

https://dspace.org/

IsiZulu adoptives from english and afrikaans: an optimality theory analysis

Khan, Tasmia

2016-07-28

http://hdl.handle.net/10539/20752

Khan, Tasmia (2016) IsiZulu adoptives from English and Afrikaans :an optimality theory analysis, University of the Witwatersrand,Juhannesburg,<http://wiredspace.wits.ac.za/handle/10539/20752>

Downloaded from a DSpace repository. https://dspace.org/

IsiZulu Adoptives from English and Afrikaans:

An Optimality Theory Analysis

by

Tasmia Khan

A thesis submitted to the University of the Witwatersrand in fulfilment of the requirements of the degree of Master of Arts in Linguistics.

Supervisor:

Dr Maxwell Kadenge

11 March 2016

DECLARATION

I hereby declare that this thesis is my original work. It has not been previously submitted, in part or entirety, to any institution of higher learning.

TKhan 11/03/2016

Tasmia Khan Date

ACKNOWLEDGEMENT

I would like to thank my supervisor Dr Maxwell Kadenge for all his help and guidance.

ABSTRACT

The study examines some phonological characteristics of isiZulu adoptives, derived from English and Afrikaans. IsiZulu is a member of the Nguni group of languages, whereas English and Afrikaans are linguistically related, belonging to the Indo-European language group. These languages have different phonological structures and borrow words from each other. This research focuses on the repair strategies employed in isiZulu to adapt and rephonologise English and Afrikaans loanwords. Rephonologisation is a process that alters the structure of a word to conform to the phonological structure of a recipient language. This investigation focuses on the segmental and syllable structure modifications that loanwords undergo in order to make them fit into the preferred phonological structure of isiZulu. Particular repair strategies described and accounted for in this study include, *inter alia*, segment substitution, vowel epenthesis, glide epenthesis, and segment deletion. Certain isiZulu adoptives are completely rephonologised while others only undergo partial adjustment. This indicates the retention, in certain instances, of English and Afrikaans segmental features and syllable structures within isiZulu loanword phonology. This study examines both variants, the fully and the partially rephonologised adoptives. Additionally, with the objective of contributing to phonological typology, the research evaluates and compares its findings to observations made by prior, similar investigations for chiShona (Kadenge, 2012; Kadenge & Mudzingwa 2012) and isiNdebele (Mahlangu, 2007; Skhosana, 2009).

The broader objective of this study is to explore the synchronic phonology of isiZulu, exposing the phonological changes that are taking place in this language due to contact with English and Afrikaans. In addition, a vast corpus of isiZulu loanwords (data) from English and Afrikaans is presented; contributing a foundation for utilisation in future studies.

The overall analysis of the data is couched within Optimality Theory (OT: Prince & Smolensky 2004), which emphasises that surface forms of language reflect the resolution of conflicts between constraints (Kager, 1999). The intra-linguistic variations of loanwords are explained in terms of constraint re-ranking, which is responsible for the phonological shape of loanwords in isiZulu and is addressed herein.

Key Terms: loanwords; adoptives; recipient language; source language; rephonologisation; Optimality Theory; Feature Geometry; constraints; markedness constraints; faithfulness constraints; input; output; candidates.

DEFINITION OF KEY TERMS

Loanwords or Adoptives: Lexical components extracted from one language incorporated into another (Cole, 1990).

Recipient Language: The 'borrowing' language, e.g. isiZulu.

Source Language: The donor language, e.g. English and Afrikaans.

Rephonologisation: A process whereby the structure of a word is altered to conform or correspond to the phonological structure of a recipient language (Kadenge, 2012), hereafter the linguistic component may be considered nativised.

Optimality Theory: A constraint-based theory

Feature Geometry: A feature-based theory

Constraints: Structural requirements that are either satisfied or violated by output candidates (Kager, 1999).

Faithfulness Constraints: Restrictive requisites demanding that an output form 'preserves the properties' of the input form, i.e. there is a degree of similarity required between the output form and its input form (Kager, 1999).

Markedness Constraints: Regulatory requisites stipulating that an output form meets a certain level or standard of structural well formedness or shape (Kager, 1999).

Candidates: Possible surface realisations of the input form.

Input: A lexical element of the donor language prior to any phonological changes, i.e. the original underlying representation (Prince & Smolensky, 1993).

Output: The rephonologised or nativised lexical item or word in the recipient language, considered as surface realisation (Prince & Smolensky, 1993).

LIST OF SYMBOLS

//	Underlying Representation (input). i.e. The English and Afrikaans form.
[]	Surface Realisation (output). i.e. The isiZulu form.
.	Syllable Boundary
→	Rephonologised to

LIST OF ABBREVIATIONS

C	Consonant
V	Vowel
OT	Optimality Theory
FG	Feature Geometry

TABLE OF CONTENTS

DECLARATION ..... **ii**

ACKNOWLEDGEMENT ..... **iii**

ABSTRACT ..... **iv**

DEFINITION OF KEY TERMS ..... **vi**

LIST OF SYMBOLS ..... **viii**

LIST OF ABBREVIATIONS ..... **viii**

LIST OF TABLES ..... **xiii**

LIST OF TABLEAUX ..... **xv**

LIST OF FIGURES ..... **xvii**

CHAPTER 1: INTRODUCTION AND BACKGROUND **1**

1.1 Introduction 1

1.2 Background to the Study 1

1.3 Problem Statement 2

1.4 Objectives of the Study 7

1.5 Justification for the Study 7

1.6 Structure of Thesis 8

1.7 Summary 9

CHAPTER 2: LITERATURE REVIEW **10**

2.1 Introduction 10

2.2 A Review of Descriptive and Theoretical Studies on Loanword Phonology 10

2.3 Summary 21

CHAPTER 3: SOME SOCIOLINGUISTIC AND PHONOLOGICAL ASPECTS OF THE LANGUAGES UNDER INVESTIGATION **22**

3.1 Introduction 22

3.2 IsiZulu 22

3.2.1 Brief Background Details 22

3.2.2 The isiZulu Vocalic System....22
3.2.3 The isiZulu Consonantal System....24
3.2.4 The isiZulu Syllable Structure....30
3.3 South African English (SAfE)....31
3.3.1 Brief Background Details....31
3.3.2 The English Vocalic System....31
3.3.3 The English Consonantal System....34
3.3.4 The English Syllable Structure....37
3.4 Afrikaans....39
3.4.1 Brief Background Details....39
3.4.2 The Afrikaans Vocalic System....39
3.4.3 The Afrikaans Consonantal System....42
3.4.4 The Afrikaans Syllable Structure....45
3.5 Summary....47
CHAPTER 4: DATA GATHERING AND ANALYSIS TECHNIQUES....48
4.1 Introduction....48
4.2 Methodology....48
4.2.1 Data Gathering Techniques....48
4.2.2 Method of Data Verification....49
4.3 Methods of Data Analysis....49
4.3.1 Feature Geometry....49
4.3.2 Optimality Theory (OT)....52
4.4 Summary....55
CHAPTER 5: DATA ANALYSIS AND DISCUSSION....56
5.1 Introduction....56
5.2 Repair Strategies in isiZulu Loanwords from English and Afrikaans....56
5.2.1 Segment Substitution....56

5.2.1.1 Vowel Substitution 57
5.2.1.2 Consonant Substitution 61
5.2.2 Vowel Epenthesis 65
5.2.2.1 Vowel Epenthesis to Open Closed Syllables 66
5.2.2.2 Vowel Epenthesis to Simplify Complex Onsets 68
5.2.3 Glide Epenthesis 70
5.2.4 Deletion 74
5.3 The Constraint Hierarchy of isiZulu Loanword Phonology 76
5.4 Summary 77
CHAPTER 6: ISIZULU, CHISHONA AND ISINDEBELE ADOPTIVES: A COMPARATIVE ANALYSIS 78
6.1 Introduction 78
6.2 Comparing isiZulu and chiShona Loanwords 78
6.2.1 OT Comparative Analysis of isiZulu and chiShona 79
6.2.1.1 The Simplification of a Complex Onset in isiZulu and chiShona 80
6.2.1.2 The Elimination of a Syllable Coda in isiZulu and chiShona 82
6.2.1.3 The Simplification of Diphthongs in isiZulu and chiShona 86
6.2.1.4 Segmental substitutions: [r] substitution and the realisation of NCs 90
6.2.1.5 A Summary of the Similarities and Differences between isiZulu and chiShona 95
6.2.1.6 Conclusions from the Comparative Analysis of isiZulu and chiShona 96
6.3 IsiZulu Compared with isiNdebele 97
6.3.1 OT Comparative Analysis of isiZulu and isiNdebele 98
6.3.1.1 The Simplification of a Complex Onset and Syllable Coda in isiZulu and isiNdebele 98
6.3.1.2 The Simplification of Diphthongs in isiZulu and isiNdebele 100
6.3.1.3 Segmental Substitution in isiZulu and isiNdebele 103

6.3.1.4 A Summary of the Similarities and Differences between isiZulu and isiNdebele 105

6.3.1.5 Conclusions Drawn from the Comparative Analysis of isiZulu and isiNdebele.... 105

6.4 Summary 106

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS 108

7.1 Chapter Introduction 108

7.2 Summary, Conclusions and Recommendations 108

REFERENCE LIST 111

APPENDICES 119

APPENDIX 1: LIST OF ADOPTED WORDS FROM ENGLISH 119

APPENDIX 2: LIST OF ADOPTED WORDS FROM AFRIKAANS 127

APPENDIX 3: ISIZULU TOLERABLE SOUNDS AND [CC] STRUCTURES IN ADOPTIVES FROM ENGLISH AND AFRIKAANS 129

APPENDIX 4: ZONAL CLASSIFICATION OF THE BANTU LANGUAGES 130

LIST OF TABLES

Table 1: Features of the isiZulu Vowel System 24

Table 2: IsiZulu Consonant System 29

Table 3: IsiZulu Clicks 29

Table 4: English Monophthongs 33

Table 5: English Diphthongs 33

Table 6: English Triphthongs 34

Table 7: English Consonant System 37

Table 8: Examples of the Substitution of English Vowels with isiZulu Vowels 38

Table 9: Examples of the Substitution of English Consonants with isiZulu Consonants 39

Table 10: Afrikaans Monophthongs 41

Table 11: Afrikaans Diphthongs 41

Table 12: Afrikaans Consonantal System 45

Table 13: Examples of the Substitution of Afrikaans Vowels with isiZulu Vowels 46

Table 14: Examples of the Substitution of Afrikaans Consonants with isiZulu Consonants 46

Table 15: The Substitution of English Vowels with isiZulu Vowels 57

Table 16: Examples of Vowel Substitution in isiZulu Loanwords from English 58

Table 17: The Substitution of Afrikaans Vowels with isiZulu Vowels 59

Table 18: Examples of Vowel Substitution in isiZulu Loanwords from Afrikaans 60

Table 19: The Substitution of the English Consonant /r/ with isiZulu Consonant [l] 61

Table 20: Examples Illustrating the Substitution of the English Voiced Alveolar Liquid /r/ with the isiZulu Voiced Lateral Liquid [l] 62

Table 21: The Substitution of Afrikaans Consonants /r/ and /x/, with their isiZulu Equivalents [l] and [h], Respectively 63

Table 22: Examples Illustrating the Substitution of Afrikaans Consonants /r/ and /x/, with their isiZulu Equivalents [l] and [h], Respectively 65
Table 23: Examples Illustrating the Retention of the Consonant [r] in isiZulu 65
Table 24: Examples Illustrating Vowel Epenthesis to Open Closed Syllables, in isiZulu Loanwords from English and Afrikaans 66
Table 25: Examples Illustrating Vowel Epenthesis to Simplify Complex Onsets, in isiZulu Loanwords from English and Afrikaans 68
Table 26: Examples Illustrating Spreading from Coronal Vowel [i] to Form Coronal Glide [j] in isiZulu Loanwords from English 71
Table 27: Examples Illustrating Spreading from Labial Vowel [u] to Form Labiovelar Glide [w], in isiZulu Loanwords from English and Afrikaans 73
Table 28: Examples Illustrating Deletion in isiZulu Loanwords from English 75
Table 29: isiZulu Adaption Patterns Compared to chiShona 79
Table 30: The Similarities and Differences between isiZulu and chiShona 95
Table 31: isiZulu Adaption Patterns Compared to isiNdebele 97
Table 32: The Similarities and Differences between isiZulu and isiNdebele 105
Table 33: Examples of isiZulu Adoptives from English 119
Table 34: Examples of isiZulu Adoptives from Afrikaans 127
Table 35: Example of Tolerable [CC] Structures in isiZulu 129
Table 36: Example of the Accepted [r] Sound in isiZulu Adoptives 129

LIST OF TABLEAUX

Tableau X: An Example of an OT Analysis 55

Tableau 1: The Realisation of the English Word /wʊl/ in isiZulu 59

Tableau 2: The Realisation of the Afrikaans Word /pɑːl// in isiZulu 61

Tableau 3: The Realisation of the English Word /drʌm/ in isiZulu 63

Tableau 4: The Realisation of the Afrikaans Word /xans/ in isiZulu 64

Tableau 5: The Realisation of the Adopted Word /bʌs/in isiZulu 67

Tableau 6: The Realisation of the Adopted Word /stul/ in isiZulu 69

Tableau 7: The Realisation of the Adopted Word /spaɪs/ in isiZulu 72

Tableau 8: The Realisation of the English Word /blaʊz/ in isiZulu 74

Tableau 9: The Realisation of the English Word /pəinapəl/ in isiZulu 76

Tableau 10: The Simplification of Complex Onsets 80

a) The Realisation of /dəktər/ in isiZulu 80

b) The Realisation of /dəktər/ in chiShona 81

Tableau 11: The Repair of Syllable Codas 82

a) The Realisation of /dɪsk/ in isiZulu 82

b) The Realisation of /dɪsk/ in chiShona 83

Tableau 12: The Repair of a Syllable Coda through Deletion 84

a) The Realisation of /vedʒtəbl̩/ in isiZulu 84

b) The Realisation of /vedʒtəbl̩/ in chiShona 85

Tableau 13: The Simplification of a Diphthong 86

a) The Realisation of /pʌɪnt/ in isiZulu 86

b) The Realisation of /pʌɪnt/ in chiShona 87

c) The Realisation of /θaʊzənd/ in isiZulu 88

d) The Realisation of /θaʊzənd/ in chiShona 89

Tableau 14: The Substitution of [r] 90
a) The Realisation of /drʌm/ in isiZulu 90
b) The Realisation of /drʌm/ in chiShona 91
Tableau 15: The Realization of NCs 93
a) The Realisation of /pʌɪnt/ in isiZulu 93
b) The Realisation of /pʌɪnt/ in chiShona 94
Tableau 16: The Simplification of a Complex Onset and Syllable Coda 98
a) The Realisation of /stul/ in isiZulu 98
b) The Realisation of /stul/ in isiNdebele 99
Tableau 17: The Simplification of a Diphthong 100
a) The Realisation of /taɪ/ in isiZulu 100
b) The Realisation of /taɪ/ in isiNdebele 101
c) The Realisation of /fəʊn/ in isiZulu 101
d) The Realisation of /fəʊn/in isiNdebele 102
Tableau 18: The Substitution of [r] 103
a) The Realisation of /pærəfɪn/ in isiZulu 103
b) The Realisation of /pærəfɪn/ in isiNdebele 104

LIST OF FIGURES

Figure 1: Clements and Hume's (1995) Feature Geometry Model 50

Figure 2: The Feature Organisation of Vowels and Glides. 51

Figure 3: The Spreading of V-Place Features from Coronal Vowel [i].....70

Figure 4: The Spreading of V-Place Features from Labial Vowel [w].....73

Figure 5: Guthrie's Zonal Classification of the Bantu Languages 130

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

This chapter introduces the study, briefly outlining the structure of the thesis and explains the topic under investigation, inclusive of the research question and objectives of the research.

1.2 Background to the Study

Languages acquire new lexical items or words through a number of linguistic processes, including, *inter alia*, coinage, compounding, blending, clipping, backformation, conversion and borrowing (Onyebuchi & Tochukwu, 2014). Lyons (1969, p. 25) asserts that this occurs particularly in languages, which, through experiencing cultural or geographical proximity and contact, borrow or loan words from one another; as words travel across the linguistic and geographical boundaries, along with the object to which they refer. IsiZulu has endured close contact with English and Afrikaans since the arrival of the 'Whites' in KwaZulu-Natal (Khumalo, 1984, p. 201). Similar to the majority of Bantu languages, isiZulu is expanding its lexical stock through borrowing or adopting words from English and Afrikaans. The word 'Bantu' is used in this study to refer to a specific family of 'African languages', constituents of the extensive 'Niger-Congo group', spanning sub-Saharan Africa (Shillington, 1995, p. 49). It is worth mentioning that the term 'Bantu' is being used in this study in a purely technical sense and not with the connotations that it acquired in Apartheid South Africa

Cole (1990) explains that lexical acquisitions or the words extracted from one language and incorporated into another are commonly termed borrowings or loanwords. However, languages do not seem to return these loaned or borrowed words thus the term 'adoptives' is preferred (Cole, 1990, p. 345). For the purposes of this study, the words 'loanwords', 'adoptives' and 'borrowings' are considered interchangeable or synonymous, which is common practice and acceptable in the field of linguistics. This investigation looks at some phonological characteristics of isiZulu loanwords from English and Afrikaans. It investigates the manner by which words from these two languages are modified and adjusted to harmonise with, and conform to, the phonology of isiZulu.

1.3 Problem Statement

Each language exhibits a unique phonological structure. When a borrowing language (e.g. isiZulu) adopts words from source languages (e.g. English and Afrikaans), the adoptives frequently contain structures that violate the phonological well formedness of the acquiring language (Ndambuki, 2013, p. 2). For instance, isiZulu, English and Afrikaans have different syllable structures and segmental systems. IsiZulu's permissible syllables are open, suggesting that isiZulu only permits the sequence of consonant-vowel or (CV), with monophthongal V-elements, while both English and Afrikaans permit closed syllables or syllable codas (CVC). Additionally, English and Afrikaans further allow complex onsets (CC) and complex syllable nuclei (VV), in the form of long vowels and diphthongs, none of which are tolerated in isiZulu. The adopted words consequently undergo an adaption processes in order to conform to the structural constraints of the borrowing language's phonology (Kang, 2010, p. 2295). The borrowing language, isiZulu, rephonologises the adoptives to fit the "pre-existing structure of the language" (Ndambuki, 2013, p. 2). Rephonologisation is a process whereby the phonology of a word is altered to suit the phonological structure of a borrowing language. Essentially, rephonologisation occurs so that the English and Afrikaans words fit into the permissible syllable structure and segment inventory of the isiZulu language.

The overarching objective of this study is to identify and formally account for the repair strategies employed to adapt English and Afrikaans words in isiZulu phonology. Optimality Theory (hereafter OT) is used to account for how these adoptives are constrained by the permissible syllable structure and segment inventory of isiZulu. The goal is to present isiZulu loanword data and theoretically account for repair strategies used to rephonologise it. The main repair strategies that have been identified in this study are epenthesis, deletion and segment substitution.

In this study slash (/) brackets are used to illustrate the underlying representation or input form of English and Afrikaans words, while square ([…]) brackets show the output form or surface realization in isiZulu. Additionally, aspiration (p^h, t^h, k^h) as well as other diacritics such as stress (ˈ), are not included in the transcription so that the reader is not confused as that is not what is being analysed.

Vowel epenthesis is a process whereby a vowel is inserted to satisfy constraints on the syllable structure of the borrowing language (Uffmann, 2004). Vowel epenthesis may occur to open

closed syllables (syllable coda's [CVC]), as well as to simplify complex onsets (CC structures). This is exemplified in (1) and (2) below:

(1) [CVC] → [CVC**V]** /**nɜ**:**s**/ → [u.ne.s**i]** 'nurse'

(2) [CC] → [C**V**.C] /**sk**u:l/ → [i.s**i**.ko.le] 'school'

In example (1), the closed syllable [CVC] is resyllabified to [CV.CV] through vowel insertion. Epenthesis aligns the adoptive with the isiZulu phonological system, which prefers CV syllables. In example (2), a complex syllable onset, in the form of [CC], is simplified to [CV]. This is achieved through the epenthesis of a vowel between the two consonants. This clearly displays the dual function of vowel epenthesis in isiZulu loanword phonology, viz., (i) to open closed syllables and (ii) to simplify complex onsets. This investigation demonstrates that these resyllabification processes are triggered by the high ranking of syllable structure markedness constraints which militate against closed syllables and complex onsets in isiZulu. These markedness constraints dominate faithfulness constraints that prohibit epenthesis (insertion) and the deletion of segments or features. Faithfulness constraints comprise the restrictions that require the output to be as much faithful to the original input as possible; thus, they militate against segmental feature changes, epenthesis and deletion (Kager, 1999).

It is noteworthy that the word-initial vowel insertion in the above examples (e.g. **u**nesi 'nurse' and **i**sikole 'school'), as well as in examples throughout this study (e.g. **i**kofi 'coffee'), constitutes a morphological process to fulfil the language's (isiZulu) morphosyntactic requirement (Aronoff & Fudeman, 2005), which demands nouns to begin with an augment or pre-prefix. An analysis of the morphosyntactic characteristics of isiZulu loanwords is beyond the scope of this study.

Generally, epenthesis is utilised as an alternate or cover term for spreading (Kadenge & Mudzingwa, 2011, p.149), which refers to all or some of the features of an epenthetic segment being supplied by one or all of the input segments (Clements & Hume 1995; Kadenge & Mudzingwa, 2011, p. 149). In isiZulu loanword phonology, spreading is used to simplify diphthongs, as exemplified in (3) below

(3) [VV] → [CV**G**V] /sp**aɪ**s/ → [i.si.pa.**j**i.si] 'spice'

Example (3) reveals that words with complex syllable nuclei, in the form of diphthongs, are prohibited in isiZulu. Just like the majority of southern Bantu languages, isiZulu bans diphthongs in its native phonology, congruently reflected in its loanword phonology. The repair strategy used for the simplification of these complex vowels into monophthongs is glide epenthesis. This type of glide epenthesis embodies a spreading process, due to the fact that the features of the epenthetic glide are sponsored by input vowels. It is shown that the epenthetic glides [w] and [j] are in complementary distribution or constitute contextual variants in isiZulu loanword phonology. The glide [w] is inserted in the context of labial vowels: [u] or [o], while the glide [j] is introduced in the context of coronal vowels: [i] or [e]. In this study, it is shown that the repair of complex syllable nuclei is governed by the demand to have simple syllables in isiZulu (i.e. CV syllables); syllables with simple onsets and simple syllable nuclei.

Deletion is a process wherein a segment or segments are omitted from a word (Ndambuki, 2013). This repair strategy is used to eliminate complex onsets (consonantal sequences) and syllable codas in isiZulu loanword phonology as portrayed in example (4) below:

(4) [CVVCVV**CVC**] → [V.CV.CV.**CV**] /ləʊkeɪ**ʃən**/→ [i.lo.ǧi.ʃi_] ‘location’

Example (4) demonstrates that the word-final syllable coda [n] is eliminated through deletion in isiZulu because closed syllables are not permitted in isiZulu. This thesis presents additional examples of this process, along with a formal OT analysis.

Segment substitution involves the replacement of an item to phonetically close segments in the recipient language (Hussain, Mahmood & Mahmood, 2011, p. 4). For instance, when isiZulu adopts an English or Afrikaans word, it reshapes the vowels and consonants to the closest available segments in its segment inventory. Examples of vowel and consonant substitutions follow.

Vowel substitution is active in isiZulu loanword phonology. For example, the lax or [-tense] vowels /ɪ/ and /ə/ are not part of the isiZulu vowel inventory, consequently are substituted with the tense coronal [i] and pharyngeal [a] vowels respectively, as illustrated in (5):

(5) /d**ɪ**.n**ə**/ → [i.d**i**.n**a]** ‘dinner’

In addition, there is active consonant substitution process in isiZulu loanword phonology. Hence, /r/ is substituted with [l], as /r/ is not incorporated in the isiZulu phonetic inventory (Khumalo, 1984, p. 211).

This substitution process is demonstrated in example (6) below:

(6) /**r**ɔk/ → [i.**l**o.ɠwe] ‘dress’

The repair strategies discussed so far (epenthesis, deletion and segment substitution) are considered to form a ‘conspiracy’. Kisserberth (1970) describes a phonological ‘conspiracy’ as a set of distinct rules or processes that contribute the same function, i.e. to eliminate illicit structures, for example CVC syllables. For instance, vowel epenthesis is utilised to open closed syllables, thus it creates a CV structure, as well as simplifying complex onsets, effecting the elimination of consonant clusters, and rendering a CV structure, with glide epenthesis or spreading employed to monophthongise complex syllable nuclei, creating a CV structure. This connotes a single target for these different repair strategies, viz., the creation of the isiZulu preferred syllable structure, composed of the CV shape or template.

As aforementioned, certain isiZulu adoptives are fully rephonologised, while others are not. This signifies that isiZulu loanword phonology has two sub-phonologies, viz., one composed of completely rephonologised words and the other with partially rephonologised words. When adoptives are not fully rephonologised (partially rephonologised) certain marked segmental and syllable structures originating from the source language are retained in the receptor language. Consequentially, borrowing may introduce new segments, which did not previously exist, into the receptor language (Crawford, 2009, p. 2). For instance, in example (6) above, the segment /r/, which does not exist in the native isiZulu consonant inventory, is substituted with its liquid counterpart [l]. The [r] may now be accepted into the Zulu segment inventory by modern isiZulu speakers (Khumalo, 1984; Koopman, 1992), as it occurs in several words in everyday speech, although only occurring in adoptives, as evidenced in examples (7) through (11):

(7) /**r**u.lə/ → [i.**l**u.la] → [i.**r**u.la] ‘ruler’

(8) /**r**ʌ.bə/ → [i.**l**a.ba] → [i.**r**a.ba] ‘rubber’

(9) /**r**eɪk/ → [i.**l**e.ki] → [i.**r**e.ki] ‘rake’

(10) /**r**eɪdɪəʊ/ → [i.**l**e.di.jo] → [i.**r**e.di.jo] ‘radio’

(11) /kæ**r**ət/ → [i.ka.**l**o.ti] → [i.ka.**r**o. ti] ‘carrot’

Loanword adoption patterns are a common theme in linguistic research. To contribute to phonological typology, this study compares its findings to previous research on two different Bantu languages, namely, chiShona (Kadenge, 2012; Kadenge & Mudzingwa, 2012) and isiNdebele (Mahlangu, 2007; Skhosana, 2009). IsiZulu, chiShona and isiNdebele are categorised as southern Bantu languages and, analogous to a multitude of other Bantu languages, they prefer a simple open CV syllable structure, which prohibits closed syllables [CVC] and complex onsets or consonantal clusters [CC]. It is intended that the comparison elicits, and contributes insight into, patterns of loanwords occurring generally in southern Bantu languages.

An example is used to illustrate this, comparatively assessing how consonantal clusters [CC] are simplified, individually contrasting isiZulu to chiShona (Kadenge, 2012) and isiNdebele (Mahlangu, 2007):

(12) IsiZulu’s simplification of a [CC] structure in comparison to chiShona:

IsiZulu	ChiShona
/**dr**ʌm/ → [i.d**i**.la.m**u**] ‘drum’	/**dr**ʌm/ → [d**i**.ra.m**u**] ‘drum’

(13) IsiZulu’s simplification of a [CC] structure in comparison to isiNdebele:

IsiZulu	IsiNdebele
/**st**ɔ:/ → [i.s**i**.to.l**o**] ‘store’	/**st**ɔ:/→ [i.s**i**.to.l**o**] ‘store’

Examples (12) and (13) demonstrate that vowel epenthesis is common in these three languages and serves the same functions, i.e. opening closed syllables and simplifying complex onsets. This is an anticipated result as these languages have the same innate native syllable structure requirements.

Khumalo (1984) observes that certain consonant clusters and syllable codas are repaired through consonant deletion in isiZulu loanword phonology as shown in examples (14) and (15) below (Khumalo, 1984, p. 206)

(14) /pəinapə**l**/→ [upajinapu_] ‘pineapple’

(15) /ləʊkeɪʃən/→ [ilokiʃi_] ‘location’

This separates isiZulu from chiShona and isiNdebele where this strategy is never optimal. The operation of these repair strategies are a result of constraint ranking and reranking and are explained in this study utilising the OT concept of factorial typology.

1.4 Objectives of the Study

The objectives of this study are:

I. To identify, describe and formally analyse repair strategies (phonological processes) utilised in isiZulu loanword phonology to rephonologise words from English and Afrikaans, using Optimality Theory;

II. To present an analysis of phonological changes in isiZulu phonology triggered by adoption, with specific reference to new segments and syllable structures;

III. To compare isiZulu loanwords to those of chiShona and isiNdebele, with the hope of contributing to phonological typology.

1.5 Justification for the Study

Historically, in South Africa, isiZulu speakers have been in close contact with English and Afrikaans speaking people. Consequently, isiZulu has adopted many words from the two languages. This study describes and accounts for how adoptives are rephonologised in order to conform to the permissible phonology of isiZulu. This renders the study significant, through demonstrating the manner in which new or borrowed words are adopted and adapted into isiZulu phonology, as well as contributing to the existing research and previous and current research pertaining to loanword phonology in Bantu languages overall. Owino (2003, p. 16) asserts that by analysing the occurrence of borrowing numerous aspects of the language’s phonological systems can be determined.

Existing literature indicates that there is very little known about isiZulu loanword phonology, with the limited exception of Khumalo’s (1984; 1987) brief descriptions of how loanwords are resyllabified in isiZulu. This study builds on Khumalo’s work, considering it an initiation point,

and is intended towards establishing a more comprehensive insight into, and explanation of, this topic. Previous studies on loanwords in isiZulu, for instance like Khumalo (1984; 1987) and Koopman (1992), have been predominantly descriptive, vis-à-vis formal theoretical analysis. The primary characteristic differentiating the current study, is that it presents an OT analysis of isiZulu loanword phonology, showing the predictability of repair strategies in this language. OT assists in explaining why one strategy is chosen over another. Above all, this study presents new data on isiZulu loanword phonology.

1.6 Structure of Thesis

This thesis is composed of seven chapters and an additional appendices division.

Chapter 1 provides a concise introduction, the research question, and an outline of the objectives and intent of this study.

Chapter 2 reviews previous literature related to the topic, identifying gaps in knowledge which this study attempts to fill.

Chapter 3 focuses on the deliberated languages, viz., isiZulu, English and Afrikaans, contributing a synoptic contextualisation and background of each, incorporating their history and sociolinguistic status, in conjunction with each language's acceptable syllable structures and segment inventories.

Chapter 4 explains the methods of data collection and analysis.

Chapter 5 provides the data analysis, inclusive of a detailed explication of repair strategies employed in isiZulu loanword phonology; an explanation of those adoptives completely and partially rephonologised; a comparison of English and Afrikaans adoptives; and concludes with a formal OT analysis of data.

