# A MORPHOPHONEMIC ANALYSIS OF DHOLUO NOMINALS

**BY**

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## DECLARATION AND APPROVAL

### Declaration

This is my original work and has not been presented for an award of a Diploma or conferment of a Degree in any other University or Institution.

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### Approval

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## DEDICATION

This work is dedicated to my aging but supportive parents, Daniel Okwayo and Perez Menya. You have always wanted me to ‘read more books’ and so I will.

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However, I would like to exonerate all those whom I have acknowledged, and who assisted me during this research project from the attribution, blame and errors contained herein. This is my original work and I take responsibility for errors and omissions of whatever kind that may be in this work.

## ABSTRACT

Dholuo is one of the languages with a highly productive nominal marking system, particularly in plural formation. Despite this, previous studies have differed sharply on exactly how number is expressed in Dholuo nouns. Previous attempts that have proposed the use of voice polarity, switch alpha rule, the use of articulators or prosodic features in explaining number in Dholuo have been challenged. Moreover, these approaches posit feature polarity (voice, manner or prosodic) as a feature that solely applies to nouns. However, this feature also occurs in other nominals such as the possessive, adjectives, numerals, genitives and determiners. Again, none of the attempts has endeavored to fully account for the morphemes **–e**, **-i** and **–ni** occurring at the end of Dholuo plural forms. In this regard, this study looked at the whole spectrum of Dholuo nominal morphology comprising of nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives in an attempt to help characterize further the feature of number in Dholuo. The objectives of the study were: first, to describe the structure of Dholuo nominals; second, to determine how number is realised in Dholuo nouns; and lastly, to explain the morphophonological alternations in Dholuo nominal structure. The study used the theoretical framework known as Optimality Theory (OT). From the accessible population of the 31,573 native speakers of Dholuo in Bondo Town, a sample of 30 respondents was chosen through a systematic random sampling technique. Data for analysis was collected through the targeted elicitation approach using various test frames/matrices administered to this study sample. This study being a descriptive analytical research, the data collected was analysed through interpretive and descriptive process. The analysis shows that the feature "voice," in general or voice polarity in particular, is not an exclusive constraint for defining Dholuo plurals but is a general descriptive constraint for all Dholuo nominal inflectional processes. The study's attempt to account for the morphemes **–e**, **-i** and **–ni** occurring at the end of Dholuo plural forms which were not exhaustively considered by the previous works, established that plural formation in Dholuo is regular and that Dholuo has a basic plural marker **–e** which has three allomorphic variations **–e, -i, -ni** occurring in specific, morphophonologically defined environments. The study also found out that phonotactic restrictions in Dholuo nominals play a crucial part in yielding the structures in the plural forms. In particular, articulatory harmony which is the highest ranked constraint defining number in Dholuo nouns, and which provides elaborate and alternative explanation of number in Dholuo to the voice polarity phenomenon defines the alternation in the final syllable of the root. Consonant harmony requires alteration or retention of articulatory parameters so that the behaviour of obstruent, nasal, approximant final noun roots is uniquely defined in each case. Vowel harmony (backness, rounding, height, ATR) is responsible for the morphophonological variations in the vowels in the root in relation to the vowel in the suffix. The suffixation of a morpheme**,** therefore, has a defining effect on the morphophonology of the nominal constituent in the inflected form. The results of this study are expected to provide new data that offers an alternative description of number in Dholuo nouns, which has been an elusive research question. The findings of the study will be an invaluable pedagogical tool for TOESL as well as being reference material for future studies in Dholuo.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **Adj** | Adjective |
| **AP** | Adjective Phrase |
| **Arg** | Argumental |
| **ATTR** | Attributive |
| **C** | Consonant |
| **CC** | Candidate chains |
| **CON** | Constraint Set |
| **DEM** | Demonstrative |
| **DET** | Determiner |
| **ESL** | English as a Second Language |
| **EVAL** | Evaluator |
| **GEN** | Generator |
| **Gen** | Genitive case |
| **Morph** | Morpheme |
| **N** | Noun |
| **Nom** | Nominative/nominal |
| **NounR** | Noun Root |
| **NP** | Noun Phrase |
| **NPs** | Noun Phrases |
| **OT** | Optimality Theory |
| **Pl** | Plural |
| **Pl.Morph** | Plural Morpheme |
| **Pred** | Predicate |
| **PWord** | Phonological Word |
| **Pl** | Singular |
| **TOESL** | Teachers of English as a Second Language |
| **V** | Vowel |

## KEY FOR THE PHONETIC SYMBOLS USED

**Table 1**

*Dholuo Consonant Sounds*

| | | Labial | Dental | Alveolar | Palatal | Velar | Glottal |
|---|---|---|---|---|---|---|---|
| Stops | Voiceless | **p** | | **t** | | **k** | |
| | Voiced | **b** | | **d** | | **g** | |
| Fricatives | Voiceless | **f** | **ɵ** | **s** | **ʧ** | | **h** |
| | Voiced | | **ð** | | **ʤ** | | |
| Nasals | | **m** | | **n** | **ɲ** | **ŋ** | |
| Nasal-Consonant | | **mb** | **nð** | **nd** | **ɲʤ** | **ŋg** | |
| Lateral | | | | **l** | | | |
| Trill | | | | **r** | | | |
| Glide | | **w** | | | **j** | | |

*(Note:Adapted from Okoth-Okombo,1997 & Suleh,2013)*

**Table 2**

*Dholuo Vowel Sounds*

| | | Front | Central | Back |
|---|---|---|---|---|
| **[-ATR]** | Half-close | **ɪ** | | **ʊ** |
| | Mid | **ɛ** | | **ɔ** |
| | Half-Open | | **ə** | |
| **[+ATR]** | Close | **i** | | **u** |
| | Mid | **e** | | **o** |
| | Open | | **ɑ** | |

*(Note:Adapted from Okoth-Okombo,1997 & Suleh,2013)*

# CHAPTER ONE: INTRODUCTION

## 1.1 Background to the Study

This research describes the morphophonemics of Dholuo nominals in the framework of Optimality Theory (OT). Morphophonemics, (also Morphophonology or morphonology) is the branch of linguistics that studies the interaction between morphological and phonological aspects of language. Its chief focus is the sound changes that take place in morphemes (minimal meaningful units) when they combine to form words (Chaer, 2007). It can also be defined as the changing events morphemes form in a morphological process, both affixation, reduplication or in composite. Öztaner (2007) defines it as a subsystem that connects morphology and phonology. Morphophonemics describes the forms of morphemes realized in the phonological level. Morphophonological analysis often involves an attempt to give a series of formal rules (known as phonological rules) that successfully predict the regular sound changes occurring in the morphemes of a given language. Such series of rules convert a theoretical underlying representation into a surface form that is actually heard. When morphemes combine, they influence each other's sound structure (whether analysed at a phonetic or phonemic level), resulting in a variety of differing pronunciations for the same morpheme. Morphophonology attempts to analyse these processes. A language's morphophonological structure is generally described with a series of rules, which, ideally, can predict every morphophonological alternation that takes place in the language. This study aimed at giving a morphophonemic analysis description of Dholuo nominals.

In Morphophonological analysis, the nominal structure plays a significant role. Just like morphemes are central in morphology, so are nominals in morphophonemics (Gaskill, 2013; Nurse, 2003 & Spencer, 1994). In linguistics, the term nominal refers to a category used to group together nouns and adjectives based on shared properties (Crystal, 2008). The nominal grouping is motivated by the fact that nouns and adjectives, in many languages, share a number of morphological and syntactic properties (Crystal, 2008). Typically, an affix related to a noun appears attached to the other words within a group,

such as determiners and adjectives, to create agreement. Such morphological agreement usually occurs in parts within the noun phrase (NP).

Languages with overt nominal agreement vary in how and to what extent agreement is required. In these languages (with overt nominal agreement), nominals can be seen in the shared morphemes that attach to the ends of nouns and adjectives and agree in case, gender, number or person (Nurse, 2003; Vaux & Cooper, 1999). The English language illustrates characteristics of nominals at a syntactic level because nouns and adjectives take the same complements at the head level. This is not so with Latin and a number of the Bantu group of languages, which have a highly productive marking system in which Nominals can be seen in the shared morphemes that attach to the ends of nouns and adjectives and agree in case, number, person or gender. In a study of Bantu Languages, Nurse (2003) states that these languages have a highly productive marking system in nominals. Kiswahili, for example, will strictly select morphemes based on class. Consider the agreement of the morpheme **–m** in "**m**-toto **m**-dogo" (a small child) and **–ki** in "**ki**-kapu **ki**-dogo" (a small basket) with Class 1 for human beings and Class 7 for things respectively.

The current study assumes that Dholuo, just like Bantu languages, has a highly productive marking system in nominal morphology as observed by Nurse (2003). One of the things the researcher was interested in finding out is whether Dholuo nominals, other than exhibiting overt morphology, have a straightforward way of marking plurality in its morphophonology. Numeral classifiers are also important in the analysis of nominal morphology. Numerals according to Cooper and Vaux (1999) are common in many East African languages, but it has not been adequately documented in Dholuo making it a crucial component for description by this study as part of Dholuo nominal structure. Numerals relate closely to the nominal particle, number which is the interest of the current study.

Cardinal in the description of a language's morphophonology is the nominal constituent, number. Number is the grammatical category which groups words in terms of functional opposition of singular ↔ plural (Alyilmaz, 2017; Gautam, 2018 & Norris, 2018). Singular refers to a single entity while plural to a group referent. There are languages that express number in a straightforward way, that is, as singular ↔ plural opposition (Gautam, 2018).

However, number is a very challenging grammatical aspect of a language (Alyilmaz, 2017) and cannot be simplified in the concept of 'plurality' alone. It is this complexity of morphological plurality in nouns observed in languages such as Turkish where plurality is marked by affixation, among other linguistic elements (Alyilmaz, 2017) and in Ingush where number marking is a twofold product of affixation of gender/number concord (Norris, 2018) that motivates the current study. This study set out to describe the complexity of how number is expressed in Dholuo nouns by looking at the whole spectrum of Dholuo nominal morphology- nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives. It also aimed at not only resolving the disagreements and controversies that have surrounded the debate on plural formation in Dholuo but also adding onto the debate by providing an elaborate alternative way of describing number formation in Dholuo nouns.

Number formation in Dholuo nouns has been an elusive concept for scholars. Previous studies (Alderete, 2001; Bye, 2006; De'Lacy, 2002, 2009, 2010; Okoth, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) have disagreed sharply on how number is expressed in Dholuo nouns. Despite the fact that scholars have previously disagreed on exactly how number is realized in Dholuo nouns, there has been, at least, a majority understanding that number in Dholuo is expressed by some feature alternation. What researchers have not conclusively agreed on is which specific feature.

First, there are those who argue that number, in Dholuo, is realized by what is called 'voicing alternation' of the final sound, (Alderete, 2001; Stonham, 1994; Tucker, 1994; &

Wolf, 2005), or 'voicing polarity,' in which nouns, in the singular form, which end in voiced phonemes, the voiced phonemes become devoiced while those ending in voiceless sounds, the voiceless sounds become voiced in plural forms.

Although proponents of voice alternation/polarity have argued that nouns in Dholuo switch the voice feature in plural formation, such an assumption that nouns can be either inherently singular or plural in their basic form, and that obstruent voicing serves to indicate the marked (non-inherent) value of number for each noun maybe deficient because there are several nouns in Dholuo ending in consonants but which do not alter the voice feature in the plural as the data in (1) shows. Secondly, the analysis does not account for any semantic motivation between basic singular and basic plural forms. Furthermore, there are nouns, which end in the morpheme **–e, -i,** or **-ni** without necessarily voice alteration.

1.

| | | | |
|---|---|---|---|
| **arip→** | **arip-e** | 'milky way' | (Trommer, 2008) |
| **ip→** | **ip-e** | 'tail' | (Trommer, 2008) |

Other scholars such as Trommer (2006) assume that final obstruents in Dholuo noun roots are underlyingly either voiced, unvoiced or unspecified for voicing. Voicing polarity in consonant-final roots then amounts basically to final devoicing, while vowel-final roots show a three way-contrast of voicing distribution However, in his subsequent study, Trommer (2008) admits the earlier analysis had a problem in that the distribution given above is generally marginal. The current study, therefore, intended to offer an alternative description that would either clarify or dispute the controversy seen in Trommer (2006, 2008). The question this study grapples with is whether Dholuo plural is a product of voice polarity or a result of autosegmental processes, and if the latter, to offer an elaborate analysis that caters for the void in Trommer (2006).

The use of either voice polarity (Alderete, 2001; Stonham, 1994; Wolf, 2005) or switch alpha rule (Okoth, 1977, 1982) in describing plural formation in Dholuo has been argued as in-comprehensive by those routing for "prosodic structure" (Bye, 2006; de'Lacy, 2010) or those who argue for the use of "articulators" (Ong'ayo, 2016). For example, Bye (2006) argues that plural in Dholuo, and feature polarity, is a product of prosodically and morphologically conditioned 'stopping' and 'destopping' of Dholuo nouns and verbs which affixes a [stop] feature immediately following the nucleus (V) resulting in insertion of a /C/ as seen in (2) below.

2. (a) **ʧwɛ ʧwɛ-ʧɛ** 'leech'
   (b) **duɛ due-ʧe** 'moon, month'

Whereas in the case of CVCV core, the [stop] merges with the rightmost consonant as demonstrated in (3) below:

3. (a) **ɔkwadʒɔ ɔkwəʧe** 'cane'
   (b) **lowo lope** 'earth'

The above analysis assumes that all Dholuo noun roots are exclusively stops and if they were not, they must be made to be one by either insertion or merging. Even if insertion and merging were to explain plural formation in Dholuo, it would take care of a very marginal section of the nominal structure. This study, therefore, purposed to explain all the processes (morphological, phonological or otherwise) involved in describing plural formation in Dholuo.

The previous studies (Alderete, 2001; Bye, 2006; De'Lacy, 2002, 2009, 2010; Okoth, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) have not only disagreed amongst themselves but they have also presented analyses with gaps as far number formation in Dholuo nouns is concerned. Consequently, the present study not only aimed at providing an alternative explanation of how plurals are formed in Dholuo, but also to give an elaborate account of observable morphological alternations, some of which the previous studies have not exhaustively accounted for.

First, previous research has marginally accounted for the morphemes **–e, -i,** and **-ni** that are found at the end of plural forms in Dholuo. In addition, their analyses have concentrated largely on feature exchange ignoring these morphemes (**–e, -i,** and **-ni** ) that could unlock the problematic plural formation in Dholuo. Moreover, certain Dholuo nominal structures, such as possessives, exhibit similar voicing or devoicing of final root sounds when, for example, expressing possession confirming that feature alteration may not be a preserve of plural formation.

The object language of this study is Dholuo. Dholuo language is spoken by the Luo community of East Africa. Luo are part of the Western Nilotic group of speech communities whose cradle land is believed to be the Southern Sudan and who settled on the lands around Lake Victoria between 1490 and 1600 A.D. (Ogot,1967). Dholuo is mutually intelligible with Alur, Acholi, Shilluk, Bor, Lango and Padhola dialects of Uganda (Greenberg, 1995). In Kenya, Dholuo is used for broadcasts in local print and electronic media. The Luo in Kenya are found in Siaya, Kisumu, Homabay and Migori counties (formerly Nyanza Province). A number of Dholuo speaking families can also be found in various parts of Kenya as a result of marriage and migration. The Kenya Population and Housing Census (2019) puts the total number of Luo at five million sixty-six thousand, nine hundred and sixty-six (5,066,966).

There are two major varieties of Dholuo: the Boro-Ukwala variety (also known as the 'Trans-Yala') and the Kisumu-South Nyanza variety (Adhiambo, 1990). The Boro-Ukwala variety is spoken in Ugenya, Alego, Yimbo and parts of Gem, while the Kisumu-South Nyanza variety is spoken in Kisumu, Homabay, and Migori counties and some parts of Siaya, which are not included in the Boro-Ukwala group (Adhiambo, 1990). Although these varieties of Dholuo have a high degree of mutual intelligibility, they are distinct enough in their phonological and lexical features to an extent that one can tell the region a speaker comes from by the way they speak (Aduda, 2013)

Dholuo has ten (10) Vowel Phonemes in its inventory. The [+ATR] (**i u e o ɑ**) with a corresponding number [–ATR] Vowels [**ɪ ʊ ɛ ɔ ə**] (Okoth-Okombo, 1997). It has 26 Consonantal Phonemes: Stops [**p b t d k g**]; Fricatives [**f s h ɵ ð]**; Nasals [**m n ɲ ŋ**], Prenasalized Stops [**mb nð nd ɲʤ ŋg**] (Okoth-Okombo, 1997; Suleh, 2013). Suleh, 2013 also identifies the lateral [**l**]; the glides [**w j**] and the trill [**r**]. (See: Tables 1 and 2). Although Dholuo is a tone language, tone is normally not represented in its orthography (Okoth Okombo, 1997).

## 1.2 Statement of the Problem

Number in Dholuo has proven to be an elusive concept for researchers. Different studies put forward analyses, which disagree on exactly how number in Dholuo nouns is expressed. The analyses put forward range from voicing alteration/polarity, the use of prosodic features and manner alternation. These approaches have not only disagreed amongst themselves, but have also explained with observable gaps how number is realized in Dholuo nouns. For instance, they have not fully accounted for the morphemes **[e], [i]** and **[ni]** overtly occurring word-finally in Dholuo plural forms. Similarly, their account for number in Dholuo as a feature alternation motivated phenomenon does not recognize that other Dholuo nominal structures exhibit similar voicing or devoicing of noun root final sounds, for instance the expression of possession. This study, therefore, sought to offer an alternative description and analysis of number in Dholuo by looking at the whole spectrum of Dholuo nominal morphology (nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives) and the related morphophonological alternations in the OT framework.

## 1.3 Objectives of the Study

The general objective of this study was to describe the morphophonology of Dholuo nominal structures using Optimality Theory.

The specific objectives of this study were to:

i. Describe the structure of Dholuo nominals.
ii. Determine how number is realized in Dholuo nouns.
iii. Explain the morphophonological alternations in Dholuo nominals.

## 1.4 Research Questions

This study sought to address the following research questions:

i. What is the structure of Dholuo nominals?
ii. How is number realized in Dholuo nouns?
iii. What morphophonological alternations occur in Dholuo nominals?

## 1.5 Justification of the Study

The purpose of this study was to explain the morphophonological alternations in Dholuo nominals in the framework of Optimality Theory. This study is expected to form an important literature resource for reference by students and teachers interested in Dholuo data. Further, it was intended to provide an alternative analysis of plural formation in Dholuo nouns by giving a detailed description of Dholuo nominals.

Moreover, how number is realised in Dholuo nouns has been elusive to scholars, most of who disagree largely on plural formation in Dholuo nouns. The previous studies have focused on the process of feature polarity in nouns when it is evident that this phenomenon occurs in other Dholuo nominal structures. The findings of this research will; therefore, fill this gap in knowledge by offering an alternative analysis of number in Dholuo and a comprehensive description of morphophonemic alternations in Dholuo nominals.

In addition, Teachers of English as a second language (TOESL) in schools where pupils have Dholuo as their first language will find the data and analysis from this study invaluable in explaining transfer errors in learning English. Furthermore, the Constitution of Kenya (2010) states that "Every person has the right to use the language, and participate in the cultural life, of the person's choice" Article 44 (1) (2) (a-b). This same constitution also creates county governments with autonomous legislative functions. It is expected that it is only a matter of time before indigenous languages are used in parliamentary debates at county assemblies. Currently, indigenous languages are taught in Grade 1, 2 and 3 in the new Competency Based Curriculum (CBC). In this sense, this study offers a valuable resource not only for those interested in publishing literature in Dholuo, but also for the Hansard editors at the county assemblies.

## 1.6 Significance of the Study

The findings of this study reveals that the voice polarity phenomenon employed by earlier studies in describing number formation in Dholuo nouns runs into empirical problem, particularly with Dholuo data. First, the study demonstrates that feature alternation, particularly voice polarity is empirically unattainable as noun roots in Dholuo do not end in voiced obstruents. Furthermore, the study has established that this phenomenon occurs as well in other nominals such as possessives and demonstratives vindicating the fact that voice polarity is not an exclusive feature for plural formation. In addition, the study has established that the (**NO(+Vc)CODA)** constraint in Dholuo nominals, which bars obstruents from being realized with **+VOICE** feature in the final phoneme of the root rules out the voice polarity phenomenon (see Section 4.2.1). As such, the study argues that [**VOICE]** feature plays a crucial, but not exclusively dominant, role in the description of formation of plurals or possession in Dholuo nominals. The study has established that Dholuo nominals behave in a significantly similar way in all the inflection processes. The feature [**VOICE]** is therefore an aspect of consonant hardening or weakening, an articulatory harmony requirement defining inflectional processes in Dholuo nominals. Consequently, this study concludes that Dholuo has a basic plural marker **-e** which has three allomorphic variations **–e, -i, -ni**. In

particular, articulatory harmony (consonant hardening/weakening and vowel place harmony) in Dholuo nominals play a crucial part in yielding the structure in the plural forms specifying the overt alternation in the root-final syllable.

## 1.7 Scope of the Study

This study, basically encompass the most salient aspects of Dholuo morphology and explains how they submit to morphophonemic constraints. However, practically it confines itself to the analysis of the structure of Dholuo nominals and how number is realised in Dholuo nouns. In attempting to describe number, this study excludes other grammatical aspects (gender, case, person) that might be overtly expressed when Dholuo nominals submit to morphophonemic alternations. Even if mentioned, these grammatical aspects are not discussed in detail.

It is unknown, at this point, how such omission might weaken the objectives of the study. Nonetheless, it is the researcher's conviction that aspects not encompassed by this study will be the work of other future research efforts. It will be the work of another study to explain the variations, if any, in how borrowed words into Dholuo lexicon may display different morphophonological processes in plural formation.

The study basically, in describing Dholuo nominal morphology, focuses on: Nouns, Adjectives, Numerals, Demonstratives, Possessives, Personal Pronouns, and their composite morphophonemics. This study confines itself to how Optimality Theory as conceived by McCarthy and Prince (2004); Prince (1994); Prince and Smolensky (1993) explain the morphophonemics of Dholuo nominals and the theory's ability to describe the variations that occur in sound changes and pronunciation in Dholuo plurals. The study was confined in Bondo Sub-County from which a random sample of respondents was chosen. Bondo was a convenient location for this study both in terms of cost and logistics. The researcher was able to easily deliver the test frames to the respondents and monitor both the pilot study and actual collection of data.

## 1.8 Limitations of the Study

It is assumed that the sample population chosen provided accurate and adequate data for the study, their fluency in Dholuo notwithstanding. It is assumed that the respondents were sincere and honest in their responses; however, the researcher being a native speaker of Dholuo used his intuitive knowledge to gauge the extremes on responses obtained. The list of nouns and nominals supplied in the test frames may have been a limitation to a free response that would be got from informal conversation; however, the researcher ensured that the words in the list contained a representative sample of all Dholuo phonemes. This study assumes that these responses were not mechanical, rehearsed and discussed or simply copied as to compromise a variety of result. To resolve this, the researcher personally delivered the test frames to the respondents and explained in detail what the respondents were required to do and the need to be honest and thorough.

## 1.9 Definitions of Key Terms

**Morphophonemics:-** (also morphophonology or morphonology) is the branch of linguistics that studies the interaction between morphological and phonological or phonetic processes focusing on the sound changes that take place in morphemes (minimal meaningful units) when they combine to form words. In Dholuo, phonological processes are either whole segment process (e.g., deletion, insertion) or modification type processes (e.g., assimilation and vowel harmony). The processes are mostly regressive with the suffixes initiating the dominant assimilation processes known as consonant hardening or weakening with vowels conforming to vowel place harmony.

**Nominal:** -a category used to group together nouns and adjectives based on shared properties. The nominal grouping is motivated by the fact that nouns and adjectives, in many languages, share a number of morphological and syntactic properties. Nominal morphology in Dholuo display a productive overt nominal marking. The particles consist of nouns, adjectives and numerals existing as bare or suffixed forms while personal pronouns, demonstratives, interrogatives and genitives existing as bound morphemes only

getting their semantic implication in a context.

**Optimality:** -this is the capability of a candidate in OT to satisfy the conflicting linguistic constraints and emerge victorious amongst competing candidates. Optimal candidate is also the output or the well-formed structure. Dholuo nominals adhere strictly to articulatory harmony in all suffixation processes.

**Constraint:** -a principle employed by OT in which a universal set of rules put requirements on well-formedness and structural organisation of segments. It ensures segments are marked for certain features and impose identity between output (surface form) and input (underlying structure). Constraints can conflict, are arranged in language specific format, and are violable. There is a constraint in Dholuo which enforces morphophonological alternations in the final phonemes in all Dholuo nominal structures in inflections. Dholuo has 8 constraints governing plural formation.

**Vowel Place:** -this is a cover term used in this study to refer to all the vowel features such as height, backness, rounding and ATR

**Assimilation:** -a phonological process in which there is a change of one sound to (become phonetically similar to) another due to the effect of a neighbouring sound or sounds so as to maintain a continuous, effortless flow of speech. The dominant assimilation process in Dholuo is consonant hardening or weakening with vowels conforming to vowel place harmony.

## 1.10 Theoretical Framework

This study is anchored on a theoretical framework known as Optimality Theory. Optimality Theory (hereinafter referred to as OT) is a linguistic model proposing that the observed forms of a language arise from the interaction between conflicting constraints. OT analysis is considered appropriate in achieving the study's objectives which are: first, to describe the structure of Dholuo nominals; second, to determine how number is realised in Dholuo nouns; and finally, to explain the morphophonological alternations in Dholuo nominal structure. The study's attempt to account for the morphemes **–e**, **-i** and **–**

**ni,** which are considered allomorphic variations of Dholuo plural morpheme can best be achieved by a framework such as OT that defines Dholuo linguistic restrictions admitting such variations. OT differs from other approaches to phonological analysis, such as autosegmental phonology and linear phonology (SPE) or even Generative phonology, which typically uses rules rather than constraints. OT models grammars as systems that provide mappings from inputs to outputs; typically, the inputs are conceived of as underlying representations, and the outputs as their surface realizations.

In linguistics, OT has its founding work on the influential talk by linguists Alan, Prince and Paul, Smolesky (1991) and later expanded by Prince and Mcarthy (2004). There are three basic components of the theory:

1. GEN (generator) takes an input, and generates the list of possible outputs, or candidates.
2. CON (constraint set) provides the criteria, in the form of strictly ordered but violable constraints, used to decide between candidates.
3. EVAL (evaluator) chooses the optimal candidate based on the constraints, and this candidate is the best output.

Optimality theory assumes that these components are universal and that differences in grammars reflect different rankings of the universal constraint set, CON.

The principles of OT as conceived by McCarthy and Prince (1993, 2001, 2004) constitute four aspects. First is *Violability*, constraints are violable; but violation is minimal. Second is *ranking*, constraints are ranked on a language-particular basis; the notion of minimal violation is defined in terms of this ranking. Third is *inclusiveness*, the constraint hierarchy evaluates a set of candidate analyses that are admitted by very general considerations of structural well-formedness which implies there are no specific rules or repair strategies. And the fourth is *parallelism*, best satisfaction of the constraint hierarchy is computed over the whole hierarchy and the whole candidate set.

Three principles underlie the component of Gen as assumed by McCarthy and Prince (1993, 1994, 2004), as well as Prince and Smolensky (1993): 1. *Freedom of Analysis*-states that any amount of structure may be posited. 2. *Containment*- no element may be literally removed from the input form. The input is thus contained in every candidate form, and, 3. *Consistency of Exponence*-no changes in the exponence of a phonologically-specified morpheme are permitted.

The other invaluable concept in OT analysis is the CON. In optimality theory, every constraint is universal. CON is the same in every language. There are two basic types of constraints: 1. *Faithfulness constraints,* which require that the observed surface form (the output) match the underlying or lexical form (the input) in some particular way; that is, these constraints require identity between input and output forms. 2. *Markedness constraints,* which impose requirements on the structural well-formedness of the output. Each plays a crucial role in the theory. Faithfulness constraints prevent every input from being realized as some unmarked form, and markedness constraints motivate changes from the underlying form.

The final and probably the most salient component of OT is the concept of *ranking* or better still *optimality*. To make this clear, let us consider a hypothetical language with two candidates **A** and **B**. Given these two candidates, **A** and **B**, **A** is better than **B** on a constraint if **A** incurs fewer violations than **B**. Candidate **A** is better than **B** on an entire constraint hierarchy if **A** incurs fewer violations of the highest-ranked constraint distinguishing **A** and **B**. **A** is optimal in its candidate set if it is better on the constraint hierarchy than all other candidates.

The grammar functions to pair underlying forms with surface forms: (**input1**, **output1**), (**input2**, **output2**), and so on. Suppose we have a certain underlying form /$\mathbf{in_k}$/ which gives rise, via Gen, to a candidate set {**cand1**, **cand2**, **cand3** and **cand4**}. If both **A** and **B** agree over the candidate set, then there is nothing to say. The optimal candidate -the output associated with $in_k$ -is just the one that meets both constraints. The suboptimal

candidate is the one that fails both of them. However, the interest increases sharply when the constraints disagree, or conflict, on the candidate set

The clearest way to set this out is in tabular form known in OT as *constraint tableaux* (4). Let us use the example given by McCarthy & Prince (2001) taking into consideration a hypothetical input /$\mathbf{in_k}$/

4.

| INPUT-OUTPUT | **A** | **B** | **C** | **D** |
|---|---|---|---|---|
| ☞ $Cand_1$ | | | | * |
| $Cand_2$ | *! | | *! | * |
| $Cand_3$ | | | **! | |
| $Cand_4$ | | * | ***! | |

Candidate **C**$\mathbf{and_1}$ and **cand**$\mathbf{_3}$ meet both **A** and **B**; while **C**$\mathbf{and_2}$ meets **B** but fails **A** just as **C**$\mathbf{and_4}$ meets **A** but fails **B**. Suppose now that **C**$\mathbf{and_1}$ is the correct output form associated with /$\mathbf{in_k}$/, constraint **A** has priority over constraint **B**, in the sense that when **A** and **B** disagree on a candidate-pair, the decision between them is made by A alone. In this case, we will say '**A** dominates **B**' and write: **A** >> **B**. At this point **C**$\mathbf{and_2}$ straightaway loses to all the potential competitors because of fatal violation of **A**. With the domination relation specified, we can construct a display that registers how various candidates fare on the hierarchy, using a Constraint Tableaux, in which **A** >> **B** >> **C** >> **D**, /$\mathbf{in_k}$/.

But how does **C**$\mathbf{and_1}$ become optimal and not **C**$\mathbf{and_3}$? **A** and **B** are uniform over the set, but **C** distinguishes them. In this case, the constraint **A** and **B** -though higher-ranked- can make no decision, and the matter is passed on to **C** thus indicating that simple violation of a constraint is never in itself fatal. Violation is only fatal when there are other competing candidates that pass the constraint. **C**$\mathbf{and_1}$ is, therefore, the optimal form or output because of two further reasons. Even though all the three violate constraint **C**, there is fatal violation by the other two which therefore hands **C**$\mathbf{and_1}$ victory. The second consideration that hands **C**$\mathbf{and_1}$ victory is therefore the principle of *Harmonic Ordering.* Harmonic Ordering entails the desirable result that any single constraint will only be

violated minimally in an optimal form. Therefore, other than fatal violation of **C**, **Cand$_3$** violates **C** twice and **Cand$_4$** three times committing the worst single violation of multiple segments compared to **Cand$_1$**.

There are a few basic conventions one needs to note from the constraint tableau: Left-to-right column order mirrors the domination order of the constraints, violation of a constraint is marked by an asterisk (*), satisfaction is indicated by a blank cell; the pointing finger (☞**)** marks the optimal candidate. Once a candidate does worse than another candidate on the highest-ranking constraint distinguishing them, it incurs a crucial violation (marked in the tableau by an exclamation mark) (*!). Shading emphasizes the irrelevance of the constraint to the fate of the candidate. A loser's cells are shaded after the fatal confrontation; the winner's, when there are no more competitors. To understand this better, let us put it in the perspective of the English plural considering the manifestations it incurs. Let us use the plural morpheme **/z/** realized on the surface as **–s** or **–es** in the words 'cats, dogs, dishes'. If these examples are subjected to the following constraint set, in descending order of domination (where, M: markedness, F: faithfulness) so that:

**M: *SS** - Sibilant-Sibilant clusters are ungrammatical: one violation for every pair of adjacent sibilants in the output.

**M: Agree (Voi)** - Agree in specification of [voi]: one violation for every pair of adjacent obstruents in the output which disagree in voicing.

**F: Max** - Maximize all input segments in the output: one violation for each segment in the input that doesn't appear in the output (This constraint prevents deletion).

**F: Dep** - Output segments are dependent on having an input correspondent: one violation for each segment in the output that doesn't appear in the input (This constraint prevents insertion).

**F: Ident (Voi)** - Maintain the identity of the [voi] specification: one violation for each segment that differs in voicing between the input and output.

We can subject them to a constraint tableau as follows:

5.

| dish + z > dishiz | | | | | |
|---|---|---|---|---|---|
| **dish + z** | ***SS** | **Agree** | **Max** | **Dep** | **Ident** |
| ☞ **dishiz** | | | | * | |
| **dishis** | | | | * | *! |
| **dishz** | *! | * | | | |
| **dish** | | | *! | | |
| **dishs** | *! | | | | * |

6.

| dog + z > dogz | | | | | |
|---|---|---|---|---|---|
| **dog + z** | ***SS** | **Agree** | **Max** | **Dep** | **Ident** |
| **dogiz** | | | | *! | |
| **dogis** | | | | *! | * |
| ☞**dogz** | | | | | |
| **dog** | | | *! | | |
| **dogs** | | *! | | | * |

7.

| cat + z > cats | | | | | |
|---|---|---|---|---|---|
| **cat + z** | ***SS** | **Agree** | **Max** | **Dep** | **Ident** |
| **catiz** | | | | *! | |
| **catis** | | | | *! | * |
| **catz** | | *! | | | |
| **cat** | | | *! | | |
| ☞**cats** | | | | | * |

In the constraint tableaux above (4-7), the optimal candidates are [ˈdɪʃɪz] (dishes), [ˈdɒgz] (dogs) and [ˈkæts] (cats) respectively. The violations incurred by the candidate 'dogiz' are a subset of those incurred by 'dogis'; specifically, if you epenthesize a vowel, changing the voicing of the morpheme is a fatal violation of constraints in the English language. In the 'dog + z' tableaux, there is a candidate 'dogz' which incurs no violations whatsoever thus harmonically bounds all other possible candidates.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Introduction

This chapter offers a critique of previous research in Dholuo morphophonology, Dholuo nominals, number in Dholuo and related empirical studies as well as studies that have used OT as a theoretical framework. In analyzing Dholuo morphophonemics, this study seeks to describe the structure of Dholuo nominals, determine how number is realized in Dholuo nouns and explain the morphophonological alternations in Dholuo nominals. Previous studies have looked at conditioning occurrence of morphemes, function and status of morphophonological processes as a pedagogical tool. The studies have also discussed nominal grouping and marking system, semantic motivation of morphemes and relation of specific morphemes with their grammatical categories as well as analysis of the grammatical category- number.

There are a number of reference materials on Dholuo language, which include Huntingford (1969), Malo (1952), Onyango (2002), and Stafford (1967). These works provide grammatical descriptions of Dholuo intended, especially, for those who are interested in learning and acquiring a working knowledge of the language. These works form the basis of the current study and are vital reference materials.

Some of the previous studies have focused on Dholuo morphology, phonology, semantics and syntax. There are studies such as Omondi (1982) that have focused on morphological process involved in the formation of Dholuo words such as compounding, affixation and reduplication. However, Omondi (1982) differs with the current study in terms of data and process just as Atoh's (2001) semantic analysis of Dholuo nouns using a semantic field approach does. Another study, Okombo (1982) offers an analysis of Dholuo morphophonemics in Generative Framework, which is crucially relevant for this study but which differs as well in the framework used.

## 2.2 The Structure of Nominals

The first objective of this study was to describe the structure of Dholuo nominals. The term nominal in linguistics refers to a category that groups together nouns and adjectives based on shared properties (Crystal, 2008.) The nominal grouping is motivated by the fact that in many languages, nouns and adjectives share a number of morphological and syntactic properties. Typically, an affix related to the noun appears attached to the other words within a group to create agreement. Such morphological agreement usually occurs in parts within the NP, such as determiners and adjectives but how and to what extent this agreement is required differs from one language to another.

In languages with overt nominal morphology, grasping the inter-relation of specific morphemes and a particular grammatical category is as key as understanding its semantics without which utterances appear as little more than a string of words (Vaux & Cooper, 1999). In their study of Polish, Vaux and Cooper (1999) reveal that the following two constructions with the same word order can mean very different things.

1. (a) Mężczyzn**a** caluje kobiet**ę** (The man kisses the woman)
   (b) Mężczyzn**ę** caluje kobiet**a (**The woman kisses the man)

In (1a) above, the nominative ending **–a** in 'mężczyzn**a'** identifies the man as the subject and the accusative ending –**ę** in 'kobiet**ę'** identifies the woman as the direct object; in (1b) the change in the endings have effect in change of meaning.

These languages, with overt nominal morphology, categorise the nouns in classes or declensions based on the morphological endings (Vaux & Cooper, 1999) so that there is a straightforward way of eliciting plural forms based on the nominative singular endings. This study would like to attest if plural formation in Dholuo nouns is a direct product of the language's overt nominal morphology as is demonstrated by Vaux and Cooper (1999) in their study of Polish. Number in Dholuo nouns may or may not be a straightforward affair as the above study claims. Despite being a complex grammatical category, number is an important component of the nominal structure of any given language.

Unlike English where nominals are realized syntactically, Latin and a number of Bantu group of languages have a highly productive marking system in which nominals can be seen in the shared morphemes that attach to the ends of nouns and adjectives and agree in case, number, person or gender, (Nurse, 2003). In languages like Latin with overt nominal morphology, nouns are grouped into one of the five declensions, or noun classes. In Latin, the case and number endings, for example, are different for each declension, so that, for instance, the morpheme **–a** is the nominative singular ending for nouns of the first declension, but not for any other declension. The current study was interested in finding out if Dholuo nouns fall into different classes based on their roots and or forms. The study by Nurse (2003) takes the morphosyntactic approach while the current study takes the morphophonemic approach. In addition, the object language of study, Latin and Kiswahili, are different from Dholuo both in typology and structure. The two studies therefore are expected to yield slightly different results.

Another aspect crucial in nominal morphology is the grammatical case gender. English, unlike other languages does not overtly exhibit grammatical gender in its morphology. Determining if there is grammatical gender requires eliciting the words for inanimate objects and other non-human nouns, as well as human nouns. Creissels (2002) observes that most sub-Saharan languages, and a number of Nilo-Saharan languages as well, display a binary gender system with the sex distinction as their semantic basis (*masculine* vs. *feminine*). However, he notes there are other forms of expressing gender for example "generic gender" as seen in Hamar. Table 3 exemplifies generic gender in Hamar language.

**Table 3**

*"Generic Gender" in Hamar Language.*

| | |
|---|---|
| á**tti** | (general) 'bird' |
| á**ttɛ** | (singular masculine) '(small) bird' |
| á**ttino** | (singular feminine) 'big bird' |
| á**ttina** | (singular feminine) 'birds' |

*Note. Adapted from Creissels (2002) view of other forms of expressing gender*

Despite the above two gender assignment procedures being crucially relevant to this study, it is this third classification that relates closely to the object of the study. Creissels (2002) notes that there are languages that gender assignment rules is phonologically defined with a particular interesting type of interaction between gender and number as is the case of Afar language demonstrated in Table 4 below.

**Table 4**

*Gender and Number in Afar language.*

| | | | |
|---|---|---|---|
| **fiddimá** (F) | 'mat' | **fiddim** (M) | 'mats' |
| **makiiná** (F) | 'machine' | **makaáyin** (M) | 'machines' |
| **baál** (M) | 'feather' | **balwá** (F) | 'feathers' |
| **búyyi** (M) | 'well' | **buyyá** (F) | 'wells' |

*Note. Adapted from Creisels (2002) on how gender and number interact*

In Afar, gender assignment rules operate regardless of the morphological status of the ending of nouns, and they operate on noun forms (not on lexemes) regardless of the singular vs. plural distinction: the gender of plural noun forms is simply determined by their phonological form, and consequently does not necessarily coincide with the gender of the corresponding singular form. Dholuo may be structurally and phonologically unidentical with both Hamar and Afar, but the particular interesting relationship of gender with the corresponding number assignment in Afar is within the object of this study. This notwithstanding, Creissels (2002) theoretical framework relies on rules while this study puts emphasis on linguistic constraints in the analysis. Further on the question of the analysis of the nominal particle- gender, Dow and Green, (2013) offer an account of Najamba suffixation in two classes of inanimate /-**ŋgo**/ and animate /-**ŋge/** nouns that draws upon principles of stem versus affix faithfulness, as well as the phonotactics of permissible syllable margins and syllable contact in Najamba language. Although, the study by Dow and Green, (2013) offer a gender analysis in Najamba, a nominal constituent invaluable in this study, the two object languages of study (Dholuo and Najamba) are different. Further, their study draws their description from Heath (2011) which they considered "incomplete" justifying the current study to add onto the rich debate on the nominal particle, gender.

Numeral classifiers are also important in the analysis of nominal morphology. Numerals according to Cooper and Vaux (1999) are common in many East African languages, but it has not been adequately documented in Dholuo making it a crucial component for description by this study as part of Dholuo nominal structure.

Another crucial component in nominal morphology is the grammatical category, pronouns. It is easy to test if a word or a morpheme is a pronoun since pronouns replace whole NPs (Noun Phrases), are not modifiable by adjectives and determiners, (Bhat, 2004). However, a distinction must be made between personal pronouns and other "proforms" according to Bhat (2004). He further notes that the number of paradigms that occur in the system of proforms differs from language to language. In the analysis of pronominal structures, it is important to distinguish gender and number. In English for example, the 2nd Person pronoun "you" is indeterminate when it comes to number. Table 5 gives morphemes which indicate possessive pronouns in Dholuo according to Onyoyo (2001) and how each of them would inflect with the word 'gʊɔk' (dog)

**Table 5**

*Dholuo Possessives.*

| Person | | Sg | Glossary | | Pl | Glossary |
|---|---|---|---|---|---|---|
| **1** | **-a** | **gʊɔga** | my dog | **-wa** | **gʊɔgwa** | our dog |
| **2** | **-i** | **gʊɔgi** | your dog | **-u** | **gʊɔgu** | your dog |
| **3** | **-e** | **gʊɔge** | his/her dog | **-gi** | **gʊɔggi** | their dog |

*Note. The data here is adapted from Onyoyo (2001)*

From the example in Table 5 above, it is evident that there is voicing of the stem final consonant in the word 'gʊɔk,' [**k**] → [**g**], even when there is no pluralisation, but the word shows different levels of possession. Voice alteration, therefore, may not be an exclusive process in plural formation in Dholuo as the previous studies have argued. This study looks at the structure of Dholuo nominals and the encompassing Dholuo morphophonemics as a way of giving a complete description of how number is realized in Dholuo nouns.

Most languages which have overt nominal morphology could be viewed to be having straight forward way of eliciting plural forms but this may not be so with Dholuo plural formation. Despite its complexity, number is an important nominal constituent and it has been given prominence in the current study. When describing number, other grammatical properties come into interplay. For instance, according to Heidi, H. and Elizabeth, R. (2002), there is a close relationship between number and person; number and pronouns; number and determiners in many languages.

Closely related to number in nouns is the aspect of determiners. There are languages, which have determiners morphologically conditioned whereas there are others where determiners are syntactically conditioned like English. Laura and Morgan (2017) in their study of Somali nominals found out that nouns in Somali can be followed by a number of determiners whose distinction is gender based. They identified (a) definite **–ka/-ta;** (b) remote definite **–kii/-tii;** (c) possessives and, (d) demonstratives. Table 6 details some examples in Somali nominals where determiners distinctions are gender based.

**Table 6**

*Somali Determiners*

| **Root** | **Gloss** | **Noun + Det** | |
|---|---|---|---|
| **nín** | 'man' | **nín-ka** | 'the man' |
| **naág** | 'woman' | **naá-ta** | 'the woman' |
| **nín** | 'man' | **nín-kán** | 'this man' |
| **naág** | 'woman' | **naág-tan** | 'this woman' |
| **nín** | 'man' | **nín-kaé** | 'which man' |
| **naág** | 'woman' | **naág-teé** | 'which woman' |

The current study identifies and describes determiners in Dholuo nominals as well as giving an explanation on the conditioning of the determiners (morphological, phonological or syntactic) with the composite grammatical category of number. The study also offers an in-depth description of structure all the nominal particles in Dholuo: nouns, adjectives, numerals, personal pronouns, demonstratives, interrogatives and genitives.

## 2.3 Number in Dholuo Nouns

The second objective of the study was to determine how number is realized in Dholuo nouns. Number is a very challenging grammatical aspect of a language (Alyilmaz, 2017). Number might appear to be one of the simplest and straightforward natural categories but on closer inspection it presents a great many difficulties, both logical and linguistic (Jespersen, 1924) and therefore its analysis as a category in particular languages may be a very complex matter (Lyons, 1968). Acoording to Corbett (2001) number is neither a singular-plural opposition nor do all items that mark number behave the same way. In his study of number, Corbett (2001) examines five assumptions made about number formations. His study forms a basis for the current one but his over-reliance on English exemplification, a language with covert inflectional morphology sets it apart from Dholuo which the researcher views to display overt number marking. Number may therefore be deceptively simple, (Corbett, 2002) but can not be simplified in the concept of 'plurality' alone (Alyilmaz, 2017). The current study was particularly interested in determining how number is expressed in Dholuo by offering an in-depth description of number in Dholuo nouns, bearing in mind the complexity and varied ways in which it may be realized in other languages.

Alyilmaz (2017) studied "plurality" of nouns in Turkish, in which he concludes that the plural morpheme **/+lar/** is affixed after nouns functioning as subject. He argues that the **/+lar/** affix is only one of the linguistic elements in the morphological plurality used for marking plural in Turkish. Further, Alyilmaz (2017) argues that the plurality in Turkish is a name of a category (as it is in all world languages) and is made in three ways: morphological plurality, semantic plurality, and syntactic plurality.

Drawing from Alyilmaz (2017) analysis above, it is incumbent on this study to elaborately explain number in Dholuo nouns so as to dispense or clarify some of the assumptions by other studies which argue that number is just a dual opposition of singular-plural. Although there are indeed languages with this basic opposition, there are also many languages with richer systems; with a dual, trial, paucal, with the richest systems having five number values as in Sursurunga (Corbett, 2002).

Number in Dholuo is similarly a complex phenomenon. This study deals with how the aspect of morphology relates to number, for example the question of whether number in Dholuo is prototypically inflectional. It is the assumption of this study that number is a distinct nominal category. However, there are documented data showing number in other languages as a verbal category (Corbett, 2002).

Previous studies (Alderete, 2001; Bye, 2006; De'Lacy, 2002, 2009, 2010; Okoth-Okombo, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) have not quite agreed on how exactly number is expressed in Dholuo. Various studies have proposed differing explanation of plural formation in Dholuo. In each successive explanation, they have marginally conceded that there is some feature alternation involved in plural formation. However, these studies disagreed sharply on what particular features are used to describe plural formation in Dholuo nouns. The present study also grapples with the question whether there is genuinely a voice polarity in Dholuo data as claimed by some previous research.

Stonham (1994) provides the earliest documented attempt to explain the phenomenon of voice alternation in Dholuo plural formation. He claims that Dholuo number inflection has only one morpho-phonological rule which consistently triggers voicing of root-final obstruents. His assumption is that nouns in their basic form can be inherently either singular or plural, and that obstruent voicing serves to indicate the marked (non-inherent) value of number for each noun, in a rule formulated (2) as:

2. **C → [+voiced] /__ (V) # [+marked number].**

The analysis offered by the current study, which agrees with the observations made by Bye (2006); De'Lacy (2009, 2010) and Trommer (2008) point out to various gaps in the approach taken by Stonham (1994). First, the approach contradicts the morphological number marking in Dholuo nouns which tends to affix the three allomorphs, **-e**, **-i**, and **-ni**, to the plural noun as seen in Table 7.

**Table 7**

*Morphological Number Marking in Dholuo Nouns*

| Singular | Plural | Glossary |
|---|---|---|
| **ruɔɵ** | **ruɔð-i** | king |
| **guɔk** | **guɔg-i** | dog |
| **luɵ** | **luð-e** | club |
| **opuk** | **opug-e** | tortoise |
| **ndi:ga** | **ndi:g-ni** | bicycle |
| **ku:be** | **ku:b-ni** | water jerrican |

The current study also notes that there are a number of nouns which form their plurals without necessarily exhibiting feature polarity as demonstrated in Table 8 below.

