. The article also established that assimilation is adjacent, partial, bidirectional, and is either progressive or regressive.

Keywords: manner assimilation, phonation assimilation, place assimilation, trigger sound and target sound

1.   Introduction

In this paper we discuss consonant assimilation in isiNdebele. IsiNdebele is a Nguni language that is spoken in most parts of Matabeleland and parts of Midlands in Zimbabwe. Assimilation has been studied cross-linguistically in English, Catalon, Diola Figny, Thai, Yakurit, Yoruba and some Bantu languages by different scholars using various theories, such as the Auto-Segmental Theory, Feature Geometry Theory and the Optimality Theory. Khumalo (2003) gives a general traditional descriptive account of pre-nasalisation in isiNdebele. The traditional descriptive approach to phonology does not go beyond phonemic level in explaining phonological processes. This approach therefore denies one an opportunity of explaining phonological processes in the context of the behaviour of the phonetic correlates of phonemes. The present study seeks to explain assimilatory phonological processes in terms of how phonetic contrast between phonemes is neutralised in the formation of homorganic sounds in isiNdebele. Reference will be made to labialisation, velarization, nasalisation, plosivisation and devoicing. The discussion is premised on the Distinctive Feature theory (DF). The

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binary system of indexing distinctive features in the DF theory enables us to break down phonemes into their respective features, characterise possible contrasting features in a given language, clearly capture natural classes of phonetic features, generalise regularly occurring phenomena and to formulate predictions about the behaviour of phonetic class members. DF will be handy in providing a phonetic understanding of consonant assimilatory processes under study. In this paper we argue that consonant assimilation in isiNdebele is local, directional, that is, features are transferred either from left to right or right to left and that the process always results in the formation of homorganic sound clusters such as /*mp, mb, mf, nd, nk, nt*/. Section 1 briefly presents the methodology and the data collection methods used in this study. The DF theory is discussed in section 2 of this study. The phonological concept of assimilation is explained in section 3. In section 4 we discuss types of consonant assimilation found in isiNdebele. These include phonation assimilation, place assimilation and manner assimilation. Relevant consonantal processes that fall under these broad assimilation classes are also discussed under their respective classes. The summary of findings is presented in section 5.

2. Methodology

The researchers used a phenomenological type of qualitative research. The term 'phenomenological' denotes a method of explaining, analysing or interpreting concepts, events or situations among other things that constitute our social life. This approach enables one to tackle the questions 'what, in what ways, how and why' which relate to the study in reference. The bulk of the examples used in this study are drawn from the researchers' intuitive knowledge of isiNdebele. Two of the researchers are mother tongue speakers of isiNdebele and the third researcher, though not a mother tongue speaker of isiNdebele has a profound knowledge of isiNdebele phonology and Bantu languages in general. The tacit linguistic knowledge possessed by mother tongue speakers and their knowledge of the linguistic structure of isiNdebele qualifies them to make acceptable and grammatical judgements on given linguistic constructions.

Some of the data was collected from the University of Zimbabwe students during isiNdebele linguistic lectures. We targeted part 1, part 2 and part 3 mother tongue speakers of isiNdebele. We attended lectures on isiNdebele Morphosyntax and Elements of Ndebele Linguistic

Structure between February and May in 2013. We selected class 9 and class 10 nouns from the recorded material and then transcribed them accordingly. We were mainly interested in the changes that occur when the alveolar nasal [n] of the class 9 (iN-) and class 10 (iziN-) prefixes come into contact with the commencing consonant of the noun stem. Tape recording, according to Matika (2011:5), is one of the observational methods which capture the speech utterances by the speaker naturally. As a method, tape recordings were ideal for this study because they enabled the researchers to play back the recorded Ndebele data over and over again to confirm correct transcription of data, as a lot of phonetic details require careful listening and cross checking. According to Crystal (1997), tape recordings enable linguist's claims about the language to be checked, which ultimately provide a way of making these claims more accurate. The tape recordings capture vivid and real life contexts that are not possible with interviews. Similarly, Kadenge (2007) notes that tape recording is used as a method of data collection because it provides a linguistically accurate corpus of data.

