TOPICS IN THE MORPHOPHONOLOGY OF STANDARD SPOKEN TAMIL (SST): AN OPTIMALITY THEORETIC STUDY

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A THESIS SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSHOPHY

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UNIVERSTY OF NEWCASTLE UPON TYNE
UNITED KINGDOM
OCTOBER 2010

Acknowledgements

This thesis would not have reached this shape without the contribution of many good souls who have offered their valuable time and invaluable help on many occasions. It is my privilege to register my sincere heartfelt thanks to everyone who has contributed directly and indirectly to the completion of this thesis.

First and foremost in the list of generous souls deserving my gratitude is my supervisor, S. J. Hannahs. I am indebted to him for accepting me as his student and introducing me to the study of generative linguistics, especially Optimality Phonology. He has contributed immensely in completing this study. Without his enthusiasm, valuable guidance, constructive comments, moral support, motivation and immense patience, it would have been impossible for me to complete this study. I wish to convey my heartfelt gratitude to him.

My sincere thanks are due also to the authorities of the University of Malaya for granting me a scholarship and study leave to conduct this research work successfully.

I also owe a great deal of gratitude to my colleagues at my home institution, especially my foster father Professor Dr N Kanthasamy, Head of Department of Indian Studies, Associate Professor Dr S Kumaran, and Associate Professor Dr M Krishanan for their continuous encouragement and moral support which were shown in every possible way. Special thanks also due to them for verifying the collected data and the accuracy of the transcriptions. My gratitude is due also to my friends, Yousef Elramli, Riaz Islam Mongrio, Said Omar, Ari Om Namashivaya and everyone who has helped me directly and indirectly with valuable suggestions and extended help whenever I needed them. I gratefully acknowledge the help I have received from every one of them and others whom I have not mentioned individually by name.

Without the constant encouragement and support of my family, immediate and extended, it would have been impossible for me to have got this far. Most of all, my wife, Vimala Devi who has always been a constant source of inspiration to me deserves my sincere gratitude. My heartfelt thanks are due to her for her inequitable tolerance and all the cooperation she has extended to me throughout this period of study. My thanks are due also to my daughters Sarmila, Lalitha Sri, Nishalny and my mother, G Sivapuniam for their passionate support in the past four years.

It goes without saying that other than me no one mentioned in the foregoing is responsible for any shortcomings in the study.

Abstract

This thesis provides a novel account of the morphophonology of Standard Spoken Tamil (SST) in a constraint-based framework. Special focus is given to the constraints governed by sonority-distance in avoiding possible tension at morphology and phonology interfaces (M-P interfaces). The study is based on a thorough analysis of an extensive body of data which constitute empirical evidence for the present research. It has been argued that the repair strategies devised at M-P interfaces can be properly predicted from the perspective of sonority distance between the segments occupying the edges of the preceding and succeeding lexical items.

This thesis consists of seven chapters. The first chapter, in addition to laying a background for the present study, also gives theoretical and empirical evidence justifying the need for conducting a constraint-based study for long-running issues on the morphophonology of Tamil. The chapter includes an overview of widely applied SST in Malaysia, the source which provided statistical and empirical evidence for the present study, a brief review of the related literature, and description of the aims of the study, research questions, methodology, limitations of the study and the organization of the chapters.

Chapter two, the theoretical framework of sonority-related repair strategies (SrRS) at M-P interfaces in Tamil, introduces the theoretical framework guiding the present thesis. This chapter illustrates the sonority requirement underpinning the solutions at different types of interfaces, namely, vowel hiatus ((i) vowel versus vowel (V-V)), onset/coda asymmetry ((ii) consonant versus consonant (C-C)), general alignment ((iii) consonant versus vowel (C-V)), and less-preferred interaction of (iv) the vowel versus consonant (V-C). This chapter clarifies the relevance of sonority distance and the selection of the correct strategies to resolve conflict at M-P interfaces.

The third chapter is on the prosodic phonology of the SST. It provides a description of the prosodic phonology of standard spoken Tamil without relying upon a particular theoretical framework. The description is intended to provide insight into the overall phonological patterns of lexemes and the phonological properties of the language.

Chapter four, vowel hiatus (_V# + #V_) and SrRS in Tamil, deals with issues relating to vowel hiatus (VH), which commonly emerge when two vowels come into contact as a result of morphological concatenation. Tamil as an agglutinative language which applies various processes to word result in to various types of V# + #V_ interfaces. The language employs a range of sonority related resolutions to avoid vowel hiatus, with the sole aim of maintaining the uniformity of word internal syllables and preserving harmonic contact at the M-P interfaces. This chapter explores the sonority-related motivation behind the assignment of glides, vowel deletion (VD), and epenthesis to avoid hiatus.

Chapter five is on _C# versus #C_ interfaces and conflict management in Tamil. It deals with sonority-related resolutions applied to avoid Onset-Coda asymmetries in Tamil. Irregularities resulting from consonant versus consonant (_C# versus #C_) interaction at M-P interfaces are aggressively initiated by various segmental and sub-segmental properties. Involvement of segmental values including the visible individual segmental values and the invisible sub-strength properties such as sonority, prosodic features and the positional prominences at the interfaces have been analyzed within the positional faithfulness framework in this chapter.

Chapter six deals with _C#_#V_ (C-V) and _V#_C#_ (V-C) types of interactions in Tamil. Though these interactions appear to be a simple form of interaction at face value, they exhibit systematic and interesting phonological reactions at M-P interfaces. Previous studies analyzing the nature of the phonological reactions of C-V and V-C in literature, which have treated the foregoing interfaces as a natural way of forming demisyllables, have to a great extent obscured their amazing phonological relevance. The present study offers alternative remedies, claiming that the C-V and V-C interfaces are hosting equally important phonological reactions just as in the case of vowel hiatus (V-V) and coda and onset asymmetry (C-C), casting relevance on sonority distance.

The last chapter is the conclusion. It provides a summary and discussion of the findings.

Contents

Tables

Abbreviations

(.)	SYLLABLE BOUNDARY
[]	EPENTHESIS
<>	DELETION
ACC	ACCUSATIVE
ADJ.	ADJECTIVE
ADJ.MARK.	ADJECTIVE MARKER
ADV	ADVERBS
AFF	AFFIX
ASR	ABSOLUTE SONORITY RELEGATION
AT	ALIGNMENT THEORY
CM/s	CASE MARKER/S
CO-COMP	CO-COMPOUND WORD
CON/s	CONSTRAINT/S
CONJ.WD	CONJOINED WORD
CV	COMPOUND VERB
DERV.M/s	DERIVATIVE MARKER/S
EI	EPENTHESIS INSERTION
EPENT.	EPENTHESIS
FC/s	FAITHFULNESS CONTRAINT/S
FW	FUNCTION WORD
GA	GENERALISED ALIGNMENT
GEM.	GEMINATION
GG	GLIDE GEMINATION
GI	GLIDE INSERTION
GrWd	GRAMMAR WORD
GSF	GRADUAL SONORITY FALL
HE	HOMORGANIC EPENTHESIS
INFL.M/s	INFLECTIONAL MARKER/S
LCC	LOCAL CONSTRAINT CONJUNCTION
LEX	LEXICAL
L-P	LEXICAL PHONOLOGY
LT	LITERARY TAMIL

MAR	MARGIN
MC/s	MARKEDNESS CONSTRAINT/S
MMSD	MOST MINIMAL SONORITY DISTANCE
M-P	MORPHOLOGY-PHONOLOGY
MSD	MINIMAL SONORITY DISTANCE
NOM	NOMINATIVE
OCA	ONSET-CODA ASYMMETRIES
OT	OPTIMALITY THEORY
PF	POSITIONAL FAITHFULNESS
PM	POSITIONAL MARKEDNESS
PM/s	PLURAL MARKER/S
PNGM	PLACE-NUMBER-GENDER MARKER
PREF	PREFIX
PRON	PRONOUNS
PrWd	PROSODIC WORD
RHT	RELATIONAL HIERARCHICAL THEORY
SCL	SYLLABLE CONTACT LAW
SDP	SONORITY DISPERSON PRINCIPLE
SH	SONORITY HIERARCHY
SR	SONORITY RELEGATION
SrRS	SONORITY RELATED REPAIR STRATEGY
SST	STANDARD SPOKEN TAMIL
SSTM	STANDARD SPOKEN TAMIL IN MALAYSIA
SUB-COMP	SUB-COMBOUND WORD
SUFF	SUFFIX
VD	VOWEL DELETION
VH	VOWEL HIATUS
σ	SYLLABLE
ABL.	ABLATIVE
NOM.	NOMINATIVE

Notes on Transliteration

All the data collected for the present study has been transcribed in English using the following transliteration system. The following provides access to read and understand the transliteration of Tamil alphabets:

VOWELS

அ	a	ஆ	aː
இ	i	ஈ	iː
உ	u	ஊ	uː
எ	e	ஏ	eː
ஒ	o	ஓ	oː
ஐ	ai	ஔ	au

CONSONANTS

க்	k	ய்	y
ங்	ŋ	ர்	r
ச்	c/s	ல்	l
ஞ்	ɲ	வ்	v
ட்	d	ழ்	ɻ
ண்	ɳ	ள்	ɭ
த்	t		
ந்	n̪	ஸ்ரீ	sri
ப்	p	ஷ்	sh
ம்	m	ஸ்	s
ற்	ɽ	ஜ்	j
ன்	n		

GLOTTAL

ஃ	kh

Chapter One
Introduction

1.1 Introduction

The present thesis, entitled *Topics in the Morphophonology of Tamil: An Optimality Theoretic (OT) Study*, offers constraint-based analyses of various types of interaction taking place at the morphology-phonology interfaces in Standard Spoken Tamil (SST). Like other languages, Tamil constantly deals with various phonological and morphological factors at morphology-phonology interfaces (M-P interfaces). However, the contribution of phonological factors appears to precede the morphological in solving conflicts at the interfaces which aim to achieve either well-formed syllables, or harmonic-contact between the bordering syllables without violating sonority requirements. This study, therefore, aims to verify the uniformity of the phonologically motivated repair strategies, and their sonority-interrelatedness.

There are a range of different terms used in literature which refer to the interaction between phonology and morphology. These include *sandhi* (Clayton, 1981), Interface Study (Hale, 2000), Intermediate Study (Fougeron and Keating, 1997), morphophonemics (Carstairs, 1987), morphonology (Dressler, 1985), morphotactic study (Blevins, 2006) and phonomorphology (Sethi, 1997), and Lexical Phonology (Kiparsky, 1982: 131-176, Kiparsky, 1985:85-138, Kiparsky, 2000, Kiparsky, 1979).[1] Despite the differences in terms, these studies have been developed with a common goal – to address the issues which arise at morphologically derived and non-derived environments - the two influential environments repeatedly referred to in M-P interface studies.

Part of the problem in defining and dealing with Morphology-Phonology Interface arises from the analysts' own interests. For instance, the morphologist may well treat the focus of study as *Sandhi*, as morphophonemics or morphophonology, and

[1] For convenience, I will always apply these terms to refer to intersections within lexical items. The selection of a terminology in one instance and a different one in another instance does not affect the stand which has been taken in this thesis, that is, that intersection in the language under investigation is an integral part of its phonological system.

consequently define the focus of study as part of morphology. On the other hand, the phonomorphologist and lexical phonologists might treat this interface as phonology and try to account for its effects through phonological analysis. Although all studies agree in principle that interface study involves an intermediate linguistic domain, they have failed to reach a consensus on where to draw the line between the concerned domains and others.

Due to the various positions taken regarding the appropriate analytical framework for Morphophonology - whether this should be phonology, syntax or a separate morphological component, it is difficult to define morphophonology satisfactorily or to achieve a consensus among scholars studying morphophonology. The literature suggests that there are at least three areas of linguistic study related to morphophonology, i.e. phonology, morphology and syntax. Illustrations of these three claims may be cited as follows: Hannahs (1995), Kager (1999) and Carstairs-McCarthy (2005) represent phonologists examining morphophonology; Maiden (1991), Dressler (1985) and Spencer (1998: 126, 2000), Kaisse (1987), Young-Scholten (1993) approach morphophonology from the point of view of the morphologists; Revithiadou (2006), Truckenbrodt (1999) and Yeo (2008) deal with morphophonology to establish phonology embedded in syntax.

It is interesting to note that the place of morphophonology in grammar is not only a matter of dispute between current linguists and linguistic theories, but it also creates a dilemma for traditional grammarians. They typically focus on mechanical changes at morphological boundaries, and explicitly acknowledge the syntactic relation between the mechanical changes and syntax dating from observations as early as 2000 BC, as seen in Panini’s grammar of Sanskrit (D.Albert, 1985, Meenakshi, 1997) and that of Tamil by *Tolka:ppiyar* (Ilakkuvanar, 1994a). In the latter case, the interest focused largely on examining the nature of the juncture and its locality behaviour. For these, *Tolka:ppiyam* provided taxonomic explanations rather than empirical explanations in the form of rules and parameters. Notes on the mechanical changes are found scattered in various chapters on morphology and syntax in the manual.

Contributions of the American Structuralists, also known as Bloomfieldians, to the development of morphophonology are significant. Morphophonology was treated as part of structural change, to be specific, as allomorphic change. Bloomfield (1933), Hockett (1976a, 1976b) and Pike (1943) extensively explored the nature of juncture and its relatedness to other morphological areas. They believed that the phonetic changes within a selected morphological context were induced and conditioned by morphological factors rather than phonological factors. Their explorations remained focused on analysing the nature of morphophonemic alternations within morphological contexts.

Dressler (1985: 149) is of the opinion that the morphophonological process evolved from phonology 'by acquiring morphological but by reducing the phonological domain'. Dressler views the M-P interface as an 'in-between domain of study' that must be reviewed by morphological factors more than that of phonology. Nevertheless, he has also made it clear that phonological and morphological factors co-exist in MP, and the MP cannot be studied in the absence of either.

Spencer (1991: xii) asserts that morphophonology is a separate field of study just like morphology. Though he agrees in principle that morphophonology ought to be treated as a different linguistic domain, he stresses explicitly that it is a part of morphology when commenting on its relatedness.

Maiden (1991: 263), who firmly believes that morphophonology is a field of study which relates to two domains, applies a slightly different definition. Like others, he accepts firmly that a M-P interface covers both the morphological and phonological processes at the interface within the grammar of each system. His stance can be clearly understood from the following quotation:

> '… Morphonology belongs: at the unmediated interface between the grammatical system and phonetic processes … Morphonology exists at the frontier between phonetic processes and some of the most intimate and language-specific aspects of linguistic structures… in reality, frontiers are often the zones of turbulences… Morphonology is such a frontier zone. Turbulent and refractory it may prove to be: but it is there.'

Maiden believes that morphonology is an intermediate domain establishing connection between two domains of linguistic studies and is often filled with 'undisclosed chaoses'. His (1991: 263) fair observations also identify a number of factors conditioning linguistic reactions at intersections.

While the interest of the Structuralists was on morphological contributions at large, Linear and Non-Linear Phonologists offered an alternative view to morphophonology. Most of them began to view morphophonology as part of phonology, and a field of study analysing the representation of underlying and surface forms. Morphophonology has been treated as 'a characteristic trajectory of phonological rules' (Kiparsky, 1993: 309). He believes that it is the root cause in the development of most phonological rules. The interest of these groups towards interface issues was relatively limited at the initial stage, but noteworthy discoveries began to emerge in the mid and late 1970s. Their arguments revolved around coining a new term for morphophonology that would reflect its phonological essence, which might be seen as an effort to demote its attachment to 'mechanical change' and morphology. Besides this, phonological studies have made a significant breakthrough in examining interface-related issues using derivational approaches to a great extent, and since then have also suggested alternative approaches on a regular basis.

Before phonologists embarked on interface-related studies within derivational approaches, another approach had been initiated simultaneously in phonology. Kiparsky (1982: 131-176, 1985:85-138) introduced a new field of study, the so-called Lexical Phonology, claiming that the lexical word in stressed-based languages may evolve from several levels of interaction, before reaching the surface level. In the latter stage of its development, Kiparsky and others, e.g. Mohanan (1986), and Christdas (1988) worked constructively on morphophonological reactions within the framework of Lexical Phonology (LP).

The influence of LP in fact had an extended application to the phonology of non-stress-based languages, in that it instigated some unsettled debate. The flexibility of the methodology, however, also attracted researchers from syllable-stressed languages like Tamil to study the transparency and productivity and their correlations to level-oriented studies. Christdas (1988)[2], who made a maiden trial of associating LP to syllable-stressed language, applied a slightly modified LP framework in the analysis, which is

[2] This initial study on Tamil Phonology has a wealth of phonological information of Tamil. Christdas confirmed that the stress system of Tamil does not resemble the stress system of stress-based languages like English. In other words, Tamil is a syllable stressed-language (Balasubramaniam, 1972).

neither comprehensive as in English, which applies three stratal levels, nor in Malayalam, which applies four stratal levels. Christdas claims that Tamil, a language which has been verified for having involved at least three levels of interaction (cf.§ 1.4.2 Chapter on Review of Related Literatures) (Vasanthakumari (1989), applies only two stratal levels. Despite these disputes, the maiden study on Phonology and Morphology of a dialect of Tamil spoken in the district of *Kanyakumari*, India, remained an unprecedented study which offered treatment for stratal phonology and morphophonology issues in Tamil.

The later phase of phonological development, which saw the contribution of massive derivational researches in phonology, produced new ideas on morphophonological issues. Studies by Kenstowicz (1994), Hannahs (1995), Hale (2000), Kiparsky (2000), Anttila (2002), Broselow (2003), Bonet and Lloret (2005), Gess (2004), Colina and Diaz-Campos (2006), Halle (Summer 2006) and so on are noteworthy contributions in redefining the status of morphophonology within phonology.

Apart from this, the contour of morphophonology related studies has also been extended to cover prosodic and metrical aspects of phonology. Large bodies of literature on various languages have renewed research interest in the field with significant discoveries, which extended the legacy of LP to the maximum, before the Optimality Theory (OT) superseded derivational phonology.

The Standard Optimality Theory (OT), the constraint-based theoretical framework introduced by Prince and Smolensky (1993b), has heightened and tightened the standard of morphophonological studies within phonology. The flexibility of the framework in addressing the interface-related issues directly and efficiently without involving level-mediators which was apparent in Pre-OT literatures gained significant attention among researchers. The approach showed a significant breakthrough in analysing the structural changes at interfaces, as opposed to previous approaches which appeared to have limited applicability. The formula of rule writing, A→B/X_Y, for example, underscores structural changes and the environment instead of the participating constituents. Nevertheless, the task of explaining and configuring the structural changes with related issues falls upon the researcher. Unlike the rule (re)writing approach, OT is directly associated with the necessary information required to enable analysis of interface related environments. In other words, morphophonology has realigned the focus of phonological approaches in the right direction, according to Goldsmith (1999).

The strength of the framework has favoured OT phonology in giving greater phonological solutions to morphophonological problems. The fundamentals of OT claim that conflicting forces (Faithfulness Constraint (FC) versus Markedness Constraint (MC)) correlate directly to different forces at the intersections. It has been established that these constraints have the ability to define not only the directionality of the impact, but also the intensity of the interactions. The OT literature provides sufficient evidence for the effective role of faithfulness and markedness constraints in interaction.

Further advancement within the OT phonology has given rise to a range of approaches to morphophonology when having to address various complex issues. McCarthy (1995a) on OO-Correspondence, Kentowicz (1996) on Base Identity and Uniform Exponent, Benua (1997) on Transderivational Constraint, Alderete (2001) on Transderivational Anti-Faithfulness (TAF), Kiparsky and Bermúdez-Otero (2000) on Stratal OT, McCarthy (2005) on Optimal Paradigm, Lubowicz (2004) on Contrast Preserving Paradigm and McCarthy (2007) on Optimality Theory-Chain Candidate (OT-CC) McCarthy (2009) on Serial Harmonism are a few approaches that have enhanced the inventory of interface-related approaches within OT. In this study all of these approaches are extended OT frameworks which require additional modifications to the standard framework. On the surface, all of these theories share a similarity: targeting the intersection domain (interaction between phonological and morphological constituents and vice versa), which requires involvement on several levels. These achievements are evidence of the importance of OT in studying M-P related issues.

1.2 ...and why OT for the Present Study

OT is not only interesting theoretically but also promising because it involves the interface between phonology and morphology without involving a lot of other mechanisms. The suitability of the framework providing direct focus on the M-P interfaces at the same time, qualifies it as better framework to study morphophonology.

Its competence has been well attested within a range of interface related issues. The syllable-based approach within OT phonology has been noted as offering a consistent and effective solution for phonologically motivated alternation in derived and non-derived environments. For this reason, the present thesis, which is investigating a syllable-stressed language, has relied heavily on the constraint-based approach.

The constraint-based analysis has been well-noted for its advantages in offering economic generalisation and for rectifying some widely-held misperceptions in rule-based approaches. The obvious examples are C-V and V-C interactions, which have been acknowledged as a ‘natural way’ of interaction. However, in order to acknowledge the advantages two useful outcomes have been highlighted which might be expected from the study. The first outcome demonstrates how OT benefits the present study by referring to its theoretical strength, providing greater analytical coverage to phonological problems that have not been properly assessed for a long while. The second outcome establishes how the language under investigation could offer an avenue for obvious the extension of knowledge in this field of constraint based study. These are obvious gaps in the OT research, which will be addressed in the present thesis.

The following set of data from modern Tamil, a dialect of Dravidian Language spoken widely in Malaysia, illustrates some interesting interactions. The stems in (2) have been inflected with onsetless suffixes, while those in (3) have been attached with a plural marker. Plurals are formed in many ways in Tamil - attaching suffix /*kaɭ*/ to nominal headword, as shown in the data (3) is popular among them. The contrastive natures of suffixes trigger a range of phonological changes.

1)	*Input*		*Output*
	maram - a:	>	mʌ̃rəm()a:
	tree - is		*tree*?
	col-a:	>	cɔl(l)a:
	word - is		*word*?
	n̪iɻal - a:l	>	n̪ɪɻʌl()a:l
	shadow -by		*by the shadow*
	col-a:l	>	cɔl(l)a:l
	word-by		*by word*
	n̪i:r - ai	>	n̪i:r()əɪ
	water-the		*the water*
	kal-ai	>	kʌl(l)əɪ
	stone-the		*the stone*

2)	*Input*		*Output*
	pa: ɽai-kaɭ	>	pa:ɽəɪ()k^{h}əɭ
	rock-s		*rocks*
	muttu-kaɭ	>	mʊ̃ttʊ(k)g^{h}əɭ
	pearl-s		*pearls*
	kal-kaɭ	>	kʌ(ɽ)g^{h}əɭ
	stone-s		*stones*
	muɭ - kaɭ	>	mʊ̃(d)g^{h}əɭ
	thorn-s		*thorns*
	n̪iɻal - kaɭ	>	nĩɻəl()k^{h}əɭ
	shadow-s		*shadows*
	maram- kaɭ	>	mʌ̃rə̃(ŋ)g^{h}əɭ
	tree-s		*trees*
	karam- kaɭ	>	kʌrə(ŋ)g^{h}əɭ
	hand-s		*hands*
	vayal-kaɭ	>	vʌyəl()k^{h}əɭ
	field-s		*fields*
	viɻa:-kaɭ	>	vɪɻa:(k)k^{h}əɭ
	festival-s		*festivels*
	paiyan-kaɭ	>	pʌɪyən()g^{h}əɭ
	boy-s		*boys*

The alternations that take place between the headwords and suffixes have been marked with parenthesis (). Note that the data in (1) does not undergo any visible phonological change apart from gemination, unlike the data in (2), which has undergone significant phonological changes. In terms of phonology, the voiceless velar /k/ onset triggers various types of alternations. In other words, it has responds to segmental and prosodic properties of the word-final syllable. These internal sandhi alternations have several implications, as follows:

3) i) they present challenges to previously held opinions
ii) they raise questions concerning the relevant constraints
iii) they provide the opportunity for extending OT phonology

These points will be discussed in turn.

First of all there is the challenge to previously held views. There is a widely shared perception in pre-OT literature that interactions between C-V morpheme edges result in ‘natural outcomes’ (Dressler, 1985, Ilakkuvanar, 1994a, Tolka:ppiyam, 1996), and this thinking is also shared by many present-day Tamil grammarians. However, OT based studies have demonstrated different forms of solutions for C-V type interaction. Studies such as McCarthy and Prince (1993a), (Bye, 1999), and Lubowicz (2002b) on Correspondence Theory provide different perspectives, arguing that the interaction of

C-V morpheme edges involves misalignment of a crucial constraint, ANCHOR (STEM, R, σ, R)[3].

When the consonant of a final morpheme edge is attached to a vowel initial suffix (C-V), the vocoid merges with the coda to form an open syllable. OT terms this as ONSETMAXIMISATION. The boundary of the newly formed syllable begins at a new point, denoting that misalignment of a morphological boundary has taken place. The misalignment of the boundaries can easily be captured by the advantages of the theoretical framework at hand, the minimal effect of the interaction (see Chapter 6). The language under investigation has ample data which exhibit such requirements, and that challenges the 'plain observation' of the pre-OT studies.

The second issue challenges the relevance of certain previously introduced constraints as the solution. Beckman (1998, 2004) has analysed a similar set of data to those in (1&2) excerpted from Christdas (1988) to show that Tamil favours positional faithfulness, a view which is clear from the data in (2). The voiceless onset appears to have blocked and triggered some alternations. The Positional Faithfulness (PF) theory argues that the reactions are instantiations of PF constraint which militate against any intrusion jeopardising its existence. This study claims that deletions of coda, alternation or even gemination at M-P intersections are aimed at protecting the existence of the onset and alternation patterns found in the data (2) complying with the requirement of PF. However, the Positional Faithfulness Constraint is not the issue at this point. Rather, the crucial constraint that is used to explain the contact between syllables is the SYLLABLE CONTACT LAW (SCL).

SCL, introduced by Murray and Vennemann (1983), (Vennemann, 1988:9), is a measurement which evaluates the minimal distance between two adjacent syllables.

4) Vennemann's Syllable Contact Law
A syllable contact A$B is the more preferred, the less the consonantal strength of the offset A and the greater the consonantal strength of the onset B.
($ represents a syllable boundary, and A and B are segments)

[3] The literal meaning of this constraint is align right edge of the stem with right edge of the syllable.

The consonantal strength is measured on the basis of articulated force, where the plosives and fricatives which are obstruents, are considered to be stronger than nasals and liquids which are sonorous, and are also stronger than the vowels. This is indicated in the following diagram:

5) Vennemann’s Consonantal Strength Hierarchy (Vennemann, 1988)

Increasing Consonantal Strength

Voiceless plosives
Voiced plosives
Voiceless fricatives
Voiced fricatives
Nasals
Lateral liquids (l-sounds)
Central liquids (r-sounds)
High vowels
Mid-vowels
Low vowels

The requirement of the Syllable Contact Law could be interpreted exactly, as follows: the sequence of C_1 must be equal or higher than C_2 in $C_{1.}C_2$ sequence. Since the current phonology refers consonantal strength as sonority, it is presumed that consonantal strength and sonority refer the same.

In Beckman (2004) SCL was applied in the profile of constraints to justify the adjacency of syllables as such: */paiyan-kaɭ/* > */pʌɪyən()gəɭ/* ‘boys’. Notice that neither the CODA nor NOCODA of the preceding morphological word or the Onset (succeeding structure) in the input in data (2) has violated SCL requirements, since the sonority strength of the coda is greater than the onset. Beckman’s argument holds well up to this point.

The PF theory has been developed on the assumption that languages preserve onset compared to coda to retain articulation flexibility. Beckman argued that the priority of preserving onset is the motivation enforcing no-changes on coda in the given examples. On the contrary, the same language offers different outcomes of interactions for *kal-**k**aɭ* > *kʌ(ɽ)k*^{h}*əɭ* ‘stones’ and *muɭ-kaɭ* > *mʊ̃(d)gəɭ* ‘thorns’, where the edges of the preceding morphological words undergo phonological alternations. Beckman, who accounts for non-occurring alternations as in /*vayal-kaɭ* > *vʌyəlk*^{h}*əɭ*/ ‘fields’ and /*paiyan-kaɭ*/> /*pʌɪyən()gəɭ*/ ‘boys’, did not address the occurring alternations. This calls into question the relevance of SCL, a constraint nominated by Beckman as being responsible for establishing harmonic contact between preceding and succeeding syllables. As can be seen from the data, it is apparent that Beckman did not consider the full range of data, which still requires segmental alternation and non-alternation elsewhere for 'untold' reasons.

An alternative view is that these alternates could be considered as allomorphs. Therefore, the alternation shown within the alternates might be treated as prosodic conditions aiming to sustain harmonized contact between two well-formed syllables. If this is true, then it is MINIMAL SONORITY DISTANCE (MSD), a constraint that requires sonority distance between two adjacent segments be relatively minimal, accounted for the changes but not the SCL. This thesis offers numerous examples in Tamil associating the crucial role of MSD and the phonological alternations taking place between monosyllabic stem/word and suffix.

However, studies corroborating the efficient role of sonority such as MSD in structural changes did not receive wider acceptance within constraint-based studies. At least the interest was not as keen as that shown towards other approaches, such as segment fortification, positional faithfulness (Beckman, 1998, 2004) and coda-conditioning (Ito, 1986, 1989). Therefore, OT Phonology has a relatively limited number of studies. Carnie (1994), Chiosain (1996) and Shannon (1991) are, to name a few, have explored the relevance of sonority to some extent. The present study will further explore the role of sonority in inter-syllabic and intra-syllabic relations. As has been demonstrated, the current study is merited due to the existing gap in research of the language under investigation and the room for further explorations along the lines of previous studies.

The aim of the present thesis is to establish that both phonologically and morphologically derived and non-derived environments and the effects of the interaction between various morphological components at the intersections can effectively be studied within OT Phonology. This will be done with reference to prosodic conditions, achieving well-formed syllables and privileged contact between them. It will also verify how various repair strategies are deployed in the grammar, including both segmental and sub-segmental properties, to fulfil basic requirements.

The rest of the chapter is organised as follows. Following this introduction, §1.2 presents an overview of Tamil. §1.3 elaborates briefly setting of Tamil language and its varities in Malaysia and elsewhere. §1.4 provides justification for the selection of OT for this thesis and §1.5 gives a brief account of reviews on related literature on Tamil. § 1.6 justifies the aims of the research, and § 1.7 gives an overview of the research questions, and design. The methodology, preferred data and method of data analysis for the present study are explained in §1.8, § 1.10 and § 1.11, respectively. While §1.12 outlines the limits of the proposed study, § 1.13 gives a summary of each and § 1.14 presents the conclusion of the study. Lastly, definitions of some selected terminologies are given in §1.11.

1.3 Tamil elsewhere: an introduction

Tamil, a classical language, is spoken in almost 60 countries throughout the globe by people migrated from sub-continent of India. The migration of Indians to various countries took place in few stages. The major migration has taken place during the era of British colonization in the early of 18th and 19th century, where a lot of Indians were brought into various British colonies in South-East Asia and African nations. The migrated Indians in most of these countries have retained their mother-tongue while some have not. Indians in Sri Lanka, Burma, Malaysia, and Singapore fell within the former category while those settled in South Africa, Mauritius, Fiji and so on felt within the latter category. The latter stage of migration took place in the recent years, where Indians from mainland India and in the previously settled colonies like Sri Lanka, Malaysia, and Singapore migrated to third countries to earn better living standard in many western countries, like America, United Kingdom, France, Switzerland, and so on.

Among them, Tamil spoken in Malaysia has enjoyed unprecedented growth in the past 200 years since it was brought into this country[4]. The language which was known as 'coolly Tamil' during those early days (P.Balasubramaniam, 1989: ix) has undergone

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[4] The saga of the Malaysian Indian is steeped in centuries of civilisation hegemony – from the 1st to the 13th century as socio-cultural and religious "rules" and in the 19th and 20th centuries as politically and economically "ruled".(Mr. Krishnamurthy www.Indian in the New Millennium.com).

numerous changes by taking in some innovative features and leaving some of the unnecessary elements. All of these have aggressively transformed Malaysian Tamil into a new form of dialect by itself. To some extent, this dialect differs from other Tamil speaking communities in Singapore, Mauritius, South Africa, Sri Lanka, and even in the Tamil Nadu itself. Those features could be easily noticed in each and every one of the Tamil speaking Malaysian Indian's daily communication.

There was no clear historical evidence available to confirm the form in which Tamil has brought into this country. It is largely believed that the language has been brought as a simple spoken language by the laborers. However, Paramasivam (2006) believes that these labourers consist of three different categories as follows.

6)
i. those who had formal education in Tamil
ii. those did not learn Tamil through formal instruction and yet having the ability to converse with people those who can communicate in Tamil
iii. those who have neither learned Tamil formally nor use Tamil at home or in school; in spite of that they still can communicate with others in Tamil

However, today it is common to notice a number of fields where this language has established its foundation very firmly and bloomed into favorable positions with significant standard.

1.3.1 Tamil Language in Malaysia

Malaysia, a sovereign federation in South-east Asia, is divided into two different land boundaries, West Malaysia and East Malaysia. The former is a peninsular attached to the Asian continent; the latter is located on the northern part of the island of Borneo. Malaysia has eleven states and three federal territories in the peninsula and two states and one federal territory in East Malaysia, with a total population of 27 million people (Statistics, 2006).

Malaysia is also well-known as a multi-racial and multi-lingual nation with more than 28 different languages and plentiful dialects. Malay is the official language and is spoken by 60% of the total population. It is followed by English, Chinese and Tamil, in order of popularity.

Tamil is the fourth largely spoken language in Malaysia, spoken by approximately 8% of the total population (Census 2006). It is mainly spoken by those of Indian descents, who moved to Malaysia from Southern India during the era of British colonial rule. From that time onwards, there was a gradual development of the language in order to support the communicative needs of the Indian immigrants in the country. Unlike the other languages which were backed up by commercial and political sectors, Tamil received relatively less support both politically and economically, but enjoyed a firm growth in education.

Situations began to change as the nation gained her independence which subsequently triggered political changes and the changes in the status of MI as far as the job orientation is concerned. In 1957 almost 70.4% of the Indian labour force was in the rural plantation and winning sectors (jobs with secured income), 24.2 percent were employed in governmental agencies mainly as labourers, 3.6 percent in transport service and 1.8 percent in manufacturing. In 2000, about 15.1 percent remained in the agricultural sector whilst 63 percent were in the manufacturing and service sectors. (www. Indian in The New Millennium .com)[5] Occupationally, Malaysian Indians constitute 15.5 percent of professionals in the country. This includes doctors (28.4%), lawyers (26.8%), veterinary surgeons (28.5%), engineers (5.4%), accountants (5.5%), surveyors (3.5%), architects (1.5%) and others like lecturers, teachers and scientists. There are also increasing number of businessmen in the Indian community. The Sindhis, Gujarathis and Punjabis have been formidable businessmen as the Indian Muslims. Apart from them, there are Indian contractors, road builders, and gas suppliers (www.Indian in the New Millennium.com). Clearly it shows that the present day Indian community in Malaysia is not solely a proletarian society, but comprising people from all stages of social hierarchy from low to middle and high. For all of them, Tamil is assumed to be the unofficially proclaimed official language.

Development of Tamil in Malaysia is closely connected with educational development. The close connection between the development of both of these areas became very evident after the nation gained its independence in 1957, when a great deal of interest

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[5] This quotation was extracted from Keynote address delivered by C.P. Ramachandran, entitled *The Malaysia Indian in the New Millennium* a paper delivered in the Conference on the Malaysian India in the New Millennium on 1 & 2 June 2002.

was shown in educational development at all levels. Results of the rapid changes which began in 1957 appeared with the emergence of new avenues in educational platforms in 1963. Narayanasamy and Naina Muhammad, well-known educationists in the country, (Personal Interview) believe that the accumulated attainment and popularity of Tamil education are the backbones for language growth in Malaysia. In short, we may say that the attainment and their achievement of the language are closely connected to the Tamil-speaking community.

However, scholars have differing opinions with regard to the historical turning point. Kumaran (2003; 10) points out that 1963 'marked a historical turning point' in the growth of Tamil education in Malaysia. Vengadesan (1995) correlated the development of Tamil when Indians began to adopt Malaysia as their 'new home' and settle permanently. Nevertheless, Dass (2005a) posits the view that it was not until the 1980s that the 'historical turning point' paved the way for Tamil renaissance. He claims that a series of educational reforms initiated by the Malaysian government during this era was the reason for this achievement. The developments within the educational spectrum and its influence on the development of Tamil on the whole in Malaysia, however, are undeniable.

One of the significant results of the sustainable educational development of Tamil is the development of a cadre of Tamil language users. The cadre of Tamil language users comprises lecturers, teachers, learners, and language planners at every educational level (primary and secondary schools, teacher training colleges, university and so on). Though primary Tamil education in Malaysia is still a growing phenomenon in the country, Tamil education in Malaysia covers almost every level with more than 500 primary schools: secondary schools and tertiary level schools (Dass, 2005a).

Application of the Tamil language also covers various spectrums related to the lifestyle of Indians. Various communal-bound social activities such as daily communication, telecasting, broadcasting, business, religion and social events applies Tamil as a medium of communication. The platform created by these communal-bound activities, in turn, has paved the way for the steady development of language in the country.