**Table 8**

*Dholuo Nouns Forming Plurals without Feature Polarity*

| Singular | Plural | Glossary |
|---|---|---|
| **ip** | **ip-e** | tail |
| **arip** | **arip-e** | milky way |
| **baɵ** | **beɵ-e** | side |
| **lak** | **lek-e** | tooth |
| **lek** | **lek-e** | herd (of cattle) |
| **ʧupa** | **ʧup-e** | bottle |
| **osiki** | **osik-e** | stump |

If Stonham (1994) analysis were to be taken as it is, it would certainly imply that Dholuo nouns form plurals in a symmetrical pattern and that all nouns basically end in consonants. The example given in Tables 8 and 9 give a picture of asymmetrical plural formation as well as a mixed structure where nouns end in both consonants and vowels.

Whereas there are those who argue that Dholuo nouns form plurals by "voicing alternation", (Alderete, 2001; Stonham, 1994; Wolf, 2005), there is a group of studies that say plurals are formed by what is called "voice polarity" **(**Tucker, 1994). At least these two groups agree that the feature voice is involved in plural formation in which both argue that nouns in Dholuo which end in a voiced consonant, the consonant is

devoiced in the plural, while those that end in voiceless consonants, the consonants are voiced in the plural.

In addition, Gregersen (1972); Okombo (1982) propose a slightly different approach called switch alpha rule, a rule-based analysis which has been opposed by proponents of OT who argue that such rule-based analysis cannot adequately account for plural formation in Dholuo. Switch alpha rule states that Dholuo final consonants switch their voice feature in the plural form in a morphologically triggered plural context formulated in (3):

3. **/α/ → [β] and /β/ → [α].**

The rule in (3) above is objected by some linguists on the postulate that 'rules should not be able to arbitrarily switch feature values' and because it may also imply that language functions in a binary system (Lecarme, 2002) which may be true for some features in some languages but may not apply in others, including Dholuo.

Another proponent of voice alternation phenomenon, Wolf (2005) argues that Dholuo voicing polarity derives from allomorphy of floating features. His approach is of the autosegmental view, suggesting that patterns of mutation are the result of constraints demanding faithfulness to and distinctive realization of structure. In this perspective of explaining plural in Dholuo using the autosegmental approach, his analysis shares the basic ideology as de'Lacy's (2008). However, the two differ on both process and detail of the approach. Whereas Wolf (2005) proposes three constraints to govern the behaviour of floating autosegments, seen in (4) below, de'Lacy (2008) argues that feature changes are not implemented by attachment of floating features, but by coalescence of segments. The argument by Wolf (2005) is illustrated in (4) using the possessive genitive input **bat** **"**arm" which, according to him, will have all the three floating features **bat** [-vc]1 + { [+vc]2, [-vc]3 } and demonstrates an identical process to the nominative

plural, a clear indication that the feature alternation phenomenon is not exclusively applicable to number in nouns.

4. **bat "**arm" [-vc]1 + { [+vc]2, [-vc]3 }

| INPUT | OUTPUT | MAXFLT | NOVACDOCK | IDENT [VC] |
|---|---|---|---|---|
| **bat** [-voi]2<br>\|<br>[-voi]1 | a. **bat-{e}**<br>\|<br>[-voi]1,2 | | *! | |
| **bat** [+voi]3<br>\|<br>[-voi]1 | b.☞ **bad-{e}**<br>\|<br>[+voi]3 | | | * |
| **bat** [-voi]2<br>\|<br>[-voi]1 | c. **pat-{e}**<br>\|<br>[-voi]1,2 | * | *! | |

The constraints are such that **MAXFLT** requires the viable candidate to have one of the floating features realized in the output, **NOVACDOCK** requires some association of a floating feature to a segment, that is, floating features cannot dock onto segments that already bore the same feature value in the input and **IDENT** [VC] requires docking in the alternate voice feature. The winning candidate is ☞**bad-{e}** because it stands in correspondence with the **[+Voi]** allomorph even though it violates the docking that **[+Voi]** to an underlyingly **[-Voi]** consonant which violates **IDENT(Voi)**. Candidate (c) is out rightly ruled out because of the alignment constraint in Dholuo which requires the genitive form to be aligned to the right of the root word.

This analysis offered by Wolf (2005) is, however, deficient and would only work in a (hypothetical) language where voicing polarity appears regardless of syllable structure, (Trommer, 2008). The analysis implies roughly the same possibilities as the one offered by Stonham (1994), and Alderete (2001) 'Transderivational antifaithfulness' making inference to a language where all roots are consonant-final. This is not the case with Dholuo nouns which end in both consonants and vowels and have final devoicing.

The other proponents of voicing polarity (Pulleyblank**,** 2006 & Trommer, 2006) argue that final obstruents in Dholuo noun roots are underlyingly voiced, unvoiced or unspecified for voicing. Voicing polarity in consonant-final roots then amounts basically to final devoicing, while vowel-final roots show a three way-contrast of voicing distribution exemplified in Table 9 below.

**Table 9**

*Three Way-contrast of Voicing Distribution*

| | Sg | Pl | Gloss |
|---|---|---|---|
| a) Singular unvoiced - Plural unvoiced: | **osi:ki** | **osi:k-e** | 'stamp' |
| b) Singular voiced - Plural unvoiced: | **kidi** | **kit-e** | 'stone' |
| c) Singular voiced - Plural voiced: | **ŋu:di** | **ŋu:d-e** | 'neck of meat' |

*(Note: adapted from Trommer, 2006)*

There are inconsistencies in the data provided by Trommer (2006). For instance, the nouns in (a) and (c) in Table 9 have long vowels while that in (b) does not despite all the three being obstruent final and forming plurals in an identical way. However, in a subsequent study Trommer (2008) admits that the earlier analysis was problematic since the distribution given above in Table 9 is generally marginal. The current study, therefore, intends to offer an alternative description that would clarify or dispute the controversy seen in Trommer (2006, 2008). The question the current chapter grapples with is whether Dholuo plural is actually a product of voice polarity or a result of autosegmental processes, and if the latter, to offer an elaborate analysis that caters for the void in the previous studies (Alderete, 2001; Bye, 2006; de'Lacy, 2002, 2009, 2010; Okoth, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006, 2008; Tucker, 1994 & Wolf, 2005).

Another study, Bye (2006) on the other hand argues that plural in Dholuo, and feature polarity in particular, is a product of prosodically and morphologically conditioned 'stopping' and 'destopping' of Dholuo nouns and verbs which affixes a [stop] feature immediately following the nucleus (V) resulting in insertion of a /C/ as seen in (5) below:

5. (a) **ʧwɛ** **ʧwɛ-ʧɛ** ‘leech’
(b) **duɛ** **due-ʧe** ‘moon, month’

Whereas in the case of CVCV core, [stop] merges with the rightmost consonant as in (6) below:

6. (a) **ɔkwadʒɔ** **ɔkwəʧe** ‘cane’
(b) **lowo** **lope** ‘earth’

According to Trommer (2008), the analysis offered by Bye (2006) has not exhaustively explained plural in Dholuo. First, his analysis assumes that all Dholuo noun roots exclusively end in stops and if they were not, they must be made to be one by either insertion or merging. In OT framework which the current study relies on, markedness and faithfulness constraints will obviously block the two processes proposed by Bye (2006). Moreover, even if insertion and merging were to explain plural formation in Dholuo, it would take care of a very marginal section of the nominal structure. Also, there seems to be lack of vowel harmony in the data provided by Bye (2006) in pluralisation in (12-13) contrary to Dholuo morphophonotactic demands.

Further, de’Lacy (2009, 2010) contends as well that morphological polarity does not occur in Dholuo pluralisation. Instead, de’Lacy (2010) proposes four distinct mutations morphemes which result in: devoicing, desonorization, devocoidization, and root-final vowel deletion. According to him, the plural forces devoicing, desonorization, devocoidization and deletion of a root-final vowel. However, the current study will treat these four mutations as “aspects of lenition” borrowing from the argument advanced by Trask (2000) which expounds on Hyman (1975) phonological scale and the proposition by Lass and Anderson (1975) on weakening trajectory.

In addition, the proposition by de’Lacy (2009, 2010) is deficient because, still, it argues that voicing plays an important part in Dholuo pluralisation but the current study establishes that voicing occurs regardless of pluralisation. Secondly, some of the data used for analysis by de’Lacy (2010) are misleading as some genitive forms have been

presented as noun roots or nominative singular. For instance, the genitive forms [**koð]** "rain of", **[tidʒ]** "work of", **[ʧag]** "milk of" have been presented as nominative singular. On the contrary, the current study has demonstrated in Section 4.2.1, Section 4.2.2.1, and in Section 4.2.2.2 that voiced obstruents do not occur at the noun root final position in bare noun forms in Dholuo. As a result, the phonemes [**b**, **g**, **ð**, **ʤ**] are realised as final segments in a noun root in affixed noun forms but not in bare noun roots.

One of the studies that have strongly disagreed with the voice polarity/alternation process and the exchange rule is Ong'ayo (2016). He argues that when nouns in Dholuo change from singular to plural, they do not just alter the voice feature. He proposes that plural formation in Dholuo shows similarity in the areas of articulation in terms of articulators and where areas are not shared; there is switch in the articulators either from front to back or from back to front.

To this end, the current study agrees to a fair extent with this analysis by Ong'ayo (2016) because from the data collected, the researcher is not convinced that voice polarity could be the only feature or process defining pluralization in Dholuo nouns. However, the major weakness of Ong'ayo (2016) is that his analysis is incomplete because, on those nouns that retain their forms in either singular or plural, his explanation is that the nouns instead use vowel changes to reveal plural formation. Similarly, without offering adequate account, Ong'ayo (2016, p.12) opines that there are also cases where the suffix **–ni** is used to reveal the plurals.

It is, therefore, evident from the foregoing, that the use of feature exchange by the previous studies in explaining plural formation in Dholuo nouns is problematic. They do not adequately explain the reason why the so called 'feature alternation' is only applicable in plural formation process but not in other Dholuo nominal structures which exhibit similar voicing or devoicing of final sounds of the root when, for example, expressing possession. In addition, previous studies have not adequately accounted for the suffixes **[e]**, **[i]** and **[ni]** attached to Dholuo plural forms.

This study therefore offers an alternative analysis and description of number in Dholuo by looking at the whole spectrum of Dholuo nominal morphology (nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives) and the morphophonological alternations in the composite. Feature polarity has been seen by this study as one of the many constraints that define plural formation in Dholuo nouns. The study has also attempted to account for the suffixes **[e]**, **[i]** and **[ni]** which have been categorized as allomorphs of the morpheme –**e.**

## 2.4 Morphophonology

The third objective of this study was to describe the morphophonological alternations in Dholuo nominals. Morphophonology is the branch of linguistics that studies the processes of interaction between morphology and phonology. When morphemes combine, they have effect on each other's sound structure resulting in different variant pronunciations for the same morpheme. In languages that overtly show morphological marking, a language's morphophonemics is acutely affected by phonology. In fact, the variations in the sound system of a language (seen in the morphological markings) are a central element in nominal morphology, (Vaux & Cooper, 1999). Analysis of morphemes and morpheme boundary as well as a description of its function (morphologically and syntactically) is the central focus of researchers interested in a language's morphophonemics.

Morphophonology has been an interesting area of study for linguists the world over. There are a number of studies, in different languages, aimed at accurately predicting the phonological rules that define the observable morphophonological alternations in a language. Medeiros (2017) describes two morphemes in Hawaiian, **ho'o** and **ha'a**. Using Distributed Morphology Theory, he argues that these morphemes are syntactically conditioned but are in complementary distribution. The current study differs from Medeiros (2017) both in form and content. While he adopts the Distributed Morphology Theory, the current study uses OT in data analysis. Even though Medeiros (2017) deals with passive and nominalization processes resulting from the morpho-syntactic analysis

of the two morphemes, the latter which is the object of the current study, he used Hawaiian data while this study looks at Dholuo. Despite these points of departure, Medeiros (2017) offers invaluable account for morpho-syntactic distribution of the occurrence of the morphemes which forms foundation for this study. This study, though, has put minimal emphasis on the morpho-syntactic distribution of the morphemes that categorise Dholuo nominals. Where morpho-syntactic examples have been given, emphasis is put on the morpho-phonological variations as opposed to syntactic distribution.

Other than syntactic conditioning of the occurrence of morphemes, previous studies have analysed the function and status of morphophonemic alternations in languages. Abbas (2017) in his study of Makassar, an Australian language, examines the morphophonemic of Makassar verbs. The study aimed to reveal the status and function of morphophonemic prefix **aN-** and prefix **aK-.** The current study used targeted elicitation approach using various test frames and the researcher's intuitive knowledge of the language of study in data collection, different from Abbas (2017) who used the method of hearing, recording and noting conversations. The results of the study by Abbas (2017) showed that the prefix **aN**- and the prefix **aK-** had different status of morphophonemic. Prefix **aN-** forms serve as forming a transitive verb that can undergo the gemination of morphophonemic basis, while the prefix **aK-** forms function as an intransitive verb that can be experienced in gemination morphophonemic and glottal.

The study by Abbas (2017) focuses on verbs while this study is concerned with the morphophonemic of nominals. In addition, Abbas (2017) confines his study to just two prefixes but the current study explores the whole range of affixation (both prefixation and suffixation) processes evident in Dholuo nominal morphology. Moreover, the study was conducted on Makassar, an Australian language, but this study looked at Dholuo, a Western-Nilotic language spoken in Eastern Africa. It is interesting to look at how the result of the analysis of morphophonemic processes in Dholuo Nominals compare to morphophonemic analysis of Makassar verbs. The results of this study show that the

morphemes defining Dholuo nominals can occur as both prefixes and suffixes. Unlike in the case of Abbas (2017) these morphemes are not experienced in gemination.

The description of morphophonological alternation in a language is not an end to itself. Among other benefits, it is a useful pedagogical tool. Adebola (2013) describes the affixation processes involved in English and Yoruba word formation systems with the aim of identifying areas of differences and similarities for pedagogic implications. His analyses of English and Yoruba derivational and inflectional processes of affixation reveal that the English language offers itself to both prefixation and suffixation morphological processes but the Yoruba language lends itself to morphemic prefixation only in its word formation. Despite the convergence in pedagogic implications of the result of the current study and Adebola (2013), the latter is a comparative analysis of two languages with the aim of identifying areas of differences and similarities. While the study dealt with word formation processes of the two languages in order to expose areas of possible interest to pedagogy, the current research is neither a comparative study nor does it intend to overemphasize the pedagogical implications of the observable morphophonemic alternations. Instead, its interest is to unlock and offer an alternative description of number in Dholuo nominals. Despite this, the result of the study by Adebola (2013) is significant in second language learning as it implies that ESL teachers could use these areas of contrasts and similarities as effective teaching devices to teach and correct interference errors among learners.

In morphophonology, the central component is the morpheme. A morpheme exists either as a *root (stem)* or *affix*. An affix basically is attached before the root, in which case it is called a *prefix*, or it is attached after a root, in which case it is called *suffix*. The various realizations of the same morpheme are called *allomorphs*. Allomorphs are morphologically, phonologically or syntactically conditioned. Medeiros (2017) found out that the two morphemes in Hawaiian, ***ho‘o*** and ***ha‘a***, are syntactically conditioned allomorphs, related to distinct cyclic domains, understood within the theory of Distributed Morphology (Halle & Marantz, 1993; Marantz, 1997). The current study

intended to establish the conditioning of Dholuo plural morpheme. Although Medeiros (2017) is a study on Hawaiian while this study is on Dholuo, the two converge on the interest on conditioning of allomorphs.

The process involving the sound changes that occur when roots interact with affixes is the domain of morphophonemics. There are languages that are all suffixing, some all prefixing and there are those that have both. Green and Dow (2013) in a study of Najamba, a Niger-Congo dialect called Dogon, presented a morphophonological account of suffixing nouns in Najamba in contrast with what they considered inadequate Heath's (2011) analysis. They proposed that several phenomena reflect Najamba's stem's nature as underlyingly vowel- or consonant-final. In general, sonorant-final stems are identified by the alternation of a stem-final vowel in the bare form with null in the suffixed form. They identified two major suffixes in Najamba, the inanimate **-ŋgo** and the animate –**ŋge.**

The current trend in morphophonology is not to focus on rules that describe these morphophonological alternations, but modern grammars have been viewed as sets of principles and constraints on the well-formedness of linguistic expressions, (Spencer, 1994). One of the theories that emphasize on the well-formedness of a linguistic expression is Optimality Theory (OT) that is employed by the researcher in this study. Oztaner (1996) in a study of Turkish Grammar offers a computation of Turkish morphological description and how word forms are generated. The description constituted a morphological component consisting of a two-level morphophonemic rule and a lexicon component, which lists the lexical items and encodes the morphotactic constraints. He found that Turkish (like Najamba) is an all-suffixing language. In looking at morphophonology, the most important and productive linguistic aspect in languages that overtly show morphological markings is the nominals. Okoth-Okombo (1977) is one of the few studies that have focused on Dholuo Morphophonemics. However, Okoth-Okombo (1977) uses generative framework while this study intends used OT framework.

In looking at the morphophonemic alternations in Dholuo nominals, this study refers to other studies that have employed OT in data analysis. There are a number of studies that

have used OT in describing morphophonology of other languages. Gaskil (2013) offers an analysis of Italian Metaphony that is couched in a recent variety of Optimality Theory (McCarthy, 2007; Prince & Smolensky, 1993, 2004), a framework that is used by this study. Although the language of reference is Romance (Italian), and that of this study is Dholuo, the convergence on the theoretical framework used makes it an invaluable reference for this study.

Alderete (1998, 2001) are also crucial references to this study as far as the use of OT in explaining number in Dholuo nouns is concerned. This study is a little divergent from Aldarete's since Alderete (2001) confines his study to a variant of OT he calls Trans-Derivational Antifaithfulness (TAF). Seemingly, previous studies on Dholuo nominal morphology using OT as a theoretical framework have not been elaborately documented. This therefore justifies this study, which fills the void left by previous studies that have used other theoretical framework, particularly in the analysis of number in Dholuo nouns.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter discusses the methodology employed in the study in terms of: research design, area of the study, population of the study, sampling technique, data collection instruments, reliability and validity of data collection instruments, data collection procedures and data analysis procedures.

## 3.2 Research Design

This study adopted a descriptive analytic research design. Being a study on the Morphophonemics of Dholuo nominals, its aim was to describe the structure of Dholuo nominals, analyse the morphophonemic alterations overtly exhibited in Dholuo nominals and explain how number is realised in Dholuo nouns. Descriptive research studies are those studies, which are concerned with describing the characteristics, with specific predictions, with narration of facts and characteristics concerning individual, group or situation (Kothari, 2004). According to Kothari (2004) most of the social research comes under this category.

## 3.3 Area of Study

This study was conducted in Bondo Town (See Appendix E1-Base Map of Bondo showing political and administrative units, and Appendix E2-Map of Siaya showing Bondo and its neighbouring townships). Bondo is in Siaya County predominantly inhabited by the Luos, approximated at 90% of the population (Siaya County Spatial Plan, 2018). Bondo Town is the Sub-County headquarter of Bondo Sub-County located about 50 kms North-West of Kisumu. Bondo has a population of 197,883 (Kenya Population and Housing Census, 2019) a majority of whom are Luos, out of which 7,797 was classified urban by Kenya Population Census, 2009. According to Siaya County Spatial Plan (2018) Bondo is estimated to currently have a population of 31,573.

Bondo Town has five wards: Ajigo, Barkowino East, Barkowino West, Bondo Town and Nyawita. It covers approximately 80 $km^2$. Bondo was an appropriate location for this study not only because of its proximity to the researcher, but also because it is predominantly inhabited by Dholuo native speakers. The Kenya Population and Housing Census (2019) rates Bondo as the second most populous sub-county in Siaya, and contributes to 20% of the county's total population. Moreover, according to Siaya County Spatial Plan (2018) Bondo is not only the fastest growing town in Siaya, but also has the largest population density and the most populated per square metre.

Consequently, Bondo was a convenient location for this study both in terms of cost and logistics. The researcher was able to easily deliver the test frames to the respondents and monitor both the pilot study and actual collection of data. However, this research would suitably be conducted in any other area so long as there are native speakers of Dholuo. The study prioritises the availability of native speakers of Dholuo over their actual location.

### 3.4 Population of the Study

The general population for this study was all the native speakers of Dholuo. The target population for this study was all the native speakers of Dholuo in Kenya estimated as 5,066,966 (Kenya Population and Housing Census, 2019). The accessible population from which a study sample was chosen was all native speakers of Dholuo in Bondo Town, estimated to be 31,573 (Siaya County Spatial Plan, 2018). The population of Bondo Sub-County is estimated to be around 197,883 (Kenya Population and Housing Census, 2019). Siaya County in which Bondo is one of the six sub-counties currently has a population of 993,183, out of which 90% are estimated to be Luos (Siaya County Spatial Plan, 2018). Barkowino Secondary school, a naturally occurring cluster in Bondo Town, provided a sampling frame in the form of class registers from which a study sample was drawn.

### 3.5 Sampling Method, Sampling Procedure and Sample Size

A sample of 30 respondents selected through a systematic random sampling technique was used in this study. The sample was drawn from Barkowino Secondary school, which is a naturally occurring cluster in Bondo Town. Being a descriptive analytical study, interested in the knowledge that speakers of a language have, the sample size does not quite affect the quality of the data generated. This is because, according to Denscombe (2007), the decision on sample size tends to be based on experience and good judgement rather than relying on a strict mathematical formula. Therefore, what was significant, for the choice of the sample size in this study, was that the chosen respondents are native speakers of Dholuo. In this way, the sampling frame did not require to consider many factors for instance, the age or sex of the respondents.

Nonetheless, because the study relied on test frames for data collection, literacy was a driving factor in choosing secondary school students, a group that is actively interacting with the linguistic terminologies applied in the study. Similarly, this group of respondents was chosen by considering the likely high response rate expected as well as the time and concentration required in undertaking the test.

To get the sample, the researcher first identified all native speakers of Dholuo from the students' body at Barkowino Secondary School, with the help of the class teachers. Six hundred and fifty (650) subjects were identified, who were then assigned random numbers by the researcher. The sample of 30 respondents was then drawn from the 650 subjects listed by picking every $20^{th}$ subject from the list.

### 3.6 Data Collection Method and Instrument

The method that was used to collect data in this study was targeted elicitation approach using various test frames/matrices (See Appendix A). Targeted elicitation, which is also referred to as "alternative interview" is a technique of indirectly extracting information regarding specific ability, memory or knowledge of respondents (Kothari, 2004). In this procedure, various test frames/matrices, both long and short questions are framed to test through respondents' linguistic knowledge and application. This method enables the

collection of data where questionnaire or interview will be inappropriate because of enormity of data involved and the qualitative content of the required data. Therefore, the primary data collection tool the researcher used to collect data was test frames/matrices. The frames, as shown in Appendix A contained a list of words drawn from Dholuo-English dictionary (compiled by Capen Bob, 1998), which the respondents were expected to generate corresponding and appropriate structures of Dholuo nominals and plural forms that were used as data for the study. The researcher also used his intuitive knowledge of the language in data collection, transcription and analysis.

### 3.7 Reliability of the Research Instrument

The reliability of the research instrument was a fundamental factor in this study. Kothari (2004) defines reliability as the capability of the measure repeatedly delivering the same or near the same results. In this regard, a test-retest method was used to ensure the reliability of the test frames used to collect data in this study. The researcher administered the tests to 5 respondents who were not among the study sample. A re-test was done after two weeks with the same respondents. The researcher then scored the items and computed Pearson's correlation coefficient between the two sets after the retest. The items that were found to be vague were rephrased to make them clear and those that were found to be irrelevant were ultimately replaced.

### 3.8 Validity of the Research Instrument

Validity has been defined by Kothari (2004) as the degree to which the measuring tool measures what it is supposed to measure. Validity is an important consideration if a study measures abstract ideas (Kothari, 2004). The researcher, therefore, considered validity as an important ingredient for this study. To ensure that the instrument used to collect data in this study was valid, the researcher made sure that the test frames used were adequate in terms of content, context and process. The researcher also ensured that the test frames contained a sufficient number of items for generating appropriate data for the study. This was done with the help of experts in the field from faculty members at the University.

### 3.9 Piloting

The study considered important the fact that the chosen instrument would provide data that enables the study to answer the research questions. Subsequently, the study in its desire to achieve reliability and validity of the instruments used undertook a pilot study. The test frames were administered to 5 respondents who were then not included in the study sample. A re-test was done after two weeks with the same respondents. The pilot study concluded two weeks to the actual data collection.

### 3.10 Data Collection Procedures

Before commencing data collection, the researcher sought permission from the school authorities before engaging the students as respondents. The respondents were required to first consent to participating in the research by filling a "Research Informed Consent Form" (Appendix B) and have the form endorsed by the parent/guardian and class teacher/principal. The research instrument was delivered to and collected from the respondents by the researcher in person. This gave the researcher an opportunity to instruct the respondents on what was expected of them, their rights to participate and the quest to protect their identity and individual idiosyncrasies. The respondents were given adequate time to respond to the test frames, but with instruction not to copy, discuss or reproduce other respondents' work.

### 3.11 Data Analysis Procedure

Preliminary data analysis involved organisation of the data into a format that made it easy to group the words into respective classes thus nouns, determiners, pronouns, numerals, adjectives and possessives. The researcher then described the structure of each of the nominal classes identified. After that, the data was described in terms of thematic areas by checking similar structures making up various word classes, order of the nouns and its modifiers, recurrent morphemes marking grammatical categories and morphophonemics of these structures. In the final stage, the data was subjected to OT analysis in reference to Dholuo language constraints that define: (a) Dholuo nominal structure (b) number in Dholuo nouns and (c) Dholuo morphophonemics.

### 3.12 Ethical Consideration

This study used human beings as respondents during data collection. In this regard, ethical considerations were paramount in the data collection process. To observe this, all the data collected from the persons selected as the study sample were used for purposes of this study alone. No identities and or individual linguistic idiosyncrasies were disclosed to unauthorized persons or such revelation used for purposes other than this study's. All persons and data in this research shall remain confidential. Consent was sought from relevant authorities to use the respondents in this study. The respondents were informed of the purpose of the research and their responsibility and rights during the study. Moreover, the researcher ensured he got a research permit and research ethics clearance from the relevant authorities, such as NACOSTI (National Commission for Science, Technology and Innovation) - refer to Appendix C. The researcher also obtained a letter from the School of Postgraduate Studies at Jaramogi Oginga Odinga University of science and Technology authorising the undertaking of the research (See Appendix D). The researcher also acknowledged and correctly referenced all the works cited in this study to avoid infringing on copyright rules.

# CHAPTER FOUR: THE STRUCTURE OF DHOLUO NOMINALS

## 4.1 Introduction

The term nominal in linguistics refers to a category that groups together nouns and adjectives based on shared properties (Crystal, 2008). According to Chierchia (1998) whose work elaborately explains nominal mapping parameter, languages vary in terms of what they allow their Noun Phrases (NPs) to denote. Semantic parameter encodes this variation to determine whether NPs denote names of kinds (and are therefore argumental) **[+arg, -pred]**, predicates (and therefore require a determiner to be in an argument position) **[-arg, +pred]** or either **[+arg, +pred].**

However, not all languages would neatly fall into the parameter described above. Furthermore, the analysis offered by Chierchia (1998) is not an "all or none" typological classification. In his own admission, he states that there "is a great deal of resistance" to this typological description (Chierchia, 1998, p.334) making the assumptions above "not so standard," (p.345). Consequently, this study takes the view that Nominals in Dholuo may not fit neatly into these mappings and therefore will either take part or whole of the proposed parameters.

Basically, the nominal grouping is motivated by the fact that nouns and its modifiers (such as adjectives) share a number of morphological and syntactic properties in many world languages. Typically, an affix related to the noun appears attached to the other words within a group to create coherence between the noun and its modifiers. However, the content and extent of this agreement differs from one language to another.

The key features of any language's nominal morphology are distinctions and or relationships between case, number and person with the noun and its modifiers. To this end, Dholuo will lean heavily onto the argumental **[+arg, -pred]** language typology proposed by Chierchia (1998) but with certain variations. Dholuo nominals exhibit a productive overt nominal marking, where nominals are predominantly poly-morphemic. This study has identified Dholuo nominals to consist of bare nouns, plural nouns, pronominals, possessives, adjectives, and determiners.

### 4.2 The Structure of Nouns in Dholuo

Nouns in Dholuo occupy both the argument and predicative positions in an NP without neatly falling onto the typological description offered by Chierchia (1998). In Dholuo, nouns can exist as a bare root with neither prefixes nor suffixes, as well as a poly-morphemic word with suffixes. Unlike in some Germanic languages (for example, English) the bare noun root construction in Dholuo, (1) below, does not require a determiner to communicate grammatically.

1. **guɔk ogwejo**
   dog barked
   (a/the dog barked)

The construction in (1) above though fits Dholuo into the **[+arg, -pred]** typology in which NPs are supposed to denote names of kinds, the bare noun root **guɔk** (dog) does not denote any 'kind' of dog nor specify it to the hearer. Such a construction would therefore, in Germanic languages, need a determiner to denote a 'kind'. Unlike languages with argumental NPs, Dholuo constructions such as the one in (1) above are complete in structure and meaning.

However, it should not be conceived as though Dholuo nouns or NPs are unable to denote a kind. A particular type of dog (known to both the speaker and hearer) can be specified using a number of structural variations from the above construction. For example, a demonstrative can be used to specify the kind of the dog as demonstrated in the data in examples (2) and (3) below.

2. **guɔg-ʧa o-gwejo**

   dog-DEM.that 3Sg.Nom-barked
   (that dog barked)

3. **guɔg-ŋa mo-gwejo**

   dog-DEM.whose 3Sg.Nom-barked
   (whose dog barked)

It can be notable, from the data in the examples in (2-3) above, that the final sound of the noun root, in its bare form, is key to the morphological variations realized in the affixed forms. For instance, the noun root **guɔk** (dog) in (1) ends in the voiceless velar stop [**k**] but the suffixed form **guɔg-ʧa** (that dog) or **guɔg-ŋa (**whose dog**)** in (2-3) ends in the voiced velar stop [**g**].

This study partly offers analysis of Dholuo nominal structure by giving a detailed description of the final segments of each nominal constituent and the morphophonological variations therein. The final segments of the bare noun roots form the basis of the description of the structure of nouns in Dholuo as well as Dholuo nominal structure.

### 4.2.1. Bare Noun Roots

As discussed above, nouns can exist as a bare root (without any suffixes) for example **guɔk** (dog). Also, nouns can exist as affixed forms, for example **guɔg-ʧa** (that dog), **guɔg-ŋa** (whose dog). Bare noun roots, in Dholuo, can end in both consonants and vowels. Basing on the final segments of the roots, bare nouns can end in obstruents, nasals, approximants and vowels. Table 10 below summarises noun roots whose final segments are obstruents. Dholuo has 13 obstruents (6 stops and 7 fricatives). The phonemes [**p**, **t**, **k**, **ɵ**, and **s**] can occupy the final position in bare noun roots as demonstrated in Table 10.

**Table 10**

*Obstruent Final Noun Roots*

| Noun Root | Gloss |
|---|---|
| **lep** | tongue |
| **diep** | field |
| **otit** | firefly |
| **okot** | bell |
| **dek** | vegetable |
| **buk** | book |
| **atʃuɵ** | vulture |
| **jaɵ** | medicine |
| **mandas** | fried bread |
| **makas** | a pair of scissors |
| **ɲimbitʃ** | intestine |
| **rétʃ** | fish |

Voiced obstruents do not occur at the root final position in bare nouns in Dholuo as described in the constraint, **NO(+Vc)CODA** (1) below.

1. **NO(+Vc)CODA-** this constraint bars voiced obstruents from being realised as the root final position in C-final bare nouns

As a result, the phonemes [**b**, **g**, **ð**, **ʤ**] are realised as final segments in a noun root in affixed noun forms but not in bare noun roots. The only exception to this restriction in the data collected was a single borrowed word [**bag**] "bag". In addition, the voiceless labio-dental fricative [**f**] and the voiceless glottal fricative [**h**] do not occur naturally in the final position of Dholuo noun roots. The examples of bare noun roots ending in the voiceless alveolar fricative [**s**] in the data collected were all borrowed words, for example **mandas** (borrowed from Kiswahili "mandazi"); **makas** (borrowed from Kiswahili "makasi") **dis** (borrowed from English "dish").

Table 11 provides data on nasal final noun roots. Dholuo has 4 nasals [**m, n, ɲ** and **ŋ**] which all can occur at the root final positions.

**Table 11**

*Nasal Final Noun Roots*

| Noun Root | Gloss |
|---|---|
| **kɔm** | chair |
| **arum** | an owl |
| **ʧuɲ** | liver |
| **ajaɲ** | verbal assault |
| **kuon** | ugali |
| **rabuon** | potato |
| **ɲaŋ** | crocodile |
| **ɲatieŋ** | boulder |

The four nasals in Dholuo [**m, n, ɲ** and **ŋ**] all occur in noun root final position. They can also occupy the initial or medial positions in a noun root as seen in the last two words in Table 2 above. Though the prenasalised consonants [**mb**, **nd**, **ɲʤ**, **ŋg**, **nd**] occur in the inflected and derived forms in Dholuo, they do not occur in the root final position of bare noun roots as do nasals. As a result, the prenasalised consonants [**mb**, **nd**, **ɲʤ**, **ŋg**, **nd**] are realised as final segments in a noun root in affixed noun forms but not in bare noun roots.

Other than bare nouns in Dholuo which end in obstruents and nasals, there are nouns which end in approximants. Dholuo has three approximants [**l, r,** and **w**] which occupy the noun root final position. Table 12 provides data on noun roots ending in approximants.

**Table 12**

*Noun Roots Ending in Approximants*

| Noun Root | Gloss |
|---|---|
| **ɵuol** | snake |
| **ogwal** | frog |
| **laktar** | doctor |
| **bɔr** | animal fat |
| **law** | cloth |
| **ʧiew** | porcupine |

The data provided in Table 12 above shows that the palatal glide **[j]** does not occur in the noun root final position of bare nouns. Nonetheless, the palatal glide **[j]** and the labio-velar approximant, **[w]** occur as consonants capable of being followed by either vowels or diphthongs when they occur elsewhere in a noun root as seen in /**wuɔr/** "a pair of shoe," /**jiɛ/** "canoe," and **wuɔw** "an adolescent boy." Similarly, the alveolar approximants [**l, r**] may also occur in initial and medial positions in noun roots in their bare forms, for example /**raw/** "hippo".

In addition to consonant final noun roots, bare noun roots can also end in vowels, for instance **agulu** (cooking pot). Table 13 summarises all the possible vowels that can occupy the noun root final position in bare nouns.

**Table 13**

*Vowel Final Noun Roots*

| Noun Root | Gloss |
|---|---|
| **ratʃu:ŋgi** | sieve |
| **osiki** | stump |
| **olele** | lizard |
| **ndege** | aircraft |
| **lowo** | land |
| **polo** | heaven/sky |
| **aluru** | quail |
| **buŋgu** | forest |
| **paka** | cat |
| **punda** | donkey |

Nearly all the vowels can occupy the noun root final position in Dholuo. (The ATR values of the vowels have not been captured here.) From the data provided in Table 13 above, it is notable that in noun roots which have vowels in the final position, the restriction observed with voiced obstruents and prenasalised consonants does not apply if these (obstruents and prenasalised) occur prevocalically.

### 4.2.2. Noun Roots with Suffixes

Other than the existence of bare noun roots as noun words in Dholuo, nouns in Dholuo can also occur as noun roots affixed with inflectional and derivational affixes, mostly suffixes. Noun roots can admit suffixes to form a single noun word as exemplified earlier in (2 & 3) and in (4) below.

4. **guɔg-no** **gwejo**
dog-Dem.that 3Sg.Nom-bark
(that dog barks/barked)

Other than the suffixation of a determiner as seen in (4) above, noun roots in Dholuo can take a number of suffixes both inflectional and derivational. Noun roots can be affixed with plural suffixes, genitive suffixes, demonstrative suffixes, interrogative suffixes and with pronoun suffixes, as presented in the discussion that follows.

#### 4.2.2.1. Noun Roots with the Plural Suffix

The plural morpheme allomorphs can be affixed to noun roots to form a single noun word. In Dholuo, the plural morpheme is realised by the suffixes [**-ni**, **-i**, and **-e**]. Each of the three suffixes occurs in a specific environment.

First, there are noun roots that take the [**-ni**] allomorph in forming plurals. Noun roots which take the [**-ni**] allomorph end predominantly in vowels. There is a very small group of C-final noun roots, a majority of them ending in approximants, which take the [**-ni**] allomorph in forming plurals. Noun roots that take the [**-ni**] allomorph have a long vowel in the preceding syllable.

The data in Table (14) summarises the V-final noun roots which take the [**-ni**] allomorph in forming plurals.

**Table 14**

*Vowel Final Noun Roots Taking the [-ni] Plural Allomorph*

| Noun Root | Plural Form | Root Gloss |
|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋg-ni** | sieve |
| **kwe:si** | **kwe:s-ni** | smoking pipe |
| **ku:be** | **ku:b-ni** | jerrican |
| **oke:be** | **oke:b-ni** | a rich man |
| **pa:ka** | **pe:k-ni** | cat |
| **ndi:ga** | **ndi:g-ni** | bicycle |
| **pe:do** | **pe:d-ni** | thorny rambler |
| **go:go** | **go:g-ni** | lump of clay |
| **pa:la** | **pe:l-ni** | knife |
| **aba:ga** | **abe:g-ni** | thorny fence |

The second group of noun roots are those that take the [**-i**] allomorph in forming plurals. The **[-i]** allomorph occurs in a specific environment. Largely, the **[-i]** allomorph occurs with noun roots whose final segment is preceded by a diphthong as exemplified by the data in Table 15. Few noun roots in Dholuo fall in this category. Still, care must be taken to distinguish diphthongs from vowel sequences.

**Table 15**

*Obstruent Final Noun Roots Taking the [-i] Plural Allomorph*

| Noun root | Plural form | Root Gloss |
|---|---|---|
| **ɲuɔk** | **ɲuɔg-i** | billy goat |
| **muɔk** | **muɔg-i** | ant bear |
| **guɔk** | **guɔg-i** | dog |
| **ruaɵ** | **rueð-i** | bull |
| **ruɔɵ** | **ruɔð-i** | king |
| **kuɔt** | **kuɔd-i** | shield |

It should be notable that nouns taking the [**-e**] allomorph in forming plurals predominantly are C-final. The final obstruents in these C-final noun roots taking [**-e**] allomorph are unvoiced. It should be notable that voiced obstruents are banned from occuring in the final position in bare C-final noun roots by a constraint in Dholuo.

The final group of noun roots are those which take the [**-e**] allomorph in forming plurals. The noun roots in this category end in obstruents, nasals, approximants and some vowels. Notably, these noun roots have a short vowel or a sequence of vowels in the preceding syllable. Table 16 provide data on obstruent final noun roots which take the [**-e**] allomorph in forming plurals.

**Table 16**

*Obstruent Final Noun Roots with the [-e] Plural Allomorph*

| Noun Root | Plural Form | Root Gloss |
|---|---|---|
| **okot** | **okod-e** | bell |
| **otit** | **otid-e** | firefly |
| **dek** | **deg-e** | vegetable |
| **opuk** | **opug-e** | tortoise |
| **ɲimbiʧ** | **ɲimbij-e** | intestine |
| **ŋeʧ** | **ŋeʧ-e** | monitor lizard |
| **pap** | **pew-e** | field |
| **aʧuɵ** | **aʧuð-e** | vulture |
| **jaɵ** | **jeð-e** | medicine |
| **dis** | **dis-e** | plate |
| **otas** | **otes-e** | paper |

As stated earlier, the voiceless obstruents [**p, t, k, ɵ**, and **s**] can occupy the final position in bare noun roots. However, Voiced obstruents do not occur at noun root final position in bare nouns in Dholuo. As a result, the phonemes [**b, g, ð, ʤ**] are realised as final segments in a noun root in affixed noun forms but not in bare noun roots. In the plural form, the obstruent in the noun root final position become either weakened or strengthened when admitting the [**-e**] allomorph.

Table 17 below summarises data on nasal final noun roots that take the [**-e**] allomorph in forming plurals. As explained earlier, in Section 4.2.1, the prenasalised consonants occupy the final position of the root in the inflected noun forms but not in bare noun roots. The plural forms in Table 16 below, therefore, have prenasalised consonants existing before the plural suffix **[-e]**.

**Table 17**

*Nasal Final Noun Roots with the [-e] Plural Allomorph*

| Noun root | Plural Form | Root Gloss |
|---|---|---|
| **arum** | **arumb-e** | an owl |
| **lum** | **lumb-e** | grass |
| **rabuon** | **rabuond-e** | potato |
| **kuon** | **kuond-e** | ugali |
| **ajaɲ** | **ajeɲʤ-e** | verbal assault |
| **ʧuɲ** | **ʧuɲʤ-e** | liver |
| **ɲatieŋ** | **ɲitieŋg-e** | boulder |
| **tɔŋ** | **toŋg-e** | spear |

It should be notable, however, that the vowels in the nouns in Table 17, unlike those in Table 15, are vowel sequences and not diphthongs. Noun roots that neither have diphthongs nor vowel sequences must have a short vowel preceding the syllable to belong to this category of noun roots taking the [**-e**] allomorph.

Noun roots that end in vowels can also take the [**-e**] allomorph in forming plurals. Table 18 below summarises data on V-final noun roots which take the [**-e**] allomorph in plural formation.

**Table 18**

*Vowel Final Noun Roots with the [-e] Plural Allomorph*

| Noun root | Plural Form | Root Gloss |
|---|---|---|
| **kidi** | **kit-e** | stone |
| **olele** | **oleʧ-e** | lizard |
| **rombo** | **romb-e** | sheep |
| **ɲojo** | **ɲoʧ-e** | githeri |
| **aluru** | **aluʧ-e** | quail |
| **agulu** | **aguʧ-e** | pot |
| **punda** | **pund-e** | donkey |

There are only three approximants in Dholuo that can occur at the final position in a noun root. All the three take the **[-e]** allomorph in forming plurals as demonstrated in Table 19 below.

**Table 19**

*Noun Roots Ending in Approximants with the [-e] Plural Allomorph*

| Noun root | Plural Form | Root Gloss |
|---|---|---|
| **situl** | **sitund-e** | stool |
| **ʊuol** | **ʊuond-e** | snake |
| **ogwal** | **ogwend-e** | frog |
| **bur** | **butʃ-e** | hole |
| **laktar** | **laktetʃ-e** | doctor |
| **ŋgaw** | **ŋgep-e** | antelope |
| **tʃiew** | **tʃiep-e** | porcupine |

There is another group of Dholuo noun roots which form plurals in an irregular way by taking both the [**-ni**] and [**-e**] allomorphs. Table 20 provides data on noun roots that end in approximants and which take the [**-ni**] allomorph.

**Table 20**
*Noun Roots Ending in Approximants with the [-ni] Plural Allomorph*

| Noun root | Plural form | Root Gloss |
|---|---|---|
| **raw** | **rew-e/ rew-ni** | hippopotamus |
| **ragwɛl** | **rogwɛnd-e/ rogwɛnd-ni** | bow-legged |
| **ogwal** | **ogwɛnd-e ogwɛnd-ni** | frog |
| **osiki** | **osik-e/ osik-ni** | stump |
| **agulu** | **agutʃ-e/ agul-ni** | pot |

There is a thin but clear-cut distinction in the root vowels in those nouns taking each of the three allomorphs. While it is distinct that those taking **–i** allomorph have a diphthong in the preceding syllable, a further distinction exists between those that take the **–ni** allomorph and those taking the **–e** allomorph. The **–ni** allomorph group have a long vowel in the preceding syllable but the **–e** allomorph group have a sequence of vowels in the preceding syllable. This, for instance, justifies the plural formation in the word **ogwal→ogwend-e/ ogwe:nd-ni.** The noun can be underlying '**ogual**' then the '**u**' glides to '**w**' and the following vowel '**a**' lengthens to compensate for '**u**' that changed to '**w**'. Then, in this case, we have **ogwa:l** which then takes the **-ni** allomorph. However, when gliding does not take place we have '**ogual**' which then takes the **–e** allomorph or gliding

takes place but it is not compensated for which then results to '**ogwal**; proving the fact that the vowel in the preceding syllable is a sequence and that is why it is able to glide.

In summary, each of the three allomorphs [**-ni**, **-i**, **-e**] occurs in a specific environment. The [**-ni**] allomorph occurs predominantly with V-final noun roots that have a long vowel in the preceding syllable. The [**-i**] allomorph on the other hand occurs with noun roots which have a diphthong in the preceding syllable. The final [**-e**] allomorph occurs elsewhere in the environments not covered by the other two. Generally, noun roots in this category end in obstruents, nasals, approximants and some vowels. Specifically, these noun roots have a short vowel or a sequence of vowels in the preceding syllable.

#### 4.2.2.2. Noun Roots with the Genitive Suffix.

Noun roots in Dholuo also take the genitive suffix to form a single noun word. Noun roots in Dholuo inflect by suffixation to show possession, in terms of person and number simultaneously. This is expressed by genitive clitic-like suffixes [**-a**, **-i**, **-e**] and [**-wa**, **-u**, **-gi**] for 1st, 2nd, 3rd person singular and 1st, 2nd, 3rd person plural respectively as discussed below. Table 21 summarises the structure of obstruent final noun roots as they inflect with 1st, 2nd and 3rd person genitive singular suffixes [**-a**, **-i**, **-e**].

**Table 21**

*Obstruent Final Noun Roots with Singular Genitive Suffixes*

| Noun Root | **1Gen Sg** (My) | **2Gen Sg** (Your) | **3Gen Sg** (His/Her/Its) | Root Gloss |
|---|---|---|---|---|
| **lep** | **lew-a** | **lew-i** | **lew-e** | tongue |
| **otit** | **otid-a** | **otid-i** | **otid-e** | firefly |
| **okot** | **okod-a** | **okod-i** | **okod-e** | bell |
| **dek** | **deg-a** | **deg-i** | **deg-e** | vegetable |
| **buk** | **bug-a** | **bug-i** | **bug-e** | book |
| **atʃuɵ** | **atʃuð-a** | **atʃuð-i** | **atʃuð-e** | vulture |
| **jaɵ** | **jað-a** | **jað-i** | **jað-e** | medicine |
| **mandas** | **mandas-a** | **mandas-i** | **mandas-e** | baked break |
| **makas** | **makas-a** | **makas-i** | **makas-e** | a pair of scissors |
| **ɲimbitʃ** | **ɲimbij-a** | **ɲimbij-i** | **ɲimbij-e** | intestine |
| **rétʃ** | **réj-a** | **réj-i** | **réj-e** | fish |

As stated earlier in Section 4.2.2, noun roots ending in obstruents have the final obstruent sounds become hardened when suffixed with the plural morpheme. The genitive singular suffix similarly triggers the morphophonological alteration of the noun root final segment. Table 22 summarises the behaviour of 1st, 2nd and 3rd person genitive plural suffixes [-wa, -u, -gi] with Dholuo noun roots ending in obstruents. The behaviour is identical to that of genitive singular suffixes with obstruent final noun roots. However, the final sound **[ʧ]** in the last two nouns in the table is deleted when the noun roots admit the genitive plural suffixes.

**Table 22**
*Obstruent Final Noun Roots with Plural Genitive Suffixes*

| Noun Root | **1Gen Pl** (Our) | **2Gen Pl** (Your) | **3Gen Pl** (Their) | Root Gloss |
|---|---|---|---|---|
| **lep** | **leb-wa** | **lew-u** | **leb-gi** | tongue |
| **alap** | **alab-wa** | **alaw-u** | **alab-gi** | field |
| **otit** | **otid-wa** | **otid-u** | **otid-gi** | firefly |
| **okot** | **okod-wa** | **okod-u** | **okod-gi** | bell |
| **dek** | **deg-wa** | **deg-u** | **deg-gi** | vegetable |
| **buk** | **bug-wa** | **bug-u** | **bug-gi** | book |
| **aʧuɵ** | **aʧuð-wa** | **aʧuð-u** | **aʧuð-gi** | vulture |
| **jaɵ** | **jað-wa** | **jað-u** | **jað-gi** | medicine |
| **mandas** | **mandas-wa** | **mandas-u** | **mandas-gi** | baked break |
| **makas** | **makas-wa** | **makas-u** | **makas-gi** | a pair of scissors |
| **ɲimbiʧ** | **ɲimbiʤ-wa** | **ɲimbi-u** | **ɲimbiʤ-gi** | intestine |
| **réʧ** | **réʤ-wa** | **réw-u** | **réʤ-gi** | fish |

Nasal final noun roots also inflect with genitive suffixes in a similar way as obstruent final noun roots. The suffixes **[-a, -i, -e]** are attached to the noun root to show possession in the singular, while the suffixes **[-wa, -u, -gi]** are attached to the noun roots to show possession in the plural. However, the behaviour of the final segment of the noun root differs from the patterns discussed above. It should further be noted that the voiceless bilabial stop **[p]** lenites to the voiced bilabial stop **[b]** before consonants and to the voiceless labial approximant **[w]** before vowels. In the same way, the voiceless palatal

fricative **[ʧ]** lenites to the voiced palatal fricative **[ʤ]** before consonants and to the voiceless labial approximant **[w]** before vowels.