3.   The Distinctive Feature Theory

The Distinctive Feature Theory presented in the Sound Pattern of English (Chomsky & Halle 1968) is based to a greater extent on the works of Jackobson & Halle (1952). While Jakobson & Halle (1952) emphasise on capturing all the possible phonological contrasts of language by means of features, Chomsky & Halle (1968) distinguish two functions of their features. On the one hand, the distinctive features are designed like Jackobson's features to capture the phonological contrasts of languages. On the other hand, they are designed to describe the phonetic content derived by phonological rules as well as underlying segments.

It has long been established that the feature, not the segments, is the basic unit of phonological representation and that features combine in a variety of ways to form speech sounds. The term distinctive feature was developed to characterise the elements which distinguish phonemes. Distinctive features are minimal contrastive sound units explaining how the sound systems of a language are organised (Crystal, 1991:109). Distinctive features may be seen either as part of the definition of phonemes or as alternative to the notion of a phoneme. According to Clark &Yallop (1990:124), a phoneme is the basic unit of a language's phonology, which is combined with other

phonemes to form meaningful units such as words or morphemes. It can also be described as the smallest segment of sound employed to form meaningful contrasts between utterances. The use of Distinctive features in phonology enables one to classify natural classes of segments and by extension to generalise regularly occurring phenomena and to formulate predictions about behaviour of class members.

The Distinctive feature principle allows an insightful phonotactic account of assimilatory processes, where sounds become more like others. Distinctive Feature Theory makes it possible to capture generalisations of segments during assimilation. It defines features that classify sounds together. Katamba (1989:35) notes that it is more insightful to observe and analyse sounds in terms of individual parameters such as distinctive features. This enables a systematic analysis of the assimilation process.

Distinctive features describe the phonetic content of the segments. Chomsky & Halle (1968) contend that sounds are no longer looked at as indivisible wholes mainly because features show what sounds have in common with each other and how they are related. The values [+] or [-] are used to indicate features of a sound, (Davenport &Hannalis, 1998:81). The value [+] indicates the presence of a feature and [−] its absence. The theory shows the smaller units that make up sounds and they are phonetic in nature as they refer to articulation.

4.   Assimilation

Campbell (2004:28) notes that a phonological process is called assimilation if, as a result of its application, two or more phonetically distinct segments agree in their value for some phonological feature(s) or feature classes(s). Thus, a target sound becomes phonetically identical to the trigger sound through the process of assimilation. Katamba (1989:80) notes that the advantage of having assimilation is that it results in smoother, more effortless, more economical transitions from one sound to another. Katamba (1989: 80) goes on to indicate that assimilation facilitates the task of speaking. The speaker usually tries to conserve energy by using no more effort than is necessary to produce an utterance.

Assimilation can either be local or distant. Local assimilation obtains between strictly adjacent segments, such as between consonants in a consonant cluster (De Lacy, 2007:335). Distant assimilation obtains between segments that are not (necessarily) adjacent, such

as between consonants across a vowel. When feature neutralization involves consonants it is known as consonant assimilation and when it involves vowels it is known as vowel harmony.

This study chiefly looks at consonant assimilationwhich is a type of assimilation where two or more consonants in the same environment become alike through the spreading of phonetic features from one consonant to another. Nolan (1992) cited in Matika (2011:8) notes that the correct mechanism of assimilation is the reduction of the target sound with the spreading of the trigger sound in articulation. Given this, assimilation can be treated as the process which takes the form of the spreading and reduction style whereby the trigger sound spreads its features to the neighbouring target sound, thereby reducing or eliminating the phonetic contrasts of the phonemes because of the influence of the trigger sound in the neighbourhood. Assimilation can only be perceived where the target sound drops phonetic contrasts as it picks up the qualities of the trigger sound. In assimilation, the target sound is made more like the trigger sound because of the influence of the latter sound on the former sound. Assimilation can be said to be a matter of phonotactics because it looks at the rules that govern sound combination within syllables. Crystal (1997:392) defines phonotactics as the sequential arrangement of unit segments in a language. It is the study of the way phonemes are combined and arranged in syllables and words of a particular language or dialects (Zivenge, 2005:63).