Chapter 6 compares isiZulu loanwords to those from chiShona (Kadenge, 2012) and isiNdebele (Mahlangu, 2007) incorporating a contrast evaluation of certain aspects of Bantu languages, to determine similarities and differences, and therefore identify (if any) loanword adaption patterns used in Bantu languages.

Chapter 7 concludes the study. It summarises the primary objectives and findings, highlights the empirical and theoretical contributions of this research and recommends areas that may require further exploration.

The Appendices incorporate a long list of isiZulu words adopted from English and Afrikaans; tolerable isiZulu structures; and Guthrie's (1971) zonal classification of Bantu languages.

1.7 Summary

This chapter outlined the focus of this study. The succeeding chapter presents a review of previous descriptive and theoretical studies related to the topic under investigation.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The previous chapter briefly discussed the area under investigation, problem statement, objectives of, and justification for, the study. This chapter presents a review of previous studies on isiZulu and loanword adaption and adoption patterns in general. A detailed review of descriptive and theoretical studies on loanword phonology are incorporated herein, identifying gaps in knowledge that this study intents to fill. Several scholars, including, *inter alia*, Khumalo (1984), Steinbergs (1985), Khumalo (1987), Koopman (1992), Owino (2003), Schnoebelen (2005), Rose and Demuth (2006), Uffmann (2006), Adomako (2008), Mwita (2009), Kadenge and Mudzingwa (2012), Kadenge (2012), Ndambuki (2013 and Ngcobo (2013) focus on the phonology of loanwords. These studies provide advantageous, useful background insights into the phonological processes occurring when words are adopted from one language into another.

2.2 A Review of Descriptive and Theoretical Studies on Loanword Phonology

This section reviews and considers previous descriptive and theoretical studies on isiZulu native and loanword phonology, and on other Bantu languages.

Clement Doke undertook the initial comprehensive study of isiZulu phonetics in 1926. Doke (1926) concentrates on the sounds and tones of the isiZulu language, along with the role these exert in the grammar of isiZulu. He carefully identifies each sound present in isiZulu and describes the stress, tone and, length of syllables in isiZulu words. Lanham (1960) conducted the subsequent profound consideration of isiZulu phonology, wherein he investigates the comparative phonology of Nguni languages. Lanham effects this through comparing the phonological components of each Nguni language. Just like Doke (1926) and Lanham (1960), Cope (1966, p. 8) renders a complete and complex description of isiZulu "phonology, tonology and tonal grammar". He extends on previous work on isiZulu phonology, utilising a number of linguistic principles in his explanations. These studies by Doke (1926), Lanham (1960) and Cope (1966) contribute insights into our understanding of isiZulu native phonology. However, loanword phonology does not receive significant attention in these descriptive studies.

A renowned scholar in the field of isiZulu phonology research is James Khumalo (1984; 1987). Khumalo's (1984) monumental study comprises a preliminary descriptive analysis of isiZulu

adoptives from English and Afrikaans. He demonstrates that new or borrowed words result in syllabic problems, which have to be modified in order to "conform to the phonotactic requirements" of isiZulu (Khumalo, 1984, p. 206). For instance, Khumalo (1984) asserts that words ending in a consonant are either repaired through deleting the consonant (however rarely) or by inserting a final vowel to create the required CV syllable shape. Khumalo (1984, p. 206) provides the following ensuing examples:

(16) /gɑːdə**n**/ → [iŋad**i**] 'garden'

(17) /həʊte**l**/ → [iɦotel**a**] 'hotel'

In example (16) and (17) English forms comprise the CVC structure, as they end in consonants. Khumalo demonstrates that in an example like the one in (16) a coda is removed through coda deletion, while in example (17) it is eliminated through vowel epenthesis (insertion). He maintains that vowel epenthesis is selected more frequently than deletion. Additionally, Khumalo (1984, p. 209-210) evaluates substitution in isiZulu adoptives, supplying the following examples:

(18) /fl**æ**g/ → [iful**e**gi] 'flag'

(19) /l**ɔr**i/→ [il**ol**i] 'motor truck' (Afrikaans)

Examples (18) and (19) portray that the English vowels /æ/ and the Afrikaans vowel /**ɔ**/, which are not found in native isiZulu, are substituted with equivalent isiZulu vowels [e] and [o], respectively. Equally, example (19) illustrates that the Afrikaans consonant /r/ is substituted with an equivalent isiZulu lateral liquid[l], as the liquid /r/ is not present in the isiZulu consonantal system. The current study investigates the phonological processes that occur when an adopted word contains illicit syllable structures. The current study builds on the findings of previous studies by additionally examining spreading as an epenthetic process, utilising analytical insights and conventions from OT and Feature Geometry (hereafter FG). Khumalo's study is helpful, as it contributes a descriptive analysis of isiZulu adoptives from English and Afrikaans; exposing the phonological modifications occurring in words when adopted from one language into another. What differentiates this study from that of Khumalo (1984) is the use of a phonological theory to analyse the data, as opposed to the exclusively descriptive nature of Khumalo's work on loanword phonology.

Following Khumalo's (1984) preliminary study, he conducts an in-depth autosegmental account of isiZulu phonology (Khumalo, 1987). In this study, Khumalo (1987) systematically defines all the isiZulu units or segments, along with their distinctive features. This is considered of utmost importance to the current research as it renders the feature specification of the isiZulu segments. In addition, Khumalo (1987) extensively explains the tonal rules of isiZulu. However, an analysis of isiZulu loanword tonology is beyond the scope of the current research.

Khumalo (1987) employs autosegmental phonology theory, which is based on the assumption that certain phonological segments exist in an orderly sequence, on a distinct tier, independent from other phonological segments (Khumalo, 1987, p. 1). He also incorporates CV phonology in his discussion of phonological processes, as segments on the CV-tier explain "the functional positions within the syllable" (Khumalo, 1987, p. 11). Khumalo's (1987) research undertaking is extremely comprehensive, although it differs from the current study regarding the theoretical framework he employs and the aspects of the phonological processes he analyses. The current study, as stated previously, makes use of OT and FG to analyse repair strategies in adoptives. Thus, the current investigation expands Khumalo's (1987) research, introducing new data and a new formal analysis constituted by OT and FG (this is explained further in Chapters 4 and 5), to substantiate and render the predictability and generalisability of the repair strategies. Furthermore, this study is intended to reveal the influence English and Afrikaans adoptives exert on the isiZulu phonological system, by considering fully and partially rephonologised adoptives.

Khumalo's (1984) study was succeeded by Steinbergs (1985), who investigated a Bantu language with similar phonological characteristics to isiZulu. She examined OshiKwanyama loanwords from English, Afrikaans and German. OshiKwanyama is a language spoken in Namibia and Angola. Steinbergs (1985) specifically focuses on morpheme structure constraints, and the modifications (adaption processes) the borrowed words undergo to comply with the OshiKwanyama phonological system. In terms of phonotactic constraints, Steinbergs observes that OshiKwanyama prohibits closed syllables [CVC], this indicates that all words must end in a vowel [CV]. The same is highlighted in Khumalo (1984) and the current study, with regard to isiZulu. This is not unexpected since OshiKwanyama and isiZulu both belong to the Bantu language group of languages. For example, in OshiKwanyama, the English borrowing /sæk/ [CVC] is modified to [osako] [V.CV.CV] 'sack' (Steinbergs, 1985, p. 92), analogously, in isiZulu, the English borrowing /mæp/ [CVC] is modified to [imapu]

[V.CV.CV] ‘map’. Relative to the modification or adaption process, Steinbergs notes that the source and borrowing languages seldom contain the same sound inventory, hence substitution occurs. Thus, for any sound not available, the closest available OshiKwanyama sound is substituted, correspondingly, the same observation is made in the current isiZulu study.

OshiKwanyama, as in isiZulu, does not have the /r/ sound in its native consonantal inventory, hence it modifies the German word /kartə/ ‘map’ to [okalita]; likewise, in isiZulu, the English word /kærət/ ‘carrot’ is altered to [ikaloti]. Another noteworthy element in Steinbergs’s (1985) study is cluster simplification. Steinbergs (1985) contends that the most common method used in cluster simplification is to insert a vowel, and the least utilised method constitutes the deletion of one of the consonants, for example, the word /fɑːrm/ is changed to [ofalama] ‘farm’ in OshiKwanyama (Steinbergs, 1985, p. 95), and the word /drʌm/ is altered to [idilamu] ‘drum’ in isiZulu. The phonotactic information elicited by Steinbergs is beneficial to the current study, as the phonotactic constraints in Bantu languages are similar, if not identical. However, as in Khumalo’s (1984) study, Steinbergs study does not employ a phonological theory to explain the adaption processes taking place.

An additional scholar who examines isiZulu is Koopman (1992), investigating isiZulu adoptives from English. His empirical focus is much broader than Khumalo’s (1984), Steinbergs’ (1985) and the current study’s, as he examines morphological interference, incorporating several processes, including back-formation, singular or plural correlations, and phonological interference, whereas the present study focuses exclusively on the phonological modifications occurring when isiZulu adopts from English and Afrikaans. The phonological adaptations that Koopman (1992) evaluates are consonantal clusters, diphthongs, nasal shifts and the /r/ segment. Similar to the current investigation, Koopman’s (1992, p. 105) study considers the changes occurring in isiZulu as a result of the influence of English borrowing. Koopman’s (1992, p. 109-111) findings demonstrate that diphthongs are spread over two syllables, with certain consonantal clusters retained and accepted in isiZulu. This is in consensus with what the current study found in terms of diphthongs and selected tolerable [CC] structures. For example, the word /taɪ/ ‘tie’ is rephonologised to [u.ta.ji], accordingly the diphthong is spread over two syllables and, in the data from the current research, the word for /strɔːbəri/ ‘strawberry’ is partially rephonologised to [istroberi], retaining the consonantal cluster.

In the treatment of the segment /r/, corresponding to Khumalo's (1984), Steinberg's (1985) and the current study's findings, the /r/ is rephonologised to [l]; however, and as explicitly stated by Khumalo (1984), in some adoptives the [r] is retained by some modern isiZulu speakers, therefore adding to the isiZulu segment inventory (Koopman, 1992, p. 110-113). The current study views and accounts for the retaining of [r] by modern day isiZulu speakers as constituting partially rephonologised adoptives. Koopman's (1992) study is beneficial as it demonstrates instances of phonological change, for instance diphthong simplification and consonant substitution, common in Bantu languages. Additionally, his study contributes a useful inventory of isiZulu adoptives from English, which are drawn upon in this study. The principal differences between Koopman's and the current study are that Koopman's (1992) investigation merely describes each phonological modification, without the employment of a phonological theory to account for the alterations, while this study employs FG and OT for this task. FG enables the formation of generalisations based on specific features, while OT allows the prediction of the best repair strategy. Koopman (1992) exclusively examines isiZulu adoptives from English. In contrast, this study concentrates on both English and Afrikaans adoptives, as in Khumalo's research undertakings. Therefore, the current study advances on the work conducted by Khumalo (1984), Steinbergs (1985) and Koopman (1992), through the presentation of a detailed formal analysis of isiZulu loanword phonology. Additionally, in relation to the theoretical framework, the current study employs the leading phonological theory, viz. OT.

Two additional studies involving isiZulu were conducted by Schnoebelen (2005) and Ngcobo (2013). They address the issue of classifying loanwords in the isiZulu noun class system. IsiZulu, as a member of the Bantu language group, uses a numbered classification or grouping system for the noun class prefix (Meinhof, 1906). Ngcobo's study utilises cognitive grammar, while Schnoebelen's study is essentially descriptive. Ngcobo and Schnoebelen conclude that loanwords may be placed into various groups, depending on the adaption process or processes a borrowed word undergoes. These studies are supportive, contributing two terms to describe the adoption patterns a language may exploit, viz. (i) lexicalisation and (ii) institutionalisation. Lexicalisation describes loanwords that remain recognisable as foreign words by native speakers of the language (i.e. isiZulu) (Ngcobo, 2013). For example, the words 'i-Java' and 'i-radio', which occur in magazines, newspapers or on the internet, but have not entirely been incorporated into the isiZulu language (Schnoebelen, 2005). Conversely, institutionalisation denotes loanwords "that have been assimilated into a language" (Ngcobo, 2013, p. 23), in a

manner by which its origin may surprise a native speaker, as once a loanword has been assimilated into the language the derivation of the word is difficult to establish, for instance the isiZulu word [ibhulukwe] meaning 'trousers' is borrowed from the Afrikaans word /bruk/ (Schnoebelen, 2005). Ngcobo's (2013). Schnoebelen's (2005) studies are dissimilar to the current study, as they focus on morphosyntactically classifying the adoptives subsequent to them having undergone an adaption process, while the current study specifically focuses on the phonological adaption processes. However, their studies are insightful to the present study, as it considers fully and partially rephonologised adoptives. Furthermore, the Ngcobo (2013) and Schnoebelen (2005) studies contribute an informative classification system for the rephonologised adoptives.

Scholars who focus on loanword adaption in other languages include Owino (2003); Rose and Demuth (2006), Uffmann (2006), Adomako (2008), Mwita (2009), Kadenge and Mudzingwa (2012), Kadenge (2012) and Ndambuki (2013).

Owino (2003) evaluates Dholuo loanwords from English and Swahili. Dholuo is a language spoken by Luo people in Kenya (Owino, 2003, p. 11). He focuses on adaption at three levels, viz., phonemic, phonotactic and prosodic (Owino, 2003, p. 3). Owino (2003), like Khumalo (1987), uses analytical tools from CV-phonology to analyse his data. Owino centres his attention on the repair strategies employed to adapt the foreign phonemes (from English and Swahili) to the Dholuo phonemic system, differing from the present study, where the foreign phonemes arise from English and Afrikaans. Owino's (2003, p. 179) findings reveal that the primary phonological processes Dholuo employs to simplify consonantal clusters and non-canonical syllable structures, are vowel insertion and vowel deletion, as illustrated by the following examples;

(20) /spænə/ → [sipana] 'spanner' (Owino, 2003, p. 170)

(21) /kəʊt/ → [koti] 'coat' (Owino, 2003, p. 158)

In example (20) the consonant cluster [sp] is repaired by inserting a vowel between the two consonants. Example (21) contains a long vowel, which is repaired through deletion. Owino (2003, p. 157) asserts that a long vowel is deleted in Dholuo in order to achieve the acceptable CV syllable structure. Owino's (2009) study differs from the current study, since he employs a rule-based theory, in contrast to the current study's utilisation of a constraint-based theory,

viz., OT. Nevertheless, Owino's (2003) study is insightful, as it demonstrates the cross-linguistic distribution of repair strategies employed in loanword phonology.

Rose and Demuth (2006) are additional scholars who examine English and Afrikaans loanword incorporation into a Bantu language, i.e. Sesotho. They adopt the contrastive feature specification model, which enables a constrained set of language specific representations (Rose & Demuth, 2006, p. 1120) and OT as the framework supporting their data analysis. Rose and Demuth (2006, p. 1118) focus on the process of vowel epenthesis, demonstrating that a word containing a consonant cluster like /skəp/is realised as [isikɛbe] 'boat'. In this example, the [sk] cluster is repaired by inserting the coronal vowel [i] between the two consonants.

Congruently, Uffmann (2006) concentrates on vowel epenthesis in loanwords. He conducts a statistical analysis of loanword corpora from different languages, inclusive of chiShona, Sranan, Samoan and Kinyarwanda. He asserts that the quality of the epenthetic vowel results from the complex interaction of three distinct processes, viz., vowel harmony, local assimilation to the preceding consonant and default insertion (Uffmann 2006, p. 1108). Uffmann (2006, p. 2-5) makes the following generalisations concerning vowel quality;

- after labial consonants /u/ is epenthesised, e.g. [timu] 'team';
- after coronal consonants /i/ is inserted, e.g. [girini]; and
- after dorsal consonants, the previous vowel is copied if it is /i, o, u/, e.g. [kuruku] 'crook', however after /e, a/ an /i/ is inserted, e.g. [cheki] 'check'.

Uffmann's (2006) perspective on the processes employed to select the epenthetic vowel is considered useful when evaluating vowel epenthesis in isiZulu, as it enables an understanding of why a certain vowel is selected in preference to an alternate or alternatives. Uffmann (2006) formalises the results of his statistical analysis utilising OT, with his findings showing that the factors constraining the different strategies are identical across languages. Furthermore, he states that spreading is constrained by the markedness of the spreading feature, "high and front vowels are more likely to spread than low vowels, and coronal and labial consonants are more likely to spread than dorsal consonants" (Uffmann, 2006, p. 1108). This is valuable to the present study, as spreading is established as the phonological adaption process employed to simplify diphthongs in isiZulu. Uffmann's study provides insights into the interaction of epenthetic and assimilation processes in loanword adaptation.

Analogous to Owino's (2003) conclusions indicating that vowel insertion and deletion are the principal repair strategies utilised to solve consonantal clusters and unacceptable syllable structures, Adomako (2008) findings, from his study on loanword adaptation in Akan, align. He states that Akan has a basic open syllable structure (CV) and foreign words being adapted into the language are compelled to undergo repair processes to conform to the well-formed syllable structure of the native language (Adomako, 2008). Adomako's (2008) research is informative as it provides insight into the phonological processes that Bantu languages employ to repair illicit structures in their loanword phonology. Corresponding to the current study, Adomako employs OT to explain these repair strategies in Akan loanword adaptation. He asserts that, among these processes, vowel epenthesis is the dominant strategy, most commonly applicable in the adaption process (Adomako, 2008, p. 1). This aligns with the conclusions presented by Rose and Demuth (2006) and Uffmann (2006). The principal focus on vowel epenthesis, which to a degree constitutes the scope of the current study, is common and renders this research comparable to the work of Owino (2003), Rose and Demuth (2006), Uffmann (2006) and Adomako (2008).

Adomako compares his analysis with that of similar analyses undertaken in two Bantu languages, viz., chiShona and Sesotho. This is considered in the present study as the data analysis of the isiZulu loanwords from English and Afrikaans (in Chapter 5) are compared (in Chapter 6) to Kadenge's (2012) and Kadenge and Mudzingwa's (2012) analyses of chiShona and Mahlangu's (2007) and Skhosana's (2009) research into isiNdebele. In Adomako's (2008, p. 107) comparison of Akan, chiShona and Sesotho, he concludes that the language-specific ranking of constraints accounts for the major differences in the processes employed by the three languages. This is a significant theoretical observation, with the intent of this study comprising the explanation of how the constraint hierarchy of native isiZulu phonology is reflected in that of the language's loanword phonology.

Several additional scholars utilising OT to analyse their loanword phonology data include Mwita (2009), Kadenge (2012), Kadenge and Mudzingwa (2012) and Ndambuki (2013). Each of their studies is similar to the current endeavour and is explained in detail below.

Mwita (2009) analyses Kiswahili loanwords from Arabic. Kiswahili is a Bantu language, predominantly spoken in East Africa and Arabic is a Semitic language arising in the Middle East. He analyses how Kiswahili has nativised its Arabic borrowings, i.e. the resyllabification of Kiswahili loanwords from Arabic. Mwita's (2009) focus is similar to that of the current

study, wherein he concentrates on syllable structure and syllable repair processes, for instance vowel epenthesis, consonant deletion, cluster tolerance (allowing [CC] structures); and feature change (i.e. substitution). The overall analysis of Mwita's (2009) study is couched in OT and he provides the conclusion that CV is the most common syllable structure in Kiswahili. This means that complex onsets or syllable codas are prohibited. However, through borrowing, Kiswahili has adopted structures such as [CCV] and [CCCV], traditionally uncommon in the language (Mwita, 2009, p. 48-50). For instance, the word [čuŋgwa] 'orange' contains the consonant cluster [CCCV] (Mwita, 2009, p. 51). Mwita (2009, p. 59) accounts for this acceptable cluster, by affirming that there is a "high level of tolerance" in Kiswahili. Finally, he maintains that the most common epenthetic vowels in Kiswahili are the high [i] and [u] (Mwita, 2009, p. 59). Mwita's (2009) results are analogous to findings in the current study, vis-à-vis isiZulu, wherein only simple [CV] structures are permitted. However, adopted words have introduced new features into these language, for example [CCCV], manifesting in the word [istroberi] 'strawberry'. This study is germane, through its demonstration of the manners by which OT may be used to account for the nativisation processes. The exclusive difference between Mwita's (2009) and the current research involves the specific languages assessed.

Conversely, and contrasting to Mwita (2009), Kadenge (2012, p. 81) investigates aspects of the phonology of chiShona loanwords from English in monolingual speakers, using Clements and Hume's (1995) FG and OT. He avers that complex onsets, complex syllable nuclei, for instance long vowels and diphthongs, and syllable codas are repaired using vowel epenthesis and spreading. For example, the complex onset and syllable coda in the loanword /drʌm/ 'drum' is repaired through vowel epenthesis and realised as [diramu] while the complex syllable nuclei, in the form of a diphthong, in the loanword /ɡəʊt/ 'gout' is simplified to [gawuti]. In this example, the V- place features of the labial vowel [u] spread and result in the formation of the labial glide [w] (Kadenge, 2012, p. 79). Consequently, Kadenge (2012, p. 81-82) asserts that in chiShona monolingual loanwords vowel epenthesis is employed to simplify complex onsets and to remove syllable codas, and glide epenthesis is applied to repair diphthongs by the spreading of V-place features from input vowels.

Subsequently, Kadenge and Mudzingwa (2012) compare chiShona loanwords of monolingual and bilingual speakers, demonstrating significant phonological differences. They note that monolinguals are completely faithful to the native phonology of chiShona, for instance having simple onsets, substitution of /l/ with [r], voicing of postnasal voiceless plosives and

monophthongisation of diphthongs, whereas bilinguals retain certain features of English phonology such as postnasal voiceless plosives, complex onsets and the lateral approximants. This is shown in the loanword /prəʊtiːn/ 'protein', which is repaired differently by monolingual and bilingual chiShona speakers. In monolingual speech, the loanword /prəʊtiːn/ 'protein' is realised as [puroteni] while in bilingual speech it is realised as [proteni] (Kadenge & Mudzingwa, 2012). This connotes that monolinguals do not accept complex onsets while bilinguals do. An additional example illustrates the rephonologisation of the loanword /rent/. Monolinguals realise /rent/ as [rendi] because they voice the postnasal voiceless plosives (a native rule), while bilinguals, not adhering to this rule, realise /rent/ as [renti], showing that bilinguals permit postnasal voiceless plosives (Kadenge & Mudzingwa, 2012, p. 147).

Kadenge and Mudzingwa's (2012) analysis is founded on insights from FG and OT. Analytical tenets from FG are implemented to generate a unified description of the place of articulation (constriction-location) of consonants and vowels. This is useful when it comes to the analysis of the largely predictable interaction of consonants and vowels that share the same place of articulation. This explains assimilatory and epenthetic processes that result from spreading of place features, such as glide epenthesis. OT is utilised in Kadenge and Mudzingwa's (2012, p. 141) study to illustrate the ranking of constraints in the rephonologisation of loanwords by monolinguals and bilinguals, in conjunction with their employment of the concept of factorial typology to expose that monolingual and bilingual loanword phonologies differ due to different ranking of the same set of constraints. They observe that "English words violate some constraints of chiShona syllable structure well-formedness" (Kadenge & Mudzingwa, 2012, p. 142). For example, English permits complex onsets, complex syllable nuclei composed of long vowels and diphthongs and syllable codas, which chiShona prohibits. Consequently, English loanwords in chiShona are 'repaired' to conform to the preferred chiShona phonological structures, especially syllable structure, phonotactic constraints and segment inventory. However, when adoption occurs in bilinguals, certain features of the input are retained, for instance complex onsets, the lateral approximant [l] and postnasal voiceless obstruents (obstruents are speech sounds formed by impeding airflow i.e. consonants (Katamba, 1989)) (Kadenge & Mudzingwa, 2012, p. 142). Kadenge and Mudzingwa (2012, p. 150) demonstrate that, in monolingual speech, vowel epenthesis has a dual function; i.e. it is utilised to simplify consonantal clusters and to remove syllable codas. In bilingual speech, vowel epenthesis is exclusively employed to repair syllable codas. Glide epenthesis occurs in both monolingual and bilingual speech to repair diphthongs.

In summary, Kadenge and Mudzingwa (2012) demonstrate that loanword rephonologisation is predominantly governed by syllable structure well-formedness rules, phonotactic constraints and segment inventory of the receptor language. Kadenge and Mudzingwa's (2012) study is comparable to the current investigation, as both exploit FG to describe the place features of consonants and vowels, critical when selecting an epenthetic segment. Furthermore, both studies focus on the rephonologisation and resyllabification of adoptives, in concert with the application of OT to explain this. FG and OT provide the current study with the facility to deliver a more coherent analysis of the phonological processes, displaying their predictability. The predominant difference between the two studies constitutes Kadenge and Mudzingwa (2012) separating their analysis into monolingual and bilingual loanwords, whereas this study presents a combined analysis of words adopted by both types of speakers. In addition, this study examines English and Afrikaans adoptives in isiZulu, while Kadenge and Mudzingwa (2012) only concentrate on English.

Ndambuki (2013), just like Kadenge (2012) and Kadenge and Mudzingwa (2012), evaluates loanwords from English into Kikamba. Kikamba is a Bantu language with the majority of speakers comprising the Kamba people of Kenya (Ndambuki, 2013, p. 7). His primary focus concerns the strategies Kikamba utilises to modify English loanwords into the recipient phonological system, as the phonemic inventories of the two languages differ significantly. English allows closed syllables, and consonantal clusters in the onset- which Kikamba does not and as a result, the English loanwords are significantly altered (Ndambuki, 2013, p. 8). (Ndambuki, 2013, p. 8). Ndambuki (2013, p. 106) uses OT to analyse his data, with his findings revealing the main strategies employed to adapt English words to Kikamba phonology are; insertion, deletion and feature change. He concludes that loanword phenomena in Kikamba can be adequately accounted for by utilising a constraint-based theory, for example OT (Ndambuki, 2013, p. 107). This study is appropriate for consideration as it contributes insight into the phonological processes that Bantu languages exploit to repair illicit structures in their loanword phonology, along with contributing a detailed OT analysis of the adaption processes used in Bantu loanword phenomena enable the present study to envisage the performance of the English adoptives in isiZulu

Studies by Kadenge (2012), Kadenge and Mudzingwa (2012) and Ndambuki (2013) enable the present study to envisage the performance of the English adoptives in isiZulu, as chiShona, Kikamba and isiZulu all belong to the Bantu language group. Moreover, these studies,

including those by Uffmann (2006), Rose and Demuth (2006), Adomako (2008) and Mwita (2009), contribute a detailed OT analysis of the phonological processes employed in the rephonologisation of loanwords, inclusive of vowel epenthesis, segment substitution, and spreading. It is the objective of the current study to contribute both empirically and theoretically to the field of loanword phonology.

2.3 Summary

This chapter encompassed the review and explanation of selected descriptive and theoretical studies, focusing on methodologies, findings, theoretical frameworks and the manner by which these could be compared to, or differentiated from, the current investigation, in conjunction with consideration of the insight rendered into isiZulu and loanword adaption and adoption processes. The subsequent chapter presents a descriptive analysis of isiZulu segmental phonology, as a background to data analysis, along with certain sociolinguistic details of the language.

CHAPTER 3: SOME SOCIOLINGUISTIC AND PHONOLOGICAL ASPECTS OF THE LANGUAGES UNDER INVESTIGATION

3.1 Introduction

The previous chapter presented a review of several previous descriptive and theoretical studies related to our topic, in order to gain an insight into what has already been done on isiZulu and loanword phonology. This chapter considers the geographical location, genetic affiliation, and segmental and syllable structures of each language. Furthermore, the motivation for rephonologisation, especially resyllabification and segment substitution, are demonstrated and a comparison of the English and Afrikaans sound systems to that of isiZulu is presented. When comparing these languages, it is important to show the vocalic and consonantal systems of all the languages being observed and distinguished in order to determine the variances between the languages.

3.2 IsiZulu

3.2.1 Brief Background Details

IsiZulu is the most commonly spoken language in South Africa (Naidoo, van der Merwe, Groenewald & Naudé, 2005, p. 3), especially prevalent in KwaZulu-Natal, also known as the Zulu Kingdom. The 2011 census ascertained that it constitutes the 'mother tongue' or native language of 22.7% of the country's population (SouthAfrica.info, 2001). It is a member of the Nguni language group, together with siSwati, isiXhosa and isiNdebele, which are mutually intelligible languages. Furthermore, isiZulu is categorised as belonging to the Southern Bantu language group (Cope, 1966, p. 1) and is classified as S.30 in Guthrie's (1971) classification of Bantu languages (see Appendix 4, Figure 5, for Guthrie's Zonal Classification). The subsequent sections present a brief synopsis of the segmental phonology of isiZulu, focusing on vowels and consonants.

3.2.2 The isiZulu Vocalic System

The isiZulu segmental system consists of five simple vowels (monophthongs), viz., /a/, /e/, /i/, /o/ and /u/ (Doke, 1927; Khumalo, 1984; Poulos & Msimang, 1998; Sibanda 2009). Unlike English and Afrikaans, isiZulu prohibits diphthongs. Vowel length and the tense-lax

distinctions are non-contrastive in this language. Table 1 shows the features of the isiZulu vowel system.

The isiZulu vowels can be described as follows (Cope 1966, p. 17; Khumalo, 1987, p. 184):

(22) [a] - low central unrounded vowel

e.g. [im**a**li] ‘money’

(23) [e] - mid front unrounded vowel

e.g. [itij**e**la] ‘tar’

(24) [i] - high front unrounded vowel

e.g. [isik**i**ba] ‘t-shirt’

(25) [o] - mid back rounded vowel

e.g. [umak**o**ti] ‘bride’

(26) [u] - high back rounded vowel

e.g. [um**u**ti] ‘tree’

Using the FG model proposed by Clements and Hume (1995), the isiZulu vowels may be further categorised relative to the place features, i.e. labial, coronal, dorsal and pharyngeal. Labial refers to a sound produced or articulated by movement of the lips; coronal concerns a sound articulated with the tongue tip or blade, dorsal involves a sound articulated with the body of the tongue (middle of the tongue), and pharyngeal to a sound articulated with the tongue root (Katamba, 1989; Clements & Hume, 1995). This designates that the articulatory features of isiZulu vowels may be described as follows: the back vowels [u] and [o] are labial, the front vowels [i] and [e] are coronal and the central vowel [a] is pharyngeal. Table 1 illustrates the feature specifications of the isiZulu vowel system.

Table 1: Features of the isiZulu Vowel System

	[a]	[e]	[i]	[o]	[u]
Labial				✓	✓
Coronal		✓	✓		
Pharyngeal	✓				

(Khumalo, 1981, 1984, 1987)

Table 1 depicts the nature of vowels acceptable or permissible in isiZulu. Any alternative vowels found in adoptives, which are prohibited in isiZulu, are substituted with those phonetically closest to them. The substitution patterns are described and explained in Chapter 5. The consideration of the allowable isiZulu consonantal system follows.

3.2.3 The isiZulu Consonantal System

John (2000) defines a consonant as a sound in a language "which is characterised by a constriction or closure at one or more points along the vocal tract". In isiZulu, there are both consonantal and click sounds.