Table 23 summarises the structure of nasal final noun roots as they inflect with the singular genitive suffixes **[-a, -i, -e].**

**Table 23**

*Nasal Final Noun Roots with Singular Genitive Suffixes*

| Noun Root | 1Gen Sg (My) | 2Gen Sg (Your) | 3Gen Sg (His/Her/Its) | Root Gloss |
|---|---|---|---|---|
| **kɔm** | **kɔmb-a** | **kɔmb-i** | **kɔmb-e** | chair |
| **arum** | **arumb-a** | **arumb-i** | **arumb-e** | an owl |
| **miliɲ** | **miliɲʤ-a** | **miliɲʤ-i** | **miliɲʤ-e** | round worm |
| **ajaɲ** | **ajaɲʤ-a** | **ajaɲʤ-i** | **ajaɲʤ-e** | verbal assault |
| **kuon** | **kuond-a** | **kuond-i** | **kuond-e** | ugali |
| **rabuon** | **rabuond-a** | **rabuond-i** | **rabuond-e** | potato |
| **ɲaŋ** | **ɲaŋg-a** | **ɲaŋg-i** | **ɲaŋg-e** | crocodile |
| **ɲatieŋ** | **ɲatieŋg-a** | **ɲatieŋg-i** | **ɲatieŋg-e** | boulder |

The nasal sound in the noun roots ending in nasals become hardened to prenasal consonants when the noun root admit the singular genitive suffix. No other morphological alteration occurs in the noun roots. The nasal final noun roots also take plural genitive suffixes **[-wa, -u, -gi]** to express possession in the plural. The morphophonological alteration of the noun root final sound is identical to the case in Table 21.

Table 24 summarizes the structure of nasal final noun roots as they inflect with the plural genitive suffixes **[-wa, -u, -gi].**

**Table 24**

*Nasal Final Noun Roots with Plural Genitive Suffixes*

| Noun Root | 1Gen Pl (Our) | 2Gen Pl (Your) | 3Gen Pl (Their) | Root Gloss |
|---|---|---|---|---|
| **kɔm** | **kɔmb-wa** | **kɔmb-u** | **kɔmb-gi** | chair |
| **arum** | **arumb-wa** | **arumb-u** | **arumb-gi** | an owl |
| **miliɲ** | **miliɲʤ-wa** | **miliɲʤ-u** | **miliɲʤ-gi** | Round worm |
| **ajaɲ** | **ajaɲʤ-wa** | **ajaɲʤ-u** | **ajaɲʤ-gi** | verbal assault |
| **kuon** | **kuond-wa** | **kuond-u** | **kuond-gi** | ugali |
| **rabuon** | **rabuond-wa** | **rabuond-u** | **rabuond-gi** | potato |
| **ɲaŋ** | **ɲaŋg-wa** | **ɲaŋg-u** | **ɲaŋg-gi** | crocodile |
| **ɲatieŋ** | **ɲatieŋg-wa** | **ɲatieŋg-u** | **ɲatieŋg-gi** | boulder |

The case of noun roots ending in approximants follows a similar pattern. Table 25 below summarises the morphophonological behaviour of Dholuo noun roots as they inflect with the singular genitive suffix [**-a**] "my" which is identical to the behaviour with the other two singular genitive suffixes **[-i] "**your" and **[-e]** "his/her/its".

**Table 25**

*Noun Roots Ending in Approximants with Singular Genitive Suffixes.*

| Noun Root | 1.Gen Sg (My) | 2. Gen Sg (Your) | 3. Gen Sg (His/Her/Its) | Root Gloss |
|---|---|---|---|---|
| **ɵuol** | **ɵuond-a** | **ɵuond-i** | **ɵuond-e** | Snake |
| **ragwɛl** | **ragwɛnd-a** | **ragwɛnd-i** | **ragwɛnd-e** | bow-legged |
| **laktar** | **laktaʧ-a** | **laktaʧ-i** | **laktaʧ-e** | doctor |
| **bɔr** | **bɔʧ-a** | **bɔʧ-i** | **bɔʧ-e** | animal fat |
| **ʧiew** | **ʧiep-a** | **ʧiep-i** | **ʧiep-e** | porcupine |

The final obstruents in the nouns in Table 25 undergo hardening when admitting the genitive suffixes. In the process of hardening, the sounds strive to maintain places of articulation i.e. alveolar lateral [**l**]hardening to alveolar prenasalised consonants [**nd**]; alveolar trill [**r**] hardening to alveolar unvoiced palatal fricative [**ʧ**] while labial glide [**w**] hardens to unvoiced labial stop [**p**].

Table 26 summarizes the behaviour of Dholuo noun roots as they inflect with the plural genitive suffix [**-wa**] "our" which is identical to the behaviour with the other two plural genitive suffixes **[-u] "**your" and **[-gi]** "their".

**Table 26**

*Noun Roots Ending in Approximants with Plural Genitive Suffixes.*

| Noun Root | 1.Gen Pl. (My) | 2. Gen Pl. (Your) | 3. Gen Pl. (Their) | Root Gloss |
|---|---|---|---|---|
| **ɵuol** | **ɵuond-wa** | **ɵuond-u** | **ɵuond-gi** | snake |
| **ragwɛl** | **ragwɛnd-wa** | **ragwɛnd-u** | **ragwɛnd-gi** | bow-legged |
| **laktar** | **laktatʃ-wa** | **laktatʃ-u** | **laktatʃ-gi** | doctor |
| **bɔr** | **bɔtʃ-wa** | **bɔtʃ-u** | **bɔtʃ-gi** | animal fat |
| **law** | **law-wa** | **law-u** | **law-gi** | cloth |
| **ʧiew** | **ʧiep-wa** | **ʧiep-u** | **ʧiep-gi** | porcupine |

In Dholuo inflectional morphology, vowels appear to be invisible when they occur in the final position of noun roots. Consequently, the behaviour of vowel final noun roots in affixation of both the plural and genitive suffixes is dictated by the prevocalic consonant. Therefore, the morphophonology of obstruents, nasals and approximants that come before the final vowel in vowel final noun roots follow the patterns described in the preceding discussion. Table 27 summarises the behaviour of vowel final noun roots when they inflect with singular genitive suffixes [**-a, -i, -e**]**.**

**Table 27**

*Vowel Final Noun Roots with Singular Genitive Suffixes*

| Noun Root | 1Gen Sg (My) | 2Gen Sg (Your) | 3Gen Sg (His/Her/Its) | Root Gloss |
|---|---|---|---|---|
| **raʧu:ŋgi** | **raʧu:ŋg-a** | **raʧu:ŋg-i** | **raʧu:ŋg-e** | sieve |
| **olele** | **olend-a** | **olend-i** | **olend-e** | lizard |
| **ndege** | **ndek-a** | **ndek-i** | **ndek-e** | aircraft |
| **lowo** | **lop-a** | **lop-i** | **lop-e** | land |
| **polo** | **pond-a** | **pond-i** | **pond-e** | heaven/sky |
| **aluru** | **alutʃ-a** | **alutʃ-i** | **alutʃ-e** | quail |
| **buŋgu** | **buŋg-a** | **buŋg-i** | **buŋg-e** | forest |
| **punda** | **pund-a** | **pund-i** | **pund-e** | donkey |

There is no morphophonological alteration of the final consonant in the words **ratʃu:ŋgi, buŋgu** and **punda** in Table 27 above and Table 28 below because of the constraints governing the occurrence of nasals in noun root final segment in Dholuo nominals. The four nasals in Dholuo [**m, n, ɲ** and **ŋ**] all occur in noun root final position. They can also occupy the initial and medial positions in a noun root. However, the prenasalised consonants [**mb**, **nd**, **ɲdʒ**, **ŋg**, **nd**] occur only in the inflected and derived forms in Dholuo; they do not occur in the root final position of bare noun roots as do nasals. As a result, the prenasalised consonants [**mb**, **nd**, **ɲdʒ**, **ŋg**, **nd**] are realised as final segments in a noun root in affixed noun forms but not in bare noun roots.

Table 28 summarises the behaviour of vowel final noun roots when they inflect with plural Genitive suffixes [**-wa, -u, -gi**].

**Table 28**

*Vowel Final Noun Roots with Plural Genitive Suffixes*

| Noun Root | 1gen Pl (Our) | 2gen Pl (Your) | 3gen Pl (Their) |
|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋg-wa** | **ratʃu:ŋg-u** | **ratʃu:ŋg-gi** |
| **olele** | **olend-wa** | **olend-u** | **olend-gi** |
| **ndege** | **ndek-wa** | **ndek-u** | **ndek-gi** |
| **lowo** | **lop-wa** | **lop-u** | **lop-gi** |
| **polo** | **pond-wa** | **pond-u** | **pond-gi** |
| **aluru** | **alutʃ-wa** | **alutʃ-u** | **alutʃ-gi** |
| **buŋgu** | **buŋg-wa** | **buŋg-u** | **buŋg-gi** |
| **punda** | **pund-wa** | **pund-u** | **pund-gi** |

In admitting the genitive suffixes, the final vowel in this category displayed in Tables (27-28) gets deleted. Nonetheless, the prevocalic consonants follow the pattern described earlier with regard to the morphophonological behavior of the obstruents, nasals and approximants occurring root finally. This demonstrates that noun roots in Dholuo are underlyingly consonant final.

However, it should be noted that the structures demonstrated by the data presented in Tables 21-28 only show the case of singular nouns. The morphophonology of the noun

root will be different when the singular or plural genitive suffixes are attached to the plural forms of the nouns. In this case, the noun root will have to undergo the regular plural formation process before it admits the genitive suffix. For example the noun root [**okot**] "bell", will change into the plural form [**okod-e**] admitting the plural suffix [**-e**] before it admits any of the singular or plural genitive suffixes to form, for instance, [**okod-e-wa**] "our bells" or [**okod-e-gi**] "their bells"

#### 4.2.2.3. Noun Roots with the Demonstrative Suffix.

Demonstratives can also be suffixed to noun roots to form a single noun word. The suffix marking the demonstrative is a bound morpheme which is attached post nominally to the noun root. This suffix is marked for number and proximity to the referent so that we have singular demonstrative [**-ni, -ʧa** and **-no**]; plural demonstrative [**-gi, –go** and **-ka**]; and which can be categorized further as: near referent **[-ni** and **-gi],** far referent **[-no** and **-go]** and remote referent **[-ʧa**, and **-ka]** as discussed below. Table 29 illustrates the structure of obstruent final noun roots with the demonstrative suffixes [**-ni, -ʧa** and **-no**] which describe singular near referent, singular remote referent and singular far referent respectively.

**Table 29**

*Obstruent Final Noun Roots with Singular Demonstrative Suffixes*

| NounR | NounR + [**-ni**] (This) | NounR + [**-no**] (That) | NounR + [**-ʧa**] (That) | Root Gloss |
|---|---|---|---|---|
| **lep** | **leb-ni** | **leb-no** | **leb-ʧa** | tongue |
| **alap** | **alab-ni** | **alab-no** | **alab-ʧa** | field |
| **otit** | **otid-ni** | **otid-no** | **otid-ʧa** | firefly |
| **okot** | **okod-ni** | **okod-no** | **okod-ʧa** | bell |
| **dek** | **deg-ni** | **deg-no** | **deg-ʧa** | vegetable |
| **buk** | **bug-ni** | **bug-no** | **bug-ʧa** | book |
| **aʧuө** | **aʧuð-ni** | **aʧuð-no** | **aʧuð-ʧa** | vulture |
| **jaө** | **jað-ni** | **jað-no** | **jað-ʧa** | medicine |
| **mandas** | **mandas-ni** | **mandas-no** | **mandas-ʧa** | baked break |
| **makas** | **makas-ni** | **makas-no** | **makas-ʧa** | scissors |
| **ɲimbiʧ** | **ɲimbiʤ-ni** | **ɲimbiʤ-no** | **ɲimbiʤ-ʧa** | intestine |
| **rétʃ** | **réʤ-ni** | **réʤ-no** | **réʤ-ʧa** | fish |

Obstruent final noun roots behave in an identical way with the three singular demonstrative Suffixes **[-ni], [-ʧa]** and **[-no]**. The noun root final obstruent, save for the voiceless alveolar fricative [**s**], weakens as they acquire the demonstrative suffixes **[-ni], [-ʧa]** and **[-no].** However, the proximity to the referent does not influence any morphological change in the noun root. Nonetheless, the behaviour is different when they admit the three plural demonstrative Suffixes **[-gi], [-go]** and **[-ka]** as shown in Table (28) in which there are observable morphological alternations. Plural demonstrative suffixes motivate a morphological change in the noun roots so as to enforce coherence between them in terms of number. This trend is replicated in all the noun roots with plural demonstrative suffixes as discussed below.

Table 30 below illustrates the structure of obstruent final noun roots with the demonstrative suffixes **[-gi], [-go]** and **[-ka]** which describe plural near referent, plural remote referent and plural far referent respectively. The noun root first takes the plural morpheme **[-e]** then the demonstrative suffix. In doing so, the plural morpheme **-e** then triggers vowel place assimilation of the vowel in the root. For instance **makas→makes-e-gi** raising and fronting **a→e.**

**Table 30**

*Obstruent Final Noun Roots with Plural Demonstrative Suffixes*

| Nounr | Nounr + [**-gi**] (These) | Nounr + [**-go**] (Those) | Nounr + [**-ka**] (Those) | Root Gloss |
|---|---|---|---|---|
| **lep** | **leb-e-gi** | **leb-e-go** | **leb-e-ka** | tongue |
| **alap** | **alab-e-gi** | **alab-e-go** | **alab-e-ka** | field |
| **otit** | **otid-e-gi** | **otid-e-go** | **otid-e-ka** | firefly |
| **okot** | **okod-e-gi** | **okod-e-go** | **okod-e-ka** | bell |
| **dek** | **deg-e-gi** | **deg-e-go** | **deg-e-ka** | vegetable |
| **buk** | **bug-e-gi** | **bug-e-go** | **bug-e-ka** | book |
| **aʧuɵ** | **aʧuð-e-gi** | **aʧuð-e-go** | **aʧuð-e-ka** | vulture |
| **jaɵ** | **jeð-e-gi** | **jeð-e-go** | **jeð-e-ka** | medicine |
| **mandas** | **mandes-e-gi** | **mandes-e-go** | **mandes-e-ka** | baked break |
| **makas** | **makes-e-gi** | **makes-e-go** | **makes-e-ka** | scissors |
| **ɲimbiʧ** | **ɲimbij-e-gi** | **ɲimbij-e-go** | **ɲimbij-e-ka** | intestine |
| **réʧ** | **réj-e-gi** | **réj-e-go** | **réj-e-ka** | fish |

Table 31 illustrates the structure of nasal final noun roots with the demonstrative suffixes [**-ni, -ʧa** and **-no**] which describe singular near referent, singular remote referent and singular far referent respectively.

**Table 31**

*Nasal Final Noun Roots with Singular Demonstrative Suffixes*

| NounR | NounR + [**-ni**] (This) | NounR + [**-ʧa**] (That) | NounR + [**-no**] (That) | Root Gloss |
|---|---|---|---|---|
| **kɔm** | **kɔmb-ni** | **kɔmb-ʧa** | **kɔmb-no** | chair |
| **arum** | **arumb-ni** | **arumb-ʧa** | **arumb-no** | an owl |
| **miliɲ** | **miliɲʤ-ni** | **miliɲʤ-ʧa** | **miliɲʤ-no** | Round worm |
| **ajaɲ** | **ajaɲʤ-ni** | **ajaɲʤ-ʧa** | **ajaɲʤ-no** | verbal assault |
| **kuon** | **kuond-ni** | **kuond-ʧa** | **kuond-no** | ugali |
| **rabuon** | **rabuond-ni** | **rabuond-ʧa** | **rabuond-no** | potato |
| **ɲaŋ** | **ɲaŋg-ni** | **ɲaŋg-ʧa** | **ɲaŋg-no** | crocodile |
| **ɲatieŋ** | **ɲatieŋg-ni** | **ɲatieŋg-ʧa** | **ɲatieŋg-no** | boulder |

Table 32 illustrates the structure of nasal final noun roots with the demonstrative suffixes **[-gi], [-go]** and **[-ka]** which describe plural near referent, plural remote referent and plural far referent respectively. The noun root first takes the plural morpheme **[-e]** then the demonstrative suffix as was the case with obstruent final roots illustrated in Table 30 in obstruent final noun roots.

**Table 32**

*Nasal Final Noun Roots with Plural Demonstrative Suffixes*

| NounR | NounR + [**-gi**] (These) | NounR + [**-go**] (Those) | NounR + [**-ka**] (Those) | Root Gloss |
|---|---|---|---|---|
| **kɔm** | **kɔmb-e-gi** | **kɔmb-e-go** | **kɔmb-e-ka** | chair |
| **arum** | **arumb-e-gi** | **arumb-e-go** | **arumb-e-ka** | an owl |
| **ʧuɲ** | **ʧuɲʤ-e-gi** | **ʧuɲʤ-e-go** | **ʧuɲʤ-e-ka** | liver |
| **ajaɲ** | **ajeɲʤ-e-gi** | **ajeɲʤ-e-go** | **ajeɲʤ-e-ka** | verbal assault |
| **kuon** | **kuond-e-gi** | **kuond-e-go** | **kuond-e-ka** | ugali |
| **rabuon** | **rabuond-e-gi** | **rabuond-e-go** | **rabuond-e-ka** | potato |
| **ɲaŋ** | **ɲeŋg-e-gi** | **ɲeŋg-e-go** | **ɲeŋg-e-ka** | crocodile |
| **ɲatieŋ** | **ɲitieŋg-e-gi** | **ɲitieŋg-e-go** | **ɲitieŋg-e-ka** | boulder |

Table 33 illustrates the structure of approximant final noun roots with the demonstrative suffixes [**-ni, -ʧa** and **-no**] which describe singular near referent, singular remote referent and singular far referent respectively.

**Table 33**

*Noun Roots Ending in Approximants with Singular Demonstrative Suffixes*

| Nounr | Nounr + [**-Ni**] (This) | Nounr + [**-ʧa**] (That) | Nounr + [**-No**] (That) | Root Gloss |
|---|---|---|---|---|
| **ɵuol** | **ɵuond-ni** | **ɵuond-ʧa** | **ɵuond-no** | Snake |
| **ragwɛl** | **ragwɛnd-ni** | **ragwɛnd-ʧa** | **ragwɛnd-no** | bow-legged |
| **laktar** | **laktaʧ-ni** | **laktaʧa-ʧa** | **laktaʧ-no** | Doctor |
| **bɔr** | **bɔnd-ni** | **bɔnd-ʧa** | **bɔnd-no** | animal fat |
| **ŋgaw** | **ŋgab-ni** | **ŋgab-ʧa** | **ŋgab-no** | antelope |
| **ʧiew** | **ʧieb-ni** | **ʧieb-ʧa** | **ʧieb-no** | porcupine |

Table 34 below illustrates the structure of approximant final noun roots with the demonstrative suffixes **[-gi], [-go]** and **[-ka]** which describe plural near referent, plural remote referent and plural far referent respectively. The noun root first takes the plural morpheme **[-e]** then the demonstrative suffix as was the case with obstruent final roots illustrated in Table 30 and nasal final roots in Table 32.

**Table 34**

*Noun Roots Ending in Approximants with Plural Demonstrative Suffixes*

| NounR | NounR + [**-gi**] (these) | NounR + [**-go**] (those) | NounR + [**-ka**] (those) | Root Gloss |
|---|---|---|---|---|
| **ɵuol** | **ɵuond-e-gi** | **ɵuond-e-go** | **ɵuond-e-ka** | snake |
| **ragwɛl** | **rogwɛnd-e-gi** | **rogwɛnd-e-go** | **rogwɛnd-e-ka** | bow-legged |
| **laktar** | **laktetʃ-e-gi** | **laktetʃ-e-go** | **laktetʃ-e-ka** | doctor |
| **bɔr** | **bɔtʃ-e-gi** | **bɔtʃ-e-go** | **bɔtʃ-e-ka** | animal fat |
| **ŋgaw** | **ŋgep-e-gi** | **ŋgep-e-go** | **ŋgep-e-ka** | cloth |
| **ʧiew** | **ʧiep-e-gi** | **ʧiep-e-go** | **ʧiep-e-ka** | porcupine |

V-final noun roots also admit demonstrative suffixes. However, as previously explained vowels are invisible in sufface realizations when they occur in root final position in Dholuo nominals. As such, the behavior of the vowel in V-final noun roots is dictated by the prevocalic consonants. The prevocalic consonants follow the pattern described earlier

with regard to the morphophonological behaviour of the obstruents, nasals and approximants occurring root finally. Table 35 illustrates the structure of the V-final noun roots with the demonstrative suffixes [**-ni, -ʧa** and **-no**] which describe singular near referent, singular remote referent and singular far referent respectively. It should also be noted that [**w**] becomes [**p**] before vowels and [**b**] before consonants, for instance **ʧieb-ni** (Table 33) and **ʧiep-e-ka** (Table 34)

**Table 35**

*Vowel Final Roots with Singular Demonstrative Suffixes*

| Noun Root | NounR + [**-ni**] (this) | NounR + [**-ʧa**] (that) | NounR + [**-no**] (that) | Root Gloss |
|---|---|---|---|---|
| **raʧu:ŋgi** | **raʧu:ŋg-ni** | **raʧu:ŋg-ʧa** | **raʧu:ŋg-no** | sieve |
| **osiki** | **osig-ni** | **osig-ʧa** | **osig-no** | stump |
| **olele** | **olend-ni** | **olend-ʧa** | **olend-no** | lizard |
| **lowo** | **lob-ni** | **lob-ʧa** | **lob-no** | land |
| **polo** | **pond-ni** | **pond-ʧa** | **pond-no** | heaven/sky |
| **aluru** | **alund-ni** | **alund-ʧa** | **alund-no** | quail |
| **buŋgu** | **buŋg-ni** | **buŋg-ʧa** | **buŋg-no** | forest |
| **paka** | **pag-ni** | **pag-ʧa** | **pag-no** | cat |

Constraints governing articulatory harmony in Dholuo nominals demand that the vowel in the V-final noun roots gets deleted in admitting a suffix. In addition, prenasalised consonants do not undergo alteration in inflectional process because they do not naturally occur in C-final positions in noun roots as seen in [ **raʧu:ŋgi],** [**punda]** and **[buŋgu]** in both Table 35 and 36**.**

Table 36 below illustrates the structure of vowel final noun roots with the demonstrative suffixes **[-gi], [-go]** and **[-ka]** which describe plural near referent, plural remote referent and plural far referent respectively. The noun root first takes the plural morpheme **[-e]** then the demonstrative suffix as was the case with obstruent final roots illustrated in Table 30; nasal final roots in Table 32 and with approximant final in Table 34.

**Table 36**

*Vowel Final Roots with Plural Demonstrative Suffixes*

| Noun Root | NounR + [**-gi**] (these) | NounR + [**-go**] (those) | NounR + [**-ka**] (those) | Root Gloss |
|---|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋg-e-gi** | **ratʃu:ŋg-e-go** | **ratʃu:ŋg-e-ka** | sieve |
| **osiki** | **osik-e-gi** | **osik-e-go** | **osik-e-ka** | stump |
| **olele** | **olend-e-gi** | **olend-e-go** | **olend-e-ka** | lizard |
| **ndege** | **ndek-e-gi** | **ndek-e-go** | **ndek-e-ka** | aircraft |
| **lowo** | **lop-e-gi** | **lop-e-go** | **lop-e-ka** | land |
| **polo** | **pond-e-gi** | **pond-e-go** | **pond-e-ka** | heaven/sky |
| **aluru** | **alutʃ-e-gi** | **alutʃ-e-go** | **alutʃ-e-ka** | quail |
| **buŋgu** | **buŋg-e-gi** | **buŋg-e-go** | **buŋg-e-ka** | forest |
| **paka** | **pek-e-gi** | **pek-e-go** | **pek-e-ka** | cat |
| **punda** | **pund-e-gi** | **pund-e-go** | **pund-e-ka** | donkey |

#### 4.2.2.4. Noun Roots with Interrogative Suffixes

In addition to demonstrative suffixes, noun roots can take interrogative suffixes [**-ŋa, -aŋɔ, manɛ** and **magɛ]**. The interrogative suffixes [**-ŋa** and **-aŋɔ**] are bound morphemes and together with the noun root they form a single noun word, for example **guog-ŋa** "whose dog," **guog-aŋɔ** "what dog". On the other hand, the interrogative suffixes **[manɛ** and **magɛ]** are free morphemes which together with the noun roots form a two-word NP, for example, **guok manɛ** "which dog" **guogi magɛ** "which dogs" as discussed below.

Table 37 and 39 illustrate the structure of obstruent final singular nouns and plural nouns respectively with the interrogative suffixes **[-ŋa]** "whose" and [**-aŋɔ**] "what".

**Table 37**

*Obstruent Final Singular Nouns with the Interrogative Suffixes*

| NounR | NounR + [**-na**] "Whose" | NounR + [**-na**] "What" | Root Gloss |
|---|---|---|---|
| **sup** | **sub-ŋa** | **sub-aŋɔ** | tongue |
| **alap** | **alab-ŋa** | **alab-aŋɔ** | field |
| **otit** | **otid-ŋa** | **otid-aŋɔ** | firefly |
| **okot** | **okod-ŋa** | **okod-aŋɔ** | bell |
| **dek** | **deg-ŋa** | **deg-aŋɔ** | vegetable |
| **buk** | **bug-ŋa** | **bug-aŋɔ** | book |
| **atʃuɵ** | **atʃuð-ŋa** | **atʃuð-aŋɔ** | vulture |
| **jaɵ** | **jað-ŋa** | **jað-aŋɔ** | medicine |
| **mandas** | **mandas-ŋa** | **mandas-aŋɔ** | baked break |
| **makas** | **makas-ŋa** | **makas-aŋɔ** | pair of scissors |
| **ɲimbitʃ** | **ɲimbidʒ-ŋa** | **ɲimbidʒ-aŋɔ** | intestine |
| **rétʃ** | **rédʒ-ŋa** | **rédʒ-aŋɔ** | fish |

All the final obstruents in the noun roots in Table 37 harden when admitting the interrogative suffix **[-ŋa]** "whose". Then noun roots in Table 37 are in their singular form. However, when interrogative suffixes occur with plural nouns, the noun root first acquire the plural suffix [**-e**] before admitting the interrogative suffix as illustrated in Table 38 below. Nonetheless, the final obstruent hardens in an identical manner demonstrated in Table 37 with singular nouns.

**Table 38**

*Obstruent Final Plural Nouns with the Interrogative Suffixes*

| NounR | NounR + Pl + [**-na**] "Whose" | NounR + Pl + [**-na**] "What" | Root Gloss |
|---|---|---|---|
| **sup** | **sub-e-ŋa** | **sub-e-aŋɔ** | soup |
| **alap** | **alab-e-ŋa** | **alab-e-aŋɔ** | field |
| **otit** | **otid-e-ŋa** | **otid-e-aŋɔ** | firefly |
| **okot** | **okod-e-ŋa** | **okod-e-aŋɔ** | bell |
| **dek** | **deg-e-ŋa** | **deg-e-aŋɔ** | vegetable |
| **buk** | **bug-e-ŋa** | **bug-e-aŋɔ** | book |
| **atʃuɵ** | **atʃuð-e-ŋa** | **atʃuð-e-aŋɔ** | vulture |
| **jaɵ** | **jeð-e-ŋa** | **jað-e-aŋɔ** | medicine |
| **mandas** | **mandes-e-ŋa** | **mandes-e-aŋɔ** | baked break |
| **makas** | **makes-e-ŋa** | **makes-e-aŋɔ** | pair of scissors |
| **ɲimbitʃ** | **ɲimbij-e-ŋa** | **ɲimbij-e-aŋɔ** | intestine |
| **rétʃ** | **réj-e-ŋa** | **réj-e-aŋɔ** | fish |

Table 39 illustrates the structure of obstruent final noun roots with the interrogative suffixes **[mane]** and [**mage**] both having the meaning of "which". However, **[mane]** is singular in meaning while [**mage**] is plural. For that reason, when nouns admit [**mage**], they first admit the plural suffix. The interrogative suffixes **[mane]** and [**mage**], as previously explained, are free morphemes which together with the noun root form a two-word NP. Consequently, as demanded by articulatory harmony constraints in Dholuo defining hardening or weakening of noun root final sounds in inflectional processes, the behaviour of obstruents will differ when nouns acquire the interrogative suffixes **[-ŋa]** "who/whose" and [**-aŋɔ**] "what" on one hand and **[mane]** and [**mage**] on another as seen in Table 39 below. This constraint requires that noun root final consonants except **[s]** in the input are realized as hardened or weakened segments in the output. That is, noun root final obstruents which are always phonologically strong, weaken word internally but remain hard word finally in the output.

**Table 39**

*Obstruent Noun Roots with the Interrogative Suffixes*

| NounR | NounR + [**mane**] "which" | NounR + Pl + [**mage**] "which" | Root Gloss |
|---|---|---|---|
| **sup** | **sup mane** | **sub-e mage** | tongue |
| **alap** | **alap mane** | **alab-e mage** | field |
| **otit** | **otit mane** | **otid-e mage** | firefly |
| **okot** | **okot mane** | **okod-e mage** | bell |
| **dek** | **dek mane** | **deg-e mage** | vegetable |
| **buk** | **buk mane** | **bug-e mage** | book |
| **atʃuɵ** | **atʃuɵ mane** | **atʃuð-e mage** | vulture |
| **jaɵ** | **jaɵ mane** | **jað-e mage** | medicine |
| **mandas** | **mandas mane** | **mandes-e mage** | baked break |
| **makas** | **makas mane** | **makes-e mage** | pair of scissors |
| **ɲimbitʃ** | **ɲimbitʃ mane** | **ɲimbidʒ-e mage** | intestine |
| **rétʃ** | **rétʃ mane** | **réj-e mage** | fish |

Table 40 and 41 below illustrates the structure of nasal final noun roots when they occur with the interrogative suffixes **[-ŋa]** "whose" and [**-aŋɔ**] "what".

**Table 40**

*Nasal Final Singular Nouns with the Interrogative Suffixes*

| NounR | NounR + [**-ŋa**] "Whose" | NounR + [**-aŋɔ**] "What" | Root Gloss |
|---|---|---|---|
| **kɔm** | **kɔmb-ŋa** | **kɔmb-aŋɔ** | chair |
| **arum** | **arumb-ŋa** | **arumb-aŋɔ** | an owl |
| **ʧuɲ** | **ʧuɲdʒ-ŋa** | **ʧuɲdʒ-aŋɔ** | liver |
| **ajaɲ** | **ajaɲdʒ-ŋa** | **ajaɲdʒ-aŋɔ** | verbal assault |
| **kuon** | **kuond-ŋa** | **kuond-aŋɔ** | ugali |
| **rabuon** | **rabuond-ŋa** | **rabuond-aŋɔ** | potato |
| **ɲaŋ** | **ɲaŋg-ŋa** | **ɲaŋg-aŋɔ** | crocodile |
| **ɲatieŋ** | **ɲatieŋg-ŋa** | **ɲatieŋg-aŋɔ** | boulder |

Nasal final noun roots behave in identical way when they occur with the plural suffixes, genitive suffixes, demonstrative Suffixes and interrogative suffixes. The noun root final nasal hardens to prenasalised consonants as they acquire the suffixes but remain weak word finally as is demonstrated in Tables 40, 41 and 42.

**Table 41**

*Nasal Final Plural Nouns with the Interrogative Suffixes*

| NounR | NounR + [**-ŋa**] "Whose" | NounR + [**-aŋɔ**] "What" | Root Gloss |
|---|---|---|---|
| **kɔm** | **kɔmb-e-ŋa** | **kɔmb-e-aŋɔ** | chair |
| **arum** | **arumb-e-ŋa** | **arumb-e-aŋɔ** | an owl |
| **ʧuɲ** | **ʧuɲʤ-e-ŋa** | **ʧuɲʤ-e-aŋɔ** | liver |
| **ajaɲ** | **ajaɲʤ-e-ŋa** | **ajaɲʤ-e-aŋɔ** | verbal assault |
| **kuon** | **kuond-e-ŋa** | **kuond-e-aŋɔ** | ugali |
| **rabuon** | **rabuond-e-ŋa** | **rabuond-e-aŋɔ** | potato |
| **ɲaŋ** | **ɲaŋg-e-ŋa** | **ɲaŋg-e-aŋɔ** | crocodile |
| **ɲatieŋ** | **ɲitieŋg-e-ŋa** | **ɲitieŋg-e-aŋɔ** | boulder |

Table 42 illustrates the occurrence of nasal final noun roots with the interrogative suffixes **[mane]** and [**mage**]

**Table 42**

*Nasal Final Noun Roots with the Interrogative Suffixes*

| NounR | NounR + [**mane**] "Which" | NounR +Pl + [**mage**] "Which" | Root Gloss |
|---|---|---|---|
| **kɔm** | **kɔm mane** | **kɔmb-e mage** | chair |
| **arum** | **arum mane** | **arumb-e mage** | an owl |
| **ʧuɲ** | **ʧuɲ mane** | **ʧuɲʤ-e mage** | liver |
| **ajaɲ** | **ajaɲ mane** | **ajaɲʤ-e mage** | verbal assault |
| **kuon** | **kuon mane** | **kuond-e mage** | ugali |
| **rabuon** | **rabuon mane** | **rabuond-e mage** | potato |
| **ɲaŋ** | **ɲaŋ mane** | **ɲaŋg-e mage** | crocodile |
| **ɲatieŋ** | **ɲatieŋ mane** | **ɲitieŋg-e mage** | boulder |

Table 43 and 44 below illustrates the structure of approximant final noun roots when they occur with the interrogative suffixes **[-ŋa]** "whose" and [**-aŋɔ**] "what".

**Table 43**

*Singular Nouns Ending in Approximants with the Interrogative Suffixes*

| NounR | NounR + [**-ŋa**] "What" | NounR + [**-aŋɔ**] "What" | Root Gloss |
|---|---|---|---|
| **ɵuol** | **ɵuond-ŋa** | **ɵuond-aŋɔ** | snake |
| **ogwal** | **ogwand-ŋa** | **ogwand-aŋɔ** | frog |
| **laktar** | **laktand-ŋa** | **laktaʧ-aŋɔ** | doctor |
| **bɔr** | **bɔnd-ŋa** | **bɔʧ-aŋɔ** | animal fat |
| **ŋgaw** | **ŋgab-ŋa** | **ŋgap-aŋɔ** | antelope |
| **ʧiew** | **ʧieb-ŋa** | **ʧiep-aŋɔ** | porcupine |

**Table 44**

*Plural Nouns Ending in approximants with the Interrogative Suffixes*

| NounR | NounR + [**-ŋa**] "What" | NounR + [**-aŋɔ**] "What" | Root Gloss |
|---|---|---|---|
| **ɵuol** | **ɵuond-e-ŋa** | **ɵuond-e-aŋɔ** | snake |
| **ogwal** | **ogwend-e-ŋa** | **ogwend-e-aŋɔ** | frog |
| **laktar** | **laktɛʧ-e-ŋa** | **laktaʧ-e-aŋɔ** | doctor |
| **bɔr** | **bɔʧ-e-ŋa** | **bɔʧ-e-aŋɔ** | animal fat |
| **ŋgaw** | **ŋgep-e-ŋa** | **ŋgep-e-aŋɔ** | antelope |
| **ʧiew** | **ʧiep-e-ŋa** | **ʧiep-e-aŋɔ** | porcupine |

Approximant final noun roots similarly behave in identical way when they occur with the plural suffixes, genitive suffixes, demonstrative Suffixes and interrogative suffixes. The approximant at the noun root final position hardens as they acquire bound suffixes but remains soft word finally as demonstrated in Table 45. However, it should be further noted that [**r**] fortifies to [**ʧ**] before vowels and [**nd**] before consonants. Similarly, [**w**] hardens to [**p**] before vowels and [**b**] before consonants.

**Table 45**

*Noun Roots Ending in Approximants with the Interrogative Suffixes*

| NounR | NounR + [**mane**] "Which" | NounR + [**mage**] "Which" | Root Gloss |
|---|---|---|---|
| **ɵuol** | **ɵuol mane** | **ɵuond-e mage** | snake |
| **ogwal** | **ogwal mane** | **ogwend-e mage** | frog |
| **laktar** | **laktar mane** | **laktetʃ-e mage** | doctor |
| **bɔr** | **bɔr mane** | **bɔtʃ-e mage** | animal fat |
| **ŋgaw** | **ŋgaw mane** | **ŋgap-e mage** | antelope |
| **tʃiew** | **tʃiew mane** | **tʃiep-e mage** | porcupine |

V-final noun roots also admit interrogative suffixes. However, as previously explained vowels are opaque in sufface realizations when they occur in root final position in Dholuo nominals. In that regard, the behavior of the vowel in V-final noun roots is dictated by the prevocalic consonants which follow the pattern described earlier with regard to the morphophonological behavior of the obstruents, nasals and approximants occurring root finally. Table 46 illustrates the structure of vowel final noun roots when they occur with the interrogative suffixes **[-ŋa]** "whose" and [**-aŋɔ**] "what".

**Table 46**

*Vowel Final Singular Nouns with the Interrogative Suffixes*

| Root | NounR + [**-ŋa**] "What" | NounR + [**-aŋɔ**] "What" | Root Gloss |
|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋg-ŋa** | **ratʃu:ŋg-aŋɔ** | sieve |
| **osiki** | **osig-ŋa** | **osig-aŋɔ** | stump |
| **olele** | **olend-ŋa** | **olend-aŋɔ** | lizard |
| **ndege** | **ndek-ŋa** | **ndek-aŋɔ** | aircraft |
| **lowo** | **lob-ŋa** | **lop-aŋɔ** | land |
| **polo** | **pond-ŋa** | **pond-aŋɔ** | heaven/sky |
| **aluru** | **alund-ŋa** | **alutʃ-aŋɔ** | quail |
| **buŋgu** | **buŋg-ŋa** | **buŋg-aŋɔ** | forest |
| **paka** | **pag-ŋa** | **pag-aŋɔ** | cat |
| **punda** | **pund-ŋa** | **pund-aŋɔ** | donkey |

When the V-final roots displayed in the above Table 46 admit the interrogative suffixes, the final vowel gets deleted. The same is seen when the interrogative suffixes occur with

plural nouns but the noun first acquires the plural morpheme before admitting the interrogative suffix as illustrated in Table 47.

**Table 47**

*Vowel Final Plural Nouns with the Interrogative Suffixes*

| Root | NounR +Pl + [**-ŋa**] "What" | NounR + Pl + [**-aŋɔ**] "What" | Gloss |
|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋg-e-ŋa** | **ratʃu:ŋg-e-aŋɔ** | sieve |
| **osiki** | **osig-e-ŋa** | **osig-e-aŋɔ** | stump |
| **olele** | **olend-e-ŋa** | **olend-e-aŋɔ** | lizard |
| **ndege** | **ndek-e-ŋa** | **ndek-e-aŋɔ** | aircraft |
| **lowo** | **lop-e-ŋa** | **lop-e-aŋɔ** | land |
| **polo** | **pond-e-ŋa** | **pond-e-aŋɔ** | heaven/sky |
| **aluru** | **alutʃ-e-ŋa** | **alutʃ-e-aŋɔ** | quail |
| **buŋgu** | **buŋg-e-ŋa** | **buŋg-e-aŋɔ** | forest |
| **paka** | **pek-ni-ŋa** | **pek-ni-aŋɔ** | cat |
| **punda** | **pund-ni-ŋa** | **pund-ni-aŋɔ** | donkey |

Table 48 illustrates occurrence of V-final noun roots with the interrogative suffixes [**mane**] and [**mage**].

**Table 48**

*Vowel final Noun Roots with the Interrogative Suffixes*

| Root | NounR +Pl + [**mane**] "What" | NounR + Pl + [**mage**] "What" | Root Gloss |
|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋgi mane** | **ratʃu:ŋg-e mage** | sieve |
| **osiki** | **osiki mane** | **osig-e mage** | stump |
| **olele** | **olele mane** | **olend-e mage** | lizard |
| **ndege** | **ndege mane** | **ndek-e mage** | aircraft |
| **lowo** | **lowo mane** | **lop-e mage** | land |
| **polo** | **polo mane** | **pond-e mage** | heaven/sky |
| **aluru** | **aluru mane** | **alutʃ-e mage** | quail |
| **buŋgu** | **buŋgu mane** | **buŋg-e mage** | forest |
| **paka** | **paka mane** | **pek-ni mage** | cat |
| **punda** | **punda mane** | **pund-ni mage** | donkey |

In summary, nouns in Dholuo exist both as bare forms as well as inflected forms with suffixes. These suffixes are mostly bound with the noun root from which they derive their

grammatical function. Noun roots in Dholuo can be affixed with plural suffixes, genitive suffixes, demonstrative suffixes, interrogative suffixes. The suffix and the noun root together form one noun word in Dholuo nominals. The morphophonological behaviour of the noun roots when they occur with the suffixes (plural, genitive, demonstrative, and interrogative) is identical in all instances. This is an attestation that the feature polarity phenomenon used by earlier studies in explaining plural formation in Dholuo nouns runs into empirical problem because the phenomenon is a feature of all the affixation processes in Dholuo.

### 4.3 The Structure of Adjectives in Dholuo

The noun root and its adjectival modifier in Dholuo together form a two-word NP. For example, [**guok ma-duoŋ]** "a big dog" is comprised of the noun root [**guok]** and the adjective stem [**ma-duoŋ]**. The adjective takes the attributive prefix **ma-** which semantically refers to 'that is'. Such an attributive prefix is not unique to Dholuo. In Hanunoo, a Philippine language, there is a morphologically and semantically identical attributive prefix **ma-** used in describing colour and colour ranges (Comrie, 1989) as exemplified in Table 49 below.

**Table 49**

*Attributive Prefixes in Hanunoo Language*

| Adjective | Gloss |
|---|---|
| **(ma)jlagti** | white and all other light tints |
| **(ma)jbiru** | black and dark tints of other colours |
| **(ma)rara** | range of red, orange, and maroon |
| **(ma)iatuy** | range of yellow and lighter tints of green and brown. |

*Note. Data in this table is adapted from Comrie (1989) explanation of the prefix [**ma-**] in Hanunoo, a Philipine language*

In Dholuo, the attributive prefix **ma-** isolates and uniquely qualifies words used with an adjectival sense as is exemplified in (5) below. It is, therefore, used contextually and not in isolation.

5. **gɔt ma-bor**

hill ATTR-tall-3Sg
(a tall hill)

6. **gɔd-e ma-boʧ-o**
hill-3Pl ATTR-tall-Pl
(tall hills)

Consequently, the word **bor** "tall" cannot be used in isolation without the attributive prefix **ma-** in an NP. If it has to, then the noun has to acquire a determiner as below (7).

7. **gɔd-no bor**
hill-DEM.that tall-3Sg
(that tall hill)

8. **gɔd-e-go boʧ-o**
hill-3Pl ATTR-tall-Pl
(those tall hills)

As demonstrated in (5-8) above, Adjectives in Dholuo may exist as bare roots as well as with suffixes. Consequently, this study gives a detailed analysis of the structure of adjectives by giving a description of the final sound segments of the adjective roots which forms the basis of the morphophonological descriptions in Chapter 6. Adjectives in Dholuo end in obstruents, nasals, approximants and vowels as discussed below. Dholuo has 13 obstruents (6 stops and 7 fricatives). The phonemes [**p**, **t**, **k**, **ɵ**, and **s**] can occupy the final position in bare adjective roots as discussed below. Table 48 provides data that illustrates some of the obstruent final adjective roots.

**Table 50**

*Obstruent Final Adjective Roots*

| Adjective Root | Gloss |
|---|---|
| **top** | rotten |
| **bup** | enough |
| **mit** | sweet/delicious |
| **ʧot** | broken |
| **tek** | difficult |
| **nok** | few/little |
| **biɵ** | sharp |
| **poɵ** | slippery |
| **liʧ** | wonderful |
| **keʧ** | bitter |

Table 50 shows that, like it is with noun roots, voiced obstruents [**b**, **g**, **ð**, **ʤ**] do not occur in the adjective root final position. Similarly, the voiceless alveolar fricative [**s**], the voiceless labio-dental fricative [**f**] and the voiceless glottal fricative [**h**] do not occur naturally in the final position of Dholuo adjective roots. Table 51 provides data exemplifying nasal final adjective roots.

**Table 51**

*Nasal Final Adjective Roots*

| Adjective Root | Gloss |
|---|---|
| **jɔm** | soft |
| **lum** | green |
| **kwiŋ** | harsh |
| **leŋ** | glistening/shining |
| **ʧon** | old/legendary |
| **sin** | sombre |
| **duɔŋ** | big/large |
| **liŋ** | quiet/silent |

Adjective roots may also end in approximants. Table 52 below provides data exemplifying adjective roots which end in approximants.

**Table 52**

*Adjective Roots Ending in Approximant*

| Adjective Root | Gloss |
|---|---|
| **mɔɔl** | humble |
| **mil** | shiny |
| **tar** | bright |
| **bor** | Far |
| **ŋaw** | delicate |
| **liw** | dilute |

Adjective roots in Dholuo also end in vowels. Table 53 provides data exemplifying vowel final adjective roots in Dholuo. All the 5 [+**ATR**] vowels **[e, o, u, i, & a]** occur at the adjective root final position.

**Table 53**

*Vowel Final Adjective Roots*

| Adjective Root | Gloss |
|---|---|
| **ðele** | unlimited |
| **gele** | stubborn |
| **ŋgoro** | cowardly |
| **jolo** | gullible |
| **numu** | unripen |
| **tulu** | throughout |
| **tiriri** | fossilised |
| **rawiɲʤi** | incorigible |
| **raga** | young/youthful |
| **baŋga** | weird |

Just like noun roots, adjective roots in Dholuo can also take suffixes. The following suffixes can be added to an adjective root to form adjective words: plural suffixes, demonstrative suffixes and genitive suffixes.

Adjective roots can take the plural suffixes. However, number is not normally overtly marked in adjectives except in just a few. Table 54 provides data which exemplifies plural suffixes occurring with some adjective roots. From the data obtained, only five

adjective roots overtly demonstrated number by admitting the plural suffix [**-o**]. Otherwise, only adjective roots describing colour consistently displayed overt number marking by admitting the suffix [**-e**] as illustrated in Table 55 indicating that adjectives in Dholuo do not always display number marking as nouns do.

**Table 54**

*Adjective Roots with Plural Suffixes*

| Adjective Root | Root + Pl. Suffix | Gloss |
|---|---|---|
| **bor** | **boʧ-o** | tall/far |
| **tin** | **tind-o** | green |
| **duɔŋ** | **doŋg-o** | big |

It should be notable, however, that some adjective roots are opaque in the process illustrated in Table 54 above. For instance, **biɵ→biɵ-o** "sharp"**; ʧiek→ʧiek-o** "short", do not display phonological alternation in the final consonant.

**Table 55**

*Adjective Roots Describing Colour with Plural Suffixes*

| Adjective Root | ATTR + Root + Pl. Suffix | Root Gloss |
|---|---|---|
| **kwar** | **ra-kweʧ-e** | red |
| **lum** | **ra-lumb-e** | green |
| **buor** | **ra-buoʧ-e** | brown |
| **buor** | **di-buoʧ-e** | brown |
| **ŋer** | **ra-ŋeʧ-e** | grey |
| **teŋ** | **ra-teŋg-e** | black |
| **bo** | **di-boj-e** | white |
| **kijo** | **di-kiʧ-e** | purple |

Adjectives hardly display overt number marking as previously explained. However, adjectives describing colours admit the plural suffix [**-e**]. The rest of the few adjectives displaying overt number marking admit the plural suffix [**-o**]. This study has not

established any further linguistic motivation in the choice between [**-e**] and [**-o**] plural suffixes in adjectives.

In addition, adjective roots must admit attributive prefixes [**ma-**] "that is" as exemplified in 6-8, [**ra-**] and [**di-**] as illustrated in Table 55 which gives them grammatical and semantic references. The choice between the attributive prefixes [**ra-**] and [**di-**] is based on gender; where [**ra-**] is used for inanimate while [**di-**] is used for animate referents. Syntactically, the attributive prefix [**ma-**] not only precedes all other affixes but it also isolates and uniquely qualifies words used with an adjectival sense as is exemplified in (9-10).

9. **kɔm ma-ra-buor**

   chair-3Sg ATTR-ATTR-brown-3Sg
   (a brown chair)

10. **kɔmb-e ma-ra-buoʧ-e**

    chair-3Pl ATTR-ATTR-brown-3Pl
    (brown chairs)

When the adjective acquires the plural suffix, the noun also has to cohere in terms of number by acquiring a plural suffix. However, when the noun changes its gender the second attributive prefix also changes as exemplified in (11-12). The adjective also acquires a vowel which gets deleted in the plural form.