Assimilatory changes are classified in terms of three intersecting trichotomies, namely total or partial, adjacent or distant, regressive or progressive. Roach (2003) describes assimilation as a process which involves both partial and complete sound modification in terms of the phonetic properties of sounds. Partial assimilationaccounts for the changes in which there remain some phonetic differences between segments involved, whereas in complete or total assimilation, sounds are modified to become identical in all aspects.

According to Fortune (1955:79), consonant assimilation can either be progressive or regressive, depending on whether the target sound occurs after or before the trigger sound. Matika (2011:9) notes that in regressive assimilation the direction is from the right to the left as the sound changes with reference to the following segment. Thus, if a target sound is affected by one that comes later (trigger sound) in a word, the assimilation is termed regressive. Regressive assimilation can also be called anticipatory assimilation because speakers anticipate

(spread back) the articulation of the following sound when articulating the preceding sound (Collen, 2003). Progressive assimilation involves the modification of a sound with reference to the preceding segments, thus the direction appears to be from left to right (Crystal, 1997).

Consonant assimilation can also be adjacent or distant. Adjacent consonant assimilation is when a conditioned sound and a conditioning sound will be following each other whereas distant consonant assimilation is where a sound or sounds will be separating the target sound from a trigger sound. Campbell (2004:28-29) notes that these parameters interact with one another to give the combinations such as Partial Adjacent Progressive Assimilation and Partial Adjacent Regressive Assimilation among other combinations.

4.1   *Partial Adjacent Progressive Assimilation*

Partial adjacent progressive assimilation is a process where a target sound immediately precedes a trigger sound and further picks some of the phonetic features of the other sound. The direction is from the left to the right as shown in example 1 below.

1.   *i**nd**ima (Field target)*
        *iN–**l**im-a*
        9-ploughVR- NDM

From the above example the sound [n] and [l] are next to each other. The target sound [l] is to the right of the trigger [n] sound thereby generating the progressive nature of assimilation. The target sound drops its original manner of articulation feature [+lateral approximant] as it picks up the manner of articulation feature [+plosive] of the trigger sound. Consequently, the target sound [l] is articulated as [d].

4.2   *Partial Adjacent Regressive Assimilation*

Partial adjacent regressive assimilation involves the picking up of some qualities of the trigger sound. The changing sound is to the right of the trigger sound thereby generating the regressive nature of assimilation.

2.   *Imfundo (education)*
        *iN-**f**und-o*
        9-learnVR-NDM

In the above example the trigger sound and the target sound are next to each other. The target sound [n] is to the left of the trigger sound [f]. The labial feature is spread from the trigger sound to the sound

thereby making [n] to change to [m].

5.   Types of Consonant Assimilation

There are three types of consonant assimilation namely, phonation assimilation, place assimilation and manner assimilation.
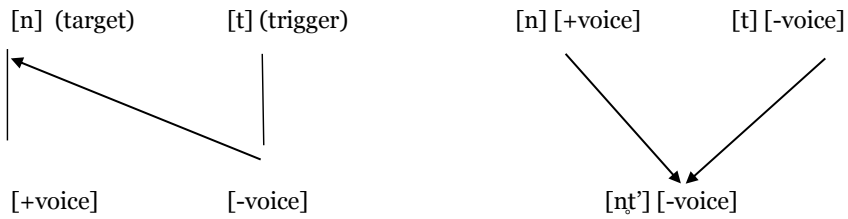
5.1   Phonation Assimilation

Phonation assimilation is when a voiceless sound and a voiced sound agree in phonation. In the process, the dominant feature is spread from the trigger sound to the target sound thereby determining whether a target sound should be voiced or voiceless. The spreading of a phonation feature makes a targeted sound to agree with a trigger sound in terms of voicing. This can be illustrated as follows:

3.   *imfundo (education)*
        iN-fund-o
        9-learn VR-NDM
        [mf]
4.   *inkuni (firewood)*
        i(zi)N- khuni
        10-firewood
        [n̥]- [voiced] and [kh]- [voiceless]
        [ŋk']
5.   *intando (will)*
        iN-thand-o
        9-loveVR-NDM
        [n̥]- [voiced] and [th]- [voiceless]
        [n̥t']

The Ndebele examples above show phonation assimilation where voiceless sounds [f, th and kh] trigger a voiced nasal [n̥] sound to devoice.The target sound acquires the voiceless feature from the mentioned voiceless sounds. The voiced [n] sound becomes devoiced when it precedes the voiceless sounds [f, th and kh] in isiNdebele. Thus, the target sound [n] devoices due to the influence of neighbouring voiceless sounds. As shown in the above examples, the spreading of the voiceless feature captures phonation assimilation since phonation assimilation is treated as the spreading of the [+voice] or [−voice] feature. The spreading of the feature [-voice] can be represented by the following diagrams:

Figure 1: The spreading of the feature [-voiceless]

[n] (target)   [t] (trigger)   [n] [+voice]   [t] [-voice]

[+voice]   [-voice]   [ņt'] [-voice]

The spreading of the feature [-voice] causes the nasals to devoice. As shown by the above diagram, phonation assimilation in isiNdebele is regressive in nature.

5.2 Place Assimilation

Collen (2003) notes that place assimilation is a form of assimilation which involves the modification of the place of articulation or constriction or location features between adjacent sounds so that they become more similar to facilitate an effortless speech segment. Matika (2011:9) defines place assimilation as the form of assimilation which entails the modification of sounds in terms of the place of articulation. Therefore, in place assimilation only the place of articulation features spread from the trigger sound to the target sound. Place of articulation (also called point of articulation) of consonants is the point of contact where an obstruction occurs in the vocal tract between articulatory gestures, an active articulator (typically some part of the tongue) and a passive location (typically some part of the roof of the mouth) (Clark &Yallop, 1990:123). Place assimilation can take various forms, that is, it can be coronal, labial and dorsal depending on the place features which are triggered.

5.2.1   Velarisation

This is a form of place assimilation whereby the velar sounds and click sounds act as the triggers of assimilation. Velar assimilation can involve velar consonants as triggers in isiNdebele.Velar assimilation can be termed 'velarisation' because it involves velar consonants and click sounds as the triggers. Velarisation is a secondary approximation of the back of the tongue towards the soft palate (velum), (Ball &Rahilly, 1999:127). In this regard, velar sounds are the ones which spread their (velar) features to the adjacent non-velar sound (targets).

Velar sounds refer to those sounds produced at the back of the mouth with the tongue body refracted towards the soft palate.

Clicks have an inherent velar quality they acquire by being products of the velaric airstream mechanism. The airflow responsible for click production is initiated by the back of the tongue and the velum. Consequently, isiNdebele clicks have an underlying [+velar]. This is the feature that is spread to non-velar sounds leading to their velarization. This type of assimilation in isiNdebele can be shown by the examples below:

6.   *in**k**uthalo (industriousness)*
       *i**N**-**kh**uthal-o*
       9-industriousVR-NDM
       [ŋk']

7.   *in**gx**oxo (conversation)*
       *i**N**-**x**ox-o*
       9-discussVR-NDM
       [ŋ‖]

8.   *in**gc**ebo (riches)*
       *i**N**-**c**eb-o*
       9-be rich VR-NDM
       [ŋ|]

9.   *in**gq**ondo (brain)*
       *i**N**-**q**ondo*
       9-brain
       [ŋ!]