The widespread application of Tamil within various communal-bound activities has been costly in terms of language manipulation. Each one of the above mentioned fields has now developed its own register and jargon. These are popular within education and mass communications. It can be said that the Tamil language in Malaysia, has attained some noteworthy achievements. At present, Tamil dominates some purposeful sphere to a considerable extent, and has a capability to progress to a wider extent in Malaysia. Its substance is easily noteworthy in many domains of knowledge like educational, literature, scientific field, technological, computational, mass media (electronic and print) and cultural aspects. Each one of these fields has been developed constructively to benefit the mass and the language itself (Mohana Dass, 2001a).

Every Tamil speaker has greater exposure to different forms of applied Tamil in a number of ways within the context of Malaysia. Apart from the vast majority of Tamil speaking individuals, there are also other influential avenues where application of Tamil can be noticed clearly. Tamil Media such as television, radio, cinema and stage drama, for examples, also offer continuous encouragement for the Tamils. The end-product of these exposures is obvious - different degree of knowledge acquaintance reserved by the speakers originated from their exposure to the varieties of language application. David (2003) points out that rapid language shift is already starting to take place within Indian community in Malaysia, yet, it is happening in rapid speed in nowadays.

It is common to notice appearance of various loanwords in spoken Tamil applied by many Malaysians. English loanwords usually outnumber other languages, although the speaker might have little exposure or proficiency in the language. Apart from English, inclusion of *Bazaar Malay* is also very common Indian's spoken exercises. The following are some of the exemplary foreign words which have registered frequent application in Tamil. Example of Malay loanwords: *a:ga:a:ga*, 'approximately' *parang* 'chopping knife', *pasar malam* 'night market', *bayam* 'a vegetation', *bomoh* 'spiritual guru', *tukkul* 'hammer', duriyan 'a fruit', *bakul* 'basket', *keropok* 'snack', *mi: goring* 'fried noodle, *nasi lemak* 'fat rice', *rambuta:n* 'a fruit', *rendang* 'a kind of cooking' *rottan* 'cane', *rojak* 'a kind of cooking', *laksa* 'a kind of cooking', *langsat* 'a kind of fruit', *cikku* 'a kind of fruit', *cendol* 'a kind of mixture of ice and sugar extract', *satte* 'a kind of cooking', *sultan* 'Sultanate'. Some of the Chinese loanwords; *pa:v* 'a kind of cooking', *tavvu* 'hardened soya', *kuetiyau* 'a kind of fried noodle', mi: 'noodle' *mi:hun* 'tiny noodle', ca:siyau 'pork'(Extracted and modified for present study from, Balasubramaniam, 1989a:19). Though, code switching and code mixing are common among them, when it comes to preference of the language their choice usually falls on English but not Malay. This is a factor that needs further investigation before bound for any conclusion remark.

Balasubramaniam (1989b), who studied the linguistic properties of standard spoken Tamil in the context of Malaysia also concludes that as a result of such rigorous lingual development, the Tamil language in Malaysia conforms to all criteria that may qualify it as a dialect by itself. The dialect of Tamil in Malaysia, according to him, is a hybrid-form which consists partly of standard spoken Tamil, (which is common to Tamil elsewhere) and partly of Tamil with a mixed Malaysian essence heavily influenced by its surrounding languages: Malay, Chinese and English. Nevertheless, native speakers are of the opinion that on the whole this dialect still preserves the essential features of literary Tamil used widely elsewhere while at the same time assimilating a less significant portion of locally developed essence.

1.3.2 Tamil and its varieties and the Standard Spoken Tamil

Tamil is a diglossic language. Diglossia refers to a lingual situation where a language is written and spoken differently. The written form is referred as high variety while the spoken form is regarded as low variety. Ferguson's much referred definition of diglossia reads as follows:

> Diglossia is a relatively stable language situation in which, in addition to the primary dialects of the language (which may include a standard or regional standards), there is a very divergent highly codified (often grammatically more complex) superposed variety, the vehicle of a larger and respected body of written literature, either of an earlier period or of another speech community, which is learned largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation.
>
> (Ferguson, 1953: 236)

It is obvious from the foregoing that a language may posit two different forms for two different purposes: one is to facilitate spoken communication among the language speakers, while the other is for written communication, aimed to sustain unity among the diversity.

Tamil is a diglossic language, which comprises high and low varieties of language. The high variety is also known as formal language, standard language or literary language, while the low variety is called informal language, non-standard language or non-literary language. A strict but conventionally observed boundary prohibits overlapping of formal and informal language styles at a distance (Ferguson, 1959, Ramaswami, 1999). The former is widely applied in formal situations, while the latter is applied in informal situations. Nevertheless, both varieties have restricted but influential application in Malaysia. Broadcasting, education, official talks, platform talks and telecasting are some examples of the high variety of Tamil, whilst other domains utilise the low variety of Tamil, a form of Tamil that uses colloquial terms.

1.3.3 Definition of Standard Spoken Tamil

In describing the climates of SST application, Ganesan (1984) noted that there are three distinguished places involving SST application.

7)
- i. Normal situations like classroom lectures (apart from Tamil Language and Literatures), platform speeches, seminars, conferences and assembly speeches (expect when reading a written passage)
- ii. Radio broadcasting, other that news and talks, the cinema
- iii. Conversations among the characters n novels and short stories

Gnanasundram (1980) also seconds Ganesan's viewpoint through his investigation and confirms that the varieties of SST is exist.

The spoken Tamil itself divided into various divisions. Generally it has been accepted that the language is divided into two types, 'standard spoken Tamil' and 'colloquial Tamil'. The former should be referred to a language spoken by a middle class Non-Brahmin Tamils, while the latter is spoken by others. Apart from these two obvious versions there is handful of spoken verities one could easily notice in the common application. Most of the linguists believe that it is the former should be considered as standard spoken Tamil in general.

However, different scholars have different opinions in determining what is known as SST. Their differences can be acknowledged in the line of different factors such as time and place in defining the SST for the varieties of spoken Tamil found within the Indian sub-continent. For instance, G Srinivasa Varma (1980) referred to Zvelebil (1964) who is of the opinion that ST should be referred to as the language spoken by majority of the middle-class people who live in the major cities. These groups of peoples are comprised of selected Indian clans such as *Pillai, Mudaliar, Kavundar and Chettiyar* communities and their languages set the best norm and the core of the colloquial standard, he claims. Although their claim seemed to be based on reasonable justification in explaining the varieties Tamil spoken in the Tamil Nadu and towards some extend shows similarities, but it has very little offers to understand the Malaysian version of spoken Tamil.

P Balasubramaniam (1983) confirms that are two significant language application preferences among the rural and plantation Indians in Malaysia. Indians who live in the rural plantations showed the tendency of using more Malay words compared to those in the urban areas, who unwittingly involve more English loanwords (Balasubramaniam, 1987) in their daily communication. However, in another study, Balasubramaniam (1989a) reaffirms that the Tamil spoken by urban middle-class Tamils is the one should be considered as Standard Spoken Tamil for the following reasons;

8) i. it is widely understood by the Tamil speaking community in Malaysia
ii. ..generally accepted that the variety of Tamil that is spoken by the middle-class population in the urban centres can be taken as the standard form

(Balasubramaniam, 1989a:7)

In the context of Malaysia, it might be accepted that the middle-class people were the people responsible to establish the standard spoken Tamil, it can hardly be understood by the fraction of caste communal differences, which is not so prevalent in Malaysia compared to Tamil Nadu, in which spoken Tamil differs according to the caste and region such as Naadaar dialect, Vellaalar dialect, Chennai dialect, Koimbatore dialect, Ramnad district dialect, Nanjil dialect and so on. In short, we assume that Tamil spoken in Malaysia does not show any caste or communal or district differences, but different standards.

Undoubtedly, the present-day Tamil in Malaysia, with these combined linguistic ingredients, is a new sociolinguistic platform that may promise some interesting linguistic findings.

1.4 Review of Related Literatures

The goal of the current section is to review literature related to the Morphophonology of Tamil. Tamil has a large body of work on Morphophonology, covering a range of aspects relating to Morphology and Phonology interactions to morpho-syntax. Some of these studies are mere extensions of grammatical thoughts (therefore, they have been skipped), while others are research works. Some of these research-based studies, which have made significant contribution to the development of the domain, have been reviewed in this section.

The selected research literature has been divided into three groups based on three key aspects; the preference of data, the applied theory and the dialectal forms. Some experimental studies that apply theoretical frameworks within an empirical context, with special focus given to contemporary issues, have been selected for the purpose of this study. Four of these studies are linguistics works which have analysed the dialects of Tamil (and one has applied secondary data), spoken in various places, namely the Tirunelveli dialect, Madurai dialect, *Kanyakumari* dialect, and Malaysian dialect. One of them analyses Literary Tamil. The review of this literature has been presented under the respective headings:

9) Research literatures
   a. Descriptive studies
   b. Generative studies
   c. Derivative studies
   d. Lexical Phonology
   e. Constraint based analysis

1.4.1 Descriptive studies

Dialect of Vellar

Subramoniam (2003)[6] offers some significant notes on the morphophonology of the *Vellar* dialect, a dialect which is spoken in the southern part of India. The significant notes of MP carry individualities that are hardly noticed in Tamil spoken elsewhere.

[6] This is his PhD thesis submitted to the University of Edinburgh in 1968 publication of which was delayed for decades. Nevertheless, its inclusion is justified by its date of ‘birth’.

Altogether, 12 types of such morphophonological exercises, (as shown in (10)), have claimed to have an effective role at M-P interfaces and Morpho-Syntax. The study also has verified that morphological and phonological apparatus play a crucial role in shaping allomorphic changes between two morphological boundaries with different values, as indicated below.

10) i. /i/ and /e/ before vowels > iy or ey respectively between stem and suffix
ii. a,u and o before vowels > av, uv or ov respectively between stem and suffix
iii. all consonants ending stems except those in –y and –v before word juncture
iv. after short vowel monosyllabic stems all Cs lengthen
v. long Vy before y > V.y
vi. e before morphemic juncture > ay
vii. all t-, ending N.sts. > -m ending ones everywhere except before case markers
viii. Phonemic actualisation of morphophonemic –q
ix. Shortening. After nasals, long stop > short stop
a. ka:n.-p.- tu > ka:npatu
x. Palatalisation
a. iq or yq + t > ic. Or yc
b. ik > ik.y
c. –nt>-nc
xi. Assimilation
a. d+t>dd
b. R+n>RN
c. N+n>NN
d. N+t>Nd
e. L+n> LN
xii. Reduction u
a. u > u between suffixes $V_2 + V_1 > V_1$

(Subramoniam, 2003)

The chart shows some interesting outcomes. Few of the given morphophonological reactions are typical dialect-centric exercises, while others are common to Literary Tamil (LT). The last three phonological changes such as palatalisation, assimilation and reduction of /u/ ought to be treated as dialect-specific processes. They make a significant contribution to the morphophonology of Tamil as a whole, as other regional variants or LT do not have any. However, lack of explanation of these variants deters us from knowing them properly.

Let us focus on the assimilation of d-t in (10xi (a)). An obstruent such as /d/ is prohibited in word final positions in Tamil. Despite the restriction, the author claims assimilation of both lead to voice assimilation, /dd/. It is unclear why and where the /d-t/ association is possible and they are altered to /dd/. Since the language prefers obstruent clusters or sequences of the same kind, say, /kk/, /cc/, /tt/ and /pp/ (gemination) within tautomorphemically, it is impossible to receive /d/ and /t/ in adjacent positions in the first place. The assimilation is impossible, indeed. Though which study has indicated significant morphophonological outcomes of spoken Tamil, its explanatory discrepancies have obscured the validity of their significance.

Dialect of Malaysia

Balasubramaniam (1989a: 137-170) analysed the nature of morphophonology on standard spoken Tamil in Malaysia. It observes that the morphophonemics of the standard spoken Tamil is divided into two significant classes: lexical morphophonemic and morpho-syntax.

The MP studies in Balasubramaniam (1989) centred on the internal organisation of minimal sound-blocks, syllables. It claims that syllables and the properties of the participating sound segments are crucial in determining the outcome of interactions. Except for the information on phonological reactions triggered by the contact between syllable and segments plus indications on the form of syllable structure, as in (11) and (12), the study offers very little explanation verifying other outcomes, which creates doubts on his stance on the role of syllables on the study of morphology-phonology.

11) Nominals ending in consonants
CVC → CVCC / case suffix
All short monosyllabic nominals ending in consonants double the final consonant when followed by a casal suffix.
kaN + e = kaNNe 'eye-accusative'

All other consonantal-ending nominals other than short monosyllabic nominals of the VC structure take 0/ empty morpheme before the case suffix
ma:n + e → ma:ne

(Balasubramaniam, 1989a:141)

Gemination of voiceless obstruents receives extensive elaboration in Balasubramaniam (1989). The study claims that the four voiceless stops, /k.c.t.p/, which usually geminate in intervocalic environments, are extended consonants which are applied to fill a phonological gap resulting from the interaction between participating components at intersections. His description on gemination is as follows:

12) (i) Lexical Morphophonemic

In a V+V structure where V stands for infinitives and V stands for finite or imperative verbs, the consonants k, c, t, and p are doubled after:

a) infinitives ending in –a. Example: tara + connaangka = taracconnaanga 'they told to give'

In a VP + V structure (where VP stands for verbal participle and V stands for finite or imperative verb), the consonants k, c, t, and p are doubled after verbal participles ending in i, u, -y.

Example: eddi + pa:r = addippa:r

Compound verbs

Nominal ending in ã that precede verbs with p-initials in a compound verb stem of the N+V type, drop the nasalization of the final ã and double the initial p- of the verb.
Example : a:ttirã + padu = a:ttirappadu 'feel angry'

When nominals ending in -ddu and –ttu precede verbs with –initials in a compound verbal stem of the N+V type, the p-initial of the verb is doubled.
Example : kaddu +padu = kadduppadu 'obey'

Casal Noun + verb

Verbs with k, c, t and p initials double their initial consonants after nominals ending in accusative case marker –e and dative case markers, -akku, -ukku
Example : enakku + teriyũ = enakkutteriyũ

(ii) Morpho-Syntax

In an adverb + verb structure (where Adv stands for adverb and v for verb) the consonants k, c, t and p are doubled after,
the adverbs of time, Example: *ne:ttu, and ta:matama*:,
adverbs of affirmation, Example: *kaNdippa:*, *niccayama*:
adverbs of manner, Example: *a:seya:, veruppa:; ippadi, appadi*;
interrogative adverbs, Example: *eppadati* and *etukku*
adverb of time + verb : ne:ttu + conna = neettucconna
adverb of affirmation +verb : kandippa + ceyna~ 'he wil certainly do it'
adverb of manner + verb : ippadi + conna~ = ippadic conna~ 'he said like this'

(Balasubramaniam, 1989a: 116-166)

The given geminates share a common cause of appearance. Every voiceless obstruent geminates (doubles) in intervocalic positions regardless of lexical differences. Although the description intimates that the gemination flexibility within standard spoken Tamil in Malaysia and that of LT have similarities to some extent, the study did not offer details of similarities or differences, except for the value of their appearance.

The study also provides some over-generalised rules for certain morphophonological reactions. While discussing sound changes at the intersections, it concluded that interaction between coda and onset or vice versa and their phonological reactions in Tamil are divided into three main phonological rules:

13) (i) Rule I concerns within mono-syllabic nominal ending in consonants such as n, N, y, l, L and the plural suffixes or casal suffixes). The coda consonants usually doubled.

(ii) Rule II is concerned with the doubling of word initial consonants such as, k, c, t, and p. He has provided close to 11 environments in which this sort of doubling usually take place. Most of the rules resemble the MP rules suggested for the same environment in the literary Tamil.

(iii) Rule III is about nominal words that end in /du/ or /Ru/. According to him, nominals with $V{:}C_1U$ and $CVCVC_1U$ structure, where C_1 is either d or R, always doubles. In these cases, the /d/ will be replaced with /dd/ and the /R/ with /tt/. The given rule is just another verification of the same context in the literary Tamil

(Balasubramaniam, 1989a: 166 - 170)

Although the study offers examples of descriptions of morphophonemic standard spoken Tamil, it does not totally detach itself from classical grammarians' thinking. The study has given the impression that it is an elaborate description of classical grammar. Therefore, except for the verification of the rules concerned and the operation of the old morphophonemic mechanism in modern Tamil, the study has delivered relatively few significant outcomes. The selected methodology seems to be the factor which has mainly deprived him of his noble aim.

1.4.2 The Generative Phonology (a study of the Madurai dialect)

A generative study by Vasanthakumari (1989)[7] offers phonological treatment for morphology-phonology interactions in the Madurai dialect, a dialect which is spoken in the region located at the south-west of Tamil Nadu, South India. The study explains various generative rules of verb and noun formations and inflections, and the detail of morphophonology and mechanisms related to it in the form of rules and rule orderings.

Chapter Four of the book entitled *The Phonological Rules* offers the findings on morphophonology. It includes segment insertion, segment deletion, feature switching, contextual variation, consonant alternations and principles of rule ordering, which are conditioned by phonologically and morphologically derived environments (Vasanthakumari, 1989: 88-121). The author believes that alternation patterns which differ from one another are 'characterized' by a minimal set of features (Vasanthakumari, 1989: 87).

Discussion on MP covers a range of morphophonological activities and pertinent issues related to it. Three of them are worth mentioning. First is the topic on segment insertion having recursive application in the language, including the u-insertion, t-insertion, doubling of consonants, v-glide insertion, and y-glide insertion. Second, is palatalisation, and third is the level ordering in Tamil.

Insertion of /u/, a crucial phonological exercise in Tamil, has been extensively dealt in this study. Previous studies (Caldwell, 1987, Christdas, 1988/2006) argue that Tamil generally has been in the practice of adding /u/ to lexical words ending with selective stop segments. However, this is still in dispute as scholars have yet to reach a full consensus on its appearance and application. Some believe that it is a euphonic sound (Caldwell, 1987, Samuel, 1996), whilst others believe that it is an epenthesis (Christdas, 1988, Vasanthakumari, 1989).

Vasanthakumari claims that Tamil has obligatory and non-obligatory u-insertions. Obstruent is inherently prohibited word finally, therefore they are subject to addition of /u/. But if it appears in that position the grammar suggests automatic insertion of /u/,

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[7] This study emerged somewhere parallel to that of Christdas (1988/2006), which used another influential theory in the Phonology, Lexical Phonology.

which is called obligatory /u/. Other obstruents that may freely occur word finally sometimes receive a /u/, which is called non-obligatory /u/. Vasanthakumari argues that glide /y/ behaves differently, and does not receive non-obligatory /u/ as widely perceived as among obstruents. In summary, Vasanthakumari asserts that spoken Tamil has numerous lexical items bonded with both obligatory and non-obligatory /u/.

The topic of palatalisation is another interesting outcome of Vasanthakumari's study. Palatalisation had never received a proper explanation in previous literatures of the language. She claims that palatalisation triggered by interaction between the base stem and intermediate elements (as in (14)) should be treated as feature switching.

14) tuɳi + nt+… → tuɳi +nc + … 'to dare…'
pati +tt+…→ pati +cc + … 'to read..'

(Vasanthakumari, 1989: 105)

According to the first instance, alveolar-dental /t/ in the suffix palatalizes when it is attached to a stem ending with /i/. Both of them are palatalized after gemination in the second. Note that feature changing referred by Vasanthakumari in fact can be referred to as consonant lenition.

Vasanthakumari also gives an account of rule-based level ordering in Tamil. She stresses that some lexical items involve a few levels of change before surface; therefore, strata rule cannot be avoided in Tamil. The author lists five instances highlighting the significant intermediate levels in Tamil. The following is one instance.

15)	ciri + t+…	Underlying representation
	ciri + tt + …	Doubling of consonants
	ciri + cc + …	Palatalisation
→	ciricc+…	

(Vasanthakumari, 2000: 120)

Accordingly, the output /*ciricc*/ has surpassed three levels: underlying forms, gemination and palatalisation. The double palatalisation occurrence is conditioned by the double alveolar stop, /tt/. The data allows her to conclude that Tamil involves at least three different levels.

As an emergent study, the Generative Phonology of Tamil (Vasanthakumari, 2000: 105) has offered a significant generative experiment on the phonology of Tamil and offered some valuable findings for the advancement of MP.

1.4.3 Derivative study

The book entitled *A Grammar of Contemporary Literary Tamil* by *Kothandaraman (Kothandaraman, 1997 261-334)* consists of two chapters enumerating vast lists of morphophonemic illustrations within a derivative approach. The manual lists 168 morphophonemic rules with recurrent applications, reflecting the status of present-day Tamil morphophonemics. Unfortunately, most of them are elaborated forms of classical grammatical works and did not provide renewed knowledge on the status of present-day morphophonemics.

Despite being a good reference manual regarding the status of present-day Tamil, it not only contains some misleading information, but also lacks supportive explanations. Some of the findings have been introduced in an unfriendly manner, as can be seen in the following examples.

16) na:n + Pl_1 → *na:ngkaḻ*
na:n + Pl_2 → *na:m*
na:n + Pl → *na:ngkaḻ*

Pl = plural, Pl_1 = plural inclusive, Pl_2 = plural exclusive,
(Kothandaraman, 1999a: 261-334)

The examples demonstrate that the grammar derives three different outputs for the same stem word attached to a plural marker (which is unstated). The second example creates an intriguing outcome - alternation of the input to a non-similar form, *na:m* ‘us’., Since the given derivation rules are not supported with additional information, except for the outlined indication at the bottom, the cause of the alternation remained unexplained. It seems that the author’s ambitious attempt to promote various complex issues in simplex forms was the root cause for the defects *(*cf. Chapters 5&6).

1.4.4 The Lexical Phonology (a study of the Kanyakumari dialect)

Christdas (1988), a significant linguistic study done within the framework of Lexical Phonology, is another dialectal study with special focus on the Phonology and Morphology of Tamil. Empirical data for the study was obtained from a dialectal Tamil spoken in the district of Nagercoil, in South India. The manual considers Phonology and Morphophonology as a single domain of study consisting of some interesting and controversial findings.

Although notes on morphophonology can be seen throughout the thesis, chapters on Noun [8] and Verb [9] formation provide a plentiful background of information on Morphophonology. The chapters introduce morphological issues arising from a number of primary and secondary affixes to stem words. Primary affixes are believed to bind more closely to the stem, while the secondary affixes distance themselves from the stems (as in 17) in word formation, similar to affixes in English. The former are known for conveying the primary grammatical meaning, and the latter which are also referred to as post-cyclic affixes and less productive in word-formation, conveys additional grammar sense to the structure they bond. Both the derivational and inflectional affixes are said to have distinctive structural compositions. In short, the two chapters have a wealth of information on word-formation and the alternation taking place between them, and their involvement with strata.

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[8] This chapter deals extensively with the following issues; i) Discussion on inflectional morphology centered around six different structures of nouns; namely, noun stems, nominatives, oblique stems, case suffix, plural suffix and clitics. ii) Explanation on morphological and phonological constitution of various sound segments, including, obstruent final stems, apical gemination, p-final stems, nature of polysyllabic sonorant-final stems. iii) Status of monosyllabic stems iv) Notes on derivational morphology - suffixation of as vowel initial suffix, obstruent-initial suffix, sonorant-initial suffix, prefixation and compounding.

[9] The chapter on verb morphology deals with the following issues extensively; i) Discussion on inflection of verbs with special reference to two important structural patterns - temporal stems and pronominal suffixes; ii) Phonological conditions of gemination; governed gemination and automatic gemination; iii) Tense formation in relation to coronal and assimilation. iv) Discussion on irregular monosyllabic stems, with special reference to formation of past tense /nt/ and deletion of /c/. v) Notes on the derivational verb – formation of verbal participles and relative participles.

17) The Basic Structure: Stem – Plural Marker – Case Marker – Clitics

The significant contribution of this study is, arguably, the verification of strata order and the number of levels involved in Tamil morphophonology. The study proposes that 'two lexical levels are adequate to handle the morphological processes of Tamil' (Christdas, 1988: 365). The author claims that all phonological exercises found within the phonological structure of the language must belong to one of the two stratums as in (18). In other words, all derived nouns and verbs or inflected nouns or verbs in Tamil involve no more than two levels, as shown below.

18) I. Oblique

a. Apical-final stems	Level 1
b. All other stems	Level 2

II. Plural

a. V-final stems Level 1	
b. All other stems	Level 2
c. Nominative	Level 2
d. Cliticization	Level 2

(Christdas, 1988: 365)

The point made by Christdas must be examined thoroughly. Previously we have seen the argument put forth by Vasanthakumari (2000: 120) who claims that the language involves more than two levels, especially in cases where affixation leads to palatalisation. Vasanthakumari points out that palatalisation involves as a minimum three level orderings in the Madurai dialect, but Christdas claims that palatalisation involves no more than two levels in the Kanyakumari dialect. Although this raises doubts on the generalization of both studies on level ordering, Vasanthakumari's explanation that palatalisation must involve at least three levels seems convincing and acceptable.

Another controversial contribution of Christdas is classification of epenthesis, which challenges 'the rule of majority' in Tamil. The epentheses have been classified numerically into four main groups: epenthesis 1, 2, 3 and 4, with no explanation for the chosen classification.

Besides offering a range of significant contributions to Lexical Phonology of Tamil nouns and verbs,[10] it also consists of some over-generalization. Perception on UR and epenthesis classification is one of them.

Christdas claims that 'all noun stems are consonant final in UR' (Christdas, 1988: 349), a statement of which validity can be viewed in two perspectives. According to the first view, the claim can be reinterpreted as the language not having vowel-final stems. This can be verified with the help of the following examples ending with vowels: *valai* 'net', *talai* 'head, *kai* 'hand', and *malai* 'mountain'. Examining these examples through the given lens would produce the following underlying representations; */*val/, /*tal/, /*k/,* and /**mal*/, and these nominal stems must be grammatically sound. Unfortunately these bases neither qualify as minimal words in Tamil[11] nor meet the condition of minimal phonological necessities defined by the prosodic phonology of Tamil, especially the /*k/. The grammar requires that all stem words must be FOOT-BINARITY. Therefore, the given forms are ill-formed.

One may argue that the binary requirements of these stems could be filled through various phonological strategies when they fill the 'prominent' (stem) environment. The question of repairing is not an issue at all because the inherited phonological defects would simply deter them from being considered as stems in the first place. Having seen that the items have not met the minimal phonological requirements, it is apparent that the original assumption of Christdas, 'all noun stems are consonant final in UR', does not stand as a valid premise.

The second thought is this. It might be assumed that all stems in the given dialect end with a consonant. Hence, the given forms such as *valai* 'net', *talai* 'head, *kai* 'hand',

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[10] Schiffman (1993) concedes that the thesis has missed some pertinent linguistic issues, such as deletion of intervocalic vowels. Schiffman claims that intervocalic /v/ deletion in Tamil, an important phonological process that systematically takes its course in inflectional phonology, has eluded proper investigation among the researchers. He trusts that Lexical Phonology framework has the capacity of capturing these environments, but a study carried out within this framework such as Christdas (2006) failed to do so.

[11] The term stem in Christdas refers to both - the root and the stem. What has been referred to as stem in Christdas is known as '*adiccol*' and '*ve:rccol'* in Tamil. Literally the former gives the meaning base and the latter, root. Any individual sound segment or combination of them that may qualify as stem or root, literally, must denote a semantic sense (Nannu:l, 214). The term stem in Christdas refers to both the root and stem.

and *malai* ‘mountain’ should end in the following ways, *vala*y ‘net’, *tala*y ‘head, *ka*y ‘hand’, and *malay* ‘mountain’. It seemed that Christdas has offered her opinion based on the latter, by claiming ‘all noun stems are consonant final in UR’.

The classification of epentheses[12] especially that related to the epenthetic of [u] and [ɪ] given by Christdas must also be questioned. It is important to note that Christdas classifies [u] and [ɪ] as two different classes of epentheses (Christdas, 1988: 88) showing different phonological roles without any crossover. A classification of epenthesis of [u] irrespective of individuality and context sensitivity may produce an ill-formed structure, simply because the /ɪ/ is not an independent epenthesis, because the emergence of epenthesis [ɪ] in a particularly sensitive context is related to epenthetic [u], at least in Tamil.

The following example elaborates on this in detail. The compound word, */ka:du + ya:nai/* > */ka:ddɪya:nə̃ɪ/* ‘forest elephant’[13] shows that the stem final /u/ is dropped and replaced with epenthesis [ɪ], indicating that they are in complementary distribution. In fact, the epenthesis [ɪ] is not an independent epenthesis form in Tamil, and it may only take place in a given context. The question needing clarification at this point is whether or not two epentheses share the same context. If, the answer is yes, we may accept Christdas’s claim.

Accepting her assumption that all word-final /u/ are epenthesis and epentheses [u] and [ɪ] in Tamil do not share the same context may lead to some practical problems. According to her, the epenthesis [u] is applied to every word ending with an obstruent: /p, t, d, ɽ, c and k/. On the other hand, the same epenthesis also appears between a monosyllable base and a suffix, as in */val-u-nar/* > */vʌllʊnə̃r/ ‘specialist’.* Christdas’s

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[12] The language has a well-established set of epentheses - 33 epentheses (in the classical grammar, *Tolka:ppiyam* (Ilakkuvanar, 1994). The number was reduced to nine during the 11th century, (*Nannu:l*, (ka:ndikavurai, 1997). The following are the same set of epentheses that are also applied widely in present-day Tamil; /*a, u, ku, attu, ittu, aRRu, iRRu, an, in/.* These epentheses (known as empty morphs) perform special duties such as avoiding unnecessary conflict between segments, avoiding complex coda structures and so on. Hence, their emergence is motivational based – epenthesis cannot emerge without triggering motivation. Grammar of the same language, too, did not offer any account of studies, claiming that epenthesis may occur at the word final position.

[13] This example is taken from the grammar of classic Tamil.

assumption can also be attested to in another way. Attaching epenthesis [u] to lateral /l/ before attaching the stem to the suffix may give the following output, /*valu*/. Attaching the derived stem to the suffix yields to an ungrammatical form, /*valu-nar/* > /**vʌlunə̃r/*. The output incurs defects for not having a moraic coda, (/l/) which is automated when they appear in the stem/word-initial syllable within intervocalic positions. The author provided neither information nor distinctions regarding such irregularities which lead to perception troubles.

It is worthwhile to refer back to Caldwell and Samuel, at this point, who believe that the word final /u/ in Tamil should be treated as a euphonic element. Since accepting this point of view may solve the problem, the present study accepts them as euphonic elements but not epenthesis.

1.4.5 The Constraint based study

There are two constraint-based studies[14] by the same author, Beckman, on Tamil. One of them is *On the Status of CODACOND in Phonology* (2004), and the other is a thesis entitled *Positional Faithfulness* (1997). These studies have depended heavily upon secondary data, from Christdas (1988).[15]

Beckman established that the language provides encouraging evidence to support the study on Positional Faithfulness, a crucial element that claims to determine the directionality of morphophonological activities. Beckman's analysis also accounts for a range of repairing strategies aiming at harmonising Onset/Coda asymmetries, such as nasal place assimilation, lateral assimilation (when necessary), no assimilation to non-coronal segments, and lastly, epenthesis in an obstruent-obstruent cluster. One significant piece of the analysis is reviewed here.

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[14] There are altogether four studies which fall into this category. Two of them, which are analysed here, have been done by Beckman. Another work by Kaun, Input Constraint in Tamil, is inaccessible. Another study is Gordon's (1999), Positional Weight constraint in OT, which has explored the status of stress in Tamil, which is irrelevant for the current study.

[15] Other than that, Beckman has also relied upon Christdas for phonological information on Tamil to draw her conclusion. cf. Vasanthakumari, who has the same point of view, but Caldwell and Samuel who has different views regarding the /u/ at the word final.

Beckman (2004) argues that epenthesis insertion in a bid to satisfy CODA-CONDITION within Onset/Coda Asymmetries in Tamil is not generated due to interaction between Markedness and Faithfulness constraints, but is motivated by interaction between 'independently motivated faithfulness and syllable well-formedness constraints'. Epenthesis insertion between obstruent + obstruent cluster, as in */kaṯap+kaḷ/ → [ka. ḏɜ. vɯ. xɜ],* which reflects a classical CODA-CONDITION pattern, is not 'an overt prohibition on Coda Place, but rather the low priority given to place faithfulness outside the onset position', claims Beckman (2004: 114). In terms of positional faithfulness Beckman believes that the emergence of epenthesis is prioritised because of the necessity to retain a privileged position like the the onset over the weak position like the coda.

Details of this explanation are as follows. In the following example, */kaṯap + kaḷ/ → [ka. ḏɜ. vɯ. xɜ]*[16] 'doors', a nominal stem is attached with an onset-initial plural marker. Upon the interaction, the voiceless obstruents /*ṯ*/ and /*p/* were replaced with their voiced counterparts, /ḏ/ and /p/, respectively, while the /p/ underwent further lenition, and became labio-dental fricative, /ʋ/. Beckman believes that the motivation for the alternations is triggered by the highly-ranking constraints such as SCL and MAX-IO against IDENT-ONSET and IDENT (PLACE), which have helped the onset and coda to preserve their places with the help of an epenthesis. It is the structural constraints which favoured the preferred output but not the interaction between (coda and onset,) as in tableau (19), says Beckman.

[16] Beckman's study on the status of epenthesis has a fundamental problem, which does not originate from her analysis, but from the secondary data used for the analysis. The dialect of Tamil, which is spoken in the district of Nagarcoil in Tamil Nadu seemed to employ uncommon practices. The term /*katavu*/ is composed of two lexical items; the stem /*kada*/ and nominal suffix /*vu*/. When these terms are combined, the coronal /d/ lenite becomes dental /t/. This is how this combined term; /*katavu*/ is derived in the literary Tamil. Certainly, any Tamil speaker with a fair knowledge of the word formation theory of the language would not accept the stem /katap/ as the base or derived term of /*katavu*/. As a dialect whose lexicon originates from the main language, the concerned dialect is expected to respect the fundamentals of word formation rules. If we accept this truth, (then input involved in the combination should be, /*kaṯavu/ + kaḷ*/ and not /*kaṯap*/ + *kaḷ*/; this doubt whether the lengthy argument delivered by Beckman has been built upon a baseless foundation.

19) Epenthesis in obstruent + obstruent sequence

/kaṯap + kaḽ/	MAX -IO	SCL	ID-ONS	* LAB, *DOR	* COR	NO CODA	DEP-IO	IDENT (Place)
☞ a.ka. d̪ɜ. ʋɯ. xɜ				k, ʋ, x	d̪		*	
b. ka. d̪ɜp. kɜ		*!		k, p, k	d̪	*		
c. ka. d̪ɜ. xɜ	*!			k, x	d̪			

(Beckman, 2004)

The analysis shows that SCL and MAX-IO, two higher ranking constraints, are the decisive factors and are attributed to epenthesis insertion. The winner output sustained few changes; the dental /t/ altered to voiced counterpart, bilabial /p/ turned into labio-dental fricative, /ʋ/, the final and antepenultimate low vowels raised to /ɜ/, and insertion of an epenthetic vowel. Subsequently, the candidate that allows lenition of /p/→/ʋ/ and epenthesis has been selected as the winner. In other words, the failure of the losers confirmed by their inability to promote such flexibility originates from positional faithfulness constraints.

Beckman’s contributions to Tamil constraint-based phonology are simply enormous. However, the study also runs on some weak assumptions, and over-generalisations. For example, the study generalises that all root-initial syllable codas of the language retain their place features, but in non-initial positions they undergo place assimilations (Beckman, 2004). This is not always true, as the codas in non-initial stems are still allowed to retain their place feature by relinquishing their sonority, as in the following, */mutal-mai/→ / mɤ̃tə̃nmãĩ/* ‘chief’. Although most of the foundational information delivered in Beckman’s study will maximise the success of this study for certain, the present study also challenges some of the pertinent conclusions offered in Beckman (1997).

1.4.6 Studies by Extended Grammar Studies (EGS)

Apart from this core literature, there are a few studies which have analysed the characteristics of the morphophonological mechanism in Tamil. These studies have argued for various morphophonological issues, including, the role of empty morphs and their irregularities, participating sound segments, the crucial role of the voiceless obstruents at the intersections, and historical inconsistencies of certain morphophonological processes. For their extended application of morphophonological norms of the classical grammar, we call them Extended Grammar Studies (EGS). It appears that the aim of these studies is to draw a correlation between MP of classical Tamil and the present-day Tamil, instead of giving them a fresh methodological perception. The following are reviews of selected research papers offering significant contributions.

Empty Morphs

Meenakshisundaram (1959) has offered two noteworthy contributions. One is the analysis of the emergence of empty morphs, which are commonly inserted within inflected forms. He is of the opinion that augments are conditioned by syntactic values rather than morphological and phonological requirements. He argued that case markers triggering various phonological changes within morpho-syntax and the derived augmentshave close connections[17]. The latter is believed to originate from the former in the course of language development. Interaction between nominal stem */vaal/ '*sword' and a case-sign, /*aal*/ produces an output with epenthesis such as */vaal-in-aal*/.[18] He claims that the result is generated by the interacting voiced retroflex lateral, /l/ and the instrumental case-sign. He also adds that augment */attu/,* which surfaces after all words ending in /m/ and other nouns ending in '*a'* or *'aa'* denoting plants when they are added to a case marker, is due to the fact that the open-ended lexical terms have bilabial nasal either /am/ or /m/ underlyingly.