Clicks are only found in the Khoisan languages and certain Southern Bantu languages, including isiZulu, isiXhosa and isiNdebele (Khumalo, 1987, p. 102). Naidoo et al. (2005) asserts that there are voiced, voiceless, aspirated and nasalised clicks, occurring at three articulatory positions, viz., palatal, alveo-lateral and dental. As click sounds are not found in English or Afrikaans, this thesis allocates minimal attention thereto.

The isiZulu consonants consist of plosives, fricatives, affricatives, nasals and approximants, as well as implosives, and the liquid /r/ which only occurs in words borrowed from other languages, e.g. English and Afrikaans (Naidoo et al., 2005). The phenomenon of the /r/ sound being retained is discussed in Chapter 5.

The consonants in isiZulu can be voiceless, aspirated, voiced and breathy voiced (Naidoo et al., 2005). Voicing refers to the state of the vocal cords, i.e. whether they are vibrating or not when a particular sound is produced. Aspiration, which is represented by a raised or superscript

/h/ e.g. [C^{h}], occurs when a sound is produced with a puff of air forced through the vocal folds (Naidoo et al., 2005). Ball and Rahilly (1999) proclaim that breathy voice is formed with relaxed but still vibrating vocal folds, combined with a whisper through the latter portion of the vocal folds. In isiZulu, aspiration is a contrastive feature, this signifies that its use distinguishes lexical meaning, whereas breathy voice does not (Naidoo et al., 2005). For example, in isiZulu the word /p^{h}aka/ with an aspirated /p/ sound means 'dish up' whereas the word /paka/ without an aspirated /p/ means 'park'. Doke (1927), Khumalo (1981; 1987, p. 77), Naidoo et al. (2005) and Thomas-Vilakati (2010) indicate that the isiZulu consonants and clicks may be described as follows:

Plosives:

(27) [p] - voiceless bilabial plosive

e.g. [u**p**opola] 'you examine'

(28) [p^{h}] - aspirated bilabial plosive

e.g. [i**p^{h}**aket^{h}e] 'packet'

(29) [b] - voiced bilabial plosive

e.g. [i**b**uŋane] 'beetle'

(30) [t] - voiceless alveolar plosive

e.g. [i**t**omu] 'bridle'

(31) [t^{h}] - aspirated alveolar plosive

e.g. [umfowe**t^{h}**u] ''

(32) [d] - voiced alveolar plosive

e.g. [in**d**oda] 'husband'

(33) [k] - voiceless velar plosive

e.g. [i**k**ilasi] 'class'

(34) [k^h] – aspirated velar plosive

e.g. [isi**k^h**ova] ‘owl’

(35) [g] - voiced velar plosive

e.g. [u**g**ogo] ‘grandmother’

Implosives:

(36) [ɓ] - voiced bilabial implosive

e.g. [u**ɓ**up^{h}ansi] ‘bottom’

(37) [ɠ] - voiced velar implosive

e.g. [u**ɠ**uɬala] ‘stay’

Fricatives:

(38) [f] - voiceless labio-dental fricative

e.g. [im**f**iso] ‘desire’

(39) [v] - voiced labiodental fricative

e.g. [im**v**elo] ‘nature’

(40) [ɬ] - voiceless lateral fricative

e.g. [ukuɬala] ‘to sit’

(41) [ɮ] - voiced lateral fricative

e.g. [ukuɮa] ‘to eat’

(42) [s] - voiceless alveolar fricative

e.g. [i**s**ilo] ‘wild animal’

(43) [z] - voiced alveolar fricative

e.g. [umu**z**i] ‘village’

(44) [ʃ] - voiceless post-alveolar fricative

e.g. [i**ʃ**ilo] ‘they said’

(45) [h] - voiceless glottal fricative

e.g. [uhala] ‘cotton or thread’

(46) [ɦ] - breathy voiced glottal fricative

e.g. [iɦala] ‘rake’

Affricatives:

(47) [tʃ] - voiceless palatal affricative

e.g. [u**tʃ**wala] ‘alcohol’

(48) [dʒ] - voiced palatal affricative

e.g. [in**dʒ**a] ‘dog’

(49) [kɬ] - voiceless velar lateral affricative

e.g. [uku**kɬ**eza] ‘to fall’

Nasals:

(50) [m] - voiced bilabial nasal

e.g. [umlo**m**o] ‘mouth’

(51) [n] - voiced alveolar nasal

e.g. [i**n**to] ‘thing’

(52) [ɲ] - voiced palatal nasal

e.g. [i**ɲ**oɠa] ‘snake’

(53) [ŋ] - voiced velar nasal

e.g. [i**ŋ**kosi] ‘king’

Approximants:

(54) **[**l] - voiced lateral liquid

e.g. [-**l**ala] ‘sleep’

(55) [r] - voiced alveolar trill (from adopted words)

e.g. [i**r**ajisi] ‘rice’

(56) [w] - voiced labio-velar glide

e.g. [u**w**eta] ‘waiter’

(57) [j] - voiced palatal glide

e.g. [umvi**j**o] ‘wild medlar tree’

Clicks:

(58) [kǀ, kǀʰ, gǀʱ, ŋǀ, ŋǀʱ] - dental clicks

(59) [k!, k!ʰ, g! ʱ, ŋ! ŋ! ʱ] - post-alveolar clicks

(60) [kǁ, kǁʰ, gǁʱ, ŋǁ, ŋǁʱ] - alveolar lateral clicks

The articulatory (place) features of the isiZulu consonants are as follows; the segments [p; pʰ; b; ɓ; f; v; m; w] are labial; [t; tʰ; d; s; z; ʃ; ɬ; ɮ; tʃ; dʒ; n; n] are coronal; [k; kʰ; g; ɠ; ɲ; ŋ] are dorsal; and [h; ɦ] are pharyngeal.

Table 2 below depicts a summary of the isiZulu consonant system and Table 3 shows the isiZulu click sounds.

Table 2: IsiZulu Consonant System

	Bilabial	Labio-Dentals	Dental	Alveolar	Post-Alveolar	Palatal	Velar	Glottal
Plosives	pʼ p^h b̪			tʼ t^h d			kʼ k^h g	
Implosives	ɓ						ɠ	
Fricatives		f v		s z	ʃ			h ɦ
Lateral			ɬ ɮ					
Affricatives					tʃ dʒ			
Nasals	m			n		ɲ	ŋ	
Trill				r				
Approximants **Glides** **Lateral Approximant**	w			l		j		

(Doke, 1927; Khumalo, 1981, 1984, 1987; Poulos & Msimang, 1998; Naidoo et al., 2005; Thomas-Vilakati, 2010)

Table 3: IsiZulu Clicks

Dental Clicks	[kǀ, kǀʰ, gǀʱ, ŋǀ, ŋǀʱ]
Post-Alveolar Clicks	[k!, k!ʰ, g!ʱ, ŋ! ŋ!ʱ]
Alveolar Lateral Clicks	[kǁ, kǁʰ, gǁʱ, ŋǁ, ŋǁʱ]

(Doke, 1927; Khumalo, 1981, 1984, 1987; Poulos & Msimang, 1998; Naidoo et al., 2005; Thomas-Vilakati, 2010)

Table 2 lists the tolerable consonants in the isiZulu language system. If an adopted word contains a consonant not permitted in isiZulu, the foreign consonant is substituted with an acceptable isiZulu consonant. Table 3 contributes a list of isiZulu's click sounds. The click sounds are unique and inherent to isiZulu (of the three languages under investigation), and are therefore considered irrelevant to this study, as they are not existent in English or Afrikaans.

3.2.4 The isiZulu Syllable Structure

Words are broken up into syllables, i.e. sequences of consonants (C) and vowels (V). The syllable structure of isiZulu is simple. Similarly to the majority of southern Bantu languages, isiZulu has a five-vowel system, as illustrated in Table 1. It does not permit diphthongs and vowel length does not differentiate meanings (Taljaard & Snyman, 1993). IsiZulu syllables are open, denoting that there are no codas; consonants can only occur at the beginning of a syllable, and syllables end in a vowel [V]. Sequences of consonants [CC] or vowels [VV] are not preferred in isiZulu (Khumalo, 1984; 1987). However, certain isiZulu adoptives from English and Afrikaans do contain complex onsets. The cause of this corresponds with the reason for the acceptance of the alveolar trill [r] (Khumalo, 1984; 1987) (see Appendix 3, Table 36). Hence, modern-day isiZulu speakers have retained selected [CC] structures in adoptives (see Appendix 3, Table 35 for the tolerable CC structures).

IsiZulu, aligned with the majority of other Bantu languages, is a tonal language (Govender, Barnard & Davel, 2005). Tone refers to the varying of pitch in certain syllables or words. Katamba (1989, p. 186) asserts that pitch may be utilised in a tonal language to differentiate word meanings or express grammatical differences. Therefore, tone is a contrastive feature in isiZulu. An analysis of the tonology of isiZulu loanwords, however, is a subject for a future investigation.

Furthermore, isiZulu contains occurrences of labialisation (consonant + /w/, e.g. [ɠo**dw**a] ‘but’), prenasalisation (nasal + consonant, e.g. [u**mb**ala] ‘shin’) and aspiration (consonant + /h/, e.g. [uɠuk^{h}et^{h}a] ‘choice’). However, these sequences of consonants or co-articulations are phonologically recognised as single phonemes (Naidoo et al., 2005, Ndambuki, 2013). In isiZulu orthography, strings of two or more consonants, for example, *inter alia*; <hl>/; <bh>; <dl>; <sh>; <ny>; and <ng>, may be symbolised as single consonants, for example ‘inyama’ is transcribed as [i**ɲ**ama] ‘meat’. Likewise, in phonetic transcription, single consonants can be denoted by two or more symbols, for example ‘**j**abulani’ is transcribed as [**dʒ**aɓulani] ‘be happy’ (Naidoo et al., 2005). Therefore, the permissible syllable structures in isiZulu comprise V (onsetless syllable) and CV, exemplified in the following examples:

(61) [u.ha.la] V.CV.CV ‘cotton or thread’

(62) [u.lo.ɓe.la] V.CV.CV.CV ‘he/she/it writes for’

The syllable structures depicted in examples (61) and (62) represent the shape of isiZulu words. Inferring from Clements and Keyser's (1983) set of syllabic groups, viz., CV, V, CVC, and VC, Khumalo (1987, p. 13) asserts that languages can be classified into the following types:

Type 1: CV

Type 2: CV, V

Type 3: CV, CVC

Type 4: CV, V, CVC, VC

Judging from the foregoing discussion and examples (61) and (62), isiZulu constitutes a Type 2 language, as its permissible syllable structures are CV and V. Syllable structure is a critical factor in the resyllabification process, as it dictates the shape to which all adoptive words conform.

3.3 South African English (SAfE)

3.3.1 Brief Background Details

There are a several varieties of English spoken around the world inclusive of British, American and South African English. This study centres on South African English (SAfE). SAfE is derived from British English, due to British immigration and colonisation in the19th century (Bekker, 2008, p. 70). English was declared an official language of South Africa in 1910 (Gough, 1996) and constitutes the home language of 9.6% of the Country's population (SouthAfrica.info, 2001). English is a component of the Indo-European language group (Grimes, 1996) and constitutes the primary language of business, government and commerce (Gough, 1996) as well as the medium of instruction in the majority of schools and tertiary institutions (Gough, 1996). In South Africa, English functions as a lingua franca denoting it is a medium of communication between people of different languages (Gough, 1996).

3.3.2 The English Vocalic System

The English segmental system contains more vowels than that of isiZulu, with approximately twenty-five vowels in total (Bekker, 2008; Jensen, 1993; Zivenge, 2009, p. 315), whereas isiZulu has five simple vowels. English contains monophthongs or simple vowels, diphthongs

and triphthongs. Diphthongs and triphthongs are considered complex, as they are characterised respectively by two and three vowel qualities. The English vowels may be described as follows (Bekker, 2008, p. 148-149; Khumalo, 1984; Jensen, 1993):

(63) [ɑ] – low back unrounded vowel

e.g. [f**ɑ**ːm] ‘farm’

(64) [ɒ] - short low back rounded vowel

e.g. [g**ɒ**t] ‘got’

(65) [æ] - short low front unrounded vowel

e.g. [m**æ**t] ‘mat’

(66) [e] - short mid-high front unrounded vowel

e.g. [b**e**d] ‘bed’

(67) [ə] - short, mid central unrounded vowel

e.g. [**ə**baʊt] ‘about’

(68) [ɜː] – long mid-low central unrounded vowel

e.g. [nɜːd] ‘nerd’

(69) [i] – short, high front unrounded vowel

e.g. [hæp**i**] ‘happy’

(70) [iː] - long high front unrounded vowel

e.g. [s**i**ːt] ‘seat’

(71) [ɪ] - short high front unrounded vowel

e.g. [s**ɪ**t] ‘sit’

(72) [ɔː] - long mid-low back rounded vowel

e.g. [st**ɔ**ːl] ‘stall’

(73) [uː] - long high back rounded vowel

e.g. [p**u**ːl] ‘pool’

(74) [ʊ] – short mid-high near-back rounded

e.g. [f**ʊt**] ‘foot’

(75) [ʌ] - short mid-low back unrounded vowel

e.g. [s**ʌ**n] ‘sun’

Table 4 below presents the English monophthongs, Table5 the English diphthongs and Table 6 the English triphthongs.

Table 4: English Monophthongs

	Front	**Central**	**Back**
Close	i ɪ		uː ʊ
Mid	e	ə ɜː	ɔː
Open	æ	ʌ	ɑ ɒ

(Khumalo, 1984; Jensen, 1993, p. 26-38)

Table 5: English Diphthongs

	Front	**Central**	**Back**
Close	ɪə	ʊə	
Mid	eɪ eə	əʊ	ɔɪ
Open	aɪ	aʊ	

(Khumalo, 1984; Jensen, 1993, p. 26-38)

Table 6: English Triphthongs

	Front	Central	Back
Close		əʊə	
Mid	eɪə		ɔɪə
Open	aɪə	aʊə	

(Musk, 2010)

3.3.3 The English Consonantal System

English has approximately 24 consonants, whereas isiZulu exhibits around 59 consonants, as well as a unique set of click sounds (Khumalo, 1984; 1987; Cope 1983; Naidoo et al., 2005). The English consonants may be described as (Jensen, 1993, p. 33):

Plosives:

(76) [p] - voiceless bilabial plosive

e.g. [**p**ɑːti] ‘party’

(77) [b] - voiced bilabial plosive

e.g. [**b**læŋk] ‘blank’

(78) [t] - voiceless alveolar plosive

e.g. [**t**riː**]** ‘tree’

(79) [d] - voiced alveolar plosive

e.g. [**d**ɒg] ‘dog’

(80) [k] - voiceless velar plosive

e.g. [**k**ɪs] ‘kiss’

(81) [g] - voiced velar plosive

e.g. [**g**rɪp] ‘grip’

Nasals:

(82) [m] - voiced bilabial nasal

e.g. [**m**ɒp] ‘mop’

(83) [n] - voiced alveolar nasal

e.g. [**n**ætʃrəl] ‘natural’

(84) [ŋ] - voiced velar nasal

e.g. [swɪ**ŋ**] ‘swing’

Liquids:

(85) [r] - voiced alveolar liquid

e.g. [**r**əʊp] ‘rope’

(86) [l] - voiced alveolar lateral liquid

e.g. [**l**ʌv] ‘love’

Fricatives:

(87) [f] - voiceless labio-dental fricative

e.g. [**f**ʌn] ‘fun’

(88) [v] - voiced labiodental fricative

e.g. [**v**æn] ‘van’

(89) [θ] - voiceless dental fricative

e.g. [**θ**ɪn] ‘thin’

(90) [ð] - voiced dental fricative

e.g. [**ð**əʊz] ‘those’

(91) [s] - voiceless alveolar fricative

e.g. [**s**ænd] ‘sand’

(92) [z] - voiced alveolar fricative

e.g. [**z**ɪp] ‘zip’

(93) [ʃ] - voiceless post-alveolar fricative

e.g. [**ʃ**i] ‘she’

(94) [ʒ] - voiced post-alveolar fricative

e.g. [**m**eʒə] ‘measure’

(95) [h] - voiceless glottal fricative

e.g. [**h**ʌg] ‘hug’

Affricative:

(96) [tʃ] - voiceless post-alveolar affricative

e.g. [**tʃ**i:z] ‘cheese’

(97) [dʒ] - voiced post-alveolar affricative

e.g. [**dʒ**ɪm] ‘gym’

Glides:

(98) [j] - voiced palatal glide

e.g. [**j**es] ‘yes’

(99) [w] - voiced labio-velar glide

e.g. [**w**eb] ‘ web’

Table 7 below presents the English consonantal system.

Table 7: English Consonant System

	Bilabial	Labio-dentals	Dental	Alveolar	Post-alveolar	Palatal	Velar	Glottal
Plosives	p b			t d			k g	
Nasals	m			n			ŋ	
Fricatives		f v	θ ð	s z	ʃ ʒ			h
Affricatives					ʧ ʤ			
Liquid Lateral				r l				
Glides	w					j		

(Jensen, 1993, p. 26-38)

3.3.4 The English Syllable Structure

English has a more complex syllable structure than isiZulu. English, unlike isiZulu, permits closed and open syllables [CVC] (see example 106), long vowels [V:] (see example 101), diphthongs [VV] (see example 104) and triphthongs [VVV] (see example 3). English does not have prenasalisation and aspirated sounds, whereas isiZulu has a number of aspirated sounds that distinguish word meaning. English allows monosyllabic words (words having one syllable) such as [fʌn] 'fun', whereas these are prohibited in isiZulu, as similarly to the majority of Bantu languages, its words are, at minimum, disyllabic.

IsiZulu prohibits consonantal clusters, in contrast to English wherein consonantal clusters with two or more consonants [CC] are permitted (see example 103) (Naidoo et al., 2005). When isiZulu adopts an English word containing a consonant cluster, for instance [frɪdʒ] [CCVC], the adopted word is repaired to conform to the isiZulu syllable structure, in a manner whereby the [CC] cluster is realised as [CV.CV] – [i.fi.li.dʒi] 'fridge. English permits the following syllable structures, some of which are repaired to fit into the CV syllable structure of isiZulu:

(100) VC [æz] 'as'

(101) CV: [ti:] 'tea'

(102) CVCC [lɪft] 'lift'

(103) CCV: [stɔ:] 'store'

(104) CVVC [vəʊt] ‘vote’

(105) CCVC [frɪdʒ] ‘fridge’

(106) V. CVC [ɒ.fɪs] ‘office’

(107) CV. CVC [kʌ.bəd] ‘cupboard’

(108) CCVVC [pleɪt] ‘plate’

(109) CV. CV. CVV [hɒ.lɪ.deɪ] ‘holiday’

(110) CCCVCC [streŋgθ] ‘strength’

(111) CCVCCCC [prɒmpts] ‘prompts’

The above description of the English syllable structures displays a number of differences between English and isiZulu. This renders the resyllabification and rephonologisation of adopted words crucial. Table 8 and Table 9 below demonstrate the substitution of English segments with the closest available and phonetically similar isiZulu segments. Phonetic similarity means sharing most features, which could be height, lip rounding, frontness or backness.

Table 8: Examples of the Substitution of English Vowels with isiZulu Vowels

English Form	IsiZulu Form	English Vowels	IsiZulu Realisation	Gloss
/let**ɪ**s/	[ul**eti**si]	/ɪ/	[i]	lettuce
/kɒfi/	[ik**o**fi]	/ɒ/	[o]	coffee
/v**æ**n/	[i.v**e**.ni]	/æ/	[e]	van
/b**ɒ**ks/	[i.bo.ǧi.si]	/ɒ/	[o]	box
/k**ɒ**l**ə**ni/	[i.k**o**.l**o**.ni]	/ɒ/ and /ə/	[o] and [o]	colony
/kemɪk**ə**l/	[ikemik**a**li]	/ə/	[a]	chemical
/w**ʊ**l/	[iw**u**li]	/ʊ/	[u]	wool
/l**ʌ**nʧ/	[il**a**nʧi]	/ʌ/	[a]	lunch
/n**ɜ**ːs/	[un**e**si]	/ɜ/	[e]	Nurse

Table 9: Examples of the Substitution of English Consonants with isiZulu Consonants

English Form	IsiZulu Form	English Consonants	IsiZulu Realisation	Gloss
/kærət/	[ikaloti]	/r/	[l]	carrot

Tables 8 and 9 demonstrate that several of the English vowels are substituted with phonetically similar isiZulu vowels, however relative to consonants, only the English voiced alveolar liquid /r/ is substituted with the isiZulu voiced lateral liquid [l].

3.4 Afrikaans

3.4.1 Brief Background Details

Afrikaans is one of South Africa's eleven official languages, is spoken by 13.5% of the population (SouthAfrica.info, 2001) and constitutes the third most commonly spoken language in the Country. Afrikaans was developed in Cape Town (Saho, 2010) originating from 17th century colloquial Dutch (van der Merwe, 1951, p. 23), although they differ in their grammar and vocabulary.

3.4.2 The Afrikaans Vocalic System

Afrikaans, just like English, has more vowels in its segmental system than isiZulu. De Villiers (1976) indicates that Afrikaans is comprised of seventeen monophthongs and eight diphthongs, in comparison to isiZulu, which contains five simple vowels. Donaldson (1993, p. 13-18) and Mahlangu (2007, p. 10-18) assert that Afrikaans vowels may be described as follows:

(112) [a] - short, low unrounded vowel

e.g. [p**a**d] 'road'

(113) [a:] - long, low unrounded vowel

e.g. [pl**a:**s] 'farm'

(114) [œ:] - long, mid-low front rounded vowel

e.g. [st**œ:**p] 'veranda'

(115) [ɛ] - short, mid-low front unrounded vowel

e.g. [m**ɛ**t] ‘with’

(116) [ɛ:] - long, mid-low front unrounded vowel

e.g. [s**ɛ:**] ‘say’

(117) [e:] - long, mid-high front unrounded vowel

e.g. [spr**e:**k] ‘speak’

(118) [ə] - short, central unrounded vowel

e.g. [n**ə**k**s**] ‘nothing’

(119) [ɪ] - short high front unrounded vowel

e.g. [d**ɪ**t] ‘it’

(120) [i] - short, high front unrounded vowel

e.g. [bəs**i**l] ‘enthuse’

(121) [i:] - long, high front unrounded vowel

e.g. [sp**i:**lkas] ‘chest of drawers’

(122) [o:] - long, mid-high back rounded vowel

e.g. [**o:**m] ‘uncle’

(123) [ø:] - long, mid- high front rounded vowel

e.g. [n**ø:**s] ‘nose’

(124) [ɔ] - short, mid-low back rounded vowel

e.g. [**ɔ**mpad] ‘detour’

(125) [ɔ:] - long, mid-low back rounded vowel

e.g. [b**ɔ:**rtɛsɛl] ‘easel’

(126) [u] - short, high back round vowel

e.g. [**u**rtɪpə] ‘original’

(127) [u:] - long, high back rounded vowel

e.g. [m**u:**r] ‘nut’

(128) [y] - short high front rounded vowel

e.g. [n**y**s] ‘news’

(129 [y:] - long high front rounded vowel

e.g. [m**y:**r] ‘wall’

Table 10 below depicts Afrikaans monophthongs and Table 11 Afrikaans diphthongs (Donaldson, 1993; Mahlangu, 2007, p. 13-18; Ager, 2011)

Table 10: Afrikaans Monophthongs

	Front	**Central**	**Back**
High	i i:		u u: y y:
Mid	ɛ: e: ɛ ø	ə	o: ɔ ɔ: œ
Low			a a:

(Donaldson, 1993; Mahlangu, 2007, p. 13 – 18)

Table 11: Afrikaans Diphthongs

	Front	**Central**	**Back**
Close			
Mid	əi	əu	œy oːi
Open			aːi

(Donaldson, 1993; Mahlangu, 2007, p. 13 – 18; Ager, 2011)

3.4.3 The Afrikaans Consonantal System

Afrikaans has approximately twenty-six consonants, in contrast to isiZulu's fifty-nine (Naidoo et al., 2005). The Afrikaans consonantal system may be described as follows (Donaldson, 1993; Mahlangu, 2007, p. 18; Ager, 2011):

Plosives:

(130) [p] - voiceless bilabial plosive

e.g. [**p**an] 'frying pan'

(131) [b] - voiced bilabial plosive

e.g. [**b**luːs] 'blouse'

(132) [d] - voiced alveolar plosive

e.g. [**d**ɔːrp] 'town'

(133) [t] - voiceless alveolar plosive

e.g. [**t**ɑːfəl] 'table'

(134) [k] - voiceless velar plosive

e.g. [**k**at] 'cat'

(135) [g] - voiced velar plosive

e.g. [**g**ɔlf] 'golf'

(136) [c] - voiceless palatal plosive

e.g. [mɔŋ**c**i] 'small mouth'

Fricatives:

(137) [f] - voiceless labiodental fricative

e.g. [**f**ɛnstər] 'window'

(138) [s] - voiceless alveolar fricative

e.g. [**s**toːf] ‘stove’

(139) [z] - voiced alveolar fricative

e.g. [zum] ‘buzz or zoom’

(140) [ʒ] - voiced post-alveolar fricative

e.g. [**ʒ**ak] ‘coat’

(141) [ʃ] - voiceless post-alveolar fricative

e.g. [**ʃ**iːk] ‘fashionable’

(142) [x] - voiceless velar fricative

e.g. [**x**lɔː] ‘believe’

(143) [ɦ] - voiced glottal fricative

e.g. [**ɦ**ɛmp] ‘shirt’

(144) [ç] - voiceless palatal fricative

e.g. [**ç**istər] ‘yesterday’

Affricatives:

(145) [tʃ] - voiceless post-alveolar affricative

e.g. [**tʃ**ɛx] ‘Czech’

(146) [ts]- voiceless alveolar affricative

e.g. [**ts**œːnɑːmi] ‘seismic wave’

Trill:

(147) [r] - voiced alveolar trill

e.g. [**r**ɔk] ‘dress’

(148) [ʁ] - voiced uvular trill

e.g. [**ʁ**ɛx] ‘right’

Nasals:

(149) [m] - voiced bilabial nasal

e.g. [**m**al] ‘carzy’

(150) [n] - voiced alveolar nasal

e.g. [**n**ɑːlt] ‘needle’

(151) [ŋ] - voiced velar nasal

e.g. [ri**ŋ**] ‘ring’

(152) [ɲ] - voiced palatal nasal

e.g. [bɔːɲ**c**is] ‘beans’

Liquid:

(153) [l] - voiced alveolar lateral

e.g. [**l**oːp] ‘walk’

Glides:

(154) [j] - voiced palatal glide

e.g. [**j**aː] ‘yes’

(155) [w] - voiced labio-velar glide

e.g. [**w**ɛx] ‘away’

Table 12 summarises the Afrikaans consonants.

Table 12: Afrikaans Consonantal System

	Bilabial	Labio-Dentals	Alveolar	Post-Alveolar	Palatal	Velar	Uvular	Glottal
Plosives	p b		t d		c	k g		
Fricatives		f	s z	ʒ ʃ	ç	x		ɦ
Affricative				tʃ				
Trill			r				ʀ	
Nasals	m		n		ɲ	ŋ		
Liquid			l					
Glides					j	w		

(Donaldson, 1993; Mahlangu, 2007, p. 13 – 18; Ager, 2011)

3.4.4 The Afrikaans Syllable Structure

Just like English, Afrikaans permits marked structures like closed syllables [CVC] (see example 160), consonantal clusters [CC] (see examples 157, 159 and 162), long vowels [V:] (see example 161); and diphthongs [VV] (see examples 158, 159 and 162). In Afrikaans vowel length [V:] is a contrastive feature, as aspiration is in isiZulu. For example, the word [s**a**l] with the short low unrounded vowel /a/ means 'will' and [s**a**ːl], with the long low unrounded vowel /aː/ means 'saddle'. Afrikaans, like English, permits monosyllabic words, e.g. [kla] 'finished', prohibited in isiZulu. In Afrikaans, onsets may be either simple [CV] or complex [CCV]. For instance, the isiZulu adoptive from Afrikaans [**st**ul] [**CC**VC] contains a complex onset. As a result, this adoptive undergoes an adaption process, with the [CC] structure simplified to [CV.CV] or [i.si.tu.lo]. Afrikaans allows the following syllable structures:

(156) VC [as] 'like'

(157) CCV [xloː] 'believe'

(158) CVVC [fəut] 'mistake'

(159) CCVVC [stəut] 'naughty'

(160) CV CVC [bɔ.tər] 'butter'

(161) CV:C CVC [boːɲ.cis] ‘bean’

(162) CCVV CVC [spəi.kər] ‘nail’

Like English, Afrikaans segments are substituted with phonetically close isiZulu segments. Table 13 and 14 below illustrate this process.

Table 13: Examples of the Substitution of Afrikaans Vowels with isiZulu Vowels

Afrikaans Form	IsiZulu Form	Afrikaans Vowels	IsiZulu Realisation	Gloss
/sœykər/	[uʃ**u**ɠ**e**la]	/œ/, /y/ and /ə/	[u] and [e]	sugar
/sløːtəl/	[isiɬ**u**t^{h}**u**lelo]	/øː/	[u]	key
/brœx/	[ibul**o**ho]	/œː/	[o]	bridge
/pɑːl/	[ip**a**li]	/ɑː/	[a]	pole
/kɑːmeːl/	[ik**a**mela]	/ɑː/	[a]	camel
/veːk/	[iv**i**ki]	/eː/	[i]	week
/mnyːt/	[imin**i**t^{h}i]	/yː/	[i]	minute

Table 14: Examples of the Substitution of Afrikaans Consonants with isiZulu Consonants

Afrikaans Form	IsiZulu Form	Afrikaans Consonants	IsiZulu Realisation	Gloss
/xans/	[ihansi]	/x/	[h]	goose
/rək/	[iloɠwe]	/r/	[l]	dress

Table 13 shows that there are a number of Afrikaans vowels without isiZulu equivalents. Consequently, they are substituted by the closest, phonetically similar isiZulu ones. Table 14 demonstrates that the Afrikaans voiceless velar fricative /x/ is substituted with the isiZulu voiceless glottal fricative [h]. The Afrikaans voiced alveolar liquid /r/ is substituted with the voiced lateral liquid [l], as isiZulu does not have the voiced alveolar liquid /r/ in its consonantal inventory.

Therefore, taking into account the vast array of differences between the English and Afrikaans language systems, as compared to that of isiZulu when an English or Afrikaans word is adopted into isiZulu, certain foreign segments (vowels or consonants) are rephonologised to comply

with the segmental requirements of isiZulu. This is demonstrated in the preceding Tables 8, 9, 13 and 14. Within this contextualisation, the overarching objective of this study is to present a theoretically informed analysis of repair strategies utilised to rephonologise English and Afrikaans words in isiZulu.

3.5 Summary

This chapter briefly described each of the languages' phonologies focusing on segment inventories and syllable structures, to render a contextualisation or background for the analysis of data, arrayed in Chapters 5 and 6. The next chapter discusses the data collection methods and theoretical framework utilised for this investigation.