The examples above show velar place assimilation where the velar consonant [k] and click sounds [‖], [|] and [!] act as the trigger sounds and [n] acts as the target sound. In this case, the feature [+velar] comes from the clicks which are produced on the velaric airstream and it spreads to the preceding non-velar sound, the alveolar nasal [n]. The nasal sound [n] acquires the velar feature and consequently becomes a velar nasal sound [ŋ]. From the above examples, it can be noted that velar place assimilation in isiNdebele is regressive in nature. This form of place assimilation can be represented as follows:

Figure 2: Velar assimilation triggered by velar consonants

[n] (target)   [kʰ] (trigger)   [n] [+voice]   [kʰ] [-voice]

=

[+alveolar]   [+velar]   [ŋk'][-voice]
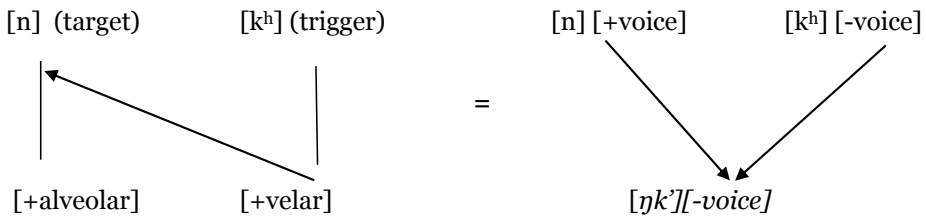
The above diagram shows that velar place assimilation in isiNdebele is regressive as the direction is from right to left as the speaker anticipates the place of articulation of the velar sound when producing the preceding alveolar sound such that the preceding alveolar sound is produced as a nasalised velar.
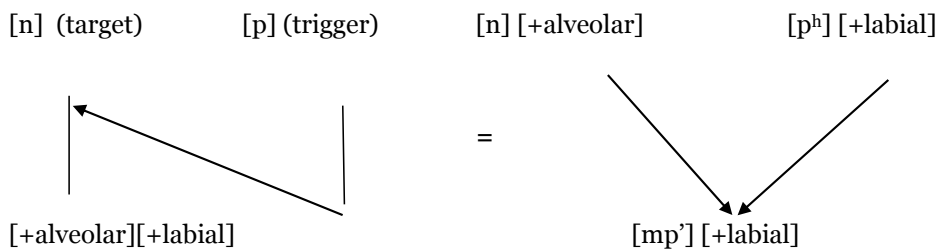
5.2.2 Labialisation

According to Crowley (1987), labialisation is a type of place assimilation where a given sound becomes labialised due to the influence of a neighbouring, adjacent labial sound. Ziervogel (1967:70) notes that labialisation is a phenomenon in which non-labial consonants are changed so that they have to be pronounced with the lips. This process is whereby a labial sound spreads its labial feature to the non-labial sound so that the latter is articulated in the labial region. This process usually targets the place of articulation of non-labial sounds which explains why it is known as the labialisation. The alveolar nasal is labialised when it is immediately preceded by the labial [β and ph] and the labio-dental [f and v]. The examples below illustrate labial assimilation in isiNdebele:

10.   *impilo (life)*
       iN-phil-o
       9-liveVR-NDM
       [mp']

11.   *imbizo (battalion)*
       iN-βiz-o
       9-callVR-NDM
       [mb]

12.   *imfundo (education)*
       iN-fund-o

    9-learnVR-NDM
    [mf]
13.   ***imvu***
    *i**N**- **v**u*
    9-sheep
    [mv]

From the examples above, the trigger sounds are the labial sounds [ph, β] and the labio-dental sounds [f, v]. The target consonant [n] (which stands for all nasal sounds m, n, and ŋ) become libialised, thus it acquires the labial feature from the neighbouring consonants and becomes [m]. The labial sounds referred to in this case are [ph, b, v and f] which are the triggers of this process and the non-labial sound is the target of this process because it lacks the labial feature. From the above examples, the feature labial spreads from the trigger sound to the target sound. The target sound is influenced by the feature [+ labial] and it becomes identical to the trigger sound in terms of place feature. This form of assimilation can be illustrated by the following diagram:

Figure 3: The spreading of the feature labial

[n] (target)   [p] (trigger)   [n] [+alveolar]   [pʰ] [+labial]

                               =

[+alveolar][+labial]   [mp'] [+labial]

The above diagram shows that labial assimilation is a type of place assimilation that involves the spreading of the feature [+labial] to non-labial sounds. An alveolar sound acquires a labial feature of the following labial sound. The diagrams above also show the regressive nature of labial assimilation in isiNdebele.