His second contribution revolves around augment */a:n*/. Originally, it meant 'that place' (Meenakshisundaram, 1959: 129) , but connotes a different meaning in the latter stage of language development. He argues that case-sign which occurs after the names of stars or days, has now changed its functional role, and is known as an augment, */a:n/.*

[17] He added that these augments are called 'inflexional increments' by Caldwell and '*ca:riyai'* by Tamil grammarians.

[18] Most of the scholars differ in verifying the origin of these forms in Tamil. He assayed that Caldwell is of the opinion that they are old case-signs[18], while Tamil grammarians recognise some connection between them and the case-markers; they did not call them case signs. The latter were keen in discussing their relation to the sandhi rules governing the declined nouns.

Overall, the paper has argued for a syntactic relation between the case markers and the appearance of augments more than others. His argument for underlying /m/ is rather interesting; unfortunately, it has not received a good reception within the present-day analysis.

Kothandaraman (1982: 79), which argues for epenthesis insertion between stem and case markers, concludes that Tamil has two 'empty-morphemes', obligatory and non-obligatory. Empty morphs like /*attu/* are obligatory augments, and commonly applied to conjoin suffixes and words ending in 'am'. The non-obligatory empty morph may or may not occur within two words, as in the following examples, /*u:r-ai/* > */u:rinai/* and */u:rai/*, and */n̪u:l-ai/* > /*n̪u:linəɪ/* and /*n̪uləɪ/*. Though, both output representations are grammatically sound, it is the latter which receives popular acceptance in present-day Tamil, with predictable occurrence within nominal and verbal inflection, claims the author. It is interesting to note that Kothadaraman and Meenakshisundram's point of view on /*attu*/, coincides, verifying that the augment has a rather enormous functional role in the language.

Another study by Arangkaraasan (1992: 162) reports that Tamil has a series of empty morphs whose behaviour is conditioned by the participating morphemes, a similar point of view to morphologists. His elaboration on the functionality of empty morphemes in Tamil, i.e., the usual merging between the nominal stem and case marker (it is called *collurupu* in Tamil), especially the empty morph /*anru*/. Accordingly, the special augment appears between every case marker, except for two, namely the second and fourth, (*ai* and *ku*, respectively) and (nominal that denotes temporal) meaning in present-day Tamil a situation which differs from pre-Modern Tamil.

Samuel (1996) is of the view that empty morphemes are inserted to regulate the perceptual order of surface forms. He argues that epentheses within the following situations are performing such a function: the numerals ending in /u/ which tend to have augments [an] and [in], demonstrative pronouns such as /*atu/, /itu/* which prefer augment [an], the collective nouns that receive [aʈʈu] and [iʈʈu] augments and the nouns ending in /n/ which prefer an augment of [u]. When a structure ending with obstruents or other stops is attached to an onset, phonotactic conflicts encountered by the structure may block articulatory flexibility; the irregular contact between the involved segments is regulated by an augment insertion. He believes that every empty morph emerging at the intersections has individual properties and therefore must be determined on a case by case basis, but not categorically (Samuel, 1996: 148). In fact, Samuel's point of view contradicts Kothandaraman's view (Kothandaraman, 1982), which says that empty morphs have fixed and predictable occurrences. Samuel's perception on the occurrence of augment is defended thoroughly in the present thesis.

Vowels, Hiatus and its permutations

Schiffman (1971b: 6-7) in his published book, entitled, *A Reader for Advanced Spoken Tamil, Volume 2,* suggests a number of compulsory morphophonemic rules for spoken Tamil. It includes three categorical explanations: glide insertion, MP of oblique forms and vowel harmony, for which he provides simple and straightforward explanations along with supporting examples.

Vowel Harmony (VH), a phenomenon which has not been greatly recognised within the phonology of Tamil receives significant attention by the author. VH refers to a phenomenon where a noun stem and suffix are attached, or inflected to a case marker, and the quality of the vowels of the suffixes are harmonised according to the final vowel of the noun to maintain harmony between participating vowels across morpheme boundaries. He claimed that this is an automatic process in Tamil, and covers both native and loan words, as in the following examples.

20) /*-ukku*/ 'dative' becomes /ykki/ after
Native word
/mature/ + /ki/ > /*matureyki*/
the city of maturai to maturai

This is an automatic process.

Loan word such as
/laybreeri/ + /*-ukku*/ > /*laybreerikki*/
Library – to to the library
(Schiffman, 1971b: 6-7 (with modification))

This automatic process is seen within loan word.

21) Also after /i/ and /e/, the suffix /-le/ 'locative' becomes /-yle/.
/*vazi*/ + /-le/ → *vaziyle*
'way' on the way

(Schiffman, 1971b: 6-7 (with modification))

Samuel (1996) also argued for vowel lengthening and shortening in present-day Tamil. He argued that vowel sounds might be lengthened or shortened when monosyllable stems are inflected, as in the following; */ka:n-da:n/* > */kanda:n/*. The moraic quality of vowels in the stem is reduced. Besides, vowel shortening is also common in numerals, such as in, /*o:r/* > */oru/*, and */i:r/* > */iru/*. Some verbal stems also tend to be realized as verbal nouns without the help infusions or suffixation, confirms Samuel (1996:81). He also indicated that vowel lengthening is common in word internal changes as in, /*kedu/>/ke:du/,/cudu/ >/cu:du/,* [19] where the first syllable of the terms undergo lengthening. Overall, his work highlighted the presence of both vowel lengthening and shortening in Tamil, but he did not elaborate on this.

Another of Samuel's noteworthy contributions is that of justification for the misconception of vowel hiatus in Tamil by Caldwell (Samuel, 1996: 86). Vowel hiatus is not a troublesome phenomenon for many languages; it is accepted without resistance. Tamil resists it forcefully with insertion of glide, while some Indo-European languages employ different methods, such as insertion of /*n*/. Based on this prior knowledge, Caldwell (1987:174) assumed that the boldfaced /*n*/ in the following examples; /*ka:ddi**n**a/, /poruLa**n**a*/ as an epenthesis tends to avoid hiatus conflict. Unfortunately, the /n/ is part of the large composition of augment /an/ and [in], which generates (a) crisp edge – in other words, it is another form of euphonic morphs, claims Samuel. This argument, in fact, is a major contribution to the theoretical assumption of hiatus resolution in Tamil; it involves no epenthesis other than glides.

Pandurangam (2004: 35-48) in his study tracing back the historical evolution of vowel hiatus in Tamil claims that morphophonological rules evolve from time to time, that evolution leads to application changes. For instance, glide insertion was non-obligatory

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[19] Metathesis, though not so prevalent in Tamil, can still be seen, as in the following example, civiRi> viciRi and tacai>catai.

in the era of classical grammarians. Unruly application of the glides is common during that period, where the glide /v/ and /y/ has never been used systematically. Pandurangam claims that the non-systematic application must be due to its acceptance as a non-obligatory device. He adds that this trend began to change in the 11th century, in *Veeracooliyam,*[20] where application of glide was formalised, and was treated as an obligatory apparatus. This finding verifies that morphophonological rules also evolve along with the progress of the language.

Word-Final shortened /ʉ/

Samuel (1996: 63-73) demonstrates some statistical and empirical evidences arguing for the significant behaviour of shortened /ʉ/ at interfaces, proving that application of shortened /ʉ/ is still relevant in present-day Tamil. The shortened /ʉ/ word-final has a significant functional role in Tamil. Caldwell (1987: 130-134) refers to it as euphonic sounds.[21] The segment is added to hard consonants to ease pronunciation: the same behaviour is also reflected in application of /ɨ/, as in */n̪ay/ → /n̪aayɨ/*. Therefore, Samuel has concluded that the /ʉ/ performs a euphonic role but not a grammatical function; hence, this is why it tends to lose its positional value easily when adjoined to others at junctures. The barred /ʉ/ makes a significant contribution to the morphophonemic studies of Tamil; those unaware of it might recognise this as epenthesis, as in the case of Christdas (1988).

[20] He claimed that the emphasis given by *Veeracooliyam*, a manual from the 12th century, claims that Tamil grammar and Sanskrit grammar are not two different entities but one, and has an influential contribution in changing the perception of scholars towards, *udampadumey* 'glides'.

[21] Telugu is the only Dravidian language that employs this rule strictly and assures that every word must end in /u/. But, this is an optional act in Tamil.

Gemination

Ramasami (1992: 48-51), in a paper on the behaviour of the word-initial consonants and their gemination nature,[22] stresses that gemination of obstruents at the intersections is closely related to the semantic property of the lexical items rather than to phonology. It is common to see voiceless obstruents in Tamil (this includes affricate /c/) geminate when they are preceded by a structure ending with NOCODA. In certain cases, the non-plosives also suffer gemination to meet the contextual need. Though Ramasami's perception on the inclination between semantic and morphophonology could not be undermined in Tamil, it is also apparent that his hypothesis runs foul. However, the present thesis provides evidence arguing that gemination is a purely phonological phenomenon in Tamil, which can be explained without referring to semantic revelations.

In general, the studies that fall within the category of extended grammar studies have offered relatively limited but significant contributions to the morphophonology of Tamil from various perspectives. Although some of them appear to offer explicit findings, a few generalisations offered by these studies still warrant a proper and full analysis.

1.4.7 Discussion

The foregoing review shows that over the past few decades research-based studies have offered encouraging insight into morphophonology related mechanisms, in a number of ways. The literature engaged in the debate relating to morphophonology has clarified selective issues casting recurrent applications. Misconceptions relating to augments such as */an/, /in/, /arru/ /ittu/, /attu/* and */a:n/* and their applications, their relevance and their locality preference, have been widely discussed, whilst only a few of the research papers have shown interest in analysing selected augments, such as the */a:n/* and its origin.

[22] He has included Tamil in this list which has the respective sound segments at word-initial positions; /k,c,(s), t, p, m, n, ng, v, y/. He claimed that Tamil (and Malayalam) represents a conservative state of affairs in Dravidian where divergence is maintained between oral and written form due to historical causes.

Other than this, word-final shortened /ʉ/ also gained sufficient attention. Though studies believe that word final /ʉ/ is applied to ease articulatory flexibility, they have failed to reach a consensus confirming the exact nature of this eminent form. Some assume it is epenthesis, while others assume it is a mere euphonic element. After considering the phonological contribution of the element and the fact that the language has a ‘real’ [u] epenthesis, the conclusion could be reached that treating the word-final shortened /ʉ/, as a euphonic segment may render more benefits. However, the misconceptions and misinterpretations of word final /*u*/ and its role play within morphophonology of Tamil can only be verified by an empirical study.

The same sort of misconception can also be found within classification of epentheses and their utilities. Morphophonology of Tamil is closely related to the application of various augments: they are applied within a selective context to perform selective phonological roles, including filling segmental gaps, filling prosodic gaps and providing crisp edges. Unfortunately, most of the studies recognise epenthesis as space filler by neglecting its proper functions which differ from one context to another. Epentheses also face some over-generalised classifications, as in the case of Christdas, who believes that Tamil has four different forms of epentheses. Though Vasanthakumari and Kothandaraman did not disclose the number, they are of the opinion that there are more than four, in conceding the point of view of the classical grammarians. Epenthesis, a crucial repairing strategy in this language, clearly needs an empirical revisit.

Another important issue which has captured the interest of researchers is level ordering. Generative and Lexical Phonologists believe that phonological alteration/changes within structures may involve a few stages. Believing that these concepts are well suited to Tamil, Vasanthakumari and Christdas for example, have carried out pioneering explorations and claimed that Tamil involves three and two levels, respectively. Beckman who joined in the same pursuit did not anticipate this claim; the framework and the data applied by Beckman did not involve any level ordering requirements. This raised the question as to whether the language involves level ordering in the first place. If yes, then, the quest would be to determine the number - two or three, as suggested by the forerunners, or four as suggested for Malayalam, another Dravidian, sister, language (Mohanan, 1989). The unsettled dispute is crucial for the present-study, because the chosen framework, Optimality Theory, denies the existence of level-ordering. This is another research question which will eventually be addressed in the present study.

Last but not least, is the discussion which revolves around vowels at the interfaces. Pandurangan (2004), who has tracked the evaluation of vowel hiatus, confirmed that application of verified hiatus resolution is a 'recent development' but not a classical one. Schiffman's substantial findings of vowel harmony are new and have never been highlighted in the language before. Both findings show that vowel morphophonology has remained an understudied field in the contemporary research enterprise of the language, and is still evolving.

Overall, it could be said that the literature examined so far has added impressive input into the advancement of the field, both directly and indirectly. It is undeniable that all of these studies have responded to the need of the time and filled the gap accordingly. They have also added research worthy qualities to studies related to the MP of Tamil.

It should, however, be pointed out that until now no empirical research using a constraint-based approach has been carried out on the morphophonology of Tamil. Except for a few, most of the previous studies have ignored spoken Tamil, and have concentrated on a pre-determined language. The use of the same methodology as that of their predecessors appears to be the main factor limiting their ability to explain the individualism of morphophonology in detail. Available literature such as Vasanthakumari (1989) and Christdas (1988) that have directly involved spoken Tamil, have also lapsed in terms of a time frame. In the past 20 years, spoken Tamil might have acquired various dynamic aspects, which appear to have been ignored by most of the studies produced after Vasanthakumari and Christdas. Hence, research concerned with covering essential changes that have taken place over a period of time in spoken Tamil is now necessary.

In short, this study is an attempt to fill these gaps by exploring the nature of current standard spoken Tamil using the Optimality Theoretic framework, based on the following (§1.5) interlinked research questions which were raised to investigate the changes that have appeared in the course of time. In accordance with that call, and in response to the existing research gap, the present study is set to analyze the contemporary development of the morphophonological phenomenon within the rule-less theory, Optimality Theoretic Framework.

1.5 Aim of the Research and Expectations

This emergent study seeks constraint-based explanations for the interaction between phonological and morphological constituents at lexical levels within the data derived from Tamil spoken in Malaysia. The ultimate aims of the study are as follows:

22) i. To develop a comprehensive constraint-based explanation for morphophonological interaction in spoken Tamil, which is economic in nature and efficient in application.

ii. To identify the universal constraints and their ranking as a substitute approach for the popular taxonomic explanation.

iii. To identify newly developed morphophonological features, if any, that actively participate at phonology-morphology intersections.

iv. To redefine the present-day phonological alternation patterns by drawing a clearer distinction between the classical and present-day morphophonology.

v. To verify and nominate premises for realigning the trend of phonological studies related to Tamil. This study is expected to offer new mechanisms for realigning the morphophonological studies which have been engulfed within taxonomic and rules plus parameter thoughts.

This study is expected to help language planners, linguists, and language teachers in the higher educational institutions and schools, as well as students. More importantly, it may facilitate the formation of new avenues for future phonological studies in the field related to Morphology-Phonology Intersections in Tamil.

1.6 Research Questions

The proposed study has a series of interlinked research questions to explore:

23)

1. What is Morphophonology?
   a. To identify current methods applied in Morphophonology
   b. To identify the domain of Morphophonology in Tamil
   c. To assess the status of present-day Morphophonology of Tamil
   d. To map current Morphophonology theories with available data

2. What are the general constraints defined in morphology-phonology intersections and particularly in Tamil?
   a. To document the general constraints involved at the morphology-phonology intersections
   b. To document the language-specific constraints involved at Morphology-Phonology Intersections

3. What will be the contribution of this Morphology-Phonology Intersection study?
   a. To identify the fundamentals of morphophonology in Tamil
   b. To provide possible solutions for existing problems in morphophonology related studies

4. What is the current status of morphophonology of spoken Tamil in Malaysia?
   a. To identify any available important trends in the morphophonology related phonology of spoken Tamil in Malaysia
   b. To identify any changes occurring in Tamil morphophonology
   c. To form possible generalisations for morphophonological constraints identified, and to compress the available quantity of morphophonemic rules

1.7 Research methodology

This is a constraint-based study. The Optimality Theoretic framework by Prince and Smolensky (1993a) serves as the primary theoretical framework for the present study, while works by Kager (1999) and McCarthy (2002a, 2008) serve as OT textbooks. Apart from these, the present study also relies on relevant research papers and their findings.

It is hoped that the chosen framework will provide an insight to phonologically-driven alternations at intersections and other issues related to it. Most of the available Morphology-Phonology Interface related studies in Tamil have benefitted from various methodological approaches, such as taxonomy, rule rewriting, derivational and Lexical

Phonology. They did not all fully succeed in providing new insights into reducing the ongoing disputes related to interface activities in Tamil. They offered very few user friendly resolutions to improve the shortcomings in this field. The utilisation of a constraint-based approach is expected to render a better result and noteworthy outcomes.

The present study has been carried out within the standard version of the Optimality Theoretic Framework for the following reason. The extended theoretic frameworks seem to be problem-centric nominations, where each of them addresses micro-level problems. For this reason, they might be appropriate for analysis involving examples of such nature, but not for a study like this which aims to cover the fundamentals of the intersection. As opposed to all forms of extended versions of OT frameworks, the present study hopes that standard OT would do more justice.

In terms of analysis, priority is given to the Standard Optimality Theory. The present study has not included an analysis that either calls for stratal order or an extended version of Optimality Theoretic frameworks. Effort has made to analyse data exhibiting derived and non-derived environments within the framework of standard OT. Nevertheless, the present study has benefitted from the introduction of extended properties of constraints and their interactions, which could deal with complex phonological issues (details of their inclusion can be observed in Chapter 2, which provide a theoretical background of the morphology-phonology interaction).

Instead of advocating extended theories, the present study has used the extension of the constraints. For instance, other than basic constraint forms, the extended versions of constraints such as Local Conjunction Constraints (LCC), Family of Positional Faithfulness (PF) constraints, Positional Markedness Constraints (PM) and Alignments Constraints (AC) have been applied in positions wherever applicable. Hence, holistically this would be a study that offers explanations for interaction between phonological components within a standard Optimality Theoretic framework with reference to various basic and extended versions of constraints that are found within OT Phonology and particularly as found in Prince and Smolensky (1993a), Kager (1999), and McCarthy (2002a, 2008).

Therefore this study aims to provide a comprehensive account of constraint-based morphophonology for Tamil. It also trusts that ‘a finer theory like OT and its acuteness in analysing constraints and the obtained ranking orders may exhibit the phonological nature of a language in detail’, following Kager (1999).The outcome of this study, undoubtedly, will draw a distinctive line dividing the thought of present-day phonology and that of the classic morphophonology of Tamil.

1.8 Morphology of Tamil: The Definition

Morphology is a science of studying the structure of words. Morphemes are minimal components of a sentence but larger components than a sound block. Literally, morphology consists of two terms, ‘morph’ and ‘ology’. While the former ‘morph’, refers to a minimal meaningful unit of a language, the latter Greek term refers to ‘science or nature of study’. In sum, morphology can be interpreted as the science of studying minimal meaningful units of a language.

It is important to have some basic knowledge on morphology of Tamil at this point. This fundamental knowledge can be obtained in several ways. However, it is sensible to consider the view of Bloomfield (1933:196), who argues that ‘it is impossible to set up a full consistent scheme of parts of speech, because the word-classes overlap and cross each and other’. In line with his argument, an overview of the morphology of Tamil is offered without relying upon any particular theory.

Word classes found in a language can be grouped in many ways. All together there are three different thoughts in Tamil giving different thought of word classifications. The first is the thought of traditional grammarians; the second is the thought of post-grammarians while the third is thought of the present-day grammarians.

The traditional grammarians such as *Tolka:ppiyar*, *Nannu:l*, and so on, for example, believe that the word classes can be grouped into four distinctive classes as follows:

24) The linguists say that the words are said to be of two kinds, noun and verb
(Tolkappiyam, stanza 158)

25) They say that the morphemes (idaiccol) and semantemes (uriccol) may appear depending upon them (Tolkkappiyam, stanza 159)

26) Of them,
On examining, the nouns are said to be of three categories-those which belong to high class and those which belong to non-class and those which belong to both classes, in usage (Tolkkappiyam, stanza 160)

27) Nouns can be classified into five genders of two classes (stanza 161)
(Ilakkuvanar, 1994:15)

In short, they can be listed as follows.

28) nouns ‘*peyarccol’*
verbs ‘*vinaiccol’*
particles ‘*idaiccol’*
adjectives and adverbs ‘*uriccol’*

The post-traditional grammarians have different thought in classifying the words. They believe that Tamil have expanded its word classes, but the expansion still closely connected to classification system given by the traditional grammarians. They have offered a slightly modified system as follows:

29) i. nouns ‘*peyarccol’*
ii. verbs ‘*vinaiccol’*
iii. particles ‘*idaiccol’*
iv. adjectives *‘peyaruric col’*
v. adverbs ‘*vinaiyuriccol’*

It is obvious that factually there are no significant different between them, except for the acknowledgment of specific role of adjectives and adverbs.

Contrary to the previous thoughts, present-day grammarians offer a comprehensive list of word classification in Tamil. Besides retaining two of the main word classes, nouns and verbs, they have added more than a dozen word classes with rational explanation. S. Saktivel (1996), Kothandaraman (1997), S. Agethiolingam (2000), M.A Noorman (2000), Mohana Dass (20005) are a few of those who have clearly accepted the expansion of Tamil word classes. However, their nominations share some similarities and dissimilarities as well. For sake of convenient, we rely on classification given by given by Kothandaraman (1997), who believes that word classes in Tamil can be divided into 10 types, as follows:

30) The linguists say that the words are said to be of two kinds, noun and verb (Tolkappiyam, stanza 158)

31) They say that the morphemes (idaiccol) and semantemes (uriccol) may appear depending upon them (Tolkkappiyam, stanza 159)

32) Of them,
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36) word classes

Noun
Verb
Adjectives
Adverbs
Intensifier
Conjunction
Interjection
Introductory
Summoners
Responsive (Kothandaraman, 1997: 25)

Let us look at them one by one with brief description and example.

37) i) Noun – a term which is capable of taking a case suffix or post position

Example : *a:ɳ* 'boy'
pu: 'flower'

ii) Verb – a term which is capable of taking tense marker

Example : *a:du* 'dance'
a:*dina:n* 'he-dance-past tense'

iii) Adjectives – a term which gives extra quality for a noun

Example : *kedda* 'bad'
ciɽiya 'small'

iv) Adverb – a term which gives additional quality for a verb

Example : *mella* 'slowly'
viraiva:ka 'swiftly'

v) Intensifier – a particle which qualifies a noun or a verb to render intensified denotation

Example : *mika* 'very'
kadi 'very'

vi) Conjunction – a term which function as connective to conjoin two or more words

Example : *e:nenil* 'because'
um *-ra:mum kaɳɳanum* 'Ram and Kannan'

vii) Interjection – a term used to indicate strong emotional reflection

Example : *aiyo:* 'alas'
o: 'Oh'

viii) Introductory – a term placed in the beginning of a sentence to function

as introductory element
Example : *enave:* 'so that'
avva:ɽu 'Such as'

ix) Summoner – a term that is used to draw other's attention
Example : *e:y* 'hey'

x) Responsive – a term related to summoner. A term that carries receptive values from the hearer.
Example : *enna:ŋga* 'yes/hello dear''

Among the given types of words the nouns and the verbs can be described in detail.

Present-day grammarians like Agesthialingom (1996a), Lehman (1994), Schiffman (1999b), and Kothandaraman (1997) claim that nouns can be further divided into various sub-groups as follows.

38) Simple Nouns
- i. Basic Nouns
  - a. Proper nouns
    - i. Human
    - ii. Non-human
  - b. Common nouns
    - i. Human
    - ii. Non-human

- ii. Derived Nouns
  - a. Simple Pronouns
  - b. Simple verbal nouns

- iv. Simple Adjectives
- v. Compound Nouns
  - a. Nominal compound
  - b. Verbal compound
  - c. Case compound
  - d. Metaphoric compound
  - e. Conjugative (um) compound
  - f. Ablative compound

- vi. Complex Nouns
- vii. Derived Nouns
- viii. Complex Pronouns
- ix. Verbal nouns
- x. Derived Adjectives
- xi. Inflected Nouns
  - Numbers and nouns
  - Fillers and nouns
  - Case markers and nouns

Postpositions and nouns
Clitics and nouns

Like the nouns, verbs also can be divided into various sub-groups.

A term that denotes action is known as verb. It also known as temporal term as it is allowed to have tense markers. In Tamil, a verb is treated as action and temporal denoting term. It also may be qualified by an adverb or adverbial, and could be altered into adjectival or adverbial participles, besides denoting its basic roles.

Some scholars (Agesthialingom, 1996a, Kothandaraman, 1997, Sivalingam, 2000) believe that the Tamil verbs have several representations and transposition schemes which are determined by syntactic context. While allowing all of these demanded functions in a single structural form, the new verbal structure becomes a complex structural form. Therefore, Tamil verbs are noted for housing various extra-linguistics items.

A verbal structure may require several functional elements to qualify itself as a verb. Unlike the nouns which have two components, verbs may have as minimal as three elements and as maximum as seven constituents, as shown in (37). The basic form of verbal structure consists of a verbal root, an intermediate element and a suffix. The base is the centre element responsible for determining the meaning of the newly derived or inflected structure, while the intermediate infix is accountable for defining tense, the suffixes denotes a sense of person-number-gender (PNG) indication[23], which is essential to maintain the syntactic relation between the subject and verb.

Though verbs are found in various patterns and perform various functional roles, fundamentally they can be classified under two main categories: the finite verbs and non-finite verbs. Structural wise, they are divided into three structural forms: simple, complex and compound, as follows.

[23] For complete information on Tamil PNG marker system of Tamil, one may refer to any decent Tamil grammar book such as Sivalingam Sivalingam's (2000) *Vinaiyiyal*, Lehman Lehman's (1994) *Grammar of Literary Tamil*, Agesthialingom’s (1996b). *Vinaiyiyal* and so on.

39) 1. Simple Verbs
   i. Simple Finite Verbs
      a. Definitive
      b. Implicative
      c. Imperative
      d. Desiderative
      e. Optative
      f. Potential
      g. Prohibitive

   ii. Simple Infinitives
   iii. Simple adverbs
   iv. Simple Negatives

2. Complex Verbs (Inflected finite verbs)
   i. Complex Finite Verbs
      a. Direct and indirect
      b. Active and Passive
      c. Automatic and Causative
      d. Transitive verbs and Intransitive verbs

   ii. Complex Infinitives
   iii. Complex adverbs
   iv. Complex Negatives

3. Compound Verbs
   a. Noun + verb form
   b. Verb + verb form
   c. Particle +verb form

Although it is obvious that morphological words can be studied from various perspectives in Tamil, they still can be grouped under three main classes based on their structural formation namely, single word, compound word and phrasal words.

1.8.1 Internal Organization of Lexical Words in Tamil

The classical grammarians

The classical grammarians applied a systematic method to verify the belongingness of a morphological word. They believed that the method is an efficient way of verifying the components of a structure in an agglutinative language like Tamil. Based on that, they claimed that all morphological words in Tamil can be divided into two main categories, divisible and non-divisible, a thought which is evident from the following stanza.

40) எழுத்தே தனித்தும் தொடர்ந்தும் பொருள்தரின்
பதமா மதுபகாப் பதம்பகு பதமென
இருபாலா இயலும் என்ப
ezutte: tanittum todarntum poruLtarin
patama:m atupaka:p patampaku patamena
irupa:laki iyalum enpa (Cinnasamy, 1999:128)

(Organisation of a single segment or combination of few segments that give semantic meaning should be treated as word, which are divided into two, divisible and non-divisible -self-interpretation)

The sutra clarifies that a full fledge morphological word can be divided into two divisible and non-divisible. It also believed that a simplex divisible word may consist as minimum as two elements as in (35) and as maximum as eight elements as in (37).

41) Base - Suffix

1 2

42) kol – ai > kolai

kill – nom.marker *murder*

1 2

43) Vst - (Asp Aux) – (Voice Aux) (Mod. Aux) – Tense – PNG –(clitics 3) (clitics 4)

1 2 3 4 5 6 7 8

elutik–katta-vaikkap-par-tt-an-a-ata

1 2 3 4 5 6 7 8

Needless to say that interaction between one and another morphological component would generate an interface environment which may challenge the harmonic reconciliation between them.

1.8.2 Lexical items of Spoken Tamil (SpT)

The entire lexical items of spoken Tamil also can be divided along the classification given by the traditional grammarians. Like the previous, SST also consists of divisible and non-divisible lexical items, as in (44) and (45), respectively.

44) *man* 'soil'
maram 'tree'
pari:dccai 'examination'
kadika:ram 'watch'
ka:rtige:yam 'Karthigeyan'
nada 'walk'

45) *talai-van* → *talaivan* 'chief'
mania-vi → *manaivi* 'wife'
pa:d(u)-ku -an → *pa:dakan* 'singer'
a:c(u) –iri-ar → *a:ciriyar* 'teacher'
varai-v-a:n → *varaiva:n* 'he-3rd person singular-will draw-future tense'
padi-k-kir(u) - *a*:n → *padikkira*:n 'he-3rd person singular-reading-present-continuous tense'

In other words, we may claim that the non-divisible lexical items can be considered as monomorphemic forms, and they do not involve any morphophonological processes. The divisible lexical items, on the other hand, can be called as polymorphemic forms which may involve various types of morphophonological processes.

The entire lexical inventory of spoken Tamil (SST) also can be drawn into two groups based on their functional roles. The first group represents most common elements of the parts of speech: nouns, pronouns, verbs, adverbs and adjectives, which are labeled as content words (CWs) in this study. The CWs form the base for any morphological extension activity in this language. The second group embodies vast number of functional words (FWs), which behave differently from the CWs. Terms like the articles, propositions, conjunctions, interjections, tense markers, nominative markers, case markers, clitics, PNG markers and so on fall under this category. The FWs usually add the desired grammatical values; subsequently, preserve the grammaticality of the newly formed morphological word. In short, we may claim that word formation in Tamil is a combined performance of CWs and FWs with different degree of involvements and interactions.

1.8.3 Lexical words and Typology of Interaction

To learn the diversity of Tamil lexes system, especially those involving heterosyllabic lexical items, it is vital to have a fair knowledge of the organization of word internal components (WICs). Since not all lexical items of the Tamil lexical system share similar structural pattern and they may involve different degrees of involvement and interaction of sub-components, fair acknowledgement of the structural differences and the quality of involved WICs also become crucial to identify the nature of interaction within a word. In what follows, we will see the variety of interactions between selected words and the importance of morphophonological effects between them, which differ from one to another based on the difference of application of WICs.

Previous phonological studies offer handful of opportunities to account different degrees of involvement and interaction for the kinds of interaction that may take place between phonological units within phonological words. Mitsuhiko's (2004) analysis on the effect of stratified phonological lexicon argues that phonological words tend to exhibit inconsistencies, internally and externally, when different lexical components are attached to a base word to form a complete structure. Studies by Alderete (2001) Lubowicz (2002a) Antilla (2002), which account for it as a part of morphological composition, claim that it is an activity of closing the phonological gap. Despite the different perspectives in defining the interactions between lexical components, their aims have always been the same, identifying the phonological gap that influenced by morphological words to maintain the structural well-formedness.

It is vital for a morphophonological study to account the contribution of morphological interactions especially when it involves analysis of a single language. Therefore, this section aimed to find *unity among the diversity* of interaction patterns found within STM. Before that, I will show the ways to apprehend the constituents of lexical components in proper order in the language at hand.

Knowing the WICs of morphological words in Tamil is important to account for the following reason, at least. Tamil is an agglutinative language, where new morphological words are formed by adding some additional affixes to base lexemes, for instance. All derived morphological words are made of two components, a base and at least one affix. The phonological quality of the internal sub-lexemes usually determines the morphophonological changes at interfaces. The bases lexemes, for instance, appeared to have influential role to control the proper well-formed lexical output. This means that any surface true nominal or verbal forms may have different underlyingly representations. Having adequate exposure to internal organisation of lexical words, hence, is essential to understand the nature of interfaces, as well.

We will have a glance at six-fold lexemes that might be sequenced within a well-formed lexical word, as follows.

46)
Base + Juncture/Inflectional juncture + Intermediate suffixes + Epenthesis + Suffix

cey					kai	ceykai ‘behavior’
col			n		a:n	coɳɳa:ɳ ‘he said’
pa:r	t		t		a:n	pa:rtta:ɳ ‘he saw’
ta:		ṉ	t		a:n	ta:ṉta:ɳ ‘he gave’
pa:ɽa		ṉ	t	aɳ	a	paɽaṉttana ‘they flown’

The chart shows that a well-formed lexical item may consist of six lexemes, as follows:

47) i. The base
ii. The suffix
iii.The Intermediate element
iv.Epenthetic Segment/Morph v. Juncture
v. Inflected Juncture
vi.Special character

The Base

The base is an important component of all in a well-formed structure. All derived/inflected terms must have a base and at least an affix. Hence the base is treated as a primary platform in morphological extension activity. The base can be filled by either content or functional words belong to noun, verb or function words. Among them, the FW is noted for having significantly limited occurrences compared to nouns and verbs.

The Suffix

Suffix is the second prominent component of a phonological word. It is impossible to form a well formed derived structure without its presence. It is also important substance to generate basic intersections. The STM has several types of suffixes of which selection is determined by the base and the intended output structure. The selection, however, is controlled predominantly by the major word classes, nouns and verbs. For example, the nominal bases only take noun-based suffixes while the verbal bases take verbal suffixes, and FWs take suffixes belong to noun, but not the verb, strictly.

The intermediate elements

The language has various types of Intermediate Elements (IEs), which also can be classed as functional words. The IEs, as implicated by the term, behave as mediators by occupying a position between the base and suffix. There are two types IEs found in Tamil i.e. temporal IEs and nominal IEs. While the former participates within verbal inflections to render temporal senses, the latter is used in nominal extensions. The nominal IEs though known for not showing any divisional discrimination but the verbal IEs are claimed to be divided along three different tenses: the past, present and future. The followings are the individual verbal IEs.

48) i. IE of past tense: t, d, ɽ, in, n, y
ii. IE of future tense: kiɽu, kinɽu, a:n̪inɽu
iii. IE of future tense: p, v, k
iv. IE denoting negative sense: a:

The followings are the nominal IEs,

49) Intermediate Elements of nouns: ɲ , n̪, c, t, v, ic

Both types of IEs we have seen so far have significant role not only in forming a well-formed structure, but also in validating the impact of morphophonology. It must be reminded that these FWs are not bound to either an individual word class or structural dereferences. We will refer to these elements from time to time.

Filler

The filler is a representative term which refers to augments or epenthetic segments or empty morphs[24]. The filler performs a significant role - avoids unnecessary conflicts between codas of succeeding base and onsets of the proceeding suffixes. The filler, which serve the purpose of mediator, may take a place anywhere in-between the base and suffix.

The language is believed to have more than 30 of such fillers. However, the STM has a limited number of fillers such as *an, in, aɽɽu, iɽɽu, attu, ittu am, a, u,* and *ku*. These are another kind of FWs playing significant role to preserve the wellformedness of derived/inflected morphological words.

Sandhi /Junctures

Junctures (sandhi) play influential role in agglutinative languages like Tamil. It is mainly used to avoid the emergence of intervocalic context involving voiceless obstruents, a highly marked situation within a structure, to avoid phonological gaps emerging from the contact between two phonological constituents. The juncture may only be represented by one of the four voiceless obstruents; *k, c, t* and *p*. Sandhi is applied a strategic device to manage the effect of gemination in STM.

Inflected Juncture (IJ)

IJ is treated as mirror image of Junctures. A dental obstruent which is inflected to a homorganic nasal is known as IJ. Whenever the original form of Juncture is blocked from surfacing freely due to some structural requirements or phonological constraints, its counterparts emerge to fill the gap.

[24] The Tamil term equalling to them is *ca:riyai*.

Special character (SC)

Last but not least is the seventh element of a well-formed structure, known as special character. The SC emerges at exceptional circumstances, involving negative forms alone. The only SC found in STM is epenthetic /t/, which occurs independently or along with the presence of other juncture or epenthetic segments. It has been well conceded that these forms co-exist along with the negative adjectival forms ending with final syllable, /*ta*/, as in the following examples, *n̪adakka:ta, padikka:ta, colla:ta, kadika:ta* and on.

With the foregoing we end the information on morphology of Tamil. This section has offered a brief introduction to morphology of Tamil with special reference to word classifications, its internal constituents, and derivation of morphological words and generation of interface environments. The given information is essential to understand the derived environments and interaction of morphological and phonological constituents within a well formed structural form.

Nevertheless, the given explanation on morphology of Tamil must be considered as superficial, as it is aimed to render fundamental understanding about the nature of word classes and their formation in Tamil. The purposive explanation is intended to offer a clearer view on the possible emergence of various interfaces within a single morphological word, alone.