CHAPTER 4: DATA GATHERING AND ANALYSIS TECHNIQUES

4.1 Introduction

Chapter 3 reviewed each of the languages' geographical locations, genetic affiliations, and segmental and syllable structures. The previous chapter encompassed a comparison of the English and Afrikaans sound systems to that of isiZulu. This chapter presents a concise explanation of the methods employed to gather, verify and analyse data in this study. The data sources are discussed along with the ways through which the data was verified. The analysis techniques (i.e. methods of data analysis) comprise two phonological theories, viz., Feature Geometry and Optimality Theory, which are outlined herein. The next section discusses the data gathering techniques employed in this study.

4.2 Methodology

4.2.1 Data Gathering Techniques

This study presents and formally analyses a large corpus of isiZulu adoptives from English and Afrikaans. The data for this study was gathered from a number of sources, inclusive of, *inter alia*, isiZulu educational books, i.e. *Ungangishiyi Phela Shongololo* (Daly & Msimang, 1991), *Say it in Zulu: For beginners/third-language speakers* (Wilkes & Nkosi, 1998) and *Ibhuku Lokuzithokozisa* (Mshengu & Bosch, 1987), along with previous studies on isiZulu, for instance those of Khumalo (1984, 1987), Koopman (1992), Poulos and Msimang (1998) and Ngcobo (2013). The main advantage of gathering data from multiple sources including books and previous studies is that it generates a large corpus of data. A total of 255 isiZulu loanwords from English and Afrikaans were collected from these sources (see Appendix 1, Table 33 and Appendix 2, Table 34, for a list of the English and Afrikaans adoptives). The criteria utilised to select the loanwords were based on their relevance to the current study. This means that the loanwords used in this study, are those considered to best exemplify the strategies on which this thesis focuses. The English data are transcribed using an online transcription system called: *PhoTransEdit (http://www.photransedit.com/),* the Afrikaans data are transcribed using a previous study (Mahlangu, 2007, p. 8-60) and with the help of a linguist and, the isiZulu data are transcribed using the online dictionary *isiZulu.net (https://isizulu.net/).*

4.2.2 Method of Data Verification

The data for this study was verified in terms of authenticity and pronunciation by native speakers of isiZulu. The verification of the data was conducted through the following sequence: two students from the University of the Witwatersrand, who are first language isiZulu speakers, were asked to verify the large corpus of isiZulu adoptives collected, ensuring these are actual isiZulu words, and then they were asked to pronounce each of the words, facilitating the capturing of the correct phonetic and phonological transcription of each word. In addition, the correct pronunciation enables one to distinguish whether the word derived from English or Afrikaans. However sometimes it is difficult to determine whether a loanword is derived from English or Afrikaans, as isiZulu speakers have been in contact with both English and Afrikaans speakers. A second method of verification involved looking up these words in isiZulu dictionaries. The dictionaries utilised are: *Scholar's Zulu Dictionary* (Dent & Nyembezi, 1995), *Compact Zulu Dictionary* (Dent & Nyembezi, 1995); *Zulu-English Dictionary* (Doke, Malcolm & Sikakana, 1958), *The English, Afrikaans, Xhosa and Zulu Aid* (Uys, 2002) and *isiZulu.net* (https://isizulu.net/). The motivation for multiple dictionaries is corroboration and the online dictionary is more likely to be complete, as these dictionaries are updated more regularly than older printed versions.

4.3 Methods of Data Analysis

In this thesis, the Feature Geometry (FG) model is employed to describe the feature structure of vowels and glides, and to account for glide epenthesis as a spreading process (explained further in Chapter 5). The overall data analysis is set within Optimality Theory. The following section briefly discusses the tenets of FG, relevant to the analysis of data in this study.

4.3.1 Feature Geometry

FG is a phonological theory, introduced by Nick Clements and Elizabeth Hume in 1985 (Halle, Vaux, & Wolfe, 2000). Clements and Hume (1995) assert that the basic units of phonological representation are features. Features are organised on auto segmental tiers, and are hierarchically grouped. In the production of speech, several independent articulators are utilised, viz., the lips (Labial), tongue blade (Coronal), tongue body (Dorsal), tongue root (Radical), soft palate (Rhinal) and vocal folds (Glottal) (Clements & Hume, 1995). Articulators play a fundamental role in the organisation of segment structure, thus are represented on

individual nodes of their own on separate tiers. For example, Labial, Coronal, Dorsal, and Pharyngeal are linked to the place constituent or node on the feature hierarchy (Clements & Hume, 1995). An illustration of this model can be seen in Figure 1 below.

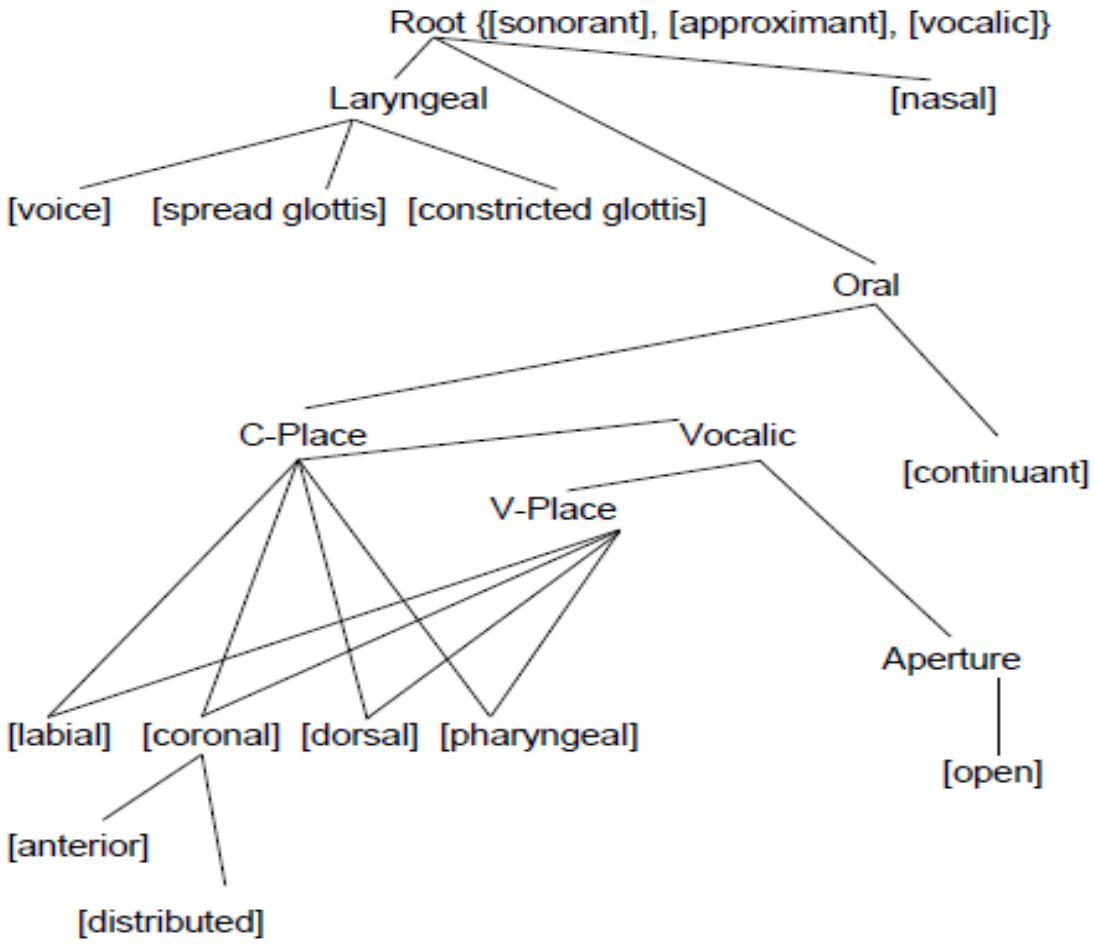
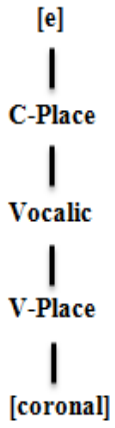
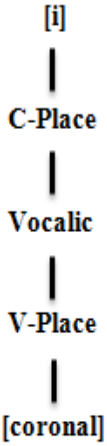


Figure 1: Clements and Hume's (1995, p. 292) Feature Geometry Model

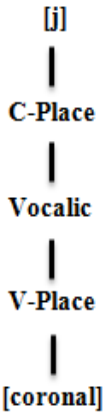
Features are said to be universal. The feature theory maintains that all languages draw upon a similar set of speech properties in the construction of their phonological systems (Clements & Hume, 1995). Kadenge (2012) emphasises that FG is useful in demonstrating that vowels and glides are phonetically similar, as they share the same feature organisation. Figure 2 (a – g) below illustrates the feature organisation of vowels and glides.



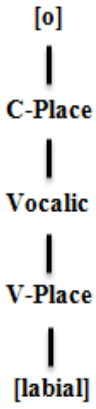
a. The feature structure of [e]



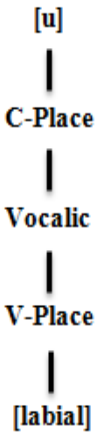
b. The feature structure of [i]



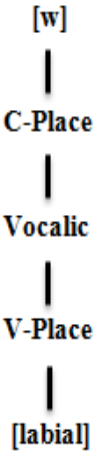
c. The feature structure of [j]



d. The feature structure of [o]



e. The feature structure of [u]



f. The feature structure of [w]



g. The feature structure of [a]

(adapted from Kadenge, 2012, p. 67)

Figure 2: The Feature Organisation of Vowels and Glides.

Figure 2 (a-g) reveals that the palatal glide [j] has a similar feature structure as the vowels [e] and [i], and likewise, the labio-velar glide [w] has an identical feature structure to the vowels [o] and [u]. The main difference between glides and their corresponding vowels is that glides are non-moraic while vowels are moraic. This feature organisation depicted in Figure 2 is crucial when considering glide epenthesis through spreading, as a repair strategy utilised to adapt loanwords. For instance, inserting the glides [j] or [w] to simplify diphthongs [VV] in certain cases, for example:

(163) /baɪsɪkəl/ → [iba**j**isikili]

(164) /foʊn/ → [ifo**w**uni],

Alternatively, by inserting a vowel to open closed syllables [CVC]:

(165) /dæm/ → [idamu].

Examples (163) and (164) have complex syllable nuclei, in the form of the diphthongs [aɪ] and [oʊ], respectively. Since diphthongs are not found or acceptable in isiZulu phonology hence they are repaired through glide epenthesis.

Example (163) illustrates that the insertion of the palatal glide [j] creates an onset for the second vowel in VV sequence [aɪ]. Figures 2 (b) and (c) illustrate that the vowel [i] and the glide [j] share the same phonetic feature, i.e. coronal. Correspondingly, example (164) demonstrates that the labiovelar glide [w] creates an onset for the second vowel in a VV sequence [oʊ]. Figures 2 (e) and (f) illustrate that the vowel [u] and the glide [w] share the same phonetic feature, i.e. labial.

Example (165) demonstrates that in the adopted word /dæm/ the syllable coda is repaired through the insertion of the vowel [u], when adopted in isiZulu. FG is useful in in explaining that the labial vowel [u] is inserted in the environment of a labial consonant [m]. Consistently, example (164) [i.fo.wu.n**i**], displays that the coronal vowel [i] is inserted in the context of the coronal consonant [n]. OT is concisely discussed in the following subsection.

4.3.2 Optimality Theory (OT)

Optimality Theory, the contemporary leading theoretical paradigm in phonology, was introduced by Prince and Smolensky (1993), as a framework for linguistic analysis (Zuraw,

2003, p. 819). OT is a constraint-based theory that affirms that Universal Grammar contains a set of violable constraints and these constraints demonstrate the universal properties of language (Archangeli, 1997).

The OT model operates according to three basic principles, viz., Generate (GEN), Constraint (CON) and Evaluate (EVAL). The GEN generates or produces a list of potential outputs or candidates (two or more) from a given input. From these output candidates, one is identical to the input while the others are structurally altered (Kar, 2009). The grammar system provides mappings from inputs to outputs. Inputs (e.g. /stɔr/) are regarded as the underlying representations, and the outputs (e.g. [isitolo]) as their surface realisations (Prince & Smolensky, 1993).

CON constitutes a universal set of constraints. This denotes that all the worlds' languages have access to the same set of constraints and the variances occurring among languages depend on how they (the different languages) rank these constraints (same sets of constraints). In sum, all languages have strictly ordered violable constraints and the way in which a language ranks these constraints is used to distinguish the optimal candidates (Archnageli, 1997). Constraints are hierarchically ranked, with the candidate that violates the least ranked constraint considered optimal. Kager (1999, p. 9) describes a constraint as "a structural requirement that may either be satisfied or violated by an output form". A form is synonymous with a candidate.

There are two notable types of constraints in Universal Grammar, viz., markedness constraints and faithfulness constraints. Faithfulness constraints require the output to be similar to the input, whereas markedness constraints require the output to have a particular 'optimal' shape (Kar, 2009; van Oostendorp, 2004, p. 2). Markedness constraints assess the well-formedness of the output structures (Hume, 2004, p. 79) and therefore, impose certain limits on the occurrence of particular segments (Kar, 2009). An example of a markedness constraint is *COMPLEX which states that complex structures such as [CC] (complex onsets) or [VV] (complex nuclei) are prohibited. Faithfulness constraints are said to keep markedness constraints in equilibrium (van Oostendorp, 2004). For instance, the insertion of a segment to satisfy the marked constraint *COMPLEX would result in the violation of the faithfulness constraint DEP-IO (no insertion) as the epenthetic (or inserted) segment has no corresponding item in the input (Mwita, 2009).

The function of EVAL is to subsequently select the optimal candidate from the set of candidates produced by the GEN. The optimal candidate is chosen, based on the specific languages' constraint hierarchy, since constraint ranking is language dependent. Tesar and Smolensky (1993, p. 8) assert that languages differ in their ranking of constraints, as certain constraints are given priority over others. Therefore, the optimal candidate is the candidate that violates the low ranked constraints, as OT allows the lower ranked constraints to be violated, to satisfy the higher ranked constraints (Kar, 2009). Kar (2009) stresses that violability is what guarantees that the optimal candidate is not obligated to satisfy all constraints.

OT was selected for the purposes of analysing data in this study due to its analytical machinery allowing an insightful exploration of why a specific language -in this case isiZulu- chooses one repair strategy over another, e.g. epenthesis is optimal, while deletion is not. Kadenge (2012, p. 68) maintains that OT is able to adequately capture "optimal repair strategies". For example, epenthesis may be chosen over deletion, if deletion is a highly ranked constraint and epenthesis (insertion) is lowly ranked, then a candidate violating a lower ranked constraint is optimal. From our review of previous studies, we see that OT is favoured by a number of scholars who examine loanword adaption and adoption patterns.

Typically, an OT analysis is presented in an OT Tableau, as demonstrated in Tableau *X* below. In Tableau *X*, Language *X* refers to the language currently being analysed, along with its particular ranking of the constraints. For instance, when we examine isiZulu adoptives from English or Afrikaans the word *isiZulu* replaces Language *X*. A comma appearing between constraints (constraint 1, constraint 2, constraint 3) specifies that there is no crucial ranking between the constraints. In an OT tableau, this is illustrated by dashed lines between the constraints (Tejada, 2012). When one constraint dominates over another, this is symbolised by (>>), for example constraint 3 >> constraint 4. In an OT tableau this is represented by solid lines between the constraints (Tejada, 2012). The candidates or outputs are listed vertically on the far left of the tableau, while the input and constraints are listed horizontally in the first row of the tableau. The constraints in the tableaux are listed from the highest ranked to the lowest ranked (left to right). An asterisk (*) is used to depict a violation and an exclamation mark (!) is employed to represent a fatal violation of a constraint. Finally, a pointer (☞) is used to show the optimal candidate.

Tableau X: An Example of an OT Analysis

Language *X*: Constraint 1, Constraint 2, Constraint 3 >> Constraint 4

/input/	Constraint 1 Highest ranked	Constraint 2	Constraint 3	Constraint 4 →Lowest ranked
a. Candidate 1	*!			
☞b. Candidate 2				*
c. Candidate 3			*!	

An example of an analysis for Tableau X:

Tableau *X* demonstrates that for Language *X* Candidate 1 and Candidate 3 fatally violate the high ranked constraints 1 and 3, therefore they cannot be optimal. Candidate 2 is the winner as it satisfies all the high ranking constraints and only violates the lowly ranked constraint 4.

Tableau *X* and its analysis are only presented in this chapter in order to demonstrate how OT works. The actual analysis of data is presented in the subsequent chapter.

4.4 Summary

This chapter contributed a brief explanation of the methodological approaches employed in this study. A total of 255 isiZulu loanwords were accumulated from isiZulu books and, previous isiZulu studies. The examples presented in this study were verified for grammaticality and acceptability, using two native speakers of isiZulu, as well five isiZulu dictionaries. Two theoretical approaches were employed to analyse the data, viz. Feature Geometry and Optimality Theory. FG is useful in describing the feature structure of vowels and glides and to account for glide epenthesis as a spreading process, while OT provides an insightful constraint-based analysis of the adaption processes triggered in isiZulu loanword phonology. FG and OT are renowned in the area of phonology and have been used in previous studies for quite some time The following chapter presents an analysis and explanation of the data.

CHAPTER 5: DATA ANALYSIS AND DISCUSSION

5.1 Introduction

The previous chapter briefly discussed the methods employed to gather, verify and analyse data for this study, through a detailed explanation of the data sources, data verification techniques and the two phonological theories used to analyse the data, viz., Feature Geometry and Optimality Theory. This chapter presents, interprets and formally analyses some aspects of the phonology of isiZulu adoptives. A detailed explanation of repair strategies employed in isiZulu loanword phonology is presented in this chapter. These repair strategies are discussed in relation to FG and OT. Those adoptives that are completely and partially rephonologised are identified, through the presentation of English and Afrikaans adoptives, along with the repair strategy they undergo in order to fit into isiZulu's acceptable syllable structure. Finally, this chapter contributes a formal OT analysis of the data.

5.2 Repair Strategies in isiZulu Loanwords from English and Afrikaans

As demonstrated earlier, the phonological systems of isiZulu, English and Afrikaans differ considerably. When isiZulu adopts a word from English or Afrikaans, the adopted word may contain foreign segments and syllable structures that violate the isiZulu syllable structure and segmental well-formedness, respectively. As a result, foreign and non-conforming adoptives have to be phonologically repaired. This designates that they have to be rephonologised in order to conform to the isiZulu preferred phonological system. The data have shown that the principal repair strategies used in isiZulu loanword phonology are; substitution (vowel and consonant substitution), insertion (vowel and glide epenthesis) and elision (deletion). This chapter presents data that illustrates these repair strategies, along with a formal analysis.

5.2.1 Segment Substitution

Substitution is a process whereby a segment or phoneme is replaced by a phonetically-close segment in the recipient language. There are two types of substitutions, viz., vowel and consonant substitution. When isiZulu adopts an English or Afrikaans word, it rephonologises the vowels and consonants to the closest available vowels and consonants in its segmental inventory. The following section presents the segmental substitution patterns that are obtained in isiZulu loanword phonology.

5.2.1.1 Vowel Substitution

(a) Substitution of English vowels

Table 15 and 16 below demonstrate the substitution patterns of English vowels.

Table 15: The Substitution of English Vowels with isiZulu Vowels

English Vowels	IsiZulu Realisation
/æ/	[e]
/ɒ/	[o]
/ɑ/	[o]
/ʊ/	[u]
/ʌ/	[a]
/ɜ/	[e]
/ɪ/	[i]
/ə/	[o], [a] and[e]

In Table 15 the English vowels /æ/ and /ɜ/ are substituted with the isiZulu vowel [e], the English vowels /ɒ/ and /ɑ/ are substituted with the isiZulu vowel [o], the English vowel /ə/ is substituted with the isiZulu vowels [o], [a] and [e] and the English vowels /ɪ/, /ʊ/, and /ʌ/ are substituted with the isiZulu vowels [i], [u] and [a], respectively. This is because the English vowels do not occur in the isiZulu vowel inventory. Table 16 below presents examples of vowel substitution in isiZulu loanwords from English.

Table 16: Examples of Vowel Substitution in isiZulu Loanwords from English

English Form	isiZulu Form	Gloss
/kɒfi/	[ik**o**fi]	coffee
/væn/	[iv**e**ni]	van
/bɒks/	[ib**o**ʤisi]	box
/kɒlәni/	[ik**o**l**o**ni]	colony
/wʊl/	[iw**u**li]	wool
/lʌnʧ/	[il**a**nʧi]	lunch
/nɜːs/	[un**e**si]	nurse
/tɔɪlәt/	[itojil**e**ti]	toilet
/sɪlvә/	[is**i**liv**a**]	silver

Table16 presents examples illustrating vowel substitution in isiZulu adoptives from English. For instance, the English form of 'wool' is /wʊl/ and is realised as [iwuli] in isiZulu. Therefore, the English vowel /ʊ/ is realised as [u] in isiZulu. In order to account for this realisation (and all others), we appeal to specific segmental markedness constraints that refer to the segmental inventory of isiZulu (Kadenge & Mudzingwa, 2011; 2012). The aim of these constraints are to rid the input forms of the language of certain impermissible or marked structures (Kadenge & Mudzingwa, 2011, p. 212). The markedness constraint which bans the vowel /ʊ/ is defined in (166). Tableau 1 formalises the realisation /wʊl/ in isiZulu.

(166) ***ʊ** - the vowel [ʊ] is prohibited (Kadenge & Mudzingwa, 2011, p. 156)

A faithfulness constraint that militates against changing the features of input segments is IDENT-IO. This constraint is defined in (167) below:

(167) IDENT-IO - The features of a vowel or consonant in the input must be identical to those of a corresponding vowel or consonant in the output (Kadenge & Mudzingwa, 2012, p. 146).

IDENT-IO is ranked below the segmental markedness constraint ***ʊ** and is low ranking in isiZulu. As a result, it incurs a non-fatal violation, thus can consequently be violated.

It is important to mention, prior to any analysis, that the [i] inserted at the beginning of isiZulu words such as [iwuli] or [iveni], *inter alia*, is not considered a violation, as it is a morphosyntactic requirement of isiZulu (Aronoff & Fudeman, 2005).

Tableau 1: The Realisation of the English Word /wʊl/ in isiZulu

**isiZulu: ***ʊ>>IDENT-IO

Input: /wʊl/ **Output:** [iwuli]

/wʊl/	*ʊ	IDENT-IO
a. [wʊl]	*!	
☞b.[i.wu.li]		*

Candidate (a) is fully faithful to the input but fatally violates the high ranked constraints *ʊ, which prohibits the vowel [ʊ], therefore it is not optimal. Candidate (b) is the winning candidate. It substitutes the vowel /ʊ/ with the acceptable isiZulu vowel [u] -as both are high back vowels- in turn violating the low ranked constraint IDENT-IO, which militates against segmental feature changes. Subsection 5.2.1.1(b) discusses the substitution of Afrikaans vowels with isiZulu vowels.

5.2.1.1 (b) Substitution of Afrikaans vowels

Table 17 and 18 below demonstrate the substitution patterns of Afrikaans vowels.

Table 17: The Substitution of Afrikaans Vowels with isiZulu Vowels

Afrikaans Vowels	IsiZulu Realisation
/øː/	[u]
/ɪ/	[i]
/œː/	[o]
/yː/	[i]
/ɑː/	[a]
/ə/	[e] and [u]

In Table 17 the Afrikaans vowel /œː/ is substituted with the isiZulu vowel [o], the Afrikaans vowels /ɪ/ and /yː/ are substituted with the isiZulu vowel [i], the Afrikaans vowel /ɑː/ is substituted with the isiZulu vowel [a], the Afrikaans vowel /øː/ is substituted with the isiZulu vowel [u] and the Afrikaans vowel /ə/ is substituted with the isiZulu vowels [e] and [u]. This is because the above listed Afrikaans vowels do not have equivalent values in the isiZulu vowel inventory. Table 18 below demonstrates examples of vowel substitution in isiZulu loanwords from Afrikaans.

Table 18: Examples of Vowel Substitution in isiZulu Loanwords from Afrikaans

Afrikaans Form	isiZulu Form	Gloss
/sl**ø**ːt**ə**l/	[isiɬ**u**t**u**lelo]	key
/br**œ**ːx/	[ibul**o**ho]	bridge
/n**ɑ**ːlt/	[in**a**liti]	needle
/t**ɑ**ːf**ə**l/	[itaf**u**la]	table
/sk**ə**p/	[isik**e**be]	boat
/pɑːl/	[ip**a**li]	pole
/sk**œ**lt/	[isikw**e**leti]	debt
/sn**œ**y**e**f/	[isin**e**mfu]	snuff

Table 18 presents vowel substitution patterns in isiZulu loanwords from Afrikaans. The Afrikaans form is presented and then the isiZulu realisation is given. For example, the Afrikaans form of ‘pole’ is /pɑːl/ and the isiZulu realisation is [ipali]. In summary, the Afrikaans vowel /ɑː/ is realised as [a] in isiZulu. The substitution of the Afrikaans vowels /ɑː/ in isiZulu is formalised in Tableau 2 below. The constraint which bans the vowel /ɑː/ is *ɑː which is defined in (168), and the constraint which enables the substitution of a feature is IDENT-IO. As we have established above, under section 5.2.1.1(a), IDENT-IO is lowly ranked. Thus it enables the substitution of a foreign segment with an isiZulu equivalent.

(168) *ɑː– the vowel /ɑː/ is prohibited in isiZulu.

Tableau 2: The Realisation of the Afrikaans Word /pɑːl/ in isiZulu

IsiZulu: *ɑː>>IDENT-IO

Input: /pɑːl/ **Output:** [ipali]

/pɑːl/	*ɑː	IDENT-IO
a. [pɑːl]	*!	
☞ b. [i.pa.li]		*

Candidate (a) fatally violates the high ranking constraint *ɑː, which prohibits the vowel [ɑː] as it is not part of the isiZulu vowel inventory. Candidate (b) is the winner, as it substitutes the vowel [ɑː] with the vowel [a] -these two vowel are phoneticallysimilar as they share the features low and unrounded- in violation of the low ranked constraint IDENT-IO- that demands that the features of the vowel in the input should be identical to the corresponding vowel in the output (Kadenge & Mudzingwa, 2012, p. 14). Therefore, any candidate that substitutes an impermissible vowel or consonant with an equivalent isiZulu vowel or consonant, violates IDENT-IO. Next we evaluate consonant substitution.

The preceding analysis may be applied *mutatis mutandis* to all other vowel substitution patterns in isiZulu loanword phonology.

5.2.1.2 Consonant Substitution

(a) Substitution of English consonants

Tables 19 and 20 below demonstrate the consonantal substitution patterns of English vowels.

Table 19: The Substitution of the English Consonant /r/ with isiZulu Consonant [l]

English Vowels	IsiZulu Realisation
/r/	[l]

In Table 19 the English voiced alveolar liquid /r/ is substituted with the isiZulu voiced alveolar lateral liquid [l]. This is because the English alveolar liquid /r/ does not occur in isiZulu's native consonantal inventory. Only the feature [+lateral] distinguishes /r/ from /l/.

Table 20 below presents examples of the voiced alveolar liquid /r/ substituted with the voiced lateral liquid [l] in isiZulu loanwords from English.

Table 20: Examples Illustrating the Substitution of the English Voiced Alveolar Liquid /r/ with the isiZulu Voiced Lateral Liquid [l]

English Form	isiZulu Form	Gloss
/stɔ(**r**)/	[isito**l**o]	store
/kæ**r**ət/	[ika**l**oti]	carrot
/pet**r**əl/	[upeti**l**oli	petrol
/**r**eɪdɪəʊ/	[i**l**edijo]	radio
/pæ**r**əfɪn/	[upa**l**afini]	paraffin
/gæ**r**ɑːdʒ/	[iga**l**adʒi]	garage
/b**r**ʌʃ/	[ibu**l**aʃi]	brush
/t**r**eɪ/	[iti**l**eji]	tray
/d**r**ʌm/	[idi**l**amu]	drum

Table 20 presents examples of isiZulu consonantal substitution patterns. For example, the English form of 'drum' is /d**r**ʌm/ and the isiZulu realisation is [idi**l**amu]. This example, demonstrates that English voiced alveolar liquid /r/is realised as the voiced lateral liquid [l] in isiZulu. It also further exemplifies that the vowel /ʌ/ is substituted with the vowel [a]. Tableau 3 provides a formal analysis of this process**.** The constraint that prohibits the voiced alveolar liquid /r/ is *r, this is explained in (169) below. The constraint which bans the vowel /ʌ/ is *ʌ, as defined in (170) below. Consonantal substitution also involves segmental feature changes, and the faithfulness constraint that prohibits this is IDENT-IO, explained in (167) above.

(169) *r - the consonant [r] is prohibited.

(170) *****ʌ- the vowel [ʌ] is prohibited (Kadenge & Mudzingwa, 2012, p. 145).

Tableau 3: The Realisation of the English Word /drʌm/ in isiZulu

IsiZulu: *r, ***ʌ** >>IDENT-IO

Input: /d**r**ʌm/ **Output:** [idi**l**amu]

/d**r**ʌm/	*r	***ʌ**	IDENT-IO
a. [drʌm]	*!	*	
☞ b. [i.di.**l**a.mu]			**

Candidate (a) is non-optimal because it fatally violates the high-ranking segmental markedness constraints *r and *ʌ. *r bans the [r] sound and *ʌ bars the vowel [ʌ] in isiZulu. Candidate (b) substitutes the voiced alveolar liquid /r/ and the vowel /ʌ/, with the voiced lateral liquid [l] and the vowel [a], respectively. It, thus, violates the lowly ranking constraint IDENT-IO twice. Candidate (b) is thus the optimal candidate. Next we discuss the substitution of Afrikaans consonants with isiZulu consonants**.**

5.2.1.2 (b) Substitution of Afrikaans consonants

Tables 21 and 22 below illustrate the consonantal substitution patterns of Afrikaans vowels.

Table 21: The Substitution of Afrikaans Consonants /r/ and /x/, with their isiZulu Equivalents [l] and [h], Respectively

Afrikaans Vowels	IsiZulu Realisation
/r/	[l]
/x/	[h]

Table 21 depicts that the Afrikaans voiceless velar fricative /x/ is substituted with the isiZulu voiced glottal fricative [h]. These two fricatives differ in terms of place of articulation; /x/ is velar and /h/ is glottal. The Afrikaans voiced alveolar liquid /r/ is substituted with the voiced alveolar lateral liquid [l] in isiZulu, as isiZulu does not have the voiced alveolar liquid /r/ and the voiceless velar fricative /x/ in its consonantal inventory. Table 22 illustrates examples of the substitution of Afrikaans consonants with isiZulu consonants.