11. **ɲuɔk ma-di-buoro**

    goat-3Sg ATTR-ATTR-brown-3Sg
    (a brown goat)

12. **ɲuɔg-i ma-di-buoʧ-e**

    goat-3Sg ATTR-ATTR-brown-3Sg
    (brown goats)

Adjective roots also take pronoun suffixes to form a single adjective word. Personal pronouns in Dholuo may stand alone as free morphemes or may be bound as discussed in Section 4.4 and illustrated in Table 68 which is tabulated below for emphasis.

| Person | Number | Case | | |
|---|---|---|---|---|
| | | Nominative | Accusative | Genitive |
| 1 | Sg. | **an-** | **-a** | **-a** |
| | Pl | **wan-** | **-wa** | **-wa** |
| 2 | Sg | **in-** | **-i** | **-i** |
| | Pl | **un-** | **-u** | **-u** |
| 3 | Sg | **en-** | **-e** | **-e** |
| | Pl | **gin-** | **-gi** | **-gi** |

When adjectives admit a pronoun suffix, the pronoun must first acquire a genitive particle [**-ne**] meaning "for". The particle which has clitic-like characteristics attaches to the pronominal host and together the two form a pronominal clitic both of which are phonologically interdependent but syntactically autonomous, for example **ne + wan→ n=wa** "for us", **ne + un→ n=u** "for you". Finally, the pronominal clitic attaches post-nominally to the adjective to form AdjP, for instance **mit=n=wa** "sweet for us", **mit=n=u** "sweet for you". For that reason, the final sounds in the adjective root final position do not exhibit morphophonological alternation characteristic of Dholuo nominal morphology. This is because root final obstruents which are always phonologically strong, weaken word internally but remain hard word finally in the output in all inflectional processes in Dholuo nominals. Similarly, root final sounds which are always phonologically weak, harden word internally but remain weak word finally in the output in all inflectional processes in Dholuo nominals. Thus, obstruents (Table 56-57) which are phonologically strong and which are expected to weaken word medially remain strong when they admit pronominal clitics; while nasals (Table 58-59) and approximants (Table 60-61) which are phonologically weak, and which are expected to harden word medially, remain weak when they admit pronominal clitics.

Table 56 exemplifies obstruent final adjective roots occurrence with singular pronominal clitics [**n=a, n=i, n=e**]. The obstruents [**p, t, k, ɵ, ʧ**] which are always phonologically strong remain hard when the pronominal clitics **n=a, n=i, n=e** are admitted.

**Table 56**

*Obstruent Final Adjective Roots with Singular Pronoun Suffixes*

| Adjective Root | 1 Sg. Pron (me) | 2 Sg. Pron (you) | 3 Sg. Pron (him/her/it) | Root Gloss |
|---|---|---|---|---|
| **top** | **otop=n=a** | **otop=n=i** | **otop=n=e** | rotten |
| **bup** | **bub=n=a** | **bup=n=i** | **bup=n=e** | enough |
| **mit** | **mit=n=a** | **mit=n=i** | **mit=n=e** | sweet/delicious |
| **ʧot** | **oʧot=n=a** | **oʧot=n=i** | **oʧot=n=e** | broken |
| **tek** | **tek=n=a** | **tek=n=i** | **tek=n=e** | difficult |
| **nok** | **nok=n=a** | **nok=n=i** | **nok=n=e** | few/little |
| **biɵ** | **biɵ=n=a** | **biɵ=n=i** | **biɵ=n=e** | sharp |
| **poɵ** | **poɵ=n=a** | **poɵ=n=i** | **poɵ=n=e** | slippery |
| **liʧ** | **liʧ=n=a** | **liʧ=n=i** | **liʧ=n=e** | wonderful |
| **keʧ** | **keʧ=n=a** | **keʧ=n=i** | **keʧ=n=e** | bitter |

Table (57) illustrates the behaviour of plural pronominal clitics [**n=wa, n=u, n=gi**]. Like is the case in Table 57, the obstruents remain hard in the inflected form.

**Table 57**

*Obstruent Final Adjective Roots with Plural P*ronominal Clitics

| Adjective Root | 1 Pl. Pron (me) | 2 Pl. Pron (you) | 3 Pl. Pron (them) | Root Gloss |
|---|---|---|---|---|
| **top** | **top=n=wa** | **top=n=u** | **top=n=gi** | rotten |
| **bup** | **bup=n=wa** | **bup=n=u** | **bup=n=gi** | enough |
| **mit** | **mit=n=wa** | **mit=n=u** | **mit=n=gi** | sweet/delicious |
| **ʧot** | **ʧot=n=wa** | **ʧot=n=u** | **ʧot=n=gi** | broken |
| **tek** | **tek=n=wa** | **tek=n=u** | **tek=n=gi** | difficult |
| **nok** | **nok=n=wa** | **nok=n=u** | **nok=n=gi** | few/little |
| **biɵ** | **biɵ=n=wa** | **biɵ=n=u** | **biɵ=n=gi** | Sharp |
| **poɵ** | **poɵ=n=wa** | **poɵ=n=u** | **poɵ=n=gi** | slippery |
| **liʧ** | **liʧ=n=wa** | **liʧ=n=u** | **liʧ=n=gi** | wonderful |
| **keʧ** | **keʧ=n=wa** | **keʧ=n=u** | **keʧ=n=gi** | bitter |

Table 58 below exemplifies nasal final adjective roots occurrence with singular pronominal clitics [**n=a, n=i, n=e**]. Nasals are naturally phonologically weak. In admitting pronominal suffxes, the remain weak in the inflected form.

**Table 58**

*Nasal Final Adjective Roots with Singular Pronominal Clitics*

| Adjective Root | 1 Sg. Pron (me) | 2 Sg. Pron (you) | 3 Pl. Pron (him/her/it) | Root Gloss |
|---|---|---|---|---|
| **jɔm** | **jɔm=n=a** | **jɔm=n=i** | **jɔm=n=e** | Soft |
| **ralum** | **ralum=n=a** | **ralum=n=i** | **ralum=n=e** | Green |
| **kwiŋ** | **kwiŋ=n=a** | **kwiŋ=n=i** | **kwiŋ=n=e** | Harsh |
| **leŋ** | **leŋ=n=a** | **leŋ=n=i** | **leŋ=n=e** | glistening/shining |
| **ʧon** | **ʧon=n=a** | **ʧon=n=i** | **ʧon=n=e** | old/legendary |
| **sin** | **sin=n=a** | **sin=n=i** | **sin=n=e** | Sombre |
| **duɔŋ** | **duɔŋ=n=a** | **duɔŋ=n=i** | **duɔŋ=n=e** | big/large |
| **liŋ** | **liŋ=n=a** | **liŋ=n=i** | **liŋ=n=e** | quiet/silent |

Table 59 exemplifies nasal final adjective roots occurrence with the plural pronominal clitics [**n=wa, n=u, n=gi**]

**Table 59**

*Nasal Final Adjective Roots with Plural Pronominal Clitics*

| Adjective Root | 1 Pl. Pron (us) | 2 Pl. Pron (you) | 3 Pl. Pron (them) | Root Gloss |
|---|---|---|---|---|
| **jɔm** | **jɔm=n=wa** | **jɔm=n=u** | **jɔm=n=gi** | soft |
| **ralum** | **ralum=n=wa** | **ralum=n=u** | **ralum=n=gi** | green |
| **kwiŋ** | **kwiŋ=n=wa** | **kwiŋ=n=u** | **kwiŋ=n=gi** | harsh |
| **leŋ** | **leŋ=n=wa** | **leŋ=n=u** | **leŋ=n=gi** | glistening/shining |
| **ʧon** | **ʧon=n=wa** | **ʧon=n=u** | **ʧon=n=gi** | old/legendary |
| **sin** | **sin=n=wa** | **sin=n=u** | **sin=n=gi** | sombre |
| **duɔŋ** | **duɔŋ=n=wa** | **duɔŋ=n=u** | **duɔŋ=n=gi** | big/large |
| **liŋ** | **liŋ=n=wa** | **liŋ=n=u** | **liŋ=n=gi** | quiet/silent |

Table 60 below provides data exemplifying occurrence of singular pronominal clitics with adjective roots ending in approximants. As is the case with phonologically weak nasals (Table 58-59), approximants remain weak in the inflected form.

**Table 60**

*Adjective Roots Ending in Approximant with Singular Pronominal Clitics*

| Adjective Root | 1 Sg. Pron (me) | 2 Sg. Pron (you) | 3 Sg. Pron (him/her/it) | Root Gloss |
|---|---|---|---|---|
| **mɔɔl** | **mɔɔl=n=a** | **mɔɔl=n=i** | **mɔɔl=n=e** | humble |
| **mil** | **mil=n=a** | **mil=n=i** | **mil=n=e** | shiny |
| **tar** | **tar=n=a** | **tar=n=i** | **tar=n=e** | bright |
| **bor** | **bor=n=a** | **bor=n=i** | **bor=n=e** | far |
| **ŋaw** | **ŋaw=n=a** | **ŋaw=n=i** | **ŋaw=n=e** | delicate |
| **liw** | **liw=n=a** | **liw=n=i** | **liw=n=e** | dilute |

Table 61 provides data exemplifying occurrence of plural pronominal clitics with adjective roots ending in approximants.

**Table 61**

*Adjective Roots Ending in Approximant with Plural Pronominal clitics*

| Adjective Root | 1 Pl. Pron (us) | 2 Pl. Pron (you) | 3 Pl. Pron (them) | Root Gloss |
|---|---|---|---|---|
| **mɔɔl** | **mɔɔl=n=wa** | **mɔɔl=n=u** | **mɔɔl=n=gi** | humble |
| **mil** | **mil=n=wa** | **mil=n=u** | **mil=n=gi** | shiny |
| **tar** | **tar=n=wa** | **tar=n=u** | **tar=n=gi** | bright |
| **bor** | **bor=n=wa** | **bor=n=u** | **bor=n=gi** | far |
| **ŋaw** | **ŋaw=n=wa** | **ŋaw=n=u** | **ŋaw=n=gi** | delicate |
| **liw** | **liw=n=wa** | **liw=n=u** | **liw=n=gi** | dilute |

Vowel final adjective roots also admit suffixes. However, vowels are realised as opaque segments in the root final position in Dholuo nominals. The pre-vocalic consonants in these V-final roots behave in identical manner to the consonants in the C-final roots. However, as seen in the foregoing discussion, pronominal clitics function as independent syntactic atoms in an AdjP. Consequently, the root final consonants do not display morphophonological alterations. Table 62 provides data showing occurrence of singular pronominal clitics with the vowel final adjective roots.

**Table 62**

*Vowel Final Adjective Roots with Singular Pronominal Clitics*

| Adjective Root | 1 Sg. Pron (me) | 2 Sg. Pron (you) | 3 Sg. Pron (him/her/it) | Root Gloss |
|---|---|---|---|---|
| **oðele** | **oðele=n=a** | **oðele=n=i** | **oðele=n=e** | unlimited |
| **gele** | **gele=n=a** | **gele=n=i** | **gele=n=e** | stubborn |
| **ŋgoro** | **ŋgoro=n=a** | **ŋgoro=n=i** | **ŋgoro=n=e** | cowardly |
| **jolo** | **jolo=n=a** | **jolo=n=i** | **jolo=n=e** | gullible |
| **numu** | **numu=n=a** | **numu=n=i** | **numu=n=e** | unripen |
| **tulu** | **tulu=n=a** | **tulu=n=i** | **tulu=n=e** | throughout |
| **raga** | **raga=n=a** | **raga=n=i** | **raga=n=e** | young/youthful |
| **baŋga** | **baŋga=n=a** | **baŋga=n=i** | **baŋga=n=e** | weird |

Table 63 provides data showing occurrence of plural pronominal clitics with the vowel final adjective roots.

**Table 63**

*Vowel Final Adjective Roots with Plural Pronominal Clitics*

| Adjective Root | 1 Pl. Pron (us) | 2 Pl. Pron (you) | 3 Pl. Pron (them) | Root Gloss |
|---|---|---|---|---|
| **oðele** | **oðele=n=wa** | **oðele=n=u** | **oðele=n=gi** | unlimited |
| **gele** | **gele=n=wa** | **gele=n=u** | **gele=n=gi** | stubborn |
| **ŋgoro** | **ŋgoro=n=wa** | **ŋgoro=n=u** | **ŋgoro=n=gi** | cowardly |
| **jolo** | **jolo=n=wa** | **jolo=n=u** | **jolo=n=gi** | gullible |
| **numu** | **numu=n=wa** | **numu=n=u** | **numu=n=gi** | unripen |
| **tulu** | **tulu=n=wa** | **tulu=n=u** | **tulu=n=gi** | throughout |
| **raga** | **raga=n=wa** | **raga=n=u** | **raga=n=gi** | young/youthful |
| **baŋga** | **baŋga=n=wa** | **baŋga=n=u** | **baŋga=n=gi** | weird |

Adjective roots may also admit other nominal roots to form a two word AdjP. The addition of a noun root (NounR) to an adjective root (AdjR) does not, similarly, trigger morphophonological alteration of the root final segment as has been demonstrated with the pronominal clitics. This therefore confirms the fact that these pronominal clitics function as separate words. Tables (64) and (65) below respectively exemplify the scenario of how all other adjective roots will behave with other noun roots.

**Table 64**

*Obstruent Final Noun Roots and Adjectives Roots*

| Noun root | Gloss | NounR + Adj | Gloss |
|---|---|---|---|
| **lep** | tongue | **lep ma-duoŋ** | a big tongue |
| **alap** | field | **alap ma-tin** | a small field |
| **otit** | firefly | **otit ma-mol** | a crawling firefly |
| **okot** | bell | **okot ma-lelo** | a noisy bell |
| **dek** | vegetable | **dek mo-top** | a rotten vegetable |
| **buk** | book | **buk ma-ɲien** | a new book |
| **atʃuɵ** | vulture | **atʃuɵ ma-wuɔr** | a greedy vulture |
| **jaɵ** | medicine | **jaɵ ma-ketʃ** | bitter medicine |
| **mandas** | fried bread | **mandas ma-jom** | a soft fried bread |
| **makas** | scissors | **makas ma-biɵ** | a sharp pair of scissors |
| **ɲimbitʃ** | intestine | **ɲimbitʃ ma-ler** | clean intestine |
| **rétʃ** | fish | **rétʃ ma-mit** | a delicious fish |

**Table 65**

*Nasal Final Noun Roots and Adjectives*

| NounR | Gloss | NounR + Adj | Gloss |
|---|---|---|---|
| **kɔm** | chair | **kɔm bao** | a wooden chair |
| **arum** | owl | **arum mo-jir** | a satanic owl |
| **ajaŋ** | assault | **ajaŋ ma-nono** | useless verbal assault |
| **kuon** | ugali | **kuon ma-liet** | hot ugali |
| **rabuon** | potato | **rabuon ma-puɔt** | a slender potato |
| **ɲaŋ** | crocodile | **ɲaŋ mo-leði** | a tricky crocodile |
| **ɲatieŋ** | boulder | **ɲatieŋ ma-pek** | a heavy boulder |

The same pattern illustrated in Table 64 with obstruent final noun roots, Table 65 with Nasal final noun roots is replicated with noun roots ending in approximants as well as with noun roots that end in vowels. In addition, adjectives in Dholuo are not normally marked for gender. Inflections for animate and non-human referents are therefore identical as shown in Table 66 below.

**Table 66**

*Inflections for Human and Non-human Referents*

| Noun (Sg) | Gloss | Adj | N+Adj (Sg) | Gloss | N+Adj (Pl) | Gloss |
|---|---|---|---|---|---|---|
| **dek** | vegetable | **otop** | **dek ma-otop** | rotten vegetable | **deg-e mo-top** | rotten |
| **okot** | bell | **lelo** | **okot ma-lelo** | noisy bell | **okod-e ma-lelo** | noisy |
| **ruɔɵ** | king | **ger** | **ruɔɵ ma-ger** | harsh king | **ruɔð-i ma-ger** | harsh |
| **dis** | plate | **obar** | **dis ma-obar** | broken plate | **dis-e ma-obar** | broken |

Furthermore, the structural position of the adjective in an AdjP follows a similar pattern seen in the other nominal constituents. The adjective comes after the noun stem which it modifies. However, when demonstratives are admitted in the NP construction consisting of a noun stem and an adjective, the demonstrative is attached to the adjective and not to the noun. In this sense, the adjective admits the attributive prefix **ma-** before it and other modifiers after it. Despite this, syntactic variations yield a number of semantic possibilities, some of which are as a result of emphasis by the speaker. There can be instances where the speaker would want to draw attention to the noun stem, as shown in (13), as well as other instances where the attention is focused on the adjective (14).

13. **law-ni** **kwar**
    dress-DEM.this red
    (this dress is red)

14. **law** **ma-kwar-ni**
    dress ATTR-red-DEM.this
    (this red dress)

15. **law** **ma-kwar**
    dress ATTR-red (a red dress)

In the constructions (13-15) above, the demonstrative [**ni]** 'this' is shifted to the noun stem to lay emphasis on the noun (13) and to the adjective to lay emphasis to the redness of the dress (14). The attributive prefix (**ma-**) is therefore present in (14) and (15) but lacking in (13). This therefore, posits that demonstratives can be attached to both the noun root and adjective stem, as seen in Table (67).

**Table 67**

*Position of Adjectives in Dholuo Nominals*

| | |
|---|---|
| **luɔ ma-tin** | small stick |
| **luð-e ma-tindo** | small sticks |
| **luð-ʧa** | that stick |
| **luð-e-ka** | those sticks |
| **luɔ ma-tin-ʧa** | that small stick |
| **luð-e ma-tindo-ka** | those small sticks |
| **luð-ni tin** | this stick is small |
| **luðe-ka tindo** | those sticks are small |

### 4.4 The Structure of Personal Pronouns in Dholuo

This study deals with the descriptive generalizations of the morphology of Dholuo personal pronouns as well as the subsequent morphophonemic variations in their syntactic application. Pronouns, like nouns, are a subclass of a noun phrase (NP) and tend to share grammatical properties within languages (Lee & Bautin, 1992). However, the term 'pronoun' has been used to refer not only to personal pronouns but also to 'proforms', including words such as demonstratives, indefinites, interrogative pronouns, relative pronouns, etc. (Cormier, 2011).

The grammatical properties associated with the pronoun as a lexical category vary from one language to the other. As a result, it has been problematic for linguists to settle on a unifying definition of pronouns. Traditionally, pronouns have been defined to be the nominal category that "stand for nouns" (Bhat, 2004; Cormier, 2011; Lee & Bautin, 1992). However, most linguists find this definition to be unsatisfactory mainly because personal pronouns do not "stand for" any nouns as such, whereas demonstrative or interrogative pronouns can "stand for" adjectives, adverbs, or even verbs. Nonetheless, attempts to find alternative definitions have not been satisfactory either forcing linguists to retain the traditional definition as the only workable one (Bhat, 2004). For that reason, this study adopts the understanding of pronouns as the nominal forms that basically replace nouns and NPs in a syntactic construction. This study looks at Dholuo personal

pronouns as a distinctive nominal category but with a continuum of semantic references to other forms of pronouns which, for purposes of distinction, will be referred to as *proforms*.

In isolation, pronouns may exist as free morphemes, but this as well varies from one language to another. Personal pronouns in Dholuo, like in many other world languages display certain restricted morpho-phonology and morpho-syntactic properties such as case, person and number. Case marking (nominative, accusative, genitive) is based on the syntactic function of the NP and is imposed by the structural configuration within which that NP occurs (Cormier, 2011; Lee & Bautin, 1992). The data in Table 68 below demonstrates case marking in Dholuo personal pronouns.

**Table 68**

*Case Marking in Dholuo Personal Pronouns*

| Person | Number | Case | | |
|---|---|---|---|---|
| | | Nominative | Accusative | Genitive |
| 1 | Sg. | **an-** | **-a** | **-a** |
| | Pl | **wan-** | **-wa** | **-wa** |
| 2 | Sg | **in-** | **-i** | **-i** |
| | Pl | **un-** | **-u** | **-u** |
| 3 | Sg | **en-** | **-e** | **-e** |
| | Pl | **gin-** | **-gi** | **-gi** |

It should be noted that the accusative and the genitive forms in Dholuo personal pronouns are morphologically identical. Nonetheless, it should not be misconstrued that the two are equally identical semantically. This study has established that genitive suffixes in Dholuo function as bound morphemes as discussed extensively in Section 4.2.2.2 in their occurrence with noun roots. However, personal pronouns in the nominative and accusative case function as clitics and for that reason they do not trigger morphophonological alterations of final segments of any nominal category as do other suffixes in Dholuo. Genitive suffixes are therefore discussed as independent nominal category from personal pronouns based on this contrasting syntactic function.

In Dholuo, all personal pronouns are monosyllabic. Even though these pronouns can begin with either a consonant or a vowel, they strictly display a closed syllabic system of VC or CVC tier. Since personal pronouns in Dholuo function as independent syntactic atoms and not as morphemes when added to other nominal categories, they do not trigger morphophonological alternations exhibited when other morphemes are attached to these nominals confirming the fact that they function as clitics in nominal phrases and as words elsewhere in syntactic constructions. However, they must be attached to a nominal category from where they derive their semantic reference. That notwithstanding, the structural occurrence of personal is unique in each nominal category. Personal pronouns in the nominative case are attached before a verb in a syntactic construction as demonstrated in (16-17) below.

16. **a-somo**
    I 1 Sg.NOM.read
    (I am reading)

17. **wa-somo**
    We 1 Pl.NOM.read
    (We are reading)

The scenario above will be different when pronouns in the accusative case are affixed to verbs. In example (18-19) the pronouns are suffixed after the verb in a syntactic construction.

18. **i-som-e**
    You 2 Sg.NOM.read it
    (You are reading it)

19. **i-somo-gi**
    You 2 Sg.NOM.read them
    (You are reading them)

The verb root final vowel is deleted in (18) when admitting the pronoun [**-e**] to satisfy constraints in Dholuo nominals which enforce articulatory harmony with regards to vowel place.

In addition, Personal pronouns in Dholuo are determinate in form as far as case and number concord are concerned unlike in other languages, for example English, where the 2nd person pronoun "you" is indeterminate in form in its syntactic occurrence as displayed in (20) below. In this sense, case and number concord is overtly evident in the three persons for Dholuo personal pronouns as exemplified in Table (69).

20. (a) **he** gave **you** a book
(b) **you** gave **him** a book

The English 3rd person singular nominative form '**he**' is clearly distinct from the 3rd person singular accusative form '**him**', both in form and syntactic function. This is not the case with the 2nd person personal pronoun '**you**' which, though shifts its syntactic function from the accusative case (20-a) to nominative case in (20-b), remains unchanged both phonemically and morphologically. Assuming that the above constructions are utterances from the same interlocutors and by the same speaker, the form '**you**' will be understood to be the hearer in both cases. A change of the speaker (21) below does not help in the indeterminate nature of the English personal pronoun '**you**'.

21. **i** gave **you** a book

The above scenario in English is totally different from the one in Dholuo, displayed below in Table (69) where case and number concord is an obligatory feature of personal pronouns in their syntactic occurrence.

**Table 69**

*Case and Number Concord in Dholuo Personal Pronouns*

| | | | |
|---|---|---|---|
| **a-mij-i buk** | I gave you (Sg) a book | **a-mij-o-u bug-e** | I gave you (Pl) books |
| **i-mij-a buk** | You (Sg) gave me a book | **u-mij-o-wa bug-e** | You (Pl) gave us books |
| **a-mij-e buk** | I gave him a book | **wa-mij-o-gi buge** | we gave them books |
| **i-mij-e buk** | You (Sg) gave him a book | **i-mij-a bug-e** | You (Sg) gave me books |

According to Lee and Bautin (1992) the property person is defined with reference to the notion of pronominal participant role. Person, therefore, is a referential property and thus is discourse dependent. Personal pronouns have a primary role of determining the nature of communication by indicating and shifting the 'speech roles' from the first person (i.e.,

'being the speaker') and second person (being the addressee) along with that of 'being a third person' i.e., non-speaker/non addressee, (Bhat, 2004). It is in this primary role that personal pronouns are able to exhibit various morphological, structural changes and agreement markers. However, Dholuo personal pronouns just like proforms in other languages are dissociated and distinct from their referents, (Bhat, 2004). They, therefore, admit neither articles nor other modifiers. In exhibiting number and gender concord, reference is made to number or gender of the personal pronoun rather than of the referent.

22. **ɔ-mij-a buk**
3Sg.Nom-give-1Sg.Acc book-Sg
(He/she gave me a book)

23. **ɔ-mij-a bug-e**
3Sg.Nom-give-1Sg.Acc book-Pl
(He/she gave me books)

In the examples above, the personal pronoun in the nominative and accusative case is morphologically identical in each of the utterances. However, the referent '**buk**' (a book) is in the singular form in (22) and plural form in (23). Despite this, the personal pronoun remains unchanged in number agreement marker even with the change of referent from singular form '**buk**' to the plural form '**bug-e**'. This is also true even when the personal pronoun in the accusative case in the same NP is in plural, just like the plural referent '**buge**' (24).

24. **ɔ-mij-o-wa bug-e**
3Sg.Nom-give-1Pl.Acc book-Pl
(He/she gave us books)

Similarly, the 3rd person nominative form (**gi-)** and accusative form (**wa-)** in example (25) below exhibit agreement number marker for the personal pronoun but not for the referent which in this case is in the singular form.

25. **gi-mij-o-wa buk**
3Pl.Nom-give-1Pl.Acc book-Sg
(They gave us a/the book)

In addition, most languages generally do not allow modifiers to occur with personal pronouns, apparently because attaching them would make personal pronouns functionally less efficient. On the contrary, such languages allow numerals to occur with them (Bhat, 2004). Numerals occur in context as appositive rather than a modifier when used with personal pronouns. Dholuo personal pronouns demonstrate a similar case as seen in Kannada, for example, where numerals precede nouns in a noun phrase, whereas they follow personal pronouns (Bhat, 2004). In summary, the position in which numerals occur when used with nouns is different from the position in which they co-occur when used with personal pronouns.

26. *Position of proforms in Kannada NPs (Bhat, 2004)*
    a) **ibbaru hudugaru**
       two boys
    b) **na:vu ibbaru**
       we two

27. *Position of personal pronouns in Dholuo NPs*
    a) **ʤɔpuɔɲʤ-e ərijo**
       teacher-Pl two
       teachers two* (two teachers)

    b) **wan ʤɔpuɔɲʤ-e ərijo**
       1Pl.Nom teacher-Pl two
       we teachers two* (we two teachers)

In kannada, numerals occur pre-nominally when used with nouns and after the proform when used with pronominals. In Dholuo, however, numerals occur after nouns in an NP when used with nouns while pronouns occur before nouns when used with numerals. Nonetheless, irrespective of the occurrence of personal pronouns in an NP, VP or in any syntactic construction, they do not trigger morphophonological alternations of the root final sounds. This is so because they function as independent syntactic atoms.

## 4.5 The Structure of Numerals in Dholuo

Numerals, according to Cooper and Vaux (1999), are common in many East African languages, but it has not been adequately documented in Dholuo making it a crucial component for description by this study as part of Dholuo nominal structure. However, just like in most world languages, numerals in Dholuo are not an elaborately developed nominal category. In fact, numerals in most languages may not be a well-developed system with wide-ranging options for counting to even include decimals (Olga, 2012). As a result, numerals as a constituent of nominals, assumes different understanding depending on a language.

Generally, numerals are understood as nominal expressions that are used to denote the exact number of objects for an open class of objects in an open class of social situations with the whole speech community in question (Olga, 2012). A numeral system is a part of a natural language, primarily devoted to the expression of positive whole numbers. Numerals are a unique grammatical or nominal category because it has an almost universal scientific notations (1, 2, 3…100 etc.) making semantic inference easy and direct. What differs from one language to another is how these universal scientific notations are expressed grammatically. For instance, some linguists have treated numerals such as one, two and three either as generalized quantifiers or restrictive modifiers (Bale et al, 2010).This study, however, leans to the traditional definition proposed by Olga (2012).

Numerals are divided into two major groups- cardinal and ordinal. This classification in Dholuo is displayed below in Table (70)**.**

**Table 70**

*Ordinal and Cardinal Numerals in Dholuo*

| Figures | Cardinals | Series | Ordinals |
|---|---|---|---|
| 1 | **ətʃɪel** | first | **mɔkwɔŋgo** |
| 2 | **ərijɔ** | second | **mər ərijɔ** |
| 3 | **ədek** | third | **mər ədek** |
| 4 | **əŋwen** | fourth | **mər əŋwen** |
| 5 | **əbitʃ** | fifth | **mər əbitʃ** |
| 6 | **əutʃɪɛl** | sixth | **mər əutʃɪɛl** |
| 7 | **əbırıjɔ** | seventh | **mər əbırıjɔ** |
| 8 | **əborɔ** | eighth | **mər əborɔ** |
| 9 | **ətʃikɔ** | ninth | **mər ətʃikɔ** |
| 10 | **əpar** | tenth | **mər əpar** |
| 11 | **əpar gatʃɪel** | eleventh | **mər əpar gatʃɪel** |
| 50 | **piɛr əbitʃ** | fiftieth | **mər piɛr əbitʃ** |
| 100 | **miə ətʃɪel** | hundredth | **mər miə ətʃɪel** |

The lower-valued ordinals (1, 2, 3, and 4) in most languages tend to be formed suppletively, without any obvious morphological connection to the corresponding cardinal numeral (Bale et al, 2010; Olga, 2012). Thus in English ‘first’ is not formed from ‘one’, whereas ‘fourth’ is formed by suffixing ***-th*** to ‘four’. Similarly, in Dholuo, **mɔkwɔŋgo** (first) is not formed from the cardinal **ətʃɪel** (one) nor is it mono-morphemic like the rest of the ordinals formed by a combination of the corresponding cardinal numeral preceded by the ordinal identifier morpheme **mər-.**

Dholuo numerals may only cover up to a certain system of number counting. This study noted that fractions have no native words. In this case, all words describing fractions are borrowed from either Kiswahili or English as demonstrated in Table 71 below.

**Table 71**

*Fractions in Dholuo Numerals*

| Figures | Fraction | Gloss |
|---|---|---|
| ½ | **nus** | Half (Kiswahili 'nusu') |
| 1/8 | **robo** | An eighth (Kiswahili "robo" |
| ¼ | **kwɔta** | Quarter (English 'quarter') |
| ¾ | **ədek gi robɔ** | Three quarter (Dholuo and Kiswahili ) |

Fractions are freely (and interchangeably) expressed with words from either of the languages aforementioned. For example, the numeral for 'quarter' can be **robɔ** (borrowed from Kiswahili 'robo') or **kwɔta** (from English 'quarter'). There are also instances where a mixture of native numeral word and a borrowed one is used to express a fraction. A good example is the fraction **ədek gi robɔ**, three-quarter (¾) in Table (71) above. This is a conglomeration of the native cardinal **ədek** (three) and the Kiswahili numeral **robɔ** (quarter) joined by the conjunction **gi** (and/with) which literally translates to 'three and quarter'. However, as the fractions diminish in value, they are easily expressed by simply describing the numeral on top and the one below (i.e., the numerator and denominator). For example, ⅕ (one fifth) is **ətʃiel ewi əbitʃ (**literally, 'one on top of five').

Nonetheless, percentages have native expressions in Dholuo as displayed below in Table (72).

**Table 72**

*Percentages in Dholuo Numerals*

| Figures | Percentage | Gloss |
|---|---|---|
| 10% | **atamalo əpar** | 'percent ten' (ten percent) |
| 50% | **atamalo piɛr əbitʃ** | 'percent fifty' (fifty percent) |
| 100% | **atamalo miə ətʃiel** | 'percent hundred' (hundred percent) |

Numerals display freedom of co-occurrence in Dholuo. The example in (28) below gives Dholuo illustrations, in which ordinal and cardinal numerals co-occur in the same NP.

28. **ɲiɵindo ərijɔ mɔ-kwɔŋgo**
child-Pl two first
(the first two children)

In the construction in (28) above, both the cardinal and ordinal numerals occur post-nominally. In addition, the cardinal **ərijɔ** (two) stays closer to the noun than the ordinal **mɔ-kwɔŋgo** (first). In this sense, the cardinal **ərijɔ** performs the general quantifier function giving the noun **ɲiɵindo** (children) number value, while the ordinal **mɔ-kwɔŋgo** performs the modifier function restricting the category of the referent (i.e., the first).

Consequently, it is the general quantifier function of numerals (Bale et al, 2010) that singles out this nominal category to its close relationship with the grammatical feature of 'number' in nouns. Number is the grammatical term used for the singular ↔ plural distinction marked on nouns in most languages, and supplemented in some languages by categories such as dual, paucal and even trial (Lee & Bautin, 1992). Grammatical number tends to be indicated in the morphology of nouns (e.g., by an affix), whereas numerals are distinct words or phrases.

Nonetheless, number has a loose relationship with numeral expressions in most languages. Otherwise, it is expected that in any language the numeral expressing 1 (one) would accompany a singular noun, the numeral expressing 2, 3…10 etc. would similarly accompany a plural noun (or a dual, trial, paucal noun if the language has such number expressions) but such a neat pattern is not always universal (Bale et al, 2010; Olga, 2012).

In Hungarian, for example, a noun following any numeral, for whatever number, is grammatically singular; the plural form of a noun is used only in the absence of any preceding numeral expression. As demonstrated by Bale et al (2010) Turkish and Western Armenian permit numerals greater than one to combine with bare noun roots, despite the fact that both languages have a productive plural morpheme (**-lar** in Turkish, **-(n)er** in Western Armenian). This characteristic as shown in (29 and 30) below is completely distinct from both the scenario in Dholuo (32) and English (31).

29. *Turkish, (Bale et al, 2010)*
    (a) **çocuk**
        boy
    (b) **çocuk-lar**
        boy-PL
    (c) **iki çocuk**
        two boy-Sg

30. *Western Armenian, (Bale et al, 2010)*
    (a) **dəgha**
        boy
    (b) **dəgha-ner**
        boy-PL
    (c) **yergu dəgha**
        two boy-Sg

31. *English, (Bale et al, 2010)*
    (a) boy
    (b) boy-s
    (c) two boy-s
32. Dholuo
    (a) **opuk**
        tortoise
    (b) **opug-e**
        tortoise-Pl
    (c) **opug-e ətʃɪel***
        tortoise-Pl one*

In Dholuo, consequently, there has to be a clear morphological plural marker suffixed to the noun to agree with the numeral and number of the noun referent as demonstrated in (33) below. Absence of this number agreement marker will yield ungrammatical construction as seen in (32c) above. As a result, in some other languages (Dholuo typologically fitting in this category) singular object nouns denote only singular countable entities (Bale et al, 2010).

33. (a) **opuk ətʃɪel**
        3Sg.Nom.tortoise one
        (one/a tortoise)

    (b) **opug-e ədek**
        3.Nom.tortoise-Pl three
        (Three tortoises)

The association of personal pronouns with numerals is rather different from the association of proforms or nouns with them. In the former case, numerals function as appositive phrases that do not directly modify the pronouns. They provide additional information regarding the identity (in terms of number) of their referents, but since personal pronouns are not directly concerned with the identity of their referents, their association with numerals can only be indirect (Bhat, 2004). Here, reference is made to number or gender of the personal pronoun rather than of the referent.

34. **ɔ-mij-a luɵ ətʃɪel**
3Sg.Nom-give-1Sg.Acc stick-Sg one
(He/she gave me one stick)

35. **ɔ-mij-a luð-e ədek**
3Sg.Nom-give-1Sg.Acc stick-Pl three
(He/she gave me three sticks)

In the examples (34-35) above, the personal pronoun [**ɔ-]** which is in the nominative case and the personal pronoun [**–a]** in accusative case remains morphologically unchanged in each of the utterances (34) and (35). However, the referent '**luɵ**' (a/the stick) is in the singular form in (34) and plural form **luð-e** in (35) altering its morphology by adding the plural suffix [**–e]** and also changing the voice feature of the final phoneme.

The scenario above is also replicated even when the personal pronoun in the accusative case in the same NP is in plural, just like the plural referent '**luð-e**' in example (36) below.

36. **ɔ-mijo-wa luð-e ədek**
3Sg.Nom-give-1Pl.Acc stick-Pl three
(He/she gave us three sticks)

The noun referent in Dholuo NP has to agree in number with the numeral modifier by exhibiting a morphological agreement marker. However, the personal pronoun which co-occurs with the numeral does not show such morphological alteration or agreement marker. Therefore, numeral in a Dholuo NP modifies the noun referent in terms of

quantity and therefore has to agree with its grammatical number but not with its appositive personal pronoun, even if the latter is in plural (37).

37. **gi-mijo-wa luɵ**
3Pl.Nom-give-1Pl.Acc stick-Sg
(They gave us a/the stick)

In addition to the morphological description of numerals above, Dholuo numeral words do also take other suffixes such as plural suffixes and genitive suffixes as discussed below. Table 73 below provides data covering the initial ten cardinals and how they occur with the plural suffixes in Dholuo.

**Table 73**

*Numerals with Plural Suffixes*

| Cardinals | Gloss | Cardinal + Pl. suffix | Gloss |
|---|---|---|---|
| **ətʃɪel** | one | **ətʃɪend-e** | ones |
| **ərijɔ** | two | **əritʃ-e** | twos |
| **ədek** | three | **ədeg-e** | threes |
| **əŋwen** | four | **əŋwend-e** | fours |
| **əbitʃ** | five | **əbidʒ-e** | fives |
| **əutʃɪɛl** | six | **əutʃɪɛnd-e** | sixes |
| **əbɪrɪjɔ** | seven | **əbɪtʃ-e** | sevens |
| **əborɔ** | eight | **əbotʃ-e** | eights |
| **ətʃikɔ** | nine | **ətʃig-e** | nines |
| **əpar** | ten | **əpatʃ-e** | tens |

It is worth noting that only the plural allomorph [**-e**] is admitted by the cardinal numerals in Dholuo. Table 74 provides data exemplifying occurrence of numerals with genitive suffixes in Dholuo nominals.

**Table 74**
*Numerals with Singular Genitive Suffixes*

| Gloss | Cardinals | 1Gen Sg (my) | 2Gen Sg (your) | 3Gen Sg (his/her/its) |
|---|---|---|---|---|
| one | **əʧɪel** | **əʧɪend-a** | **əʧɪend-i** | **əʧɪend-e** |
| two | **ərijɔ** | **əriʧ-a** | **əriʧ-i** | **əriʧ-e** |
| three | **ədek** | **ədeg-a** | **ədeg-i** | **ədeg-e** |
| four | **əŋwen** | **əŋwend-a** | **əŋwend-i** | **əŋwend-e** |
| five | **əbiʧ** | **əbiʤ-a** | **əbiʤ-i** | **əbiʤ-e** |
| six | **əuʧɪɛl** | **əuʧɪɛnd-a** | **əuʧɪɛnd-i** | **əuʧɪɛnd-e** |
| seven | **əbırıjɔ** | **əbıʧ-a** | **əbıʧ-i** | **əbıʧ-e** |
| eight | **əborɔ** | **əboʧ-a** | **əboʧ-i** | **əboʧ-e** |
| nine | **ɔʧikɔ** | **ɔʧig-a** | **ɔʧig-i** | **ɔʧig-e** |
| ten | **əpar** | **əpaʧ-a** | **əpaʧ-i** | **əpaʧ-e** |

Table 75 below provides data exemplifying occurrence of numerals with plural genitive suffixes in Dholuo nominals.

**Table 75**

*Numerals with Plural Genitive Suffixes*

| Gloss | Cardinals | 1Gen Pl (our) | 2Gen Pl (your) | 3Gen Pl (their) |
|---|---|---|---|---|
| one | **əʧɪel** | **əʧɪend-wa** | **əʧɪend-u** | **əʧɪend-gi** |
| two | **ərijɔ** | **əriʧ-wa** | **əriʧ-u** | **əriʧ-gi** |
| three | **ədek** | **ədeg-wa** | **ədeg-u** | **ədeg-gi** |
| four | **əŋwen** | **əŋwend-wa** | **əŋwend-u** | **əŋwend-gi** |
| five | **əbiʧ** | **əbiʤ-wa** | **əbiʤ-u** | **əbiʤ-gi** |
| six | **əuʧɪɛl** | **əuʧɪɛnd-wa** | **əuʧɪɛnd-u** | **əuʧɪɛnd-gi** |
| seven | **əbırıjɔ** | **əbıʧ-wa** | **əbıʧ-u** | **əbıʧ-gi** |
| eight | **əborɔ** | **əboʧ-wa** | **əboʧ-u** | **əboʧ-gi** |
| nine | **ɔʧikɔ** | **ɔʧig-wa** | **ɔʧig-u** | **ɔʧig-gi** |
| ten | **əpar** | **əpaʧ-wa** | **əpaʧ-u** | **əpaʧ-gi** |

When numerals acquire a suffix, the final segment of the numeral alters its morphology. The alteration is dependent on whether the numeral ends in obstruent, nasal, approximant or vowel. In that case, the behaviour of numeral final sound is identical to the behaviour of all nominal root final sounds in Dholuo when these acquire a suffix. That is obstruents lenite and alters their voice feature, nasals fortify to become prenasalised and approximants fortify by switching articulators.

## 4.6 The Structure of Determiners in Dholuo

Determiners are important constituents of a nominal group in many languages. Determiners are words or phrases that precede an NP and serve to express its (the noun's) reference in the context. Dholuo determiners are largely poly-morphemic with a marginal section being mono-morphemic. In Dholuo, determiners can be largely grouped into three classes: demonstratives, possessive pronouns and interrogatives

### 4.6.1 The Structure of Demonstratives in Dholuo

In Dholuo, an NP consisting of the demonstrative and the noun stem is a poly-morphemic single word. The demonstrative suffix is marked for number and proximity to the referent so that we have:

i. The singular demonstratives **[-ni, -no** and **-ʧa],** equivalent to the English 'this', 'that' and 'that'.
ii. Plural determiners **[-gi, -go** and **-ka],** equivalent to the English 'these', 'those' and 'those'.
iii. Near referent **[-ni** and **-gi],** equivalent to the English 'this' and 'these'
iv. Far referent **[-no** and **-go],** equivalent to the English 'that' and 'those'.
v. Very far (remote) referent **[-ʧa** and **-ka],** equivalent to the English 'that' and 'those'.

The noun root changes depending on the final sound segment as is with the rest of Dholuo nominal morphology. The morphological change demonstrated by the final consonant of the noun root is the behaviour of Dholuo nominals when they submit to affixation. Therefore, obstruents, nasals and approximants fortify or lenite depending on its positional occurrence in a word. The final consonant in the vowel final roots alter its morphology in the fashion displayed by the other consonants aforementioned. Table (76) shows a few noun roots and how they inflect with Dholuo demonstratives.

**Table 76**

*Nominal Inflections with Dholuo Determiners*

| | Singular | | | Plural | | | |
|---|---|---|---|---|---|---|---|
| Noun Root | Near (this) | Far (that) | Remote (that) | Near (these) | Far (those) | Remote (those) | Gloss |
| opuk | **opug-ni** | **opug-no** | **opug-ʧa** | **opuge-gi** | **opuge-go** | **opuge-ka** | tortoise |
| réʧ | **redʒ-ni** | **redʒ-no** | **redʒ-ʧa** | **redʒ-e-gi** | **redʒ-e-go** | **redʒ-e-ka** | fish |
| bim | **bimb-ni** | **bimb-no** | **bimb-ʧa** | **bimb-e-gi** | **bimb-e-go** | **bimb-e-ka** | gorilla |
| bul | **bund-ni** | **bund-no** | **bund-ʧa** | **bund-e-gi** | **bund-e-go** | **bund-e-ka** | hole |

### 4.6.2 The Structure of Interrogatives in Dholuo

These are **-ŋa, -aŋɔ, manɛ** and **magɛ.** The choice of these interrogatives is dependent on gender and number so that there are animate and inanimate, human and non-human, singular and plural distinctions. The interrogatives are basically mono-morphemic. The interrogatives **-ŋa** and **-aŋɔ** which are singular in referent roughly mean the same as the English "who" and "what" and are the only ones that influence the change in the morpho-phonology of the noun root they refer to. The morphophonological alterations replicate what is seen in the other nominal structures. The interrogative **-ŋa** can only be used with human gender referent while **-aŋɔ** for non-human referents. The interrogatives **manɛ** and **magɛ** do not have effect on the morpho-phonology of the stem word because they function as separate words. The two can be used for both animate/inanimate as well as human/non-human referents. The interrogative **manɛ (**which/what) is used with singular referents only, while **magɛ** (which/what) is used for plural referent. Table (77) below summarizes the forms and functions of Dholuo interrogatives in context.

**Table 77**

*Gender and Number in Dholuo Interrogatives*

| Interrogative Suffix | Gender | | | | Number | |
|---|---|---|---|---|---|---|
| | Animate | Inanimate | Human | Non-human | Singular | Plural/Mass |
| **-ŋa** | + | - | + | - | + | - |
| **-aŋɔ** | - | + | - | + | + | - |
| **manɛ** | + | + | + | + | + | - |
| **magɛ** | + | + | + | + | - | + |

When the interrogative **ŋa** or **aŋɔ** is used, they have to be preceded by a noun as demonstrated in (38-41) below. In other words, the two interrogatives occur post-nominally in an NP, and generally to the extreme end in a syntactic structure.

38. **mə guɔg ŋa?**
This 3Sg.dog.Gen who
(whose dog is this?)

39. **guɔk dwaro aŋɔ?**
3Sg.dog.Nom want what
(what does the dog want?)

40. **ruɔө manɛ ma-tuo?**
3Sg.king.Nom which ATTR-sick
(which king is sick?)

41. **ruɔð-i magɛ ma-tuo?**
3Pl.king.Nom which ATTR.sick
(which kings are sick?)

Like all other Dholuo nominal constituents, the final sound segment of the nominal dictate the morphophonological alternations noticeable in inflectional and derivational processes. However, as shall be elaborately demonstrated later, these alternations are much influenced not only by the final sound segments but also by the occurrence of the nominal constituent either as a single poly-morphemic word or as two separate mono-morphemic words as discussed below. Tables 78 below demonstrate the occurrence of the interrogative **[-ŋa]** 'whose' with obstruent final noun roots.

**Table 78**

*The interrogative [-ŋa] "whose" with Obstruent Final Noun Roots*

| NounR | Gloss | NounR + [**-ŋa**] "whose" | Gloss |
|---|---|---|---|
| **diep** | diarrhoea | **dieb-ŋa** | whose diarrhoea |
| **sup** | sup | **sub-ŋa** | whose sup |
| **ot** | house | **od-ŋa** | whose house |
| **got** | hill | **god-ŋa** | whose hill |
| **guɔk** | dog | **guɔg-ŋa** | whose dog |
| **opuk** | tortoise | **opug-ŋa** | whose tortoise |
| **luɵ** | club | **luð-ŋa** | whose club |
| **ruaɵ** | bull | **ruað-ŋa** | whose bull |
| **dis** | plate | **dis-ŋa** | whose plate |
| **otas** | paper | **otas-ŋa** | whose paper |
| **rétʃ** | fish | **rédʒ-ŋa** | whose fish |
| **kitʃ** | orphan | **kidʒ-ŋa** | whose orphan |

However, the morpho-phonological alternations noticeable above with the interrogative occurring as a bound morpheme in an NP are not seen when the noun root and the interrogative particle occur as separate words. This is demonstarated in the data in Table 79 exemplifying the occurrence of the interrogative **[manɛ]** 'which' with obstruent final roots. In Table 78, the root final obstruents weaken while they remain hard in Table 79.

**Table 79**

*The Interrogative **[manɛ]** "which" with Obstruent Final Noun Roots*

| NounR | Gloss | NounR + [**-ŋa**] "which" | Gloss |
|---|---|---|---|
| **diep** | diarrhoea | **diep manɛ** | which diarrhoea |
| **sup** | sup | **sup manɛ** | which sup |
| **ot** | house | **ot manɛ** | which house |
| **got** | hill | **got manɛ** | which hill |
| **guɔk** | dog | **guɔk manɛ** | which dog |
| **opuk** | tortoise | **opuk manɛ** | which tortoise |
| **luɵ** | club | **luɵ manɛ** | which club |
| **ruaɵ** | bull | **ruaɵ manɛ** | which bull |
| **dis** | plate | **dis manɛ** | which plate |
| **otas** | paper | **otas manɛ** | which paper |
| **rétʃ** | fish | **rétʃ manɛ** | which fish |
| **kitʃ** | orphan | **kitʃ manɛ** | which orphan |

The interrogative [**magɛ**] is basically used with plural nouns. Therefore, if it has to be used with any of the noun roots in Table (79) above, there will have to be a morphological alternation in the noun so as agree with the interrogative. For example, the noun **kitʃ** (orphan) will form the NP **kitʃ manɛ** (which orphan) with the interrogative [**manɛ**] and the NP **kij-e magɛ** (which orphans) with the interrogative [**magɛ**]. Table (80) demonstrates a fuller picture of the occurrence of [**magɛ**] "which/what" with noun roots ending in approximants a case which is replicated with nasal final noun roots.