1.9 Data Collection

The data for the present study is derived from selected programmes using the high variety of Tamil, which is also known as *standard spoken Tamil* (Balasubramaniam, 1989b). The data collection relied mainly on broadcasting and talks on variety of subjects. In total, 10 radio dramas and 15 talks have been recorded and transcribed for the purpose of the analysis. The data exhibiting derived and non-derived environments resulting from morphological concatenations has been selected for the analysis. Limited but relevant data has been included in the sections.

A survey was conducted to verify two issues related to data before collect them. First of all, the suitability of the data has been verified: all measurements have been taken to include the data representing vocabulary of day to day communication. Secondly, the spoken Tamil has been verified to represent the standard spoken Tamil, alone. Other forms of the words have been avoided in this study simply to find the morphophonological constraints of spoken Tamil, but not of a well-planned and pre-determined language.

The data for the present study is derived from selected programmes using the high variety of Tamil, which is also known as *standard spoken Tamil* (Balasubramaniam, 1989b). The data collection relied mainly on broadcasting and literary discourses. In total, 10 radio dramas broadcast in *Radio Minnal FM*, Malaysia and 15 discourses using the SST have been recorded. The data exhibiting derived and non-derived environments resulting from morphological concatenations has been selected for the analysis. Limited but relevant data has been included in the sections.

The recorded programmes have been transformed into MP3 format to preserve the quality of the data and their longevity. The programmes have been played many times before they have been transcribed accordingly, for the purpose of the analysis. The process of recording and transcribing took almost nine month to reach its satisfactory level of completion. Out of the few thousands of words obtained at this stage, morphophonology examples have been chosen randomly from the master list. The data applied in the study, is actually representing one third of the huge collection of words collected for the present study.

The chosen morphophonology words and the accuracy of the transcription have been verified twice before used in the study. Initially, the selected words have been identified and replayed to confirm the verification of the accuracy, once again. At the latter stage, the set of the selected data were past to second party for verification. At this stage, the verifiers have picked some words randomly and verified the accuracy of the transcription. The data has been rechecked and updated according to the given suggestions.

It must be stressed that this is a constraint-based study; therefore, phonological rules drawn in previous generative phonological studies have been skipped in this study. Meanwhile, throughout the study various limitations and restrictions also have been used in the course of the study. All of them have been properly mentioned throughout the research in the relevant sections.

1.9.1 Data classification

The nature of Morphology-Phonology Interaction in Tamil is significantly modified by a number of morphologically and phonologically controlled requirements. Morphological words such as nouns, verbs, suffixes and functional words insist on extrametrical requirements in certain cases when they occupy the base or the succeeding positions. Phonologically, the nature of phonotactic constraints which vary from one location to another, such as zealously guarded positional prominences and less zealously guarded ones, also insist upon unparalleled outputs, when they meet at a cross-over point. The interface environments are indeed coloured by these combined contributive factors.

To preserve the originality of the data, they have been presented in a designated form showing the prominence of their interactions. The data has been divided into four-fold classifications, as follows:

50) i) Noun – Suffix
ii) Verb - Suffix
iii) Prefix - Noun
iv) Noun - Function Words

Nouns and verbs cover all kinds of content and serve as bases in the interaction, while the suffixes refer to all kinds of derivative and inflexional suffixes. While the prefixes refer to selective demonstrative articles using prefixes on nouns, the function words refer to all post-lexical suffixes inflecting nouns and verbs. Apart from this, no additional tribute has been paid to morphological categories in this study.

In response to the foregoing contributive patterns, the data has been analysed based on the quality of the segments participating at the edges, which design a pattern of interaction. The data has been classified into four major categories: CODA - NOCODA - ONSET and ONSETLESS, which in a simpler form can be defined as C-C, C-V, V-V, and

V-C types of interaction. The following are details of data classification and the topic of M-P Interactions which have been covered in each classification.

51) i. _V# versus #V_

Gliding, deletion, Epenthesis

ii. _C# versus # C_

Sonority Relegation, Gemination (Stops and Nasals), Segment Epentheses, Syllable Epentheses, Double Epentheses, Vowel Shortening (Distant Effect) Chain reaction (Counter feeding), Multiple Reactions, Coda deletion and Vowel Lengthening, Deletion of coda and gemination, Deletion of coda and gemination and so on

iii. _C# versus # V_

Deletion, Epenthesis, Gemination, Progressive assimilation, Regressive assimilation, Maximal Onset and so on

iv. _V# versus #C_

Deletion, Epenthesis, Homorganic nasal epenthesis, Regressive assimilation, internal vowel shortening, Deletion of syllable and so on

It is obvious that the _C# versus # C_ interaction garners interest of various repairing strategies, and the least is _V# versus #V_. The other two; _C# versus # V_ and _V# versus #C_ involve moderate reactions. While deletion and epenthesis is a universal practice for every one of these categories, gliding and sonority relegation remain special strategies for _V# versus #V_ and _C# versus # C_. Gemination is another strategy compelled by onset- initial structures. The richness and the complexity of the reactions triggered by the language to fill the phonological gap within a structure show the seriousness of the language in maintaining the well-formedness of the structure.

In short, data analysis has been carried out in four levels within two distinguished positions, stem/word initial syllable and non-initial syllable of stem/word in the present study. The collected data has been refined in such a way as to avoid redundancy.

1.10 Limitations

This study is carried out with certain limitations. These are as follows:

52) a. Data Collection

A limited number of radio programmes using standard spoken Tamil, aired in Malaysia (*Radio Minnal*) and a few talks using standard spoken Tamil were used as sources of data for this study. Altogether 25 programmes, 10 recorded radio dramas and 15 literary talks have been collected and transcribed for this purpose. Morphophonology examples were randomly chosen from the list.

b. Avoidance of literary works

Data from literary Tamil has been avoided in this study. This was done to find the morphophonological constraints of spoken Tamil, but not of a well-planned and pre-determined language.

c. Concentration of the study

Fundamentally, this is a constraint-based study; therefore, phonological rules drawn in previous generative phonological studies have been skipped.

Meanwhile, throughout the study various limitations and restrictions have been used in the course of the study. All of them have been properly mentioned throughout the research in the relevant sections.

1.11 Chapter Classifications

This thesis has seven chapters altogether. The first, the Introduction, provides an introduction to the morphophonology in general and Tamil. It justifies the selection of the optimality approach for the present study. It also gives an introduction to morphophonology related issues in Geneative Enterprise and SST in Malaysia, the source for empirical data for this study. This is followed by the review of related literature, which evaluates the contribution of morphophonological studies in Tamil. The same section also identifies existing research gaps that have been addressed in this study. Besides that, the chapter also clarifies the aim of the study, research questions, the methodology, data selection and limitation(s), and the chapter classification.

Chapter two of the thesis elaborates on the theoretical framework of sonority relatedness to repair strategies. Besides clarifying the universal requirement of sonority, and the available approaches in phonology to address the sonority requirement cross-linguistically, the chapter also identifies gaps in the approaches, barricading their direct application to Tamil. It offers measurements to capture relative sonority distance in Tamil at two levels, intra-syllable and inter-syllable. The last section of the chapter introduces two popular positional methodologies, positional faithfulness and positional markedness strategies, that have been widely applied in the present analysis. It also offers a case study verifying the relevance of the selected strategy.

Chapter three of the thesis gives preliminary information on the data. It provides a description of phonology, prosodic phonology, and the morphology of the data.

Chapter four, five, and six are analyses chapters. Chapter four gives an analysis of V#_#V interactions, while chapter five gives an analysis of C#_#C interactions, and chapter six offers analysis of two types of interactions, C#_#V and V#_#C. The analyses have been offered under a few selected prominent topics, such as glide insertion, deletion, epenthesis insertion, gemination, assimilation of place of articulation, sonority relegation, alignment, diphthong devaluation, vowel raising, vowel shortening and vowel lengthening.

Chapter seven is the conclusion. It concludes the thesis with findings and discussion of the findings.

1.12 Conclusion

This chapter covers four issues. The introduction of the chapter briefly shows how the morphophonology gained research momentum within various linguistic domains. It also elaborates on the disputes among the researchers and their interest locus on the study of morphophonology. The same section also establishes the relevance of OT and its response to existing problems, and identified the existing research gaps in Tamil.

The second part of the chapter covers the background of the language, the dialect of Tamil which is spoken widely in Malaysia. This chapter covers information which is closely related to Tamil spoken elsewhere in the world. This chapter argues that in the course of its development, the language made noteworthy improvements characterized by the local essence.

Review of related literature is handled in the third segment of the chapter. Various literatures from various places within various frameworks are reviewed in this section. The review offers platforms to identify the contribution of previous studies and the existing gaps in the literatures of Tamil Morphophonology.

The last segment of the introduction chapter covers various notes on the methodology. This section presents information about research design, aims of the thesis, research questions, limitations, and related technical terms. Each part of the section is self-explanatory. On the whole, this chapter illustrates the research background, verifies the research interest, its direction and the locus of the research subject.

Chapter Two
The Theoretical Framework of Syllable Well-formedness and Sonority-related Repair Strategies (SrRS) at the Morphology-Phonology Interfaces in Tamil

2.1 Introduction

The present chapter has two main aims. Apart from clarifying the fundamentals of sonority requirements underpinning syllable well-formedness and repair strategies at the Morphology-Phonology Interface (M-P Interface), it also introduces the theoretical framework guiding the present thesis. This framework has been developed based on the relevance of sonority distance.

Many scholars (Berg and Niemi, 2000, Carnie, 1994 and so on, Chiosain, 1996, Davis and Shin, 1999, de Lacy, 2004, Draca, 1995, Gouskova, 2004) have argued that sonority distance and syllable harmony are two closely related entities. In support of their views, the language investigated in this study gives a range of evidence confirming that sonority distance is all that matters in establishing harmonic reconciliation at M-P interfaces. Tamil utilises a range of significant methods in manipulating the sonority distance at interfaces i.e. coda-conditioning, relegating sonority, and epenthesis and so on. The present chapter formalises the correlation between sonority requirements and syllable well-formedness at Morphology-Phonology Interface (M-P Interface).

Due to the interaction between different Morphology-Phonology (M-P) factors, interfaces become the locus of unnecessary tensions. Rice (2007) in her study on the nature of ‘phonological gaps at phonology and morphology interfaces’ argues that phonological factors precede the morphological in preserving their structural well-formedness. Similarly, various types of phonological alternations are applied by languages to maintain syllable well-formedness claims Lombardi (2001:16). Kager (1999) asserts that structural ill-formedness is essentially previewed by phonological necessities to maintain the structural harmony of morphological words. Likewise, structural harmony in SST is sustained through segmental and sub-segmental apparatus, in which the requirements of the latter are known for rendering motivation to trigger various forms of Sonority-related Repair Strategies (SrRS).

Lexical inconsistencies found in a language might be divided into two - naturally inherited or derived inconsistencies. According to Mitsuhiko (2004) [1] the internal inconsistencies might be due to innate properties of the phonological elements[2]. She adds that lexical internal inconsistencies might also be caused by various word internal sub-lexical elements in derived phonological words. Based on the phonotactic properties of the segments participating at the interfaces, languages avoid such kinds of inconsistencies at surface level with the help of a range of repair strategies, including place assimilation, voice assimilation, final obstruent devoicing, final consonant deletion, intervocalic consonant lenition, vowel reduction, and so on (Mohanan, 1993: 62) The universal preference of these approaches is what has been termed as sonority-driven repair strategies or resolutions aiming to resolve structural ill-formedness, following Kager (1999: 91-93) and Mohanan (1993).

The abovementioned strategies are found all across world languages. For instance languages such as Axininca Campa (McCarthy and Princes, 1986) Emai, the Nigerian-Congo language (McCarthy, 2002a), Tamil and others, avoid sonority clashes between two vowels potentially in hiatus as a result of compounding or morphological concatenation for a particular reason. The 'unwelcomed' hiatus tension re avoided in many ways - glide insertion, deletion, gemination and epenthesis, the selection of which is neither random nor fixed. This selection accounts for various language specific requirements, being the root cause for not also avoiding a selection of repair strategies.

[1] Mitsuhiko has pointed out a number of examples of lexical inconsistencies within the Japanese Phonological system - application of postnasal voicing and non-application of postnasal voicing. **N**on-uniform application of post nasal voicing is also observed in Zoque (between native and Spanish-origin words; (Wonderly, 1951) and Tamil (between native and Sanskrit-origin words; (Asher and Kumari (1997))(Ota, 2004).

[2] The treatment of such language-internal inconsistencies has been a long-standing issue in phonological theory (Mathesius 1929, Fries and Pike 1949, Chomsky and Halle 1968, Postal 1968, Mohanan 1986). Recent research in OT deals with the phonological non-uniformity by admitting internal variances in constraint interaction (McCarthy and Prince 1995, Ito and Mester 2000, 1995a, 1999, Urbebanczyk 1995, Benua 1997, Inkleles, Orgun and Zoll 1997, Pater 2000, Inkelas and Zoll 2003). The same approach has been adopted in many OT-based analyses of intra-morpheme variation, though the details of implementation vary across specific proposals (Antila and Cho 1998, Boersma and Hayes 2001, Hayes 2000, Nagy and Reynolds 1997). English prefixes *in-* (e.g., impossible) and *un* (e.g., unpalatable), of which only the former exhibits nasal place assimilation (Dorothy, 19749), according to Mitsuhiko (2004).

However, at the heart of these applied strategies there lies a uniformity of target which can be closely linked to various visible and invisible linguistic factors in general.

One of the sub-segmental factors among them is sonority distance - a requirement which measures syllable uniformity and is satisfactorily achieved at both intra and inter-syllable levels. Studies such as (Carnie, 1994, Clements, 1988, Draca, 1995, Jesperson, 1904, Selkirk, 1984, Sievers, 1881) argue that the logical order of sound-segment organisation is laid upon the bricks of sonority, whose requirements differ from one language to another. (Gouskova, 2004). Languages like Kirgish (Gouskova, 2004) and Selyarese (Lacy, 2004) for example, ensure that the resonance requirements are met precisely to avoid phonological conflicts at the interfaces. A language like Tamil, on the other hand, requires a language-specific resonance to account for both levels of segmental contacts: at the inter-syllable level and the intra-syllable level. Whenever the requirements of structural harmonies are not met satisfactorily the language invokes Sonority-related Repair Strategies. The empirical aim of the present chapter is to map out language specific sonority-related specifications at the intersections of two prominent positions, the edges of the preceding and succeeding morphological words.

2.2 Sonority-related Repairing Strategies (SrRS) in Tamil

There are only a limited number of studies which have directly related sonority to repair strategies triggered at the phonology interface. Syllable Contact Law (Vennemann, 1988) Sonority Dispersion Theory (Clements, 1988), and Relational Hierarchies (Gouskova, 2001, Gouskova, 2004) are among those which have investigated the direct contribution of sonority to devising solutions for phonologically incongruent words. Shannon (1991), Gouskova (2001, 2004), Carnie (1994), and Alber and Plag (2001) on the other hand, have established the relevance of sonority in the context of syllable well-formedness and harmonic contact between adjacent syllables within a few languages, such as Dutch, Kirgish, Irish, and English Creole. The crucial role of sonority in motivating alternations at the interfaces is well-demonstrated within these studies.

Tamil and the abovementioned languages share a lot of similarities with respect to sonority contact relations or other things. The similarity can be seen at the level of involving sonority relativity in resolving morphophonological conflicts at M-P interfaces. Tamil is a language that does not tolerate sonority violations between adjacent components at intra-syllable and inter-syllable levels: it accepts sequenced consonants with greater or fixed sonority-disparity at both levels, as depicted in the following data.

1)	Input	Output
	a) /va:y - ka:l/ →	va:ykka:l
	mouth – path	*drain*
	b) /pul – kaɭ/ →	pʊɽkəɭ
	grass- s	*grass*
	c) /viral-kal/ →	vɪrəlk^{h}əɭ
	finger-s	*fingers*

Two types of sonority contacts can be witnessed here – one is between a glide and a velar stop /y-k/ in (1a), and the other is between a coronal liquid and a velar stop /l-k/ in (1b) and (1c). Conflicts arising from interaction between /y-k/ are resolved through gemination in (1(a)), but the clash in (1b), */pul-kaɭ/ → / pʊɽkəɭ/* ‘grass’ is resolved through desonorisation. It shows that liquid of a stem/word-initial syllable is desonorised to a level where it may imitate a voiced stop, [d], while the place feature of the coronal segment is retained, but the non-initial stem/word-initial syllable is not. Example (1c) shows no changes: the final [l] and the initial [k] remain unchanged. Obviously, interaction between the concerned segments, /y-k/, and /l-k/ in the foregoing examples, operates based on a mutually accepted degree of sonority distance across the syllable boundary.

While this is the case of sonority tolerance between coda and onset across the syllable boundary, Tamil prefers a different sort of sonority tolerance at intra-syllable levels. It prefers a mechanism that allows different forms of syllable configurations with various levels of complexity, preferably a complex syllable configuration between the onset and nucleus compared to that of the nucleus and coda. The following example of vowel hiatus, */kalvi-atika:ri/ → /kalviyatika:ri/* ‘educational officer’, may clarify this succinctly. The glide /y/ insertion has a few functions besides avoiding hiatus conflict in Tamil. We will see one that is relevant to this section - the complexity of the syllable configuration in terms of sonority distance, Vowel (V)-Glide (G)-Vowel (V).

The complexity of the syllable configuration can be hypothetically attested to in two ways, namely, formation of a syllable coda (VG) and formation of a syllable onset (GV). Since the glide and vowel stand close to each other within the sonority hierarchy with small resonance differences, a GV syllable configuration is predicted to be complex and less harmonic (according to SDP) compared to that of VG (refer to (26) and (27) in section 2.11.1 for more information). Nevertheless, the former is less harmonic compared to the latter because of its least sonority distance to vowels. In this way, the selected repair strategies or the candidates exhibit interconnectedness inherently based on specific sonority-dispersion practice, and they can be addressed as a schema of relative-sonority-distance.

The above mentioned schema of relative-sonority-distance operative in Tamil is different from that found in other languages. It is neither as complex as the schema that is found in Sidamo or Kirghiz (Gouskova, 2004), which requires a greater and steeper degree of sonority falling between coda and onset, respectively, nor as simple as the schema required in Icelandic and Faroese. These care about the sonority rise at the syllable boundary, but the sonority fall is not repaired (Gouskova, 2004). Tamil falls in-between these two, with preferences for a schema of relative sonority distance, it maintains sonority distance between coda and onset at all-times: the greater the distance the better the sequence in polysyllables, and the less distance the better the sequence elsewhere. It is crucial for any framework to capture these generalizations in order.

The intrinsic nature of the schema of relative sonority distance of Tamil has been indicated in what follows so as to meet the language specific requirements. For this formulation, three previous theories have been relied upon, namely, the Syllable Contact Theory (SCL) (Murray and Vennemann, 1983), the Sonority Dispersion Theory (SDP) (Clements, 1988) and the Relational Hierarchy Theory (RHT) (Gouskova, 2004), which have universal values in displaying sonority within studies related to syllable-contacts. These theories do allow for some common norms that are not applicable to Tamil at large; therefore, it is crucial to specify the contribution of each of these theories in advance before formalising one for Tamil.

The rest of the chapter is devoted to developing a simple theoretical framework explaining the relevance of SrRS in Tamil using data that has not been analysed widely. In the course of the discussion, the similarities and the differences of previous approaches to the present study have been shown along with their relationship to Sonority-Related Repair Strategies. This involves the smallest prosodic component of the phonological hierarchy, the syllable and its compents - onset, nucleus and coda (cf.

3.2 for phonological hierarchy of Nespor and Vogels). The proposed framework is expected to offer significant contributions in two ways: to evaluate the contribution of sonority in maintaining the well-formedness of the syllable and to validate the contribution of sonority in establishing harmonic contact between the adjacent syllables. In short, it will clarify the contribution of sonority in maintaining the structural contiguity of the syllable in Tamil.

The rest of the chapter is organized as follows. Following this introduction there is a discussion of the contribution of previous studies related to SrRS, where special reference has been made to Syllable Contact Law, the Sonority Dispersion Theory and the Relational Hierarchy Theory. Following this is a discussion on the theoretical framework developed for intra-level and inter-level SrRS for the present study. The sample data and the hypothesis of the present study are presented in §2.14. This is followed by a case study of Onset-Coda Asymmetry in Tamil to show the relevance of the proposed framework resolving sonority sequencing violations within lexical items. Section 2.17 provides a conclusion.

2.3 Previous Sonority Related Theories

The connection between sonority-driven resolution and phonological inconsistencies can probably be traced from the era of Jesperson (1904). Jesperson's sonority hierarchy as in (2) gives a basic sonority ranking for onset and coda, in other words, harmonic contact between the peripheral components of syllables. His proposal claims that the components with higher sonority value in the coda and that of low value in the onset would form a better combination of syllable margins, as they may reach a mutual-sonority break that serves to ease articulations.

2) a. Coda:
w > r > l > n > z > d > s > t

b. Onset:
t > s > d > z > n > l > r > w Jesperson (1904)

Accordingly, a term such as /tow/ with the least sonorous onset and most sonorous coda is harmonic than a term such as /wet/ with the most sonorous segment and ending with the least sonorous coda. Though the sonority hierarchy seems basic, it has influenced most of the follow-up theories that have relied upon the relevance of sonority-contact at the syllable boundaries.

The sonority influence on phonological resolutions has been well established by a large body of literature. They have addressed the complexity of phonological gaps and repair strategies and their relevance to the sonority-hierarchy. Since it is impossible to discuss all of them in this chapter, they have been referred to in selected influential contributions, as follows:

3) i. Syllable Contact Law (SCL)
ii. Sonority Dispersion Principle (SDP)
iii. Relational Hierarchical Theory (RHT)

These ideas have been chosen for their effective explanation of sonority driven resolutions. It must be borne in mind that evaluating their contribution for the advancement of the phonology is not the intention here but rather, it is for the purpose of grasping the internal requirements of the theories.

2.4 Syllable Contact Law (SCL)

Syllable Contact Law (SCL) is a mechanism that accounts for the relationship in contact between two adjacent consonants standing across the syllable boundaries. Words that consist of more than one syllable constantly establish contact with other syllables. Languages apply various measures to ensure that contact occurs in harmonized ways. Ensuring the properties of the adjacent consonants are at an agreeable sonority distance, relative to each other, is one of the frequently encountered ways of establishing non-conflicting interaction. The apparatus that captures such formalities is known as the Syllable Contact Law (Hooper, 1976), Murray and Vennemann (1988: 9), Clements (1988).

Formulation of SCL suggested by Murray and Vennemann based on the sonority distance has limited functions. The phonological discrepancies of the languages may prohibit easier reconciliation of two sound segments of differing sonority value adjoined in morphological concatenation or compounding. Therefore it can be said that languages differ from one another in terms of what counts as a sonority violation between two consonants in sequence ($C_{1.}C_2$) in order to avoid violation of the law of sonority hierarchy. To be precise, the heterosyllabic sequence C_1C_2 must have either equal or falling sonority value, and most importantly, it must not rise across the syllabic boundary.

The strategy that defines the systematic sonority gap required within the sequenced consonants is termed as Syllable Contact Law in Phonology (Vennemann, 1988 :40). He elaborates it in terms of consonantal strength, as follows.

4) Venemann's Syllable Contact Law
A syllable contact A$B is the more preferred, the less the consonantal strength of the offset A and the greater the consonantal strength of the onset B.
($ represents a syllable boundary, and A and B are segments)

In current phonology the consonantal strength is frequently referred to as the concept of sonority. Hence the present-study refers to syllable contact phenomena in terms of sonority rather than consonantal strength, following Davis and Shin (1999).

According to the Syllable Contact Law (SCL), syllable contact is preferred if the syllable boundaries are filled by coda and onset of greater sonority slope, in which the sonority of the former must be higher than the sonority of the latter. The specific wording of the syllable contact constraint, than can be defined in the wording suggested by Bat El (1996: 304).

5) Syllable Contact Law
The onset of a syllable must not be of greater sonority than the last segment in the immediately preceding syllable." (That is, avoid rising sonority over a syllable boundary.)

The significant role of SCL in defining the harmonic contact between consonants that may occupy C_1 and C_2 in heterosyllabic consonant clusters has been demonstrated in the Discussion section. This self-operative principle ensures 'a minimal harmony' between the boundaries of two hetero-syllabic forms existing in all instances, and has some relevance within the phonology across the languages.

2.5 Sonority Dispersion Principle

The Sonority Dispersion Principle[3] (SDP) (Clements, 1988)) is another sonority related theory, which evinces two crucial effects of sonority in configuring a well-formed syllable. One is the sonority distance and the harmony within a syllable, and the other is the sonority distance and the harmony between adjacent syllables, which are referred to as intra syllable sonority preference and inter-syllable sonority preference, respectively. SDP gives a scale aggregating the complexity of VC and CV configurations.

SDP stipulates that configurations of VC and CV demisyllables and syllable contacts have different forms of uniformity divergences. For example, VO and OV demisyllable configurations involving obstruents and vowels do not realise the same form of complexity. The VO configuration is assumed to be more complex as opposed to the OV configuration, yet the former is considered less harmonic than the latter. In other words, a better syllable configuration should exhibit a sharper rise in sonority between onset and the nucleus, and a gradual drop in sonority between the nucleus and coda (Clements, 1988, Romani and Calabrese, 1998). At the inter-level syllable contact, coda and onset are expected to exhibit a greater sonority slope to establish contact harmony between adjacent consonants. The effective function of sonority distance in syllable configuration, and the relevance of sonority distance within syllable contacts are the two major concerns of the present study. The study claims that Tamil only deploys sonority-related (relational) resolutions to erode the phonological gaps at the interfaces.

This idea concerning syllable configuration and sonority distance has a long historical tradition. Clements states that the idea was first introduced in Siever’s (1881) original work which is reads as follows,

[3] Romani and Calabrese (1998) argued that Clements (1990) and other phonologists (Vennemann (1988) and Basbøll (1977) are of the opinion that the hierarchy of CV syllable templates has an inherent inability ‘to capture the full range of linguistic facts’, therefore, they suggest a different methodology, to study the components of a syllable concerning their immediate constituents. The study also suggests the importance of the relative distance between the peak and the preceding and succeeding consonants, on the scale of sonority. He has formulated a principle, called the Sonority Dispersion Principle that bears a direct relationship between the property of segments—sonority, in creating a complex form of syllable template.

> According to sonority principle segments can be ranked along a scale according to the degree to which they possess the property of sonority; segments higher in the scale tend to stand close to the syllable peak and are more likely to form syllable nuclei. (In Clements, 1988: 64)

Clements verified the claim with little modification, asserting that the foregoing description works cross-linguistically, at least, for surfacing syllables. The same line of thought is conceded by Selkirk (1984), Kager (1999) and so on, who demonstrate that a syllable template with single onset consonant and a nucleus vowel (CV) is optimal as opposed to other forms, say an open syllable with complex onset (CCV), closed syllable with marginal coda (CVC), single syllable with vowel (V), or syllable without onset (VC). Along these lines, we may argue that the best optimal syllable form, CV, is OV, where the obstruent is voiceless.

With these expectations of SDP in mind it may be said that a well-formed syllable should perform the following: the sonority gap between the first component of syllable, onset, and the nuclei must rise gradually and reach the peak, for CV template syllables. The sonority is expected to drop gradually between the peak and the coda, as shown in the following diagram.

6)

		Peak					Peak	
	Onset		Coda		Onset		Coda	
	(C)	(V)	(C)		(C)	(V)	(C)	Output
Gloss								
	/p	u	l/	-	/k	a	ɭ/ →	/pʊɽkəɭ/ ‘grass’

SDP has accounted for the sonority distance for the emerging complexity between VC and CV. The smaller the sonority distances between the syllables’ components, the higher the score of complexity, as illustrated in (7). For instance, monosyllabic words such as /pan/, /cat/, /saw/ and /kit/, of $(C_1)V(C_2)$ syllable form, display two different forms of complexity. The sonority contact between C-V in the given examples are presumably less complex, because of the sonority distance between C_1 and nuclei, which is still at large (/pa/, /ca/, /sa/ and /ki/), as opposed to sonority contact between the V-C, which are presumed to be complex because the sonority distance between the nuclei and C_1 is less. Among the V-C syllable forms, the [at] and [it] are assumed to be more complex than the [an] and [aw], because of the sonority disparity between the obstruent and nasal and glide. The distribution of sonority values between the syllable components is the key reference of the SDP.

SDP also argues for harmony contact between demisyllables (VC and CV). Clement (1988) argues that the Sonority Dispersion Theory and the Syllable Contact Law, form an integral system in evaluating the complexity of syllable contacts. Both of them are two interdependent linguistic theories, in which the role played by one cannot be stipulated in the absence of the other.

Based on this, Clements calculated the complexity of contact between hetero-syllables using the same principle as shown in (7). Again the same principle prevailed, where the sonority disparity is smaller, the higher the complexity of clustering relations. The aggregate of complexity of demisyllables in contact, as shown in Table 1, determines the tolerance of languages to complex heterosyllabic clusters. A language that prefers complexity cut-off point as seen in 7, like Tamil, accepts the sequence of Glide-Vowel, Liquid-Obstruent, Nasal-Nasal, and Obstruent-Liquid.

7)

(A)/(B)	Vocoid	Obstruent	Nasal	Liquid	Glide
Vocoid	V-V (6)	V-O (5)	V-N (4)	V-L (3)	V-G (2)
Glide	**G-V (7)**	G-O (6)	G-N (5)	G-L (4)	G-G (3)
Liquid	L-V (8)	**L-O (7)**	L-N (6)	L-L (5)	L-G (4)
Nasal	N-V (9)	N-O (8)	**N-N (7)**	N-L (6)	N-G (5)
Obstruent	O-V (10)	O-O (9)	O-N (8)	**O-L (7)**	O-G (6)

(Clements, 1988: 72-73)

Table 1 Configuration of Syllable Complexity

The table illustrates the complexity of the contact-tension between two demisyllables, CV and VC. The degree of harmonic contact is accounted for by the aggregate of complexity of ranking, which is represented by the cut-off points. The harmony between two syllables decreases when they proceed leftward.

The SDP has its strength that could be utilized for the present study, and a slight shortfall that needs to be avoided. From the foregoing explanation, there is no doubt that the complexity between the demisyllables in contact could be articulated effectively in terms of the aggregate of the complexity of syllable ranking. Though the ranking is meant largely for demisyllable contacts, the details still involve other forms of regular contact, including the C-V and V-C, two types of interactions that have been investigated in this thesis. This is a relevant sign which can be utilised properly in the present-study.

Nonetheless, the different stance held by SDP in ranking the vowel sonority, is weaknesses that decline its adoptability without necessary modifications. In general, Clements (1988) is of the view that all vowels that form the peak have the same sonority level, a level higher than consonants. However, Tamil vowels warrant at least two different forms of sonority classifications for vowels. These are not as comprehensive as suggested by Kenstowicz (1994) and Crosswhite (1999) who believe that vowels do posit a different level of sonority hierarchy, as the sonority value of vowels also appears to be another crucial factor in deciding the types of sonority-related resolution in Tamil. The present study proposes a moderate view of vowel hierarchy.

In summary, we have seen that the SDP has strengths and weaknesses that need to be considered. It offers better options in evaluating the complexity of syllable configuration, like no other studies have offered. The SDP also has a slight weakness in accounting for the complexity of vowel sonority and their individualities. The forthcoming sections will illustrate how the complexity encoding strategy is applied for the present study but before that, sonority related resolution will be examined.

2.6 Relational Hierarchical Theory (RHT)

Relational Hierarchy Theory (RHT) is an apparatus that explains relational strength between adjacent consonants. Gouskova (2004), the proponent of the theory, argues that adjacent consonants have a relational attachment, and can be aggregated in specific ways. The relational attachment, of course, is measured based on the sonority principle. Hence, RHT can be claimed as another tool that bears on the intimacy of sonority distance.

Gouskova states that languages fall into two categories in terms of the requirements for sonority distance between two consonants. One requires maintaining a relative distance between the concerned consonants, while another type requires an exact amount of sonority distance. The RHT formulation for languages falls within the latter category and comprises a range of sub-themes, suggesting ways of manoeuvring the relation between onset and coda on the scale of sonority distance.

Gouskova argues that some languages, like Kazakh (as in 8), prefer relational contact, in which they expect the coda and onset to exhibit sonority distance but the exact distance is not an issue.[4] As opposed to this, a language like Sidamo requires a certain degree of sonority fall, while a language like Kirghiz expects a steeper sonority drop. In contrast, sonority rise in languages like Icelandic and Farose is a matter which needs to be capped within limits whereas sonority fall is not. In short, languages prefer specific ways of ensuring the sonority distance between coda and onset is maintained; the greater the distance the better the sequence.

8) Kazakh onset desonorisation in contact (Davis 1998)

/kol-lar/	kol.dar	'hands'	cf. al.ma.lar	'apples'
/murin-ma/	mu.rin.ba	'nose-INT'	cf. kol.ma	'hand-INT'
/koŋɯz-ma/	koŋɯz-ba	'bug-INT'	cf. ki.jar.ma	'cucumber-INT'

Gouskova (2004)

RTH offers a delicate way of expressing the relational requirements of sonority within Optimality Theory. RHT is concerned with two issues: capturing the relationship between constraint and sonority scales, and the relationship between the constraints, on the basis that the 'constraints do not have access to scales; they are rather built up from the scale and mirror them in their ranking' (Gouskova, 2004). The RHT constraints are claimed to be inter-related, because they originate from the same class. The formulations of these constraints in fact respond to the weakness of SCL. The sonority disparity perception, according to the author, has been transformed as multi-value constraint hierarchies, because neither SCL nor SDP has direct access to constraint formulations.

[4] This is achieved in a number of ways – 'sonorant consonants must be desonorised when they follow a consonant that has the same or lower sonority, but not when they follow a vowel or a consonant of higher sonority' Gouskova (2004).

Gouskova developed a comprehensive scale of syllable contact hierarchy (as in (10)) that corresponds to the scale of relational syllable contact given in the tables, similar to the one used to measure the distance in the Sonority Dispersion Principle. Relational requirements are expressed as constraint hierarchies, derived from the same harmonic scale that gives rise to non-harmonic relational constraint hierarchies. The constraints *DISTANCE *x* (*DIST *x*) (as in 10) account for distance violation, and it may ban all illogical sonority sequences of coda-onset that do not belong to the respective column. For instance, *DIST-2 stands for *[w.l, r.n, l.z, n.d, z.s, d.t] and will be assigned one mark of violation for any coda-onset sequence that falls within the set, as in the chart given in (9).

The chart, in fact, offers the mirror image of sonority distance between C-C types of syllable contact in the forms of constraints.

9)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
w.t >	w.s >	w.d >	w.z >	w.n >	w.l >	w.r >	w.w >	r.w >	l.w >	n.w >	z.w >	d.w >	s.w >	t.w
	r.t	r.s	r.d	r.z	r.n	r.l	r.r	l.r	n.r	z.r	d.r	s.r	t.r	
		l.t	l.s	l.d	l.z	l.n	l.l	n.l	z.l	d.l	s.l	t.l		
			n.t	n.s	n.d	n.z	n.n	z.n	d.n	s.n	t.n			
				z.t	z.s	z.d	z.z	d.z	s.z	t.z				
					d.t	d.s	d.d	s.d	t.d					
						s.t	s.s	t.s						
							t.t							
-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7

Table 2 Configuration of Syllable Contact and Distance

10) Syllable contact hierarchy

*DIST+7 » *DIST+6 » *DIST+5 » *DIST+4 » *DIST+3 » *DIST+2 » *DIST+1 » *DIST 0 » *DIST -1 » *DIST-2 » *DIST-3 » *DIST-4 » *DIST-5 » *DIST -6 » *DIST-7

To reiterate, it can be concluded that RHT offers a specific way to express the relationship between two consonant components. The relationship between sonority and the place-value of the segments has a direct relevance to the present study. The second issue is the relationship between the constraints, where certain constraints are related while others are not. The two proposals will be referred to whenever necessary.

2.7 Interim conclusion

What have been shown so far is how all of these sonority-driven theories have focused on hierarchical order, and how to calculate the exact sonority distance in a desirable manner. The SCL though, did not offer a detailed account of the calculation whereas the SDP, its predecessor, has offered some visionary illustration for such articulation. The well-developed scale accounts for the sonority distance demonstrated by Gouskova (2004) in (9 & 10) is an end product of the sonority-driven syllable contact scale. The contributions of these theories are essential, and cannot be overlooked by any study working on relativity of sonority distance, such as this one.

Unfortunately, direct application of these theories to the present study is almost impossible due to some obstacles. Two of these obstacles can be identified. First of all is the comprehensiveness of the theories, where the SCL and the SDP are too general. They need modifications to be referred directly to any Sonority-Related relational resolution based studies. On the other hand, the RHT is too comprehensive to be taken as good referential material for a language such as Tamil which prefers relative sonority difference alone. The aforementioned qualities make it impossible for the present study to accept them without modification.