Table 22: Examples Illustrating the Substitution of Afrikaans Consonants /r/ and /x/, with their isiZulu Equivalents [l] and [h], Respectively

Afrikaans Form	isiZulu Form	Gloss
/spəikə**r**/	[isipiɠi**l**i]	nail
/bɔtə**r**/	[ibote**l**a]	butter
/**r**ək/	[i**l**oɠwe]	dress
/samb**r**eːl/	[isambu**l**ela]	umbrella
/**x**ans/	[i**h**ansi]	goose
/dɔ**r**p/	[ido**l**oba]	town
/b**r**uk/	[ibu**l**uɠwe]	trouser
/b**r**œx/	[ibu**l**o**h**o]	bridge

Table 22 illustrates the substitution of the voiced alveolar liquid /r/with the voice alveolar lateral liquid [l], and the voiceless velar fricative /x/ with the glottal fricative [h]. For instance, the Afrikaans word for 'goose' /xans/ is realised as [ihansi] in isiZulu. Tableau 4 below provides an OT analysis of the Afrikaans word /xans/, in isiZulu. The marked segmental constraint which bars the occurrence of /x/ is *x, and the faithfulness constraint that restricts feature change is IDENT-IO, as explained in (171) and (167), respectively.

(171) *x – the consonant [x] is prohibited.

Tableau 4: The Realisation of the Afrikaans Word /xans/ in isiZulu

IsiZulu: *x >>IDENT-IO

Input: /xans/ **Output:** [ihansi]

/xans/	*x	IDENT-IO
a. [xans]	*!	
☞b. [i.ha.nsi]		*

Candidate (a) fatally violates the high ranking constraint *x which prohibits the consonant [x], as it is not part of the isiZulu consonant inventory. Candidate (b) is the winner. It substitutes the consonant [x] with the isiZulu consonant [h] in violation of the low ranked constraint IDENT-IO - which states that features of the segment in the input should be identical to the corresponding segment in the output (Kadenge & Mudzingwa, 2012, p. 14). This violation is inconsequential since this is a low ranking constraint.

Concerning the status of the [r] sound in isiZulu, Khumalo (1984, 1987) and Koopman (1992) note that it is now accepted into the isiZulu segment inventory by modern isiZulu speakers, as it occurs in many words in everyday speech. However, this only occurs in adopted words. These words are said to be partially rephonologised. Table 23 below contributes a list of words, which demonstrate the retaining of the consonant [r] in isiZulu adoptives.

Table 23: Examples Illustrating the Retention of the Consonant [r] in isiZulu

Adopted Form	isiZulu Form	Modern isiZulu Form	Gloss
/**r**ulə/	[i**l**ula]	[i**r**ula]	ruler
/**r**ʌbə/	[i**l**aba]	[i**r**aba]	rubber
/**r**eɪk/	[i**l**eki]	[i**r**eki]	rake
/**r**aɪ**s**/	[i**l**ajisi]	[i**r**ajisi]	rice

The preceding Table 23 shows that modern isiZulu allows the [r] in its segment inventory. In this variate of isiZulu, the segmental markedness constraint *r is low ranking. In the following section we look at vowel epenthesis.

5.2.2 Vowel Epenthesis

Vowel epenthesis is a process whereby a vowel is inserted in order to satisfy constraints on syllable structure in the borrowing language (Uffmann, 2004). In isiZulu vowel epenthesis has two function, viz., (i) to fulfil the open syllabicity prerequisite (Ndambuki, 2013), i.e. to open closed syllables and (ii) to break up consonantal clusters, i.e. to simplify complex onsets. For example, [CVC] changes to [CV.CV] after vowel epenthesis, as isiZulu does not allow syllable codas and [CC] changes to [CV.C] as isiZulu does not allow complex onsets. These two functions of vowel epenthesis are discussed further below.

5.2.2.1 Vowel Epenthesis to Open Closed Syllables

As previously stated, both English and Afrikaans allow syllable codas [CVC] whereas isiZulu does not. When isiZulu adopts a word from English or Afrikaans which contains a syllable coda vowel epenthesis is used to open the syllable. From this section onwards (through the rest of Chapter 5) a single table is used to illustrate both English and Afrikaans adoptives. This is convenient in this section, as vowel epenthesis manifests identically in both languages. Table 24 below provides examples illustrating vowel epenthesis to open closed syllables in isiZulu loanwords from English and Afrikaans.

Table 24: Examples Illustrating Vowel Epenthesis to Open Closed Syllables, in isiZulu Loanwords from English and Afrikaans

Adopted Form	isiZulu Form	Gloss
/væn/	[iveni**i**]	van
/bʌs/	[ibas**i**]	bus
/seːp/ (from Afrikaans)	[insip**o**]	soap
/vɔl/ (from Afrikaans)	[uvol**o**]	wool
/dɔm/ (from Afrikaans)	[isidom**u**]	stupid person
/dʒæm/	[udʒam**u**]	jam
/pɑːl/ (from Afrikaans)	[ipal**i**]	pole
/nɜːs/	[unes**i**]	nurse
/pen/	[ipen**i**]	pen
/bant/ (from Afrikaans)	[iband**e**]	belt

Examples in Table 24 show that a vowel is inserted whenever an adopted word contains a [CVC] structure. Accordingly, it is the aim of vowel epenthesis to satisfy the "open syllabicity" condition of NOCODA (Ndambuki, 2013, p. 55).

(172) NOCODA – Syllable codas are prohibited (syllables are open (Kager 1999)).

For example, in the word /nɜːs/ 'nurse', with the structure [CVC], the vowel [i] is inserted in order to open the closed syllable (e.g.[CVC**[i]**]). For that reason, vowel epenthesis violates faithfulness, as the epenthetic vowel in the output does not have an input correspondent (Ndambuki, 2013, p. 55). The faithfulness constraint which bars insertion is DEP-IO. DEP-IO

as defined in (173) below, is a lowly ranked constraint, while the markedness constraint NOCODA is highly ranked in isiZulu loanword phonology.

(173) DEP-IO - Output segments must have input correspondents (no epenthesis) (Kager, 1999, p.100).

Furthermore, the vowel inserted at the word final position is not random. It depends on the feature specification of the coda consonant in the input (Ndambuki, 2013, p. 73). Therefore, if the final consonant in a closed syllable is labial, then a round vowel, such as /u/ or /o/ is inserted and, if the final consonant is dorsal or coronal, then the coronal vowel /i/ is inserted (Ndambuki, 2013). For example, in the word /bʌs/ the coda consonant is /s/ [coronal], therefore the coronal vowel [i] is inserted to open the closed syllable. Subsequently, /bʌs/ 'bus', which is [CVC], is resyllabified to [ibasi] [V.CV.C**V**]. The realisation /bʌs/ is formalised in Tableau 5. The highly ranked marked segmental constraint, which prohibits the vowel /ʌ/ is *ʌ, as described in (174) below:

(174) *ʌ- the vowel [ʌ] is prohibited.

Tableau 5: The Realisation of the Adopted Word /bʌs/ in isiZulu

IsiZulu: NOCODA, *ʌ >> DEP-IO, IDENT-IO
Input: /bʌs/ **Output:** [ibasi]

/bʌs/	NOCODA	*ʌ	DEP-IO	IDENT-IO
a. [bʌs]	*!	*		
b. [i.bʌ.si]		*!	*	
☞ c. [i.ba.si]			*	*

Candidate (a), which is fully faithful to the input is non-optimal, as it fatally violates the high ranking syllable structure markedness constraint, NOCODA. Candidate (b) inserts the vowel [i] to break up the [CVC] structure, this only violates the lowly ranked constraint DEP-IO, as candidates that insert (vowel epenthesis) a segment or segments violate DEP-IO. However, both candidates (a) and (b) violate the segmental markedness constraint *ʌ, which bans the

vowel [ʌ]. Thus, candidate (b) is not optimal. Candidate (c) is the optimal candidate as it opens the closed syllable by inserting the vowel [i], the epenthetic [i] functions as the nucleus for the [s]. Candidate (c), also repairs the violation to *ʌ by substituting it with the vowel [a]. As a result, Candidate (c) violates the low ranking faithfulness constraints DEP-IO and IDENT-IO, respectively. A discussion of vowel epenthesis to simplify complex onsets follows.

5.2.2.2 Vowel Epenthesis to Simplify Complex Onsets

Both English and Afrikaans permit complex onsets, whereas isiZulu does not. If isiZulu adopts a word from English or Afrikaans that contains a [CC] structure, the [CC] structures are resyllabified into a [CV.CV] structure. Accordingly, vowel epenthesis breaks up a consonantal cluster in order to obtain an unmarked syllable structure (Ndambuki, 2013). Examples illustrating the simplification of complex onsets are presented in Table 25 below.

Table 25: Examples Illustrating Vowel Epenthesis to Simplify Complex Onsets, in isiZulu Loanwords from English and Afrikaans

Adopted Form	isiZulu Form	Gloss
/skuːl/	[is**i**kole]	school
/tæksi/	[iteɠ**i**si]	taxi
/steːn/ (from Afrikaans)	[is**i**tini]	brick
/steəz/	[is**i**tezi]	stairs
/bɒks/	[iboɠ**i**si]	box
/stul/ (from Afrikaans)	[is**i**tulo]	chair
/skoːl/	[is**i**kole]	school
/pleɪt/	[ip**u**leti]	plate
/spəikər/ (from Afrikaans)	[is**i**piɠili]	nail
/bruk/ (from Afrikaans)	[ib**u**luɠwe]	trouser
/sambreːl/ (from Afrikaans)	[isamb**u**lela]	umbrella
/sløːtəl/ (from Afrikaans)	[is**i**łutulelo]	key

Table 25 illustrates that when an adopted word contains a [CC] structure, a vowel is inserted between the two consonants to break up the consonantal cluster. For example, in the word /stul/ ‘chair’, which has the word-initial cluster [st], the vowel [i] is inserted between the two

consonants (e.g. [C**[i]**C]), in order to create a CV structure. Thus, the word /stul/ which is [**CC**VC] is resyllabified to [V.**CV.C**V.CV] [isitulo]. The constraint that bans complex onsets is *COMPLEX, which is defined in (175). The realisation of the word /stul/ is formalised in Tableau 6.

(175) *COMPLEX - Complex onsets and syllable nuclei (diphthongs) are prohibited (Prince & Smolensky, 2004)

Tableau 6: The Realisation of the Adopted Word /stul/ in isiZulu

IsiZulu: *COMPLEX, NOCODA >> DEP-IO

Input: /stul/ **Output:** [isitulo]

/stul/	*COMPLEX	NOCODA	DEP-IO
a. [stul]	*!	*	
b. [si.tul]		*!	*
☞c. [i.si.tu.lo]			**

Candidate (a) fatally violates the high-ranking syllable structure markedness constraint *COMPLEX, which militates against consonantal clusters. Candidate (b) inserts the vowel [i] to repair the [CC] structure, but it is non-optimal because it fatally violates NOCODA. Candidate (c) is the optimal candidate. It inserts the vowel [i] to break up the CC sequence and inserts the vowel [o] to open the closed syllable. It, however, violates the low ranking faithfulness constraint DEP-IO. The Afrikaans word /stul/ is monosyllabic and the resyllabification of this word transforms it into a multisyllabic word, a preferred outcome in isiZulu as the language, like the majority of other Bantu languages, does not allow monosyllabic words (Doke, 1927).

It is noteworthy that, thus far, there is no evidence for or against a crucial ranking between the syllable structure markedness constraints; *COMPLEX, NOCODA, and the markedness segmental constraints *ʊ, *r, *ʌ, *x, *ɑː. They are all high-ranking markedness constraints.

Conversely, the faithfulness constraints DEP-IO and IDENT-IO are ranked lower than the markedness constraints and there is no crucial ranking between the two.

In the succeeding section we examine glide epenthesis.

5.2.3 Glide Epenthesis

Glide epenthesis is utilised in loanword phonology to simplify diphthongs (Augusto, 2012). It is the insertion of a glide [j] or [w] between the elements of a diphthong. The motivation for glide epenthesis is to break up [VV] sequences of a diphthong. As mentioned earlier, diphthongs are impermissible in isiZulu.

In isiZulu phonology either the palatal glide [j] or the labiovelar glide [w] is inserted between [VV] sequences within a word, hence [CVV] is realised as [CVGV]. These epenthetic glides are in complimentary distribution; [j] is inserted in the context of a coronal vowel, while [w] is inserted in the context of a labial vowel (Kadenge & Mudzingwa, 2012). This epenthetic process is best described as a spreading process rather than default insertion (Kadenge & Mudzingwa, 2011). According to Kadenge and Mudzingwa (2011, p. 149), during the spreading process all features are provided by an input segment. In this section, FG is used to illustrate the spreading of V-Place features as shown in Figure 3 and Figure 4. Figure 3 illustrates spreading from a coronal vowel to form [j].

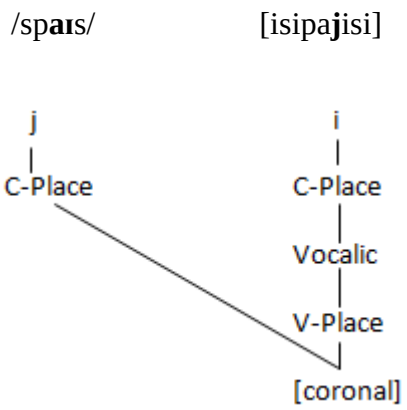


Figure 3: The Spreading of V-Place Features from Coronal Vowel [i]

Figure 3 shows that the spreading of V-Place features from coronal vowel [i] results in the formation of a coronal glide [j]. Thus, the homorganic glide [j] is inserted in the context of the

coronal vowel [i]. It is inserted to break up the impermissible [VV] sequence; a diphthong. Table 26 below presents examples demonstrating the glide epenthesis process of [j].

The research did not find any loanwords from Afrikaans that illustrate the glide epenthesis process of [j].

Table 26: Examples Illustrating Spreading from Coronal Vowel [i] to Form Coronal Glide [j] in isiZulu Loanwords from English

English Form	isiZulu Form	Gloss
/t**ɔɪ**lət/	[ito**j**ileti]	toilet
/t**aɪ**gə/	[ita**j**iga]	tiger
/l**aɪ**n/	[ula**j**ini]	line
/w**aɪ**n/	[iwa**j**ini]	wine
/sp**aɪ**s/	[isipa**j**isi.]	spice
/t**aɪ**ə/	[ita**j**a]	tyre
/r**aɪ**s/	[ila**j**isi]	rice
/p**ɔɪ**nt/	[ipo**j**inti]	point
/t**i**:/	[iti**j**e]	tea
/s**aɪ**n/	[sa**j**ina]	sign

Table 26 demonstrates that when a diphthong [VV] occurs, and the second vowel is a coronal vowel (vowels produced with front of the mouth), the palatal glide [j] is inserted. For example, the word 'spice' is /spaɪs/ in English and [isipajisi] in isiZulu. This example illustrates that the English word /sp**aɪ**s/ contains a diphthong. The markedness constraint that prohibits diphthongs is *COMPLEX. The undominated constraint *COMPLEX is defined in (175) above and it demands the prohibition of complex onsets and syllable nuclei (diphthongs) (Prince & Smolensky, 2004). The faithfulness constraint that bans spreading is UNIQUE. UNIQUE is lowly ranked in isiZulu and is defined in (176) below;

(176) UNIQUE – ∀*x*, where *x* is a feature, *x* must have a unique segmental anchor *y*, (no spreading) (Benua 1997).

The English word /sp**aɪ**s/ contains the unacceptable vowel [ɪ]. As we have seen in Tables 15 and 16, the vowel /ɪ/ is substituted with the isiZulu equivalent [i]. The marked segmental constraints that militates against this vowel is *ɪ, which is defined in (177). Tableau 7 presents a formal analysis of the realisation of the word /spaɪs/ in isiZulu.

(177) *ɪ - the vowel [ɪ] is forbidden (Kadenge & Mudzingwa, 2011, p. 152).

Tableau 7: The Realisation of the Adopted Word /spaɪs/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ɪ >> DEP-IO, UNIQUE, IDENT-IO

Input: /spaɪs/ **Output:** [isipajisi]

/spaɪs/	*COMPLEX	NOCODA	*ɪ	DEP-IO	UNIQUE	IDENT-IO
a. [spaɪs]	*!*	*	*			
b. [si. paɪs]	*!	*	*	*		
c. [si.pa.jis]		*!		*	*	*
☞d. [i.si.pa.ji.si]				**	*	*

Candidate (a) is not optimal as it violates the high ranked syllable structure markedness constraint *COMPLEX twice; it contains a complex onset and a complex syllable nucleus in the form of a diphthong. In addition, it violates NOCODA and *ɪ. Candidate (b) does well to repair the complex onset by inserting the vowel [i]. This simplifies the consonant cluster [sp], by creating a nucleus for [s]. Consequently, it violates the low ranking constraint DEP-IO. Candidate (b) is disqualified by *COMPLEX and NOCODA, as it contains the intolerable diphthong [aɪ], and it ends in a consonant. Candidate (c) inserts the coronal glide [j] to simplify the diphthong. This violates the low ranked constraint UNIQUE, which requires that there should be no spreading (Benua, 1997). Therefore, any candidate that spreads violates UNIQUE. Candidate (c) further violates the low ranking constraints DEP-IO and IDENT-IO, as it simplifies the complex onset [sp] and, substitutes the vowel [ɪ] with the isiZulu equivalent [i], respectively. However, candidate (c) is eliminated by ending in a consonant, which violates the high ranked constraint NOCODA. Candidate (d) repairs all illicit structures, and only violates the lowly ranked constraints DEP-IO, UNIQUE and IDENT-IO. As a result, candidate (d) is the optimal candidate. Figure 4 below illustrates the spreading of the labial vowel [u] to form [w].

/blaʊz/ [ibula**w**uzi]

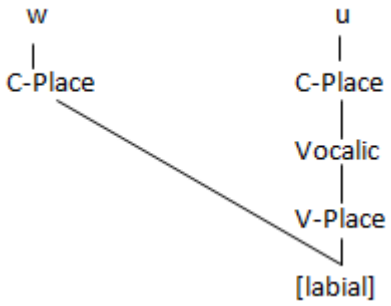


Figure 4: The Spreading of V-Place Features from Labial Vowel [w]

Figure 4 illustrates that spreading of V-Place features from labial vowel [u] results the formation of labiovelar glide [w]. This is not surprising, as Figure 2 (e) and (f) illustrate that the vowel [u] and the glide [w] are phonetically similar, as they have an identical feature structure except that [u] is moraic while [w] is non-moraic. In sum, the labial glide [w] is inserted in the context of the labial vowel [u]. This process breaks up the impermissible diphthong or [VV] sequence. Table 27 below presents data exemplifying this process.

Table 27: Examples Illustrating Spreading from Labial Vowel [u] to Form Labiovelar Glide [w], in isiZulu Loanwords from English and Afrikaans

Adopted Form	isiZulu Form	Gloss
/dʒænjʊri/	[udʒanu**w**ali]	January
/febjʊəri/	[ufeɓru**w**ari]	February
/xlo:/ (from Afrikaans)	[ikol**w**a]	believe
/fəʊn/	[ifo**w**una]	phone
/ʃaʊə/	[iʃa**w**a]	shower
/kɔlɪflæʊr/	[ukalifula**w**a]	cauliflower
/blaʊz/	[ibula**w**uzi]	blouse

Table 27 presents examples illustrating glide epenthesis to simplify diphthongs in English and Afrikaans adoptives. In particular, it demonstrates that when a labial vowel (vowels produced with the lips) occurs in a [VV] sequence, the labiovelar glide [w] is inserted between the two vowels. However, it is the second vowel that is required to be [labial]. This process breaks up the impermissible [VV] sequence. For example, the word 'blouse' is /blaʊz/ in English and

[ibula**w**uzi] in isiZulu. The realisation of /blaʊz/ in isiZulu is formalised in Tableau 8. In this analysis, we utilise the ranking of markedness (175) and faithfulness (176) constraints that were used in the glide epenthesis of [j], viz., *COMPLEX and UNIQUE.

Tableau 8: The Realisation of the English Word /blaʊz/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ʊ >> DEP-IO, UNIQUE, IDENT-IO

Input: /blaʊz/ **Output:** [ibulawuzi]

/blaʊz/	*COMPLEX	NOCODA	*ʊ	DEP-IO	UNIQUE	IDENT-IO
a. [blaʊz]	*!*	*	*			
b. [bu.laʊz]	*!	*	*	*		*
☞c. [i.bu.la.wu.zi]				**	*	*

Candidate (a) is eliminated by the high-ranking constraint *COMPLEX because it contains a complex onset [bl] and a diphthong [aʊ]. It also violates the high ranking constraints NOCODA, because it ends in a consonant, and *ʊ which prohibits [ʊ] in isiZulu. Candidate (b) repairs the complex onset through vowel epenthesis, it inserts the vowel [u] between the consonants [b] and [l], thereby violating the faithfulness constraint DEP-IO. However, candidate (b) violates the high ranked markedness constraints *COMPLEX and NOCODA. Thus, candidates (a) and (b) are not optimal. Candidate (c), which repairs the diphthong through spreading the V-Place feature [labial] from [u] to form [w], is the optimal candidate. It violates DEP-IO twice and UNIQUE once. This violation is inconsequential because these faithfulness constraints are lowly ranked in the language.

5.2.4 Deletion

Deletion is a process wherein a segment or segments are omitted from a word (Ndambuki, 2013). The symbol '_' is used to represent a deleted segment. Deletion is a repair strategy utilised in isiZulu loanword phonology to eliminate complex onsets and syllable codas.

Khumalo (1987) asserts that deletion, as the optimal repair strategy, is very rare. We can consider deletion the last resort. If epenthesis is unachievable for a complex onset and syllable coda, deletion is chosen as the optimal repair strategy. For instance, if an adoptive contains numerous illicit structures, deletion is considered. For example, the word /loʊkeɪʃən/ 'location' contains two diphthongs, impermissible vowels and a syllable coda, as a result it would require numerous alterations. Accordingly, a repair to the word /loʊkeɪʃən/ would yield the following output; [ilowukejiʃeni]. Thus, it is resyllabified to [ilokiʃi] through deletion.

Table 30 provides examples of deletion in isiZulu adoptives from English. In the data collected only a few examples of deletion were found, none were from Afrikaans.

Table 28: Examples Illustrating Deletion in isiZulu Loanwords from English

English Form	isiZulu Form	Gloss
/pəinapəl/	[upajinapu_]	pineapple
/ləʊkeɪʃən/	[iloʤiʃi_]	location
/kɪtʃɪn/	[ikiʃi_]	kitchen

Table 28 illustrates examples were syllable codas are deleted in order to fulfil the NOCODA constraint in isiZulu loanword phonology. Khumalo (1984) maintains that certain syllable codas are repaired through consonant deletion in isiZulu. For example, /paɪnæpəl/ 'pineapple', which has the following structure [CVVCVCVC] is resyllabified to [upajinapu_] [V.CV.CV.CV.CV_]. The realisation of /paɪnæpəl/ is analysed in Tableau 9 below. The faithfulness constraint, which prohibits deletion is MAX-IO, defined in (178), and the constraint that bans schwa *ə is defined in (179).

(178) MAX-IO - Input segments must have output correspondents, (no deletion) (Kager, 1999, p. 102).

(179) *ə- Shwa is prohibited (Kadenge & Mudzingwa, 2012, p. 145).

Tableau 9: The Realisation of the English Word /paɪnæpəl/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ɪ, *æ, *ə >> MAX-IO>> UNIQUE, IDENT-IO,

Input: /paɪnæpəl/ **Output:** [upajinapu_]

/paɪnæpəl/	*COMPLEX	NOCODA	*ɪ	*æ	*ə	MAX-IO	UNIQUE	IDENT-IO
a. [paɪnæpəl]	*!	*	*	*	*			
b. [pa.ji.na.pul]		*!					*	***
☞c.[u.pa.ji.na.pu_]						*	*	***

Candidate (a) fatally violates the high-ranking constraints *COMPLEX, NOCODA, *ɪ, *æ, and shwa. As a result, it is non-optimal. Candidate (b) repairs the diphthong by inserting the coronal glide [j] to split up the diphthong and this violates the lowly ranked constraint UNIQUE. Candidate (b) substitutes the impermissible vowels with acceptable isiZulu vowels. However, Candidate (b) ends in a consonant, therefore, it cannot be optimal. Candidate (c) is the optimal candidate. It repairs all illicit structures akin to Candidate (b), and repairs the closed syllable through deletion, thereby only violating the lowly ranked constraints MAX-IO, UNIQUE and IDENT-IO.

The constraint hierarchy that determines the realisation of isiZulu loanwords from English and Afrikaans, is rendered in 5.3 below.

5.3 The Constraint Hierarchy of isiZulu Loanword Phonology

In this section we provide the constraint hierarchy of isiZulu loanword phonology, as it is the ranking of these markedness and faithfulness constraints that determine the optimal realisation of the English and Afrikaans loanwords in isiZulu.

The isiZulu loanword constraint hierarchy can be summarised as follows:

*COMPLEX, NOCODA, *ʊ, *r, *ʌ, *æ, *x, *ə, *ɪ >>MAX-IO>>DEP-IO, UNIQUE, IDENT-IO.

In terms of hierarchical ranking of constraints, there is no crucial ranking between the markedness constraints *COMPLEX, NOCODA, *ʊ, *r, *ʌ, *æ, *x, *ə and *ɪ. The faithfulness constraints on the other hand, are ranked lower than the markedness constraints. However, MAX-IO is lower ranked than the markedness constraints, but higher ranked than the other faithfulness constraints, since it is not always chosen as the optimal candidate to remove syllable codas. In the same way as the markedness constraints, there is no crucial ranking between the faithfulness constraints DEP-IO, UNIQUE, IDENT-IO..

5.4 Summary

This chapter focused on presenting a formal OT analysis of the phonological processes triggered in the rephonologisation of isiZulu adoptives from English and Afrikaans, viz. segment substitution, vowel epenthesis, glide epenthesis, and deletion. A number of examples are presented in this chapter, in the form of tables, along with a brief discussion. One example representing each process was then formalised utilising insights from OT and followed by a detailed explanation. This chapter concludes by presenting a summary of the ranking of markedness and faithfulness constraintsin isiZulu loanword phonology. These constitute the constraints that determine the realisation of loanwords in isiZulu. In the subsequent chapter we compare our findings for isiZulu to what has been found in two other Bantu languages, namely chiShona and isiNdebele, to contribute, in a small but significant way, to phonological typology.

CHAPTER 6: ISIZULU, CHISHONA AND ISINDEBELE ADOPTIVES: A COMPARATIVE ANALYSIS

6.1 Introduction

The preceding chapter formally analysed some aspects of isiZulu phonology, focusing on repair strategies employed in isiZulu loanword phonology, using OT and FG. This chapter compares isiZulu loanwords to those from chiShona (Kadenge, 2012; Kadenge & Mudzingwa, 2012) and isiNdebele (Mahlangu, 2007; Skhosana, 2009). The comparison enables us to determine similarities and differences, and therefore identify any loanword adaption patterns used in southern Bantu languages overall.

6.2 Comparing isiZulu and chiShona Loanwords

ChiShona is a southern Bantu language spoken in Zimbabwe. Akin to isiZulu, chiShona has a simple five vowel system, viz. /i/, /e/, /a/, /u/ and /o/ (Kadenge, 2012, p. 60). Similar to the majority of southern Bantu languages, chiShona has a simple CV syllable structure (Kadenge, 2012; Kadenge & Mudzingwa, 2012). However, onsetless or syllables beginning with a vowel do occur, but are limited to word initial position as seen in the chiShona second person pronoun [u.no] ‘this one’ (Kadenge, 2012). In isiZulu and chiShona, syllables are open; this means that syllables must end in a vowel [V]. For that reason, syllable codas are prohibited in isiZulu and chiShona. Complex onsets, for instance, [CC] structures, and complex syllable nuclei, e.g. diphthongs [VV], are not permitted in either isiZulu or chiShona (Khumalo, 1984; Kadenge, 2012; Kadenge & Mudzingwa, 2012). IsiZulu examples from the current study (Appendix 1, Table 33), and chiShona examples from Kadenge (2012, p. 71-77) and Kadenge and Mudzingwa (2012, p. 148) are given in Table 29 below:

Table 29: isiZulu Adaption Patterns Compared to chiShona

Underlying Form	IsiZulu Form	ChiShona Form	Gloss
a. /dɒktə/	[udoɠotela]	[dokota]	doctor
b. /dɪsk/	[idisiki]	[disiki]	disc
c. /pʌɪnt/	[ipajinti]	[pajindi]	pint
d. /θaʊzənd/	[itawuzendi]	[tawuzendi]	thousand
e. /vedʒtəbl/	[ivedʒi_]	[vedʒɪburu]	vegetable
f. /drʌm/	[idilamu]	[diramu]	drum

Table 29 presents the underlying form of loanwords found in both isiZulu and chiShona. Additionally, the isiZulu and chiShona forms of the loanwords are presented in this table to display how each word is realised in their respective language. Examples (a) and (b) reveal impermissible [CC] structures, viz. [kt], and [sk], respectively, while examples (c) and (d) present unacceptable diphthongs. Example (c), additionally exposes that voiceless prenasalised plosives e.g. [nt], as depicted in the word /pʌɪ**nt**/, are retained in isiZulu e.g. [ipaji**nt**i], while they are voiced in chiShona e.g.[paji**nd**i]. Example (e) illustrates that in isiZulu, a coda may be eliminated through deletion (a very rare process), while in chiShona this does not occur. Example (f) displays that isiZulu replaces the voiced alveolar liquid /r/ with the voiced lateral liquid [l], while chiShona does not. In addition, examples (b), (c), (d), (e) and (f) contain syllable codas, as they all end in a consonant. In the subsequent section we construct OT tableaux to analyse the similarities and differences (if any) between the isiZulu and chiShona realisation of the adopted words. We analyse the ways in which isiZulu resolves complex onsets, syllable codas, complex syllable nuclei (diphthongs) and segmental substitutions, in comparison to chiShona.

6.2.1 OT Comparative Analysis of isiZulu and chiShona

In this section we compare isiZulu and chiShona repair strategies. We achieve this in the following manner; (i) we divide this section into three subsections. Each subsection focuses on a specific impermissible syllable structure, such as complex onset, syllable coda, complex syllable nuclei and segmental substitution. This is accomplished using OT tableaux. (ii) OT tableaux are divided into an (a) isiZulu and (b) chiShona subdivision. (iii) Each tableau examines a loanword containing a relevant impermissible structure and segment.

6.2.1.1 The Simplification of a Complex Onset in isiZulu and chiShona

Tableau 10 examines the adoptive /dɒktə/, which contains the impermissible consonant cluster [kt]. Table 29 demonstrates that the complex onset is eliminated through insertion (vowel epenthesis) in both isiZulu and chiShona. The constraint that bans complex structures is (175) *COMPLEX, and the constraint that prohibits insertion is (173) DEP-IO. Furthermore, the adoptive /dɒktə/ contains the vowels [ɒ] and [ə] which are not found in isiZulu or chiShona, thus they are substituted with isiZulu and chiShona equivalents. The constraint that bans the vowel [ɒ] is *ɒ, defined in (180) below, and the constraint that prohibits shwa [ə] is *ə, defined in (179). The constraint that bars segmental substitution and/or feature changes is IDENT-IO, explained in (167).