**Table 80**

*The Interrogative [magɛ] with Noun Roots Ending in Approximants*

| NounR | Gloss | NounR + [**manɛ**] "which/what" | Gloss |
|---|---|---|---|
| **ɵuol** | snake | **ɵuond-e magɛ?** | Which snakes |
| **ogwal** | frog | **ogwɛnd-e magɛ?** | Which frogs |
| **laktar** | doctor | **laktetʃ-e magɛ?** | Which doctors |
| **bɔr** | animal fat | **bɔtʃ-e magɛ?** | What animal fats |
| **ŋgaw** | antelope | **ŋgep-e magɛ?** | Which antelopes |
| **ʧiew** | porcupine | **ʧiep-e magɛ?** | Which porcupines |

### 4.6.3 The Structure of Possessive Pronouns in Dholuo

Possession in Dholuo nominals is both overtly and covertly marked. The overt nominal possession marking in Dholuo is the most productive. Like the rest of Dholuo nominals, possession is expressed by an inflectional suffix. Noun roots inflect by suffixation to show possession, person and number simultaneously. Possession is expressed in two ways: (i) using genitive clitic-like suffixes, and (ii) 'of' possessive constructions. Apart from the affixation of the morpheme that marks possession, the final phoneme of the noun root changes in various ways as discussed above.

The nouns that show possession using the genitive clitic-like suffixes are structurally poly-morphemic and behave in a similar, but not entirely identical, fashion to the case in plurals, in which final phonemes in noun roots change in a number of ways. This is exemplified below with the nominative word **okot** "bell" in the data in Table 81.

**Table 81**

*Possession in Nominative Noun Root in Dholuo*

| Genitive (Sg) | | Genitive (Pl) | |
|---|---|---|---|
| **okod-a** | my bell | **okod-e-na** | my bells |
| **okod-wa** | our bell | **okod-e-wa** | our bells |
| **okod-i** | your (sg) bell | **okod-e-ni** | your (sg) bells |
| **okod-u** | your (pl) bell | **okod-e-u** | your (pl) bells |
| **okod-e** | his/her/its bell | **okod-e-ne** | his/her/its bells |
| **okod-gi** | their bell | **okod-e-gi** | their bell |

Dholuo genitive pronouns hardly stand in isolation (as free morphemes). In almost all instances, the noun attaches to the possessive pronoun suffix which is simultaneously marked for person, number and case. Table (82) summarizes the possessive pronouns that can be attached to nouns:

**Table 82**

*Dholuo Genitive Pronouns*

| Glossary (English Equivalent) | Person | Number Sg | Pl |
|---|---|---|---|
| my/our | 1 | **-a** **-na** | **-wa** |
| your | 2 | **-i** **-ni** | **-u** |
| his/her/its their | 3 | **-e** **-ni** | **-gi** |

Generally, the final phoneme of the noun root dictates the various alterations that the noun undergoes. In addition, the syntactic position of the genitive suffix is crucial in arriving at a well-formed NP showing possession. All affixes in the genitive form are aligned to the rightmost side of the noun. Despite this, semantic implications should be considered as any variations which are inconsiderate to this might yield a number of semantic possibilities seen below in Table (83).

**Table 83**

*Semantic Implications in Dholuo Genitive Suffixes*

| | |
|---|---|
| **dek** | vegetable |
| **deg-e** | vegetables |
| **deg-a** | my vegatable |
| **deg-e-wa** | our vegetables |
| **deg-wa** | our vegatable |
| **deg-e-gi** | these vegetables |
| **deg-gi** | their vegatable |

The ‘of possessive’ in Dholuo nouns is uniquely the only nominal category that is mono-morphemic. It consists of two noun roots: the noun that is possessed and the one that possesses. The ‘of possessive’ in Dholuo is an endocentric compound. The noun root that possesses remains unchanged in the genitive form unless if pluralized, while the noun root that is possessed inflects to show possession. For example, the noun **pap** ‘field’ and **opira** ‘football’ will become **paw opira** ‘field of football,’ the noun root **pap** ‘field’

changing to the genitive form **paw** ‘field of’ while **opira** ‘football’ remains unchanged. In this case, the final phoneme of the noun root, the unvoiced bilabial stop [**p**] switching articulators to lenite to the bilabial approximant [**w**]. As has been shown with the other genitive cases, the final phoneme of genitive form may lenite or fortify as is the case with **pap→paw.** Table (84) illustrates the “of-possessive” constructions with various noun roots.

**Table 84**

*"Of-Possessive" in Obstruent Final Noun Roots*

| Noun Root 1 | Glossary | Noun Root 2 | Glossary | Genitive (Of Possessive ) | Glossary |
|---|---|---|---|---|---|
| **ot** | house | **guɔk** | dog | **od guɔk** | house of dog |
| **jaɵ** | medicine | **ʤa-tuo** | patient | **jað ʤa-tuo** | medicine of patient |
| **rétʃ** | fish | **ʤa-nam** | fisherman | **reʤ ʤa-nam** | fish of fisherman |
| **lum** | grass | **ðiəŋ** | cow | **lumb ðiəŋ** | grass of cow |
| **lep** | tongue | **ðiəŋ** | cow | **lew ðiəŋ** | tongue of cow |
| **alap** | field | **dek** | vegetables | **alab dek** | field of vegetables |
| **otit** | firefly | **ʤuok** | witchery | **otid ʤuok** | firefly of witchery |
| **okot** | bell | **diel** | goat | **okod diel** | bell of goat |
| **dek** | vegetables | **alap** | field | **deg alap** | vegetables of field |
| **buk** | book | **ŋaɵi** | child | **bug ŋaɵi** | book of child |
| **atʃuɵ** | vulture | **ŋato** | person | **atʃuð ŋato** | vulture of person |
| **mandas** | fried bread | **ŋato** | person | **mandas ŋato** | bread of person |
| **makas** | scissors | **ʤa-tuo** | patient | **makas ʤa-tuo** | scissors of patient |

In showing “of possession” in obstruent final noun roots, it is only the final sound of the first noun root that displays morphological alteration. This is displayed in all the noun roots as demonstrated in the data in Tables (85-87) below. The arrangement of which noun root comes first or last also has influence on semantic implication of the resultant NP, in other words which noun stem possesses the other. Consider the following constructions in examples (42-43) involving the noun roots [**alap**] ‘field’ and [**dek**] ‘vegetable’. The former occurs in the genitive form in (42) and as a bare noun root form in (43). Conversely, the latter occurs in the genitive form in (42) and bare noun root form in (43). This has a huge influence in the different semantic implications in the two constructions.

42. **alab dek**
field.GEN vegetable
a vegetable field/ a field of vegetables
43. **deg alap**
vegetable.GEN field
a field vegetable / a vegetable that grows in the field

Table 85 below provides data on the occurrence of nasal final noun roots with 'of-possessive'.

**Table 85**

*"Of-Possessive" in Nasal Final Noun Roots*

| Noun Root 1 | Glossary | Noun Root 2 | Glossary | GEN (of possessive ) | Glossary |
|---|---|---|---|---|---|
| **kɔm** | chair | **ŋato** | person | **kɔmb ŋato** | chair of person |
| **arum** | an owl | **ʤuok** | witchery | **arumb ʤuok** | owl of witchery |
| **ʧuŋ** | liver | **guɔk** | dog | **ʧuʤ guɔk** | liver of dog |
| **ajaŋ** | assault | **nam** | lake | **ajaŋʤ nam** | assault of lake |
| **kuon** | ugali | **ʤatuo** | patient | **kuond ʤatuo** | ugali of patient |
| **rabuon** | potato | **pap** | field | **rabuond pap** | potatoes field |

Table 86 below provides data exemplifying the occurrence of 'of-possessive' with noun roots ending in approximants.

**Table 86**

*"Of-Possessive" in Noun Roots Ending in Approximants*

| Noun Root 1 | Glossary | Noun Root 2 | Glossary | Genitive (of possessive ) | Glossary |
|---|---|---|---|---|---|
| **ɵuol** | snake | **nam** | lake | **ɵuond nam** | snake of lake |
| **ogwal** | frog | **jao** | pond | **ogwand jao** | frog of pond |
| **laktar** | doctor | **guɔk** | dog | **laktaʧ guɔk** | doctor of dog |
| **bɔr** | animal fat | **rétʃ** | fish | **bɔʧ rétʃ** | fat of fish |
| **law** | cloth | **ʤa-tuo** | patient | **law ʤa-tuo** | cloth of patient |
| **ʧiew** | porcupine | **pap** | field | **ʧiep pap** | porcupine field |

Table 87 provides data exemplifying the occurrence of 'of-possessive' with vowel final noun roots.

**Table 87**

*"Of-Possessive" in Vowel Final Noun Roots*

| Noun Root 1 | Glossary | Noun Root 2 | Glossary | Genitive (of possessive ) | Glossary |
|---|---|---|---|---|---|
| **ratʃu:ŋgi** | sieve | **laktar** | doctor | **ratʃu:ŋg laktar** | sieve of doctor |
| **osiki** | stump | **buŋgu** | forest | **osig buŋgu** | stump of forest |
| **olele** | lizard | **jao** | pond | **oletʃ jao** | lizard of pond |
| **ndege** | aircraft | **polo** | heaven/sky | **ndek polo** | aircraft of sky |
| **lowo** | land | **buŋgu** | forest | **lop buŋgu** | land of forest |
| **ʧiew** | porcupine | **pap** | field | **ʧiep pap** | porcupine of field |
| **aluru** | quail | **pap** | field | **alutʃ pap** | quail of field |
| **buŋgu** | forest | **osiki** | stump | **buŋg osiki** | forest of stump |

In vowel final noun roots, the noun root final segment displays morphological alteration in the "of possessive" construction. The final vowel gets deleted and the preceding consonant alternates in the manner reminiscent with the behavior of the other C-final noun roots when they take suffixes.

### 4.7 Summary

In summary, nominals in Dholuo constitute: nouns, adjectives, numerals, personal pronouns, determiners and the composite. Nominal categories such as nouns, adjectives and numerals may exist as bare forms of mono-morphemic single words. They can also occur with suffixes as single words or as NPs made up of two separate words. The other nominal categories (personal pronouns, demonstratives, interrogatives and possessives) occur as bound morphemes which only derive their semantic implications from a context. When nominal constituents admit suffixes, the final segment of the host constituent displays morphological alternations which are identical in almost all the classes of sounds, i.e., obstruents, nasals, approximants and vowels. The root final consonants surface as weakened or hardened segments in inflectional processes. In other words, if the root final consonant is weak it hardens word internally but remains weak word finally or when the root final sound is hard, it weakens word internally but remains hard word finally.

# CHAPTER FIVE: NUMBER IN DHOLUO

## 5.1 Introduction

The other objective that this study dealt with is the question of number in Dholuo nouns. Referring to Sapir (1921) on the various ways in which the concept of number manifests itself in language, Lee and Bautin (1992) point out to four ways, which are (1) singular and plural; (2) singular, dual, and plural; (3) singular, dual, trial, and plural; and (4) single, distributive, and collective. Despite this description, Lee and Bautin (1992) further argue that the most common distinction in the property of number is that which exists between singular and plural. In some languages, singular nouns are morphologically unmarked while plural nouns are morphologically marked. Other languages, like Bonggi, do not mark plural grammatically. Moreover, in languages with dual or trial number distinction, the dual and the trial are almost always morphologically marked (Greenberg 1963).

So, how is number realized in Dholuo nouns? The answer to this question has been a long-standing debate among linguists. There have been marginal concessions by previous studies, albeit with observable contradictions, that Dholuo nouns express plurality through feature alternation. The studies have, however, not exhaustively accounted for the reason why there is feature alternation only when nouns change from singular to plural form. This "feature alternation" phenomenon is problematic because, certain Dholuo nominal structures exhibit similar voicing or devoicing of root final sounds when, for example, expressing possession. Furthermore, the studies have offered incomplete account of the morphemes **-e, -i, -ni** overtly occurring word-finally in Dholuo plural forms.

In this regard, this chapter, therefore, seeks to offer an alternative description and analysis of number in Dholuo by looking at the whole spectrum of Dholuo nominal morphology comprising nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives and the related morphophonological alternations using OT framework. A description of the structure of the whole spectrum of Dholuo nominals

offers an alternative analysis of how number is expressed in Dholuo nouns seen in light of the original OT framework (Prince & Smolensky, 1993) that define Dholuo morphophonological alternations. This study argues that the two variants of OT (Correspondence Theory and Containtment Theory) used by previous studies have given problematic and contradictory results. The current study also questions the "exchange rule" or "feature alternation" employed extensively in the previous studies on number in Dholuo nouns.

This chapter provides both an alternative explanation of how plurals are formed in Dholuo nouns and an elaborate account of observable morphophonological alternations, some of which the previous studies have not accounted for exhaustively. Previous research (Alderete, 2001; Bye, 2006; De'Lacy, 2002, 2009, 2010; Okoth, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) have marginally accounted for the morphemes **–e, -i, -ni** that are found at the end of plural forms in Dholuo. Previous analyses (Alderete, 2001; Bye, 2006; De'Lacy, 2002; Okoth, 1977, 1982; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) have concentrated largely on feature exchange ignoring these important morphemes that could possibly unlock the problematic plural formation in Dholuo. Moreover, there are certain Dholuo nominal structures which exhibit similar voicing or devoicing of final sounds of noun roots when, for example, expressing possession (Bye, 2006; de'Lacy, 2010; Trommer, 2006 & 2008) confirming that feature alternation may not be a preserve of plural formation.

### 5.2 Previous Arguments on Number in Dholuo Nouns

To lay bare the fact that the approach used in the previous studies (Alderete, 2001; Bye, 2006; De'Lacy, 2002, 2009, 2010; Okoth, 1977, 1982; Ong'ayo, 2016; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005) has been problematic, the current chapter traces the arguments put forward in support of feature alternation, especially voice polarity. Here, this study grapples with the question whether there is genuinely a voice polarity in Dholuo data.

The earliest documented attempt in description of number formation in Dholuo nouns (Stonham, 1994) using voice alternation phenomenon posit that there is only one morpho-phonological rule which consistently triggers voicing of root-final obstruents. The assumption here is that nouns in their basic form can be inherently either singular or plural, and that obstruent voicing serves to indicate the marked (non-inherent) value of number for each noun, in a rule formulated as:

1. **C → [+voiced] /__ (V) # [+marked number].**

Most voice polarity proponents buy the proposition by Stonham (1994) except the proponents of another near-identical phenomenon of "exchange rule" advanced by Gregersen (1972) and Okoth (1982) proposing some form of morphological reversals which have the format:

2. **/α/ → [β]** and **/β/ → [α]**,

Wolf (2005) on the other hand argues that Dholuo voicing polarity derives from allomorphy of floating features taking the autosegmental view sharing the basic ideology as de'Lacy's (2008). Further, Alderete (2001) offers 'Transderivational antifaithfulness' in description of number formation in Dholuo nouns which still proposes voice polarity phenomenon. The other proponents of voicing polarity (Pulleyblank**,** 2006 & Trommer, 2006) argue that final obstruents in Dholuo noun roots are underlyingly voiced, unvoiced or unspecified for voicing. Another approach (Bye, 2006 & de'Lacy, 2010) on the other hand argue that plural formation in Dholuo, and feature polarity in particular, is a product of prosodically and morphologically conditioned 'stopping' and 'destopping' of Dholuo nouns. Ong'ayo (2016) disagrees with both the voice polarity process and the exchange rule proposing the use of articulators, arguing that when nouns in Dholuo change from singular to plural, they do not just alter the voice feature.

### 5.3 The Problem of 'Feature Exchange'

Is there genuinely a voice polarity or exchange rule in Dholuo data as far as plural formation is concerned? This is the question that part of the analysis in this chapter strives to clarify. This phenomenon of exchange rule (also referred to as feature alternation/polarity) is some form of morphological reversals which have the format described in (2) above, i.e: **/α/ → [β]** and **/β/ → [α]**, (where **α** and **β** represents some feature with the variable '**+**' or '**-**' value and which keep reversing these values and or these features in certain morphological or phonological environment.)

Feature exchange, however, has been dismissed by some scholars (de'Lacy, 2010 & Lecarme, 2002). The objections are based on the postulate that 'rules should not be able to arbitrarily switch feature values.' According to Lecarme (2002) a polarity principle should also be rejected on conceptual grounds irrespective of the empirical question of whether polarity systems are found in natural language. Feature exchange would imply that language functions in a binary system in which what happens to a given feature on the left is the mirror image of what is expected to happen on the same or alternate feature on the right in a linguistic operation. Even though this may be true for some features in some languages, it may not apply in others.

For that reason, feature exchange in Dholuo plural formation runs into empirical problem. The examples below in Tables 88 and 89 give a picture where this rule only applies to a marginal section of Dholuo nouns and therefore should not be the general descriptive rule for number in Dholuo nouns. In particular, the voice polarity does not explain the behaviour of the alveolar lateral **[l]**, the alveolar trill **[r],** the labial glide **[w]** and the palatal glide **[j]** as seen in Table 88 which provides data on plural formation in nouns ending in approximants.

**Table 88:**

*Plurals of Noun Roots Ending in Approximants*

| Singular | Plural | Glossary |
|---|---|---|
| **liel** | **liet-e** | graveyard |
| **bur** | **butʃ-e** | hole |
| **lowo** | **lop-e** | land |
| **ɲojo** | **ɲotʃ-e** | maize, beans mixture |

From the foregoing, the alternation of the alveolar lateral **[l]** with the unvoiced alveolar stop **[t];** and that of the alveolar trill **[r]** and the palatal glide **[j]** with the unvoiced palatal fricative **[ʧ]**; the labial glide **[w]** with the unvoiced labial stop **[p]** would certainly be beyond voice polarity phenomenon. Similarly, the defiance of some stop-final roots to obey the phenomenon of voice polarity as seen in some noun roots in Table 88 would be enough attestation to its failure to effectively explain pluralisation in Dholuo nouns. While voice polarity/alternation phenomenon is deficient in accounting for the behaviour of approximants, it does not as well account for the behaviour of some stops as demonstrated in Table 89.

**Table 89**

*Voice Polarity Problem in Some Stop Final Roots*

| Singular | Plural | Gloss |
|---|---|---|
| **osiki** | **osik-e** | stump |
| **ndi:ga** | **ndi:g-ni** | bicycle |
| **koŋga** | **koŋg-e** | sisal tree |
| **lek** | **lek-e** | herd (of cattle) |
| **ʧupa** | **ʧup-e** | bottle |
| **laʧ** | **leʧ-e** | urine |

Consequently, if voice polarity were to be used, the unvoiced velar **[k]** in **osiki** would be expected to alternate with the voiced counterpart **[g]** in the plural to yield the

ungrammatical **osige*** as seen with **guɔk- guɔgi.** The same procedure would also be advanced in the case of **ndi:ga** so that the expected plural be ***ndi:k-e/ ndi:k-i** or **ndi:k-ni*.** Even still, voice polarity fails to explain the **-ni** morpheme in **ndi:g-ni,** the **-i** in **guɔgi,** and the **-e** in **ʧok-e** neither does it explain what happens to the vowels **[a, i]** in the V-final noun roots in Table 89 above. The current chapter has established that the alteration in the voice feature of the final phoneme of the noun root occurs in pluralisation, genitive forms and other inflected forms such as adjectival construction. To put this into a better perspective, consider the morphophonological behaviour of the root-final phoneme of the word **otit** "firefly" in various inflected forms illustrated in Table 90.

**Table 90**

*Morphophonological Behaviour of Root Final Phoneme in Inflections*

| | | |
|---|---|---|
| Nominative (Sg.) | **otit** | firefly |
| Nominative (Pl.) | **otid-e** | fireflies |
| Genitive (Sg.) | **otid-a** | my firefly |
| Genitive (Pl.) | **otid-wa** | our firefly |
| Nominative (Pl.) + Genitive (Sg.) | **otid-e-na** | my fireflies |
| Nominative (Pl.) + Genitive (Pl.) | **otid-e-wa** | our fireflies |
| NounR + interrogative | **otid-ŋa** | whose firefly |
| NounR + Pl. + interrogative | **otid**-e-**ŋa** | whose fireflies |
| NounR + determiner | **otid-ni** | this firefly |
| NounR+ Pl. + Det. | **otid-e-gi** | these fireflies |
| NounR+ Pl. + Genitive (Sg.) + Det. | **otid-e-na-gi** | these my fireflies |
| NounR+ Pl. + Genitive (Pl.) + Det. | **otid-e-wa-gi** | these our fireflies |

Evidently, the voicing of the final phoneme of the noun root occurs in all the inflected cases in Table 90 above. This is a clear indication that plural formation in Dholuo nouns is not a result of voice polarity. The voice feature is therefore just one of the many constraints defining inflection processes in Dholuo nominals including affixation of plural, genitive, determiner, interrogative and pronominal morphemes to the noun root. Other constraints such as Dholuo noun syllable structure, phonotactic restrictions and articulatory harmony (consonant, vowel and consonant-vowel) similarly play a crucial factor in describing inflection processes in Dholuo nominals. This chapter demonstrates that consonant hardening and weakening define the morphophonological variations seen

in the noun root final consonant but does not define pluralisation. The researcher argues that Dholuo nouns form plurals by affixation of the three allomorphs, **-e**, **-i**, and **-ni** to the noun root in certain morphophonologically defined environments.

## 5.4 The Plural Marker in Dholuo Nouns

The current study is of the view that any model of morphology must make provisions for deviations from the principle that language description follows a straightforward pattern. The approach taken here, consequently, deviates from the feature polarity phenomenon employed by earlier studies in describing plural formation in Dholuo nouns. Furthermore, the behaviour of Dholuo nouns in forming plurals has been observed to follow a similar pattern to other nominal structures when inflected. The current study, therefore, takes the view that Dholuo has a basic plural marker **-e** which has three allomorphic variations **–e, -i, -ni** occurring in specific, morphophonologically defined environments. Consequently, the question is how does a noun stem inflect with a particular allomorph and not the other?

### 5.4.1 The [-i] Allomorph

The **[-i]** allomorph occurs in a specific environment. Largely, the **[-i]** allomorph occurs with noun roots whose final segment is preceded by a diphthong. The words in this category were all native noun roots without a single loan. Moreover, the entire group of noun roots taking the **[-i]** allomorph are C-final as summarized in Table 91.

**Table 91**

*Plural Nouns with the [-i] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **guɔk** | **guɔg-i** | dog |
| **ʤuɔk** | **ʤuɔg-i** | witchcraft |
| **ɲuɔk** | **ɲuɔg-i** | billy goat |
| **ruɔө** | **ruɔð-i** | king |
| **ruaө** | **rueð-i** | bull |
| **kuɔt** | **kuɔd-i** | shield |
| **muɔk** | **muɔg-i** | ant bear |
| **өuɔn** | **өuɔnd-i** | cockerel |

It should be notable, however, that there are some noun roots with vowel sequences and which do not form their plurals in the manner described in Table 91 above. They are: **өuol**, **ʧiew, ɲatieŋ** and **kuon** whose plural forms are **өuond-e**, **ʧiep-e, ɲitieŋg-e** and **kuond-e.** This is so because vowels in the root form a sequence and not a diphthong

### 5.4.2 The [-ni] Allomorph

As noted earlier, the three allomorphic variations are defined in certain phonological and morphological environments. The **[-ni]** allomorph also occurs in a specific environment. The **[-ni]** allomorph occurs with V-final noun roots only. It occurs with noun roots that have a long vowel preceding the final consonant of the V-final noun root. The data in Table 92 exemplifies plural formation in vowel final native noun roots while 93 illustrate loan roots.

**Table 92**

*Vowel Final Native Roots Occurring with the [-ni] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **hi:ga** | **hi:g-ni** | cup |
| **ago:la** | **ago:l-ni** | veranda |
| **ago:ko** | **ago:k-ni** | chest |
| **apa:ka** | **ape:k-ni** | wave |
| **bu:nde** | **bu:nd-ni** | gun |
| **so:ko** | **so:k-ni** | a well |
| **aba:ʤa** | **abe:ʤ-ni** | large spear |
| **osi:ki** | **osi:k-ni** | stump |
| **aba:ga** | **abe:g-ni** | thorny rambler |
| **mo:di** | **mo:d-ni** | reed |
| **agu:lu** | **agu:l-ni** | pot |
| **ndi:ga** | **ndi:g-ni** | bicycle |
| **oga:nda** | **oge:nd-ni** | community |

**Table 93**

*Vowel Final Loan Roots Taking the [-ni] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **ku:be** | **ku:b-ni** | cube-shaped jerrican (English "cube") |
| **pa:ka** | **pe:k-ni** | cat (Kiswahili "paka") |
| **mito:ka** | **mito:k-ni** | car (English "motor car") |
| **raʧu:ŋgi** | **raʧu:ŋg-ni** | sieve (Kiswahili "kichungi") |
| **ota:nda** | **ote:nd-ni** | bed (kiswahili "kitanda") |
| **api:ko** | **api:k-ni** | motorcycle (kiswahili "pikipiki") |

The final vowel is deleted when forming plurals. It should be notable also that these noun roots taking **[-ni]** allomorph do not submit to voice alteration of the final segment in the noun root further diluting the voice polarity/alternation phenomenon.

### 5.4.3 The [-e] Allomorph.

This allomorph occurs elsewhere in a variety of environments not encompassed by the other two. Specifically, the **[-e]** allomorph occurs with noun roots whose final segment is preceded by a short vowel or vowel sequences. The **[-e]** allomorph, therefore,

productively inflects with noun roots whose final sound segments are: obstruents, nasals, approximants, and vowels whether the roots are native or loans.

Table 94 exemplifies obstruent final native roots taking the **[-e]** allomorph in forming plurals. These native noun roots have the final consonant preceded by a short vowel.

**Table 94**

*Obstruent Final Native Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **pap** | **pew-e** | field |
| **gɔt** | **gɔd-e** | hill |
| **okot** | **okod-e** | bell |
| **atʃuɵ** | **atʃuð-e** | vulture |
| **piɵ** | **pið-e** | mole hill |
| **ʧak** | **ʧeg-e** | milk |
| **kitʃ** | **kij-e** | orphan |
| **itʃ** | **ij-e** | stomach |

Of the five obstruents [**p, t, k, ɵ**, and **s**], only **[s]** does not naturally occur in the Dholuo native noun root final position. However, when it does occur, for example in loan roots, it takes the **[-e]** allomorph like is the case with the rest of the four obstruents. The obstruents in Table 94 weaken when the roots admit the plural suffix **–e.**

The **[-e]** allomorph also occurs with obstruent final loan roots in forming plurals as exemplified in Table 95 below. The final obstruents in these loan roots are preceded by short vowels. Like it is in Table 94, the obstruents in Table 95 lenite which admitting the plural suffix **-e.** This however is with the exception of [**s**] which does not naturally occur in Dholuo noun roots final position.

**Table 95**

*Obstruent Final Loan Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **dis** | **dis-e** | plate |
| **otas** | **otes-e** | paper |
| **mandas** | **mandes-e** | fried bread |
| **kabitʃ** | **kabidʒ-e** | cabbage |
| **oŋget** | **oŋged-e** | blanket |
| **buk** | **bug-e** | book |

The final consonants in the noun roots (both native and loans) occurring with the **[-e]** allomorph can also be nasals. Table 96 exemplifies nasal final native roots taking the **[-e]** allomorph in forming plurals while Table 97 illustrates loan roots taking the **[-e]** allomorph. It should be notable that a number of noun roots in Table 96 have vowel sequences preceding the final consonants as opposed to diphthongs illustrated in Table 91 which on the contrary admit the –**i** allomorph.

**Table 96**

*Nasal Final Native Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **arum** | **arumb-e** | an owl |
| **lum** | **lumb-e** | grass |
| **rabuon** | **rabuond-e** | potato |
| **kuon** | **kuond-e** | ugali |
| **ajaɲ** | **ajeɲdʒ-e** | verbal assault |
| **ʧuɲ** | **ʧuɲdʒ-e** | liver |
| **ɲatieŋ** | **ɲitieŋg-e** | boulder |
| **tɔŋ** | **toŋg-e** | spear |

Table 97 illustrates nasal final noun loan roots taking the **[-e]** allomorph in forming plurals. The nasals in these loan roots are preceded by short vowels.

**Table 97** *Nasal Final Loan Roots Taking the [-e] Allomorph*

| Noun root | Plural Form | Gloss |
|---|---|---|
| **sim** | **simb-e** | Sim card |
| **kalam** | **kalemb-e** | pen |
| **lɔŋ** | **loŋg-e** | pair of long trousers |
| **sabun** | **sabund-e** | soap |
| **san** | **send-e** | plate |
| **daram** | **daremb-e** | drum |

In both cases in native roots (Table 96) and loan roots (Table 97), the nasals in the root final position fortify to prenasalised consonants when the plural suffix is added to the root.

The final consonants in the noun roots occurring with the **[-e]** allomorph can also be approximants. The noun roots with approximant final noun roots may be native noun roots as illustrated in Table 98 or loans as illustrated in Table 99. The approximant in these roots may be preceded by a short vowel or vowel sequences. In addition, the approxiamnts fortify when the plural suffix **-e** is added to the noun root.

**Table 98**

*Approximant Final Native Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **bul** | **bund-e** | drum |
| **ɵuol** | **ɵuond-e** | snake |
| **bur** | **buʧ-e** | hole |
| **laktar** | **laktetʃ-e** | doctor |
| **ŋgaw** | **ŋgep-e** | antelope |
| **ʧiew** | **ʧiep-e** | porcupine |
| **raw** | **rep-e** | hippo |

**Table 99**

*Approximant Final Loan Roots Taking the [-e] Allomorph*

| Noun root | Plural Form | Gloss |
|---|---|---|
| **situl** | **sitund-e** | stool |
| **bɔl** | **bɔnd-e** | ball |
| **gɔl** | **gɔnd-e** | goal |
| **kar** | **ketʃ-e** | car |

The **[-e]** allomorph also occurs with vowel final roots in forming plurals. The V-final roots may be native or loan roots as illustrated in Tables 100 and 101 respectively. The vowel preceding the final segment in these V-final roots is a short vowel. It should be notable, however, that Dholuo noun roots are underlyingly C-final. Therefore, the consonants in the pre-vocalic positions in the roots in Tables 100 and 101 behave in identical way to the other inflectional processes in Dholuo nominal morphology, that is strong sounds lenite while weak sounds fortify in acquisition of the plural morpheme **-e.**

**Table 100**

*Vowel Final Native Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **dani** | **dej-e** | grandmother |
| **buŋgu** | **buŋg-e** | forest |
| **ʧogo** | **ʧok-e** | bone |
| **kidi** | **kit-e** | stone |
| **dwɛ** | **dweʧ-e** | month |
| **olele** | **oleʧ-e** | lizard |
| **rombo** | **romb-e** | sheep |
| **ɲojo** | **ɲoʧ-e** | githeri |
| **aluru** | **aluʧ-e** | quail |
| **akuru** | **akuʧ-e** | dove |
| **dipo** | **dip-e** | veranda |
| **tipo** | **tip-e** | shadow |
| **bura** | **buʧ-e** | meeting |

**Table 101**

*Vowel Final Loan Roots Taking the [-e] Allomorph*

| Singular | Plural | Gloss |
|---|---|---|
| **punda** | **pund-e** | donkey |
| **ndege** | **ndek-e** | aircraft |
| **okombe** | **okomb-e** | cup |
| **boma** | **bomb-e** | town |
| **misa** | **mis-e** | mass |
| **koti** | **kod-e** | coat |

### 5.4.4 Irregular Plural Formation in Dholuo

Dholuo, just like in other languages, there are nouns that form their plurals in an irregular way as the data in Table 102 illustrates.

**Table 102**

*Nouns Forming Plurals in Irregular Ways*

| Singular | Plural | Gloss |
|---|---|---|
| **ɲako** | **ɲiri** | girl |
| **ðako** | **mon** | woman |
| **ðiaŋ** | **ðok** | cattle |
| **ðano** | **ʤi** | person |
| **ot** | **udi** | pot |
| **diel** | **diek** | goat |
| **ɲaɵi** | **ɲiɵindo** | child |
| **pesa** | **pes** | money |
| **dani** | **deje** | grandmother |
| **dala** | **mier** | home |
| **jaɵ** | **jien** | drug |

The nouns in the category in Table 102 above form their plurals in different, irregular ways. They generally do not admit the plural morphemes [**-e, -ni, -i**] in forming their plurals. Instead, there is internal morphological adjustment of the singular form when changing to the plural form. Others do admit the plural morphemes but the root final segments fail to fortify or lenite as is regular of pluralisation of Dholuo nouns.

### 5.4.5 Nouns Remaining Unchanged in the Plural Forms

In Dholuo, as in other languages, there are those nouns whose structures remain the same both in singular and plural forms. The data in Table 103 below illustrates nouns that remain unchanged both morphologically and phonologically in the plural forms. A majority of nouns in this group are abstract nouns. These nouns end in both consonants and vowels and there were no loan roots in this category.

**Table 103**

*Nouns Remaining Unchanged in Plural Forms*

| Singular | Plural | Gloss |
|---|---|---|
| **lep** | **lep** | tongue |
| **diep** | **diep** | diarrhoea |
| **lit** | **lit** | pain |
| **gek** | **gek** | hiccups |
| **ran** | **ran** | stupidity |
| **bweŋ** | **bweŋ** | great grandchild |
| **lotʃ** | **lotʃ** | power |
| **mitʃ** | **mitʃ** | gift |
| **ler** | **ler** | light |
| **mor** | **mor** | joy |

### 5.4.6 Nouns Forming Plurals in Multiple Ways

There is another group of Dholuo noun roots which form plurals in multiple ways by taking both the [**-ni**] and [**-e**] allomorphs. Table 104 provides data on noun roots that predominantly end in approximants except the loan root **okebe** (tin) and which take both the [**-ni**] and [**-e**] allomorphs.

**Table 104**

*Noun Roots Ending in Approximants with the [-ni] Plural Allomorph*

| Noun root | Plural form | Root Gloss |
|---|---|---|
| **raw** | **rew-e/ rep-e/rew-ni** | hippopotamus |
| **ragwɛl** | **rogwɛnd-e/ rogwɛnd-ni** | bow-legged |
| **ogwal** | **ogwɛnd-e ogwɛnd-ni** | frog |
| **osiki** | **osik-e/ osik-ni** | stump |
| **agulu** | **aguʧ-e/ agul-ni** | pot |
| **okebe** | **okep-e/okep-ni** | tin |

There is a thin but clear-cut distinction in the root vowels in those nouns taking each of the three allomorphs **[e, i, ni]**. While it is distinct that those taking **–i** allomorph have a diphthong in the preceding syllable and those taking the **-e** allomoph have a short vowel or a sequence of vowels in the penultimate syllable, a further distinction exists between those roots that take the **–ni** allomorph and those taking the **–e** allomorph. The **–ni** allomorph group have a long vowel in the preceding syllable but the **–e** allomorph group have a sequence of vowels in the preceding syllable. This, for instance, justifies the plural formation in the word **ogwal→ogwend-e/ ogwe:nd-ni.** The noun can be underlying '**ogual**' but which during suffixation, the plural morpheme initiates an articulary harmony process in which then the '**u**' glides to '**w**' and the following vowel '**a**' lengthens to compensate for '**u**' that changed to '**w**'. In this case, then, we have **ogwa:l** which then takes the **-ni** allomorph. However, when gliding does not take place we have '**ogual**' which then takes the **–e** allomorph or gliding takes place but it is not compensated for which then results to '**ogwal**; proving the fact that the vowel in the preceding syllable is a sequence and that is why it is able to glide. This is the procedure that makes us end with multiple ways of plural formation in Table 104.

### 5.4.7 Phonological Opacity in Dholuo Plural Formation

There are, however, a number of cases in which articulatory harmony (in consonants and vowels) and other constraints in Dholuo describing number do not yield the expected structures and as such the interaction is opaque and is blocked in a number of instances. A small number of nouns do not neatly fall into the structural confines described above. There are instances where certain nouns do not follow the dominant pattern shown by the rest of other nouns in the group. As such, phonological opacity occurs in plural formation in certain Dholuo nouns. For instance, the constraint **ObsHrd[_#C]~Wk[#C_#]** which requires that noun root final obstruents except **[s]** which are always phonologically strong, weaken word internally but remain hard word finally in the output; and the constraint **SonWk[_#C]~Hrd[#C_#]** which demands that if the noun root final sound is weak, it hardens word internally but remains weak word finally run into phonological opacity. Table 104 below exemplifies nouns whose final obstruents fail to fortify or lenite as is expected in pluralisation of nouns in Dholuo despite that fact that they admit the regular plural morpheme **–e**.

**Table 105**

*Phonological Opacity in Plural Formation in Dholuo Nouns*

| Root | Plural | Gloss |
|---|---|---|
| **ip** | **ip-e** | tail |
| **arip** | **arip-e** | milky way |
| **baʊ** | **beʊ-e** | side |
| **latʃ** | **latʃ** | urine |
| **lak** | **lek-e** | tooth |
| **lek** | **lek-e** | herd (of cattle) |
| **ʧupa** | **ʧup-e** | bottle |
| **osiki** | **osik-e** | stump |
| **kuom** | **kuom-e** | hump |

From the foregoing discussion, this study argues that, plural formation in Dholuo is regular. Dholuo has a basic plural marker [**-e]** which has three allomorphic variations

[**-e], [-i],** and [**-ni**]. The allomorphic variations are defined in specific morphophonological environments. The **[-i]** allomorph occurs with noun roots whose final segment is preceded by a diphthong. The **[-ni]** allomorph occurs predominantly with V-final noun roots that have a long vowel preceding the final consonant of the noun root, whether the noun root is native or loan. The [**–e]** allomorph, on the other hand, occurs in a variety of environments across the spectrum. Specifically, the [**–e]** allomorph occurs with noun roots whose final segment is preceded by a short vowel or a vowel sequence. Therefore, the underlying plural morpheme is the **-e** allomorph which surfaces as **–i** or **–ni** in specific morphophonological environments and remains as **–e** elsewhere as described above.

### 5.4.8 OT Analyses of the Plural Forms

It is notable, however, that the alternations observable in the final phonemes in the noun root are not specific to suffixation of the plural morpheme. The alternation is a phenomenon which occurs in all inflected forms in Dholuo nominals. In general, Dholuo nominals adhere strictly to articulatory harmony in all suffixation processes. There is, therefore, a constraint in Dholuo which enforces morphophonological alternations in the final phonemes in all Dholuo nominal structures in inflections.

Consequently, the morphophonological alternation in the final segment of the noun root (e.g. from **[k]→[g], [t]→[d], [n]→[nd], [ɵ]→[ ð]** etc) seen in the discussion in sections 5.4.1, 5.4.2 and 5.4.3 above is an obligatory process in Dholuo inflection with regard to consonants and which has been explained earlier. Inflectional processes in Dholuo nominals trigger a change in the final segment of the root word in certain morphophonological environments in a process known as consonant weakening/hardening, {see constraint (2) below}. Again, it should be noted that this is a necessary but not obligatory process in plural formation as it is a phenomenon uniformly applicable in all suffixation processes in Dholuo nominals.

2. **ObsHrd$_{[_\#C]}$~Wk$_{[\#C_\#]}$**–this constraint requires that word final consonants except **[s]** in the input are realized as hardened or weakened segments in the output. That is, word final obstruents which are always phonologically strong, weaken word internally but remain hard word finally in the output.

The case in (2) above only captures strong segments. Sonorants and vocalic segments (nasals, liquids and approximants) which are generally weak segments are captured by the constraint in (3) below.

3. **SonWk$_{[_\#C]}$~Hrd$_{[\#C_\#]}$-**demands that if the word final sound is weak, it hardens word internally but remains weak word finally.

The above constraints, however, must play alongside other universal linguistic constraints, for instance, which require some identity between the input and output.

**4. Ident~Hrd/Wk-** requires that the hardened or weakened segment in the output must be identical to the segment in the input.

To get the optimal candidate admitting the **-ni** allomorph in forming plurals, however, the defining constraint will have to do with the penultimate syllable of the noun root as summarised in Constraint (5) below. The **–ni** allomorph occurs with roots whose penultimate syllable has a long vowel.

5. **V:_#C$_{Root}$-ni -**this constraint demands that we only get the **–ni** allomorph when the final consonant of the root is preceded by a long vowel

To yield a well-formed structure, however, the above constraint (5) plays alongside other linguistic constraints including (6), (7), (8) and (9) in Dholuo plural formation.

Consequently, for the nouns which take the **[-i]** allomorph, the constraint which will determine the plural allomorph that is admitted by the noun root will have to define the vowel in the root. As earlier explained in section 5.4.1, the **[-i]** allomorph occurs with roots that have a diphthong preceding the final consonant of the noun root, and explicitly

exemplified in Table 91, the constraint in (6) below is highly ranked in pluralisation of nouns which take the **[-i]** allomorph and therefore defines which candidates are admitted.

6. $\mathbf{V_{[DIPH]\_}\#C_{Root}[-i]}$- this constraint demands that the **–i** allomorph only occurs with roots whose final consonant is preceded by a diphthong.

The **[-e]** allomorph on the other hand occurs in all other environments not defined by the other two allomorphs. It occurs with nouns with C-final phonemes as well as those with V-final noun roots. The **[-e]** allomorph is the morpheme which occurs with noun roots across the spectrum irrespective of whether the roots are native or loan. Specifically, the **[-e]** allomorph occurs with noun roots whose final segment is preceded by a short vowel or vowel sequence as illustrated in the constraint in (7) below.

7. $\mathbf{V_{[V\leftrightarrow VV]\_}\#C_{Root}[-e]}$- this constraint demands that the **–e** allomorph only occurs with roots whose final segment is preceded by a short vowel or vowel sequence.

In addition, articulatory harmony as regards to vowels in the input and output segments is an obligatory requirement in the pluralisation of nouns as well as in all other inflectional processes in Dholuo. This requirement is defined by the constraint in (8) below.

8. **ArtHam(v-v) -**requires that vowel features in the output must be harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place (backness, rounding, height, ATR).

Here, it is the vowel in the suffix that triggers harmony. Therefore, when suffixation occurs the vowel in the root has to change in order to harmonise with the vowel in the suffix. It is for that reason, for example, that the open central vowel **[a]** in the C-final noun root **pap** "field" and V-final loan root **paka** "cat" whose plural forms are **pew-e** and **pek-ni** and not ***paw-e** or ***pak-ni** have to satisfy this articulatory coherence. The vowel in the input has to agree with the mid front vowel [**e**] in **pew-e** or close front vowel [**i**] in **pek-ni** in the suffixes in terms of vowel place. This is not seen, for example, in the **osiki→osik-ni** in which vowel harmony is already achieved. Faithfulness to vowel-place features is therefore a necessary but not obligatory condition to be met in plural

formation. In addition, this vowel place harmony also requires that vowels in V-final roots are deleted in the output before admitting a suffix as summed in constraint (9).

9. **ArtHam(_v#$_{[Del]}$) -** this constraint requires that final vowels in V-final roots are deleted in the output when admitting a suffix to satisfy this articulatory coherence requirement regarding vowel place.

Therefore, using the example of **guɔk-guɔg-i,** we can use the constraint tableaux (3) below to illustrate how the above and other articulatory constraints come into play to yield the well-formed plural forms that admit the [**-i]** allomorph.

3. input: **guɔk + -i** "dog + Pl"

| OUTPUT **guɔk-guɔg-i** | **$V_{[DIPH]}$_#$C_{Root}$[-i]** | **$ObsHrd_{[\#C]}$~ $Wk_{[\#C-\#]}$** | **$SonWk_{[\#C}$~ $Hrd_{[\#C-\#]}$** | **Ident~ Hrd/Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| (a)☞**guɔg-i** | | | * | | | |
| (b) **guɔk-i** | | * | | | | |
| (c) **guɔk-ni** | *! | * | | | | |
| (d) **guɔg-ni** | *! | | * | | | |
| (e) **guɔg-e** | *! | | * | | | |
| (f) **gɔg-i** | * | | * | *! | | |
| (g) **guk-i** | * | * | | *! | | |

The first two candidates (a) and (b) both satisfy the highly ranked constraint **$V_{[DIPH]}$_#$C_{Root}$[-i]** which dictates the environment in which the [**-i**] allomorph occur. Thus, all the candidates (c, d, e) with different plural allomorph from the [**-i**] have a fatal confroontation with the highest ranked constraint **$V_{[DIPH]}$_#$C_{Root}$[-i]** and are straight away knocked out. For that reason, the last two candidates (e) and (f) similarly have a fatal confrontation with the most highly ranked constraint because they have a short vowel instead of a diphthong in the preceding syllable. Further, the two are ruled out because they fatally violate the constraint, **Ident~Hrd/Wk** which enforces identity between the segment in the input and output and which prevents deletion and or insertion.The fact that one of the vowels in the noun roots surfaces as deleted segment also renders the outputs semantically inadmissible in the language. However, candidate (b) **guɔk-i** has a fair competition with the optimal candidate (a)☞**guɔg-i** until it is

knocked out by the constraint, **ObsHrd$_{[\#C]}$~Wk$_{[\#C-\#]}$** which demands that the noun root final obstruents in the input are realized as weakened segments word internally in the output. It is this constraint that also leads to candidates (c) and (g) losing ultimately to the optimal candidate. The final two constraints, **ArtHam(v-v)** and **ArtHam(_v#$_{[Del]}$)** play no decisive role in this. Similarly, the constraint **SonWk[_#C]~Hrd[#C_#]** plays no major decisive role as it only concerns sonorants.

The phonotactic restrictions defining Dholuo nominal structure play a crucial part in yielding the structure in the plural form. In particular, articulatory harmony seen in consonant hardening/weakening and vowel place (backness, rounding, height, ATR) harmony is responsible for the morphophonological variations in the noun root final sounds.

Using the example of **paka-pekni,** we can use the constraint tableaux (4) below to illustrate how articulatory constraints come into play to yield the well-formed plural forms that admit the [**-ni]** allomorph.

4. Input: **pa:ka + ni** "cats"

| OUTPUT **pa:ka-pe:k-ni** | **V:_# C$_{Root}$[-ni]** | **ObsHrd$_{[\#C]}$~ Wk$_{[\#C-\#]}$** | **SonWk$_{[\#C]}$ ~Hrd$_{[\#C-\#]}$** | **Ident~ Hrd/Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| (a)☞**pe:k-ni** | | * | * | * | | |
| (b)**pak-ni** | ***!** | * | * | * | ***!** | |
| (c)**paka-ni** | ***!** | * | * | | ***!** | ***!** |
| (d)**pe:k-i** | ***!** | * | * | * | | |
| (e)**pek-e** | ***!** | * | * | * | | |

The outputs (b), (c), (d) and (e) suffer fatal violation of the second highly ranked constraint, **V:_#C$_{Root}$[-ni]** which demands that the winning candidate only admits the **–ni** morpheme when the final consonant of the root is preceded by a long vowel. Thus, all the candidates whose penultimate syllables are not preceded by a long vowel are ruled out. Candidates (b) and (c) further suffer fatal confrontation with the last two constraints because they fail to adhere to articulatory coherence on vowel place, where **ArtHam(v-v)**

demands coherence between vowels in the noun root and that in the suffix, and **ArtHam(_v#$_{[Del]}$)** demanding deletion of the final vowel in all V-final roots**.**

The **[-e]** allomorph is the morpheme which occurs with noun roots across the spectrum (i.e., after roots with final obstruents, nasals, approximants and vowels) irrespective of whether the roots are native or loan. Constraint Tableau (5), (6) and (7) illustrate plural formation with the **[-e]** allomorph.

5. input: **atʃuɵ + -e** "vultures"

| OUTPUT **atʃuɵ- atʃuð-e** | **$V_{[V\leftrightarrow VV]}$_#$C_{Root}$ [-e]** | **ObsHrd$_{[\#C]}$~ Wk$_{[\#C-\#]}$** | **SonWk$_{[\#C]}$ ~Hrd$_{[\#C-\#]}$** | **Ident~ Hrd/Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| (a)☞**atʃuð-e** | | | * | | | |
| (b)**atʃuð-ni** | *! | | * | | | |
| (c) **atʃuɵ-ni** | *! | *! | | | | |
| (d)**atʃuð-i** | *! | | * | | | |
| (e) **atʃuɵ-e** | | *! | | | | |

The constraints which define the appropriate environment, by default, knocks out non-optimal outputs and qualify the output with the **-e** morpheme only. Consequently, two candidates (a) and (e) compete favourably until (e) **atʃuɵ-e** suffer fatal confrontation with the constraint, **ObsHrd$_{[\#C]}$~Wk$_{[\#C-\#]}$** which requires that root final obstruents which are phonologically strong surface as weak segments word internally but remain hard word finally. The optimal candidate (a)☞**atʃuð-e**, therefore, triumphs because of "Harmonic Ordering," a principal of OT which entails that in the desirable result, any single constraint will only be violated minimally in an optimal form. The rest of the constraints play no further decisive role in the choice of the well-formed output.