The second noteworthy concern is the status of SCL and the SDP, which cannot be deduced as onset and coda sonority constraints. An OT constraint is violable and composed in negative forms, unlike the inviolable constraints within SCL and the SDP. Hence, it is necessary to deduce the status of sonority relation between the onset and coda in different forms. Neither the RHT, which has offered a technical device to calculate the distance and the constraints, nor the SDP and SCL, can be applied directly in the present study, as they have different forms of requirements. As promoted by the RHT, the exact sonority distance does not matter in Tamil; however, the language also does not reject sonority inclination entirely. The requirement of Tamil lies somewhere in between, and can be formed by adding some qualifications to the sonority-related theories that have been reviewed in the foregoing sections.

2.8. The Syllable

It is widely believed that syllable structures do not exist in the lexicon, but they are derived. As a theory that prioritizes input before generating output, the non-existence of syllables in the lexicon causes a theoretical problem for OT. The OT framework, therefore, assumes syllables are not part of the algorithmic structure building (Prince and Smolensky, 2004) but are part of the base, which is justified by Richness of Base (ROB). It assumes that syllables exist in the base and that they are generated by function GENerator, just like other grammatical properties. Syllables within OT are larger components that are constructed as a process of incorporating segments into higher prosodic constituents.

The phonotactics and the functional benefits of syllables are well-established. Spencer (2002: 73-74) observes the following as the contribution of syllables:

11) i) conform to certain organizational patterns
ii) play an important role in the organization of phonological processes of a language (such as epenthesis)
iii) phonological processes can best be understood as syllables or some constituents of syllable

Kager (1999: 91) verifies that syllables are capable of providing proper phonological generalizations, defining phonological patterns, verifying the well-formedness of the sequence of the segments and so on. He also argues that the syllable plays an important role in studying the well-formedness of structural forms, the prosodic nature of a structure and the demarcation of morpheme edges. On this basis, he believes that all repairing options, namely, epenthesis, deletion, alternation and so on are triggered at the intersections performing unitary functions – avoiding syllable ill-formedness[5] (Kager, 1999: 91).

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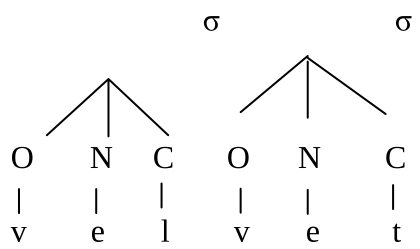
[5] OT Phonology also has a handful of evidence to confirm the contribution to syllables in morphophonology. Alber and Plag (2001), for example, have attested the relevance of syllables in an English-based Creole, Sranan. They established that syllable restructuring through deletion of segments and epenthesis, two non-uniform practices, accounts significantly for the well-formedness of the structure in Sranan. The language appears to favour deletion in some environments, especially when complex onsets are involved (cf. story > tori), while in other cases, it prefers epenthesis, especially, in

It has been repeatedly said that the sonority distance and repair strategies in Tamil have bonded interrelatedness cohesively at the heart of the syllable configuration and syllable contact. Syllable configuration across the morpheme boundaries bonds cohesive ties for two reasons: to establish a cohesive syllable structure and to establish a cohesive bond between two lexical forms. It is therefore important to obtain some background on the intrinsic nature of the syllable in general and that of Tamil before coming to terms with the complexity of syllable configurations and their representations.

The syllable, an important prosodic unit, consists of orderly sequenced sound segments with respect to their sonority values. It comprises an onset and rhyme. The rhyme has an obligatory nucleus and non-obligatory coda. Universally, the peak is filled with nuclei having high sonority value, while consonants serve as margins for the nucleus peak, either onset or coda (as shown in 12. Note that the rhyme has been omitted for simplification).

12)



The syllable structure consists of tripartite components: obligatory onset and nucleus and non-obligatory coda. Universally, a syllable prefers to begin with an onset and end without a coda consonant.[6]

The universally preferred syllable pattern is constantly challenged by language specific syllable preferences. The selection type of a syllable over others is grounded on the

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word-final positions, as in walk > waka (Alber, 2001). The study also showed how these two interrelated processes involved a complex interaction of language specific markedness and universal preference constraints in detail.

[6] Despite this universal requirement, languages differ significantly with respect to the syllable structure and the preferred components – those that prefer Onset over Onsetless syllables, and those that prefer Coda over NoCoda. Categorically, both types of languages are known as CV and CVC. Tamil is a CVC but occasionally allows Onsetless and NoCoda syllables within a structural form.

principle of appropriateness but not fixed prerequisites. A few studies on the typology of syllable structure in different languages, such as Greenberg (1978), Padgett (1994), and Ito (1986) establish that languages prefer certain prominent positions filled with particular types of syllables compared to others. Among them onset and NOCODA are favoured cross-linguistically as opposed to closed syllables (CVC) and vowel-initial syllables (VC or V), though their existence is not prohibited in the majority of world languages. In fact, syllabification is a language-specific enterprise.

2.9. Syllables in Tamil

Tamil has no studies promoting the effective role of syllables in phonology or the role of syllables in morphology-phonology interfaces but it has a few studies that have nominated the role of syllables (Kothandaraman, 1999a, Ravisankar, 1994). Exceptional studies such as Vasanthakumari (1989), Kothandaraman (1999a), and Christdas (1988) have achieved modest success in verifying its importance in solving morpho-phonological related issues. Other studies such as Keane (2004a, 2006) and Gordon (2004) have defined the phonotactic organisation of segments and their well-formed string, and believe that syllables may provide cues for knowing the stress patterns in this language. None of these studies have made significant constraint-based contributions associating the syllable and sonority in solving issues arising at the M-P interfaces.

The following examples show the language specific preference of syllable typology at interfaces in Tamil:

13)	Input	Output	
a.	kaɳ - il	kʌ̃ɳ. ɳɪ̃l	(C-V Interaction)
	eye-loc	*eye-loc'*	
	putar-il	pʊtʌrɪl	
	bush-loc	*bush-loc*	
b.	vi ɻa: - il	vɪ. ɻa:. vɪl	(V-V Interaction)
	ceremony-loc	*ceremony-loc*	
c.	vi ɻa: - kaɭ	vɪ. ɻa:k.kəɭ	(V-C Interaction)
	ceremony-s	*ceremonies*	
d.	manam- kaɭ	mʌ̃.nə̃. ŋəɭ	(C-C Interaction)
	mind-s	*minds*	

The given examples involve suffixations. Data in (13a-b) receive an onsetless suffix while data in (13c-d) receive an onset suffix. However, in term of the outputs, they differ significantly. Examples in (13a) and (13b) demonstrate different forms of requirements compared to examples (13c) and (13d), as far as the structural well-formedness is concerned.

The details of the miniature changes are as follows. The ill-formed structures without an onset are 'supplied'[7] with an onset in three different ways: gemination as in (13a), onset maximization as in (13a) and gliding as in (13b). Nasal segments in the first and the second examples of (13.a) is geminated. Examples in (13.b), receive an onset through glide insertion. Data in (13.c) experience onset maximisation, a non-radical change to level the non-compliant syllable, besides involving demarcation of morpheme boundaries. The last data, (13.d) represents a typical case of onset-coda asymmetry: place feature of bilabial coda /m/ has been licensed by the place feature of onset /k/ – an indication of a crucial environment of CODA-CONDITION.

2.9.1 Onsets

What we have seen above are mostly generic strategies for preserving the well-formedness of the syllable at interfaces in Tamil, regardless of word-classes and their differences. It is obvious that the language avoids onsetless syllables, as in (14), an unmarked syllable forms within word internal syllables.

14) ONSET
$*[_\sigma$ V Syllables must have Onset (Itô, 1989, Prince and Smolensky, 1993b)

The structural constraint at hand is powerful, because it may generate all ill-formed syllable structures regardless of context explicitness. It requires all the language specific

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[7] Like Tamil, Axininca Campa also has a consonantal resyllabification to satisfy the demand of Onset (Kager, 1999: 93).

syllables to begin with onset but not with a vowel[8]. The light and heavy syllable structures such as CV and CVC are satisfied by it but onset syllables such as VC or V forms are not. Tamil is not an onset dominated language, as it also allows V or VC more frequently at word-initial position. Hence, it is necessary for the constraint to exclude the position to avoid its malfunction. The modified version of the constraint which may exclude the word-initial position and block all onsetless syllables in the language is,

15) ONSET
$*[_{\sigma}\ V^{*\text{STEM/WORD-INITIAL}}$ Syllables must have Onset, excluding word-initial position

2.9.2 CODA and NOCODA

Coda is a controversial component of syllables. Since coda consonants tend to be unreleased, the syllables with codas are marked universally. Whenever there are two open syllables creating an intervocalic consonant, languages tend to syllabify them according to the norms of universal syllabification[9] as in (16).

16) CV.CV >> CVC.V

Tamil likewise prefers Onset syllabification to Coda syllabification.

While languages prefer syllables beginning with a consonant on the left, they prefer the same syllables to end with a non-final consonant on the right margin. Coda consonants which stand before another consonant tend to be unreleased and lack perceptual cues that are present in prevocalic consonants, which are released (Ohala, 1993, Steriade,

[8] The need for a syllable to have an onset is grounded in the articulatory and perceptual system (Padget 1990, Lombardi 2001, Beckman, 2002); it is vital for a syllable to begin with a consonant rather than a vowel. Tamil enforces this requirement word-internally but not word-initially.

[9] There are two exceptional languages that prefer a reversal pattern of syllable organisation within a single intervocalic consonant claimed by Oykangand (Sommer 1981) and Barra Gaelic (Borgstrom (1937) which prefers backward syllabification – coda of the preceding syllable (CVC.V). Kager doubts the validity of their claim (1999: 95).

1982a, Steriade, 1995). Universally, the syllables that end with codas are treated as marked situations; therefore, most of the languages prefer to avoid it as Boumaa Fijian (Kager, 1999)[10] and so on. As we have seen, Tamil still tolerates onsetless syllables in word-initial positions, so it is necessary for the constraint to exclude the position to avoid malfunctioning.

17) NOCODA
    $*C]_\sigma$ (Syllables are open)

NOCODA and coda syllables are equally preferred in Tamil. The preference of NOCODA over coda or vice versa is not fixed but verified based on case by case basis. If it is necessary for a structure to maintain structural well-formedness, the language supplies a coda, otherwise it maintains the NOCODA, such as in the following: /*mʌ̃rə**k**kɪɭəɪ*/ 'branch of a tree' and /*pʌɻəmʌ̃rə̃m* / 'fruit tree'. The former received a coda, /k/ (bold-faced), while the latter did not. Therefore, the ranking of coda in Tamil should be read as,

18) NOCODA » CODA - the coda is disallowed
19) CODA » NOCODA - the coda is retained

It must be said that the ranking is basic and the ranking of the conflicting constraints should be motivated by additional constraints as well.

Complex onset and complex coda (CC) are other reserved phonological phenomena. Though some languages avoid complex onset or coda altogether, some languages prefer both of them in a limited way. Tamil is just such a language which prefers complex coda but avoids complex onset. Nevertheless, the complex coda, which may only consist of two consonants, is allowed at word-internal positions alone but it is restricted elsewhere. The CC preference in Tamil can be represented by the following structural constraints.

20) * COMPLEX^{ONSET}
    $*[_\sigma$ CC Onsets are simple

[10] Languages are divided into two classes for their treatment towards coda: those that prefer Coda, such as Arabic, Tunica, English, and those that do not allow codas, such as Fijian Mazateco Cayavava (Blevins 1995), (Kager, 1999: 94). Tamil falls within the first category; it allows Codas, and demands Codas in certain situations.

21) $*\text{C}\textsc{omplex}^{\text{CODA}}$
$*\text{CC}]_{\sigma}$ Codas are simple

22) $*\text{C}\textsc{omplex}^{\text{CODA(*W-INT)}}$
$*\text{CC}]_{\sigma}$ Word-internal codas are simple

Except for word-internal complex coda, word-initial and word-final complex consonants are heavily dominated in Tamil.

So far, the basic setting of Tamil syllabification system has been shown. This does not elaborate intensity of interaction and syllable alterations. A brief look will be taken at the requirements of syllable well-formedness at M-P interfaces before obtaining a basic framework showing the preference of contact and its complexity.

2.10 M-P interfaces and Syllable Well-formedness in Tamil

M-P interfaces of a language system can be described in many ways. One is four-fold classifications which account for the segmental differences at the edge of the morphological words. Based on this, four types of interactions may be identified which occur at the juncture between different segments and different segment types. They are described as follows:

23) i) vowel versus vowel (V-V),
ii) consonant versus consonant (C-C),
iii) consonant versus vowel (C-V), and
iv) vowel versus consonant (V-C)

The first type of interaction is also known as hiatus-conflict; the second is popularly referred to as onset/coda asymmetry; and, the third is known as natural assimilation, syllabification that involves no intrusive factors. However, the fourth option is less popular and does occur in Tamil. Each of these segmental contacts bears on the relevance of sonority in one way or another, making the four-fold classification an appropriate choice of classification for the current exploration.

Tamil prefers different forms of resolutions at different interfaces, provided they respect the phonological properties of the involved sound segments. To clarify this in detail, we shall refer to the language specific requirements which are well-explained by the data in (24).

24) Data

I. _V# versus #V_

Input	Output
a - an	ʌvə̃n
that-PNG	*he-singular-third place-distance*
kal~kaɽ - u - aɾ	kʌɽɽʌʊər̄
learn-epent-PNG	*the learned person*
maɾuntu - aɾ	mʌ̃ɾʊttʉʊəɾ
medicine-PNG	*doctor*
tiː - il	tiːyɪl
fire -in the	*in the fire*

II. _C# versus # C_

Input	Output
iyal - kai	ɪjəɽgəɪ
nature-nom-marker	*nature*
ka:ɳ – ci	ka:dtʃɪ
see- nom-marker	*sight*
atiɾ – ci	atɪɾctʃɪ
shock- nom-marker	*shock*
makiɻ - ci	mʌ̃gɪɻctʃɪ
happy-nom-marker	*happiness*
cey -n̪anɽi	cəjn̪n̪ʌ̃nɽɪ
do- favour	*the favour*
aːɭ-tal	aːɭʊtəl
rule- nom-marker	*the ruling*
col-tal	cɔllʊtəl
say- nom-marker	*the saying*

III. _C# versus # V_

Input	Output
pin - aɾ	pɪ̃nnə̃r̄
after- nom-marker	*afterward*
mun - aːdɪ	mʊ̃nnaː̃dɪ
before- nom-marker	*before this*
malaɾ - itaɻ	mʌ̃ləɾɪtəɻ
flower-pedal	*flower-pedal*
kadan – utavi	kʌdənʊ̃təʊɪ
loan-help	*loan*
en - uɭ	ẽnnʊ̃ɭ
me-in	*within me*
maiyam – il	mʌ̃ttɪyɪl
center-loc	*in the centre*
maiyam - a	mʌ̃ttɪyə
center-loc	*the central*

IV. _V# versus #C_

Input	Output
paddu - puːcc	pʌddaː̃mp̃uːctʃɪ
silk-worm	*butterfly*
aːndu - kaɭ - aː	aːndʉgəɭaː
year-s-ergative	*years*
e - ʋʌɳɳam	eʋʋʌɳɳə̃m̄
which-way	*which way*
aɭavu - ku	aɭəʋɪɽgʉ
level-CM	*to the level'*
aːndu - kaɭ	aːndʉgəɭ
year-s	*years*

The given examples are belonging to two categories: derivational and inflectional, in respective order. In _V# versus #V_ type of interaction (24.I), there are two glides, /y/ and /v/, have been inserted to level the phonological gap between two lexical units. In _C# versus # C_ type of interaction (24.II) a range of resolutions have been triggered; sonority relegation, gemination and epenthesis. In _C# versus # V_ type of interaction (24.III), gemination and natural assimilation have been involved. In _V# versus # C_ type of interaction (24.IV) three types of resolutions are involved - natural assimilations, gemination and epenthesis. Though the selection of resolutions sounds familiar in each case, the motivation for the selection appears to be unfamiliar; it differs from one context to another depending on the structural requirements.

Having seen that the requirements of the language inhibit the range of interactions as a means of resolving conflicts at M-P interfaces, there are two questions that might be considered. Firstly, are there any similarities among the resolutions? Secondly, can all of them be addressed adequately within the selected family of constraints within the Optimality Theory?

The answer to the first question is yes. It can be answered by virtue of sonority distance at both intra-syllable and inter-syllable levels. It is the cohesiveness measured through the sonority distance and which motivates the selection of the correct repair in order to avoid unnecessary phonological gaps.

The foregoing claim can be justified as follows: instead of inserting an epenthetic consonant, the language prefers glide insertion avoiding hiatus violations, as in (24.I), a reason which is grounded on the prosodic requirements and the sonority. Tamil is a language that does not favour word-internal onset-less syllables; hence, an onset is 'supplied' in the form of glide in this case.

Nevertheless, there is a reason for selection of glide /y/. The sonority disparity between glide and vowel not only allows harmonic bondage among the constituents of the structure, but also provides a desired harmonic contact between the syllable forms. The desired cohesiveness cannot be achieved in the presence of a consonant like /k/ filling the vacuum. The cohesiveness of syllable configuration of syllable C-V, where the C is velar and V is vowel (OV) is less complex compared to that of glide and vowel (GV), in terms of the SDP. This might be the reason for Tamil to select gliding, but not consonantal epenthesis to solve hiatus conflicts as in the case of a language like Axininca Campa (Kager, 1999).

The same principle of justification can also be stretched to two other forms of interactions involving vowels. Repairing strategies initiated for interactions of _C# versus #V_ and _V# versus #C_, again might refer to sonority requirements. The following examples represent them, in order, */maiyam/ - /il/* → */mʌ̃ttɪyɪl/* 'in the centre' and */paddu/* - */puːcci/* → /*pʌddaːmp̃uːctʃɪ/* 'butterfly'. The given structure may have established harmonic contact, CV and VC, yet the structures involve epenthesis to resolve the emerging conflict, of which necessity bears direct correlation to sonority in Tamil. The details of other collateral requirements are furnished in the relevant chapter.

Apart from this, the _C# versus #C_ type of interactions operates differently in this language. To be precise, the requirement of sonority disparity involving two consonants differs crucially from the C-V and V-C type of interactions. This can be manifested as follows: in the following example, */iyal-kai/ >/ɪjəɽgəɪ/* 'nature' the /l-k/ consonants share syllable boundary in compliance with the requirement of the Syllable Contact Law proposed by Vennemann. Yet, the sonority of the /l/ is relegated to a minimal level. This is an explicit case of sonority involvement to ensure that the adjacent consonants respect the most minimal sonority distance. As can be seen in the foregoing discussion, it is apparent so far that sonority distance is a crucial factor in mediating the selection of repairing strategies in Tamil.

As for the second question, it appears that the relational intimacy between the syllable and its components can be captured as a constraint with little modification. Since it is obvious that sonority has a crucial role to play in resolving various phonological problems the sonority hierarchy could be brought to the centre of the discussion as a family of constraints describing the relative relational sonority distance. This is what has been attempted in the second part of the discussion.

2.11 The intra-level SrRS - Syllable well-formedness

In this section, the theoretical framework that has been used for the present-study is explained. The framework of sonority-related repair strategies is developed on the principles of SCL and the SDP originally but bearing in mind language specific needs. The two SrRS components that will be explained are, i) intra-level SrRS, and ii) inter-level SrRS, respectively.

At this point a review of the order of sonority hierarchy of Tamil which will be discussed in Chapter 3 should be made before moving ahead with the configuration of syllable complexity in Tamil.

Sonority is the degree of audible resonance of sound segments (Clements, 2002). It represents the classification of sound segments indicating the relation of a particular segment to other sound segments. In other words, the Sonority Hierarchy (SH) is a scale that shows the resonance aggregate of a particular sound segment in relation to others. Phonology has a range of SH schema, of which the basic order of the resonance ranking is, (Vowels > Glides > Liquids >Nasals > Obstruents). However, for the purpose of the present study a more specific set of language specific SH, as in (25), has been applied which may serve as the fundamental resonance scale of the sound segments in the language.

25)

Least Sonorous	↑	Voiceless Plosives
Voiced Plosives		
Voiceless Fricatives		
Voiced Fricatives		
Nasals		
Laterals		
Liquids		
Glides		
High (Close) Vowels /		
Mid Vowels		
Most Sonorous	↓	Low (Open) Vowels

Table 3 Sonority Hierarchy of Segments in Tamil

The given sonority hierarchy is crucial for the present study. The proposed distinctions within the ranking represent language specific sonority needs that have to be respected. The necessity of the proposed ranking will become apparent in the analysis chapters.

2.11.1 Configuration of Tamil syllables and their complexity

The central argument of the SDP is that the complexity of the interactions between the components of syllables at the intra-syllable level is not same. Onset and nuclei bonding tends to exhibit a different form of intensity from that of the nuclei and coda although the peripheral segments belong to the same segmental-class. To be precise, C-V syllabification of stop and vowel and V-C syllabification of the same stop show two different levels of complexity; where the former is known for lesser complexity, the latter is known for more complexity. Since the complexity in-between the syllable matters in C versus V type of M-P interfaces in Tamil, the next task is to illustrate how the intra-syllable configuration is achieved in this language based on the principles of the SDP.

The followings are the syllable configuration charts which describe the order of syllabification on the scale of its complexity for demisyllables, CV and VC. For the former, the complexity decreases as the sonority level of the onset decreases. The level of harmony indicates a reversal operational strategy whereas the harmony of bondage increases as the sonority level of the onset increases. As for the latter, V-C interaction, the order of complexity and harmony works in a reversal manner: the least sonorant segment tends to form a complex bond with the least harmony, while the most sonorous segment tends to form the least complex cluster and the most harmony bondage.

26) Examples of simple onset configurations

Most Harmonic ↑	Voiceless Plosives	+ Low Vowels (ka and ka:)
(Least Complex)		+ Mid Vowels (ke and ke:)
		+ High Vowels (ki and ki:)
Voiced Plosives		+ Low Vowels (da and da:)
		+ Mid Vowels (de and de:)
		+ High Vowels (di and di:)
	Voiceless Fricatives	+ Low Vowels (ca and ca:)
		+ Mid Vowels (ce and ce:)
		+ High Vowels (ci and ci:)
	Nasals	+ Low Vowels (ma and ma:)
		+ Mid Vowels (me and me:)
		+ High Vowels (mi and mi:)
	Laterals	+ Low Vowels (la and la:)
		+ Mid Vowels (le and le:)
		+ High Vowels (li and li:)
	Flaps	+ Low Vowels (ra and ra:)
		+ Mid Vowels (re and re:)
		+ High Vowels (ri and ri:)
	Glides	+ Low Vowels (ya and ya:)
(Most Complex)		+ Mid Vowels (ye and ye:)
Least Harmonic ↓		+ High Vowels (yi and yi:)

Table 4 Hierarchy of Onset Syllable Complexity and Harmony

27) Examples of simple coda configurations

Least Harmonic	Low Vowels (ak and a:k) + Voiceless Plosives
(Most Complex)	Mid Vowels (ek and e:k) +
	High Vowels (ik and i:k) +
	Low Vowels (ad and a:d) + Voiced Plosives
	Mid Vowels (ed and e:d)
	High Vowels (id and i:d)
	Low Vowels (a and a:c) + Voiceless fricatives
	Mid Vowels (e and e:c)
	High Vowels (i and i:c)
	Low Vowels (am and a:m) + Nasal
	Mid Vowels (em and e:m)
	High Vowels (im and i:m)
	Low Vowels (al and a:l) + Laterals
	Mid Vowels (el and e:l)
	High Vowels (il and i:l)
	Low Vowels (ar and a:r) + Flaps
	Mid Vowels (er and e:r)
	High Vowels (ir and i:r)
	Low Vowels (ay and a:y) + Glides
(Least Complex)	Mid Vowels (ey and e:y)
Most Harmonic	High Vowels (iy and i:y)

Table 5 Hierarchy of Coda Syllable Complexity and Harmony

The given charts are in plain form, i.e. they neither specify the positional prominence of the syllables nor their constituents. The configuration charts of onsets or codas are meant to represent scale of harmony and the complexity of the respective syllables, the basis epicentre of which is sonority.

2.12 Sonority Related Constraints

It is not hard to find a handful of attempts at identifying sonority related constraints in OT Phonology. Prince and Smolensky (1993b), de Lacy (2004), Gouskova (2004) and so on are among those who demonstrate conversion of fixed sonority hierarchy to constraints. They also have attested the adoptability of these constraints in predicting the contextual neutralisation involving different classes of sound segments at prominent positions. Contribution of sub-segmental features, sonority variances, in the form of constraints also have been represented in their novel attempts. As we have seen before, Gouskova (2004) has offered a precise formulation of sonority constraints describing the sonority distance. But, de Lacy (2004) suggested a moderately modified hybrid form of sonority related constraints, comprising sonority scale constraints proposed by Prince and Smolensky (1993b) and the indication of prosodic prominent features.

Accommodating the sonority related constraints in a straightforward manner is vital in order to conduct a fruitful constraint-based study. To perform this task, a strategy has been applied which is closely related to the fundamental forms of sonority constraints suggested by Prince and Smolensky (1993b) and that of de Lacy (2004) with slight differences, so that it may necessarily account for the prosodic markedness of prominent positions, such as onset and coda.

Since word-initial, word-medial and word-final positions have different phonological requirements in Tamil, the language imposes strict restrictions against selective prominent positions which vary from one position to another. Onsetless syllables, for example, are allowed in word-initial position, but not word-medial. Restrictions are also applicable to onset segments and coda segments - onsets are reserved positions for voiceless stops and their homorganic nasals and glides. The restriction is even tighter for coda segments, where only sonorous segments are allowed at word-final positions. Rather interestingly, no restriction is held for word-medial codas, except for two liquids i.e. rhotic and retroflex lateral in stem/word-initial heavy-syllable-CVC. Other than this the natural phonology of the language imposes no restrictions on other consonants word-medially. No consonant clusters are allowed word-initially and word-finally: coda clusters can only emerge word-medially. The language has no onset clusters in any position. The foregoing illustration of Tamil prosodic markedness suggests that both the prominent and non-prominent positions within lexical items deserve proper attention in any constraint-based study. It is vital to acknowledge such ranking of positional prominence.

Prince and Smolensky's (1993b) proposal, a universal ranking of constraints related to sonority hierarchy capturing the sonority generalisations for consonants and vowels within OT, is relevant at this point. They propose the following schemas:

28) The margin sonority hierarchy:
||*MAR/vowel »* MAR /glide »* MAR /liquid » *MAR /nasal »* MAR /obstruent||[11]

The nucleus sonority hierarchy:
||*NUC/obstruent»* NUC/ nasal»* NUC/liquid » *NUC/glide»* NUC/vowel||

29) Typology of vowel ranking
*MID-VOWEL (MV) >> LOW VOWEL (LV), HIGH VOWEL (HV)

Schema in (28) represents order of marginal sounds and their sonority order, while that in (29) elaborates on the hierarchy of vowels.

These two default ranking schemas have been tailored in a way to suit the language specific requirements in the following sections.

2.12.1 The Margin Sonority Hierarchy

The foregoing schema of margin sonority has been reviewed in two ways to ensure its appropriateness to the present study. The details of the reviews are as follows.

The first review of sonority scale concerns liquids in Tamil. As will be explained in §3.4.2, and defended in subsequent chapters, the liquids and laterals are identified as two different consonant classes in this language. Since the components of the liquids, such as retroflex approximant laterals and rhotics exhibiting dissimilar behaviour, deserve proper recognition the schema has been designed to accommodate the necessary changes.

The second review concerns the proposal of a language specific plain schema that will do what is necessary. The phonemic inventory of Tamil does not distinguish the voiced

[11] Though liquids and laterals usually regarded as forming division, the present study has treated them as belonging to two different divisions.

and voicelessness of stops; the present-study likewise did not distinguish the differences. The original schema also has been added with some qualification to represent two prominent categories, onset and coda at word-initial and non-initial positions. The first elaboration in (30) represents the onset margin constraints in accord to sonority hierarchy, and (31) represents that of the coda.

30) Margin sonority:
Onset: ||* MAR $_{onset}$/vowel» * MAR $_{onset}$/glide» * MAR $_{onset}$/liquid» * MAR $_{onset}$/lateral» * MAR $_{onset}$/nasal» * MAR $_{onset}$/obstruent||
Onset(σ_1): ||* MAR $_{onset(\sigma1)}$/vowel »* MAR $_{onset(\sigma1)}$/glide » * MAR $_{onset(\sigma1)}$/liquid» * MAR $_{onset(\sigma1)}$/lateral» * MAR $_{onset(\sigma1)}$/nasal»* MAR $_{onset(\sigma1)}$/obstruent||

31) Margin sonority:
Coda: ||* MAR $_{coda}$/obstruent »* MAR $_{coda}$/nasal» * MAR $_{coda}$/liquid» MAR $_{coda}$/lateral» * MAR $_{coda}$/glide »* MAR $_{coda}$/vowel||
Coda(σ_1): ||* MAR $_{coda\ (\sigma1)}$/obstruent »* MAR $_{coda(\sigma1)}$/nasal »* MAR $_{coda\ (\sigma1)}$/liquid» * MAR $_{coda\ (\sigma1)}$/lateral»* MAR $_{coda(\sigma1)}$/glide »* MAR $_{coda\ (\sigma1)}$/vowel||

Some words on the schemas are in order. The modified schemas represent the ranking order of sonority constraints at two significant positions, onset and coda. The first ranking of each set is a general ranking, and the second one is a specific order which refers to stem/word initial syllables. The ||*MAR$_{onset}$/obstruent|| bans all obstruents in onset, but the ||*MAR $_{onset(\sigma1)}$/obstruent|| bans onset obstruents in initial syllables. The initial syllable can be a member of a root, stem, word or any lexical item, as well. Likewise, as for the coda, the ||*MAR$_{coda}$/nasal|| bans all nasals in coda, and the ||*MAR$_{coda(\sigma1)}$/nasal|| will ban nasals in the coda of root, stem, word or any lexical initial. In other words, these constraints would perform the same function performed by *ONSET/OBSTRUENT and *CODA/NASAL or *CODA/OBSTRUENT and *ONSET/NASAL, respectively. A combination of a set of constraints will be used in this study.

The foregoing ranking schema indicates the intensity of the segments marked at respective levels, as well. For instance, having a liquid as onset is much less preferable than having an obstruent as onset. In the same way, having an obstruent as a coda is more marked than having a glide as a coda.

It must be stressed that no initiative has been taken to ensure the schema distinguishes the prominences of word classes. The present study differentiates for Tamil the role of root-initial syllables from others, as done in Beckman (1998), besides recognising the differences at stem and word levels. This has purposely been done for two reasons - to comply with the aim of the study, emphasising syllables and the sonority related repair strategy, and except for prosodic prominences, such as onset and coda of initial stem/words, there is no significant distinction between lexical classes. What is important here is the initial coda of a lexeme, where the stem/word-initial light monosyllable coda tends to behave differently from other types of coda patterns. The schemas in (30 & 31) will help us to address the issue adequately.

2.12.2 The Nucleus Sonority Hierarchy

The sonority hierarchy of nucleus in Tamil can easily be configured by defending the flexibility of vowel occurrence. As illustrated in (32), the Mid-Vowel is ranked lower in sonority hierarchy compared to Low and High vowels. The sonority hierarchy and the constraints ranking of the nucleus do not show any differences. It has been well-established in Christdas (Christdas, 1988) and Beckman (Beckman, 1997), and verified in Chapter Three that Mid-vowels are more severely restricted in word-final positions than the High and Low vowels in this language. Based on this finding, the following ranking typology is proposed for vowels, following Beckman.

32) Typology of vowel ranking in Tamil
*MID VOWEL(MV) » LOW VOWEL (LV), HIGH VOWEL (HV)

The elaborated assignment of ranking typology associated with (each) consonant class as represented for obstruent velar /k/ as in (34) is possible for every single consonant.

33) Typology of vowel ranking in Tamil
*C- MIDVOWEL (CMV) » C-LOWVOWEL (CLV), C- HIGHVOWEL (CHV)

*ke, ke:, ko, ko: (SMV) » ka, ka:, (CLV), ki, ki:, ku, ku: (SHV)

34) Typology of vowel ranking in Tamil
* MIDVOWEL- C (MVC) » * LOWVOWEL- C (LVC), * HIGHVOWEL- C (HVC)

*ek, e:k (M+) » *ak, *a:k, (L+), *ik, *i:k, *uk, *u:k (H+)

Every single Tamil consonant replaced within the place of a consonant in the ranking typology will yield the same ranking order.

In this section we have seen how intra-syllable configuration can be addressed within the concept of constraints demotion. Intra-syllable configuration and the aggregate of the complexity have been developed in the earlier part of the chapter, while the latter part of the chapter has shown how all of these syllable organisations can be demoted in terms of constraints.

Following this the theoretical framework of sonority related inter-syllable contact in Tamil is shown.

2.12 Inter-level SrRS - SCL of Tamil

In the foregoing, we have seen how the sonority sequencing principle can be accommodated in the form of constraints. The present section clarifies another aspect closely related to sonority and syllables in the Morphophonology of Tamil - inter-level syllable contact.

Inter-level syllable contact is common when two lexical terms meet at the interface. Previous studies in Tamil Phonology, such as Beckman (1998, 2004) and Christdas (1988) have termed this as The Syllable Contact Law (SCL) as an essential pre-requirement for establishing permissible contact between syllables. The SCL cover term can still be scrutinised in order to offer proper insight into repair strategies applied in Tamil. Following this, the theory of inter-level contact has been elaborated on and the shortcomings of the SCL that needed to be addressed adequately have been indicated.

Reference to the Syllable Contact Law is almost mandatory in examining the essentials of sonority in syllable contact and repairing strategies which emerge in Tamil. Christdas (1988) confirms that there are two common referral elements corroborated for the formation of sequenced consonants in Tamil: the Sonority Hierarchy (SH) and the Syllable Contact Law (SCL). Any consonant cluster violating the SH and SCL prerequisites is removed from the onset-coda inventory of the language. Any sequenced consonants belonging to two different syllables are expected to respect SCL, a well-established code of conduct in Tamil, in order to preserve harmonic contact between two heterosyllabic or tautosyllabic consonants establishing contact in morphological concatenation or compounding in Tamil.

Introduction of SCL to Tamil has been done precipitately. SCL has been introduced by Christdas (Christdas, 1988) without any further qualification, assuming that the principle order of the Syllable Contact Law works for Tamil. Christdas argues that the principle of SCL proposed by Hooper (1976), Murray & Vennemann (1983), and Clements (1988) are sufficient to account for syllable contact in Tamil. This allowed Christdas to formalise that all syllable contacts in Tamil respect the designated sonority value, where the sonority of C_1 in the $C_{1.}C_2$ cluster must be greater or equal to C_2 to establish a harmonic contact (Christdas, 1988:225-229). Following Christdas, Beckman (2004) has promoted the SCL as an un-dominated constraint in Tamil with an additional stipulation, while describing the role of gemination in Tamil. Beckman argues that 'sequences of consonantal root nodes are the relevant units over which SCL is evaluated', therefore, geminates which are underlyingly moraic consonants with single root nodes always satisfy SCL uncompromisingly in Tamil. This generalisation can be scrutinised.

The foregoing illustration leads to the following ad-hoc findings. Most of all, it acknowledges what can be syllabified - two clustered segments, that is two geminated obstruents, two sonorant segments or homorganic nasal-obstruents or coda and onset consonants with greater sonority disparity can form harmonic syllable contact. To some extent it also ascertains what should be excluded from forming the margin of coda. Beyond these offerings, however, the above mentioned studies have made no significant contributions relating to syllable contact in Tamil.

Precisely speaking, previous studies fail to provide sufficient evidence to validate the role of SCL in every case of syllable contact. Convincing evidence in Tamil demonstrates that SCL is insufficient to promote the desired generalisation at selective prominent positions. Along with this, it is also unsuccessful in offering in-depth resolutions, especially for sonority gaps or detailed information of sonority distance affecting the harmonic contact between adjacent consonants at M-P interfaces. Therefore, their claims cannot be substantiated for all cases of onset and coda interactions.

At least two challenges can be established against the majority opinion on SCL in Tamil. Firstly, the SCL functions as a cover term obscuring some of the detailed accounts of every interaction involving different segments. Closer examination of the data in (35), with special preference to bold faced segments in the output, may justify this claim.

35)	Input	Output
	maram-kaɭ	mʌ̃rə̃**ŋ**gəɭ
	tree-s	*trees*
	kal - kaɭ	kʌ**ɽ**gəɭ
	stone-s	*stones*
	maɳ am – tal	mʌ̃ɳ ə̃**t**təl
	smell-nom-marker	*smelling*
	va:y – ka:l	va:y**k**ka:l
	mouth-path	*drain*

The result of onset and coda interaction within the output is represented in the form of bold faced segments. The results are known as coda-conditioning, a typical strategy of avoiding onset-coda irregularity in which the independent place feature of the codas are neutralised. In terms of SCL, the reactions are nothing more than segments respecting the sonority disparity between the adjacent consonants.

Unfortunately, the phonological changes at the interface involve more than what SCL could describe. None of the heterosyllabic syllable contacts, such as /m-k/, /m-t/, /y-k/, /l-k/ deviated from SCL. Despite respecting the desired sonority distance, the structures still underwent further modifications. This creates doubts as to whether the sonority distance account of SCL has valid ground or not. Through the observations against the given example in (35), /m-k/, /m-t/, /y-k/, /l-k/ interactions suggest the language maintains a more precise sonority distance than what can be accounted for by SCL.