(180) *ɒ - The vowel [ɒ] is prohibited.

Tableau 10: The Simplification of Complex Onsets

a) The Realisation of /dɒktə/ in isiZulu

IsiZulu: *COMPLEX, *ɒ, *ə >> DEP-IO, IDENT-IO

Input: /dɒktə/ **Output:** [udoʤotela]

/dɒktə/	*COMPLEX	*ɒ	*ə	DEP-IO	IDENT-IO
a. [dɒktə]	*!	*	*		
b. [dɒ.ko.tə]		*!	*		
☞c. [u.do.ʤo.te.la]				***	**

In Tableau (10a), candidate (a) fatally violates the high-ranking syllable structure markedness constraint *COMPLEX, which militates against consonantal clusters. Candidate (b) inserts the vowel [e] to repair the [CC] structure, but it is non-optimal because it fatally violates the segmental markedness constraints *ɒ and *ə, which ban the vowels [ɒ] and [ə], respectively. Thus, candidate (a) and (b) are not optimal. Candidate (c) is the optimal candidate. It inserts the vowel [o] to break up the CC sequence and substitutes the impermissible vowels [ɒ] and

[ə], with isiZulu equivalents. It, however, violates the low ranking faithfulness constraints DEP-IO, as it inserts segments, and IDENT-IO, as it changes the features of the vowels.

b) The Realisation of /dɒktə/ in chiShona

ChiShona: *COMPLEX, *ɒ, *ə >> DEP-IO, IDENT-IO

Input: /dɒktə/ **Output:** [dokota]

/dɒktə/	*COMPLEX	*ɒ	*ə	DEP-IO	IDENT-IO
a. [dɒktə]	*!	*	*		
☞b.[do.ko.ta]				*	**

In Tableau (10b), candidate (a) is not optimal as it fatally violates the high ranking constraints *COMPLEX, *ɒ and *ə, by, respectively, having a complex structure [kt], and the impermissible vowels [ɒ] and [ə]. Candidate (b) is the optimal candidate, it repairs the complex structure through vowel epenthesis, and removes the impermissible vowels by substituting them with chiShona equivalents.

The above Tableaux (10a) and (10b) demonstrate the simplification of complex onsets, where (10a) exemplifies the simplification of the consonantal cluster [pr] in isiZulu, while (10b) reveals how the same structure is simplified in chiShona. In Tableaux (10a) and (10b), we use the same input form /*dɒktə*/, to obtain an accurate result. The identical input form has the same impermissible complex structure, namely, [kt], which is unacceptable in both isiZulu and chiShona, since they both demand a simple CV output. Tableaux (10a) and (10b) demonstrate that the winning candidates in both languages inserts the labial vowel [o] between the two consonants in order to create a simple CV structure. This suggests that *COMPLEX is high ranking in both languages. Clearly, native segmental and syllable structure demands determine the shape of loanwords.

A notable difference between the isiZulu and chiShona output form; is that isiZulu has a morphosyntactic requirement of inserting a vowel at the beginning of a word (Aronoff & Fudeman, 2005), whereas chiShona does not. In the ensuing subsection we compare the repair of syllable codas.

6.2.1.2 The Elimination of a Syllable Coda in isiZulu and chiShona

Tableau 11 demonstrates the repair of a syllable coda in isiZulu and chiShona. Kadenge (2012, p. 73) states that syllable codas are "stray consonants" in chiShona. Syllable codas ae also stray structures in isiZulu. The markedness constrain that prohibits a syllable coda is NOCODA, as explained in (172). Table 29 shows that syllable codas are repaired through vowel epenthesis in isiZulu and chiShona. Tableaux (11a) and (11b) examine the realisation of the word /dɪsk/ in isiZulu and chiShona. This adoptive contains the vowel [ɪ] that is not found in isiZulu and chiShona. The segmental constraint that bans the vowel [ɪ] is *ɪ and is defined in (177).

Tableau 11: The Repair of Syllable Codas

a) The Realisation of /dɪsk/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ɪ >>DEP-IO, IDENT-IO

Input: /dɪsk/ **Output:** [idisiki]

/dɪsk/	*COMPLEX	NOCODA	*ɪ	DEP-IO	IDENT-IO
a. [dɪsk]	*!	*	*		
b. [di.sik]		*!		*	*
☞c. [i.di.si.ki]				**	*

Tableau (11a) above illustrates that candidate (a) is non-optimal as it fatally violates the high-ranking constraints *COMPLEX, which prohibits consonantal clusters. Additionally, it violates the constraints NOCODA and *ɪ, by ending in a consonant and containing the unacceptable vowel [ɪ], respectively. Candidate (b) inserts the vowel [i] to repair the [CC] structure, and substitutes the vowel [ɪ] with an acceptable isiZulu vowel. But, it is non-optimal because it fatally violates NOCODA. Candidate (c) inserts the vowel [i] to break up the CC sequence and inserts the vowel [i] to open the closed syllable, consequently, violating the low ranking faithfulness constraints DEP-IO and IDENT-IO. As a result, candidate (c) is the optimal candidate.

b) The Realisation of /dısk/ in chiShona

ChiShona: *COMPLEX, NOCODA, *ɪ >> DEP-IO, IDENT-IO

Input: /dısk/ **Output:** [disiki]

/dısk/	*COMPLEX	NOCODA	*ɪ	DEP-IO	IDENT-IO
a. [dısk]	*!	*	*		
b. [di.sik]		*!		*	*
☞c. [di.si.ki]				**	*

Tableau (11b) shows that candidate (a) fatally violates the high-ranking constraints *COMPLEX, NOCODA, and *ɪ. As a result, it is non-optimal. Candidate (b) repairs the complex structure [sk] by inserting the vowel [i], and substitutes the impermissible vowel [ɪ], with a chiShona vowel. However, candidate (b) ends in a consonant, therefore, it cannot be optimal. Candidate (c) is the optimal candidate. It repairs all illicit structures akin to candidate (b), and repairs the closed syllable through insertion, thereby only violating the lowly ranked constraints DEP-IO and IDENT-IO.

Tableaux (11a) and (11b) focus on comparing the resyllabification of syllable codas in isiZulu and chiShona. The optimal candidates in both isiZulu [idisiki] and chiShona [disiki] insert the vowel [i] at the end of the syllable coda, in order to open the closed syllable. As previously stated in Chapter 5, the coronal vowel [i] is usually inserted when directly preceded by a coronal consonant and, likewise the labial vowel [u] is inserted when directly preceded by a labial consonant (Kadenge 2012, p. 73). Kadenge (2012) observes the same patterns with regard to chiShona. If the insertion of [i] or [u] in relation to coronal and labial consonants fails, the default vowel [i] is inserted (Kadenge, 2012, p.73). IsiZulu and chiShona rely on vowel epenthesis in eliminating complex onsets and syllable codas.

IsiZulu is however different in that it sometimes removes syllable codas through deletion. Example (e) in Table 29 illustrates that the word ‘vegetable’ /vedʒtəbl/ is realized as [ivedʒi_] in isiZulu and [vedʒiteburu] in chiShona. This demonstrates one main difference between chiShona and isiZulu. IsiZulu sometimes eliminates syllable codas through elision while in

chiShona this is not an optimal repair strategy. The faithfulness constraint which forbids deletion is MAX-IO, as defined in (178). Thus, MAX-IO is inviolable in chiShona while it is low ranking in isiZulu. Tableaux (12a) and (12b) formalise the realisation of the word /vedʒtəbl̩/ in isiZulu and chiShona. This adoptive also contains the vowel [ə] not found in isiZulu and chiShona. The segmental constraint that bans the vowel [ə] is *ə, as defined (179).

Tableau 12: The Repair of a Syllable Coda through Deletion

a) The Realisation of /vedʒtəbl̩/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ə >>MAX-IO>> DEP-IO, IDENT-IO

Input: /vedʒtəbl̩/ **Output:** [ivedʒi_]

/vedʒtəbl̩/	*COMPLEX	NOCODA	*ə	MAX-IO	DEP-IO	IDENT-IO
a. [vedʒ.təbl]	*!*	**	*			
b. [ve.dʒi.ta.blu]	*!				**	*
c. [ve.dʒi.tab]		*!		*	*	*
☞d. [i.ve.dʒi_]				*	*	

In Tableau (12a), candidate (a), which is fully faithful to the input is non-optimal, as it fatally violates the high ranking syllable structure markedness constraints *COMPLEX and NOCODA, twice. Candidate (b) inserts the vowel [i] to break up the [CVC] structure [vedʒ], and the vowel [u], to open the closed syllable [-təbl], this only violates the lowly ranked constraint DEP-IO. Candidate (b) further violates the segmental markedness constraint *COMPLEX, which contains the complex [CC] structure [bl]. Candidate (c), repairs the complex structure through deletion, and in turn violates the lower ranking constraint MAX-IO. As candidates that delete a segment or segments violate MAX-IO. This deletion is not seen as consequential, since it results in the satisfaction of high ranked markedness constraints: *COMPLEX and NOCODA. However, candidate (c) violates the syllable structure markedness constraint NOCODA, by ending in a consonant. Thus, candidates (b) and (c) are not optimal. Candidate (d) is the optimal candidate, it removes all prohibited structures

similarly to candidate (c) and it removes the syllable coda through deletion, thereby only violating the lower ranking constraint MAX-IO, and the low ranking faithfulness constraints DEP-IO and IDENT-IO.

b) The Realisation of /vedʒtəbl̩/ in chiShona

ChiShona: *COMPLEX, NOCODA, MAX-IO,*ə >>DEP-IO, IDENT-IO

Input: /vedʒtəbl̩/ **Output:** [vedʒiteburu]

/vedʒtəbl̩/	*COMPLEX	NOCODA	MAX-IO	*ə	DEP-IO	IDENT-IO
a. [vedʒ.təbl]	*!*	**		*		
b. [ve.dʒi.te.bul]		*!			**	*
c. [ve.dʒi.te.bu_]			*!		**	*
☞d.[ve.dʒi.te.bu.ru]					***	**

Tableau (12b) displays that candidate (a) fatally violates the high-ranking constraints *COMPLEX, NOCODA, and shwa. As a result, it is non-optimal. Candidate (b) repairs the complex [CC] structures through insertion, and substitutes the impermissible vowels with acceptable chiShona vowels. However, Candidate (b) ends in a consonant, therefore, it cannot be optimal. Candidate (c) repairs the syllable coda through deletion, this fatally violates MAX-IO, as MAX-IO is high ranking in chiShona. Thus candidate (c) is not optimal. Candidate (d) is the optimal candidate, it repairs all illicit structures, and repairs the closed syllable through vowel epenthesis, thereby only violating the lowly ranked constraints DEP-IO and IDENT-IO.

Tableau 12 concentrates on the elimination of codas through deletion. In Tableaux (12a) and (12b), we analyse the input form /vedʒtəbl̩/ in isiZulu and chiShona, respectively. In isiZulu the optimal candidate is [ivedʒi_], this means that isiZulu deletes the closed syllable [CVCC], in the form of [-təbl], in order to remove the syllable coda. On the other hand, in chiShona, the optimal candidate is [vedʒiteburu], this shows that in chiShona the closed syllable [CVCC] is simplified through vowel epenthesis. Tableau (12b) shows that in chiShona, deletion of a coda is not optimal, suggesting that MAX-IO is higher ranked in chiShona than in isiZulu.

Tableau (12b) further illustrates that chiShona substitutes the lateral approximant /l/ with the alveolar trill [r] (Kadenge, 2012). As the chiShona realization of /vedʒtəbl/ is [vedʒitebu**r**u] and not [vedʒitebu**l**u]. Segmental substitution is compared in subsection 6.2.1.4. The next subsection examines the simplification of diphthongs in isiZulu and chiShona.

6.2.1.3 The Simplification of Diphthongs in isiZulu and chiShona

In this subsection, Tableaux (13a) and (13b) present an analysis of the realisation of the words /pʌɪnt/ and /θaʊzənd/ in isiZulu and chiShona. The adoptives /pʌɪnt/ and /θaʊzənd/ contain the diphthongs [ʌɪ] and [aʊ], respectively. Since isiZulu and chiShona have a strict CV syllable shape, diphthongs [VV] are impermissible in these languages. The constraint that bans diphthongs is defined in (175): *COMPLEX. Diphthongs are shown (in Table 29 (c) and (d)) to be simplified through spreading. The faithfulness constraint that bars spreading is defined in (176) and is UNIQUE.

Tableau 13: The Simplification of a Diphthong

a) The Realisation of /pʌɪnt/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ʌ, *ɪ >>DEP-IO, UNIQUE, IDENT-IO

Input: /pʌɪnt/ **Output:** [ipajinti]

/pʌɪnt/	*COMPLEX	NOCODA	*ʌ	*ɪ	DEP-IO	UNIQUE	IDENT-IO
a. [pʌɪnt]	*!	*	*	*			
b. [pa.ji.nt]		*!				*	**
☞c. [i.pa.ji.nti]					*	*	**

Tableau (13a) demonstrates that candidate (a) is fully faithful to the input, but is non-optimal since it fatally violates the high ranking constraints *COMPLEX, as it contains a diphthong, and NOCODA, as it ends in a consonant. Candidate (b) inserts the coronal glide [j] to simplify the diphthong. This violates the low ranked constraint UNIQUE, which requires that there should be no spreading (Benua, 1997). Candidate (b) further violates the low ranking

constraints DEP-IO and IDENT-IO, as it substitutes the vowel [ʌ] and [ɪ] with the isiZulu equivalent [a] and [i], respectively. However, candidate (b) is eliminated by ending in a consonant, which violates the high ranking constraint NOCODA. Candidate (c) repairs all illicit structures, and only violates the lowly ranked constraints DEP-IO, UNIQUE and IDENT-IO. As a result, candidate (c) is the optimal candidate.

b) The Realisation of /pʌɪnt/ in chiShona

ChiShona: *COMPLEX, NOCODA, *ʌ, *ɪ >>DEP-IO, UNIQUE, IDENT-IO

Input: /pʌɪnt/ **Output:** [pajindi]

/pʌɪnt/	*COMPLEX	NOCODA	*ʌ	*ɪ	DEP-IO	UNIQUE	IDENT-IO
a. [pʌɪnt]	*!	*	*	*			
b. [pa.ji.nt]		*!				*	**
☞c. [pa.ji.ndi]					*	*	***

Candidate (a) is disqualified by *COMPLEX and NOCODA, as it contains the intolerable diphthong [ʌɪ], and it ends in a consonant. Candidate (b) simplifies the diphthong by inserting the coronal glide [j]. This violates the low ranked constraint UNIQUE. It substitutes the vowels [ʌ] and [ɪ] with the isiZulu equivalents [a] and [i], respectively. However, candidate (b) ends in a consonant and is therefore non-optimal. Candidate (c) is the optimal candidate. It attends to all illicit structures, similarly to candidate (b) and opens the close syllable by inserting the vowel [i] and only violates the lowly ranked constraints DEP-IO, UNIQUE and IDENT-IO.

Tableaux (13a) and (13b) show that the output form of /pʌɪnt/ is [ipajinti] in isiZulu and, [pajindi] in chiShona, in both these output forms there is the insertion of the coronal glide [j] in between the diphthong. This is in agreement with the phonological process known as glide epenthesis, where the spreading of the V-place features of the coronal vowels [i] or [e] creates the coronal glide [j] (Kadenge, 2012, p. 76), as illustrated in Chapter 5, Figure 3. In the output form of /pʌɪnt/, in chiShona, the voiceless alveolar stop [t] is replaced with the voiced alveolar stop [d], this process is known as voicing (Mheta & Zivenge, 2009) and is discussed further, in

the next subsection (6.2.1.4). In Tableaux (13c) and (13d), we continue our analysis of diphthongs.

c) The Realisation of /θaʊzənd/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *θ, *ʊ, *ə >> DEP-IO, UNIQUE, IDENT-IO

Input: /θaʊzənd/ **Output:** [itawuzendi]

/θaʊzənd/	*COMPLEX	NOCODA	*θ	*ʊ	*ə	DEP-IO	UNIQUE	IDENT-IO
a. [θaʊ.zənd]	*!	*	*	*	*			
b. [tawu.zend]		*!					*	***
☞c. [i.ta.wu.ze.ndi]						*	*	***

Tableau (13c) illustrates that candidate (a) is eliminated by the high-ranking constraint *COMPLEX because it contains a diphthong [aʊ]. It also violates the high ranking constraints NOCODA, because it ends in a consonant, *θ, *ʊ and *ə, which respectively, prohibits the segments [θ], [ʊ], and [ə] in isiZulu. Candidate (b) removes the unacceptable segments by substituting them with isiZulu equivalents, it repairs the diphthong through spreading the V-Place feature [labial] from [u] to form [w], and in turn violates the lowly ranked constraints DEP-IO, UNIQUE, IDENT-IO. However, candidate (b) is eliminated as it violates the high ranking constrain NOCODA. Thus, candidates (a) and (b) are not optimal. Candidate (c) is the optimal candidate, it resolves all illicit structures akin to candidate (b), and opens the closed syllable by inserting a vowel. It violates DEP-IO, UNIQUE and IDENT-IO. These violations are inconsequential because these faithfulness constraints are lowly ranked in the language.

d) The Realisation of /θaʊzənd/ in chiShona

ChiShona: *COMPLEX, NOCODA, *θ, *ʊ, *ə >> DEP-IO, UNIQUE, IDENT-IO

Input: /θaʊzənd/ **Output:** [tawuzendi]

/θaʊzənd/	*COMPLEX	NOCODA	*θ	*ʊ	*ə	DEP-IO	UNIQUE	IDENT-IO
a. [θaʊ.zənd]	*!	*	*	*	*			
b. [tawu.zend]		*!					*	***
☞c. [ta.wu.ze.ndi]						*		***

In Tableau (13d) candidate (a) which is fully faithful to the input, fatally violates the high ranking constraint *COMPLEX by containing the diphthong [aʊ]. It further violates the high ranking constraints NOCODA, *θ, *ʊ and *ə. Therefore, it cannot be optimum. Candidate (b) substitutes the impermissible segments with permissible chiShona segments, and simplifies the diphthong by spreading the V-Place feature [labial] from [u] to form [w]. But candidate (b) is not optimal as it violates NOCODA, by ending in a consonant. Candidate (c) makes the necessary substitutions as candidate (b), it simplifies the diphthong by inserting the labio velar glide [w] and opens the closed syllable through vowel epenthesis, thereby only violating low ranking constraints DEP-IO, UNIQUE and IDENT-IO. As a result, candidate (c) is the optimal candidate.

Tableaux (13c) and (13d) present an analysis of the adoptive /θaʊzənd/. In Tableaux (13c) and (13d) the output form of /θaʊzənd/ is [itawuzendi] in isiZulu and [tawuzendi] in chiShona, in these output forms the labial glide [w] is inserted to spilt up the diphthong [aʊ]. According to Kadenge (2012), the spreading of V-Place features from the labial vowel forms the labial glide [w]. In the formation of the coronal glide [j] and the labial glide [w], regressive assimilation takes place (Kadenge & Mudzingwa, 2012). This means that the V-place features are spread from the second vowel of the diphthong (V2). In sum, isiZulu and chiShona simplify the unacceptable diphthong through spreading. This is in keeping with isiZulu and chiShona native phonologies which prefer CV syllable structures (Kadenge, 2012; Kadenge & Mudzingwa,

2012). The next comparative analysis focuses on [r] substitution and the realization of NCs in isiZulu and chiShona.

6.2.1.4 Segmental Substitutions: [r] Substitution and the Realisation of NCs

This subsection presents an analysis of segmental substitution in isiZulu and chiShona. First we focus on (i) [r] substitution, and then we turn our attention to (ii) the realisation of NCs.

(i) [r] Substitution

Tableau 14 analyses the adoptive word /drʌm/. Table 29 demonstrates that isiZulu substitutes the alveolar liquid /r/ with lateral approximant [l], as the adoptive word /drʌm/ contains the voiced alveolar liquid /r/ not found in isiZulu, but present in chiShona. The constraint which prohibits [r] is *r and is defined in (169). In addition, the adoptive /drʌm/ contains the impermissible consonant cluster [dr], which is resolved through vowel epenthesis in both isiZulu and chiShona. The constraint that bars complex structures is (175) *COMPLEX, and the constraint that forbids insertion is (173) DEP-IO, the adoptive /drʌm/, also contains the vowel [ʌ], which is not found in isiZulu or chiShona, thus it is substituted with an isiZulu and chiShona equivalent. The constraint that prohibits the vowel [ʌ] is *ʌ, as explained in (170) and the constraint that bars segmental substitution is (167) IDENT-IO. Tableaux (14a) and (14b) formalise the substitution of [r].

Tableau 14: The Substitution of [r]

a) The Realisation of /drʌm/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ʌ, *r >> DEP-IO, IDENT-IO
Input: /drʌm/ **Output:** [idilamu]

/drʌm/	*COMPLEX	NOCODA	*ʌ	*r	DEP-IO	IDENT-IO
a. [drʌm]	*!	*	*	*		
b. [di.ra.mu]				*!	*	**
☞c. [i.di.la.mu]					**	**

Tableau (14a) shows that candidate (a), fatally violates the high ranking constraint *COMPLEX, by containing the complex onset [dr]. It also violates the high ranking constraints NOCODA, by ending in a consonant, *ʌ and *r, by containing impermissible segments. Candidate (b) eliminates the complex onset by inserting the vowel [i], between the two consonants, it uses vowel epenthesis to open the closed syllable, and substitutes the impermissible vowel [ʌ] with permissible isiZulu vowel [a]. However, candidate (b) contains the impermissible consonant [r]. Therefore, candidates (a) and (b) are non-optimal. Candidate (c) is the winner. It substitutes the voiced alveolar liquid [r] and the vowel [ʌ], with the voiced lateral liquid [l] and the vowel [a], respectively, this violates the low ranked constraint IDENT-IO - which states that features of the segment in the input should be identical to the corresponding segment in the output (Kadenge & Mudzingwa, 2012, p. 14). It opens the closed syllable by inserting the vowel [u], in violation of DEP-IO. These violations by candidate (c) are inconsequential since these are low ranking constraints.

b) The Realisation of /drʌm/ in chiShona

ChiShona: *COMPLEX, NOCODA, *ʌ >>*r, DEP-IO, IDENT-IO

Input: /drʌm/ **Output:** [diramu]

/drʌm/	*COMPLEX	NOCODA	*ʌ	*r	DEP-IO	IDENT-IO
a. [drʌm]	*!	*	*			
☞b. [di.ra.mu]					**	*

In Tableau (14b), candidate (a) is non-optimal because it fatally violates the high-ranking constraint *COMPLEX, by containing a complex onset [dr]. It also violates the high ranking constraint NOCODA, by ending in a consonant, and the segmental markedness constraint *ʌ, which bars the vowel [ʌ] in chiShona. Candidate (b) is thus the optimal candidate. It substitutes the prohibited vowel [ʌ] with the chiShona vowel [a], and removes the complex onset and syllable coda through vowel epenthesis, thus, violating the lowly ranking constraints DEP-IO twice and IDENT-IO once. Additionally, we see that in chiShona the constraint *r is not violated by the candidates, because it is not prohibited in chiShona, as it is in isiZulu.

Tableaux (14a) and (14b) present a formal analysis of the substitution of [r], were it is shown that isiZulu substitutes the alveolar liquid /r/ with the lateral approximant [l], while chiShona

does not. Therefore, in isiZulu the constraint *r is high ranking, but in chiShona it is not. As mentioned earlier, this is because isiZulu does not have the voiced alveolar liquid /r/ in its consonantal inventory. However, as mentioned in Chapter 5, isiZulu is beginning to accept the voiced alveolar liquid /r/ in adopted words. For instance, the adopted word /ɒprə/, as examined in Tableau (10a) is realised as [i-ope**r**a] and not [i-ope**l**a]. Similarly, chiShona substitutes the lateral approximant /l/ with the alveolar trill [r], for example /lɒri/ is realised as [rori] 'lorry' in chiShona, and as seen in Tableau (12b), the adoptive /vedʒtəbḷ/ is realised as [vedʒitebu**r**u] (Kadenge, 2012, p. 71).

(ii) The Realisation of NCs

Tableaux (13a) and (13b) above analysed the realisation of the adoptive /pʌɪnt/. However, the focus in Tableaux (13a) and (13b) was on diphthong simplification through spreading. In Tableau 15, the analysis focuses on NCs (Nasal + consonant) viz. the [nt] sequence in the adoptive /pʌɪ**nt**/.

Table 29 displays that the adoptive /pʌɪnt/ is realised as [ipajinti] in isiZulu, and [pajindi] in chiShona. This reveals that in chiShona the voiceless alveolar stop [t] is replaced with the voiced alveolar stop [d]. Kadenge (2012, p. 71) notes that a nasal plus a voiceless consonant sequence, such as [nt] in the adoptive word /pʌɪnt/, is "realised as a voiced prenasalised consonant" e.g. [nd], in chiShona. As chiShona only allows NCs that are nasal plus a voiced consonant. However, this is not the same for isiZulu. The markedness constraint that prohibits voiceless obstruents after nasals is *NC̥, as defined in (181);

(181) *NC̥ - no nasal plus voiceless obstruent sequence (Kager, 1999).

Tableau 15 below formalises the realization of NCs in isiZulu and chiShona.

Tableau 15: The Realization of NCs

a) The Realisation of /pʌɪnt/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ʌ, *ɪ >>DEP-IO, UNIQUE, *NC̥, IDENT-IO

Input: /pʌɪnt/ **Output:** [ipajinti]

/pʌɪnt/	*COMPLEX	NOCODA	*ʌ	*ɪ	DEP-IO	UNIQUE	*NC̥	IDENT-IO
a. [pʌɪnt]	*!	*	*	*				
b. [pa.jint]		*!				*		**
☞c. [i.pa.ji.nti]					*	*		**

Tableau (15a) displays that candidate (a) is not optimal, as it violates the high ranked syllable structure markedness constraint *COMPLEX, as it contains a complex syllable nucleus in the form of a diphthong. In addition, it violates NOCODA, *ʌ and *ɪ. Candidate (b) does well to substitute the impermissible vowels with isiZulu equivalents and simplifies the diphthong by inserting the coronal glide [j]. This violates the low ranked constraints IDENT-IO and UNIQUE, which require that there should be no feature change and no spreading, respectively (Benua, 1997). However, candidate (b) is eliminated by ending in a consonant, which violates the high ranked constraint NOCODA. Candidate (c) is the winning candidate, it repairs all prohibited structures akin to candidate (b), and opens the closed syllable by inserting the vowel [i]. As a result, it only violates the low ranking constraints DEP-IO, UNIQUE and IDENT-IO. None of the candidates in Tableau (15a) violate *NC̥, as isiZulu allows a nasal plus a voiceless consonant sequence.

b) The Realisation of /pʌɪnt/ in chiShona

ChiShona: *COMPLEX, NOCODA, *ʌ, *ɪ, *NC̥ >>DEP-IO, UNIQUE, IDENT-IO

Input: /pʌɪnt/ **Output:** [pajindi]

/pʌɪnt/	*COMPLEX	NOCODA	*ʌ	*ɪ	*NC̥	DEP-IO	UNIQUE	IDENT-IO
a. [pʌɪnt]	*!	*	*	*	*			
b. [pa.ji.nti]					*!	*	*	**
☞c. [pa.ji.ndi]						*	*	***

Tableau (15b), shows that candidate (a) fatally violates the high-ranking constraints *COMPLEX, NOCODA, *ʌ, *ɪ, and *NC̥. As a result, it is non-optimal. Candidate (b) repairs the complex syllable nuclei, by inserting the coronal glide [j] to split up the diphthong and this violates the lowly ranked constraint UNIQUE. Candidate (b) substitutes the impermissible vowels with acceptable chiShona vowels, and removes the syllable coda through vowel epenthesis. However, candidate (b) violates *NC̥, as chiShona only allows NCs that are nasal plus a voiced consonant (Kadenge, 2012, p. 71), therefore, it cannot be optimal. Candidate (c) is the optimal candidate. It repairs all illicit structures akin to Candidate (b), and repairs *NC̥ by replacing the voiceless alveolar plosive [t] with a voiced alveolar plosive [d] (voicing), thus the sequence [nt] is realised as a voiced prenasalised consonant [nd]. Therefore, candidate (c) only violates the lowly ranked constraints DEP-IO, UNIQUE and IDENT-IO.

Tableaux (15a) and (15b) examine the realisation of NCs in isiZulu and chiShona, using the adoptive /pʌɪnt/. In the output form of /pʌɪnt/, in chiShona the voiceless alveolar stop [t] is replaced with the voiced alveolar stop [d], this is known as voicing (Mheta & Zivenge, 2009). This voicing is triggered by the fact that chiShona does not allow prenasalised voiceless obstruents, therefore all obstruents following a nasal consonant have to be voiced in chiShona, for example /mp/ in ‘lamp’ is realised as [mb] in [rambi] in chiShona and /nt/ in ‘rent’ is realised as [nd] in [rendi] in chiShona (Kadenge, 2012; Mheta & Zivenge, 2009, p. 161). As we have seen in the above analysis (Tableau 15 (a)) this does not occur in isiZulu. The constraint *NC̥

that bans prenasalised voiceless obstruent is high ranking in chiShona but not in isiZulu, as reflected in their loanword phonologies. The change from /nt/ to [nd] in chiShona is crucial, as it illustrates the differences between isiZulu and chiShona phonologies. It is important to note that the sequences of consonants or co-articulations [nd] or [mb] are phonologically recognised as single phonemes (Ndambuki, 2007). This means that in isiZulu and also chiShona, in line with the CV structure, [nd] or [mb] is recognised as one [C], while in English it is a [CC] structure. In the following subsection we summarise the similarities and differences between isiZulu and chiShona.

6.2.1.5 A Summary of the Similarities and Differences between isiZulu and chiShona

In this subsection we use a table to summarise the similarities and differences between isiZulu and chiShona.

Table 30: The Similarities and Differences between isiZulu and chiShona loanword phonologies

Features	**isiZulu**	**chiShona**
Simple five vowel system	Yes	Yes
Simple CV syllable structure	Yes	Yes
Vowel epenthesis to open closed syllables	Yes	Yes
Vowel epenthesis to simplify complex onsets	Yes	Yes
Glide epenthesis (spreading) to simplify diphthongs	Yes	Yes
Substitution of the alveolar liquid /r/ with the alveolar lateral liquid [l] (/r/ →[l])	Yes	No (/l/ → [r])
Only allows NCs that are nasal plus a voiced consonant	No	Yes
Default insertion	No	Yes
Regressive assimilation	Yes	Yes
Coronal vowel inserted in the context of coronal consonant	Yes	Yes
Labial vowel inserted in the context of a labial consonant	Always	Mostly (unless default insertion then the coronal vowel [i] is inserted)
Consonant deletion to remove codas	Sometimes	No

6.2.1.6 Conclusions from the Comparative Analysis of isiZulu and chiShona

After the above comparative analysis of isiZulu and chiShona, the following conclusions and generalisations can be made: isiZulu and chiShona have a basic open CV syllable shape, and a simple five-vowel system. This denotes that when isiZulu and chiShona adopt a word from a source language, the adoptive has to be rephonologised in order to fit in to the languages' preferred open CV syllable structure.