5.3 Manner Assimilation

Matika (2011:7) defines manner assimilation as a phonological process which looks at the modification of the target sound in terms of the manner of articulation so that the target sound becomes more identical to the trigger sound in terms of manner features. Manner features are

those which refer to the way in which a sound is articulated (Keith, 2003). Clark &Yallop(1990:81) define manner of articulation as the degree or extent of a constriction and the way in which the constriction is formed in the vocal tract. In traditional descriptions such as those following the International Phonetic Alphabet (IPA) conventions, manner of articulation can sometimes also include a specification of constriction shape, for example, in descriptions such as lateral fricative where, lateral refers to tongue configuration against the roof of the mouth.

In manner assimilation, a sound assimilates the manner of its articulation of a neighbouring sound. One common feature (e.g. continuant) can spread to contiguous sounds. Sounds that are [+ continuant] include those in which the airstream is not completely blocked in the vocal tract, (Chomsky & Halle, 1968:317). It can, therefore, be noted that in manner assimilation only the manner of articulation features spread from the trigger sound to the target sound following. Manner assimilation can also take various forms namely nasalisation and plosivisation.

5.3.1 Nasalisation

This process of nasalisation is where a sound assimilates to a neighbouring sound with respect to the feature nasal. It is common in Zulu, Xhosa and Swati (Ziervogel, 1967:71). Nasal sounds are sounds which are produced by forming an obstruction of the air current in the mouth and by lowering the velum to allow air to pass freely into the nasal cavity and out into the atmosphere. A nasal consonant is one characterised by the escape of the airstream through the nasal passage, the oral passage being entirely blocked by the lips, by the tongue tip and velar ridge, or by the back of the tongue and velum.

Oral consonants that immediately follow an alveolar nasal pick up the feature [+nasal] at the same time dropping their oral feature. The nasalisation of oral consonants is an example of manner of articulation. Pre-nasalised consonants in isiNdebele assimilate the nasality of the nasal consonant. Here are the examples of nasal assimilation:

14.   *indoda (man)*
       iN-doda
       9-man
       [nd]
15.   *inzondo (hatred)*

> *iN-zond-o*
> *9-hateVR-NDM*
> *[nz]*

16.   *imvu (sheep)*
> *iN- vu*
> *9-sheep*
> *[mv]*

The underlined oral sounds in the examples above pick up the nasal feature of the preceding alveolar nasal sound. In (15) the alveolar nasal additionally picks up the labial feature of the labio-dental. The sounds [z], [v] and [d] are oral sounds and they become pre-nasalised as a result of progressive assimilation as the feature nasal spreads from left to right. The nasality feature spreads from the nasal sounds [m] and [n] to oral sounds. Therefore, [z] [v] and [d] become pre-nasalised when preceded by the nasal sounds as shown in the above examples. The spreading of the feature [nasal] from the trigger sounds to the target sounds [z], [v], and [d] facilitates the task of speaking. This form of assimilation can be illustrated as follows:

Figure 4: Nasal feature spreading

[n] (trigger)   [d] (target)   [n] [+nasal]   [d] [+oral]