Consequently, it should be notable that stops and fricatives occurring at the root final position must surface as weakened segments in the plural form as seen in (5) above. On the other hand, nasals, liquids and approximants occurring at the root final position must surface as hardened segments in the plural form as seen in (6) below because they rank low. The constraints that come into play to yield the form in **ajaɲ→ajeɲʤ-e**, and in all sonorant final roots are elaborated by the constraint tableaux (6).

6. Input: **ajaŋ + -e** “abuse”

| OUTPUT **ajaŋ-ajeɲdʒ-e** | **$V_{[V\leftrightarrow VV]\_}$#$C_{Root}$ [-e]** | **ObsHrd$_{[\#C]}$ ~Wk$_{[\#C-\#]}$** | **SonWk$_{[\#C]}$ ~Hrd$_{[\#C-\#]}$** | **Ident~ Hrd/Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| (a)☞**ajeɲdʒ-e** | | * | | | | |
| (b)**ajaŋ-ni** | *! | | * | | *! | |
| (c)**ajeɲdʒi-ni** | *! | * | | | | |
| (d)**ajeɲdʒ-i***! | *! | * | | | | |
| (e)**aja:ŋ-e** | *! | | * | | *! | |

The optimal candidate,☞**ajeɲdʒ-e** is the well-formed structure. The constraints which define the environment that admit only the **[-e]** allomorphs, by default, knocks out non-optimal outputs and strictly qualify the output with the **-e** morpheme only. The optimal candidate satisfies all the constraints in the table except the second thus harmonically bounds all other possible candidates. The other candidate (e) **ajaŋ-e** which admits the **-e** morpheme competes favourably with the optimal candidate but is eventually knocked out. First, it violates the constraint **SonWk$_{[\#C]}$~Hrd$_{[\#C-\#]}$** which demands that when noun root final sound is weak, it must surface as hardened segment word internally but remains weak word finally in the output. The sound [**ŋ**] is therefore expected to surface as [**ɲdʒ]** on admitting the plural morpheme. Second, it fails the constraint, **ArtHam(v-v)** which enforces articulatory harmony between the vowel(s) in the root and that in the suffix. Candidate (b) also fails the vowel place harmony test imposed by this constraint. The last constraint, **ArtHam(_v#$_{[Del]}$)** which is only relevant with V-final roots plays no decisive role here.

It should notable, however, that vowel final noun roots either take the **-e** or **-ni** allomorph in forming plurals. This notwithstanding, it is important to note as well that the prosodic domain on which the hardening/weakening rules apply is within the prosodic word and not at the end of the phonological word. Therefore, the vowel is treated as invisible in suffixation. As a result, the root to which the suffix attaches is first considered consonant final before the regular process of hardening and weakening apply or before the whole process of pluralisation is initiated. Nonetheless, if the prevocalic segment in the noun

roots is an obstruent, approximant, liquid or nasal it will then take **-e** allomorph in forming plurals provided that it does not satisfy all the demands defining the other allomorph **[–ni].** Consider the constraint tableaux (7) below.

7. Input: **akuru + -e** "dove"

| OUTPUT **akuru-akutʃ-e** | **$V_{[V\leftrightarrow VV]\_}$#$C_{Root}$[-e]** | **$ObsHrd_{[\#C]}$ ~$Wk_{[\#C-\#]}$** | **$SonWk_{[\#C}$ ~$Hrd_{[\#C-\#]}$** | **Ident~ Hrd/ Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| (a)☞**akutʃ-e** | | * | | | | |
| (b) **aku:r-e** | *! | | * | | | |
| (c) **akuru-ni** | *! | | * | | | * |
| (d) **akutʃu-ni** | *! | * | | | | * |
| (e) **akuru-i** | *! | | * | | | * |

The well-formed candidate, (a)☞**akutʃ-e** fails the constraint, **$ObsHrd_{[\#C]}$~$Wk_{[\#C-\#]}$** but satisfies all constraints thus harmonically bounds the rest of the candidates. Candidate (b) **akur-e** satisfies the second highest ranked constraint but fatally violates the highest ranked. The rest of the candindates are knocked out because of fatal violation of the highest ranked constraint, **$V_{[V\leftrightarrow VV]\_}$#$C_{Root}$[-e]** which strictly admits only the [**-e**] allomorphs. In particular, constraint **SonWk[_#C]~Hrd[#C_#]** knocks out candidates (b) **akur-e;** (c) **akuru-ni** and (e) **akur-i** because the noun root final liquid [**r**] fails to harden word internally in the output. The constraint **ArtHam(v-v)** eliminates (c), (d) and (e) because they surface as incongruent segments to the input. Constraint **ArtHam(v-v)** requires that final vowels in V-final roots are deleted before admitting the plural.

### 5.5 Summary

The current chapter disagrees with "feature polarity" phenomenon because it is problematic and does not explain why certain Dholuo nominal structures exhibit similar voicing or devoicing of noun root final sounds when, for example, expressing possession. This study argues that Dholuo has a basic plural marker **-e** which has three surface realizations as [**-e], [-i],** and **[-ni]**. The three allomorphic variations are defined in certain, specific phonological and morphological environments.

The **[-i]** allomorph occurs largely with C-final noun roots whose final consonants are preceded by a diphthong. The **[-ni]** allomorph also occurs in a specific environment. It occurs with V-final noun roots that have a long vowel preceding the final consonant of the noun root, whether the noun root is native or loan provided that they satisfy this defined condition. On the other hand, the [**–e]** allomorph occurs elsewhere, in a variety of environments across the spectrum. The **[-e]** allomorph productively inflects with noun roots whose final sound segments are obstruents, nasals, approximants, and most vowels and particularly with noun roots whose final segment is preceded by a short vowel or a vowel sequence.

Inflection processes in Dholuo nominals, such as plural formation trigger a change in the consonant and vowel segment features of root words in certain morphophonological environments. Therefore, the plural morpheme **[-e]** is realized as any of the three allomorphs **[–e, -i, -ni]** to satisfy a number of morphophonological demands in the whole process of pluralisation of nouns. Cardinal among these morphophonological demands is the articulatory harmony which is an invaluable but not exclusive component in defining number in Dholuo nouns. Noun root final consonants surface as hardened or weakened segments in the plural form. In addition, vowel features in the output are required to be identical to, and harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place. However, hardening or weakening of noun root final segments is a general feature of all affixation processes in Dholuo nominals and does not exclusively define plural formation. Plural formation in Dholuo is defined by specific environments which dictate which of the three allomorphs **[–e, -i, -ni]** is admitted.

# CHAPTER SIX: MORPHOPHONEMICS

## 6.1 Introduction

The third objective of this study was to explain the morphophonological alternations in Dholuo nominals. This section, therefore, attempts to answer the question: what morphophonological alternations occur in Dholuo nominals? Morphophonology (also known as morphophonemics) is that branch of linguistics that deals with the processes of interaction between morphology and phonology (Brown & Miller, 2013; Chaer, 2007 & Öztaner, 2007). Generally, when morphemes combine, they have effect on each other's sound structure resulting in different variant pronunciations for the same morpheme. In languages that overtly show morphological marking such as Dholuo, a language's morphophonemics is acutely affected by phonology.

A language's morphophonological structure is consequently described with a series of formal rules known as phonological rules or phonological processes, which, basically, can predict every morphophonological alternation that takes place in the language. According to Ruqaiya (2020) phonological rules or phonological processes are not only language specific but are also so productive that speakers will apply them to new words even if they have never heard or used them before, giving speakers intuition about which words are well-formed and are therefore grammatical. For example, we can argue that Dholuo nouns productively inflect with the morpheme [**-e**] in plural formation under certain morphophonological environments as illustrated in Table 106.

**Table 106**

*Dholuo Plural Allomorphs*

| Singular | Plural | Gloss |
|---|---|---|
| **ŋɔr** | **ŋɔʧ-e** | cowpeas |
| **hi:ga** | **hi:g-ni** | year |
| **ɲuɔk** | **ɲuɔg-i** | billy-goat |

Therefore, guided by Dholuo phonological rules, a native speaker will make the plural form of a new (probably nonsensical) word such as “muock” to become [**muogi]*** or “ga:se” to become [**gesni]*** and “dor” to be [**dotʃe]***.

In addition, phonological processes are either *whole Segment* or *modification type* processes. Whole segment processes are those processes that affect the segmental structure of the word such as deletion, insertion or those that change segments from one contrasting segment type to another e.g., coalescence, all operating at the level of phonemes. The modification type processes lead to the increase of allophones in the phonemic system of a language such as assimilation, dissimilation, and vowel harmony.

However, these phonological processes overlap and there cannot be a clear-cut distinction between them. In Dholuo nominal morphology, for example, a loan word such as the English noun “stool” will have to undergo both whole segment and modification type processes by inserting the vowel [**i**] so as to conform to Dholuo phonotactics which enforce vowel intersperse between consonant clusters to yield [**situl**]. In addition, the word [**situl**] will undergo assimilation in forming the plural form [**sitund-e**] by hardening the alveolar lateral [**l**] to the alveolar prenasalised consonant [**nd**].

### 6.2 Dholuo Morphophonotactic Restrictions

Dholuo nominals have certain morphophonotactic restrictions in the way phonemes can be arranged in a word. For example, nominals have single consonants before and after a vowel. Nominals are both consonant and vowel final and they submit to both open and closed syllabic system. In addition, words may begin with either consonants or vowels. However, it is the final phonemes in nominals that dictate morphophonological alternations discussed later in this study.

In addition, vowels in Dholuo nominals occur both word-initially and word-finally as well as syllable initially and finally. Therefore, Hyman's (1976) view that word boundaries coincide with syllable boundaries in most languages is particularly true for

Dholuo nominals. The following words in Table 107 below demonstrate syllabic boundaries in Dholuo nominals.

**Table 107**

*Syllable Boundaries in Dholuo Nominals*

| | |
|---|---|
| **ki.ta** | my stone |
| **a.ru.ŋgu** | club |
| **ɲi.mbi.je** | intestines |
| **a.ʧuɵ** | vulture |
| **ma.na.ne.se** | pineapples |

In each syllabic unit, there exists only a single vowel as seen below in example (1) and (2)

1. **ma.u.go "**tsetse fly"
2. **a.o.ra "**river"

Though, Dholuo nominals do admit vowel sequences, such sequences, nonetheless, do not form a glide within the same syllable for example as seen in (1) and (2) above. This is so because a vowel sequence that begins with a non-high vowel constitutes two syllables and cannot be realized as a diphthong (Adhiambo, 1981). This argument is qualified by the fact that the articulation of the first vowel in such sequences is normally completed before the articulation of the next vowel begins.

Despite this, it should be noted that semi-vowels, **[w**, **j]**, occur as consonants capable of being followed by either vowels or diphthongs as demonstrated in Table 108.

**Table 108**

*Occurrence of Semi-Vowels in Dholuo Nominals*

| Noun Root | Gloss |
|---|---|
| **wuɔr** | shoe |
| **jiɛ** | boat |
| **wuow** | adolescent |
| **ojiɛjo** | rat |
| **hawi** | luck |

There is a marginal occurrence of two or more consonant sequences in a noun; basically, there are no more than two consonant sequences. Otherwise, if two (or more consonants) have to occur sequentially, for example in cases where borrowing occurs, there has to be vowel insertion to break that sequence as exemplified in Table 109.

**Table 109**

*Vowel Insertion in Consonant Sequences in Dholuo Nominals*

| | |
|---|---|
| **s**[i]**tul** | From English "stool" |
| **m**[i]**toka** | From English motor-car |
| **d**[i]**ro** | From English "drawer" |
| **s**[i]**kat** | From English "skirt" |

In addition, all word initial consonants, for example, have to be followed by a vowel; rarely there exists CCV-cluster in Dholuo nominals. All consonants including the prenasalised consonants are observed to occur word initially and therefore syllable initially. If a noun begins with a consonant, it has to be followed by a vowel (3) and if it begins with a vowel, it has to be followed by a consonant (4)

3.

**luɵ** **"**club**"**
**dek** "vegetable"
**rétʃ** "fish"

4.

**opuk** "tortoise"
**atʃuɵ** "vulture"
**itʃ** "stomach"

Generally, consonant sequences are fairly prohibited in Dholuo nominals. However, existing restrictions in the coda are hardly the mirror image of those in the onset. For instance, voiced obstruents do not occur at the final position of a root. Consequently, the phonemes [**b**, **g**, **ð**, **ʤ**] are realised in the affixed forms but not in the roots. In addition,

the voiceless alveolar fricative [**s**], the voiceless labial fricative [**f**] and the voiceless glottal fricative [**h**] do not occur naturally in the final position of Dholuo nominal roots. The examples of bare nouns with final [**s**] in the data presented by this study were all borrowed words, for example **mandas** (borrowed from Kiswahili "mandazi"); **makas** (borrowed from Kiswahili "makasi") **dis** (borrowed from English "dish").

Therefore, the following phonemes [**b**, **f, g, ð, h, ŋʤ, nd, mb, ŋg, nð** and **j**] occur word initially (5) but not word finally in nominal roots. In the rare occasions where they occur at word final position, they have to be followed by a vowel (6).

5.

| | |
|---|---|
| **bim** | "gorilla" |
| **dani** | "grandmother" |
| **ðiaŋ** | "cow" |
| **ŋgaw** | "antelope" |
| **jaɵ** | "medicine" |
| **fuwo** | "stupidity" |
| **guɔk** | "dog" |
| **hawi** | "blessings" |
| **nʤaga** | "bang" |
| **rindi** | "stool" |
| **rombo** | "sheep" |
| **nðanðu** | "taste" |

6.

| | |
|---|---|
| **aduda** | "basket" |
| **obaðo** | "snare" |
| **neŋgo** | "price" |
| **luja** | "sweat" |
| **muofu** | "the blind" |
| **higa** | "year" |
| **hoho** | "valley" |
| **baŋʤo** | "music band" |
| **rindi** | "stool" |
| **rombo** | "sheep" |
| **nðanðu** | "taste" |

It should be noted though, that prenasalized consonants have been represented as complex segments because they function as unit phonemes in Dholuo. However, the prenasalised consonants [**mb**, **nd**, **ɲʤ**, **ŋg**, **nd**] occur in the final segment in nominal stems but not in the roots as do nasals. Whenever they occur at the final position in a nominal root, they have to be followed by a vowel as illustrated in (6) above.

Although Dholuo nominals have both long and short vowels, some scholars have, however, argued that the occurrence of the long vowels is simply an evidence of vowel lengthening (Ngala, 1991; Odhiambo, 1981 & Okombo, 1982). In this case, therefore, vowels are viewed to be phonemically short. Vowels in the nominal root are lengthened when they precede one or no vowel at all in utterance-final position. However, a clear-cut distinction between long/short vowels on one hand and +/-ATR on another has not been adequately documented in Dholuo. Table (110) below attempts to illustrate how ATR can be used in semantic congruency in Dholuo nominals.

**Table 110**

*ATR in Dholuo Nominal Semantic Congruency*

| +ATR | | -ATR | |
|---|---|---|---|
| **bur** | "hole" | **bʊr** | "boil" |
| **kuojo** | "sand" | **kuɔjɔ** | "sprinkle" |
| **piɵ** | "small hill" | **pɪɵ** | "farming" |
| **wer** | "song" | **wɛr** | "mug" |
| **lam** | "tarmac" | **ləm** | "few/little" |

Morphophonotactic restrictions in Dholuo nominals form the rudimental basis upon which the alternations observed in the final segments in Dholuo nominals are interpreted. In particular, which phonemes trigger or are affected by sound changes in Dholuo inflectional processes is wholly dependent on restrictions described in the foregoing section. How sound changes affect each other in a word is the domain of assimilation.

### 6.3 Assimilation

Assimilation is a phonological process in which there is a change of one sound to another due to the effect of neighbouring sound or sounds (Ruqaiya, 2020). Assimilation is defined by *The Cambridge Dictionary of Linguistics* as the phonetic or phonological processes whereby a segment becomes more similar to an adjacent segment (Brown & Miller, 2013). Generally, sounds tend to assimilate (or become phonetically similar to) adjacent sound(s) in order to maintain a continuous, effortless flow of speech (Carr, 1993; Katamba, 1989). As a result, some researchers have closely linked "assimilation" to "coherence" in articulation, and in particular articulatory harmony. Assimilation has, therefore, been referred to as "co-occurrence" by some scholars and as "co-articulation" by others (Ruqaiya, 2020). Consequently, assimilation is considered an obligatory process that makes it easier for speakers to pronounce combinations of sounds by giving these sounds shared distinctive features that in other environments one or more of these would not have, thus having effect of producing some economy of effort in the utterance (Abercrombie, 1967).

In an assimilation process, distinction is made between the segments assimilated (*assimilee*), the segment which assimilates another segment (*assimilator*), and the segment resulting from assimilation (*assimilant*) (Abercrombie, 1967; Ruqaiya, 2020). According to Roach (2002) assimilation is direction dependent. Therefore, there is *progressive assimilation* when there is a change in a sound because of the influence of the preceding sound (Bhat 1967) or *regressive assimilation* also known as 'anticipatory' or 'coalescent' assimilation (Abercrombie, 1967) when the influential sounds move backwards. Similarly, assimilation can be *by-directional* if it presupposes one or more assimilators or *reciprocal (mutual) assimilation*, in which two contiguous segments simultaneously exert influence on each other (Jaraadat et al, 2020)

Most processes in Dholuo nominals are not only by-directional and regressive but also reciprocal. The example given below in (7) in pluralisation is regressive as well as

reciprocal. Other examples are seen in Dholuo nominal morphology such as personal pronouns, adjectives and determiners.

7. (a) **ŋɔr** + **e** → **ŋɔʧ-e** "cowpeas"
   (b) **kidi** + **an** → **kit-a** "my stone"
   (c) **okot** + **e** + **gin** → **okod-e-gi** "their bells"

In the examples above, the plural morpheme **-e** in (a) and the genitive –**an** in (b) influences the regressive changes in which there is hardening of the alveolar trill [**r**] to the unvoiced palatal fricative [**ʧ**] in (a), as well as hardening of the voiced alveolar stop [**d**] to the unvoiced alveolar stop [**t**] and deletion of the final vowel in (b). However, in (c) there is a by-directional change occurring both in the root word and in the suffixes. Other than weakening of [**t**] there is deletion of the final segment, the alveolar nasal [**n**] in the personal pronoun **gin**. Weakening and hardening of consonants in Dholuo nominal inflections is thus an important process in as far as assimilation in consonants is concerned.

### 6.4 Consonant Weakening and Hardening in Dholuo Nominals

The dominant assimilation process that takes place in Dholuo nominals is consonant weakening and consonant hardening. Fougeron and Keating (1997) argue that at the edges of prosodic domains, initial consonant and final vowels have more extreme (less reduced) 'lingual articulations,' which are called articulatory strengthening. Generally, the term "prosodic domains" constitute four items: the phonological word, the phonological (or intermediate) phrase; the intonational phrase, and the utterance (Fougeron & Keating, 1997).

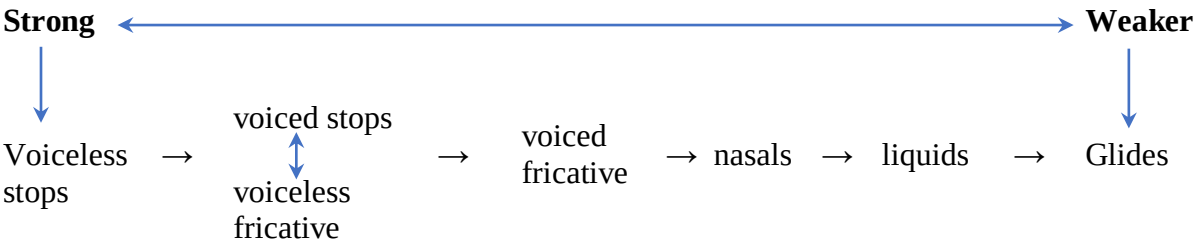
However, according to Peperkamp (1999) syntactic atoms or morphological words, do not necessarily behave as a unit. Therefore, from a phonological point of view, derivational affixes and compound members can be treated independently by phonological word-level rules. Prosodic words are typically characterized as being the domain of word stress, phonotactics and segmental word-level rules. Consonant

weakening or hardening in Dholuo nominals occur at the level of prosodic word. Nonetheless, it should be noted that the prosodic word is but one element in a series of hierarchically ordered phonological constituents known as the prosodic hierarchy (Selkirk 1981, 1986; Nespor & Vogel 1986). Still, hardening or weakening occurs at the edges of these dormains (Fougeron & Keating, 1997; Peperkamp, 1999).

Weakening or *lenition* has been defined by Trask (2000) as any phonological change in which a segment becomes less consonant-like than previously. This is always in relation with phonological *scales* or *hierarchies* which rank consonants in order of their strength (Brandao et al, 2008). Weakening has always been defined in relation to hardening or *fortition* where consonants are ranked from the strongest ones (voiceless obstruents) that require higher acoustic energy during articulation to the weakest ones (vocoids) requiring less acoustic energy in their articulation. Figure 1 below illustrates consonant weakening/hardening trajectory as conceived by Trask (2000) in what he described as "phonological scale".

**Figure 1**

*Phonological Scale (Trask, 2000)*




The concept of weakening and hardening has been described by different (but relatively synonymous) terms. Linguists are relatively in agreement as to the synonymous terms used in reference to weakening and lenition (Brandao et al, 2008). However, other scholars have referred to the same concept of weakening as *softening* (Halle, 2005). On the other hand, hardening has been referred to as fortition or *strengthening* (Brandao et al, 2008). Despite these variations, for purposes of this study, all these terms shall be treated

as synonyms and any substantial differences that could be in existence overlooked. Similarly, associated word forms such as *hard*, *strong*, *weak*, *soft*, *fortis* and *lenis* may be used interchangeably. However, the words weakening/lenition and hardening/fortition and their associated word forms shall be heavily relied on.

Generally, consonant weakening is argued to follow a certain "trajectory". That is, they follow a certain route as they lenite (Lass & Anderson, 1975). In that connection, the phonological scale (Figure 1 above) described by Trask (2000) defines two routes for the voiceless stops (voiced stops or voiceless fricatives). Moreover, the scale illustrates the relative strength of consonants with respect to their major-class features and manner of articulation features. On the other hand, according to Foley (1977) consonant hardening/strengthening is described by relating between the manner of articulation and 'voicing' (laryngeal specifications). Therefore, consonants assume different strengths by their very nature (inherent strength) or through the position they occupy in a word (initial, medial or final) or through a dynamic spontaneous change process (Hooper 1976 & Vennemann 1972). This, therefore, implies that voiced segments are by their very nature weaker than the voiceless counterparts. Similarly, voiceless stops are inherently strong just as glides are inherently weak.

The following Figure 2 captures the consonant hardening/weakening trajectory in Dholuo nominal structure indicated by the coloured and non-coloured arrows.

**Figure 2**

*Consonant Weakening/hardening Trajectory in Dholuo Nominals*

| | | Labial | Dental | Alveolar | Palatal | Velar | Glottal |
|---|---|---|---|---|---|---|---|
| Stops | Voiceless | **p** | | **t** | | **k** | |
| | Voiced | **b** | | **d** | | **g** | |
| Fricatives | Voiceless | **f** | **ɵ** | **s** | **ʧ** | | **h** |
| | Voiced | | **ð** | | **ʤ** | | |
| Nasals | | **m** | | **n** | **ɲ** | **ŋ** | |
| Nasal-Consonant | | **mb** | **nð** | **nd** | **ɲʤ** | **ŋg** | |
| Lateral | | | | **l** | | | |
| Trill | | | | **r** | | | |
| Glide | | **w** | | | **j** | | |

*Key:* ⟹ *Hardening*
➡ *Weakening*

The hardening/weakening trajectory shown above exhibit a scenario in which the assimilated segments, evidently, try to maintain places of articulation (labial, dental, alveolar, palatal, glottal) to make articulation of the assimilated sounds easy and effortless, but with a manipulated manner of articulation. The solid arrows indicate the hardening trajectory while the clear arrows indicate the trajectory of weakening. For instance, the voiceless bilabial stop [**p**] lenites to the voiced bilabial stop [**b**] or bilabial approximant [**w**] while the bilabial approximant [**w**] fortifies to the voiceless bilabial stop [**p**] and so forth and so on. As such, labial sounds will only be weakened to fellow labial sounds, but with altered laryngeal specifications, dental sounds only to fellow dental sounds, alveolar to alveolar and so forth.

### 6.4.1. Hardening and Weakening in Obstruent Final Roots

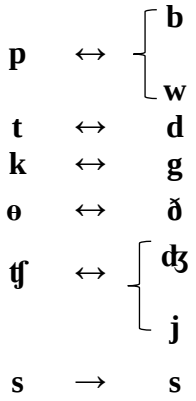
According to Trask (2000) ideology of ranking consonants in a 'phonological scale' and **the** ideology of 'weakening trajectory' offered by Lass and Anderson (1975), obstruents are inherently strong or weak. Consequently, voiceless stops [**p**, **t**, **k**] are by their very nature strong irrespective of whether they occur at the final position in Dholuo nominal

roots. Similarly, voiceless fricatives [**f**, **ɵ**, **ʧ** and **s**] are expected to be inherently strong, but this is also relative to, and dependent on, their position in a prosodic word and dynamic spontaneous change process during an utterance. However, the glottal fricative [**h**] is inherently weak due to its vocoid nature. In relation to this, it is also important to note that voiced obstruents [**b**, **d**, **g**, **ð**, **ʤ**] which are expected to be weaker than their unvoiced counterparts, do not occur at the final position in the uninflected form in Dholuo nominals except in prevocalic positions in a nominal. They are barred by phonotactic restrictions in Dholuo nominals explained in Section 6.2. This, therefore, defeats the argument advanced by other studies that nouns in Dholuo form their plural by voice polarity.

Therefore, obstruent final roots in Dholuo nominals are expected to follow the following trajectory in lenition illustrated in Figure 3.

**Figure 3**

*Lenition/Fortition Trajectory in Obstruent Final Roots*




The arrows indicate the direction/ trajectory of either lenition or fortition. For instance, [**t**] lenites [**d**] and [**d**] fortifies to [**t**]; [**ʧ**] lenites to either [**ʤ**] or [**j**] and so on. The above scenario is exemplified in Table (111) which illustrates both lenition and fortition in obstruent final noun roots.

**Table 111**

*Lenition Trajectory in Obstruent Final Roots*

| Root | Plural | Root + Det **[ŋa]** whose | Root + Gen **[-a]** my | Root Gloss |
|---|---|---|---|---|
| **duba** | **dup-e** | **dup-ŋa** | **dup-a** | sugarless |
| **pap** | **pew-e** | **pab-ŋa** | **paw-a** | field |
| **otit** | **otid-e** | **otid-ŋa** | **otid-a** | firefly |
| **ogudu** | **ogut-e** | **ogut-ŋa** | **ogut-a** | cap |
| **dek** | **deg-e** | **deg-ŋa** | **deg-a** | vegetable |
| **abaga** | **abek-ni** | **abak-ŋa** | **abak-a** | book |
| **atʃuo** | **atʃuð-e** | **atʃuð-ŋa** | **atʃuð-a** | vulture |
| **oðaðo** | **oðeo-e** | **oðao-ŋa** | **oðao-a** | tilapia |
| **ɲimbitʃ** | **ɲimbij-e** | **ɲimbidʒ-ŋa** | **ɲimbij-a** | intestine |

It should be notable that the voiceless bilabial stop [**p**] lenites to the bilabial approximant [**w**] before vowels and to the voiced bilabial stop [**b**] before consonants e.g., **pew-e** "fields", **paw-a** "my field"**, pab-ŋa** "whose field". Similarly, [**tʃ**] lenites to [**j**] before vowels and to [**dʒ**] before consonants. Vowel place articulatory harmony requirements in Dholuo nominals enforce the changes in the vowels in the nominal root to cohere with the vowel in the suffix in the inflected form, e.g., **oðaðo→oðeo-e.** In addition, [**s**] does not occur naturally in the final position in Dholuo nominals (except in loans) and therefore does not submit to sound alternation noticeable in the rest of the obstruents.

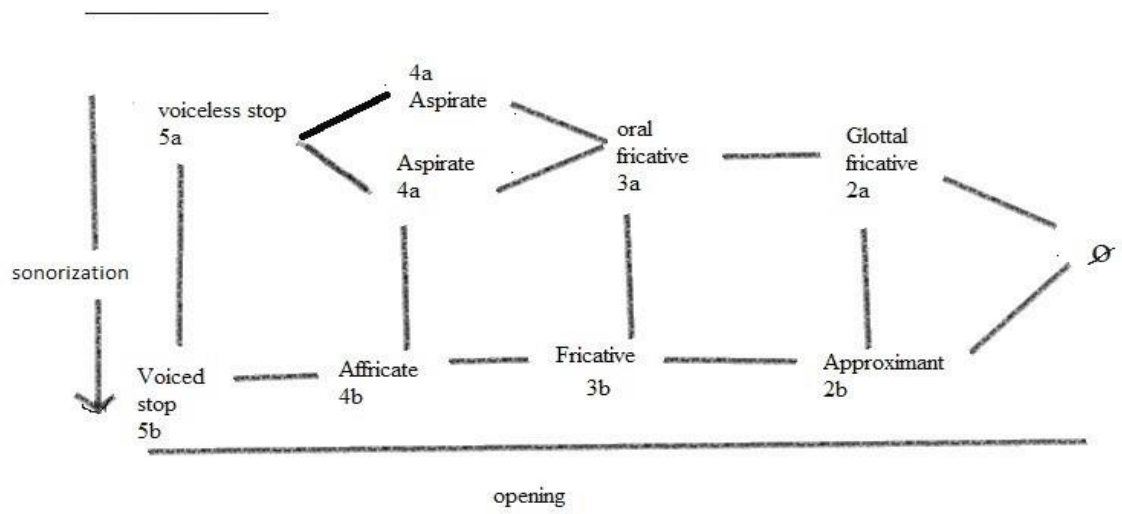
### 6.4.1.1. Hardening/ Weakening in Stop Final Nominals

Generally, voiceless stops [**p**, **t**, **k**] rank highly in a phonological scale. They therefore assimilate to sounds ranking lower in the scale. Consequently, when the voiceless stops [**p**, **t**, **k**] occur in the final position in a nominal root, they weaken to [**w** or **b**]**,** [**d**], [**g**] respectively maintaining places of articulation but shifting manner of articulation that have to do with laryngeal features. In view of that, this study will treat voicing, spirantisation, approximantisation, debuccalisation as "aspects of lenition." This way, this study borrows from the argument advanced by Hyman (1975) which not only expounds on Trask (2000) phonological scale and Lass and Anderson (1975) weakening trajectory,

but also gives a graphical representation of what the current study calls "aspects of lenition" seen in Figure 4 below.

**Figure 4**

*Aspects of Lenition (borrowed from Hyman, 1975)*




The illustration in Figure 4 above captures the two articulatory processes invaluable in lenition- change in manner and change in laryngeal state. Therefore, certain aspects of lenition will be captured by either or both of these processes. For example, aspiration is from 5a to 4a and affrication from 5b to 4b; while voicing will be from 5a to 5b.

The concept of lenition in obstruents can be explained using the assimilation process in pluralisation of **pap→pew-e**. If, for example, we take the noun **pap** (field) whose plural form is **pew-e** we can trace how the assimilant, the plural morpheme **–e** triggers the root final [**p**] to lenite to [**w**] in the plural form. First, it is worth discussing which of the /**p**/ (initial or final) is stronger. On the basis of the inherent features of a voiceless stop, /**p**/ is by its very nature strong. However, its position in a word and the dynamic spontaneous change processes it undergoes will alter its strength, which therefore implies that the initial and final /**p**/ will exhibit different phonological strengths in an utterance.

Consequently, according to Fougeron and Keating (1997) consonants display either more reduced (weakening) or more increased (hardening) lingual articulation at the edges of prosodic domains. We expect, therefore, that the word-initial /**p**/ will be an aspirated [**p**$^{\mathbf{h}}$] and as such weaker than the word-final unaspirated [**p**].

In addition, the affixation of the plural morpheme **–e** initiates the following process of assimilation.

8. **pap** + **-e** → **pew-e**

The voiceless labial stop [**p**] then assimilates to a sound that will not only retain the place of articulation but also one with a reduced lingual articulatory energy. As said earlier, when consonants are pronounced with less effort or more weakly, they commonly change into other consonants with more vocalic features (Anderson & Ewen, 1987). The voiceless labial stop [**p**] therefore lenites to the labial glide [**w**] which has reduced lingual-labial articulatory energy and the vowel assimilation processes then follows to yield **pew-e.** It is worth noting as well that [**p**] lenites to [**w**] before vowels (e.g., **pew-e** "fields") and to [**b**] before consonants (e.g., **pab-ŋa** "whose field"). The rest of the voiceless stops lenite thus [**t**]→[**d**] and [**k**]→[**g**].

Using example (8) above **pap** + **-e→pew-e,** it is important to explain vowel assimilation processes that yields [**pew-e]** and not **[p**a**w-e]*,** where [**a**] assimilates to [**e**]. The trigger plural suffix [**-e**] can be described to have **[-Back]**, **[+/-Open]** vowel [**e**]. Its harmonic effect will therefore be described with reference to *vowel place*, a cover term used in this study to refer to all the vowel features. When affixed to a root, the vowel [**e**] in the plural suffix exerts a reciprocal harmonic effect on the root vowels. That is, it will behave as both the trigger and target at the same time.

Generally, the vowel in the suffix [**-e**] has little effect on vowels in the root in which vowel place harmony is already achieved and where changes occur to neither the vowels in the root nor the vowel in the suffix, for instance **dek→deg-e.** However, when the vowel in the suffix and the one in the root do not share vowel place, vowel place

harmony is enforced. As described earlier, Dholuo phonotactics require that vowel features in the output must be identical to, and harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place.

The output **paw-e*** is, for instance, banned because the vowel **[a]** in the root which is **[+Back], [+Open]** does not cohere with the one in the suffix **[e]** whose vowel place is **[-Back]**, **[+/-Open].** Consequently, for effortless articulation, Dholuo nominal structure constraints must enforce harmony between these vowels. The central vowel **[a]** is then raised and fronted to a transparent mid **[-Back]**, **[+/-Open]** vowel **[e]** to yield **pew-e**. This is what happens in the rest of nominal roots as illustrated by the data in Table 111 and 112 as well as elsewhere.

In summary, voiceless stops weaken when they occur word medially in Dholuo nominals (see example 8). Table 112 exemplifies lenition processes in voiceless stops in a number of inflectional processes in Dholuo nominals.

**Table 112**

*Weakening of Voiceless Stops in Dholuo Nominals*

| | | | | | |
|---|---|---|---|---|---|
| **pap** | field | **gɔt** | hill | **guɔk** | dog |
| **pew-e** | field + Pl | **gɔd-e** | hill + Pl | **guɔg-i** | dog + pl |
| **paw-a** | my field | **gɔd-a** | my hill | **guɔg-a** | my dog |
| **pab-gi** | their field | **gɔd-gi** | their hill | **guɔg-wa** | our dog |
| **paw-e** | his/her field | **gɔd-e** | his/her hill | **guɔg-e** | his/her dog |
| **pab-ʧa** | that field | **gɔd-ʧa** | that hill | **gɔd-ʧa** | that dog |

On the other hand, voiceless stops remain hard when they occur word finally in Dholuo nominals. Table 113 illustrates hardening in voiceless stops when they occur word finally in a number of inflectional processes in Dholuo nominals.

**Table 113**

*Hardening in Voiceless Stops in Dholuo Nominals*

| | | | | | |
|---|---|---|---|---|---|
| **lep** | tongue | **ot** | hut | **dek** | food |
| **lep mane** | which tongue | **ot mane** | which hut | **dek mane** | which food |
| **lep maduong** | big tongue | **ot moti** | old hut | **dek moted** | cooked food |
| **lep atʃɪel** | one tongue | **ot atʃɪel** | one hut | **dek te** | all food |

In addition, the voiced stops in Dholuo [**b, d, g**] which rank slightly below the voiceless stops [**p, t, k**] assimilate to sounds ranking higher on a phonological scale. Therefore, -[**b, d, g**] harden to [**p, t, k**] respectively word medially and remain weak word finally in the inflected forms. Table 114 illustrates weakening of voiced stops when they occur word finally in inflected forms while Table 115 illustrates hardening of voiced stops in word medial positions in inflected forms. It should be noted that [**b, d, g**] only occur prevocalically in Dholuo nominal roots.

**Table 114**

*Hardening of Voiced Stops in Dholuo Nominals in Word Final Positions*

| | | | | | |
|---|---|---|---|---|---|
| **duba** | sugarless | **ogudu** | hat | **abaga** | thorns |
| **duba mane** | which sugarless | **ogudu mane** | which hat | **abaga mane** | which thorns |
| **duba matin** | little sugarless | **ogudu moti** | old hat | **abaga moti** | old tilapia |
| **duba atʃɪel** | one sugarless | **ogudu atʃɪel** | one hat | **abaga te** | all thorns |

**Table 115**

*Hardening of Voiced Stops in Dholuo Nominals in Word Medial Positions*

| | | | | | |
|---|---|---|---|---|---|
| **duba** | sugarless | **ogudu** | hat | **abaga** | Thorns |
| **dup-e** | root + Pl | **ogut-e** | root + Pl | **abek-ni** | root + pl |
| **dup-a** | my sugarless | **ogut-a** | my hat | **abak-a** | my thorns |
| **dup-gi** | their sugarless | **ogut-gi** | their hat | **abak-wa** | our thorns |
| **dup-e** | his/her sugarless | **ogut-e** | his/her hat | **abak-e** | his/her thorns |
| **dup-ŋa** | whose sugarless | **ogut-ŋa** | whose hat | **abak-ŋa** | whose thorns |

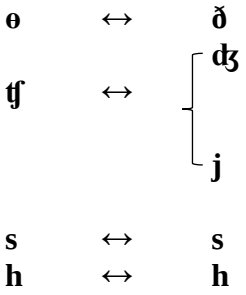
The final vowel in all V-final nominals is deleted in inflectional process before admitting the suffix. Also, the vowel in the nominal root must cohere with the vowel in the suffix in terms of articulatory parameters defining vowel place as explained earlier**.**

### 6.4.1.2. Hardening/ Weakening in Fricative Final Nominals

Voiceless fricatives are inherently strong. On the contrary, voiced fricatives are comparatively weak in relation to the voiceless counterparts (See Figure 1, 2 & 4). However, as shown earlier, they follow a certain trajectory in fortition/lenition. Figure 5 below illustrates fortition/lenition trajectory in fricative final roots in Dholuo nominals.

**Figure 5**

*Fortition/Lenition Trajectory in Fricative Final Roots*




Just like it has been demonstrated in obstuents, fricatives maintain places of articulation but shift manner of articulation that have to do with laryngeal features. Thus, voiceless fricatives weaken to more vocoid counterparts (Fig. 5) but retain places of articulation. Of all the fricatives in Dholuo nominals [**θ, ʧ, s, h**], only [**s**] remain hard irrespective of its position in a word. This can be explained by the fact that [**s**] less frequently occur naturally in Dholuo nominals. The examples we have are basically loan words. In addition, voiced fricatives [**ð, ʤ, h**] are highly restricted in occurrence at noun root final position in uninflected forms in Dholuo nominals except prevocalically. This therefore implies that articulatory harmony defined by Dholuo phonotactics dictate the well-formed structures in Dholuo nominals with fricative final roots.

Hardening and weakening in Fricative final nominal roots is illustrated in Table 116 exemplifying weakening of voiceless fricatives word medially; Table 117 exemplifies hardening of voiced fricatives word medially while Table 118 exemplifies voiceless fricatives remaining hard and voiced fricatives remaining weak at word final positions.

**Table 116**

*Weakening of Voiceless Fricatives in Word Medial Positions*

| | | | | | |
|---|---|---|---|---|---|
| **ruɔɵ** | king | **rétʃ** | fish | **rédʒ-tʃa** | that fish |
| **ruɔð-i** | root + Pl | **réj-e** | root + Pl | **rédʒ-ni** | this fish |
| **ruɔð-a** | my king | **réj-a** | my fish | **rédʒ-gi** | these fish |
| **ruɔð-gi** | their king | **réj-e-ni** | your (Pl) fish | **rédʒ-wa** | our fish (Sg) |
| **ruɔð-e** | his/her king | **réj-e** | his/her fish | **réj-e-wa** | our fish (Pl) |
| **ruɔð-ŋa** | whose king | **réj-e-ka** | those fish | **rédʒ-ŋa** | whose fish |

The fricatives [**s**] and [**h**] do not occur naturally in the final position in Dholuo nominals. In addition, they also do not exhibit alternation demonstrated by the rest of the fricatives in Table 116. The voiceless fricative [**tʃ**] becomes [**j**] before vowels and [**dʒ**] before consonants for instance, **réj-e-ni "**your (Pl) fish" and **rédʒ-ni "**this fish"

### 6.4.2. Hardening/ weakening in Nasal Final Roots

Dholuo has four nasals: labial [**m]**, alveolar [**n]**, palatal [**ɲ]** and velar [**ŋ].** All the four can occur at word initial, medial or final positions in Dholuo nominals. However, compared to obstruents, nasals are by their very nature weak (Hyman, 1975; Lass and Anderson, 1975 & Trask, 2000). Consequently, noun root final nasals in Dholuo nominals harden when they occur word medially in the inflected form to the following nasal-consonants: labial [**mb]**, alveolar [**nd]**, palatal [**ɲdʒ]** and velar [**ŋg]**. However, it is important to note that the nasal-consonants [**mb**, **nd**, **nð**, **ɲdʒ**, **ŋg]** do not occur word finally in the uninflected (root) words.

The hardening of root-final nasals will follow the trajectory illustrated in Figure 6 below.

**Figure 6**

*Lenition/Fortition Trajectory in Nasal Final Roots*

| | | |
|---|---|---|
| **m** | → | **mb** |
| **n** | → | **nd** |
| **ɲ** | → | **ɲdʒ** |
| **ŋ** | → | **ŋg** |

Furthermore, articulatory coherence is a fundamental factor in assimilation in Dholuo nominals. For that reason, it should be noted that prenasalized consonants [**mb**, **nd**, **nð**, **ɲdʒ**, **ŋg]** have been represented as complex segments because they function as unit phonemes in Dholuo nominals. Despite this, other articulatory harmony considerations are strictly observed.

In summary, root-final nasals harden word medially and remain weak word finally in the inflected form.

**Table 117**

*Hardening/weakening of Root-final Nasals in Dholuo Inflections*

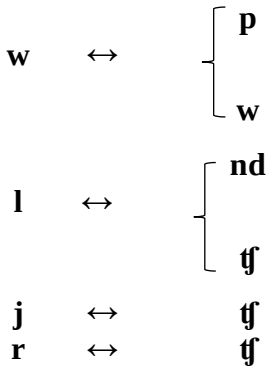
| Root | Gloss | Pl. | Gloss | Dem. | Gloss |
|---|---|---|---|---|---|
| **kɔm** | chair | **kɔmb-e** | chairs | **kɔm mane** | which chair |
| **ʧuɲ** | spirit | **ʧuɲdʒ-e** | spirits | **ʧuɲ maler** | holy spirit |
| **tɔŋ** | spear | **tɔŋg-a** | my spear | **tɔŋ motur** | broken spear |
| **rabuon** | potato | **rabuond-wa** | our potato | **rabuon nus** | half a potato |

### 6.4.3. Hardening/ weakening in Approximant Final Roots

Dholuo has the following approximants: alveolar lateral **[l]**, alveolar trill, **[r]** palatal glide **[j]** and labial glide **[w]**. However, some approximants such as **[j]** hardly occur word finally in root words or in uninflected forms in Dholuo nominals. Despite that, approximants are by their very nature weak (Hyman, 1975; Lass & Anderson, 1975 & Trask, 2000) and are, therefore, expected to fortify in assimilation. Due to their vocoid nature, approximants fortify to more consonant-like segments. In Dholuo nominals, the approximant-final roots follow the following trajectory in lenition/fortition illustrated in Figure 7 below.

**Figure 7**

*Lenition/Fortition Trajectory in Approximant Final Roots*




As much as possible, approximants will retain places of articulation in fortition especially to do with the feature [**+High**] or [**-High**]. If the approximants were to be described in terms of vowel place features, all the approximants [**l, r, j, w**] can be described by the feature [**+High**]. In hardening, therefore, they fortify to consonant segments whose place of articulation could be described as well as [**+High**]. In addition, except for [**w**], the other three- [**l, r, j**] are describable by [**+Coronal**] [**-Anterior**] features. This conforms to the observation by Escure (1977) that defines the relative strengths of consonants with relation to major-class features and manner of articulation features and which accurately captures the trajectory taken by root-final approximants in Dholuo nominals. Table 118 illustrates hardening/weakening of approximants when they occur word medially in Dholuo nominal roots.

**Table 118**

*Hardening/weakening of Root-final Approximants in Dholuo Nominals*

| Root | Gloss | Dem. | Gloss | Pl | Gloss |
|---|---|---|---|---|---|
| **ŋgaw** | deer | **ŋgab-no** | that deer | **ŋgep-e** | deer(pl) |
| **bor** | cloud | **bor-ʧa** | that cloud | **bɔʧ-e** | clouds |
| **liel** | graveyard | **liend-ni** | this graveyard | **liet-e** | graves |
| **ɲojo** | githeri | **ɲoʧ-a** | my githeri | **ɲoʧ-e** | a lot of githeri |

Therefore, as exemplified in Table 118 and Figure 7, the noun root final approximants will maintain places of articulation in fortition for ease of articulation. The bilabial

approximant [**w**] will fortify to the bilabial stop [**p**] before vowels and to [**b**] before vowels; the alveolar trill [**r**] will fortify to the alveolar fricative [**ʧ**]; the alveolar lateral [**l**] will fortify to the alveolar stop [**t**] before vowels and to the prenasalised alveolar [**nd**] before consonants. In all these processes, articulatory coherence is a fundamental factor in assimilation of approximants. Thus, places of articulation are maintained for consonants but with shifted laryngeal features while vowel place features are equally enforced in assimilation.

This notwithstanding, all the above approximants [**l, r, j, w**] will remain weak when they occur word finally as illustrated by the data in Table 119.

**Table 119**

*Lenition of Word-medial Approximants in Dholuo Nominals*

| Root | Gloss | Dem | Gloss |
|---|---|---|---|
| **ŋgaw** | deer | **ŋgaw atʃiel** | one deer |
| **bor** | cloud | **bor moditʃ** | thick cloud |
| **liel** | graveyard | **liel nus** | half of the graveyard |
| **ɲojo** | githeri | **ɲojo maŋeɲ** | a lot of githeri |

## 6.5 Vowel Harmony in Dholuo Nominals

Vowel Harmony is a well-known type of assimilation which involves coherence of features between vowels at a distance. It is a regularity found in many languages requiring vowels in certain grammatical domains to agree in terms of specific phonological features (Gafos & Dye, 2011).Vowel harmony may be described as a phonological, assimilation process in which vowel sounds in a given domain share some or all articulatory features (Agyeman, 2020; Gafos & Dye, 2011). According to Gafos and Dye (2011), vowels (V) exert influences on neighbouring vowels across intervening consonants (C). Acoustically, this means that the first vowel (V1) in a root is influenced by the phonetic identity of the second vowel (V2); the third vowel (V3) or vice versa to create a smooth transition in the vocal tract. These domains differ from one language to

the other. However, the following phonetic features apply cross-linguistically: the feature backness [**+/– Back**], height [**+/– High**], rounding [**+/– Round**] and tongue root [**+/– ATR**] (Agyeman, 2020; Casali, 2003, 2008 & 2016; Gafos & Dye, 2011).

### 6.5.1. Vowel Length Harmony in Dholuo Nominals

The question of whether Dholuo has both long and short vowels like in Bantu languages has been a long-standing debate among linguists. In some Bantu languages, for example Kisa, the occurrence of vowel lengthening is not only well attested but it is also contrastive in both lexical and grammatical morphemes (Ondondo, 2018). Table 120 illustrates the contrastive vowel length in Kisa which is more productive than in Dholuo.

**Table 120**

*Contrastive Vowel Length in Kisa (Ondondo, 2018)*

| **Short vowels** | | **Long vowels** | |
|---|---|---|---|
| **sab-a** | ask for something | **saab-a** | wash |
| **mer-a** | shoot up | **meer-a** | become drunk |
| **sir-a** | Fence | **siir-a** | jump over |
| **bol-a** | rot | **bool-a** | speak |
| **ruk-a** | rule or govern | **ruuk-a** | jump |

Unlike in Bantu languages, vowel lengthening is not adequately attested in Dholuo data. Some scholars, however, have argued that the occurrence of the long vowels in Dholuo is simply an evidence of vowel lengthening (Ngala, 1991; Odhiambo, 1981 & Okombo, 1982). In this case, therefore, Dholuo vowels are viewed to be phonemically short. Root vowels are lengthened when they precede one or no vowel at all in utterance-final position. In a consonant-final word, it is the last vowel; in a vowel final word, it is the second last vowel in a word. Pursuing this argument (Ngala, 1991; Odhiambo, 1981 & Okombo, 1982) in plural formation in Dholuo, particularly the noun roots taking the **-ni** allomorph, vowel length harmony is a prerequisite as the **–ni** plural only occurs with roots whose final segment is preceded by a long vowel. Table 121 illustrates vowel length harmony in plural formation in Dholuo nominals.