When comparing isiZulu and chiShona repair strategies, we see that isiZulu and chiShona repair complex onsets and syllable codas through vowel epenthesis. In addition, isiZulu removes syllable codas through deletion (in rare instances), while chiShona does not. Glide epenthesis through the spreading of V-place features is utilised in both chiShona and isiZulu to repair complex syllable nuclei (diphthongs). The shape or quality of the epenthetic vowel in repairing codas, and glides in repairing diphthongs, is determined by the V-Place features of the preceding consonant in both chiShona and isiZulu. Thus, labial and coronal vowels are inserted in the context of labial and coronal segments, respectively. However, in chiShona, if this fails, default insertion takes place (Kadenge, 2012) but this is not the case in isiZulu.

Also, in isiZulu the voiced alveolar liquid /r/ is substituted with the lateral liquid [l] as seen in example (6), but in chiShona the inverse occurs, the lateral liquid /l/ is substituted with the non-lateral liquid [r] (Kadenge, 2012). Another considerable difference between isiZulu and chiShona, is that chiShona does not allow prenasalised voiceless obstruents (NC̥) such as [nt] and [mp], whereas isiZulu does.

The differences are clearly shown when comparing isiZulu and chiShona constraint hierarchies:

IsiZulu: *COMPLEX, NOCODA, *ʊ, *r, *ʌ, *æ, *x, *ə, *ɪ, *θ >> MAX-IO>>DEP-IO, UNIQUE, *NC̥, IDENT-IO.

ChiShona: *COMPLEX, NOCODA, MAX-IO, *ʊ, *ʌ, *x, *ə, *ɪ, *θ, *NC̥ >> *r, DEP-IO, UNIQUE, IDENT-IO (Kadenge & Mudzingwa, 2012).

From the above constraint hierarchy, we see a similar ranking of the isiZulu and chiShona constraints, except that *NC̥ and MAX-IO are highly ranked in chiShona and lowly ranked in isiZulu, and *r is highly ranked in isiZulu and lowly ranked in chiShona. Also, in isiZulu and

chiShona there is no crucial ranking between the faithfulness constraints. In the next section we compare isiZulu with isiNdebele.

6.3 IsiZulu Compared with isiNdebele

IsiNdebele is a southern Bantu language spoken by 2% of South Africa's population, whereas isiZulu is spoken by 22.7% thereof, as mentioned previously in Chapter 3. IsiZulu and isiNdebele are closely related and both languages are commonly spoken in KwaZulu-Natal. IsiNdebele similarly to isiZulu, has five simple vowels viz. /i/, /e/, /a/, /u/, and /o/, (Skhosana, 2009; Mahlangu, 2007). In isiNdebele syllables are open, this suggests that isiNdebele, similarly to isiZulu, does not allow syllable codas and complex onsets. IsiNdebele, in the same way as isiZulu, allows onsetless or V–shaped syllables in the word-initial position as in [a.le.la] 'forbid'. IsiNdebele, equally to isiZulu does not allow diphthongs or long vowels (Khumalo, 1984; Mahlangu, 2007). IsiZulu (Appendix 1, Table 33) and isiNdebele (Mahlangu, 2007) examples of these occurrences are given in Table 31 below:

Table 31: isiZulu Adaption Patterns Compared to isiNdebele

Underlying Form	IsiZulu Form	IsiNdebele Form	Gloss
a. /stul/	[isitulo]	[isitulo]	chair
b. /taɪ/	[utaji]	[itaji]	tie
c. /fəʊn/	[ifowuna]	[ifowunu]	phone
d. /pærəfɪn/	[upalafini]	[iparafini]	paraffin
e. /wɪndəʊ/	[iwindi]	[iwindo]	window

In Table 31 above we see correspondingly to Table 29; the underlying form of loanwords found in both isiZulu and isiNdebele, along with the isiZulu and isiNdebele forms of the adoptives, are presented. This is done in order to demonstrate how each word is realised in their respective language. Example (a) presents an impermissible complex onset [st]. Examples (b) and (c) show the occurrence of complex syllable nuclei (diphthongs), and examples (a), (c) and (d) show cases of syllable codas as they all end in a consonant. Example (d), additionally demonstrates the substitution of /r/ with [l] in isiZulu. Example (e), shows that voiced prenasalised plosives e.g. [nd], as illustrated in the word /wɪndəʊ/, are reserved in isiZulu e.g. [iwi**nd**i] and isiNdebele e.g. [iwi**nd**o].

In the same way as Section 6.2.1, Section 6.3.1 analyses the differences between the isiZulu and isiNdebele realisation of the adopted words, with special attention paid to the ways in which isiZulu resolves complex onsets, syllable codas, complex syllable nuclei's, and segment substitution in comparison to isiNdebele.

6.3.1 OT Comparative Analysis of isiZulu and isiNdebele

In this section, the data from Table 31 is inserted into OT tableaux to compare the two languages' repair processes. This is achieved through (i) dividing this section into subsections. Each subsection focuses on a specific impermissible syllable structure, including complex onset, syllable coda, complex syllable nuclei and unacceptable segments. (ii) This is accomplished using OT tableaux. (iii) OT tableaux are divided into an (a) isiZulu and (b) isiNdebele subdivision. Tableau 16 examines the impermissible structures; complex onset and syllable coda, Tableau 17 analyses the illicit structure: complex syllable nuclei, and Tableau 18 evaluates the substitution of [r].

6.3.1.1 The Simplification of a Complex Onset and Syllable Coda in isiZulu and isiNdebele

Tableau 16 examines the adoptive /stul/, that contains the impermissible consonant cluster [st], and a syllable coda. In isiZulu complex onsets and syllable codas are repaired through vowel epenthesis. Table 31 shows the same for isiNdebele. The constraint that bans complex onsets is *COMPLEX and the constraint that bars syllable coda is NOCODA, as discussed in (175) and (172), respectively. The faithfulness constraint that prohibits insertion is given in (173), DEP-IO.

Tableau 16: The Simplification of a Complex Onset and Syllable Coda

a) The Realisation of /stul/ in isiZulu

IsiZulu: *COMPLEX, NOCODA>>DEP-IO

Input: /stul/ **Output:** [isitulo]

/stul/	*COMPLEX	NOCODA	DEP-IO
a. [stul]	*!	*	
b. [i.si.tul]		*!	*
☞c.[i.si.tu.lo]			**

In Tableau (16a), candidate (a), fatally violates the high ranking constraint *COMPLEX, by containing the complex onset [st]. It also violates the high ranking constraints NOCODA, by ending in a consonant. Candidate (b) eliminates the complex onset by inserting the vowel [i], between the two consonants. However, candidate (b) ends in a consonant thereby violating the high ranking constraint NOCODA. Therefore, candidates (a) and (b) are non-optimal. Candidate (c) is the winner. It simplifies the complex onset through vowel epenthesis and opens the closed syllable by inserting the vowel [u], in violation of DEP-IO twice. This violation by candidate (c) is inconsequential since this is a low ranking constraint.

b) The Realisation of /stul/ in isiNdebele

IsiNdebele: *COMPLEX, NOCODA >> DEP-IO

Input: /stul/ **Output:** [isitulo]

/stul/	*COMPLEX	NOCODA	DEP-IO
a. [stul]	*!	*	
☞b.[i.si.tu.lo]			**

Tableau (16b) illustrates that candidate (a) is non-optimal because it fatally violates the high-ranking markedness constraints *COMPLEX, by having a complex onset, and NOCODA, by ending in a consonant. Candidate (b) repairs the complex onset and syllable coda by inserting the vowels [i] and [o], respectively, thereby violating the low ranking constraint DEP-IO. Candidate (b) is thus the winning candidate.

Tableaux (16a) and (16b) look at the simplification of complex onsets and syllable codas in isiZulu and isiNdebele, respectively. In the OT analysis of the complex onset [st] in isiZulu and isiNdebele, we see the exact same phonological process occurring in both languages; vowel epenthesis. Therefore, isiZulu and isiNdebele mutually simplify complex onsets by inserting a vowel between the two consecutive consonants. In the analysis of the syllable coda we see that isiZulu and isiNdebele also apply vowel epenthesis to open the closed syllable. Next we look at the simplification of diphthongs in isiZulu and isiNdebele.

6.3.1.2 The Simplification of Diphthongs in isiZulu and isiNdebele

In this subsection, the English adoptives /taɪ/ and /foʊn/ are analysed in isiZulu and isiNdebele. These adoptives contain impermissible [VV] structures (diphthongs). Consequently, infringing on isiZulu and isiNdebele's simple CV syllable structure. As a result, these adoptives require syllable structure repair. Diphthongs are shown to be simplified through spreading in isiZulu and isiNdebele. The simplification of a diphthong is formalised in Tableaux (17a) and (17d). The markedness constraint that prohibits diphthongs is (175): *COMPLEX, and the constraint that bans spreading is (176): UNIQUE. The diphthongs [aɪ] and [oʊ] contain segments that are not found in isiZulu or isiNdebele. Accordingly, the following constraints are used *ɪ, *ʊ and IDENT-IO, as defined in (177), (166) and (167), respectively.

Tableau 17: The Simplification of a Diphthong

a) The Realisation of /taɪ/ in isiZulu

IsiZulu: *COMPLEX, *ɪ >> UNIQUE, IDENT-IO

Input: /taɪ/ **Output:** [utaji]

/taɪ/	*COMPLEX	*ɪ	UNIQUE	IDENT-IO
a. [taɪ]	*!	*		
☞b. [u.ta.ji]			*	*

Tableau (17a) shows that, candidate (a) is eliminated by the high-ranking constraint *COMPLEX because it contains the complex syllable nuclei [aɪ]. It also violates the high ranking segmental constraint *ɪ which prohibits [ɪ] in isiZulu. Candidate (b) is the optimal candidate. It repairs the diphthong through spreading the V-Place feature [coronal] from [i] to form [j] and substitutes the prohibited vowel [ɪ], with the isiZulu equivalent [i], thereby only violating the lowly ranked faithfulness constraints UNIQUE and IDENT-IO.

b) The Realisation of /taɪ/ in isiNdebele

IsiNdebele: *COMPLEX, *ɪ >> UNIQUE, IDENT-IO

Input: /taɪ/ **Output:** [itaji]

/taɪ/	*COMPLEX	*ɪ	UNIQUE	IDENT-IO
a. [taɪ]	*!	*		
☞b. [i.ta.ji]			*	*

In Tableau (17b), candidate (a) fatally violates the high ranking constraint *COMPLEX, by containing a diphthong [aɪ], and *ɪ which prohibits the vowel [ɪ], as it is not part of the isiNdebele vowel inventory. Candidate (b) is the winner, as it simplifies the diphthong by inserting the glide [j], and substitutes the vowel [ɪ] with the vowel [i], in violation of the low ranked constraints UNIQUE, that bans spreading (Benua, 1997) and IDENT-IO, that demands that the features of the vowel in the input should be identical to the corresponding vowel in the output (Kadenge & Mudzingwa, 2012, p. 14).

Tableaux (17a) and (17b) examine the input form /taɪ/, which is realised as [utaji] in (a) isiZulu and, [itaji] in (b) isiNdebele. This analysis shows the glide epenthesis which monophthongises the diphthong, where the V-place features spread from the coronal vowel to form the coronal glide [j], just as it was construed in our comparison of isiZulu and chiShona. Tableaux (17c) and (17d), formalise the realisation of /fəʊn/ in isiZulu and isiNdebele.

c) The Realisation of /fəʊn/ in isiZulu

IsiZulu: *COMPLEX, NOCODA, *ə, *ʊ >> DEP-IO, UNIQUE, IDENT-IO

Input: /fəʊn/ **Output:** [ifowuni]

/fəʊn/	*COMPLEX	NOCODA	*ə	*ʊ	DEP-IO	UNIQUE	IDENT-IO
a.[fəʊn]	*!	*	*	*			
b. [i.fo.wun]		*!				*	**
c. ☞ [i.fo.wu.ni]					*	*	**

Tableau (17c) displays that, candidate (a) fatally violates the high-ranking constraints *COMPLEX, NOCODA, *ə, and *ʊ. As a result, it is non-optimal. Candidate (b) repairs the diphthong by inserting the labial glide [w] to split up the diphthong violating the lowly ranked constraint UNIQUE. Candidate (b) substitutes the impermissible vowels [ə] and [ʊ] with the acceptable isiZulu vowels [o] and [u], respectively. However, Candidate (b) ends in a consonant, therefore, it cannot be optimal. Candidate (c) is the optimal candidate. It repairs all impermissible structures in the same way as candidate (b), and repairs the closed syllable through vowel epenthesis, thereby only violating the lowly ranked constraints DEP-IO, UNIQUE and IDENT-IO.

d) The Realisation of /fəʊn/ in isiNdebele

IsiNdebele: *COMPLEX, NOCODA, *ə, *ʊ >> DEP-IO, UNIQUE, IDENT-IO

Input: /fəʊn/ **Output:** [ifowunu]

/fəʊn/	*COMPLEX	NOCODA	*ə	*ʊ	DEP-IO	UNIQUE	IDENT-IO
a.[fəʊn]	*!	*	*	*			
b. [i.fo.wun]		*!				*	**
c. ☞[i.fo.wu.nu]					*	*	**

In Tableau (17d), candidate (a) is not optimal as it violates the high ranked syllable structure markedness constraint *COMPLEX, as it contains a complex syllable nucleus in the form of a diphthong. In addition, it violates NOCODA, *ə and *ʊ. Candidate (b) simplifies the diphthong by inserting the labial glide [w], and substitutes the impermissible vowels with acceptable isiNdebele vowels, in turn violating the low ranked constraints UNIQUE and IDENT-IO. Candidate (b), however, violates the high ranking constraints NOCODA, as it ends in a consonant, therefore it is not optimal. Candidate (c) repairs all illicit structures, and only violates the lowly ranking constraints DEP-IO, UNIQUE and IDENT-IO. As a result, candidate (c) is the optimal candidate.

Tableaux (17c) and (17d), evaluate the input /fəʊn/. This input is realised as [ifowuni] in (c) isiZulu and [ifowunu] in (d) isiNdebele. From these realisations we can deduce that the

spreading process is also occurring, where the V-place features are spreading from the labial vowel [u] to form the labial glide [w]. In the isiZulu output form of /fəʊn/; [ifowuni] the coronal vowel [i] is inserted to open the closed syllable. In the isiNdebele output form of /fəʊn/; [ifowunu] the labial vowel [u] is inserted to open the closed syllable, it can be expressed that in isiZulu the coronal vowel is inserted in the context of a coronal consonant, however in isiNdebele default insertion may occur, since a labial vowel is inserted in the context of a coronal consonant, or vowel harmony from the preceding [u]. In the following subsection we evaluate segment substitution in isiZulu and isiNdebele.

6.3.1.3 Segmental Substitution in isiZulu and isiNdebele

Tableau 18 examines the adoptive word /parəfɪn/. Table 31 displays that isiZulu substitutes the alveolar liquid /r/ with lateral approximant [l], as the adoptive word /parəfɪn/ contains the voiced alveolar liquid /r/ not found in isiZulu, but present in isiNdebele. The constraint which prohibits [r] is *r and is defined in (169). In addition, the adoptive /parəfɪn/ contains a syllable coda, as it ends in a consonant. Both isiZulu and isiNdebele, open closed syllables by means of insertion (vowel epenthesis). The constraint that prohibits syllable codas is (172) NOCODA, and the constraint that bans insertion is (173) DEP-IO. The adoptive /parəfɪn/, also contains the vowels [ə] and [ɪ], which are not found in isiZulu or isiNdebele, thus it is substituted with an isiZulu and isiNdebele equivalent. The constraint that prohibits the vowels [ə] and [ɪ], are (179) *ə and (177) *ɪ, respectively, and the constraint that bans segmental substitution is IDENT-IO, as explained in (167). Tableaux (18a) and (18b) formalise the substitution of [r].

Tableau 18: The Substitution of [r]

a) The Realisation of /pærəfɪn/ in isiZulu

IsiZulu: NOCODA, *æ, *r, *ə, *ɪ >> DEP-IO, IDENT-IO

Input: /pærəfɪn/ **Output:** [upalafini]

/pærəfɪn/	NOCODA	*æ	*r	*ə	*ɪ	DEP-IO	IDENT-IO
a. [pæ.rə.fɪn]	*!	*	*	*	*		
b. [pa.ra.fi.ni]			*!			*	***
☞c. [u.pa.la.fi.ni]						*	****

In Tableau (18a), candidate (a) is not optimal because it fatally violates the high-ranking markedness constraint NOCODA, that prohibits closed syllables, and the segmental markedness constraints *æ, *r, *ə, *ɪ, that respectively bans the segments [æ], [r], [ə] and [ɪ] in isiZulu. Candidate (b) substitutes the impermissible segments [æ], [ə] and [ɪ] with the acceptable isiZulu segments [a] and [i], respectively, and removes the syllable coda through vowel epenthesis. However, candidate (b) contains the marked segmental constraint *r, therefore it is not optimal. Candidate (c) is the winning candidate. It repairs all impermissible structures akin to candidate (b), and substitutes the voiced alveolar liquid /r/ with the voiced lateral liquid [l], thus violating the lowly ranking constraints DEP-IO and IDENT-IO**.**

b) The Realisation of /pærəfɪn/ in isiNdebele

IsiNdebele: NOCODA, *æ, *ə, *ɪ >>*r, DEP-IO, IDENT-IO

Input: /pærəfɪn/ **Output:** [iparafini]

/pærəfɪn/	NOCODA	*æ	*ə	*ɪ	*r	DEP-IO	IDENT-IO
a. [pæ.rə.fɪn]	*!	*	*	*			
☞b. [i.pa.ra.fi.ni]						*	***

Tableau (18b) illustrates that, candidate (a) is fully faithful to the input but fatally violates the high ranked constraints NOCODA, *æ, *ə and *ɪ, which respectively, prohibits closed syllables, the vowel [æ], shwa and the vowel [ɪ], therefore it is not optimal. Candidate (b) is the winning candidate. It removes the syllable coda through vowel epenthesis and substitutes the vowels [æ], [ə] and [ɪ], with the acceptable isiNdebele vowels [a] and [i], respectively. This in turn violates the low ranking constraints DEP-IO and IDENT-IO. In Tableau (18b), similarly to what was observed for chiShona in Tableau (14b), none of the candidates violate the segmental constraint *r as [r] is part of the isiNdebele consonant inventory.

Tableaux (18a) and (18b) present the substitution of [r], were it is shown that isiZulu substitutes the alveolar liquid /r/ with lateral approximant [l], while isiNdebele does not. This indicates that in isiZulu the constraint *r is high ranking, but in isiNdebele it is not. Furthermore, Tableau 18 reveals that both the isiZulu and isiNdebele output forms insert the coronal vowel [i], to open the closed syllable, proving that in isiZulu and isiNdebele, syllable codas are eliminated

through vowel epenthesis. This shows that NOCODA is high ranking in both languages. In the next subsection we summarise the similarities and differences between isiZulu and isiNdebele.

6.3.1.4 A Summary of the Similarities and Differences between isiZulu and isiNdebele

In this subsection we tabulate the similarities and differences between isiZulu and isiNdebele.

Table 32: The Similarities and Differences between isiZulu and isiNdebele

Features	**isiZulu**	**isiNdebele**
Simple five vowel system	Yes	Yes
Simple CV syllable structure	Yes	Yes
Vowel epenthesis to open closed syllables	Yes	Yes
Vowel epenthesis to simplify complex onsets	Yes	Yes
Glide epenthesis (spreading) to simplify diphthongs	Yes	Yes
Substitution of the alveolar liquid /r/ with the alveolar lateral liquid [l] (/r/ →[l])	Yes	No
Only allows NCs that are nasal plus a voiced consonant	No	Yes
Default insertion	No	Yes
Regressive assimilation	Yes	Yes
Coronal vowel inserted in the context of coronal consonant	Yes	No
Labial vowel inserted in the context of a labial consonant	Yes	No
Consonant deletion to remove codas	Sometimes	No

6.3.1.5 Conclusions Drawn from the Comparative Analysis of isiZulu and isiNdebele.

From the above comparative analysis of isiZulu and isiNdebele, the following observations may be made: isiZulu and isiNdebele share a simple open CV syllable structure and as a result, adoptives are rephonologised and resyllabified to fit isiZulu and isiNdebele's acceptable CV syllable shape. IsiZulu and isiNdebele both have a simple five vowel system. In terms of repair strategies, it can be concluded that isiZulu and isiNdebele utilise similar repair strategies akin to chiShona, namely vowel epenthesis, spreading and segmental substitution.

A notable difference is that in isiZulu, the shape of the epenthetic vowel is determined by the preceding consonant, whereas in isiNdebele default insertion takes place. Also, isiZulu substitutes the voiced alveolar liquid /r/, with a voiced alveolar lateral liquid [l], whereas isiNdebele does not.

Additionally, there were no examples found in previous studies, portraying deletion in isiNdebele. Moreover, deletion was not analysed in the comparative analysis of isiZulu and isiNdebele, as we did not identify a common adoptive (found in both isiZulu and isiNdebele), exemplifying elision. However, from previous studies (Skhosana, 2009; Mahlangu, 2007), we can deduce that deletion is not a repair process employed by isiNdebele. Therefore, MAX-IO would be high ranking in isiNdebele, as opposed to its lower ranking in isiZulu.

Like chiShona and unlike isiZulu, isiNdebele does not allow prenasalised voiceless obstruents (Skhosana, 2009). However, we could not find examples from English adoptives, nonetheless, examples found in Skhosana (2009, p. 109), substantiates this: in isiZulu the word for 'thing' is [i**nt**o], and in isiNdebele [i**nd**ɔ]. In this example, we see that in isiZulu the nasal plus voiceless consonant is accepted, but in isiNdebele it is changed to nasal plus a voiced consonant. Predictively, *NC̥ would be a high ranking constraint in isiNdebele, but low ranking in isiZulu. The constraint hierarchy of isiZulu and isiNdebele are compared below;

isiZulu: *COMPLEX, NOCODA, *r, *ʊ, *ɪ >> MAX-IO >> *NC̥, DEP-IO, UNIQUE, IDENT-IO,

isiNdebele: *COMPLEX, NOCODA, *NC̥, MAX-IO, *ʊ, *ɪ >> *r, DEP-IO, UNIQUE, IDENT-IO.

From the above constraint hierarchy, we see a similar ranking of constraints for isiZulu and isiNdebele. Similar to isiZulu and chiShona, there is a notable difference in the ranking of *r, MAX-IO, and *NC̥, in isiZulu and isiNdebele. In addition, there is no crucial ranking between the low ranking faithfulness constraints.

6.4 Summary

This chapter compared isiZulu with chiShona and isiNdebele. The utilisation of OT tableaux assisted with examining how each language repairs an illicit syllable structure. From the analysis it can be concluded that isiZulu, chiShona and, isiNdebele use vowel epenthesis as the

repair strategy or adaption process to break up illicit consonantal clusters and to open closed syllables. Khumalo (1984) asserts that certain consonant clusters are also repaired through consonant deletion in isiZulu loanword phonology. However, consonant deletion is not used in all languages, as revealed in the above comparison of isiZulu to chiShona and isiNdebele. Furthermore, it has been established that glide epenthesis through the spreading of V-place features, is the preferred process used by isiZulu, chiShona and isiNdebele in the simplification of diphthongs. Therefore, we can conclude from the three languages that we have examined that; Bantu languages follow a similar adaptation pattern in their adoption of loanwords. In the next and final chapter, the study on isiZulu adoptives from English and Afrikaans is concluded.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Chapter Introduction

This chapter summarises the principal objectives and findings of this study. It briefly outlines the empirical and theoretical contributions of this investigation and recommends areas that may require further exploration.

7.2 Summary, Conclusions and Recommendations

This study set out to examine how adoptives from English and Afrikaans are rephonologised, to permit them to conform to the permissible phonology of the receptor language, i.e. isiZulu. The aim of this study was to identify and describe the phonological processes utilised to rephonologise the isiZulu adoptives from English and Afrikaans, subsequently contributing an analysis of phonological changes in isiZulu's phonology, due to adoption and, to account for the rephonologisation of English and Afrikaans words in isiZulu, using OT.

Considering these objectives, this study explored several prior studies on loanword phonology, which contributed useful background insights into the phonological processes that occur when words are borrowed from one language to another. In addition to previous studies, the current study investigated syllable structure, vocalic and consonantal systems of all the languages being observed. This was undertaken to determine any and all the variations among the three languages. The distinctions found were that English and Afrikaans allow marked structures for instance, closed syllables [CVC], consonantal clusters [CC], long vowels [V:], and diphthongs [VV]. Additionally, English and Afrikaans have a larger set of vowels than isiZulu, English has approximately twenty-five vowels, including monophthongs, diphthongs, triphthongs and Afrikaans has seventeen monophthongs and eight diphthongs, in comparison to isiZulu, with five simple vowels. Relative to variances among consonants, isiZulu does not contain the voiced alveolar liquid /r/ found in both English and Afrikaans adoptives, as well as a voiceless velar fricative /x/ which is found in Afrikaans.

The data analysed in this study were collected from books and previous studies on isiZulu. A total of 255 loanwords were collected. The data was then verified by two native speakers of isiZulu and a number of isiZulu dictionaries. The methods used to analyse the data were Feature Geometry (FG) and Optimality Theory (OT). FG was used to describe the feature structure of

vowels and glides, and to account for glide epenthesis as a spreading process, while OT was used to provide a constraint-based analysis of the adaption processes triggered in isiZulu loanword phonology. FG and OT are renowned in the area of phonology and have been used in a number of prior studies for a long duration.

On analysis of the data the following was revealed; substitution is used to reshape the English and Afrikaans vowels and consonants to the closest available vowels and consonants in isiZulu. In English adoptives the vowels /æ/, /ɜ/, /ɒ/, /ɑ/, /ə/, /uː/, /ɪ/, /ʊ/, /ʌ/ were substituted with the closest phonetically similar vowels in isiZulu. And likewise, in Afrikaans adoptives the vowels /ə/, /eː/, /ɒ/, /ɔː/, /œː/, /oː/, /ɑː/, /aː/, /uː/ were substituted with the next phonetically similar vowel in isiZulu. As aforementioned the /r/ sound is not part of isiZulu's consonantal inventory, therefore in the English and Afrikaans adoptives that contained the alveolar liquid /r/, the /r/ sound was substituted with the alveolar lateral liquid [l]. For example, the word for 'dress' in Afrikaans, /rɔk/ was rephonologised to [iloʤwe] in isiZulu. However, the data analysis evinced that in certain adoptives the /r/ sound had been accepted, therefore the alveolar liquid /r/ was retained in a selected number of adoptives, these are viewed as partially rephonologised isiZulu adoptives. For example, /rulə/ was initially rephonologised to [ilula] but modern isiZulu speakers recognise it as [irula]. It is demonstrated that vowel epenthesis is employed to solve the issues of closed syllables and consonantal clusters. Therefore, vowel epenthesis is used to open closed syllables and to simplify complex onsets, as isiZulu does not allow syllable codas [CVC] and complex onsets [CC]. However, on further analysis the data revealed that certain consonantal clusters were tolerated in isiZulu adoptives from English, such as [st] in [istroberi] 'strawberry', [gr] in [igremu] 'gram' and, [sk] in [ideski] 'desk'. It was also found that some syllable codas are repaired through consonant deletion in isiZulu, for example the word /ləʊkeɪʃən/ 'location' which contains the syllable coda [n] is rephonologised to [iloʤiʃi] thus the syllable coda is deleted. The matter of diphthongs was solved by glide epenthesis. Glide epenthesis is used to simplify diphthongs and it is a product of the spreading of V-Place features from input vowels, as isiZulu does not allow diphthongs in its phonology.

Furthermore, the research compared the results accumulated in this study to those of similar studies on chiShona and isiNdebele. From this comparison it was concluded that isiZulu, chiShona and, isiNdebele use vowel epenthesis as the repair strategy or adaption process to break up illicit consonantal clusters and to open closed syllables. Glide epenthesis, through the spreading of V-place features, is the preferred process employed by isiZulu, chiShona and

isiNdebele in the simplification of diphthongs. Therefore, the three examined Bantu languages follow a similar adaptation pattern in their adoption of loanwords. With regards to the differences, it was found that chiShona and isiNdebele do not allow prenasalised voiceless obstruents, whereas isiZulu does. This means that prenasalised voiceless consonants, such as [nt] are rephonologised to [nd], in chiShona and isiNdebele. An additional difference comprised that in isiZulu the shape of the epenthetic vowel is determined by the preceding consonant, but chiShona (if epenthesis fails) and isiNdebele allow default insertion.

It is anticipated that this study contributes, in a small but significant way, to the field of loanword adoption and adaption in Bantu languages. Furthermore, it is hoped that this research provides the required impetus for further research in other areas of isiZulu, thereby contributing to linguistic typology. Future research could focus on the realisation of tone in isiZulu loanwords in order to deepen and broaden our understating of the phonology of loanword adaptation. Greater exploration is required into the segmental phonology of isiZulu, as the language is constantly changing, due to borrowing of certain marked structures from English and Afrikaans, including consonantal clusters and previously unaccepted segments (for example /r/).

REFERENCE LIST

Ager, S. (2011). *Omniglot*: *Writing systems and languages of the world*. Retrieved from the Omniglot website: http://www.omniglot.com/writing/afrikaans.htm.

Adomako, K. (2008). *Vowel epenthesis and consonant deletion in loanwords: A study of Akan.* (Unpublished master's thesis). University of Tromsø, Tromsø, Norway.

Archangeli, D. (1997). Optimality Theory: An introduction to linguistics in the 1990's. In Archangeli, D. and Langendoen, D.T. (Eds.), *Optimality Theory: An Overview* (p. 107-122). Malden, MA: Blackwell Publishing.

Aronoff, M. and Fudeman, K. (2005). *What is morphology? Morphology and morphological analysis*. Oxford, UK: Blackwell Publishing.

Augusto, A.F. (2012). The rephonologization of Portuguese loanwords in Kimpombo: Generative CV phonology model account. *US-China Foreign Language, 10,* 1547-1563.

Ball, M.J., and Rahilly, J. (1999). *Phonetics: The science of speech*. Great Britain, London: Arnold.

Bekker, I. (2008). *The vowels of South African English.* (Unpublished doctoral dissertation). North-West University, Potchefstroom, South Africa.

Benua, L. (1997). *Transderivational identity.* (Unpublished PhD dissertation). University of Massachusetts, Amherst, United States of America.

Clements, G.N. and Keyser, S.J. (1983). *CV phonology: A generative theory of the syllable.* Cambridge, MA: MIT Press.

Clements, G.N. and Hume, E. (1995). The internal organization of speech sounds. In Goldsmith, J (Ed.), *The handbook of phonological theory* (p. 245 - 506). Oxford, UK: Blackwell Publishing.