There are two additional issues involved beyond SCL. First is the detailed requirement of sonority distance that matters more within these examples rather than a harmonic contact suggested by SCL. The sonority distance involves the evaluation of least levels, which can be represented by two additional sub-constraints, and ought to be termed as members of SCL Family constraints. The first constraint that should be assigned here is MINIMAL SONORITY DISTANCE (MSD).

36) MINIMAL SONORITY DISTANCE (MSD)
The sonority distance between adjacent consonants must be at least minimal

MSD ensures all syllables are in contact to respect minimal sonority distance between the adjacent syllables. This vital force is the motivation for sonority downgrading, such as in the case of /*kal–kaḷ/*→ /*kʌɽgəḷ*/ 'stones', where CODA-CONDITION also failed to operate. The issue here is not neutralising the place feature of the coda, but establishing harmonic contact between the coda and onset. The MSD ensures a cohesive between the candidates having more sonority similarities. Therefore, the SCL alone fails in motivating such relegation.

The second issue is the relevance of another sonority related constraint, GRADUAL SONORITY FALL (GSF), motivating phonological alternations in the last two examples in (37), which have undergone gemination.

37) GRADUAL SONORITY FALL (GSF)
The sonority fall must be gradual between adjacent consonants

Like the foregoing, the /m-t/ and /y-k/ have not violated SCL. Despite sonority harmony having emerged between C_1 and C_2, the interfaces have acquired additional segments as if there were some tensions to be eased. The failure of SCL might be seen from a different perspective: the contact prefers the sonority fall to be descending. In other words, the sonority fall at the intra-syllable must be gradual not steep.

Given that the heavily trusted SCL is inadequate, the following is proposed to improve the requirement of $C_{1.}C_{2,}$ with special emphasis on the 'relative sonority requirements' operating at the interfaces in Tamil. The core of sonority-relatedness between coda and onset and vice-versa operating in Tamil will further be shown.

It has already been demonstrated that the language has four forms of interactions, C-C, C-V, V-C, and V-V. Among the four, the C-V, V-C and V-V somehow exhibit similar sonority-relatedness in acquiring repairing strategies, but the C-C, which is popularly known as onset and coda asymmetry, behaves differently from the foregoing. Since one of the aims of the thesis is to define the configuration of well-formed syllables and their relatedness to sonority distance, it is presumed that configuration of simple onset and simple coda and their complexity discussed in (26 and 27) are sufficient to account for the degree of syllable complexity of C-V, V-C, and V-V (V-(C)-V).

However, the C-C contact needs some further clarification. Organization of $C_{1.}C_2$ is required to respect the SCL, the base of which can be traced back to the SH of the language, where the C_1 in the sequence of $C_{1.}C_2$ must be more sonorous than or equally sonorous to C_2. The C_2 cannot be more sonorous than C_1 in any instance. These requirements can be represented as a modified typological requirement of Syllable Contact Law as follows:

38) $*C_1.C_2$

If C_1 is a component consonant of class α, and C_2 is another component consonant of class β, (heterosyllabic) interaction between these component classes must be avoided at all costs. If C_1 and C_2 are from the same class, that is, if they belong to either class α or β, their interaction might be permissible in respect of MINIMAL SONORITY DISTANCE (MSD) or GRADUAL SONORITY FALL (GSF).

Whenever a structure fails to endorse these phonological requirements, the grammar initiates Sonority-Related Repair Strategies to avoid the phonological gap, and subsequently ensures that the morphology and phonology interfaces are free from any phonological gaps – the segmental and sub-segmental phonological properties.

2.13 The Hypothesis

The present thesis hypothesizes that the repair strategies employed to level phonological inconsistencies within derived and non-derived morphological terms in syllable timed languages like Tamil are performing an integral duty: to sustain the well-formedness of the syllable structure and to preserve the pervasive syllable-contact with respect to sonority-distance between the relevant phonological segments. This is what is defined as Sonority-Related Repair Strategy (SrRS), the combined force of two requirements. The first requirement involves the intra-level sonority-related relational resolutions aiming at maintaining the well-formedness of the syllable, of which components are expected to strictly abide to sonority hierarchy. The second component, which involves the inter-level sonority-related relational resolutions, is important to maintain the harmonic contact between the adjacent coda and onset of syllables.

The SrRS in Tamil performs two functions. The first is promoting syllable well-formedness. Tamil is a (C)V(C)(C) language, which prefers only vowels to occupy nucleus positions; hence, the peak cannot be filled by any segment other than vowels. It also has the flexibility of allowing onset (CV) and coda (CVC) syllables to occur within every position of a word. It allows onsetless (V or VC) syllables word-initially, and the complex coda (CVCC) at word-medially and finally (such as in *moym.pu* ‘strength’). Tamil applies SrRS to ensure the syllables are free from inconsistencies. The ultimate aim of the intra-level SrRS then can be simplified as that of maintaining syllable well-formedness against any intrusive factors.

The second function of SrRS is establishing harmonic contact between confronting syllables. This is what has been addressed as inter-level Sonority-Related Relational Resolutions, requirements of which are relative but complex, involving a handful of sub-segmental components and their relational hierarchies. The grammar seems to apply two of the major proponents of the inter-level SrRS, Syllable Contact Law, and Sonority-driven-Distance (or the special requirements of the language, MINIMAL SONORITY DISTANCE (MSD), MOST MINIMAL SONORITY DISTANCE (MMSD) and GRADUAL SONORITY FALL (GSF)), to maintain the syllable well-formedness, and perform the right task at the right place. This constraint is crucial in denoting inter-level sonority relations between the syllables concerned.

39) MINIMAL SONORITY DISTANCE (MSD)
The sonority distance between the adjacent components of the logical pair of $C_1.C_2$ must be relatively minimal.

40) MOST MINIMAL SONORITY DISTANCE (MMSD)
The sonority distance between the adjacent components of the logical pair of $C_1.C_2$ must be at least minimal. The MMSD requirement will be fulfilled if and only if both the components of the logical pair of $C_1.C_2$ share the same place in the sonority hierarchy and/or the same place of articulation.

41) GRADUAL SONORITY FALL (GSF)
The sonority between any components of the logical pair of $C_1.C_2$ must drop gradually but not drastically.

Phonological inconsistencies that require resolutions involving the MSD in (42) allowing the following pair of adjacent consonants with independent place features simply by downgrading the sonority to another level, are shown in the following examples.

42)	Input	Output
	mutal-mai	mʊ̃tə̃**nm**ə̃ĩ
	prime-nom-marker	*primier*
	pon – ka:cu	pɔ**ɽk**a:sʊ
	gold- coin	*gold coin*
	pul– kaɭ	pʊ**ɽg**əɭ
	grass-s	*grass*
	koɭ- du	kɔ**ndʉ**
	have-nom-marker	*by having*

Note that the level of sonority has been relegated to another point, from lateral to nasal. Interestingly, the codas are allowed to surface with their independent place feature upon the relegation, as /nm/, /nd/, and /ɽk/.

But, the MMSD ensures the sonority of the laterals and the onsets are harmonised as in the following:

43)	Input	Output
	pul– kaɭ	pʊ**ɽg**əɭ
	grass-s	*grass*
	muɭ – kaɭ	mʊ**dg**əɭ
	thorn-s	*thorns*
	poruɭ – kaɭ	pɔrʊ**dg**əɭ
	thing-s	*things*
	kal-ka	kʌ**ɽg**ə
	study-CM(optative)	*study (optative)*
	kal - ɽal	kʌ**ɽɽ**əl
	study-nom-marker	*the learning*

Note that the level of sonority has been relegated to two points, from lateral to stops. Like the previous cases, the codas are allowed to surface with their independent place feature (except for the last example) upon the relegation, as /ɽg/, /dk/, and /ɽɽ/.

As is self-evident from the data, different forms of relations in terms of sonority requirements between the adjacent consonants is a crucial requirement for establishing structural harmony in this language as well. As will become apparent in the following chapters, the MMSD and MSD have ultimate roles in establishing the structural well-formedness at the intra-level and inter-level Sonority-Related Relational Resolutions in the language. However, it should be noted that these effects are restricted to monosyllable and disyllable bases; polysyllable stem bases are not forced to relegate their sonority.

The following are evidence of GRADUAL SONORITY FALL (GSF).

44)	Input	Output
	padi-t(a)	pʌdɪn̪tʰə
	obey-p/t-inf.marker	*obeyed*
	kada –t(a)	kʌdən̪tʰə
	pass-p/t-inf.marker	*the passed*
	paddu-pu:cci	pʌdd***a:m***pu: tʃtʃɪ
	silk-worm	*butterfly*

Data in (44) represent insertion of homorganic epenthesis and epenthetic-morph to support the structure experiencing gradual sonority fall at the juncture. As will become apparent in the following chapters, the MSD and GSF and the modified version of the former, MOST MINIMAL SONORITY DISTANCE (MMSD c.f §§ 5.3 and 5.4) have an ultimate role in establishing the structural well-formedness at the intra-level and inter-level Sonority-Related Relational Resolution in the language.

The following section shows the practicality of MSD, MMSD and GSF in Tamil, using the very same data that we have seen so far. Before that, I will introduce two predetermined universal rankings of constraints that have been widely applied in this study.

2.14. The Ranking Arguments

The present study has heavily benefitted from two predetermined ranking orders popularly applied within OT Phonology. One is Positional Faithfulness (PF) and the other is Positional Markedness (PM). Both approaches are known for offering better insight into positional neutralisation that takes place at the interfaces. They have referred to necessary contexts so as to fulfil one of the aims of the study which is enumerating the universal ranking order of the constraints participating at the M-P interfaces. In what follows, I have offered a minimal of PF and PM and their internal organisation of constraints.

PF proposed by Beckman (2004) uses a fixed ranking order of constraints to promote the preservation of positional and context-free faithfulness constraints in a different manner. The ranking consists of three types of constraints: a high ranked positional faithfulness constraint and a low ranked markedness constraint. All the context-free markedness constraints and the universal ranking order of the sound segments, as proposed in Prince & Smolensky (1993a), as shown in (45), are trapped in-between the high-ranking PF and lower-ranking positional constraints. The ranking is claimed for promoting positional neutralization. This allows the author to apply the same ranking typology, as in (46).

45) * LABIAL, *Dorsal »*CORONAL[12]

46) IDENT-ONSET (PLACE) » MC » IDENT(PLACE)

The significant characteristic of PF is that MCs always fall within the sandwiching position, which always gives rise ‘to neutralization outside of the privileged context’ (Beckman, 2004). This is essential to trigger assimilation of the place of articulation among the codas, without disturbing the onset. Beckman claims that the complete ranking order of PF constraints, as shown in (47) may promote neutralization of place features.

47) IDENT-ONSET (PLACE) » *LABIAL, *DORSAL » *CORONAL » IDENT(PLACE)

The given ranking shows that the low priority codas would assimilate their place of articulation with the following onset because of *LABIAL, *DORSAL » *CORONAL » IDENT(PLACE); reduction of output place specifications (place markedness) is more harmonic than complete faithfulness to the value of inputs. In other words, onset triggers spreading rather than undergoing it, because of its exclusive ranking position, which supersedes every one of the lower-ranking constraints. The ranking order ensures that faithfulness to onset specification is paramount, and it takes precedence over the imperative of minimizing the place specifications in the output.

The same context can be approached differently, within the perspective of Positional Markedness. To cap it within Positional Faithfulness (PF), all we need is two additional FCs responsible to preserve the prominence of Onset, IDENT-ONSET (PLACE) and context-free FC preserving the place specification of onset, IDENT(PLACE). On the other

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[12] The original of universal sound segments ranking consists of a fourth element, Pharyngeal as the most unmarked segment- »*Labial, *Dorsal »* Coronal»*Pharyngeal. Since the pharyngeal is not present in Tamil, I have skipped the ranking for Pharyngeal in this study.

hand, to make an analysis of the same environment using contextual-markedness (positional markedness (PM)) constraints, we need constraints such as MAX-IO, CODA-CONDITION and NOCODA, to replace the positional constraints. We may receive the following ranking order to perform the same function, neutralising the place feature of coda.

48) MAX-IO, CODA-CONDITION » *LABIAL, *DORSAL » *CORONAL » NOCODA

Both ranking options perform exactly the same tasks but in different ways. The PF advocates the plausibility of retaining the onset, while the PM advocates the coda. While PF is noted as changes triggering machanism, PM is noted as changes receptive mechanism. Since both rankings are aimed at producing the very same results - justifying the elegance of coda conditions in Tamil, the present study has applied both of them within the relevant contexts.

In the next section we will examine how these approaches might be utilised with modifications to obtain proper analytical results.

2.14 Case study: Onset/Coda asymmetry (OCA) in Tamil

In this section, case studies of positional neutralisation are presented, showing the necessity of sonority constraints drawing data from SST. Data and their requirements will be scrutinised before constraints related SrRS is analysed in order to show how sonority-related constraints may predict the environments precisely and promise deeper understanding of the context. This will be done by highlighting their minimal differences.

The representative data in (49) show different phonological reactions at the interfaces.

49)	Input	Output
	mutal-mai	mʊ̃tə̃**nm**ə̃ĩ
	prime-nom-marker	*primier*
	pul– kaɭ	pʊ**ɽg**əɭ
	grass-s	*grass*
	padi-t(a)	pʌdɪ**n̪**t^{h}ə
	obey-p/t-inf.marker	*obeyed*

In the first example the sonority of stem-final coda has been relegated to the next level, from lateral to nasal - */l/-/m/* → */nm/*. In the second instance, the stem-final coda has been relegated two levels, from lateral to stop - */l/-/k/* → */ɽk/*. Sonority relegation is common in stem/word initial and non-initial. The last example received a homorganic epenthesis, [n̠].

None of these examples have experienced coda-condition, as they should. Instead of 'repairing' the unlicensed coda, Tamil accepts codas with independent place. Alternatively the codas are required to compensate the flexibility with sonority drop. Sonority compensation, either single or double levels as seen in the data, favoured the structure to minimise the sonority gap between coda and onset, in return. The last example shows rather an interesting outcome - epenthesis without obvious motivation. Again, the motivation can be traced from sonority-requirement, enforcing gradual sonority fall. In other words, coda-condition in this language does not aim to condition the place feature, but the sonority distance.

Few active sonority-constraints responsible for the phonological changes are operating at the juncture, on top of the fundamental constraints we have seen so far. Let us focus on /*mutal-mai*/ → /*mʊ̃tə̃n***m***ə̃ĩ*/ and three of its competitors, */muta<>mai/*, */mʊ̃tə̃n***m***ə̃ĩ/* and */mutalmai/*. Among them, */mʊ̃tə̃n***m***ə̃ĩ/* is the optimal output. As preserving coda is essential in this context, MAX-IO appears to be crucial and undominated while the NOCODA is dominated in this language. This shows why candidates favouring deletion, such as /*mʊ̃tə̃<>mə̃ĩ*/ which favours NOCODA, are dominated by the sub-optimal input friendlier candidates, such as */mʊ̃tə̃n***m***ə̃ĩ*/, respecting the MAX-IO. Note that the undominated SCL has never been violated by any of them; sonority distance between the preceding and succeeding segments is highly respected.

The same is true for */pul-kaɭ/* and three of its competitors, */pu<>kal/, /pʊ***ɽg***əɭ/* and */pulkaɭ/*. The */pʊ***ɽg***əɭ/* showing similar phonological requirements surfaces as optimal output, while the /*pu<>kaɭ/* which favours NOCODA, friendlier candidates, */pʊ***ɽg***əɭ*/, respecting the MAX-IO are rejected. The SCL has never been violated by these candidates also.

The necessity of exposing the structure to different sonority is made clear. The language applies two different tactics: downgrading the sonority value for one level in an instance and two levels in the other, for the same reason. It is assumed that this is initiated by a sonority-related constraint seen before, MINIMAL SONORITY DISTANCE (MSD).

However, it is impossible to understand the necessity of epenthesis insertion in the last example. Beckman (2004) argues that Tamil exhibits a classic coda-conditioning method to avoid onset-coda asymmetry (OCA) problems, which can be understood through the lens of positional faithfulness. The V-O interaction is not a case of OCA, yet the language insisted on insertion of an epenthesis. This reveals that the data at hand cannot be argued as an instance of the coda-condition, following Ito (1989a), who claims that geminates escape the coda-condition through having a shared place of articulation. I argue that the necessity of homorganic epenthesis is triggered by the sonority constraint GRADUAL SONORITY FALL (GSF), which ensures the drop between coda and onset to be gradual. We will verify its effectiveness briefly.

Firstly, tableau analyses will be presented verifying positional neutralization using basic forms of PF and PM rankings. The analyses will be rerun using sonority-constraints to verify their effectiveness.

What follows verifies the contribution of ranking arguments of the PF and PM, which give sub-optimal results.

50) pʊ**ɽg**əɭ » pulkaɭ » pu<>kaɭ

51) SCL » IDENT-ONSET (PLACE) » *LABIAL, *DORSAL » *CORONAL » IDENT(PLACE)

52) SCL » MAX-IO » *LABIAL, *DORSAL » *Coronal » NOCODA

53)

Input /mutal-mai/	MAX-IO	*LABIAL	*DORSAL	*CORONAL	NOCODA
☞a. mʊ̃tə̃**nm**ə̃ĩ		**		**	*
☞b. mutalmai		**		**	*
c. mʊ̃tə<>mə̃ĩ	*!	**		*	
Input /pul-kaɭ/					
☞a. pʊ**ɽg**əɭ		*	*	**	*
☞b. pulkaɭ		*	*	**	**
c. pʊ<>kaɭ	*!	*	*	*	**
Input /padi-ta/					
☞a. pʌdɪ**n̪**t^{h}ə		*		**	*
b. padita		*		*	
c. pʌdɪ<>a	*!	*		*	

The foregoing analysis has largely relied on contextual-markedness constraints. The less fortunate candidates (c) were ousted from the challenge because they failed to satisfy the higher-ranking constraint, MAX-IO. Like the victor, candidate (a), its close rival candidate (b) also lost the privilege of being harmonious, simply because of violating other constraints, except the MAX-IO. Basically, the winning status of the candidate (a) and (b) could not be determined by a higher-ranking constraint, showing that the tableau is lacking some crucial information. We will return to this issue after verifying the status of PF.

The following analysis was done with the help of Positional Faithfulness constraints.

54)

Input /mutal-mai/	IDENT-ONSET (PLACE)	*LABIAL	*DORSAL	*CORONAL	IDENT (PLACE)
☞a. mʊ̃tə̃**nm**ə̃ĩ		**		**	
☞b. mutalmai		**		**	
c. mʊ̃tə<>mə̃ĩ	*!	**		*	
Input /pul-kaɭ/					
☞a. pʊ**ɽg**əɭ		*	*	**	
☞b. pulkaɭ		*	*	**	
c. pʊ<>kaɭ	*!	*	*	*	
Input /padi-ta/					
☞a. pʌdɪ**n̪**t^{h}ə		*		*	
b. padita		*		*	
c.pʌdɪ<>a	*!	*		*	*

Like the previous analyses, the tableaux also show a tie, indicating that the PF constraints have failed to select the optimal winner. The rest of the contextual independent constraints registered almost exactly the same amount of violation, while the lower-ranking FC, which is less appropriate in this context, also seemed helpless in choosing the optimal candidate. This implies that the PF and PM alone are unable to predict the right solution.

The foregoing result can be rectified with the addition of two sonority constraints. For the first two examples MSD, Minimal Sonority Distance, and SCL will be applied. For the last example MSD will be replaced with GSF. Since both constraints perform almost the same task, they will be assigned within the same ranking, as follows:

55)

Input /mutal-mai/	MSD	SCL	MAX-IO	*LABIAL	*DORSAL	*CORONAL	NOCODA
☞a. mʊ̃tə̃**nm**ə̃ĩ				**		**	*
b. mutalmai	*			**		**	*
c. *mʊ̃tə<>mə̃ĩ*			*!	**		*	
Input /pul-kaɭ/							
☞a. pʊ**ɽg**əɭ				*	*	**	*
☞b. pulkaɭ	*			*	*	**	*
c. pʊ<>kaɭ			*!	*	*	*	*

56)

Input /padi-ta/	GSF	SCL	MAX-IO	*LABIAL	*DORSAL	*CORONAL	NOCODA
☞a. pʌdɪ**n̪**tʰə				*		**	*
b. padita	*			*		*	
c.pʌdɪ<>a	*	*	*!	*			

57)

Input /mutal-mai/	MSD	SCL	IDENT-ONSET (PLACE)	*LABIAL	*DORSAL	*CORONAL	IDENT (PLACE)
☞a. *mʊ̃tə̃**nm**ə̃ĩ*				**		**	
b. mutalmai	*			**		**	
c. *mʊ̃tə<>mə̃ĩ*			*!	**		*	*
Input /pul-kaɭ/							
☞a. pʊ**ɽg**əɭ				*	*	**	
b. pulkaɭ	*			*	*	**	
c. pʊ<>kaɭ			*!	*	*	*	*

58)

Input /padi-ta/	GSF	SCL	IDENT-ONSET (PLACE)	*LABIAL	*DORSAL	*CORONAL	IDENT (PLACE)
☞a. pʌdɪn̪t^{h}ə				*		**	
b. padita	*			*		**	
c.pʌdɪ<>a	*	*	*!	*		*	*

The foregoing tableaux show the effective role of the sonority constraint, MSD, GSF and SCL. Since */l-m/, /l-k/* and */i-t/* in conforming to the requirements of syllable contact law remained silent in every instance, MSD and GSF performed the task – identifying the ‘real’ optimal candidates. To conclude, the claim that the sonority-related constraint, MSD, plays a crucial role in defining structural well-formedness is not very obvious.

2.15 Conclusion

The present chapter has offered an extensive illustration of sonority-related repair strategies aiming at maintaining the well-formedness of syllables in Tamil. It has been established that phonological gaps emerge at M-P interfaces and are levelled by rectifying the ill-formed syllable entities in respect to sonority-distance. Arguments have been centred on two strategic measurements: configuration of syllables, and establishment of harmony contact between adjacent syllable components. While the former has been referred to as syllable harmony at intra-syllable levels, the latter has been referred to as syllable harmony at inter-syllable levels. Both sections have explained the basic requirements of syllable configuration and their interrelatedness.

This chapter has put forth two hypotheses. One is that the complexity of V-V, C-V and V-C configurations and the complexity of the inter-relatedness of syllables can be accounted for within the scale of complexity developed, based on the SDP. However, two minimal-sonority-distance constraints and one sonority constraint demanding gradual sonority fall have been proposed for C-C interactions.

Practicality of the minimal-sonority-distance constraints has been demonstrated in the latter part of the chapter. Examples have been attested to within two different frameworks, PF and PM, in which both have offered unsatisfactory results. Inclusion of the proposed sonority related constraint, and the most minimal-sonority-distance constraint, has helped the grammar to predict accurately. The exercise has shown that the nominated constraint work at ground level could be extended to analyse other relevant environments.

Chapter Three
The Prosodic Phonology of Standard Spoken Tamil (SST)

3.1 Introduction

This chapter introduces the prosodic phonology of standard spoken Tamil (henceforth SST) along with a description of the phonetics and phonotactics of SST. It also offers a brief sketch of the lexical typology of SST. The combined information of phonology and lexical studies could pave a better way to acknowledge the complexity of interfaces in SST before moving on to analysis.

3.2 Prosodic Phonology: The Phonological units within a word

The field of study which examines the organization of phoneme, Prosodic Phonology, has been extensively applied in phonological investigations. The success of the application is obvious in many studies (Liberman, 1977, Nespor and Vogel, 1986, Pierrehumbert and Nair, 1995, Selkirk, 1980, Selkirk, 1984). One of the significant characteristics of prosodic phonology is the configuration of words as in phonologically ordered hierarchy - from the smallest units to larger constituents nominated by Nespor & Vogel (1986), as in (1).

1)

Phonological units	**Symbols**[13]
Phonological Utterance	(PhU)
Intonational Phrase	(InP)
Phonological Phrase	(Φ)
Clitic Group	(CG)
Phonological Word	(PW)
Foot	(Σ)
Syllable	(σ)

[13] Note that the given symbols are plain versions that do not really take into account the difference in symbolisation notices between Nespor & Vogel (1986) and Nespor & Vogel (1991).

Table 6 The Seven Phonological Units (Nespor and Vogels Prosodic Hierarchy)

The hierarchy consists of seven phonological constituents namely, syllable, foot, phonological word, clitics group, phonological phrase, intonational phrase and phonological utterance. It is believed by some that it comprises an additional component, mora that make up the syllable, which are not be discussed in detail in this study. The first three components are related to lexical words, while the rest are related to the post-lexical level.

Lexical words, which are also known as phonological words, consist of a few domains – mora, syllable and foot. The minimal syllable is expected to be monomoraic or bimoraic. Feet, on the other hand, can be either bimoraic or disyllabic. A well-formed Feet-Word is also recognised as a phonological word and might be realised by a single bimoraic syllable or polysyllable as well. These phonological words form the Clitic Group when they are added with a Clitic, then a phonological phrase, and an Intonational Phrase before reaching its complete form of Phonological Utterance, or what is popularly known as syntactic pattern. Nespor and Vogel's model offers an alternative route to address morphological words[14] within phonological terms.

The Nespor and Vogel model of phonological words has the advantage of manipulating the complexity of interaction within a single domain. According to Hannahs (1995) the theory of Prosodic Phonology, which was earlier visible in Selkirk (1980), and later developed by Nespor & Vogel (1986), and the one that received further revision in (1991) elaborates that the '…prosodic constituents define the domains of application of phonological rules, in the sense that rules are seen to apply within a constituent, at the edge of a constituent, or at the juncture between two constituents (of the same type). All of these rules can therefore be classified as domain span rules, domain limit rules and domain juncture rules, respectively (1995: 3)'. The given model is of importance to the present study which investigates the morphophonological alternations at M-P interfaces with special focus given to the syllable domain.

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[14] In terms of morphology, phonological words refer to all sorts of well-formed derived and inflected forms, including compounds.

Giving an account of the exhaustive nature of the prosodic phonology of Tamil and elaborating the important components of PP is the aim of the present study. We will focus on the first three levels of the phonological constituents and their interactions. Though the present study did not adhere to the requirement of rule orientation instigating interaction, it acknowledges that interaction must be based on domains of the same kind, such as at syllable levels. It is rather interesting to see that the language instigates every effort to preserve the well-formedness of syllable structure or in establishing a harmonic contact between the involved syllables, as has been discussed in Chapter Two. In what follows, the complexity of syllable-wellformedness in Tamil, and its individualities are shown in some detail, but before that there will be some exposure to the phonemic nature of the SST.

3.3. The Phonology of Standard Spoken Tamil

The phonology of Standard Spoken Tamil and that of literary Tamil (henceforth, LT) have some similarities and dissimilarities. The former is known for allowing some flexibility, but the latter is known for inheriting a well-defined set of phonological information which opposes flexibility. The significant differences between both of them have been well-documented in previous studies such as Schiffman (1971a, 1971b, 1979, 1999a, 2000), Kannappar (1999) Ramaswami (1999) Britto (1986), and so on. One may find distinct information on the nature of spoken Tamil in these works.

Among the unsettled disputes in the studies on spoken Tamil, is defining the quantity and quality of the phonemes. This has received overwhelming attention from the scholars. While some scholars have defined the phonemic system of Tamil from the classical grammarians' point of view, others have offered significant insight into the characteristics of the phonemes from the point of view of phonology. However, there has never been a consensus of opinion in defining either the quality or quantity of the phoneme. While offering a cross-check on the nature of these disputes in defining the quantity and the quality of phoneme, the present study also offers its own enumeration of phonemes and classification of the SST spoken in Malaysia.

3.3.1 Phonemes and the Unsettled Disputes

The phonetics of the SST and LT are divided apart acutely. Two charts in (2) and (3) represent the underlying phonemic of Tamil (LT) and the other two represent their surface form (SST). The similarities and the dissimilarities of both varieties are self-evident within the charts.

2) **Table 7 Consonants in Tamil**

	Labial	Labio-dental	Dental	Alveolar	Retroflex	Palatal	Velar	Glottal
Stops		p	t	d			k	
Affricates						c		
Nasals		m	n̪	n	ɳ	ɲ	ŋ	
Laterals				l				
Frictionless Continuant					ɭ	ɻ		
Flaps				r	ɽ			
Fricatives								
Approximants		v w				j		

3) **Table 8 Vowels in Tamil**

	Front	Centre	Back
High	i i:		u u:
Mid	e e:		o o:
Low		a a:	

While Tables (7) and (8) illustrate the phonemic inventory of LT, Tables (9) and (10) illustrate the phonemics of SST, respectively.

4) **Table 9 Consonants of SSTM**

	Labial	Labio-dental	Dental	Alveolar	Retroflex	Palatal	Velar	Glottal
Stops	p b		t t^h d̪	ʈ	d		k g	
Affricates						tʃ		
Nasals	m		n̪	n	ɳ	ɲ	ŋ	
Laterals				l				
Frictionless Continuants					ɭ	ɻ		
Flaps				r				
Fricatives				s				
Approximants		w v				y		ʔ

5) **Table 10 Vowels of SSTM**

	Front	Centre	Back
High	ɪ i:	ʉ	ʊ u:
Mid	ɛ e:	ə	ɔ o:
		ʌ	
Low		a a:	

The tables illustrate the significant differences between underlying and surfacing vowels of the LT and SST. Literary Tamil has 10 vowels, and SST has 15 of them, plus allophones. The number of SST has an enlarged consonant inventory, together with allophones. For example, since voicing is not a distintive feature in Tamil, and the voiced and unvoiced segments are usually represented by the same segments, LT has abandoned their representation. But SST recognises the voiced segments of the obstruent stops as allophones and individually, namely as obstruents, fricatives, their voiced counterparts, nasals, laterals, flaps, and partially voiced continuant allophones of stops and fricatives.

In general the quality and the quantity of LT and SST phonemes differ significantly. The well-recognised enumeration of 30 phonemes within LT is another ongoing dispute. Present day literatures indicate that LT has about 28 underlying phonemes[15] - 18 consonants and 10 vowels on the other hand the phonemic inventory of SST appears larger than that of LT. The inventory of SST phonemes is an enclosure of 26 consonants and 15 vowels.

The dispute surrounding the quantity and quality of the phoneme also revolves around defining the nature of consonants in detail. Most of the present day studies can hardly accept the trilogy classification of phonemes - hard, soft and middle class consonants, which is offered by the grammarians. Instead of that, they have offered detail classification manoeuvres in defining the consonants.

The Vowels

Disputes revolve around whether vowels are centred on their surface and underlying representations. The LT claim is that the language has five short, five long and two diphthongs, but give no proper indication on allophones or surface and underlying differences for vowels. In contrast, the claim of present day literatures is that the language has 10 underlying vowels, but a considerable number of allophones. For example, Christdas (1988) firmly states that LT has 10 underlying vowels - five underlying vowels and five of their tense counterparts, on top of 5 allophones. Devaneya (2001:132) has a different belief. He believes that LT has five underlying long vowels, and their short counterparts are derived forms. Despite the difference in defining the surface and underlying representation of the vowels, these studies have

[15] 'The Tamulians reckon thirty letters, which they call *eluttu*, twelve being vowels, and eighteen are consonants. The call the former *uyir*, and the latter, *mey*, may as if they should say soul and body: vowel is a body without soul. From these letters they form others, which may more truly be called syllables rather than letters, since they are the forms in which vowels are joined to a consonant. Tamulians do not follow the excellent plan of the Europeans to place the vowel after the consonant to form syllables, but they unite the consonant and vowel to form a third figure. And as they have called the vowel the soul, and the consonant the body, they accordingly call these syllables *uyirmey*, as if they should say an animated body (Beshi 1728: 5-6, In Christdas (p126).

accepted that the vowel system of the language is made up of 10 vowels. The present study also accepts that the language has 10 underlying vowels and two diphthongs.

The surface representation of the vowels is also under dispute. Tamil has a dozen vowel segments: five short vowels */a, e, i, o, u*/, and another five long counterparts, */a:, e:, :i, o:, u:*/ which are also known as long vowels and two diphthongs. The /i/ and /u/, for example, are known for having the following allophones /ɪ/ and /ʉ/, respectively; the low-middle /a/ usually surfaces as non-low, /ʌ/ and /ə/[16] in non initial positions; the /e/ uttered as /ɛ/ everywhere except, in the word initial positions.

However, the number of diphthongs shows increment. Kothandaraman (1996) believes that there are least five diphthongs, /*ai/, /au/, /ae/, /ei/* and */oi*/ having recurrent application in LT. Though SST's native lexicon seems to rebut newer forms of diphthongs, loan words appear to be hosting a wide range of diphthong applications. The vowel system of the SST is both rigorous and extended in comparison to LT, in terms of the quality and the quantity of the segments concerned.

The Consonants

Arguments revolving around the consonants are rather interesting. The multi-faceted disputes range from a disagreement in accepting the quantity to the quality of the sound segments and their presence in the inventory. These will be examined one at a time.

Most of the present day studies do not accept the quantity of the surfacing consonants of spoken Tamil. Unlike the 'nearly' harmonic consensus reached for the vowel inventory, studies have offered different enumerations of consonants from one dialect to another. For example, Keane (2004b) illustrated that a non-Brahmin dialect of Chennai has (21) phonemes (including allophones), while Kothandaraman (Kothandaraman, 1999a) speculated that the language has 30 of them. Badriraju (2003: 60-63) proposed 33 of them, and Christdas (Christdas, 1988) demonstrated 35 phonemes in all. The phonemic

[16] Keane (2004) shows that the the low-middle /a/ usually surfaces as non-low /ɛ/, as well.

differences shown by these studies are in fact determined by the nature of the concerned dialect.

The existence of retroflex phonemes within the phonemic inventory of SST is another aspect that merits some explanation. Schiffman (Schiffman, 1971a: 2) who studied the *Madurai* dialect/slang claims that the dialect has five stops /p/, /t/, /T/, /c/, /k/ and voiced lax variants, in respective order, *[b (v)], [d (d)],[D], [s, (j)), [g, h]*, which occur intervocalically (capital letter sounds are referred to as retroflex sounds). The sixth stop, alveolar retroflex /R/ is an underlying segment, which does not surface in rapid speech; hence, this segment is written either as /r/ intervocalically or as /*tt/* when doubled, claims Schiffman. His observation seems to be factual for colloquial Tamil spoken in Madurai.

It is rather interesting to note that the existence of retroflex is not an issue for SST in Malaysia. The phoneme does appear in SST, as speakers seem to be highly concerned in producing the phoneme. The difference between the rhotic /r/ and retroflex rhotic is apparent in SST. Hence, it can be concluded that the alveolar trill /r̪/ presents at both levels, phonemic and phonetic.

Argument also persists against confirmation of the quantity of nasal segments in spoken Tamil. LT proposes six distinguished nasals, as we can see in Table 8, which are homorganic to obstruent stops. In contrast with this view, the phonemic chart given by Keane (2004a) is an observation on Madurai slang which indicates the existence of five nasals. The engma is not present in the chart. Schiffman (1971:2), who also notes the existence of five nasals; */m, n, n, ɲ and ŋ/*, clarifies that the Madurai dialect does not have alveolar /n/. Schiffman claims that native speakers did not show serious interest in maintaining the differences between the alveolar */n/* and the alveolar ridge */N/.* It is rather interesting to note that the two observations made on the same dialect proposed two different findings. Nevertheless, SSTM shows a different perspective, where most of the speakers, especially the educated, observed the differences among the nasals in their rapid speech to articulate the semantic differences. Standard Spoken Tamil in Malaysia has 6 nasals, altogether.

Another consonantal segment which sustains the same defective interpretation is laterals. Schiffman states that only educated speakers were aware of the differences

(1999a: 3) between triplet lateral forms found in the language and practice them distinctly. However, most ordinary speakers are not aware of the distinction between the three lateral sounds /l, ɭ and ɻ/. Though his findings are beyond the debate of this study, the data from SST clearly rebut it, where the majority of the speakers appeared to preserve the differences clearly.[17]

The system of marginal sounds is another aspect of the phonology of SSTM that warrants some attention. The Marginal Sounds (MS) are borrowed sounds - received from either Sanskrit or other Indo-Aryan languages, along with their loan words. The fricative /s/, labio-dental /f/, labio-velar /v/, glottal /h/, retroflex /sh/ and so on are a few of the sounds that are popularly accepted in present day Tamil within the context of borrowing terms. We find all of these sounds in SST, application of which is minimal.

3.4. The Phonemes of SST in Malaysia (SSTM)

The characteristics of the phonemes that are found within standard spoken Tamil are described next.

3.4.1 Vowels

The standard spoken Tamil in Malaysia has a simple vowel system. It has five short vowels /a, e, i, o, u/, and five long counterparts, /a:, e:, i:, o:, u:/: These vowels tend to surface differently in rapid speech; the /i/ and /u/ have the allophones of /ɪ/ and /ʉ/, respectively. The low-mid /a/ usually surfaces as non-low, /ʌ/ and /ə/[18] in non-initial positions; the /*e*/ surfaces as /ɛ/ and /ə/ everywhere except in word initial positions. On top of this, SST also has the two diphthongs /ai/ and /au/, where the former has a recurrent application compared to the latter. The vowel system of SST in Malaysia is less rigorous compared to that used elsewhere as has been indicated in previous works.