**Table 121**

*Vowel Length Harmony in Dholuo Nominals*

| Singular | Plural | Gloss |
|---|---|---|
| **hi:ga** | **hi:g-ni** | cup |
| **ago:la** | **ago:l-ni** | veranda |
| **ago:ko** | **ago:k-ni** | chest |
| **apa:ka** | **ape:k-ni** | wave |
| **so:ko** | **so:k-ni** | a well |
| **aba:ʤa** | **abe:ʤ-ni** | large spear |
| **mo:di** | **mo:d-ni** | reed |
| **agu:lu** | **agu:l-ni** | pot |

### 6.5.2. Rounding Harmony in Dholuo Nominals

Rounding harmony requires that all the vowels in a given domain have the same rounding value, that is, either [**+Round**] or [**-Round**] (Agyeman, 2020; Casali, 2016; Gafos & Dye, 2011 & Spencer, 1986). Based on rounding feature, two harmonic sets could be realised in Dholuo Nominals as illustrated in Table 122.

**Table 122**
*Rounding Harmony in Dholuo Nominals*

| Set 1 [**+Round**] | | Set 2 [**-Round**] | |
|---|---|---|---|
| **fu:ko** | mole | **osi:ki** | stump |
| **po:ko** | guard | **ndi:ga** | bicycle |
| **ʧogo** | bone | **pa:ka** | cat |
| **okot** | bell | **ɲimbiʧ** | intestines |
| **rombo** | sheep | **aba:ʤa** | large spear |
| **ɲuɔk** | billy goat | **liel** | graveyard |

Nonetheless, rounding harmony is more pronounced where vowel sequences occur. As said earlier, such sequences are limited by Dholuo phonotactics. When allowed, vowel sequences are restricted to diphthongs in which the first vowel (V1) in the sequence and the second vowel (V2) must harmonise in terms of the rounding feature as seen below in Table 123. In this case, there are instances of rounding harmony in suffixation where the vowels in the root and those in the suffix all harmonise for the rounding feature.

**Table 123**

*Rounding Harmony and Vowel Sequences in Dholuo Nominals*

| V1,V2 [+**Round**], | Suffix V [+**Round**] | | V1,V2 [-**Round**] | Suffix V [-**Round**] | |
|---|---|---|---|---|---|
| **guɔk** | **guɔg-no** | that dog | **ʧiew** | **ʧiep-i** | your (Sg) porcupine |
| **ruɔө** | **ruɔð-u** | your (pl) king/chief | **liel** | **liet-e** | graveyards |
| **ɲuɔk** | **ɲuɔg-u** | your billy-goat | **diep** | **dieb-ʧa** | that diarrhoea |
| **rabuon** | **rabuond-no** | that potato | **jien** | **jiend-e** | medicines |
| **kuon** | **kuond-u** | your ugali | **aiða** | **aiө-e-ka** | those squirrels |
| **puɔɲdʒ** | **puɔɲdʒ-no** | that education | **bieje** | **bieʧ-e** | termites |
| **өuol** | **өuond-no** | that snake | **jie** | **jieð-i** | boat/canoe |

The only instance where this rounding harmony is slightly interrupted is when V1 or V2 is either open central [**a**] or mid front [**e**]. These two vowels in Dholuo could be referred to as *neutral* vowels in vowel harmony. According to Gafos and Dye (2011) there is a phenomenon in vowel harmony which is systematic yet unexpected in which a certain set of vowels known as neutral vowels do not undergo harmony. Neutral vowels come in two species, transparent and opaque. Whereas transparent vowels may intervene between the trigger and the target vowel even when they bear the opposite value for the harmonizing feature, opaque vowels block harmony by overriding the expected consequences of another potential trigger in the phonological form (Gafos & Dye, 2011).

Consequently, the neutral vowels [**a**] and [**e**] disobey the expected rounding harmony in Dholuo nominals exemplified in Table 123. In Table 124, the root vowels are [+**Round**] but harmonises with the suffix vowel [**a**] or [**e**] which are [-**Round**].

**Table 124**

*Rounding Harmony and Neutral Vowels*

| Root | Root + Suffix | | Root | Root + Suffix | |
|---|---|---|---|---|---|
| **kube** | **kube-ʧa** | that jerrican | **law** | **lep-e** | his cloths |
| **ruaɵ** | **ruað-a** | my bull | **rabuon** | **rabuond-wa** | our potato |
| **oke:be** | **oke:p-wa** | our rich man | **raw** | **rep-e** | hippos |
| **ɔgwaŋ** | **ɔgweŋg-e** | mongoose + Pl | **raʧu:ŋgi** | **raʧu:ŋg-a** | my sieve |

### 6.5.3. Back Harmony in Dholuo Nominals

Other than the rounding harmony, vowels in Dholuo nominals harmonize for backness feature. The [**+/-Back**] harmonic feature is strictly observed especially with vowel sequences (diphthongs). Here, V1 and V2 have to harmonise for backness. Therefore, if V1 is [**+Back**], V2 has to be [**+Back**]; and if V1 is [**-Back**], V2 similarly has to be [**-Back**]. This, therefore, means that certain vowel sequences (in a diphthong/vowel sequences) in which [**Back**] feature is not observed are banned in Dholuo nominals. While the following sequences are, hypothetically, accepted [**ɪe, ɛi, iɛ, ie, eɪ, ei, əu, əo, əu, uə, ua, uo, uɔ, au, aʊ]**, the sequences involving V1 and V2 which do not agree on [**Back**] feature such as [**eo*, oe*, ue***] are banned. Consequently, a constraint describing vowel harmony for words with vowel sequences will state thus:

9. **AGREE(BK)**- vowel sequences in a diphthong have to agree on the feature [**Back**]

This will assist in choosing the well-formed words in the scenario (10) below. The internal harmonic patterning in root words will dictate selection of candidates whose vowel sequences harmonise for either [**+Back**] or [**-Back**] for all the vowels. However, this markedness constraint is assisted by an intervening neutral vowel [**+Back**] vowel [**a**] or neutral vowel [**-Back**] vowel, [**e**] both of which are transparent in the vowel sequences harmonic patterning as illustrated in (10) with the input, **ruɔɵ** (king).

10. Input: **ruɔɵ** (king)

| **OUTPUT** | **AGREE(BK)** | **AGREE(BK) + Transparent** [**a**], [**e**] |
|---|---|---|
| **(a)☞ruɔɵ** | | |
| **(b) rueɵ** | * | |
| **(c) ruiɵ** | *! | * |

The winning candidate, (a)☞**ruɔɵ** triumphs because of the harmonic patterning of the vowels [**u, ɔ]** which are both [+**Back**]. The disharmony created in (b) and (c) where [+**Back**] is followed by [-**Back**] leads to the two candidates crashing. The second constraint which brings into play the transparent neutral [**a**] or [**e**] does not rescue candidate (b) **rueɵ** because it fails the highly ranked harmonic backness feature**.** However, if the input is another word, say, **ruaɵ** 'bull' the second constraint which requires an alternative agreement with the neutral vowel [**a, e**] would suffice to break the tie created by the intervening neutral vowel, see (11) below.

11.

| **OUTPUT** | **AGREE(BK)** | **AGREE(BK) + transparent** [**a**] [**e**] |
|---|---|---|
| **(a) ☞ruaɵ** | | * |
| **(b) ruiɵ** | *! | * |
| **(c) rueɵ** | * | |

Here, in the constraint tableaux (11), candidates (b) and (c) disagree on the constraints but still this does not rescue (c) **rueɵ,** whose disharmonic vowels rule it out. The scenario illustrated above in (9), (10) and (11) where back harmony is enforced within the root word, especially with diphthongs and vowel sequences, is exactly what is expected in inflectional forms when roots admit suffixes. The vowel(s) in the suffix must harmonise for backness with the vowels in the root unless rescued by the transparent vowel, [**a**] [+**Back**] where [-**Back**] harmony is expected; or rescued by another neutral vowel, [**e**] [-**Back**] where [+**Back**] harmony is expected. Table 125 illustrates backness harmony in Dholuo nominals in which all the vowels are [-**Back**].

**Table 125**

*[-Back] Vowels Harmonic Patterning in Dholuo Nominals*

| Root | Root + Pl. | Root Gloss |
|---|---|---|
| **pe:do** | **pe:d-ni** | thorny ramblers |
| **oke:be** | **oke:b-ni** | rich man |
| **dwɛ** | **dweʧ-e** | month |
| **san** | **send-e** | plate |
| **olele** | **oleʧ-e** | lizard |
| **ndege** | **ndek-e** | aircraft |
| **kidi** | **kit-e** | stone |

In Table 125, [**-Back**] harmony is strictly enforced and where one of the target root vowels does not obey this harmonic patterning, the suffix vowel triggers enforcement like it is seen with the word **san** "plate" where the root vowel is [**+Back**] and which is forced to alter to [**-Back**] in the suffixed form, **send-e.** It is important to note that Dholuo phonotactics enforce deletion of the final vowel in V-final roots and thus it does not affect the vowel harmony patterning in the suffixed form. Table 126 illustrates backness harmony in Dholuo nominals in which all the vowels are [**+Back**].

**Table 126**

*[+Back] Vowels Harmonic Patterning in Dholuo Nominals*

| Root | Root + Suffix | Gloss |
|---|---|---|
| **aluru** | **aluʧ-a** | my quail |
| **akuru** | **akuʧ-wa** | our dove |
| **punda** | **pund-u** | your donkey |
| **ʧogo** | **ʧok-u** | your bone |
| **numu** | **numu=nu** | unripen for you |
| **tulu** | **tulu=na** | throughout for me |
| **boma** | **bomb-u** | your town |
| **ɵʊɔl** | **ɵʊɔnd-a** | my snake |
| **okot** | **okod-wa** | our bell |

In summary, where backness harmonic patterning cannot be achieved because either one or all of the vowels in the root and the suffix vowels are disharmonic, the opacity is

salvaged by either the transparent [**+Back**], [**a**] where [**-Back**] harmony is expected; or by another neutral vowel, [**e**] [**-Back**] where [**+Back**] harmony is expected.

### 6.5.4. Vowel Height Harmony in Dholuo Nominals

Height harmony in a language requires that all the vowels in a given domain have some uniformity in height value, that is, either [**+High**] or [**-High**] (Agyeman, 2020; Casali, 2016; Gafos & Dye, 2011 & Spencer, 1986). However, it has been further argued by Gafos and Dye (2011) that 'height' harmony systems have a connection with 'tongue root' harmony. This is because tongue body vertical position correlates with phonological height and pharyngeal size. Therefore, it is evident Height↔ATR harmony interactions will be unavoidable in Dholuo nominal morphology. Furthermore, we have not given prominence to ATR harmony in Dholuo nominals in this study, but it is notable that certain continuum of vowel harmonies in Dholuo nominals will inevitably be discussed, for example, Height↔Rounding harmony interactions, Height↔Back harmony interactions, Back↔Rounding harmony interactions and of course Height↔ATR harmony interactions. Consequently, the discussions below will explore a number of these harmony interactions with particular reference to Dholuo suffixes as the trigger.

With regard to Height↔ATR harmony interactions, there are compatible acoustic gestures that link these two harmonic features. For instance, raising of the tongue body, which is required for [**+High**] vowels, and advancing of the tongue root, which is required for [**+ATR**] vowels, are compatible on one hand. Conversely, on another hand, the lowering of the tongue body which is required for [**-High**] vowels and retracting of the tongue root which is required for [**-ATR**] vowels are also compatible.

It is important to explore further the concept of vowel height harmony from another perspective. According to Clements (1990, 1991) vowel height harmony systems should be discussed in terms of an 'aperture' theory of vowel height. In this theory, the harmonic classes are distinguished based on their value for the feature **[Open]**, used to implement height distinctions. Consequently, we can isolate three sets of height harmony which we

shall describe as **[+Open]**, describing vowels that are produced with the tongue positioned as far as possible from the roof of the mouth, also known as low vowels. The second set is **[-Open]** which describe vowels that are produced with the tongue positioned as close as possible to the roof of the mouth, also known as close or high vowels. The rest of the vowels which fall in between will be described as **[+/-Open]** and these include all mid vowels, which are produced with the tongue positioned midway between open and close. Other variations will be described in respect to the cardinal height feature. For example, [**ə**] is half-open, while [**ɪ**] is half-close. Table 127 illustrates three possible harmonic sets with regard to vowel height harmony in Dholuo nominals.

**Table 127**

*Vowel height Harmony in Dholuo Nominals*

| | Set 1 **[+Open]** | Set 2 **[+/-Open]** | Set 3 **[-Open]** |
|---|---|---|---|
| **Front** | | **e, ɛ** | **i, ɪ** |
| **Central** | **ɑ, ə** | | |
| **Back** | | **o, ɔ** | **u,** |

In inflectional processes in Dholuo nominals, vowel height harmony is triggered by the vowel in the suffixes with the root vowels being the target. Its harmonic effect will therefore be described with reference to the mentioned vowel place, a cover term used in this study to refer to all the vowel features above. That is, the vowel features of the root vowel must cohere and be harmonious with vowel features in the suffix vowel. This scenario is best exemplified in plural formation in Dholuo nominals. First, it is important to note that Dholuo plural suffix [**-e**] has three allomorphic variations **-e**, **-i** and **-ni**. The suffix vowels therefore are either [**e**] or [**i**]. The suffix vowel [**i**] has little effect on root vowels taking the plural allomorph **-ni** in which vowel harmony is already achieved by virtue of identical vowel place. Furthermore, this is more pronounced if, for instance, the root vowels are either all **[-Open]**, where vowel place harmony is already achieved and where changes occur to neither the root vowels nor suffix vowel as is in the data illustrated in Table 128 below.

**Table 128**
*Default Vowel Place Harmony in Nouns Taking [–ni] Pl. Morpheme*

| Sg. | Pl. | Gloss |
|---|---|---|
| **fu:ko** | **fu:k-ni** | moles |
| **pe:do** | **pe:d-ni** | thorny ramblers |
| **oke:be** | **oke:b-ni** | rich man |
| **hi:ga** | **hi:g-ni** | cup |
| **ago:la** | **ago:l-ni** | veranda |
| **ago:ko** | **ago:k-ni** | chest |
| **bu:nde** | **bu:nd-ni** | gun |
| **so:ko** | **so:k-ni** | a well |
| **osi:ki** | **osi:k-ni** | stump |
| **mo:di** | **mo:d-ni** | reed |
| **agu:lu** | **agu:l-ni** | pot |
| **ndi:ga** | **ndi:g-ni** | bicycle |

The suffix vowel [**i**] can be placed in Set 3 (Table 127) where it shares vowel place with [**ɪ**], [**ʊ**] and **[u]** described as **[-Open].** For that reason, all the vowels [**i**] and [**u**] in the root remain unaltered in the suffixed or plural forms. Similarly, [**i**] shares vowel place with [**o**] and [**ɔ**], which though are in Set 2, are described with **[+/-Open]** feature**.** Thus, no much articulatory manipulations are required in the production of **[-Open]** and **[+/-Open]** vowels resulting in no alternations in the vowel [**o**] in both the root and suffixed forms as harmony is already achieved.

The scenario exemplified in Table 128 with noun roots taking the **–ni** plural morpheme is almost identical to the behaviour of noun roots taking the **–i** plural morpheme since the suffix vowel, [**i**] is identical both. The **[-i]** allomorph occurs with nouns whose root vowel is a diphthong. As exemplified earlier, syllabic units in Dholuo nouns admit only a single vowel. In cases where vowel sequences are partly admitted, they do not form a glide within the same syllable because a vowel sequence that begins with a non-high vowel constitutes two syllables and cannot be realized as a diphthong (Adhiambo, 1981) so the articulation of the first vowel in such sequences is normally completed before the articulation of the next vowel begins. In this case, the suffix **[-i]** which has no intervening consonant has to cohere with V1 in the diphthong. Table 129 exemplifies default vowel place harmony in noun roots taking the –**i** plural morpheme

**Table 129**

*Default Vowel Place Harmony in Nouns Taking [–**i**] Plural Morpheme*

| | | |
|---|---|---|
| **ɲuɔk** | **ɲuɔg-i** | billy goat |
| **muɔk** | **muɔg-i** | ant bear |
| **guɔk** | **guɔg-i** | dog |
| **ruɔɵ** | **ruɔð-i** | king |
| **kuot** | **kuod-i** | shield |

From the above, V1 is **[+Back]**, **[-Open]** while V2 is **[+Back]**, **[+/-Open].** However, the suffix vowel **[-i]** is **[-Back]**, **[-Open]** sharing vowel place of **[-Open]** with V1. Not much harmonic patterning changes are needed here because the suffix vowel cohere with the root vowel V1 in height harmony and partly so with V2 in height harmony as well. The vowel feature **[Back]** is transparent in this case.

However, things begin to get complex when the suffix vowel and root vowels do not share vowel place. In this instance, the suffix vowel [**i**] must trigger harmonic patterning with the root vowels being the target. As described earlier, Dholuo phonotactics require that, in the pluralisation process, the root vowel features in the output must be identical to, and harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place.

Therefore, if we take, for example, a noun root **paka** (cat) which takes the plural allomorph [-**ni**] but whose root vowel [**a**] does not cohere with suffix vowel [**i**], then vowel harmony will be obligated. In the word [**paka**], the open central vowel **[a]** has to agree with the close front vowel [**i**] in the suffix in terms of vowel place. In the 3-tier harmonic sets described earlier, [**a**] falls in Set 1, **[+Open];** while [**i**] falls in Set 3, **[-Open].** Consequently, there is disharmony between the root vowels and the suffix vowels in terms of vowel place hindering a smooth articulatory procedure. As a result, outputs such as **pak-ni*** or **pak-i*** are banned. The output **pak-ni*** is, for instance, banned because the root vowel **[a]** which is **[+Back], [+Open]** does not cohere with the suffix vowel **[i]** whose vowel place is **[-Back], [-Open].** Consequently, for effortless articulation, Dholuo nominal structure constraints must enforce harmony between these

vowels. The central vowel **[a]** is then raised and fronted to a transparent mid **[-Back]**, **[+/-Open]** vowel **[e]** to yield **pek-ni**. This is what happens in the rest of noun roots whose vowels do not cohere with the vowel [**i**] in the suffix as illustrated by the data in Table 130.

**Table 130**

*Height↔Rounding Harmony Interactions in Pluralization*

| Sg. | Pl. | Gloss |
|---|---|---|
| **r**a:**w** | **r**e:**w-ni** | hippo |
| **p**a:**ka** | **p**e:**k-ni** | cat |
| **ok**e:**be** | **ok**e:**b-ni** | rich man |
| **apa:ka** | **ape:k-ni** | wave |
| **aba:ʤa** | **abe:ʤ-ni** | large spear |
| **ab**a:**ga** | **ab**e:**g-ni** | thorny rambler |
| **oga:nda** | **oge:nd-ni** | community |
| **ruaɵ** | **rueð-i** | bull |

The scenario exemplified in the noun roots taking the **–ni** and **–i** plural morphemes is identical to the behaviour of noun roots taking the **–e** plural morpheme when it comes to enforcement of vowel harmony. When there is suffixation of the plural morpheme **[-e]** to a noun root with more than one vowel (which is not a diphthong) and which has intervening consonants, the suffix vowel has to cohere with both the vowels. However, this is not a requirement where harmony is already achieved between the vowel in the noun root and the vowel, **[-e]** in the plural suffix as illustrated in Table 131.

**Table 131**

*Default Vowel Harmony in Nouns Taking [-e] Plural Allomorph*

| Noun Root | Plural | Root Gloss |
|---|---|---|
| **okot** | **okod-e** | bell |
| **atʃuɵ** | **atʃuð-e** | vulture |
| **opuk** | **opug-e** | tortoise |
| **ɵuol** | **ɵuond-e** | snake |
| **bur** | **butʃ-e** | hole |
| **tʃiew** | **tʃiep-e** | porcupine |
| **buŋgu** | **buŋg-e** | forest |
| **tʃogo** | **tʃok-e** | bone |
| **kidi** | **kit-e** | stone |
| **olele** | **oletʃ-e** | lizard |

The vowel [**e**] can be placed in Set 2 **[+/-Open]** and with other acoustic descriptions of **[-Back].** There is, therefore, no enforcement of vowel harmony requirements to root vowels such as [**o**], [**i**], [**u**] and [**e**] that share vowel place features. This is because the suffix vowel [**e**] share vowel place feature **[+/-Open]** with [**o**]; the feature **[-Open]** with [**u**] and the feature **[-Back]** with [**i**].

However, where vowel place features are not shared, such as in the root vowel [**a**], described as [**+Open**] and [**+/-Back**], there is disharmony in articulation and as such vowel harmony must be enforced in the suffixed form. The root vowel [**a**] is either raised and fronted to [**+/-Open**] vowel, [**e**] or raised and fronted to [**-Open**] vowel, [**i**] in the suffixed form so as to cohere and be harmonious with the suffix vowel [**e**]. In the end, the well-formed surface realisation of the plural form must have the suffix vowel, [**e**] share vowel place with some or all the root vowels V1, V2 and V3. Where some, except one, of the root vowels already cohere with the suffix vowel, the disharmonious vowel is forced to cohere. For instance, in the word **ɲatieŋ,** V2 and V3 are harmonious with the suffix vowel but V1 is not, in which case vowel height harmony is enforced in the target V1. In the words, **kal**a**m, lakt**a**r** and **dar**a**m** both V1 and V2 are disharmonious with the suffix vowel in which case height harmony is enforced in the target V2 which is closer to the

suffix vowel. The rest of vowel harmony enforcement in nouns taking the **–e** plural morpheme is illustrated by the data in Table 132.

**Table 132**

*Vowel Height Harmony in Nouns Taking [-e] Plural Allomorph*

| Noun Root | Plural | Root Gloss |
|---|---|---|
| **ajaɲ** | **ajeɲʤ-e** | verbal assault |
| **ɲatieŋ** | **ɲitieŋg-e** | boulder |
| **kalam** | **kalemb-e** | pen |
| **raw** | **rep-e** | hippo |
| **laktar** | **laktetʃ-e** | doctor |
| **daram** | **daremb-e** | drum |
| **dani** | **dej-e** | grandmother |
| **kar** | **ketʃ-e** | car |
| **ŋgaw** | **ŋgep-e** | antelope |
| **alap** | **aleb-e** | open place |
| **pap** | **pew-e** | field |
| **ʧak** | **ʧeg-e** | milk |

Consequently, markedness constraint regarding vowel-place features is therefore an obligatory condition to be met in inflectional processes in Dholuo nominals. Constraint Tableaux (12) illustrates vowel harmony data in plural formation in Dholuo nominals.

12.

| **INPUT** | **OUTPUT** | **ObsHrd$_{[\#C]}$ ~Wk$_{[\#C-\#]}$** | **SonWk$_{[\#C]}$ ~Hrd$_{[\#C-\#]}$** | **Ident~ Hrd/Wk** | **ArtHam (v-v)** | **ArtHam (_v#$_{[Del]}$)** |
|---|---|---|---|---|---|---|
| **paka+ni** | (a)☞**pek-ni** | * | | | | |
| | (b)**paka-ni** | * | | | * | |
| | (c)**pak-ni** | * | | | * | * |
| **raw+ni** | (a)☞**rep-e** | | | | | |
| | (b)**rew-e** | * | | | | |
| | (c)**rap-e** | | | | * | |

Candidate (c) in both cases lose to the optimal candidate because of their confrontation with the constraint **ArtHam(v-v)** which requires that vowel features in the output must be harmonious with the vowel segment features in the input in terms of articulatory

parameters defining vowel place (backness, rounding, height, ATR). The other candidates such as (b) [**paka-ni**] lose because of confrontation with faithfulness constraints, **ArtHam(_v#$_{[Del]}$)** which requires the final vowels in V-final roots be deleted in the output when admitting a suffix. Other constraints such as **ObsHrd$_{[_\#C]}$~Wk$_{[\#C_\#]}$** demands that word final obstruents are realized as hardened or weakened segments in the output, while **SonWk$_{[_\#C]}$~Hrd$_{[\#C_\#]}$** plays no decisive role as it concerns only word final sonorants.

### 6.6 Deletion

Deletion can be described as a product of assimilation. The first stage in all inflectional processes in Dholuo nominals is suffixation. The suffix then triggers the process of assimilation with the root vowels and its intervening consonants being the target. The next step, therefore, involves consonant assimilation, where strong root final segments harden word medially and weaken word finally, while weak root final segments fortify word medially and lenite word finally as the case may be. For instance, [**k**] in the noun root **ʧak** (milk) in example (13) below fortifies to [**g**] in all inflectional processes in Dholuo nominals.

13. **ʧak** → **ʧeg-e** "milk+Pl"
→ **ʧag-a** "my milk"
→ **ʧag-wa** "our milk"
→ **ʧag-ŋa** "whose milk"
→ **ʧag-aŋɔ** "what milk"
→ **ʧag-ʧa** "that milk"

However, even with these processes we still end up with certain consonant and vowel sequences which are inadmissible in Dholuo nominal morphology. This is because there is a constraint in Dholuo which demands that consonant or vowel sequences in a cluster must agree in terms of articulatory features. This constraint aids in ease of articulation where sequences occur. Consequently, when consonants or vowels in a cluster have

articulatory features which are not harmonious, they pose a tricky articulatory procedure which demands that it be repaired by either deletion or insertion.

Deletion in Dholuo nominal morphology is prominently exhibited in V-final roots when they admit suffixes. First, it should be noted that noun roots in Dholuo are underlyingly consonant final. Therefore, the vowel in the V-final roots is treated as invisible in suffixation. In this case, the root to which the suffix attaches is consonant final after which the regular process of hardening and weakening described above applies. Consequently, the noun root final vowel is deleted in the inflected form because it interrupts articulatory harmony as demanded by the constraint, **ArtHam(_v#$_{[Del]}$)** illustrated in Table 133. Deletion takes place in plural formation in Dholuo nouns. Table 133 illustrates deletion in noun roots (native or loan) which form their plurals by admitting the plural suffix **–e** while Table 134 illustrates deletion in noun roots (native or loan) admitting the plural suffix **–ni.**

**Table 133**

*Deletion in Dholuo Nouns Taking the Plural Suffix [**-e**]*

| Root | Input | Output | Root Gloss |
|---|---|---|---|
| **buŋgu** | **buŋgu + -e** | **buŋgø-e** | forest |
| **ʧogo** | **ʧogo + -e** | **ʧokø-e** | bone |
| **kidi** | **kidi + -e** | **kitø-e** | stone |
| **olele** | **olele + -e** | **oleʧø-e** | lizard |
| **rombo** | **rombo + -e** | **rombø-e** | sheep |
| **ɲojo** | **ɲojo + -e** | **ɲoʧø-e** | githeri |
| **aluru** | **aluru + -e** | **aluʧø-e** | quail |
| **akuru** | **akuru + -e** | **akuʧø-e** | dove |
| **dipo** | **dipo + -e** | **dipø-e** | veranda |
| **tipo** | **tipo + -e** | **tipø-e** | shadow |
| **bura** | **bura + -e** | **buʧø-e** | meeting |
| **punda** | **punda + -e** | **pundø-e** | donkey |
| **ndege** | **ndege + -e** | **ndekø-e** | aircraft |
| **okombe** | **okombe + -e** | **okombø-e** | cup |
| **boma** | **boma + -e** | **bombø-e** | town |
| **misa** | **misa + -e** | **misø-e** | mass |
| **koti** | **koti + -e** | **kodø-e** | coat |

Dholuo nominal roots are treated are underlyingly consonant final. The addition of a plural suffix, therefore, creates disharmony in articulation which is repaired by deletion of the vowel in the root. The reason the vowel in the noun root is deleted and not the one in the suffix is because, as explained above, the vowel is treated as invisible in suffixation and its deletion does not render us with a form that is semantically inadmissible in Dholuo as would the deletion of the suffix vowel. In addition, there is a secondary reason which explains deletion in Table 133. Vowel sequences are generally discouraged in Dholuo nominal morphology. However, where such sequences are admitted (for instance in diphthongs) vowel place harmony is obligatory. Therefore, there is disharmony in articulation when there is suffixation of the plural morpheme **[-e]** to a V-final noun root, especially where vowel place features are not shared between the vowel in the root and that in the suffix. The inflected form has more than one vowel (which is not a diphthong), as illustrated in Table 133, and as such vowel harmony must be enforced in the suffixed form by deletion of one of the vowels.

**Table 134**

*Deletion in Dholuo Nouns Taking the Plural Suffix **[–ni]***

| Root | Input | | Output | Root Gloss |
|---|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋgi** | **+ -ni** | **ratʃu:ŋgø-ni** | sieve |
| **kwe:si** | **kwe:si** | **+ -ni** | **kwe:sø-ni** | smoking pipe |
| **ku:be** | **ku:be** | **+ -ni** | **ku:bø-ni** | jerrican |
| **oke:be** | **oke:be** | **+ -ni** | **oke:bø-ni** | a rich man |
| **pa:ka** | **pa:ka** | **+ -ni** | **pe:kø-ni** | cat |
| **go:go** | **go:go** | **+ -ni** | **go:gø-ni** | lump of clay |
| **pa:la** | **pa:la** | **+ -ni** | **pe:lø-ni** | knife |
| **aba:ga** | **aba:ga** | **+ -ni** | **abe:gø-ni** | thorny fence |
| **ndi:ga** | **ndi:ga** | **+ -ni** | **ndi:gø-ni** | bicycle |
| **pe:do** | **pe:do** | **+ -ni** | **pe:dø-ni** | thorny rambler |

Deletion also occurs when nouns admit genitive suffixes. Table 135 illustrates deletion when nouns admit singular genitive suffixes while Table 136 illustrates deletion when plural genitive suffixes are added to V-final noun roots.

**Table 135**

*Deletion in Dholuo Nouns with Singular Genitive Suffixes*

| Noun Root | 1Gen Sg (My) | 2Gen Sg (Your) | 3Gen Sg (His/Her/Its) | Root Gloss |
|---|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋgø-a** | **ratʃu:ŋgø-i** | **ratʃu:ŋgø-e** | sieve |
| **olele** | **olendø-a** | **olendø-i** | **olendø-e** | lizard |
| **ndege** | **ndekø-a** | **ndekø-i** | **ndekø-e** | aircraft |
| **lowo** | **lopø-a** | **lopø-i** | **lopø-e** | land |
| **polo** | **pondø-a** | **pondø-i** | **pondø-e** | heaven/sky |
| **aluru** | **alutʃø-a** | **alutʃø-i** | **alutʃø-e** | quail |
| **buŋgu** | **buŋgø-a** | **buŋgø-i** | **buŋgø-e** | forest |
| **punda** | **pundø-a** | **pundø-i** | **pundø-e** | donkey |

**Table 136**

*Deletion in Dholuo Nouns with Plural Genitive Suffixes*

| Noun Root | 1Gen Pl (Our) | 2Gen Pl (Your) | 3Gen Pl (Their) |
|---|---|---|---|
| **ratʃu:ŋgi** | **ratʃu:ŋgø-wa** | **ratʃu:ŋgø-u** | **ratʃu:ŋgø-gi** |
| **olele** | **olendø-wa** | **olendø-u** | **olendø-gi** |
| **ndege** | **ndekø-wa** | **ndekø-u** | **ndekø-gi** |
| **lowo** | **lopø-wa** | **lopø-u** | **lopø-gi** |
| **polo** | **pondø-wa** | **pondø-u** | **pondø-gi** |
| **aluru** | **alutʃø-wa** | **alutʃø-u** | **alutʃø-gi** |
| **buŋgu** | **buŋgø-wa** | **buŋgø-u** | **buŋgø-gi** |
| **punda** | **pundø-wa** | **pundø-u** | **pundø-gi** |

Deletion also occurs when demonstrative suffixes are added to V-final noun roots. Table 137 illustrates deletion when nouns admit singular demonstrative suffixes while Table 138 illustrates deletion when plural demonstrative suffixes are added to V-final noun roots.

**Table 137**

*Deletion in Dholuo Nouns with Singular Demonstrative Suffixes*

| Noun Root | NounR + [**-ni**] (this) | NounR + [**-ʧa**] (that) | NounR + [**-no**] (that) | Root Gloss |
|---|---|---|---|---|
| **raʧu:ŋgi** | **raʧu:ŋgø-ni** | **raʧu:ŋgø-ʧa** | **raʧu:ŋgø-no** | sieve |
| **osiki** | **osigø-ni** | **osigø-ʧa** | **osigø-no** | stump |
| **olele** | **olendø-ni** | **olendø-ʧa** | **olendø-no** | lizard |
| **lowo** | **lobø-ni** | **lobø-ʧa** | **lobø-no** | land |
| **polo** | **pondø-ni** | **pondø-ʧa** | **pondø-no** | heaven/sky |
| **aluru** | **alundø-ni** | **alundø-ʧa** | **alundø-no** | quail |
| **buŋgu** | **buŋgø-ni** | **buŋgø-ʧa** | **buŋgø-no** | forest |
| **pa:ka** | **pa:gø-ni** | **pa:gø-ʧa** | **pa:gø-no** | cat |

Addition of plural demonstrative suffixes triggers the pluralisation process in Dholuo nouns first. Thus, before admitting the demonstrative suffix, a plural suffix is first added so that there is number concord in the suffixed form. Deletion, however, takes place before the addition of the demonstrative suffix since it had already been triggered by the addition of the plural suffix as illustrated in Table 138.

**Table 138**

*Deletion in Dholuo Nouns with Plural Demonstrative Suffixes*

| Noun Root | NounR + [**-gi**] (these) | NounR + [**-go**] (those) | NounR + [**-ka**] (those) | Root Gloss |
|---|---|---|---|---|
| **raʧu:ŋgi** | **raʧu:ŋgø-e-gi** | **raʧu:ŋgø-e-go** | **raʧu:ŋgø-e-ka** | sieve |
| **osiki** | **osikø-e-gi** | **osikø-e-go** | **osikø-e-ka** | stump |
| **olele** | **olendø-e-gi** | **olendø-e-go** | **olendø-e-ka** | lizard |
| **ndege** | **ndekø-e-gi** | **ndekø-e-go** | **ndekø-e-ka** | aircraft |
| **lowo** | **lopø-e-gi** | **lopø-e-go** | **lopø-e-ka** | land |
| **polo** | **pondø-e-gi** | **pondø-e-go** | **pondø-e-ka** | heaven/sky |
| **aluru** | **aluʧø-e-gi** | **aluʧø-e-go** | **aluʧø-e-ka** | quail |
| **buŋgu** | **buŋgø-e-gi** | **buŋgø-e-go** | **buŋgø-e-ka** | forest |
| **pa:ka** | **pe:kø-ni-gi** | **pe:kø-ni-go** | **pe:kø-ni-ka** | cat |
| **punda** | **pundø-e-gi** | **pundø-e-go** | **pundø-e-ka** | donkey |

### 6.7 Insertion

In Dholuo nominal morphology, nouns strictly have single consonants before and after a vowel. Generally, there is marginal occurrence of two or more consonant sequences in a nominal. There are, basically, no more than two consonant sequences. However, if two (or more consonants) have to occur sequentially, there has to be vowel insertion to break that sequence. Dholuo nouns, therefore strictly submit to **PARSE$_{(vow)}$** constraint described below (14) in which vowels, which are underlyingly invisible, are realized on the surface. For example, a loan word such as the English noun "stool" will have to undergo both whole segment and modification type processes by inserting the vowel [**i**] so as to conform to Dholuo phonotactics which enforce vowel intersperse between consonant clusters to yield [**situl**].

14. **PARSE$_{(vow)}$** –this constraint enforces vowel intersperse between consonants in a sequence.

Table 139 illustrates vowel insertion in Dholuo nouns to satisfy the phonotactic restrictions with regard to articulatory harmony where consonant sequences occur especially in English loan words. Insertion in this case occur largely word medially but it may also occur word/syllable initially or word finally as exemplified in the three two words.

**Table 139**

*Vowel Insertion in Dholuo Nouns*

| Input | Output | Gloss |
|---|---|---|
| **stu:l** | **s[i]tul** | From English "stool" |
| **məʊtəka:** | **m[i]:toka** | From English motor-car |
| **drəʊə** | **d[i]ro** | From English "drawer" |
| **skɜ:t** | **s[i]kat** | From English "skirt" |
| **blæŋkət** | **b[a]raŋget** | From English "blanket" |
| **kjub** | **ku:b[e]** | From English "cube" |
| **pɔpɔ** | **[a]pojo** | From English "pawpaw" |
| **pikipiki** | **[a]pi:k[o]** | From Kiswahili "pikpiki" (motorcycle) |

In all the inflectional processes, the loan roots above in Table 139 retain the inserted phonemes. Furthermore, they follow the regular assimilation processes with regard to hardening or weakening of consonants when inflected as illustrated in Table 140.

**Table 140**

*Insertion in Dholuo Inflectional Processes*

| Root | Root + Pl | Root + Gen **–a** "my" | Root + Dem –**ʧ**a "that" | Root Gloss |
|---|---|---|---|---|
| **situl** | **sitund-e** | **sitund-a** | **sitund-ʧ**a | stool |
| **mito:ka** | **mitok-ni** | **mitok-a** | **mitoka-ʧ**a | motor car |
| **diro** | **diroʧ-e** | **diroʧ-a** | **diro-ʧ**a | drawer |
| **sikat** | **siked-e** | **sikad-a** | **sikad-ʧ**a | skirt |
| **baraŋget** | **baraŋged-e** | **baraŋged-a** | **baraŋged-ʧ**a | blanket |
| **ku:be** | **kub-ni** | **kup-a** | **kube-ʧ**a | cube |
| **apojo** | **apoʧ-e** | **apoʧ-a** | **apojo-ʧ**a | pawpaw |
| **api:ko** | **apik-ni** | **apik-a** | **apiko-ʧ**a | motor cycle |

## 6.8 Summary

Phonological processes in Dholuo are either whole segment process (e.g. deletion, insertion) or modification type processes (e.g. assimilation and vowel harmony). In addition, the phonological processes are not only by-directional and regressive but also reciprocal. The suffixes are themselves the triggers as well as targets in a number of inflectional processes.

The dominant assimilation process that takes place in Dholuo nominals is consonant weakening and consonant hardening. Consonant weakening and hardening in Dholuo nominals occur at the level of prosodic word, particularly at the edges of the word. Therefore, nominal root final consonants surface as weakened or hardened segments in inflectional processes. In other words, if the root word final consonant is weak it hardens word internally but remains weak word finally or when the root final sound is hard, it weakens word internally but remains hard word finally.

Generally, Dholuo nominals submit to articulatory harmony in all suffixation processes. In conformance with articulatory coherence, there is assimilation of vowel place as well as consonant hardening or weakening. Further, this coherence is enforced by either insertion of vowels to break disharmonious consonant sequences or deletion of segments which are disharmonious in articulatory process. As a result, in enforcing articulatory harmony in vowels, vowel features in the output are required to be identical to, and harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place.

In addition, Dholuo phonotactics allow freedom of occurrence of both consonants and vowels at initial, medial or final positions in a word. However, restrictions at the coda are incongruent with those at the onset. For example, voiced obstruents occur at both initial and medial positions in a word but never at the root final position in C-final nominals. Furthermore, the occurrence of consonant and vowel sequences is restricted. However, where such sequences are admitted, there has to be vowel intersperse between consonants or they do not form a glide within the same syllable in case of vowel sequences.

# CHAPTER SEVEN: SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 7.1 Introduction

This chapter provides the study's summary, conclusion and recommendations. The summary is given with respect to the general objective of the study. The findings for each of the three objectives are also presented giving an elaborate conclusion on the structure of Dholuo nominals, number in nouns and morphophonological alternations in Dholuo nominal structure. This section also presents recommendations and suggestions for future studies.

## 7.2 Summary

The general objective of this study was to describe the morphophonology of Dholuo nominal structures using Optimality Theory. Data for analysis was collected through the targeted elicitation approach using various test frames administered to a study sample of 30 respondents chosen through a systematic random sampling technique from the accessible population of the 31,573 native speakers of Dholuo in Bondo Town. This study being a qualitative survey study, the data collected was analysed through interpretive and descriptive process using the Optimality Theory (OT) framework.

This study was premised on the view that Dholuo is one of the languages with a highly productive overt nominal marking system, particularly in plural formation. However, previous studies disagreed extensively on how exactly number in Dholuo nouns is expressed. Attempts by these previous studies proposing the use of voice polarity (Alderete, 2001; Stonham, 1994; Trommer, 2006; Tucker, 1994 & Wolf, 2005); switch alpha rule (Bye, 2006; de'Lacy, 2010 & Ong'ayo, 2016); the use of articulators (Ong'ayo, 2016) or prosodic features (Bye, 2006; de'Lacy, 2010 & Trommer, 2008) in explaining number in Dholuo have all been challenged. The current study has argued that these previous studies have not exhaustively explained why feature polarity (voice, manner or prosodic) occurs in other nominals such as the genitives, personal pronouns, demonstratives, interrogatives, adjectives and numerals.

Moreover, the current study was of the view that the previous works have not exhaustively accounted for the morphemes **–e**, **-i** and **–ni** occurring at the end of Dholuo plural forms and which seems to hold the key to unlocking number in Dholuo nouns. Consequently, this study has attempted to provide an alternative way of describing plurals in Dholuo by looking at the whole spectrum of Dholuo nominal morphology - nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives. The study was set to answer the following research questions: (i) what is the structure of Dholuo nominals? (ii) How is number realised in Dholuo nouns? (iii) What morphophonological alternations occur in Dholuo nominal structure?

In an attempt to answer these research questions, this study was of the view that any model of morphology must make provisions for deviations from the principle that language description follows a straightforward pattern. The approach taken here, therefore, deviated from the voice polarity phenomenon employed by earlier studies in describing number formation in Dholuo nouns because the approach runs into empirical problem, particularly with Dholuo data. Consequently, this study looked at the whole spectrum of Dholuo nominal morphology (nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives) as a basis for not only providing a complete exhaustive description of plural formation in Dholuo nouns but also as an alternative way of further determining pluralization in Dholuo nouns which has been an elusive research problem.

The first objective of the study was to describe the structure of Dholuo nominals. The researcher was persuaded that because voice polarity feature was evident in other Dholuo inflectional processes other than pluralisation, a description of the whole spectrum of the nominal structure would give a better insight into determining plural formation in Dholuo nouns which the previous studies failed to exhaustively offer. In that endevour, the study borrowed the view proposed by Chierchia (1998) on nominal mappings parameter. However, the researcher has argued that Dholuo nominals do not fit neatly onto these mappings and therefore only take part of the proposed parameters. First, the study has demonstrated that Dholuo leans heavily onto the argumental **[+arg, -pred]** language

typology proposed by Chierchia (1998) but with certain structural variations. For example, nominals have been treated in this study as the syntactic category that includes all the constituents of NP such as nouns, noun modifiers and pronouns. Consequently, this study has identified and described the structure of nouns, adjectives, numerals, personal pronouns, determiners and the composite. The findings demonstrate that Dholuo nominals submit to a productive overt nominal marking.

The study's findings on the structure of nouns reveal that nouns in Dholuo occupy both the argument and predicative positions in an NP without neatly falling onto the typological description offered by Chierchia (1998). Nouns can exist as a bare root (without any suffixes) for example, **guɔk** (dog). Also, nouns can exist as inflected forms with suffixes, for example **guɔg-ʧa** (that dog), **guɔg-ŋa** (whose dog). The study has demonstrated that nouns in Dholuo admit plural, genitive, demonstrative, and interrogative suffixes in the inflected form. The study has also demonstrated that the final consonants in a noun root undergo morphophonological alternations in the inflected forms in a process defined in this study as consonant hardening or weakening (e.g., **k→g**; in **guɔk→guɔg-ʧa**; **guɔk→guɔg-ŋa)**. The study findings have also demonstrated that there is freedom of occurrence of consonants and vowels at the initial, medial and final positions in a noun root. For instance, nouns begin and end with both consonants (obstruents, nasals, approximants) and vowels but with certain phonological restrictions incongruent in the coda and onset. For example, the following phonemes [**b**, **f, g, ð, ndʒ, nd, mb, ŋg, nð, j**] occur elsewhere in a noun root but not at the root final position.

The study has also described the structure of adjectives. The researcher has demonstrated that adjectives are poly-morphemic. The adjectival modifier takes an attributive prefix [**ma-]** which semantically refers to 'that is'. The attributive prefix **ma-** isolates and uniquely qualifies words used with adjectival sense. The attributive prefix **ma-** is not marked for number but the adjective which it pre-modifies and the noun which both the prefix and the adjective jointly post-modify are marked for number. The structure of adjectives has been established to bear a lot of similarities with that of nouns. For example, the following phonemes [**b**, **f, g, ð, ndʒ, nd, mb, ŋg, nð, j**] occur elsewhere in

an adjective stem but not at the adjective stem final position. Adjectives also admit suffixes. However, there is a slight difference to that of nouns in admitting suffixes. For instance, adjectives do not always exhibit overt plural marking except only in a few instances. In addition, when adjectives admit a pronoun suffix, the pronoun must first acquire a genitive particle [**-ne**] meaning "for" which has clitic-like characteristics attaching to the pronominal host and together the two form a pronominal clitic both of which are phonologically interdependent but syntactically autonomous. The pronominal clitic attaches post-nominally to the adjective to form AdjP, for instance **mit=n=wa** "sweet for us", **mit=n=u** "sweet for you". For that reason, the final sounds in the adjective root do not exhibit morphophonological alternation characteristic of Dholuo nominal morphology.

Further, this study has looked at the structure of Dholuo personal pronouns. Personal pronouns have been treated as a distinctive nominal category but with a continuum of semantic reference to other forms of pronouns which, for purposes of distinction, have been referred to as 'proforms'. Dholuo personal pronouns display certain restricted morpho-phonemic and morpho-syntactic properties such as case, person and number just like in many other languages of the world (Cormier, 2011; Lee & Bautin, 1992). Case marking (nominative, accusative, genitive) has been demonstrated to be based on the syntactic function of the NP and is imposed by the structural configuration within which that NP occurs. It has also been demonstrated in this study that personal pronouns freely begin with either a consonant or a vowel but they strictly display a closed syllabic system of (C)VC. Finally, personal pronouns have been demonstrated to co-occur with numerals and are determinate in form as far as case and number concord is concerned.

In addition, this study has analysed the structure of determiners which have been demonstrated to be largely poly-morphemic with a marginal section being mono-morphemic. Determiners in Dholuo are generally grouped into three classes: demonstratives, possessive pronouns, and interrogatives. The demonstrative suffix is marked for number and also for proximity to the referent. The interrogatives, on the other

hand, are basically mono-morphemic. The choice of the interrogative is dependent on gender and number so that there are animate and inanimate, human and non-human, singular and plural distinctions.

Also, this study has looked at how possession is marked in Dholuo nominal morphology. Possession in Dholuo nominals is both overtly and covertly marked. The overt nominal possession marking is the most productive. It is expressed by an inflectional suffix which shows possession, person, and number simultaneously. Further, possession is expressed using "of possessive" nominals. We have demonstrated that apart from the suffixation of the morpheme that marks possession, the final phoneme of the noun root changes in various ways depending on the final consonant of the noun root akin to the process in plural formation in nouns. This morphophonological behaviour of the final phoneme is identical in almost all nominal particles in inflections. This is the reason why this study disputes the 'voice polarity' hypothesis in explaining plural formation in Dholuo nouns.

The second question this study was concerned with was: how is number realized in Dholuo nouns? The study traced the previous arguments in number formation in Dholuo nouns and demonstrated the problem of feature alternation extensively employed by previous studies. There have been marginal concessions by previous studies, albeit with observable contradictions, that Dholuo nouns express plurality through feature alternation. This "feature alternation" phenomenon has been disputed by this study because it is not only problematic but also has observable inconsistencies. Furthermore, the researcher was persuaded that the previous studies have offered incomplete account of the morphemes **-e, -i, -ni** overtly occurring word-finally in Dholuo plural forms.