Cole, D.T. (1990). Old Tswana and new Latin. *South African Journal of African Languages, 10* (1), 345 – 353.

Cope, A. T. (1966). *Zulu phonology, tonology and tonal grammar*. (Unpublished doctoral dissertation). University of Natal, Durban, South Africa.

Crawford, C.J. (2009). *Adaption and transmission in Japanese loanword phonology*. (Unpublished master's dissertation). Cornell University, New York, United States of America.

Daly, N. and Msimang, C.T. (1991). *Ungangishiyi phela shongololo*. Pretoria, SA: Afrika Limited.

Dent, G.R. and Nyembezi, C.L.S. (1995). *Scholar's Zulu dictionary.* Pietermaritzburg, SA: Shuter and Shooter Publishers.

Dent, G.R. and Nyembezi, C.L.S. (1995). *Compact Zulu dictionary*. Pietermaritzburg, SA: Shuter and Shooter Publishers.

De Villiers, M. (1976). *Afrikaanse klankleer: Fonetiek, fonologie en woordbou*. Cape Town, SA: Balkema.

Doke, C.M. (1926). *The phonetics of the Zulu language*. Johannesburg, SA: Witwatersrand University Press.

Doke, C.M. (1927). *Textbook of Zulu grammar*. Johannesburg, SA: Witwatersrand University Press.

Doke, C.M., Malcolm, D.M.K. and Sikakana, J.M.A. (1958). *English-Zulu/Zulu-English dictionary*. Johannesburg, SA: Witwatersrand University Press.

Donaldson, B., C. (1993). *A grammar of Afrikaans*. Berlin, NY: Mouton de Gruyter.

Gaebler,C. (2004). *IsiZulu.net: Online isiZulu dictionary*. Retrieved from the isiZulu.net website: https://isizulu.net/.

Gough, D. (1996) *English in South Africa*. In Silva P. (Ed.), *A dictionary of South African English on historical principles* (p. xvii-xix.). Oxford, UK: Oxford University Press.

Govender, N., Barnard, E., and Davel, M. (2005, September 4-8). *Fundamental frequency and tone in isiZulu: Initial experiments.* Retrieved from the Researchgate website: https://www.researchgate.net/publication/221482232

Grimes, E. (1996). *Ethnologue: Languages of the world*. Dallas, Texas: Summer Institute of Linguistics.

Guthrie, M. (1971). *Comparative Bantu: An introduction to the comparative linguistics and prehistory of the Bantu languages*. Farnborough, UK: Gregg International Publishers.

Halle, M., Vaux, B., and Wolfe, A. (2000). On feature spreading and the representation of place of articulation. *Linguistic Inquiry, 31*(3), 387- 444.

Hussain, Q., Mahmood, R., and Mahmood, M.A. (2011). Vowel substitution: A comparative study of English loans in Punjabi and Urdu. *International Journal of Linguistics, 3* (1), 31-38.

Jensen, J.T. (1993). *English Phonology*. Amsterdam, NL: John Benjamin's Publishing.

John, A. (2000). *The handbook of Phonology theory*. Oxford, UK: Blackwell Publishers.

Kadenge, M and Mudzingwa, C. (2011). Diphthong simplification through spreading: An Optimality Theory account. *Language Matters, 42* (1), 142 - 161.

Kadenge, M. and Mudzingwa, C. (2012). Comparing chiShona loanwords of monolingual and bilingual speakers: An Optimality Theory analysis. *South African Journal of African Languages, 32* (2), 141 – 151.

Kadenge, M. (2012). The rephonologization of Shona loanwords from English: An Optimality Theory analysis. *Acta Academica, 44* (1), 56 - 84.

Kager, R. (1999). *Optimality Theory*. Cambridge, MA: Cambridge University Press.

Kang, Y. (2010). Tutorial overview: Suprasegmental adaptation in loanwords. *Lingua, 120* (9), 2295-2310.

Kar, S. (2009). *The syllable structure of Bangla in Optimality Theory and its application to the analysis of verbal inflectional paradigms in distributed morphology*. Tübingen, Germany: University of Tübingen.

Katamba, F. (1989). *An introduction to phonology*. London, UK: Longman.

Khumalo, J.S.M. (1981). *Zulu tonology.* (Master's dissertation). University of the Witwatersrand, Johannesburg, South Africa.

Khumalo, J.S.M. (1984). A preliminary survey of Zulu adoptives. *African Studies, 43* (2), 205 – 216.

Khumalo, J.S.M. (1987). *An autosegmental account of Zulu phonology.* (Unpublished PhD thesis). University of the Witwatersrand, Johannesburg, South Africa.

Kisserberth, C. (1970). On the functional unity of phonological rules. *Linguistic Inquiry 1*(1), 291-306.

Koopman, A. (1992). Zulu and English adoptives: Morphological and Phonological interference. *South African Journal of African Languages*, *12* (1), 105-115.

Lanham, L.W. (1960). *The comparative phonology of Nguni*. Grahamstown, South Africa: Rhodes University.

Lyons, J. (1969). *Introduction to Theoretical Linguistics.* Cambridge, MA: Cambridge University Press.

Mahlangu, K.S. (2007). *Adoption of loanwords in isiNdebele.* (Unpublished master's thesis). University of Pretoria, Pretoria, South Africa.

Maho, J. (2001). The Bantu area: Towards clearing up a mess. *Africa and Asia, 1*(1), 40-49.

Meinhof, C. (1906). *Grundzüge einer vergleichenden Grammatik der Bantusprachen*. Berlin: Dietrich Reimer.

Mshengu, T.T.B and Bosch, S. (1987). *Ibhuku lokuzithokozisa: The fun way to learn isiZulu*. Cape Town, SA: ESST.

Mudzingwa, C., and Kadenge, M. (2011). Comparing hiatus resolution in Karanga and Nambya: An Optimality Theory account. *Nordic Journal of African Studies, 20* (3), 203-240.

Musk, N. (2010). *The vowels and consonants of English.* Lingkoping, Sweden: Lingkoping's Universiteit.

Mwita, C.L. (2009). The adaptation of Swahili loanwords from Arabic: A constraint-based analysis. *The Journal of Pan African Studies, 2* (8), 46 - 61.

Naidoo, Y., van der Merwe, A., and Naude, E. (2005). *Development of Speech Sounds and Syllable Structure of Words in Zulu-Speaking Children.* Pretoria, SA: University of Pretoria.

Ndambuki, B. M. (2013). *A constraint-based analysis of Kikamba nativized loanwords.* (Unpublished master's dissertation). Kenyatta University, Nairobi, Kenya.

Ngcobo, M. (2013). Loan words classification in isiZulu: The need for a Sociolinguistic approach. *Language Matters: Studies in the Languages of Africa, 44* (1), 21-38.

Onyebuchi, O. C., and Tochukwu, O. G. (2014). Word formation processes in Nigerian Short-Message-Service. *Theory and Practice in Language Studies, 4* (11), 2215-2222.

Owino, D. (2003). *Phonological nativization of Dholuo loanwords.* (Unpublished doctoral dissertation). University of Pretoria, Pretoria, South Africa.

Pinchuck, T., McCrea, B., and Reid, D. (2002). *Guide to South Africa*. Cape Town, CT: Rough Guides.

Poulos, G and Msimang, C.T. (1998). *A Linguistic analysis of Zulu.* Cape Town, SA: Via Africa.

Prince, A. and Smolensky, P. (1993). *Optimality Theory: Constraint interaction in generative grammar*. Colorado, USA: Blackwell Publishing.

Prince, A. and Smolensky, P. (2004). *Optimality Theory: Constraint interaction in generative grammar*. Colorado, USA: Blackwell Publishing

Rose, Y. (1999). A structural account of root node deletion in loanword phonology. *Canadian Journal of Linguistics, 44* (4), 359-404.

Rose, Y and Demuth, K. (2006). Vowel epenthesis in loanword adaption: Representational and phonetic considerations. *Lingua, 116,* 1112 - 1139.

Schnoebelen. T. (2005). *The shape of things to come: The nominal morphology of Zulu loanwords.* Retrieved from the Readbag website: http://www.readbag.com/stanford-tylers-notes-papers-zulu-loans-schnoebelen

Shillington, K. (1995). *History of Africa*. Oxford, UK: Macmillan Publishers.

South African History Online. (2010). *From European to "Afrikaner".* Retrieved from the SA history website: http://www.sahistory.org.za/people-south-africa/afrikaans.

Sibanda, G. (2009). Vowel Processes in Nguni: Resolving the Problem of Unacceptable VV Sequences. In Matondo, M., Mc Laughlin, F., and Potsdam, E. (Eds.), *Selected Proceedings of the 38th Annual Conference on African Linguistics* (p. 38-55). Somerville, MA: Cascadilla Proceedings Project.

Skhosana, P.B. (2009). *The linguistic relationship between southern and northern Ndebele*. (PhD dissertation). University of Pretoria, Pretoria, South Africa.

South Africa info. (2001). *The languages of South Africa*. Retrieved from the South Africa info website: http://www.southafrica.info/about/people/language.htm#.UWCmS6IrqSp.

Steinbergs, A. (1985). The role of MSCs in OshiKwanyama loan phonology. *Studies in African Linguistics, 16 (1),* 89-101.

Taljaard, P.C. and Snyman, J.W. (1993). *An introduction to Zulu phonetics*. Cape Town, SA: Marius Libbe Publishers.

Tejada, L. (2012). *Tone gestures and constraint interaction in Sierra Juarez Zapotec.* Los Angeles, USA: University of Southern California.

Tench, P. (1990). *The roles of intonation in English discourse*. New York, NY: Frankfurt.

Tesar, B. and Smolensky, P. (1993). *The learnability of Optimality Theory: An algorithm and some basic complexity results*. Colorado, USA: University of Colorado.

Thomas-Vilakati, K.D. (2010). *Coproduction and coarticulation in isiZulu clicks*. Oakland, California: University of California Press.

Uffmann, C. (2004). *Vowel epenthesis in loanword phonology*. (Unpublished PhD thesis). Philipps Universitat, Marburg, Germany.

Uffmann, C. (2006). Epenthetic vowel quality in loanwords: empirical and formal issues. *Lingua, 116*, 1079-111.

Uys, I. (2002). *The English, Afrikaans, Xhosa and Zulu aid: Word lists and phrases in four languages.* Cape Town, SA: Pharos Dictionaries NB Publishers.

Van der Merwe, H.J.J.M. (1951). *An introduction to Afrikaans.* Cape Town, SA: Balkema.

Van Oostendorp, M. (2004). *The theory of Faithfulness*. Amsterdam: Meertens Institute.

Wells, J. C. (2014). *PhoTransEdit: English phonetic transcription.* Retrieved from the PhoTransEdit website: http://www.photransedit.com/online/text2phonetics.aspx.

Wilkes, A. and Nkosi, N. (1998). *Say it in Zulu: For beginners or third-language speakers*. Cape Town, SA: Kagiso Education.

Zivenge, W. (2009). *Phonological and morphological nativisation of English loans in Tonga.* (Unpublished Doctoral dissertation). South Africa, University of South Africa.

Zuraw, K. (2003). Optimality Theory in Linguistics. In Arbib, M. (Ed.), *The Handbook of Brain Theory and Neural Networks* (p. 819-822.). Cambridge, MA: MIT Press

APPENDICES

APPENDIX 1: LIST OF ADOPTED WORDS FROM ENGLISH

Table 33 below presents examples of isiZulu adoptives from English.

Table 33: Examples of isiZulu Adoptives from English

English Form	isiZulu Form	Gloss
/stɔː/	[isiˈtɔːlo]	store
/kɒfi/	[iːkʰoːfi]	coffee
/spaɪs/	[isipaˈjiːsi]	spice
/bætəri/	[iːˈbeːtʰri]	battery
/pɔɪnt/	[iːpʰoˈjiːnti]	point
/kærət/	[iːkʰaˈloːtʰi]	carrot
/kærət/	[iːkʰaˈroːtʰi]	carrot
/vəʊt/	[iːˈvoːti]	vote
/stəʊv/	[isiˈtoːfu]	stove
/səʊfə/	[uˈsɔːfa]	sofa
/letɪs/	[uleˈtiːsi]	lettuce
/steəz/	[isiˈteːzi]	stairs
/tiː/	[iːˈtiːje]	tea
/dɪnə/	[iːˈdiːna]	dinner
/mænɪdʒə/	[imɛˈnɛːʤa]	manager
/gəʊld/	[iːgoˈliːde]	gold
/nɜːs/	[uˈneːsi]	nurse
/dʒæm/	[uˈʤaːmu]	jam
/bɒks/	[iːboˈʤiːsi]	box
/kælɪndə/	[iːkʰaˈlɛːnda]	calendar
/tiːtʃə/	[uˈtʰiːʃa]	teacher

/bɪʃəp/	[umbiˈʃoːbi]	bishop
/ʃelf/	[iːʃeˈluːfu]	shelf
/zaɪənɪst/	[iːziˈjoːni]	zionist
/skeɪl/	[isi'kaːlo]	scale
/mʌni/	[iˈmaːli]	money
/tæksi/	[iːteˈɠiːsi]	taxi
/selfəʊn/	[iːseˈluːlafoˈwuːna]	cell phone
/bɔːd/	[iːˈboːdi]	board
/sɪŋk/	[uˈsiːŋki]	sink
/saɪn/	[saˈjiːna]	sign
/sɪstə/	[iːsisiˈtɛːla]	sister
/dɪsembə/	[udiˈsɛːmba]	December
/həʊtel/	[iːɦɔˈtɛːla]	hotel
/ləʊkeɪʃən/	[iːloˈɠiːʃi]	location
/dʒeɪl/	[iːˈɖʒɛːle]	jail
/bʊk/	[iːˈbuːɠu]	book
/ɪndiən/	[iːnˈdiːja]	indian
/pɪl/	[iːpʰiˈliːsi]	pill
/peɪpə/	[iːˈpʰɛːpʰa]	paper
/hɒlədeɪ/	[iːhoˈliːde]	holiday
/pəliːs/	[iːpʰoˈjiːsa]	police
/skuːl/	[isiˈkɔːle]	school
/səʊldʒə/	[iːˈsɔːʧa]	soldier
/kemɪst/	[umkʰeˈmiːsi]	chemist
/dɪsk/	[iːdiˈsiːɠi]	disc
/bɒtəl/	[iːbɔˈɮɛːla]	bottle
/ɪŋglɪʃ/	[isiŋˈgiːsi]	English
/beɪk/	[ˈbaːɠa]	bake

/væn/	[iːˈveːni]	van
/kɒləni/	[iːkoˈloːni]	colony
/kwɔːtə/	[iːˈkɔːta]	quarter
/bʌs/	[iːˈbaːsi]	bus
/bɔːl/	[iːˈbɔːla]	ball
/pəʊl/	[iːˈpaːli]	pole
/kæt/	[iːˈkaːti]	cat
/ruːlə/	[iˈluːla]	ruler
/rʌbə/	[iˈlaːɓa]	rubber
/tɔɪlɪt/	[iːtʰojiˈleːtʰi]	toilet
/ʃaʊə/	[iːˈʃaːwa]	shower
/fɪʃ/	[uˈfiːʃi]	fish
/taɪgə/	[iːtʰaˈjiːga]	tiger
/ʃɑːk/	[uˈʃaːɠa]	shark
/pensəl/	[iːpɛnˈsɛːla]	pencil
/dæm/	[iːˈdaːmu]	dam
/kəmpjuːtə/	[iːkʰompiˈjuːtʰa]	computer
/desk/	[iːdeˈsiːɠi]	desk
/gəʊld/	[iːgoˈliːde]	gold
/sɪlvə/	[iːsiˈliːva]	silver
/pleɪt/	[iːpuˈleːti]	plate
/keɪdʒ/	[iːˈkʰeːdʒi]	cage
/bɑːskɪt/	[ubasiˈɠiːdi]	basket
/baɪsɪkəl/	[iːbajisiˈɠiːli]	bicycle
/petrəl/	[upʰetʰiˈloːli]	petrol
/kɜːtən/	[iːkʰeˈtʰiːni]	curtain
/brekfəst/	[iːbulaɠuˈfeːsi]	breakfast
/ɒfɪs/	[iːɦoˈviːsi]	office

/reɪdɪəʊ/	[iːleˈdiːjo]	radio
/reɪdɪəʊ/	[iːreˈdiːjo]	radio
/glɑːs/	[iːgiˈlaːzi]	glass
/æpəl/	[iː-aˈpʰuːla]	apple
/dʒɜːzi/	[iːˈʤeːzi]	jersey
/pɑːspɔːt/	[iːpʰasiˈpoːtʰi]	passport
/bənɑːnə/	[ubaˈnaːna]	banana
/letɪs/	[uleˈtiːsi]	lettuce
/kjuːkʌmbə/	[iːkʰuˈkʰaːmba]	cucumber
/kæbɪdʒ/	[iːkɬaˈɓiːʃi]	cabbage
/kɒlɪflaʊə/	[ukʰalifuˈlaːwa]	cauliflower
/krɪkɪt/	[iːkʰiliˈɠiːtʰi]	cricket
/deɪt/	[iːˈdeːtʰi]	date
/lʌnʧ/	[iːˈlaːnʧi]	lunch
/kɑːpɪt/	[iːkʰaˈpʰɛːtʰe]	carpet
/dɒŋki/	[uˈdoːŋki]	donkey
/pen/	[iːˈpeːni]	pen
/θaʊzənd/	[itawuzeni]	thousand
/fəʊn/	[iːfoˈwuːna]	phone
/glʌv/	[iːgiˈlaːvu]	glove
/swiːt/	[iːˈswiːdi]	sweet
/kɔːnə/	[iːˈkʰɔːna]	corner
/drɔː/	[iːdiˈlɔːwa]	drawer
/kɒtən/	[ukoˈtiːni]	cotton
/flæg/	[iːfuˈleːgi]	flag
/greɪps/	[iːgileˈbiːsi]	grapes
/wɒtʃ/	[iːˈwaːʃi]	watch
/ʃiːt/	[iːˈʃiːdi]	sheet

/kiː/	[isiˈkʰiːje]	key
/mɑːkɪt/	[imaˈʤɛːtʰe]	market
/wʊl/	[iːˈwuːli]	wool
/tɪn/	[iːˈtʰiːni]	tin
/vedʒɪ/	[iːˈveːʤi]	veggie (English clipping of the word vegetable)
/plʌm/	[upuˈlaːmu]	plum
/dɪʃ/	[inˈdiːʃi]	dish
/stiːl/	[isiˈtiːli]	steel
/kæfeɪ/	[iːˈkʰeːfi]	café
/kʌmpəni/	[iŋkamˈpaːni]	company
/kɒlɪdʒ/	[iːkʰoˈliːʤi]	college
/fɪzɪks/	[amafiˈziːɠi]	physics
/kənsɜːt/	[iːkʰɔnˈsaːtʰi]	concert
/mɒdjuːl/	[imoˈʤuːli]	module
/fɜːnɪtʃə/	[ifaˈniːʃa]	furniture
/fɪlm/	[iːfiˈliːmu]	film
/bændɪdʒ/	[iːbanˈdeːʃi]	bandage
/ɡærɑːʒ/	[iːgaˈlaːʤi]	garage
/spʌndʒ/	[isiˈpoːnʤi]	sponge
/hɔːl/	[iːˈɦɔːlo]	hall
/hɒlədeɪ/	[iːhoˈliːde]	holiday
/dʒæm/	[uˈʤaːmu]	jam
/dʒuːs/	[uˈʤuːsi]	juice
/kɪtʃɪn/	[iːˈkʰiːʃi]	kitchen
/pɑːk/	[iːˈpaːɠi]	park
/laɪn/	[ulaˈjiːni]	line
/nʌmbə/	[iˈnaːmba]	number
/nɒvəl/	[iːnɔˈveːli]	novel

/paɪp/	[iːˈpiːpi]	pipe
/pɑːsəl/	[iːpʰaˈsɛːla]	parcel
/pærəfɪn/	[upʰalaˈfiːni]	paraffin
/sæləd/	[iːsaˈlaːdi]	salad
/pəʊstkɑːd/	[iːposiˈkʰaːdi]	postcard
/taɪə/	[iːˈtʰaːja]	tyre
/sentɪmiːtə/	[iːsentiˈmiːtʰa]	centimetre
/sətɪfɪkeɪt/	[isitifiˈʧeːti]	certificate
/waɪn/	[iːwaˈjiːni]	wine
/wɒtʃ/	[iːˈwaːʃi]	watch
/weɪtə/	[uˈwɛːta]	waiter
/treɪ/	[iːtʰiˈleːji]	tray
/ɒksɪdʒən/	[iː-oʧsiˈʤiːni	oxygen
/tʃiːz/	[uˈʃiːzi]	cheese
/kemɪkəl/	[iːkʰemiˈkʰaːli]	chemical
/gɑːdən/	[iˈŋaːdi]	garden
/drʌm/	[iːdiˈlaːmu]	drum
/keɪk/	[iːˈkʰɛːkʰe]	cake
/tenɪs/	[iːtʰeˈniːsi]	tennis
/kəʊkənʌt/	[ukʰukʰuˈnaːtʰi]	coconut
/məʃiːn/	[umˈʃiːni]	machine
/daɪəmənd/	[iːdajiˈmaːne]	diamond
/telɪvɪʒən/	[iːtʰeleviˈʃiːni]	television
/bed/	[umˈbɛːde]	bed
/tʃes/	[iːˈʃeːsi]	chess
/gɒlf/	[iːgaˈloːfu]	golf
/eɪprəl/	[u-apˈreːli]	April
/ɒktəʊbə/|	[u-ɔʧˈtʰɔːɓa]	October

/nəʊvembə/|	[unɔˈvɛːmba]	November
/mɑːtʃ/|	[uˈmaːʃi]	March
/dʒuːn/	[uˈdʒuːni]	June
/dʒuːlaɪ/	[udʒuˈlaːji]	July
/septembə/|	[usɛpˈtʰɛːmba]	September
/kændəl/|	[iːkʰanˈɮɛːla]	candle
/ʌvən/	[uɦaˈviːni	oven
/brʌʃ/	[iːbuˈlaːʃi]	brush
/ɒrɪndʒ/|	[iːwoˈliːnʧi]	orange
/hɔːs/	[iːˈɦaːʃi]	horse
/paɪnt/|	[iːpʰaˈjiːnti]	pint
/taɪ/	[uˈtʰaːji]	tie
/kɑːndəm/|	[iːkʰonˈdoːmu]	condom
/kriːm/	[ukʰiˈliːmu]	cream
/klʌb/	[iːkiˈlaːbu]	club
/græm/|	[iːgˈreːmu]	gram
/mæp/|	[iˈmaːpʰu]	map
/kiː/	[isiˈkʰiːje]	key
/næpkɪn/	[iːnaɓuˈɠeːni]	napkin
/stɑːf nɜːs/	[isiˈtaːfu - uˈneːsi]	staff nurse
/stɑːf/	[isiˈtaːfu]	staff
/rəʊbɒt/	[iːroˈboːtʰi]	robot
/skuːl/	[isiˈkɔːle]	school
/kæt/	[iːˈkaːti]	cat
/raɪs/	[iːlaˈjiːsi]	rice
/kæməl/	[iːkaˈmeːli]	camel
/maɪnjuːt/	[iːmiˈniːtʰi]	minute
/sɒks/	[iːsoˈɠiːsi]	socks

/dʒænjʊri/	[udʒanuˈwaːli]	January
/febjʊəri/	[ufeɓruˈwaːri]	February
/ɔːgəst/|	[u-aˈgaːsti]	August
/meɪ/	[uˈmeːji]	May
/ɒprə/|	[i-opera]	opera
/ɒksɪdʒən/	[iː-oɠsiˈdʒiːni]	oxygen
/pærəfɪn/	[upʰalaˈfiːni]	paraffin
/blaʊz/	[iːbulaˈwoːzi]	blouse

(English data Transcribed using: PhoTransEdit (http://www.photransedit.com/),; isiZulu data transcribed using: isiZulu.net)

APPENDIX 2: LIST OF ADOPTED WORDS FROM AFRIKAANS

Table 34 below presents examples of isiZulu adoptives from Afrikaans

Table 34: Examples of isiZulu Adoptives from Afrikaans

Afrikaans Form	IsiZulu Form	Gloss
/stul/	[isiˈtuːlo]	chair
/tɑːfəl/	[iːtaˈfuːla]	table
/spəikər/	[isipiˈʤiːli]	nail
/spoːk/	[isiˈpɔːʤwe]	ghost
/rɔk/	[iːˈlɔːʤwe]	dress
/dɔrp/	[iːdɔˈlɔːba]	town
/bruk/	[iːbuˈluːʤwe]	trouser
/sambreːl/	[isambuˈlɛːla]	umbrella
/sløːtəl/	[isiɬutʰuˈlɛːlo]	key
/but/	[uˈbuːti]	brother
/veːk/	[iːˈviːʤi]	week
/plɑːs/	[iːpuˈlaːzi]	farm
/sœykər/	[uʃuˈʤɛːla]	sugar
/mat/	[umata]	carpet
/hɛmp/	[iːˈhɛːmbe]	shirt
/bɔtər/	[iːbɔˈtɛːla]	butter
/tamɑːtiː/	[utamaˈtiːsi]	tomato
/pəinapəl/	[upʰajiˈnaːpʰu]	pineapple
/stoːf/	[isiˈtoːfu]	stove
/fɛnstər/	[iːfasiˈtɛːla]	window
/bant/	[iːˈbaːnde]	belt
/nɑːlt/	[iːnaˈliːtʰi]	needle
/skəp/	[isiˈkɛːbe]	boat

/seːp/	[inˈsiːpʰo]	soap
/steːn/	[isiˈtiːni]	brick
/knɔp/	[iŋkiˈnɔːbo]	button
/brœx/	[iːbuˈlɔːho]	bridge
/pɔs/	[iːˈpoːsi]	post
/skœlt/	[isikweˈleːti]	debt
/snœyf/	[isiˈneːmfu]	snuff
/skoːl/	[isiˈkɔːle]	school
/baŋk/	[iːˈbaːŋe]	bank
/boːɲcis/	[ubonˈʧiːsi]	beans
/xans/	[iːˈhaːnsi]	goose
/kalkun/	[iːkaliˈkʰuːni]	turkey
/pɑːl/	[iːˈpaːli]	pole
/strɑːt/	[isitaˈlaːdi]	street
/vɔl/	[uˈvɔːlo]	wool
/brik/	[iːbuˈleːɠi]	brake
/xloː/	[iːˈkʰɔːlwa]	believe
/krap/	[ɠˆlwɛːba]	scratch
/lɔri/	[iːˈloːli]	lorry/motor truck
/dans/	[umdanso]	dance
/dɔm/	[isiˈdoːmu]	stupid person
/dɔktər/	[udɔɠɔˈtɛːla]	doctor

(Afrikaans data transcribed using: (Mahlangu, 2007, p. 8-60); isiZulu data transcribed using: isiZulu.net)

APPENDIX 3: ISIZULU TOLERABLE SOUNDS AND [CC] STRUCTURES IN ADOPTIVES FROM ENGLISH AND AFRIKAANS

Table 35 below presents examples of the tolerable [CC] structures in isiZulu.

Table 35: Example of Tolerable [CC] Structures in isiZulu

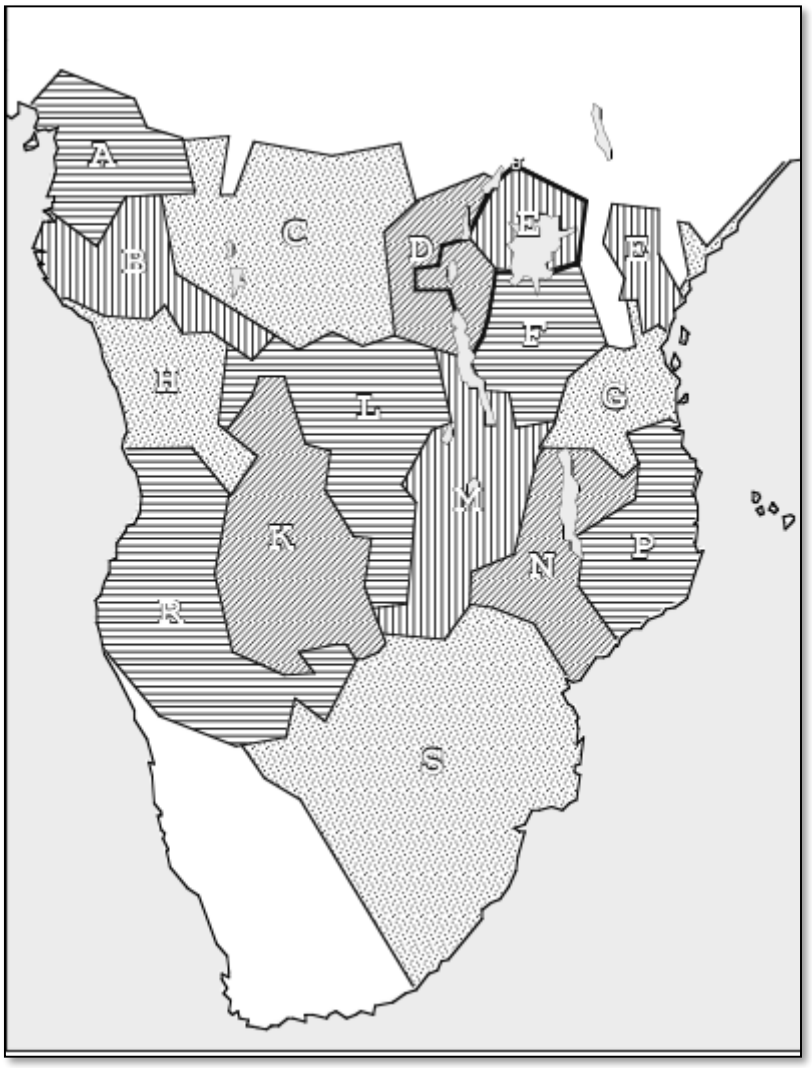
Adopted Form	isiZulu Form	Gloss
/strɔːbəri/	[iːstrɔˈbeːri]	strawberry
/ɡræm/	[iːgˈreːmu]	gram
/ɒksɪdʒən/	[iː-oɡʃiˈdʒiːni]	oxygen

Table 36 below presents examples of the accepted /r/ sound in isiZulu adoptives.

Table 36: Example of the Accepted [r] Sound in isiZulu Adoptives

Adopted Form	isiZulu Form	Modern isiZulu Form	Gloss
/ruːlə/	[iˈluːla]	[iːˈruːla]	ruler
/rʌbə/	[iˈlaːɓa]	[iˈraːɓa]	rubber
/raɪs/	[iːlaˈjiːsi]	[iːraˈjiːsi]	rice
/reɪdɪəʊ/	[iːleˈdiːjo]	[iːreˈdiːjo]	radio
/kærət/	[iːkʰaˈloːtʰi]	[iːkʰaˈroːtʰi]	carrot

APPENDIX 4: ZONAL CLASSIFICATION OF THE BANTU LANGUAGES



(adapted from Maho, 2001, p. 42)

Figure 5: Guthrie's (1971) Zonal Classification of the Bantu Languages