[17] Nevertheless, we are in an unfortunate position to verify the educational level or the exposure of Tamil education of the speakers. Undoubtedly, those who have had educational exposure to Tamil could maintain the differences of the three laterals the differences, not those who have no educational exposure to Tamil, seemingly.
[18] Keane (2004) shows that the low-middle /a/ usually surfaces as non-low /ɛ/, as well.

3.4.2 Consonants

Classification of consonants can be done in a few ways. The following are common: place of articulation, manner, and voice or voiceless. Among the given choices, the first two options were proven to be effective in learning their behavior contribution in morphophonology. Since voice is not a distinctive feature of stops in this language, they have been rebutted. We will see how these segments could be classified into effective major classes based on similarities of manner rather than distinctive features, as the former seem to make significant contribution in defining the triggering and blocking effects within M-P interfaces.

Labials

SST has three labial sounds [p, b, m], with unrestrictive applications. The [p] is voiceless, its allophone [b], and nasal labial [m] are voiced segments. The nasal is homorganic to bilabial obstruents. Since voice is not a distinctive feature in Tamil, applying the voiced or voiceless obstruent is not fixed but varies from one speaker to another. The data reveals some cases of mixed application, such as the voiced [b] for voiceless [p] on occasion. Because the changes do not make any semantic distinction, the language tolerates the interchangeability. Among the bilabial sound segments, the bilabial [m] is a significant segment that creates a range of morphophonological changes.

Labio-dentals

Standard Spoken Tamil has three labio-dental sounds, namely the /v/, /w/ and /f/. The [v], which is known as glide more popular in literary Tamil, is also addressed as a labio-dental approximant and a frictionless continuant in various accounts of Tamil phonology (Firth, 1934). The /v/ and /w/ occur in complementary forms, emergence of which is decided by the speakers who hardly show a consistent form of application. The speakers who have had exposure to Tamil education appear to maintain the sharp difference, and prefer to apply the /v/ alone; those who are not exposed to Tamil education prefer otherwise. Nevertheless, the glide /w/ is usually applied within borrowed terms, but not in native terms in SST by both types of speakers.

Palatals

Palatal sounds, such as /c, j, s, and ɲ/, are sounds that are articulated from a region covering the hard palate to post velar region. These sounds have specific recognition in the phonology of Tamil. All of these palatal sounds have been represented by a single segment, /c/, and the nasal is by homorganic nasal /ɲ/ in LT. The other two palatal sounds, /j and /s/, which are common in SST are often treated as marginal sounds to that of the native sound. Vasanthakumari (1989) and Christdas (1988) believe that the /c and j/ sound more like palatal obstruents than fricatives, as in English. The present study also assumes them as palatal segments.

Velars

SST has four velaric sounds, /k, g, x, and ŋ/, produced by contact between the back of the tongue and the velar. The /k, g, h/ are allophones of /k/, and all of these sounds appear in complementary forms. Among them /g/ and /ŋ/ are voiced and the rest are voiceless segments.

The Dentals – [t, n̪]

The [t] and [n̪] are dental sounds in SST, and [t^h] is its allophones. These segments are produced when the tip of the tongue touches the upper teeth. Among the two, the nasal is voiced and the obstruent is voiceless. These segments are also addressed as laminal sounds.

Alveolars

The number of alveolar segments found in the inventory of SST is larger than that of LT. SST lists the followings [d, ɳ, s, n, l, ɻ, ɭ, r, ɽ], as alveolar. All of them are voiced, except for /r/ and /s/. The list consists of stops, nasals, fricative and liquids.

Scholars generally believe that Tamil has an extraordinary list of liquids whose existence is heavily subject to disagreement. Donough and Johnson (1997), for instance, confirm that Tamil has an extraordinary list of five liquids two rhotics - a tap and a trill, two laterals – plain and retroflex, and a liquid that is described as both – rhotics and lateral (approximant rhotics), which have been addressed as retroflex approximants in this thesis (Alageesan, 1997, Arden, 1976, Christdas, 1988, Dass, 2005b, Kothandaraman, 1999a, Rajaram, 1980). However, a few studies, such as, Schiffman (1999a) and Zvelebil (1970) rebut the claim that these are two independent segments on the premise that phonetically there are no distinctions between two r-sounds; yet, Tamil uses two different orthographic systems to represent both differently. In support of this view, Christdas (Christdas, 1988: 131) established through 'experimental evidences' that though, [ɽ] is more retracted than the [r] in rapid speech, these segments did not show a significant difference in terms of duration and amplitude'. Nevertheless, as we have seen before, both segments do appear in SST, and they are accepted as two significant sound segments.

The true consonants of SST have been grouped in the following way. Segments have been regrouped as obstruents, nasals, glides and liquids as in (6), for the similarity in place of articulation and the manner of pronunciation. It should be remembered that the same sound segments have been addressed as Labial, Labio-dental, Dental, Alveolar, Palatal and Velar in the section on Phonetics. But, a different mode of classification has been adopted which will be used for referral purposes.

6)	Labials	[p, b, m]
	Labio-dentals	[v, w, f]
	Dentals	[t, t^h, d̪, n̪,]
	Alveolars	[d, n, ɽ, ɳ, y, r, l, ɭ, ɻ]
	Palatals	[c, j, s, ɲ]
	Velars	[k, g, ŋ]
	Glottals	[ʔ]

In terms of manner, all true consonants such as obstruents, nasals, glides and liquids are distinguished as follows.

7)	Stops	[p, b, t, d̪, t^h, t, d, ɽ, k, g]
	Affricates	[c, j]
	Nasals	[m, n̪, n, ɳ, ɲ, ŋ]
	Laterals	[l]
	Frictionless Continuants	[ɭ, ɻ]

Flaps	[r]
Fricatives	[s]
Glide Approximants	[v, w, y]

To be specific, all of these segments can also be put into a few major groups. As indicated in chart (8), these sound segments have been put into some convenient groups by assigning one of the following features; [consonants], [sonorants], [nasals], [+cons, liquids], [continuants] and [syllabics].

8) **Sounds**	**Segments**	**Major classes**
Stops	[p, b, t, d̪, t^h, t, d, c, j, s, ɽ, k, g]	[+cons, -son]
Nasals	[m, n̪, n, ɳ, ɲ, ŋ]	[+cons, +son, + nasal]
Liquids	[l, ɭ, ɻ, r]	[+cons, +son, + Liq]
Fricatives	[s]	[+cons, + continuants]
Glides Approximants	[v, w, y]	[-syllabic, -consonantal]

The obstruents or stops, for example, were distinguishable from other stops by [sonorant]. In other words they are distinguishable from stops [p, b, t, t^h, d, ɽ, k, g] by [+consonants] and [-sonorant] from other sound segments. Features such as [+consonant] and [+sonorant] may distinguish the nasals, [m, n̪, n, n, ɲ, ŋ], and liquids which comprise Lateral [l], Frictionless Continuants [ɭ, ɻ], Flap [r]. The minute differences between nasals and liquids were established by [+nasal] and [+liquid] features. The fricatives [s] were distinguished from other consonants with the features [+consonant] and [+continuant].

3.4.3 Allophones of the Obstruents

Literary Tamil did not acknowledge the existence of allophones for obstruents within its phonemic inventory. Nevertheless, present day phonology studies such as Kothandaraman (1997:4-6), Christdas (Christdas, 1988) and Krishnamurthy (2003) have verified the existence of these secondary sound segments within LT and SST though for an unknown reason LT has obscured them.

The following are the allophone distribution of SST in general and SSTM in particular. Kothandaraman (1999a) believes that the bilabial voiceless stop /p/ has three complementary allophones, voiceless [p], voiced [b] and fricative [ɸ]; however, the last allophone is not found in SSTM. When the voiceless bilabial /p/ appears at word initially, in gemination and when preceded by /d/ and /ɽ/ as shown by the examples, [*pʌɭəm*] 'fruit', [*tʌppʉ*] 'wrong', [*vədpəm*] 'hot' and [*kʌɽpʉ*] 'chastity' it becomes voiced [b] when preceded by a nasal – [*kʌmpʉ*] 'stick' and [*ʌnpər*] 'dear'. The bilabial fricative is believed to exist between in intervocalic environments, as in the following, [*cʌɸəɪ*] 'assembly', [*tɔdərɸʉ*] 'connection' and [*ɪyəlɸʉ*] 'natural'. This is not common in SST which is widely spoken in Malaysia.

The dental voiceless stop /t/ has three allophones, also; voiceless stop [t], voiced [d] and dental fricative [θ]. The voiceless [t] emerges at word initially and geminate positions, while the voiced [d̪] emerges whenever it is preceded by a nasal. In intervocalic environments, it is realised as lenited [t]. In short, the allophone distributions of voiceless /t/ are;

9) i. voiceless [t] word initially, as in [*ta:m*] 'self' and gemination, [*kʊttʉ*] 'punch'
ii. voiced [d̪] whenever preceded by nasals, as in [*ʊn̪tʉ*] 'try' and [*pʌn̪ti*] 'join'
iii. aspirated [t] in intervocalic positions as in [*mʊppʌtʉ*] 'thirty' and [*vʌyʌtʉ*] 'age'

The post-dental voiced stop, /ɽ/ which is also known as retroflex rhotic /ɽ/ did not have any variations. Some of scholars as we saw previously have doubted its existence. They believe that it does not exist in the productive phonology of language, but in the mental lexicon. The SST renders a different view - it exists in both levels without any variations.

The retroflex voiced /d/ in SSTM also has no allophones. Yet, Kothandaraman (1999a) predicted that it is a voiceless segment and it has four allophones, as follows; i) when geminated and followed by another stop, it is pronounced as itself [d], as in [*tʌddʉ*] 'plate' [*vədpəm*] 'warm'; ii) when preceded by a nasal, it sustains full voice release, as in [*tʌɳdʉ*] 'stem' and [*cəɳdʉ*] 'bouquet'; iii) when followed by vowels intervocalically, it sounds like [r], as in [*pʌdəm*] 'picture' and [*mʌɽəm*] 'heroism'; and lastly, iv) it may be freely pronounced as [ɽ] in the positions belonging to [d]. Though the first two options seemed to be practical suggestions, the last three have no grounds in SST. The former did not show significant release differences in SSTM. Therefore, SSTM receives retroflex voiceless /d/ as a voiced segment with no allophonic variations.

The velar voiceless stop /k/ has three allophones, i.e: [k], [g] and [k^h]. The voiceless velar exists in the context of geminates, as in [*ca:kkʉ*] 'sack', and when the segment is followed by coronal /ɽ/, as in [*kʌɽgəɭ*] 'stones'. Whenever a nasal precedes a voiceless velar, it is pronounced as a voiced velar [g], as in [*tʌŋgəɪ*] 'young sister. In intervocalic positions it is realised as aspirated velar [k^h], as in [*vʌɪk^hə*ɪ] 'name of the river' and [*vəlk^hə*] 'may win'.

The palatal voiceless fricative /c/ has three allophones: [c], [j] and [s], as well. The fricative /c/ retains its sound when it geminates or is followed by another stop, as in the following, [*pʌctʃəɪ*] 'green' and [*kʌdtʃɪ*] 'party'. If the sound segment is preceded by a nasal, it is voiced, [j], as in [*ʌɲcʉ*] 'five' and [*pʌɲjʉ*] 'cotton', and the [s] emerges at several positions word initially, intervocalically, as in, [*se:y*] 'children', and [*pa:səm*] 'love'.

The primary description of phonemes that has been introduced here will be used wisely within the chapter whenever it is necessary. Having seen the distribution of the allophones of SST, we will now see how these sound segments are brought together to form minimal sound blocks, syllables, word classes, and their prosodic characteristics.

3.5 The Syllable

A syllable is composed of two components, onsets and rhymes. The onset and the first component of the rhyme, which consists of a peak and/or a consonant, are obligatory elements. Universally, a syllable ending with an obligatory vowel is assumed to be more harmonic compared to a syllable ending with a coda. Therefore, some languages avoid syllables ending with coda.

However, languages like Tamil neither prefer nor reject marginal segments. The language has both types of syllables, the open syllable (CV), and the closed (CVC). It allows nothing other than vowels as nuclei, unlike languages like the English language which allows nasals and liquids as nucleus (Davenport and Hannahs, 2005:15).

The integrity of sound organisation has been addressed in a number of ways in the previous phonological literatures. Rhyme Theory (Selkirk, 1984), timing slot organisation (Lanvin (1986), C's and V's theory (Bell and Bybee, 1978, Clements and Keyser, 1983), and so on are just a few which assume that syllables are organised in minimal sound blocks. Since the present chapter is not arguing for the theoretical disputes which revolve around syllable organisations, it holds on no theories. The present exercise aims to identify the syllable-input constraints of SST, on the assumption that syllables are properly organised minimal sound blocks that share some universal gradient properties with slight language specific preferences.

3.5.1 Syllables in Tamil[19]

The stops have a distinctive appearance in Tamil. They are preferred at word-initial onset positions rather than at word-final coda positions, but at word-internal positions they have no restrictions. The inherent restriction is believed to offer the language a well-secured premise to form harmonic syllables with less complexity, in terms of the Sonority Dispersion Principle (Clements, 1988). The restriction at the coda positions also favours the language avoiding unnecessary conflicts with adjacent syllable constituents. In a language such as Tamil which never violates the principles of syllable contact, such a restriction is paramount.

Syllables are probably one of the most familiar phonological terms for Tamil. The primary phonological system of the language is divided into a basic system of CV syllables, which is believed to have around 216 basic syllabic forms, CV. Though, there were no comprehensive syllable descriptions available in pre-modern grammar texts, present-day grammar texts such as, Krishnamurthy (2003: 60-63), Vasanthakumari

[19] Among the numerous MP studies covering various ages and theories found on Tamil, it is hard to point an influential study highlighting the prominent role of syllables in MP, says Krishamuthi (2003: 60-63) and Ramanujan (1962). As we will see in Chapter 5 on Coda/Onset Asymmetries and Chapter 6 on Syllable Well-formedness and Repairing Strategies, demands of syllabification directly involved in strategizing MP processes but not anything else. The influence of phonetics in MP is relatively limited. Avoiding such an important phonotactic device in giving a proper generalization to MP related issues is one of the main reasons causing 'uncertainty' in MP of Tamil. An alternative approach as the present study will pay rightful interest to syllable related issues in the MP of Tamil.

(1989), Christdas (1988), Kothandaraman (1999a), and Subramaniom (2003: 23-24) have made a considerable contribution on syllables, confirming that the language has no individualistic requirement in patterning its syllable constituents, though universal requirements of the syllables are not accepted per se.

The syllable system of Tamil is simple and flexible, (C) V (C) (C) [C: consonant, V: Vowel (V: short vowel, v: long vowel)]. Although, the CV is an essential pattern, the language has never forbidden other patterns. The exact number of syllables found in the language is still an ongoing topic of dispute. Christdas (1988: 211) assumes that it has only six core syllables, as in (10).

10) a. CV V
b. CVC VC
c. CVCC VCC
(The V includes short and long or geminate vowels[20])

Kothandaraman (1999a: 17-18) believes that it has 12 different types of syllable patterns, a prediction which appears to be an extended version of syllable patterns given by Christdas. Subramaniom (2003) lists 14 types of syllable patterns, adding two types of additional syllables to those covered by Kothandaraman.

The extended version of syllable forms given by Kothandaraman is advantageous for the present study, for it represents every syllable pattern found in SST. However, all of them have been grouped into four sub-classes - Onset-less, Onset, Coda and Complex Coda syllables, within two general syllable classes: i.e., a group of open syllables or closed syllables for the convenience of the present study.

11) I. Open syllables
i. Onset-less syllables

a. v	ʌ-tʊ	‘that’
b. v:	a:	‘cow’
c. vc	uɭ	‘inside’
d. v:c	a:l	‘banyan’

[20] Because there were no earlier references made on Tamil geminate vowels, the introduction of geminated vowels by Christdas created a lot of expectations. However, questions on the actual phonological properties of geminate vowels remained unanswered, as Christdas did not elaborate further on this concept. It is unfortunate because the present study also is unable to elaborate on this matter.

ii. Onset syllables

a. cv	tə-rʊ	'street'
b. cv:	pu:	'flower'

II. Closed syllables

iii. Coda syllables

a. cvc	pʌl	'tooth'
b. cv:c	pa:l	'milk'
c. vc	əɭ	'inside'
d. v:c	a:l	'banyan tree'

iv. Complex Coda syllables

a. cv: cc	va:k-kəɪ	'life'
b. *[21]vcc	e:yp.pʉ	'weariness'
c. v:cc	i:rp.pʉ	'attraction'
e. cvcc	mɔym.pʉ	'strength'

(C) V (C) (C) [C: consonant, V: Vowel (V: short vowel, v: long vowel)]

The following examples show the practical suitability of syllable structures within different types of phonological words.

12)

i. Monosyllabic words

a. Open ended syllable

a: 'cow'

ma: 'animal

b. Closed syllable

ʌl 'no' close gap below

a:l 'banyan tree'

pʌl 'teeth'

pa:l 'milk'

ii. Disyllabic words

a. Open ended syllable

tərʊ 'street'

b. Closed syllable

pak^{h}əl 'morning'

ʊɭɭəm 'soul'

pʌkkə̃m 'side'

va:ykka:l 'drain'

[21] This type of syllable structure is not common in present-day Tamil.

iii. Polysyllabic words

a. Open ended syllable
ilamai 'young'

b. Closed syllable
ka:rtıke:yə̃n 'name'

The foregoing illustration clarifies how syllables form word patterns, but not the compelling factors enforcing morphophonological alternation. Explaining the compelling needs is the task of the following section.

3.6 Syllable Constraints

This section introduces the structural constraints responsible for preserving the well-formedness of syllables in the language. The description has been limited to four types of syllables described in (11). In the description emphasis has been given to the classifications of open and closed syllable forms, as each of them generates different morphophonological reactions when they come across other sound segments at the interfaces. Special care has also been given to morphological differences.

The behaviour of open-ended monosyllabic words at interfaces differs from other types of syllables. The language has an open-ended monosyllabic word, in the form of V:. When these monosyllabic words, such as in (13) are applied as stem, the places marked with (x) places were filled with coda that share the same place of articulation with the onset automatically in order to ensure that the syllable is closed and maintain structural harmony.

13) Open ended monosyllabic words
a:(x) - kaɭ > a:kkəɭ
cow-s *cows*
ma:(x) - kaɭ > ma:kkəɭ '
cow-s *cows*

A geminate is supplied to fill the sonority gap between the open-ended monosyllable stem and the voiceless obstruent suffix which is followed by a vowel in an economic manner.

The behaviour of monosyllabic words with closed syllables also shows interesting phonological behaviour at interfaces. There are two types of such forms found in the language: CVC and CV:C. Monosyllabic words of CVC pattern usually ensure the final coda is geminated, and supply an onset to avoid *Onsetless constraints, highly dominated in Tamil, whenever they are followed by vowel initial suffix or morphological words. Meanwhile, if the affixes are suffixes or lexical words with onset, the structure requires harmonic syllable contact between two components, which is achieved in a variety of ways. The gemination and alternation, in (14) are two such prominent reactions.

14) i. Interaction between monosyllabic words with closed syllables and Onsetless affixes

al-a >	ʌllə
no-nom marker	*no*
pal- ai >	pʌlləɪ
teeth-acc	*teeth-acc*
kaɳ – a:l >	kʌɳɳa:l
eye –instr	*eye –instr*

ii. Interaction between monosyllabic words with closed syllables and Onset affixes

pal- kaɭ >	pʌɽgəɭ
teeth-s	*tooth*
ka:r - kaɭ >	ka:rkəɭ
car-s	*cars*

iii. Interaction between monosyllabic words with open and closed syllables and Onset and Onsetless affixes

a:l-kaɭ >	a:lk^{h}əɭ
banyan-s	*banyans*
pa:l- ai >	pa:ləɪ
milk-acc.	*Milk-acc*
ka:r -kaɭ >	ka:rk^{h}əɭ
car-s	*cars*

The last set of the examples in (14.iii) has exceptional forms which did not undergo any phonological changes.

The second set of words, disyllabic words with open and closed syllables, also exhibit significant phonological behaviour. The disyllabic words are divided into four types in Tamil; CVCV, CV:CV, CVCV: and CV:CV:. Out of all these, disyllabic words ending with short open-ended syllables constantly show significant phonotactic retention as opposed to others. Whenever the stem consists of two short syllables, CVCV or CV:CV, attached to the onset initial structure, the onset geminates.

15) Disyllabic words of CVCV or CV:CV forms

teru - kaɭ > tərʊkkəɭ
street-s *streets*
paru-kaɭ > pʌrʊkkəɭ
mark-s *marks*

Not only the data in (14), but also those in (15) having onset initial suffix, displayed similar reactions, surfacing of geminate /k/. These are precursor examples representing a handful of examples which show how the voiceless Onset in intervocalic environments: geminates emerge to ensure the preceding syllables are closed and to establish harmonic contact between the onset and the final component of the succeeding syllable.

Voiceless stops at intervocalic positions create different phonological necessities. Phonologically, intervocalic environments are assumed to be an exclusive environment which may cause some phonologically challenging outcomes. Cross-linguistically, intervocalic positions are treated as weak (Donough and Johnson, 1997). Mohanan (1993: 62) stresses that inherently weakened stop segments weaken further when they occupy intervocalic positions. The stop segments usually geminate to fortify their stronghold positions. This exclusive strategy is common in Malayalam and most other languages across the world.

Morphophonemic constraints in Tamil offer some delightful information to acknowledge the status of intervocalic environments. It is believed that Tamil has fortis and lenis stops which have complementary distribution; initial stops are fortis while those in post-vocalic positions are lenis (Zvelebil 1970, Fowler, 1970). Segments at intervocalic positions in Dravidian languages and Tamil in particular are considered a position of lenition 'weakened occlusion' and voicing, claim Donough and Johnson (1997). Many scholars consider the fundamental stop opposition to be tense-lax rather than voiced and voiceless- because of the intervocalic lenition and the development of double consonant (Christdas, 1988, Lisker 1958, Zvelebil, 1970). The lenition exercise is also known as Caldwell Law (Christdas, 1988). It must be stressed that length distinction is a crucial factor keeping them apart, where the fortis is known for its singleton presence while the latter is known for lengthened appearance. The morphophonemics of Tamil has treated the geminated and non-geminated stops as nothing more than fortis and lenis.

Sound segments within intervocalic positions, which are universally known as weak positions (Mohanan, 1993:62), instigate various phonological reactions to protect their existence. When these environments are filled by weaker segments, the intensity of the reactions are further enhanced, as in the example in (15). Voiceless obstruents, in particular, that fall within the trap of intervocalic positions create severe reactions against the weakened positions regardless of the type of lexical or the syllable quantity. The voiced and voiceless stops at intervocalic environments are prefect examples in evaluating intensity in intervocalic environments, where they are forced to geminate and strengthen their existence, almost by nature.

The significant correlation between stops and intervocalic environments therefore must be formalised properly. The vulnerable position generating such systematic gemination is transformed into a special form of LCC constraint, as follows.

16) DERIVE-GEMINATE (DERGEM)
[[VOICELESS-STOP] & [INTERVOCALIC-ENVIRONMENT]]$_{\text{INTERFACE}}$ /(*VÇ̥V))
Voiceless stop in intervocalic position derives a geminate

This LCC protects the existence of voiceless stops in intervocalic environments, where it generates a geminate of its kind.[22]

The last type of example, the polysyllabic words, behaves almost in a similar way to what has been discussed in the foregoing. The reactions experienced by the polysyllabic words are determined by word-final syllable structures, either open or closed.

3.6.1 Licensing Onset and Coda Positional Values

Morphophonological processes and their effect at interfaces are conditioned by various linguistic factors. The coda and onset are among the influential factors. Evidence supporting the claim that Tamil manipulates the integrity of onset and coda maximally to achieve contact harmonic between the relevant syllable components are abundant. This claim will be supported by the analysis chapters. As the majority of the

[22] It is common to see some stops in intervocalic environments lenited as well. The present study did not account for such changes which are motivated by phonetic requirements at large.

morphophonological processes in SSTM are either influenced or controlled by the phonological nature of the coda and onset, it becomes vital to understand the order of their characteristics.

Onset-less Syllables

Four types of onset-less syllables are found in Tamil.

17) Onset-less syllables

a. v	ʌtʊ	‘that’
b. v:	a:	‘cow’
c. vc	ʊɭ	‘inside’
d. v:c	a:l	‘banyan’

Onset-less syllables are found in two forms - with and without coda. Only selective vowels, as listed in (18), are freely allowed in prominent positions: vowels other than that are blocked from prominent positions.

18) Onset-less syllables

a. v	b. v:	c. vc	d. v:c
a-tʊ ‘that’	a: ‘cow’	ʌl ‘no’	a:l ‘banyan’
ɪ-tʊ ‘this’	i: ‘fly’	ɪl ‘house’	i:r ‘dandruff’
ʊ-və̃n ‘a person	u: ‘flash’	uɭ ‘inside’	u:r ‘village’
in between there	e: ‘arrow’	əɭ ‘sesame’	e:r ‘plough machine’
and here’	ʌɪ ‘five’	ɔl ‘follow’	aim ‘five’
	o: ‘exclamation’		o:r ‘one’

The SSTM prefers all word-internal syllables to begin with onset, but nothing else. The onset-less syllables are allowed at word-initial syllables $V_{\sigma}]^{\text{word Initial}}$, alone. An onset-less syllable emerging within a word level as a result of morpheme conjunction is immediately supplied with an epenthesis to level structural ill-formedness. The following are the essential constraints, guarding the flexibility of onsetless syllables notified in (18).

19) $V_{\sigma}]^{\text{word Initial}}$
Onset-less syllables must not occur elsewhere other than in word-initial positions

20) $V_{\sigma(\mu\mu)}]^{\text{word InitialI}}$
An initial syllable with two moras forms a minimal word class

21) $*V_{\sigma}]^{\text{Word Medial}}$
Word medially and finally onset-less syllables are banned

22) $[\text{NUCLEUS}_{[\sigma/\text{Full Vowel}]}]^{\text{word Initial}}$ $([\text{NUC}_{[\sigma/\text{Full Vowel}]}]^{\text{word Initial}})$
Word initial syllable vowels must be in full degree

These four constraints suffice to cover the flexibility and the restriction of onset-less syllables in this language.

Diphthongs

SSTM has two surplus diphthongs that received phonemic treatment for a long time within Tamil. Present day Tamil, however, appears to have more than two diphthongs. Kothandaraman (1999a) discovered five additional diphthongs that are commonly applied in Tamil loan words. Standard Spoken Tamil shows recurring application of two classical diphthongs but not the new discoveries.

The diphthongs in SSTM have an exclusive role to play. The two diphthongs, /ai/ and /au/ with following featural order, $[V^{-High}V^{+High}]$, are retained at initial syllable, but not within the word medial and final syllable. While both of the diphthongs retain their full length of duration as /ai and au/ at word initial syllable, elsewhere they are pronounced with reduced duration and monophthongised, reduced diphthong and de-diphthongised as well. This practical alternation pattern resembles the syllable pattern of the Carib language (Grimes-Lg of the Guianasa, p38ff, In, de Lacy, 2004).

Onset Syllables and Positional Faithfulness

Onset is one of the priority syllable forms in Tamil. Tamil has two types of onsets: open syllable (CV), and closed syllable form, (CVC). Onset-less syllables are restricted to word-initial positions, while other positions are strictly endorsed for onset template syllables. How SSTM has utilized the credibility of the last function, modifying the morphophonological pattern will be shown next.

The priority assigning exercise is referred to as licensing of positional faithfulness, according to Beckman (1997). When segments are conditioned with particular platial ability, they obtain credibility to control a number of phonological activities as opposed to other segments. The credit includes controlling the rhythmic pattern, helping in moraic assessment, modifying the morphophonological pattern and so on.

In short, it is obligatory for all word-medial and word-final syllables to have an onset in Tamil. SSTM also shows the same form of restrictions and the flexibility, which can be accounted for within the form of OT constraints as follows:

23) [ONSET $^{\text{Medial/Final}}$
Word Medial or Final syllable must be an onset

The onsets have another restriction, where SST only allows selective consonants at the three prominent positions; word initial, medial and final. Of the eighteen consonants, four obstruents, namely bilabial /p/, dental /t/, palatal /c/ and velar /k/; four nasals, namely bilabial /m/, dental /n/, palatal /ɲ/ and velar /ŋ/; and, two glides namely palato-velar /y/ and labio-dental /v/ are assigned as onsets. Obstruents such as, retroflex rhotic /ʈ/ and alveolar /d/, nasals such as alveolar /n/ and retroflex nasal /ɳ/, and most of the liquids such as /r, l, ɭ, ɻ/ are disallowed in these positions. However, all of these consonants enjoy unrestricted occurrence flexibility at word medial and word-final syllable positions.

It seems that the phonological words of SST's inherent natural protection forbid sonorous segments from occupying prominent positions. Though selective nasals are chosen for the prominent positions, the nasals are ensured to have a significant similarity to obstruents in terms of place of articulation. Nasals have none - homogeneity is avoided at word-initial positions. In a word, it is obvious that SSTM allows non-coronal obstruents, homorganic and glides to fill a word-initial onset position, but disallows coronal obstruents and their homorganic and laterals and liquids.

Onset Constraints

SSTM has two prevailing onset constraints. One ensures the onset is preserved against the prominence of coda, while the other restricts the coronal obstruents from occupying prominent positions. The language specific obligations can be represented by the following constraints: ONSET-MAX and *ONSET [+CORONAL LIQUIDS].

24) ONSET-MAXIMISATION (ONSMAX)
Onset consonants in Output must be represented in Input

25) *ONSET[+CORONAL LIQUIDS]
Coronal segments should not be licensed as onset

The priority of the constraints can be attested to in a tableau as follows:

26)

Input: /laddu/	*ONSET[+CORONAL LIQUIDS]	IDENT-PLACE
☞ a. ilʌddʊ		*
b. lʌddʊ	*!	

Candidate (b) lost the competition for having a coronal onset, and violates *ONSET[+CORONALS LIQUID], while this requirement is satisfied by the winner, Candidate (a), supporting the claim that the language does not favour coronal liquids at prominent positions.

Likewise, the ONSET-MAX is also a dominant constraint in SSTM. It eliminates other onsets unfavoured choice of candidates. For instance, when a V:C initial suffix is attached to a disyllabic with a closed syllable, as in (27), the language prefers the coda to be maximised as onset, in favour of ONSET-MAX. It needs to be stressed that the language allows onsetless syllables preferably as word-initial syllables, but onset syllables are preferred elsewhere.

27)

Input: /avan-a:l/	ONSET-MAX	*V:C
☞a. ʌ.və.na:l		*
b. ʌ.vən.a:l	*!	*

The results reveal the language preference that the coda must be syllabified as the onset of the succeeding vowel whenever it is necessary.

3.6.2 Coda Syllables

Coda, the marginal consonant segments occupying the final position of a syllable, is known for its low profile acceptance and less-imperative functional roles. In OT Phonology, codas are hailed as markedness positions; therefore, the place feature of codas is usually conditioned according to the onset. However, the functional role of the coda segments differs from one language to another. For instance, compared to codas in word final positions in Dutch and English, the former does not allow voiced coda in a word final position while the latter does. Although, coda restriction found in Tamil imitates the universal behaviour of codas, it does not display radical restrictions as in the case of Dutch and English. The coda syllable distribution system of Tamil is simple.

Distribution of coda syllables differs on the line of positions within a word. The characteristics of syllable codas within word-initial (WI), word-medial (WM) and word-final (WF) positions differ significantly from one another. Though all consonants are allowed to occupy coda in WI and WM positions, only sonorous segments are allowed at WF coda positions.

SST prefers a selected number of consonants at three different coda positions within words. All consonants are allowed freely within word-medial positions. Two consonants, rhotic /r/ and retroflex approximant, /ɻ/ are banned from word initial syllable positions. Out of the 18 consonants, only sonorous consonants, such as nasal, /n, n, m/ (3), liquids /l, ɭ, ɻ, r/ (4) and glides /y/ (1). This pre-set distribution of coda is an essential input in flavouring the interface environments with various phonological inconsistencies.

In short, it is not clear why the language has restricted all voiceless segments with complete unreleased capacity from occurring within word-final coda positions, but only prefers voiced sonorous segments in these positions.

28) Word Initial Coda (WIC)		: all consonants except, /r/ and /ɻ/
Word Medial Coda (WMC)		: all consonants
Word Final Coda (WFC)		: selected nasals (n, n, m)
		: all laterals /l, ɭ, ɻ/ (3)
		: Liquids /r/ (1)
		: Glide (y)
		: no stops

Word Initial Syllable Coda

The WIC position is filled by all consonants, except for two, rhotic /r/ and retroflex approximant /ɻ/. The prohibition, however, is restricted to CVC type of syllable, with lax nuclei, and applied to CV:C syllable, with tense nuclei. Nevertheless, some loan words still allow the rhotic /r/ freely at this position.

SST appears to avoid a consonant with [+ strident] and [-continuant] at the WIC position. This may be due to perceptual reasons. The rhotic /r/ and retroflex approximant /ɻ/, though, belongs to the same natural class. They have different feature values: [+ consonant], [+ voice], [+ coronal], [- nasal] and [- obstruents], [+ strident] and [- continuant]. Among them, the retroflex approximant /ɻ/ is the only segments marked for [+strident] and [-continuant] features. Producing [+strident] and [-continuant] segments requires more effort than from those producing other consonants as it involves the creation of air turbulence in the mouth cavity and delayed release, simultaneously. For a language which treats all word-initial syllables as stressed, it may cause unnecessary delay in releasing and complicate the natural way of pronunciation. By avoiding them within CVC forms, the language seemingly has maintained perceptual harmony within lexical items.

The conclusion from the foregoing is as follows. Constriction wise, SST has undominated constraints preventing them from surface, *CV(r) and *CV(ɻ), as shown in (29). The constraints are in this language. To conclude, it is apparent that following constraints and their legitimate ranking must be sustained in the above-mentioned situation.

29) $*CV(r)]_{\sigma}^{stem/word\ initial}$
Rhotic /r/ must not surface within *CVC stem/word initial syllables

$*CV(ɻ)\ ]_{\sigma}^{stem/word\ initial}$
Retroflex approximant /ɻ/ must not surface within *CVC stem/word initial syllables

Word Final Syllable Coda (WFC) and Constraints

The WFC is another important apparatus in understanding most of the morphology-phonology interactions in Tamil. Tamil avoids unnecessary conflicts that may be due at morphological junctures by managing the coda and onset positions effectively. In other words, it is vital to acknowledge the contribution of nasals, liquids and glides (NLG segments) in avoiding unnecessary conflict between adjacent components[23].

Complex Coda Syllables and Coda Conditioning

Complex codas are found in a relatively limited number. They are allowed at word medial positions alone. The formation of Complex Codas (CCs) is found in two systematic forms; one is when a member of geminate consonants is filled by either one of the /y, r, l/, glides and retroflex approximants, or the latter is preceded by voiceless obstruents /k, c, t, p/ and their homorganic counterparts, nasals, /ŋ, ɲ, n̪, m/, as in (30).

30) **Complex Consonant Type I (Glides/Retroflex Approximants preceded by voiceless obstruent clusters**)

	/y/	/r/	/ɻ/
/k/	/yk/	/rk/	/ɻk/
/c/	/yc/	/rc/	/ɻc/
/t/	/yt/	/rt/	/ɻt/
/p/	/yp/	/rp/	/ɻp/

31) **Complex Consonant Type II (Glides/Retroflex Approximants preceded by homorganic nasal/voiceless obstruent clusters**)

	/y/	/r/	/ɻ/
/ŋ/	/yŋ/	/rŋ/	/ɻŋ/
/ɲ/	/yɲ/	/rɲ/	/ɻɲ/
/n̪/	/yn̪/	/rn̪/	/ɻn̪/
/m/	/ym/	/rm/	/ɻm/

[23] The phonology of Tamil LT and SST resembles each other in many instances, such as in, selecting the right candidate for Coda positions. LT prohibits the following nasals at WFC positions; velar nasal /ŋ/, dental nasal /n̪ /, and the coronal nasal /ɲ/; nevertheless, it freely allows other nasals at WFC. SST though does not adopt this restriction strictly within the native words: it still allows all nasals to occur at WFC in loan-words. As for the present study, it is assumed that the mentioned three nasals are retained at WFC positions, since the study has focused on data on native words, only.

This information concludes the explanation on onset and coda syllable distribution, two crucial factors, controlling the M-P interfaces in Tamil. The given information will be referred to from time to time in the forthcoming analysis chapters.

As was mentioned in the introduction, there are three prosodic elements that need to be examined in some detail. So far the syllable and the phoneme have been addressed. The relevant issues taht will be looked at next are the patterns of constraining the words.