The findings of this study demonstrate that if voice polarity were to be used, then it would only cater for a marginal section in plural formation in Dholuo leaving a lot of gaps unexplained. For instance, the unvoiced velar **[k]** in **osiki** would be expected to alternate with the voiced counterpart **[g]** in the plural to yield the ungrammatical **osige*** as seen with **guɔk→guɔgi.** The same procedure would also be advanced in the case of

**ndi:ga** so that the expected plural be ***ndi:k-e/ ndi:k-i** or **ndi:k-ni*.** Even still, voice polarity fails to explain the **-ni** morpheme in **ndi:g-ni,** the **-i** in **guɔgi,** and the **-e** in **ʧok→ʧok-e** neither does it explain what happens to the vowels **[a, i]** in the above V-final noun roots. This study has clearly demonstrated that the voice polarity rule only applies to a marginal section of Dholuo nouns and therefore should not be the general descriptive rule for number formation in Dholuo nouns. In particular, the voice polarity does not explain the behaviour of the alveolar lateral **[l]**, the alveolar trill **[r],** the labial glide **[w]** and the palatal glide **[j]** in the forms **liel→liet-e; bur→buʧ-e, ŋgaw→ŋgep-e** and **ɲojo→ɲoʧ-e**

This study therefore applied a different, alternative way of describing plural formation in Dholuo by looking at the whole spectrum of Dholuo nominal morphology comprising all the particles: nouns, adjectives, personal pronouns, genitives, interrogatives and demonstratives. The findings of the study have clearly demonstrated that plural formation in Dholuo is regular and that there is a basic plural marker **-e** which has three allomorphic variations **–e, -i, -ni**. This study also argued that the three allomorphic variations [**–e, -i, -ni**] are defined in specific morphophonological environments. The [**-ni**] allomorph has been established to occur predominantly with V-final noun roots and whose penultimate vowel is a long vowel. The [**-i**] allomorph on the other hand occurs with noun roots which have a diphthong in the preceding syllable. The final [**-e**] allomorph occurs elsewhere in the environments not covered by the other two. Generally, noun roots in this category end in obstruents, nasals, approximants and some vowels. These noun roots have a short vowel or a sequence of vowels in the preceding syllable.

The alternation of the voice feature in noun root final position has been established to be a general feature of all nominal particles in all inflectional processes. In its place, the study has proposed articulatory harmony to define the morphophonological alternations in the root-final syllable. The study has demonstrated that consonant harmony requires alteration or retention of articulatory parameters so that the behaviour of obstruent, nasal, approximant final nouns is uniquely defined in each case. The study has proposed the adoption of hardening or weakening of the noun root final phoneme in place of voice

polarity. That is, if the noun root final consonant is weak it hardens word internally but remains weak word finally or when the noun root final sound is hard, it weakens word internally but remains hard word finally. The morphophonological behaviour of vowels (both in the suffix and in the root) has been defined by vowel place harmony restrictions which demands that vowel place features in the suffix must be identical to, and harmonious with, the vowel place features in the noun root.

The third and final objective of this study was to explain the morphophonological alternations in Dholuo nominals. This study thus attempted to answer the question: what morphophonological alternations occur in Dholuo nominals? The study's findings have accurately demonstrated that Dholuo nominals have certain morphophonotactic restrictions in the way phonemes can be arranged in a word. Nominals have been demonstrated in this study to have single consonants before and after a vowel and that they are both consonant and vowel final on top of the fact that they submit to both open and closed syllabic system. In addition, words may begin with either consonants or vowels; however, it is the final phonemes in nominals that dictate the observable morphophonological alternations. The findings have also revealed that vowels in Dholuo nominals occur both word-initially and word-finally as well as syllable initially and finally submitting to Hyman's (1976) view that word boundaries coincide with syllable boundaries in most languages.

The study findings have demonstrated that phonological processes in Dholuo are either whole segment process (e.g., deletion, insertion) or modification type processes (e.g., assimilation and vowel harmony). In addition, the phonological processes in Dholuo nominals are not only by-directional and regressive but also reciprocal. The suffixes are themselves the triggers as well as target in a number of inflectional processes.

The study has argued that the dominant assimilation process that takes place in Dholuo nominals is consonant weakening and consonant hardening. Consonant weakening or hardening in Dholuo nominals occur at the level of a prosodic word, particularly at the

edges of the word. Therefore, nominal root final consonants surface as weakened or hardened segments in all inflectional process.

The study findings are in concurrence with Lass and Anderson (1975) and Trask (2000) view that consonant weakening/hardening follow a certain "trajectory" i.e., they follow a certain route as they lenite as described in Fig. 1, Section 6.4. This is described by relating between the manner of articulation and laryngeal specifications which defines the relative strength of consonants with respect to their major-class features. Therefore, consonants assume different strengths by their very nature, through the position they occupy in a word or through a dynamic spontaneous change process.

The study has also demonstrated that the assimilated segments try to maintain places of articulation (labial, dental, alveolar, palatal, glottal) to make articulation of the assimilated sounds easy and effortless (see Fig 2). For instance, the study has demonstrated that the voiceless bilabial stop [**p**] lenites to the voiced bilabial stop [**b**] or bilabial approximant [**w**] while the bilabial approximant [**w**] fortifies to the voiceless bilabial stop [**p**]. As such, labial sounds will only be weakened or hardened to fellow labial sounds, but with altered laryngeal specifications, dental sounds only to fellow dental sounds, alveolar to alveolar, velar to velar, palatal to palatal.

The study findings have similarly concurred with Trask (2000) ideology of ranking consonants in a 'phonological scale' where for instance obstruents are inherently strong or weak. For that reason, voiceless stops [**p**, **t**, **k**] in Dholuo are by their very nature strong irrespective of whether they occur at the final position in Dholuo nominal roots. All obstruent final roots in Dholuo nominals are expected to follow the trajectory in lenition illustrated in Figure 3. Voiceless fricatives which are inherently strong weaken word medially but remain strong word finally as opposed to voiced fricatives which are comparatively weak and which will harden word medially and remain weak word finally as illustrated in Figure 5.

The four nasals [**m**, **n, ɲ** and **ŋ]** in Dholuo have been established by this study as weak by their very inherent nature. Consequently, noun root final nasals in Dholuo nominals harden when they occur word medially in the inflected form to the following nasal-consonants: labial [**mb]**, alveolar [**nd]**, palatal [**ɲdʒ]** and velar [**ŋg]** but remain weak at word final positions. However, the study has established that the nasal-consonants [**mb**, **nd**, **nð**, **ɲdʒ**, **ŋg]** do not occur word finally in the uninflected (root) words as illustrated in Figure 6.

The study also revealed that the following Dholuo approximants: alveolar lateral **[l]**, alveolar trill, **[r]** palatal glide **[j]** and labial glide **[w]** which are by their very nature weak are expected to fortify in assimilation when they occur in word medial positions. Due to their vocoid nature, the study has demonstrated that the approximants fortify to more consonant-like segments. In Dholuo nominals, the approximant-final roots follow the trajectory in Figure 7. This notwithstanding, all the approximants [**l, r, j, w**] will remain weak when they occur word finally as illustrated by the data in Table 119.

Other than consonant hardening and weakening, the study also described vowel harmony as a form of assimilation which involves coherence of features between vowels at a distance. The phonetic features of backness [**+/–Back**], height [**+/–High**], rounding [**+/–Round**] and tongue root [**+/–ATR**] have been established to define vowel place harmony in Dholuo inflectional processes.

The study has established that vowel length is not adequately attested in Dholuo data. However, some scholars (Ngala, 1991; Odhiambo, 1981 & Okombo, 1982) have argued that Dholuo vowels are viewed to be phonemically short and are lengthened when they precede one or no vowel at all in utterance-final position. This study has described vowel length to define plural formation in Dholuo nouns where long vowels precede final segments in the **-ni** plural allomorphs while short vowels or vowel sequences precede final segments in **-e** plural allomorphs

Based on the rounding feature, this study has established two harmonic sets [**+Round**] and [**-Round**]. Rounding harmony has been demonstrated to be more pronounced where vowel sequences occur in Dholuo nominals. As said earlier, such sequences are limited by Dholuo phonotactics but when allowed, vowel sequences are restricted to diphthongs in which the first vowel (V1) in the sequence and the second vowel (V2) must harmonise in terms of the rounding feature. The study has also established that there are also instances of rounding harmony in suffixation where the vowels in the root and those in the suffix all harmonise for the rounding feature. The only instance where this rounding harmony is slightly interrupted is when V1 or V2 is either the *neutral* open central [**a**] or mid front [**e**] which have been established to be transparent and therefore intervene between the trigger and the target vowel. It has been demonstrated, for instance, that even when the vowels bear the opposite value for the harmonizing feature the vowels disobey the expected rounding harmony in Dholuo nominals where the [**+Round**] root vowels harmonise with the suffix vowel [**a**] or [**e**] which are [**-Round**].

The study has also established that vowels in Dholuo nominals harmonize for backness feature. The [**+/-Back**] harmonic feature is strictly observed especially with vowel sequences and diphthongs. Here, V1 and V2 have to harmonise for backness. Therefore, if V1 is [**+Back**], V2 has to be [**+Back**]; and if V1 is [**-Back**], V2 similarly has to be [**-Back**]. This, therefore, means that certain vowel sequences (in a diphthong/vowel sequences) in which [**Back**] feature is not observed are banned in Dholuo nominals. Consequently, a constraint, **AGREE(BK)** describing vowel harmony for words with vowel sequences states that vowel sequences in a diphthong have to agree on the feature [**Back**]. This study has established that [**Back**] harmony in Dholuo nominal inflection is strictly enforced and where one of the target root vowels does not obey this harmonic patterning, the suffix vowel triggers enforcement like it is seen with the word **sa**n “plate” where the root vowel is [**+Back**] and which is forced to alter to [**-Back**] in the suffixed form, **se**nd-**e** “plates”**.** Further it has been demonstrated that where backness harmonic patterning cannot be achieved because either one or all of the vowels in the root and the suffix vowels are disharmonic, the opacity is salvaged by either the transparent [**+Back**],

[**a**] where [**-Back**] harmony is expected; or by another neutral vowel, [**e**] [**-Back**] where [**+Back**] harmony is expected.

The final vowel harmony feature described by this study is ATR harmony. However, the ATR is not adequately attested in Dholuo data and for that reason, Height↔ATR harmony interactions in Dholuo nominal morphology have been exhaustively discussed in this study for other linguistic reasons as well. There are compatible acoustic gestures that link these two harmonic features. For instance, raising of the tongue body, which is required for [**+High**] vowels, and advancing of the tongue root, which is required for [**+ATR**] vowels, are compatible on one hand; the lowering of the tongue body which is required for [**-High**] vowels and retracting of the tongue root which is required for [**-ATR**] vowels are also compatible on another hand.

This study however leaned heavily on Clements (1990, 1991) 'aperture' theory of vowel height. In this theory, the harmonic classes are distinguished based on their value for the feature **[Open]**, used to implement height distinctions giving us **[+Open]**, **[-Open]** and **[+/-Open].** In inflectional processes in Dholuo nominals, vowel height harmony is triggered by the vowel in the suffixes with the root vowels being the target. Its harmonic effect has therefore been described with reference to the mentioned vowel place **[Open]**. With the plural formation in Dholuo nouns for example, this study has demonstrated that the suffix vowel [**i**] has little effect on root vowels taking the plural allomorph **-ni** in which vowel harmony is already achieved by virtue of identical vowel place.

However, when the suffix vowel and root vowels do not share vowel place, the suffix vowel [**i**] must trigger harmonic patterning with the root vowels being the target. If the root vowel does not cohere with suffix vowel, then vowel harmony will be obligated. For example in plural formation of **paka→pek-ni,** the open central vowel **[a]** has to agree with the close front vowel [**i**] in the suffix in terms of vowel place. The vowel [**a**] is **[+Open];** while [**i**] is **[-Open].** Consequently, there is disharmony between the root vowels and the suffix vowels in terms of vowel place hindering a smooth articulatory

procedure. As a result, the central vowel **[a]** is then raised and fronted to a transparent mid **[-Back]**, **[+/-Open]** vowel **[e]** to yield **pek-ni**. This is what happens in the rest of nominal roots whose vowels do not cohere with the vowel in the suffix.

Consequently, this study has established that markedness constraint regarding vowel-place features is therefore an obligatory condition to be met in all inflectional processes in Dholuo nominals. The constraint **ArtHam(v-v)** requires that vowel features in the output must be harmonious with the vowel segment features in the input in terms of articulatory parameters defining vowel place (backness, rounding, height, ATR). In addition, the constraints, **ArtHam(_v#$_{[Del]}$)** requires the final vowels in V-final roots be deleted in the output when admitting a suffix. This is because Dholuo nominals are underlyingly consonant final. The vowel in the V-final roots is treated as invisible in suffixation and is therefore deleted because it interrupts articulatory harmony as demanded by the constraint, **ArtHam(_v#$_{[Del]}$)**. In addition, Dholuo nominal morphology strictly admits single consonants before and after a vowel. If two (or more consonants) have to occur sequentially, the study has established that there has to be vowel insertion to break that sequence. Dholuo nouns, therefore strictly submit to **PARSE$_{(vow)}$** constraint which enforce vowel intersperse between consonant clusters to yield, for instance, [**sikat**] from the English loan word [**skɜ:t**].

This study; further, established that the final phoneme of the root word dictates the various alternations that the nominal constituent undergoes. For this reason, **NO(+Vc)CODA** constraint in Dholuo nominals (described in Section 4.2.1) bars obstruents from being realized with **+VOICE** feature in the final phoneme of the root word. As such, the researcher argues that [**VOICE]** feature plays a crucial, but not exclusively dominant, role in the description of formation of plurals or possession in Dholuo nominals. Voicing is one of the products expected in all assimilation processes where change in manner and change in laryngeal state are invaluable articulatory processes. Voicing is therefore treated in this study as an aspect of assimilation just like aspiration, affrication, sonorization, vocoidization.

## 7.3 Conclusion

The general objective of this study was to describe the morphophonology of Dholuo nominal structures using Optimality Theory (OT) framework. The study was premised on the view that Dholuo is one of the languages with a highly productive overt nominal marking system, particularly in plural formation but previous studies not only disagreed extensively on how exactly number in Dholuo nouns is expressed but also proposed the problematic feature polarity phenomenon which inadequately and inexhaustively explains plural formation in Dholuo.

This study has argued that feature polarity rule in Dholuo plural formation runs into empirical problem. The analysis put forward establishes that the rule only applies to a marginal section of Dholuo nouns and therefore should not be the general descriptive rule for number in Dholuo nouns. We have argued that [**VOICE]** feature plays a crucial, but not exclusively dominant, role in the description of formation of plurals or possession in Dholuo nominals. It is therefore treated in this study as an aspect of assimilation just like aspiration, affrication, sonorization, vocoidization.

From the analysis in this study, we have demonstrated that plural formation is not an emphasis on voicing polarity but instead is defined by articulatory harmony which is the highest ranked constraint defining number in Dholuo nouns, and which provides elaborate and alternative explanation of number in Dholuo to the voice polarity phenomenon. Voice as a feature, we have established from our analysis, is not a preserve of pluralization in Dholuo nouns. The alternation in the voice feature of the final phoneme of the root word occurs in pluralization, genitive forms, possessive pronouns and other inflected forms such as adjectival construction. Voice is therefore one of the many constraints defining number in Dholuo nouns.

Consequently, this study has argued that phonotactic restrictions in Dholuo nominals play a crucial part in yielding the structure in the plural form. In particular, articulatory harmony defines the alternation in the root-final syllable. We argued that consonant

harmony requires alteration or retention of articulatory parameters so that the behaviour of obstruent, nasal, approximant final nouns is uniquely defined in each case. Furthermore, vowel harmony (backness, rounding, height, ATR) is responsible for the morpho-phonological variations in the vowels in the root word in relation to the vowel in the affix.

We have also argued that Dholuo nominals submit to articulatory harmony in all inflectional processes. In conformance with articulatory coherence, there is assimilation of vowel place as well as consonant hardening or weakening. Therefore, this study proposed the adoption of hardening/weakening of the noun root final phoneme in place of voice polarity. That is, if the noun root final consonant is weak it hardens word internally but remains weak word finally or when the noun root final consonant is hard, it weakens word internally but remains hard word finally. With regard to vowel place harmony, Dholuo phonotactics demand that the vowel place features in the suffix must be identical to, and harmonious with, the vowel place features in the root word. Further, this coherence is enforced by deletion of segments which are disharmonious in articulatory process and insertion of vowel intersperse in consonant sequences to aid in smooth articulatory procedure.

Finally, this study concludes that plural formation in Dholuo is regular and that Dholuo has a basic plural marker **-e** which has three allomorphic variations **–e, -i, -ni** occurring in specific morphophonologically defined environments. The [**-ni**] allomorph occurs predominantly with V-final noun roots and whose penultimate syllable is preceded by a long vowel. The [**-i**] allomorph on the other hand occurs with noun roots which have a diphthong in the preceding syllable. The final [**-e**] allomorph occurs elsewhere in the environments not covered by the other two. Generally, noun roots in this category end in obstruents, nasals, approximants and some vowels. Specifically, these noun roots have a short vowel or a sequence of vowels in the preceding syllable.

### 7.4 Recommendations

This study recommends that future studies on number in Dholuo nouns should dig deep onto the morphophonology of derived nouns in Dholuo. Alongside this, number in Dholuo loanwords remains an area worth further study. This study did not lay emphasis on grammatical aspects such person, case and gender that may be overtly marked on Dholuo nominals. These were, however, explained alongside the morphophonological description of Dholuo nominals and the grammatical number that was the objective of this study. Future research effort should strive to give prominence to these.

Similarly, a morphosyntactic analysis of Dholuo nominals is another interesting area for future studies. In particular, such a study should give a distinctive description of the inter-play of derivational and inflectional processes in Dholuo morphophonemics. The structure of paradigms in a given language is determined by the inventory of morphosyntactic properties available in that language (Spencer, Andrew & Zwicky, 2007). In that connection, a study that adopts a morphosyntactic approach would greatly supplement the findings of this study.

Furthermore, this study has demonstrated that plural formation in Dholuo nouns is a highly productive inflectional process in Dholuo nominals. Further research effort needs to explore phonological processes in other Dholuo grammatical categories such as the verb. This study has established that nominal categories behave in identical ways, especially with regard to inflection of the root word final phonemes. This is the reason why the study disputes the feature polarity phenomenon in explaining number in Dholuo nouns. A study of phonological processes in verbs and verb forms might yield a very interesting result in comparison to the case in nominal morphology.

During data analysis, we noticed that vowel harmony in Dholuo is an area worth further exploration. According to Casali (2016) many African languages, especially in the Niger-Congo and Nilo-Saharan have a productive ATR harmony contrasts. However, our analysis did not explore deeply these vowel harmony contrasts, especially in ATR where harmonic contrasts were hard to find. Therefore, future studies need also to explore

further the argument by some scholars (Ngala, 1991; Odhiambo, 1981 & Okombo, 1982) who argue that the occurrence of the long vowels is simply an evidence of vowel lengthening but not the fact that there exists both long and short vowels in Dholuo nominals.

The current study argued that hardening/weakening in consonants is one of the major assimilation processes which explain number in Dholuo nouns. It also argued that voicing is an aspect of hardening/weakening. In addition, voice feature was not given prominence in describing number in Dholuo nouns as it happened with previous studies. Further research efforts, therefore, need to explore to what extent other aspects of assimilation such as affrication, sonorization, aspiration, approximantisation, debuccalisation manifest in Dholuo nominals.

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# APPENDICES

## Appendix A: Sample Test Frame

### Introduction

I am a postgraduate student at Jaramogi Oginga Odinga University of Science and Technology conducting a research on **A Morphophonemic Analysis of Dholuo Nominals** in Bondo Town, Siaya County. The term ***nominal*** refers to a category used to group together nouns and its modifiers. You have been chosen to help get data for this study. In confidence, kindly feel free to fill in the spaces provided according to the instruction in each section.

### SECTION A: PLURAL FORMATION IN DHOLUO

**Supply a <u>plural form</u> for each of the following words in Dholuo. The first two have been done for you. The meaning in English has been given in the first column. Follow the example given to fill in the rest.**

| | Meaning in English | Singular Form of the Noun | Plural Form of the Noun | | Meaning in English | Singular Form of the Noun | Plural Form of the Noun |
|---|---|---|---|---|---|---|---|
| **p** | field | **pap** | **pewe** | **m** | grass | **lum** | |
| | tongue | **lep** | **lebe** | | gorilla | **bim** | |
| | diarrhoea | **diep** | | | chair | **kɔm** | |
| | soup | **sup** | | | owl | **arum** | |
| | company | **kɔp** | | | pen | **kalam** | |
| **b** | | | | **n** | potato | **rabuon** | |
| **t** | bell | **okot** | | | soap | **sabun** | |
| | firefly | **otit** | | | ugali | **kuon** | |
| | hill | **gɔt** | | | stupidity | **ran** | |
| | house | **ot** | | **ɲ** | heartburn | **leɲ** | |
| | matchbox | **kibrit** | | | abuse | **ajaɲ** | |
| **d** | tortoise | **opuk** | | | great grand-child | **bweɲ** | |
| **k** | vegetable | **dek** | | | liver | **ʧuɲ** | |
| | book | **buk** | | **ŋ** | stone | **ɲatieŋ** | |
| | dog | **guɔk** | | | mongoose | **ɔgwaŋ** | |
| | billy goat | **ɲuɔk** | | | spear | **tɔŋ** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | tortoise | **opuk** | | | crocodile | **ɲaŋ** | |
| **g** | bag | **bag** | | | trousers | **loŋ** | |
| **f** | | | | **mb** | | | |
| **ɵ** | vulture | **atʃuɵ** | | **nd** | marriage | **kɛnd** | |
| | king | **ruɔɵ** | | **ɲdʒ** | teacher | **dʒapuɔɲdʒ** | |
| | club | **luɵ** | | | exam | **peɲdʒ** | |
| | bull | **ruaɵ** | | **ŋg** | economy | **kuŋg** | |
| | medicine | **jaɵ** | | | long stare | **raŋg** | |
| **ð** | | | | | economy | **kuŋg** | |
| **s** | paper | **otas** | | | stoppage | **tʃuŋg** | |
| | fried bread | **mandas** | | | boastfulness | **suŋg** | |
| | scissors | **makas** | | **nð** | | | |
| | plate | **dis** | | **l** | stool | **situl** | |
| | pineapple | **mananas** | | | snake | **ɵʊɔl** | |
| **h** | | | | | bow-legged | **ragwɛl** | |
| **tʃ** | fish | **rétʃ** | | | frog | **ogwal** | |
| | stomach | **itʃ** | | | graveyard | **liel** | |
| | doctor | **laktar** | | **r** | hole | **bur** | |
| | cloud | **bɔr** | | **o** | sheep | **rombo** | |
| | light | **lɛr** | | | githeri | **ɲojo** | |
| | vein | **ler** | | | land | **lowo** | |
| **w** | hippopotamus | **rəw** | | | bone | **tʃogo** | |
| | cloth | **law** | | | heaven | **polo** | |
| | antelope | **ŋgaw** | | **u** | quail | **aluru** | |
| | porcupine | **tʃiew** | | | pot | **agulu** | |
| | | | | | forest | **buŋgu** | |
| **j** | | | | | dust | **buru** | |
| **i** | stone | **kidi** | | | Grand-father | **kwaru** | |
| | sieve | **ratʃu:ŋgi** | | **a** | cat | **paka** | |
| | stump | **osiki** | | | bicycle | **ndiga** | |
| | Grand-mother | **dani** | | | car | **mtoka** | |
| | reed | **modi** | | | picture | **pitʃa** | |
| **e** | lizard | **olele** | | | donkey | **punda** | |
| | aeroplane | **ndege** | | | | | |
| | jerrican | **kube** | | | | | |
| | month | **dwɛ** | | | | | |
| | cup | **okombe** | | | | | |

## SECTION B: POSSESSIVE FORMATION IN DHOLUO

**Supply a corresponding <u>possessive form</u> for each of the following words in Dholuo in the spaces provided in the table. The first two have been done for you. The meaning in English for the first example has been given in each column. Follow the example given to fill in the rest in Dholuo.**

| **Meaning in English** | **Singular Form of the Noun** | **Possession in Nouns** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **1st Person** | **Plural** | **2nd person** | **Plural** | **3rd person** | **Plural Form of the Noun** |
| *field* | *Pap* | *My field* | *Our field* | *Your field* | *Your field* | *His/her field* | *Their field* |
| field | **pap** | **pawa** | **pawwa** | **pawi** | **pawu** | **pawe** | **pawgi** |
| tongue | **lep** | **lewa** | **lewwa** | **lewi** | **lewu** | **lewe** | **lewgi** |
| diarrhoea | **diep** | | | | | | |
| soup | **sup** | | | | | | |
| company | **kɔp** | | | | | | |
| bell | **okot** | | | | | | |
| firefly | **otit** | | | | | | |
| hill | **gɔt** | | | | | | |
| house | **ot** | | | | | | |
| matchbox | **kibrit** | | | | | | |
| tortoise | **opuk** | | | | | | |
| vegetable | **dek** | | | | | | |
| book | **buk** | | | | | | |
| dog | **guɔk** | | | | | | |
| billy goat | **ɲuɔk** | | | | | | |
| tortoise | **opuk** | | | | | | |
| bag | **bag** | | | | | | |
| vulture | **atʃuɵ** | | | | | | |
| king | **ruɔɵ** | | | | | | |
| club | **luɵ** | | | | | | |
| bull | **ruaɵ** | | | | | | |
| medicine | **jaɵ** | | | | | | |
| paper | **otas** | | | | | | |
| fried bread | **mandas** | | | | | | |
| scissors | **makas** | | | | | | |
| plate | **dis** | | | | | | |
| pineapple | **mananas** | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| fish | **rétʃ** | | | | | | |
| stomach | **itʃ** | | | | | | |
| orphan | **kitʃ** | | | | | | |
| intestine | **ɲimbitʃ** | | | | | | |
| cabbage | **kabitʃ** | | | | | | |
| grass | **lum** | | | | | | |
| gorilla | **bim** | | | | | | |
| chair | **kɔm** | | | | | | |
| owl | **arum** | | | | | | |
| pen | **kalam** | | | | | | |
| potato | **rabuon** | | | | | | |
| soap | **sabun** | | | | | | |
| ugali | **kuon** | | | | | | |
| stupidity | **ran** | | | | | | |
| heartburn | **leɲ** | | | | | | |
| abuse | **ajaɲ** | | | | | | |
| great grandchild | **bweɲ** | | | | | | |
| liver | **ʧuɲ** | | | | | | |
| stone | **ɲatieŋ** | | | | | | |
| mongoose | **ɔgwaŋ** | | | | | | |
| spear | **tɔŋ** | | | | | | |
| crocodile | **ɲaŋ** | | | | | | |
| trousers | **loŋ** | | | | | | |
| marriage | **kɛnd** | | | | | | |
| teacher | **ʤapuɔɲdʒ** | | | | | | |
| exam | **peɲdʒ** | | | | | | |
| economy | **kuŋg** | | | | | | |
| long stare | **raŋg** | | | | | | |
| economy | **kuŋg** | | | | | | |
| stoppage | **ʧuŋg** | | | | | | |
| boastfulness | **suŋg** | | | | | | |
| stool | **situl** | | | | | | |
| snake | **ɵuol** | | | | | | |
| bow-legged | **ragwɛl** | | | | | | |
| frog | **ogwal** | | | | | | |
| graveyard | **liel** | | | | | | |
| hole | **bur** | | | | | | |
| doctor | **laktar** | | | | | | |
| cloud | **bɔr** | | | | | | |
| light | **lɛr** | | | | | | |
| vein | **ler** | | | | | | |
| hippo-potamus | **rəw** | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| cloth | **law** | | | | | | |
| antelope | **ŋgaw** | | | | | | |
| porcupine | **ʧiew** | | | | | | |
| stone | **kidi** | | | | | | |
| sieve | **raʧu:ŋgi** | | | | | | |
| stump | **osiki** | | | | | | |
| grand-mother | **dani** | | | | | | |
| reed | **modi** | | | | | | |
| lizard | **olele** | | | | | | |
| aeroplane | **ndege** | | | | | | |
| jerrican | **kube** | | | | | | |
| month | **dwɛ** | | | | | | |
| cup | **okombe** | | | | | | |
| sheep | **rombo** | | | | | | |
| githeri | **ɲojo** | | | | | | |
| land | **lowo** | | | | | | |
| bone | **ʧogo** | | | | | | |
| heaven | **polo** | | | | | | |
| quail | **aluru** | | | | | | |
| pot | **agulu** | | | | | | |
| forest | **buŋgu** | | | | | | |
| dust | **buru** | | | | | | |
| grandfather | **kwaru** | | | | | | |
| cat | **paka** | | | | | | |
| bicycle | **ndiga** | | | | | | |
| car | **mtoka** | | | | | | |
| picture | **piʧa** | | | | | | |
| donkey | **punda** | | | | | | |

**SECTION C: 'OF' POSSESSIVE FORMATION IN DHOLUO**

**Supply an "of possessive" form (a word that shows noun possesses/owns another thing) for each of the following Dholuo words in the table. The first two have been done for you. The meaning in English for the first example has been given in each column. Follow the example given to fill in the rest with another noun/word and an "of possessive" form of your choice in Dholuo. (Do not give the English meaning).**

| Meaning in English | Singular Form of the Noun | Another Word/ Noun | Singular Form of the Noun + another word/Noun (of possessive) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| field | **pap** | **opıra** (football) | **paw opıra** (field of football) |
| tongue | **lep** | **ðiəŋ** (cow) | **lew ðiəŋ** (tongue of cow) |
| diarrhoea | **diep** | | |
| soup | **sup** | | |
| company | **kɔp** | | |
| bell | **okot** | | |
| firefly | **otit** | | |
| hill | **gɔt** | | |
| house | **ot** | | |
| matchbox | **kibrit** | | |
| tortoise | **opuk** | | |
| vegetable | **dek** | | |
| book | **buk** | | |
| dog | **guɔk** | | |
| billy goat | **ɲuɔk** | | |
| bag | **bag** | | |
| vulture | **atʃuɵ** | | |
| king | **ruɔɵ** | | |
| club | **luɵ** | | |
| bull | **ruaɵ** | | |
| medicine | **jaɵ** | | |
| paper | **otas** | | |
| fried bread | **mandas** | | |
| scissors | **makas** | | |
| plate | **dis** | | |
| fish | **rétʃ** | | |
| stomach | **itʃ** | | |
| orphan | **kitʃ** | | |
| intestine | **ɲimbitʃ** | | |
| cabbage | **kabitʃ** | | |
| grass | **lum** | | |
| gorilla | **bim** | | |
| chair | **kɔm** | | |
| owl | **arum** | | |
| pen | **kalam** | | |
| potato | **rabuon** | | |
| soap | **sabun** | | |
| ugali | **kuon** | | |
| stupidity | **ran** | | |
| heartburn | **leŋ** | | |
| abuse | **ajaŋ** | | |
| great grandchild | **bweŋ** | | |
| liver | **ʧuŋ** | | |

| | | | |
|---|---|---|---|
| stone | **ɲatieŋ** | | |
| mongoose | **ɔgwaŋ** | | |
| egg | **tɔŋ** | | |
| crocodile | **ɲaŋ** | | |
| trousers | **loŋ** | | |
| marriage | **kɛnd** | | |
| teacher | **ʤapuɔɲdʒ** | | |
| exam | **peɲdʒ** | | |
| economy | **kuŋg** | | |
| long stare | **raŋg** | | |
| stoppage | **ʧuŋg** | | |
| boastfulness | **suŋg** | | |
| stool | **situl** | | |
| snake | **ɵuol** | | |
| bow-legged | **ragwɛl** | | |
| frog | **ogwal** | | |
| graveyard | **liel** | | |
| hole | **bur** | | |
| doctor | **laktar** | | |
| cloud | **bɔr** | | |
| light | **lɛr** | | |
| vein | **ler** | | |
| hippopotamus | **rəw** | | |
| cloth | **law** | | |
| antelope | **ŋgaw** | | |
| porcupine | **ʧiew** | | |
| stone | **kidi** | | |
| sieve | **raʧu:ŋgi** | | |
| stump | **osiki** | | |
| grandmother | **dani** | | |
| reed | **modi** | | |
| lizard | **olele** | | |
| aeroplane | **ndege** | | |
| jerrican | **kube** | | |
| month | **dwɛ** | | |
| cup | **ɔkombe** | | |
| sheep | **rombo** | | |
| githeri | **ɲojo** | | |
| land | **lowo** | | |
| bone | **ʧogo** | | |
| heaven | **polo** | | |
| quail | **aluru** | | |
| pot | **agulu** | | |
| forest | **buŋgu** | | |

| | | | |
|---|---|---|---|
| dust | **buru** | | |
| grandfather | **kwaru** | | |
| cat | **paka** | | |
| bicycle | **ndiga** | | |
| car | **mitoka** | | |
| picture | **piʧa** | | |
| donkey | **punda** | | |

**SECTION D: ADJECTIVE AS NOUN MODIFIER STRUCTURE IN DHOLUO**

**Supply an <u>adjective</u> form (a word which modifies a noun) for each of the following Dholuo words in the table. The first two have been done for you. The meaning in English has been given in each column. Follow the example given to fill in the rest with an adjective form of your choice in Dholuo (Do not give the meaning in English).**

| **Meaning in English** | **Singular Form of the Noun** | **Singular Form of Noun + Adjective** | **Plural Form of Noun + Adjective** | **Meaning in English** | **Singular Form of the Noun** | **Singular Form of Noun + Adjective** | **Plural Form of Noun + Adjective** |
|---|---|---|---|---|---|---|---|
| field | **pap** | **pap maduɔŋ** (big field) | **pewe madɔŋgo** | Fish | **réʧ** | | |
| tongue | **lep** | **lep maʧiek** (short tongue) | **lep maʧieko** | Stomach | **itʃ** | | |
| diarrhoea | **diep** | | | orphan | **kitʃ** | | |
| soup | **sup** | | | intestine | **ɲimbitʃ** | | |
| company | **kɔp** | | | cabbage | **kabitʃ** | | |
| bell | **okot** | | | bee | **kitʃ** | | |
| firefly | **otit** | | | grass | **lum** | | |
| hill | **gɔt** | | | gorilla | **bim** | | |
| house | **ot** | | | chair | **kɔm** | | |
| matchbox | **kibrit** | | | owl | **arum** | | |
| tortoise | **opuk** | | | pen | **kalam** | | |
| vegetable | **dek** | | | potato | **rabuon** | | |
| book | **buk** | | | soap | **sabun** | | |
| dog | **guɔk** | | | ugali | **kuon** | | |
| billy goat | **ɲuɔk** | | | stupidity | **ran** | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| tortoise | **opuk** | | | heartburn | **leɲ** | | |
| bag | **bag** | | | abuse | **ajaɲ** | | |
| vulture | **atʃuɵ** | | | liver | **tʃuɲ** | | |
| king | **ruɔɵ** | | | stone | **ɲatieŋ** | | |
| club | **luɵ** | | | mongoose | **ɔgwaŋ** | | |
| bull | **ruaɵ** | | | spear | **tɔŋ** | | |
| medicine | **jaɵ** | | | crocodile | **ɲaŋ** | | |
| tree | **jaɵ** | | | trousers | **loŋ** | | |
| paper | **otas** | | | | | | |
| fried bread | **mandas** | | | marriage | **kɛnd** | | |
| scissors | **makas** | | | teacher | **ʤapuɔɲ ʤ** | | |
| plate | **dis** | | | exam | **peɲʤ** | | |
| pineapple | **mananas** | | | economy | **kuŋg** | | |
| bow-legged | **ragwɛl** | | | long stare | **raŋg** | | |
| frog | **ogwal** | | | stoppage | **tʃuŋg** | | |
| graveyard | **liel** | | | Boastful-ness | **suŋg** | | |
| hole | **bur** | | | | | | |
| doctor | **laktar** | | | stool | **situl** | | |
| cloud | **bɔr** | | | snake | **ɵuol** | | |
| light | **lɛr** | | | cup | **okombe** | | |
| vein | **ler** | | | sheep | **rombo** | | |
| hippo-potamus | **rəw** | | | githeri | **ɲojo** | | |
| cloth | **law** | | | land | **lowo** | | |
| antelope | **ŋgaw** | | | bone | **tʃogo** | | |
| porcupine | **tʃiew** | | | heaven | **polo** | | |
| | | | | quail | **aluru** | | |
| | | | | pot | **agulu** | | |
| stone | **kidi** | | | forest | **buŋgu** | | |
| sieve | **ratʃu:ŋgi** | | | dust | **buru** | | |
| stump | **osiki** | | | Grand-father | **kwaru** | | |
| grand-mother | **dani** | | | cat | **paka** | | |
| reed | **modi** | | | bicycle | **ndiga** | | |
| lizard | **olele** | | | car | **mtoka** | | |
| aeroplane | **ndege** | | | picture | **pitʃa** | | |
| jerrican | **kube** | | | donkey | **punda** | | |

**SECTION D: DETERMINER AS NOUN MODIFIER STRUCTURE IN DHOLUO**

**Supply a <u>determiner</u> (a word that specifies a noun) for each of the words in Table. The first two have been done for you. The meaning in English has been given in the first column. The English equivalent has also been given in the first row. Follow the example given to fill in the rest with the appropriate determiner in Dholuo. (Do not give the English equivalent)**

| **Meaning in English** | **Singular Form of the Noun** | **Determiners** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **This** | **That** | **These** | **Those** | **Whose** | **Which** |
| | Field | this field | that field | these fields | those fields | whose filed | which field |
| field | **pap** | pawni | pawcha | pawegi | pawego | pawŋa | pap mane |
| tongue | **lep** | lepni | lepcha | lepgi | lepgo | lewŋa | law mane |
| diarrhoea | **diep** | | | | | | |
| soup | **sup** | | | | | | |
| company | **kɔp** | | | | | | |
| bell | **okot** | | | | | | |
| firefly | **otit** | | | | | | |
| hill | **gɔt** | | | | | | |
| house | **ot** | | | | | | |
| matchbox | **kibrit** | | | | | | |
| tortoise | **opuk** | | | | | | |
| vegetable | **dek** | | | | | | |
| book | **buk** | | | | | | |
| dog | **guɔk** | | | | | | |
| billy goat | **ɲuɔk** | | | | | | |
| tortoise | **opuk** | | | | | | |
| bag | **bag** | | | | | | |
| vulture | **atʃuɵ** | | | | | | |
| king | **ruɔɵ** | | | | | | |
| club | **luɵ** | | | | | | |
| bull | **ruaɵ** | | | | | | |
| medicine | **jaɵ** | | | | | | |
| paper | **otas** | | | | | | |
| baked-bread | **mandas** | | | | | | |
| scissors | **makas** | | | | | | |
| plate | **dis** | | | | | | |
| pineapple | **mananas** | | | | | | |
| fish | **rétʃ** | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| stomach | **itʃ** | | | | | | |
| orphan | **kitʃ** | | | | | | |
| intestine | **ɲimbitʃ** | | | | | | |
| cabbage | **kabitʃ** | | | | | | |
| grass | **lum** | | | | | | |
| gorilla | **bim** | | | | | | |
| chair | **kɔm** | | | | | | |
| owl | **arum** | | | | | | |
| pen | **kalam** | | | | | | |
| potato | **rabuon** | | | | | | |
| soap | **sabun** | | | | | | |
| ugali | **kuon** | | | | | | |
| stupidity | **ran** | | | | | | |
| heartburn | **leɲ** | | | | | | |
| abuse | **ajaɲ** | | | | | | |
| great grand-child | **bweɲ** | | | | | | |
| liver | **ʧuɲ** | | | | | | |
| stone | **ɲatieŋ** | | | | | | |
| mongoose | **ɔgwaŋ** | | | | | | |
| spear | **tɔŋ** | | | | | | |
| crocodile | **ɲaŋ** | | | | | | |
| trousers | **loŋ** | | | | | | |
| marriage | **kɛnd** | | | | | | |
| teacher | **ʤapuɔɲ ʤ** | | | | | | |
| exam | **peɲʤ** | | | | | | |
| economy | **kuŋg** | | | | | | |
| long stare | **raŋg** | | | | | | |
| economy | **kuŋg** | | | | | | |
| stoppage | **ʧuŋg** | | | | | | |
| boast-fulness | **suŋg** | | | | | | |
| stool | **situl** | | | | | | |
| snake | **ɵʊɔl** | | | | | | |
| bow-legged | **ragwɛl** | | | | | | |
| frog | **ogwal** | | | | | | |
| graveyard | **liel** | | | | | | |
| hole | **bur** | | | | | | |
| doctor | **laktar** | | | | | | |
| cloud | **bɔr** | | | | | | |
| light | **lɛr** | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| vein | **ler** | | | | | | |
| hippopotamus | **rəw** | | | | | | |
| cloth | **law** | | | | | | |
| antelope | **ŋgaw** | | | | | | |
| porcupine | **ʧiew** | | | | | | |
| stone | **kidi** | | | | | | |
| sieve | **raʧu:ŋgi** | | | | | | |
| stump | **osiki** | | | | | | |
| granny | **dani** | | | | | | |
| reed | **modi** | | | | | | |
| lizard | **olele** | | | | | | |
| aeroplane | **ndege** | | | | | | |
| jerrican | **kube** | | | | | | |
| month | **dwɛ** | | | | | | |
| cup | **okombe** | | | | | | |
| sheep | **rombo** | | | | | | |
| githeri | **ɲojo** | | | | | | |
| land | **lowo** | | | | | | |
| bone | **ʧogo** | | | | | | |
| heaven | **polo** | | | | | | |
| quail | **aluru** | | | | | | |
| pot | **agulu** | | | | | | |
| forest | **buŋgu** | | | | | | |
| dust | **buru** | | | | | | |
| grand-father | **kwaru** | | | | | | |
| cat | **paka** | | | | | | |
| bicycle | **ndiga** | | | | | | |
| car | **mitoka** | | | | | | |
| picture | **piʧa** | | | | | | |
| donkey | **punda** | | | | | | |

Thank you very much for participating in this study. Any information you have given here will be used strictly for purposes of the study. Your identity or linguistic mistakes will not be revealed. Channel your complaint on anything you feel is offensive to your culture or person to :davidokwayo@gmail.com/0735-706013

**Appendix B: Research Informed Consent Form**

**Title of Study:** A MORPHOPHONEMIC ANALYSIS OF DHOLUO NOMINALS

**Researcher:** DAVID OWINO OKWAYO
**University:** JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
**Department:** EDUCATION, HUMANITIES AND SOCIAL SCIENCES
**Phone:** +254729871639
**Email:** davidokwayo@yahoo.com
**Supervisors:** 1. DR EMILY AYIETA ONDONDO
2. DR ROBERT OCHIENG'

## PURPOSE OF STUDY

The general objective of this study is to describe the morphophonology of Dholuo nominal structures using Optimality Theory (OT). The term ***nominal*** refers to a category used to group together nouns and its modifiers. The study is informed by the belief that previous works on plural formation in Dholuo were problematic and incomplete. The study, therefore, intends to offer an exhaustive alternative way of describing pluralisation in Dholuo nouns by looking at the whole spectrum of nominals in Dholuo: Nouns, Adjectives, Numerals, Personal Pronouns, Possessives, Interrogatives and Demonstratives.

## PROCEDURES

You have been randomly chosen to participate as a respondent to help generate data for this study. In confidence, you will be required to respond to the questions in "Test Frames" the researcher or your teacher will give you. There are instructions in each section and two examples are given to start you off. About 30 students who are native speakers of Dholuo shall participate. Your parent, or guardian, needs to give permission for you to be in this study. Still, you may choose not to participate, or you may withdraw your consent to be in the study, for any reason, without being punished.

## RISKS AND BENEFITS

Research studies are designed to obtain new knowledge. This new information may help other people (students, teachers, researchers and the government) in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in the research study. For instance, you will spend a lot of time answering and responding to the questions in the "Test Frames" which may eat onto your revision and study time.

**CONFIDENTIALITY**

Confidentiality will be maintained in this study. Data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents. Still, care shall be taken not to reveal your identity and individual linguistic errors. Therefore, do not write any identifying information in the Test Frames.

**CONTACT INFORMATION**

If you have questions at any time about this study, or you experience problems as a result of participating in this study, you may contact the researcher whose contact information is provided above. You may also contact the university directly for complaints.

**CONSENT**

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

**Participant's Signature** _____ Date _____

**Parent or Guardian Sign** _____Date _____

**Teacher/Principal Sign** _____Date _____

**Researcher's Signature** _____Date _____

## Appendix C: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **984970**

Date of Issue: **14/August/2019**

**RESEARCH LICENSE**

**This is to Certify that Mr.. DAVID OKWAYO of Jaramogi Oginga Odinga University of Science and Technology, has been licensed to conduct research in on the topic: A Morphophonemic Analysis of Dholuo Nominals for the period ending : 14/August/2020.**

License No: **NACOSTI/P/19/360**

**984970**

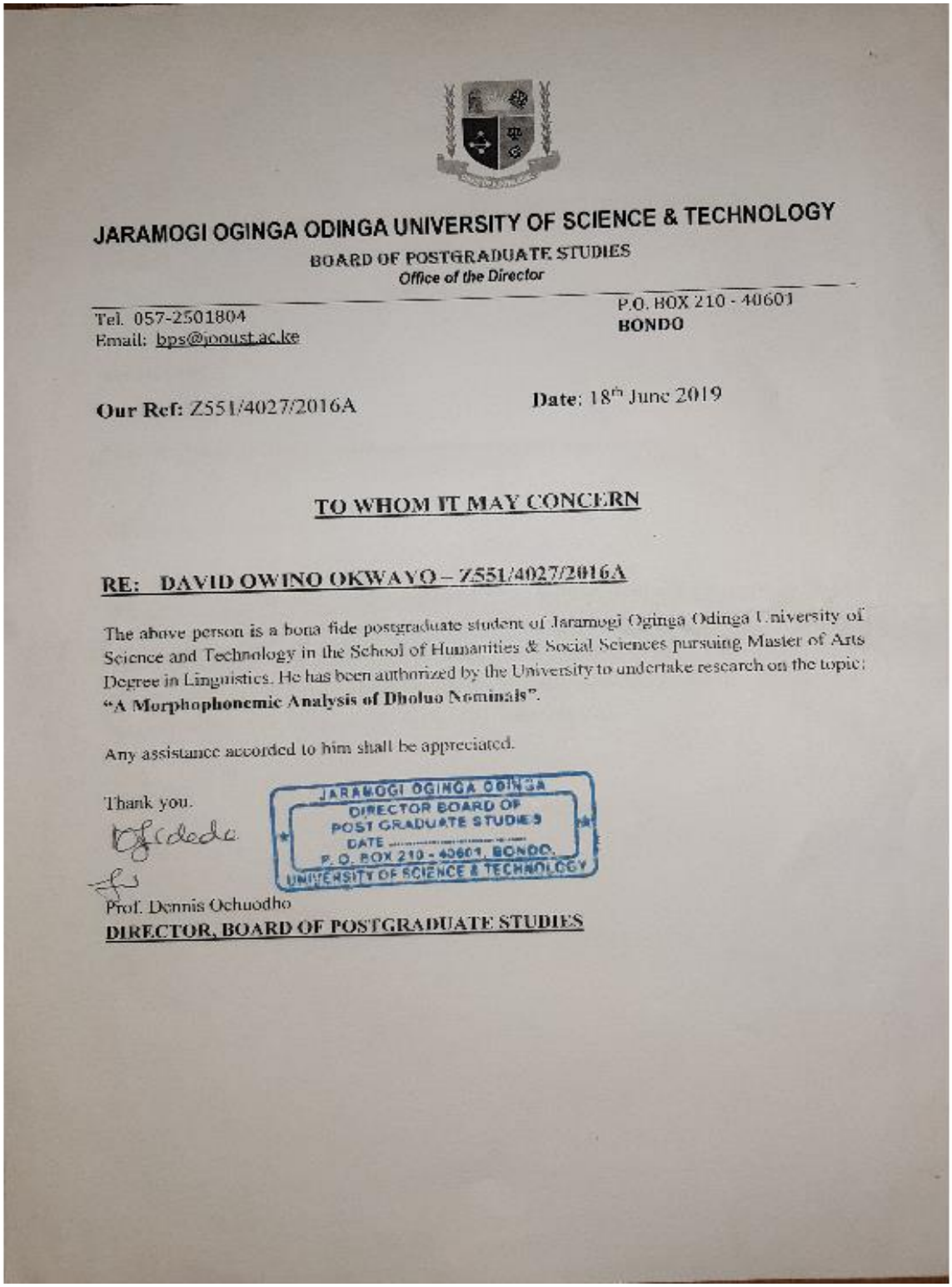
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

**Appendix D: JOOUST Letter Authorizing Research**



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

BOARD OF POSTGRADUATE STUDIES
*Office of the Director*

Tel. 057-2501804
Email: bps@jooust.ac.ke

P.O. BOX 210 - 40601
**BONDO**

**Our Ref:** Z551/4027/2016A

**Date:** 18th June 2019

**TO WHOM IT MAY CONCERN**

**RE: DAVID OWINO OKWAYO – Z551/4027/2016A**

The above person is a bona fide postgraduate student of Jaramogi Oginga Odinga University of Science and Technology in the School of Humanities & Social Sciences pursuing Master of Arts Degree in Linguistics. He has been authorized by the University to undertake research on the topic: **"A Morphophonemic Analysis of Dholuo Nominals".**

Any assistance accorded to him shall be appreciated.

Thank you.

JARAMOGI OGINGA ODINGA
DIRECTOR BOARD OF
POST GRADUATE STUDIES
DATE .....
P. O. BOX 210 - 40601, BONDO.
UNIVERSITY OF SCIENCE & TECHNOLOGY

Prof. Dennis Ochuodho
**DIRECTOR, BOARD OF POSTGRADUATE STUDIES**

**Appendix E1: Bondo Base Map (UNOCHA, 2009)**

**Appendix E2: Siaya County Towns Map (Siaya County Spatial Plan, 2018)**