=

[+nasal]   [-nasal]   [nd] [+nasal]
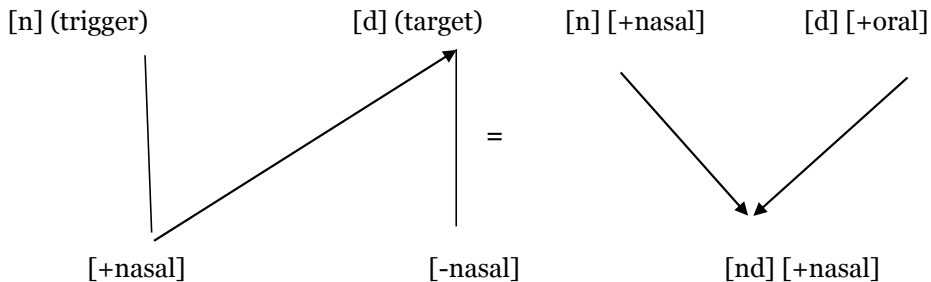
The diagram above illustrates the spreading of the [+nasal] feature to the oral sound. This spreading of the [nasal] feature discussed in this section implies the loss of the [oral] feature of the target sound. Nasal assimilation in isiNdebele is progressive as illustrated by the assimilation direction arrows above.

5.3.2 Plosivisation

Plosivisation is another type of manner assimilation. It is when a non-plosive sound becomes a plosive. The feature [+ plosive] which is inherent in the nasal sounds is spread to a non-plosive sound to give a plosive sound. In other words, the nasal sound acts as the trigger

sound in plosive assimilation. The following examples illustrate plosive assimilation in isiNdebele:

17. **i*nd*evu (beards)**
    i(zi)*N*- *l*evu
    10-beard
    [nd]

18. **i*nd*ima (Field target)**
    i*N*-*l*im-a
    9-ploughVR-NDM
    [nd]

19. **i*nd*ebe (lips)**
    i(zi)*N*- *l*ebe
    10-lip
    [nd]

From the above illustrations, the target sound [l] becomes a [plosive] because of the influence of the plosive feature which is inherent in the nasal sound [n]. Hence [l] becomes a plosive sound [d] when preceded by an alveolar nasal sound in the above examples. The spreading of the feature [+plosive] marks the dropping of the feature [+ lateral] by the target sound hence the change of [l] to [d]. As these examples show, the nature of plosive assimilation triggered by plosive consonant in isiNdebele is progressive in nature. This form of manner assimilation may be represented as follows:

Figure 5: Plosivization of an alveolar lateral [l]
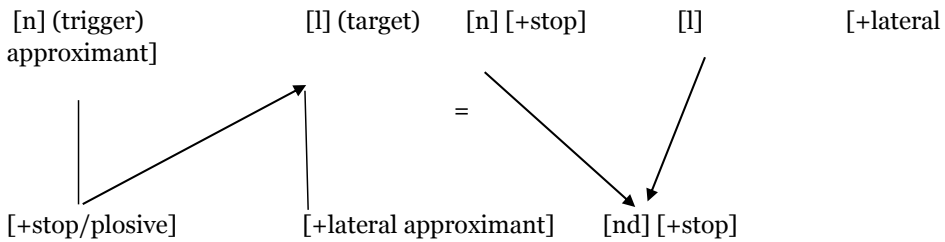
The nasal sound [n] is closer to [d] than it is to the sound [l]. Therefore, the sound [l] is plosivised and becomes a plosive sound [d]. The spreading of the [+plosive] feature reduces the phonetic contrasts between the trigger sound and the target sound which marks the occurrence of manner assimilation in isiNdebele.

6. Conclusion

Consonant assimilation in isiNdebele is obtained in the formation of class 9 and class 10 nouns. The process targets and can be triggered by both the nasal sound [n] of the class 9 prefix [iN-] and 10 [iziN-], and the initial consonants of noun stems. Consonant assimilation in isiNdebele occurs between strictly adjacent segments in a noun thereby creating homorganic sounds such as [ŋk], [mb], [nd] and [mp']. There are three types of consonant assimilation, namely phonation assimilation, place assimilation and manner assimilation in isiNdebele. Velarisation and labialization are forms of consonant place assimilation. Nasalization and plosivization are forms of consonant manner assimilation. Phonation assimilation and place assimilation in isiNdebele are regressive whereas manner assimilation is progressive. The assimilation types overlap into each other such that one example can be used to discuss phonation and place assimilation. Example 2 can be used when discussing phonation and place assimilation which means that assimilation can be bidirectional. Apart from directionality, this study has also shown that click sounds can act as trigger sounds in velar assimilation.

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