3.7 Minimal Words in Tamil

A minimal word in Tamil is composed of at least two mora weights, or a heavy monomoraic syllable or a heavy bimoraic syllable. Monomoraic words[24] such as, *ka, * ca, *da, *ta, *pa are not found in t SST, though this prohibition is not applied to suffixes. The suffixes are usually repaired accordingly to avoid structural ill-formedness, when they form part of the extended word. That is, a vowel can be bimoraic to respect WORDBINARITY, but cannot be tri-moraic (or larger): Tamil strictly avoids *SUPERHEAVY VOWELS. Words weighing less than two moras are prohibited from surfacing as stem or word. Tamil has a restricted requirement of minimal word order.

The minimal structural requirement shows that Tamil favours the following constraint.

32) WORDMINIMALITY (WDMIN)
Words are minimally bimoraic (μμ).

33) *SUPERHEAVY VOWELS
Nucleus cannot be trimoraic (μμμ)

Only stems or words that qualify as WDMIN are allowed to fill the bases for extended morphological words. Both the derived and inflected words ensure that the base is a full-fledged phonological word before being attached to suffixes, which can be either

[24] The language has two monomoraic words, such as *no* 'sick' and *tu* 'spite' which do not fit into the given minimal words requirement, at surface value. These structures are believed to have moraic onsets. Apart from these two, Tamil has about 41 qualified minimal words which are bimoraic.

monomoraic or bimoraic. Tamil does not apply the minimal moraic requirement suffixes. In short, the language basically ensures all suffixes are only attached to independent phonological words.

WORDBINARITY (WDBIN) is another crucial factor affecting the affixation. Certain inflectional suffixes, such as case markers and emphatic suffixes are only allowed to be affixed to stem words which satisfy the requirement of WORDBINARITY.

34) WORDBINARITY (WDBIN)
Words must be either bimoraic or disyllabic

At first glance Tamil foot structure may appear to be exhibiting 'culminative properties', but the prosodic system of Tamil is much more complex than that. The language has the basic left-to-right moraic trochaic organisation pattern, indicating that the following constraints are operative to give basic stress patterns.

35) Foot Binarity (FTBIN): Feet are binary (on moras).

36) ALIGN-FT-L: (FT, L, PRWD, L)
Align left edge of the foot with left edge of the prosodic word

The constraint in (36) is a general constraint, which requires that the left boundary of the foot coincide with the left boundary of the prosodic word. As far as the suffixations are concerned, they are oriented from right-to-left, indicating that the following ALIGN constraint guarantees a proper well-formed lexical organization.

37) ALIGN- SUFFIX-L (AL-SUFF-LT)
Align left edge of the suffix with right edge of the prosodic/grammar word

This alignment constraint requires that the left boundary of each suffix be arranged as closely as possible to the right boundary of the grammar/prosodic word. Any intrusion or unfilled gaps leading towards structural disharmony will be repaired accordingly.

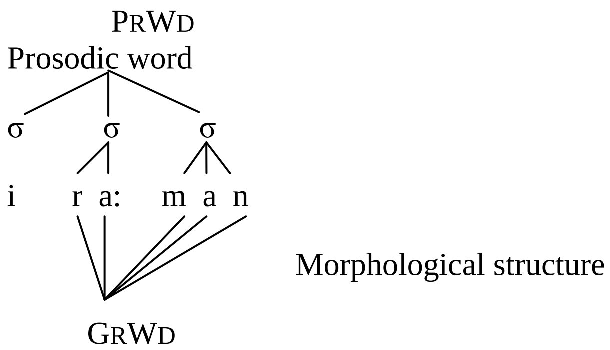
The fixed preferences require that the edges of the grammar words and prosodic words[25] must match indefinitely and be sustained in most of the cases. The constraint in (37)) guarantees that the edges of the prosodic words and grammar words must coincide to avoid mismatch violation.

38) Align-PrWd-L (PrWd, L, GrWd, L)
Align the left edge of the prosodic words with the left edge of the grammar word

This constraint requires that the edge of the prosodic word is more respected than that of the grammar word. However, it is not the case in every instance.

The diagram in (38) shows a typical phonological alignment, which does not involve any interaction between the same or different types of morpheme classes. The grammar word (GrWd) is lacking the initial /i/, but the Prosodic Word (PrWd) has one of them. Insertion of the epenthetic /i/ which has triggered alignment could be demonstrated with the help of the following diagram.

39)



The diagram shows that PrWd, the preferred well-formed structure, has been parsed faithfully but the GrWd failed to satisfy this basic demand. The PrWd sustained its well-formedness with the help of the epenthetic /i/, which is left unparsed by the GrWd.

An inflectional language like Tamil relies on derivational and inflectional activities to extend its morphological capacity. Both in derivation and inflection various affixes are involved repeatedly and rapidly which trigger various types of interactions, and which largely involve alignment.

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[25] Grammar words and prosodic words can be defined in many ways. The present study believes that the grammar words are basic inputs and the prosodic words are output surface forms with necessary extra-metrical additions.

In short, every point of juncture between the stem and another affix - a stem, prefix, variety of affixes or a functional word, may involve alignment, interaction patterns of which can be defined as follows:

40) i. Alignment (alone)
ii. Alignment and Deletion
iii. Alignment and Gemination
iv. Alignment and Epenthesis
v. Alignment and combined reactions

However, the given varieties of alignments are divided on the basis of its derived motivation. The first kind of alignment is also known as natural alignment in which the features usually correspond directly to the edges of the morphs without any crossover or intrusive factors. The second kind of alignment differs from the earlier, where it only emerges as a result of intrusive motivations.

3.8 Lexical Words and Typology of Interaction

Previous studies in phonology offer a handful of opportunities to account for the kind of interaction between phonological units in which a phonological lexicon is built on. Mitsuhiko (2004) in her analysis on the stratified phonological lexicon, claims that when different lexical components are attached within a structure, they tend to exhibit inconsistencies, both internally and externally. Studies such as Alderete (2001) Lubowicz (2002a) Antilla (2002) proposed an account to treat them as a composition of morphological components, and interaction between them which may be realized as phonological gaps.

Despite the different perspective of approaches in addressing the interaction between lexical components, their aim has always been the same - to identify the phonological gap that is checked by morphological words to maintain structural well-formedness. It is vital for a morphophonological study to account for such verities when it involves the analysis of a single language. Therefore, this section has been devised to find *unity among the diversity* of interaction patterns found within SSTM, based on the model developed by Nespor & Vogel (1986). Before that, what will be shown is the language at hand apprehends the constituents of lexical components in proper order.

3.8.1 Lexical Interface and its Properties

It is a well-known fact that lexical interface study embraces the various linguistic domains of a language. Among others, sound segment, prosodic structure (mora, syllable, feet, and phrase), and morphology (root, word, affixes, and suffixes) (Kager, 1999: 21) are relatively important components. Therefore, a proper MP investigation cannot avoid the importance of these elements. Yet, in most cases, lexical items which are built on these entities repeatedly utilise the same segments but with a slightly different purpose in different positions. Thus, there is flexibility in obtaining an economic typological pattern that may avoid repetition but provide promising visibility on almost the entire spectrum of MP.

Both phonology and morphology have different perspectives in addressing word formations. In SPE and the literature that adopted the SPE methodology, morphology preceded phonology (Chomsky and Halle 1968), but the subsequent studies changed this view and claimed that phonology precedes morphology (Siegel, 1974), Allen, 1979 and so on) to allow the phonological process such as stress assignment to materialise before morphological words reach autonomous status. The same trend is developed into the model of Lexical Phonology, which claims that phonological processes applied at different levels have no interconnection between one another, as proposed by Kiparsky (1982: 131-176) and Mohanan (1986). At the same time, phonology also offered a prosodic model (Nespor, 1986, Selkirk, 1984), which detaches itself from morphological contributions but makes the same claim, that each stratum expressing morphological expansion shows no correlation between one and other.

Morphology, on the other hand, is not only laden with surplus methodologies to define words and their classes, but also has unresolved controversies. One which is worthwhile to consider at this point is the formation of words and the principles associated with it. Studying a language such as English shows that there is no distinction between stem and word whereas a language like Tamil, which casts a significant distinction between stem and word, deepens the impact of controversy defining whether word-formation rules are word-based or stem based, claims Christdas (1988: 41).

The main aim of this section is to identify the *unity among the diversity* of M-P interactions in Tamil. Tamil, a major Dravidian language, is an agglutinative language which is known for accommodating a considerable number of interfaces within a single lexical item. One may witness as minimal as one or as maximum as five interface environments within a lexical item. Some classical grammars of Tamil allege that the interface environments amount to forty in simplified manner. However, the present-day grammarians like Kothandaraman (1999a), Cinnasamy (1996), Dass (2005b) and Thilagawathy (1995) of the thought that the language has a different number of essential interface environments - 167, 55, 43 and 40, respectively.

The lexes of SSTM can be divided into two blocks of categorization based on the derivational interest - derived and non-derived terms or compositional and non-compositional morphological words. The same have been classified as divisible and indivisible terms in the traditional grammar of Tamil. The indivisible, also known as non compositional morphological words such as the following taoutosyllabic term, *maram* 'tree', *pa:r* 'see', and *muddai* 'egg' are treated as a cohesively formed single categorical term. Words falling into this class do not involve any word-internal morphophonological chance.

The divisible terms behave in an opposite way to indivisible terms. Terms such as *karuppan* 'black man', *karuppi* 'black woman', *karumai* 'black', *kariyan* 'black person' and so on, which belong to this category of words, have more than one word internal component. The *karuppan* and *karuppi* consist of a headword, *karu* added to suffixes such as *mai, pu, an* and *i*, in order, i.e: *karu - mai – pu - an > karuppan* 'black person' and *karu - mai – pu - i > karuppi* 'black girl/lady'. These nominal suffixes infuse grammatical notion to the newly formed terms. It is obvious from the given examples that the structures involving hetero-syllables establish a disputable interface context and acquire morphophonological resolutions.

3.8.2 The Lexis

Spencer and Zwicky (1998: 1) connote that what is termed as 'word' has wider conceptualization than one imagines in a language. That,

> 'Words have phonological properties, they articulate together to form phrases and sentences, their form often reflects their syntactic functions, and their parts are often composed of meaningful smaller pieces, in addition words contract relationships with each other by virtue of their form; that is, they form paradigms and lexical groupings.'

The quotation explains that words are a central element in syntactic formation, and they are made of various smaller pieces of meaningful segments and may form categorical classes.

Following Liberman (1980), Kiparsky (1999) in his work on Lexical Phonology classified words into two different classes. He confirmed that there are two basic classes of word-formation processes, one is known as compounding and another one is affixation. He also pointed out that all of these word formation strategies are endocentric, in which the category of derived words forms part of the category of its head. The newly formed term is claimed to be non-distinct from the base lexical form.

The foregoing definitions of word, in fact, have very little relevance to the current study. The first definition did not elaborate much on word formation processes, nor did the second one, which offered a plain coverage term obscuring the enriched nature of interface environments. The so-called lexical word might be found as an individual content or functional word or in conjoined form of those two types of words in the word vocabulary of a language. Therefore, a term that qualifies for the status of word by disseminating minimal meaning, but which involves the collision between two hetero-syllables has been treated as a lexical item in this language.

The cover term, lexical, refers to various types of words, vocabulary or morphemes found within a language; however, interaction or interface environments are not always present in every one of this type of words. For instance, /*a, i, u*/, with the respective meaning of 'that', 'that' and 'in between', orderly, are monosyllabic demonstrative pronouns in Tamil. These terms are treated as isolated functional words that are part of the lexical inventory of the language. Likewise, content words such as, *kaɳɳan*

‘Kannan’, *maram* ‘tree’, *cuṉṉa:mpu* ‘chalks’ with more than one and as many as three syllables are perfectly formulated grammatical words. These taoutosyllabic terms do not involve any interaction. Contrarily, heterosyllabic terms like, *po:kku* (*po:-ku*) ‘the trend’, *vayiṟu* (*va:y-i:ṟu)*‘stomach’ and *udai (udu-ai)* ‘cloth’ are examples of minimal lexical items that host at least an interaction in the output form. These simple examples indicate that Tamil contains various lexical items with similar behavioural patterns that deserve further explanation.

3.10 Conclusion

This chapter has aimed to provide a description of the prosodic phonology of the data. The first part of the chapter has a phonological setting of the data. This was followed by a description on prosodic phonology. The section on phonology elaborated on various factors of both phonetics and phonology of SSTM that is necessary for the present study. It has covered the occurrence flexibility and restriction of vowels and consonants, nature of positional prominence and the characteristics of the distinctive features - some essential instruments in verifying the contribution of syllables in triggering the repair strategies related to the morphophonology at stem and word levels.[26] The supplied phonological explanations are of importance in order to study the response of the stratified phonological lexicon managing the intrusive elements at the interfaces.

The chapter has also introduced necessary information pertaining to the internal organization of the lexical items in Tamil. The section has put forth a handful of sub-lexical elements which cast individual characteristics in modifying the interfaces where they tend to exhibit inconsistencies in preferring possible repairing solutions to level the structural ill-formedness. With this view in mind, the morphological differences have been given proper recognition in the analysis.

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[26] Vasanthakumari (1989:11) affirms that the lexicon is assumed to control the intrinsic structure of the formatives in terms of phonological properties.

All of the given background information of phonology, prosodic phonology and morphology are essential tools to understand M-P interfaces referred in the analyses chapters.

Chapter Four
Vowel Hiatus (_V# + #V_) and SrRS in Tamil

4.1 Introduction

The V#_#V interaction or what is better known as 'vowel-hiatus conflict' works in a variety of ways in Tamil. Almost all previous literatures including Generative Phonology (Vasanthakumari, 1989), Derivative Phonology (Kothandaraman, 1999a) (Renganathan, 1983) or Lexical Phonology (Christdas, 1988), have confined hiatus analyses within rule-based parameters with a restricted preview of hiatus environments and have treated Glide Insertion (GI) as the sole hiatus resolution available in the language. Contrary to this the present study claims that resolutions aim at avoiding conflicts emerging from V-V interaction at M-P interfaces and are not issues in selecting and applying right glides alone. Apart from glide insertion, the cross-linguistic effort for avoiding hiatus, the language also applies two less popular strategies: vowel deletion (VD), and epenthesis. These preserve syllable uniformity without violating the requirements of contextual markedness. In other words, structural ill-formedness is levelled at the expense of faithfulness violation without violating sonority requirements at any point. The present chapter provides novel analyses of vowel hiatus management and their close connection to sonority distance in Tamil.

The chapter is organized as follows: §4.2 gives an overview of hiatus in general, while §4.3 elaborates on VH in Tamil. §§4.4 and 4.5 provide accounts of vowel hiatus management in general and hiatus resolutions in Tamil, respectively. Following these are individual analyses for selected hiatus issues; §§§4.6, 4.7 and 4.8, respectively. These provide a discussion on Glide Insertion, Vowel Deletion and Epenthesis. §4.9 discusses issues related to secondary vowel hiatus and §4.10 provides the conclusion and discussion.

4.2 Vowel Hiatus

According to Janet et.al., (2010), when two vowels emerge in a row, they can be identified in three different ways, namely i) they can be produced in hiatus, meaning that the two vowels are produced in two separate syllables, ii) they can also be produced as a diphthong (also known as 'synaeresis', when it occurs within the same word; and 'synalepha' when it occurs across word boundaries), meaning that the two vowels are in the same syllable, (Hualde et al. 2001), or iii) the two vowels can fuse into a single vowel of a quality that differs from that of the original two, otherwise known as 'coalescence'. Amongst the three, the first explanation (which refers to vowel hiatus which emerges as a result of morphological activities) is the most common in Tamil.

Languages which apply ‘various processes to words’ (Spencer, 2000: 9) generate a surplus range of conflict environments. However, the emergence of such volatile environments is common in agglutinative languages, like Tamil. VH, which emerges when two vowels come into contact as a result of morphological concatenation or compounding, is one of them. It is considered an unproblematic phenomenon in some languages, while some languages avoid it deliberately by using various strategies. Tamil is one of them. It employs a range of sonority-related repair strategies to avoid vowel hiatus so as to preserve structural harmony and uniformity of word-internal syllables.

Casali (1996: 12), who investigates hiatus resolutions in 92 African languages, argues that to some extent, the selection of hiatus resolutions correlates to lexical environments. His investigation identifies four types of resolutions with differing effects in four lexical environments, namely, i) between two lexical words, ii) between a lexical word and a function word, iii) between the prefix and root, and iv) between the root and a suffix. The study also confirms that elision of V_1 is more common within $V_{1.}V_2$ in the context of two lexical words and CV prefixes and root words while elision of V_2 is common in-between the boundary of a lexical and function word. Nevertheless, at the root and suffix boundaries, both V_1 and V_2 elision become a possible exercise.

McCarthy (2008) gives a different account of VH resolutions. He claims that VH and the resolutions in Emai, a language which belongs to the Benue-Congo branch of the Niger-Congo language family, are typically decided by lexical items and their contextual requirements. The language is said to have four-fold environments involving lexical and functional words acquiring different forms of VH resolutions. In fact, the situations highlighted for VH by Casali, Janet and McCarthy have a lot in common.

Hiatus resolution in Emai is controlled by different vowel qualities at the edge of lexical words. The resolutions are selected based on the vowel gradient of the lexical edges; this can be formulated as follows:

1) Different forms of vowel hiatus resolution in Emai

i) If V_1 is final in a functional morpheme and V_2 is initial of a lexical morpheme, delete V_{1} : $[\ldots V_1]_{Fun}\,[_{Lex}V_2\ldots] \rightarrow Ø\,(V_1)$

ii) If V_1 is final in a lexical morpheme and V_2 is initial of a functional morpheme, delete V_2: $[\ldots V_1]_{Lex}\,[_{Func}V_2\ldots] \rightarrow Ø\,(V_2)$

iii) If V_1 and V_2 are both in lexical morphemes or both in functional morphemes, delete V_1: $[\ldots V_1]_{Lex}\,[_{Lex}V_2\ldots]$ / $[\ldots V_1]_{Fun}\,[_{Fun}V_2\ldots] \rightarrow Ø(V_1)$

iv) But if V_1 is high (/i/ or /u/) and in a lexical (though not functional) morpheme, it changes into the corresponding glide (/y/ or /w/):
$\ldots i]_{Lex}\,[_{Lex}\,V_2 \rightarrow$ /y/
$\ldots u]_{Lex}\,[_{Lex}\,V_2 \rightarrow$ /w/

(McCarthy, 2008: 95-100)

The self-explanatory chart shows the underlying organization of word formation strategies and the emergence of vowel hiatus in Emai. It shows four ways of morphological expansion activities namely i.) Lexical + Lexical, ii.) Lexical + Functional words, iii.) Functional words + Lexical, and iv.) Functional words + Functional words. It is apparent that the components of the lexical words are treated with more importance than the functional words in Emai; hence, regardless of their position, less potent segments get deleted more easily compared to the components of prominent lexical terms. Generally, deletion targets both edges, the right or left edge. However, Emai prefers to delete vowels at the weaker edge of the preceding functional words when both positions are filled by functional words. On the other hand, Emai employs a different strategy in derivation and compounding, where V_1 of the preceding lexical is omitted, while V_2 of the succeeding term is retained, regardless of their word classes. Glide alternation seems to take place within compound words. In short, we may claim that Emai favours dual resolutions in managing VH.

VH resolutions of Tamil and Emai have a lot of similarities, and a few dissimilarities. The similarities are apparent in terms of VH environments associated with various forms of morphological activities: derivation, inflection and compound words. The dissimilarities are apparent in the selection of hiatus forms. Unlike Tamil, Emai displays a range of surprises in terms of selecting the right choice of resolution to avoid a hiatus. The selection accounts for various influential factors, ranging from the gradient of the segment to the quality of lexical items. More importantly, Emai appears to favour monotonous resolutions (vowel deletion and glide alternant) (McCarthy, 2002b), as convenient strategies in comparison to other languages such as Axininca Campa, Diyari, Warlpiri (Kager, 1999: 100) Tamil, Bengali (Kothari, September 2009) and so on, which prefer gliding, epenthesis or deletion.

This prior introduction on the hiatus setting in Tamil will be examined in some detail.

4.3 Vowel Hiatus in Tamil

Tamil has two types of VH. They have been referred to as natural Vowel Hiatus (nVH) and secondary Vowel Hiatus (sVH) for the sake of convenience. The nVH, a natural phenomenon, results from derivation and inflection, especially when a base stem or word ending with CV form (NOCODA) is attached to suffixes beginning with onsetless syllables, VC or V/VC. It involves interaction across morpheme boundaries, as shown in the data in (2), and involves the demarcation of morphological boundaries, as well.

The second type of hiatus, sVH, emerges indirectly in two instances. The first case revolves around the deletion of a final coda syllable of the preceding lexical word, such as the deletion of the bilabial /m/ in */maram-ilai/* → */mʌ̃rəvɪiləɪ/* ‘leaf of the tree’. The second instance emerges within derived environments, as in the following example, /*peɽu-(a)-aɾ/* → */pəɽɽʌʋʌr̚/* ‘the receiver’. The epenthesis within the parenthesis has triggered the glide insertion indirectly. Since Tamil does not prefer a ‘double gliding policy in a single environment’, it has initiated two different strategies, deletion and gliding, in this context. Comparatively speaking, the sVH, which is developed through additional phonological efforts, can be identified as a mirror image of nVH, aiming to maintain the uniformity of the structure without any bad clusters jeopardising syllable organization.

The nVH and sVH resolutions have significant differences in terms of boundary realignment. The nVH triggers a moderate level of alignment of morphological boundaries, where the left-edge succeeding morphological words is usually realigned to a new position, without hindering the morphological boundary of the preceding word. Contrary to nVH, the sVH triggers realignment of the morphological boundary of the succeeding and preceding lexical words, and the new morpheme boundary begins within the final syllable of the preceding lexical item.

The aforementioned Vowel Hiatus Resolutions in Tamil are represented by the following set of data.

2) i. Lex + Lex

Input	Output
te:-ilai	te:yɪləɪ
tea-leaf	*tea leaf*
kal()vi-ati()ka:ri	kʌlvɪyʌtika:rɪ
education- officer	*educational officer*
ma:- ilai	ma:vɪl əɪ
mango-leaf	*mango leaf*
va(r)a-illai	vʌrəvɪlləɪ
come-did not	*did not come*

(ii) FuncW + Suff

Input	Output
a-an	ʌvən
that-nom.marker	*he-3rd-place-sg.-imp.*
a-aɭ	ʌvəɭ
that-nom.marker	*she-3rd-place-sg.-imp.*
a-ar	ʌvər
that-nom.marker	*he(honorific)-3rd-place-sg.-imp*
i-a	ɪvəɭ
this-nom.marker	*she-3rd-place-sg.-imp*
i-ar	ɪvər
this-nom.marker	*he(honorific)-3rd-place-sg.*
e-an	əvən
who-nom.marker	*who-he-3rd-place-sg.-intg*
e-aɭ	əvəɭ
who-nom.marker	*who-she-3rd-place-sg.-intg*

(iii)Lex + Suff

Input	Output
v(a)n̪()tu - a	vʌn̪tə
came-imp. marker	*the one came-imp*
t(a)n̪()tu - a	tʌn̪tə
gave-imp. marker	*the one given-imp*
pa:r(t)tu - a	pa:rtə
saw-imp. marker	*the one saw-imp*
odi()n̪()tu-a	ɔdɪn̪tə ‘.-
broken-imp. marker	*the broken one-imp*

(iv) Lex + Suff

Input	Output
v(a)n̪()tu- a:n	vʌn̪ta:n
the one came-nom.marker	*he came-3rd-place perf.*
t(a)n̪()tu – a:n	tʌn̪ta:n
the one gave-nom.marker	*he gave-3rd-place perf*

pa:r(t)tu – a:n	pa:rta:n
the one saw-imp. marker	*he looked-3rd-place-perf.*
odi()n̪()tu - a:n	ɔdɪn̪ta:n
the broken one-imp. marker	*he broken-3rd-place-perf*

(v) Lex + Suff

Input	Output
peɽu-(a)-ar	pəɽɽəʋʌr̚/
obtain-nom.marker	*the person who obtain s/t*

(vi) Lex + Lex

Input	Output
maram – ilai	mʌrʌvɪləɪ
tree-leaf	*leaf of a tree*

The examples in (2)(i) are compound words formed by two lexical words, while those in (2)(ii) are derived words formed by attaching function words (FuncW) to suffixes. The inflected words in (2)(iii) and (iv) have been inflected with suffixes connoting grammatical nuances. The examples in (2)(v) and (vi) represent derived VH.

The data showed different results. Constituents of both lexical items within the compound words in (2)(i) have been retained with the help of the glides /v/ and /y/. The same is done within derived words in (2)(ii), where both edges have been retained with the help of glide, /v/. They represent the importance of glide insertions.

From the data, GI in Tamil can be simplified as follows. In the sequence of V_1 and V_2 ($V_1.V_2$), if the V_1 is underlyingly high-front lax or tense, /i/, /i:/, or /ai/, insert glide [y] that complies with the height and roundness of the initial onsetless of the succeeding lexical word to mediate sonority conflict in-between the concerned vowels. If the underlying vowel of the preceding word is other than a high-front lax or tense vowel, then insert glide [v] to rescue the structure[27], or delete either the V_1 or the V_2 or insert an epenthetic segments to avoid deletion. These forms of VH management within intolerable $V_1.V_2$ hiatus environments are common in the following environments: i) in

[27] Apart from this, the front-mid vowels /e/ and /e:/ display an alternative flexibility, where they appear to select both glides, /v/ and /y/ within compound formations, in which the selection is usually associated to a semantic arrangement rather than a phonological one. As for the present study, it is presumed that Tamil selects gliding of /y/ or /v/, based on the vowel gradient of the lexical edge, but not the semantic revelation.

compounding ii) in affixation to a bound morpheme and iii) in affixation to a free morpheme. The affixation includes prefixation and suffixation.[28]

The preview data confirm that VH and a selection of hiatus resolutions and morphology to some extent are intimately connected in Tamil. Because of this, the compound words provided a mixed reaction in selecting the right choice of glide to avoid hiatus environments, and have avoided deletion. However, the derived words and the inflected words behave differently. The functional words, which have a dual role in Tamil (providing grammatical cues for derived terms, and providing semantic realisation), are considered equally important within the derived terms regardless of their positional variance, therefore they have been retained. Deletion within inflectional terms, as in (2)(iii) and (iv), portrays a different scenario. The weak final vowel of the preceding lexical word, the V_1 (in the sequence of $V_1.V_2$) which is also less prominent, is deleted to avoid a sonority clash between two peaks. This shows that place prominence also plays a vital role in deciding the right choice of VH resolutions. Overall, selecting a hiatus resolution is not spontaneous, but is confirmed by the quality of vowels at the interfaces and by the participating morphological words, clarifying the data.

4.4 Types of Hiatus within Morphological Words in Tamil

From the foregoing discussion it may be concluded that Tamil has a variety of options in dealing with at least five distinctive hiatus environments. For the sake of convenience, all five environments have been brought under three types of well-known word-formation strategies as follows:

3) i. VH within derivational words
- a. Lexical (Base) + Functional (suffix) (/per()iya/ + /ar/ → /pərɪyəvər/ ‘wise man’)
- b. Functional (Suffix) + Lexical (Base) (/a/ + /aɭ()vu/ → /ʌvvʌɭʌ()vʊ/ ‘that much’)

[28] All sub-lexical items, prefixes, suffixes and functional lexical terms have been referred as function words, following McCarthy (2002) and Framklin (2000), unless otherwise stated.

ii. VH within inflexional words

a. Lexical (verbal base) + Functional (suffix$_n$) (/t(a)ntu/-/a/→ /tʌn̪tə/ ‘given infi.’)

b. Lexical (nominal base) + (Functional) suffix (/viɻa:/ -/il/ → /vɪɻa:vɪl/ ‘celeberation loc.)

iii. VH within compound words

a. Lexical + Lexical (/kudi/+/uri/()/mai/→/kʊdɪyʊrɪməɪ/ ‘citizenship’)

Two different kinds of hiatus situations are obvious within derivations. One of them emerges when a base ending with a vowel, *periya* ‘big-adj’, is attached to a suffix rendering grammatical cue, /*ar*/. The base, in the example, received a bound morpheme giving honorific connotations. Since it is impossible for the newer term to provide an intended meaning without the concerned vowels, they have been retained with glide insertion. And the other emerges in the same ways as the foregoing, except for the direction and gemination. This shows that phonological responses to hiatus environments interact with morphological necessities as well. In other words, M-P interfaces respect both the morphological and phonological cues to some extent.

Inflectional words show a different directionality of hiatus resolutions. A complex inflected term may host as many as five suffixes in Tamil, a necessity which is controlled by syntactic requirements (Cinnasamy, 1996, Dass, 2005b, Noormaan, 2000). Syntactic requirements control the emergence of various kinds of hiatus environments at intersections between a base and suffix. The number of VH environments is conditioned by the quantity and the quality of the involved segments. Nevertheless, it is the former that involves a range of hiatus environments with a fixed directionality between the verbal and nominal inflections, as has been pointed out in (4).

Compound words exhibit straightforward hiatus resolutions. They concern the right-edge of the preceding and the left-edge of succeeding lexical items. The epicentre of the hiatus can be verified directly by referring to the quality of the vowel involved. The elaboration of the VH system in Tamil has been reflected in the data given in (5).

The foregoing elaborations on VH resolutions have been transformed into a convenient diagram, using the model promoted for Emai, as can be seen below.

4) Different forms of Vowel Hiatus resolution in Tami:-

i). If V_1 is final in a lexical term and V_2 is initial of a lexical term, retain V_1 and V_2
$[\ldots V_1]_{Lex}\ {}_{Lex}[V_2\ldots] \rightarrow V_1(v/y)V_2$ retain both vowels with glide

ii). If V_1 is final in a functional morpheme and V_2 is initial of a functional morpheme, retain V_1 and V_2
$[\ldots V_1]_{Func}\ {}_{Func}[V_2\ldots] \rightarrow V_1(v/y)V_2$ retain both vowels with glide

iii). If V_1 is final in a lexical morpheme and V_2 is initial of a functional morpheme and both have the same moraic value, delete V_1[29]
$[\ldots V_1]_{Lex}\ {}_{Func}[V_2\ldots] \rightarrow V_2Ø(V_1)$

iv) Superseding rule: If V_1, the final vowel in the lexical morpheme, and V_2, the initial vowel of the functional morpheme, do not share the same moraic value, retain the heavier moraic segment and delete the light segment
$[\ldots V_{1(Light)}]_{Lex}\ {}_{Func}[V_{2\ (Heavy)}\ldots] \rightarrow Ø\ V_2\ (V_{1\ (Light\ vowel)})$, or
$[\ldots V_{1\ (Heavy)}]_{Lex}\ {}_{Func}[V_{2\ (Light)}\ldots] \rightarrow V_1Ø(V_{2\ (Light\ vowel)})$
$[\ldots V_{1(Light)}]_{Func}\ {}_{Lex}[V_{2\ (Heavy)}\ldots] \rightarrow Ø\ V_2\ (V_{1\ (Light\ vowel)})$, or
$[\ldots V_{1\ (Heavy)}]_{Func}\ {}_{Lex}[V_{2\ (Light)}\ldots] \rightarrow V_1Ø(V_{2\ (Light\ vowel)})$

v). Insert epenthesis (Example; /t/ in /oru-ar→ oruttar/)

Reference will be made from time to time to this chart.

4.5 Hiatus Resolutions in Tamil

In the following section some preview knowledge of three types of vowel hiatus within different types of morphological extensions in Tamil will become clear.

In Tamil, hiatus conflicts are resolved in three different ways, GI, VD and Epenthesis insertion (EI). Selection of one over the other is decided by both phonological and morphological factors. Selection of gliding and deletion appears to be controlled and designated by the vowel quality of the preceding and succeeding words, but selection of epenthesis is straightforward. As for deletion, the language usually retains the moraically heavier vowels but deletes the weaker. As for gliding, the language consults the very same principles governing the glide selection, between /v/ and /y/.

Tamil prefers GI over VD in many instances, as can be seen in the data given in (5). Despite having a segment with unsuitable moraic weight, and the possibility to enforce

[29] It is unknown why the language retains a heavier vowel in combination of V_1 and V_2.

VD, the language still prefers GI. GI is noticed in two instances where other options failed to be applied. The first instance is when vowel segments fail to be elided, and the second instance is when vowels are required to be retained.

As far as VD is concerned, Tamil shows a reverse preference to widely held cross-linguistic patterns in certain ways. Casali and McCarthy have confirmed that VD selects the vowel at the left edge of the succeeding lexical item, while the vowel at the right edge of the succeeding lexical item is preserved (Casali, 1996, McCarthy, 2008, McCarthy, 2002b). However, the given preference is not held in Tamil – it prefers to delete vowel segments at the right edge of the preceding lexical item in the majority of the cases, while the vowel at the left edge is maintained. Regardless of where it belongs in terms of word-classes, this preference is still subject to the superseding requirement given in (4).

Epenthesis to avoid VH is not a common practice in Tamil, so is applying /t/ as an epenthetic consonant. Kothandaraman (1977, 1980, 1972a, 1972b, 1982) described the special character in parenthesis in *varu(t)i* as an unpopular epenthesis, which is the only applied epenthesis in the above mentioned context. Apart from this evidence which was taken from classical grammar, the language did not show the application of /t/ elsewhere. The data at hand is another instance showing that epenthesis /t/ (as in 5 (V)) also finds its roots in present day Tamil and subsequently proves that Tamil employs three different strategies to avoid VH. Although, the given input is usually resolved with the insertion of glide /v/, it is also realised with epenthesis /t/, as shown in the data.

The following data show how Tamil applies all of these three strategies at M-P interfaces involving four word-classes: Lexical + Lexical, Lexical + Suffixes, Lexical + Functional words and Prefixes + Lexical words.

5) (I) Glide Insertion
Nominal
a. Insertion of glide /y/
i. Lex + Lex

Input	Output
e(n̪)ta – oɾu	ən̪θ̃ə̃ʊɔɾʉ
which –one	*whichever*
kudi – uɾi()mai	kʊdɪyʊɾɪmə̃ĩ
citizen-ship	*citizenship*
paɳi - aːʈʈu	pʌɳĩyaːʈʈʉ
job- do	*do the job*

ii. Lex + Suff (CM)

1. Case marker ai ~ əɪ/ə

aː(d)ci - ai	aːdcɪyəɪ
ruling-acc	*the ruling-acc*
aːcai - ai	aːcəɪyəɪ
desire-acc	*desire-acc*
aːcu – iɾi – aɾ - ai	aːcɪɾɪyəɾəɪ
error-ride-nom.marker-acc	*teacher-acc*
kai - ai	kʌiyəɪ
hand-acc	*hand-acc*
maːmi - ai	mãːmĩyəɪ
aunty-acc	*aunty-acc*
paɭɭɪ - ai	pʌɭɭɪyəɪ
school-acc	*school-acc*

Case marker oːdu –odu - ~ a

ini()mai - oːdu	ĩnɪmə̃ĩyoːdʉ
nice-instru.	*niceely intr.*
moɻi - oːdu	mɔ̃ɻɪyoːdʉ
language-instr.	*along with language-instr*
n̪ʌ̃(n)ɽɪ - oːdu	n̪ʌ̃nɽɪyɔːdʉ
thanks-instru.	*with thanks-instr*
teːti - oːdu	teːtɪyoːdʉ
date-instr.	*with date-instr.*
ʋaːɾ(tt)ai - oːdu	ʋaːɾttəɪyoːdʉ
word-instr.	*with words-instr.*
ʋacatɪ - aːl	ʋʌcʌtɪyaːl
convenient-intru	*by conveniences-instr.*

ɪn (aːyʊĩn) (ablative/ sociative (abl./soc.)

kadai - in	kʌdəyĩn
shop-abl.	*shop-abl.*
paɳi - in	pʌɳĩyĩn
job-abl.	*job-abl.*

ɪl ~ la (aːlʌyəttɪl ~aːlʌyəttɪlə) (locative (loc.)

aː(d)ci - il	aːdctʃɪyɪl .
rulling-loc.	*under the ruling-loc*
adi - padai - il	ʌdɪppʌdəɪyɪl
fundamental-loc.	*fundamental-loc.*
aʋai – il	ʌʋəɪyɪl
hall-loc.	*in the hall*
camaːti - il	cʌmãːtɪyɪl
cemetery-loc.	*cemetery-loc.*
kɪɻʌ()mai - il	kɪɻʌmə̃yɪl
day-loc.	*day-loc.*
kodu()mai - il	kɔdʊmə̃ĩyɪl
toture-loc	*under the torture-loc.*

pu:mi - il	pu:mĩyɪl
earth-loc	*earth-loc.*
pula()mai - an	pʊlʌʊʌ̃n
genius-nom.marker	*poet*
ti: - il	ti:yɪl
fire-loc	*in the fire*
valai - al	vʌləɪyəl
bend-nom.marker	*bangles*

Verb

Input	Output
i. Lex + Lex	
carɪ(y)illai-o:	cʌɾɪyɪlləɪyo:
right-not -emphasis	*not correct? (emphasis)*
carɪ-illai	cʌɾɪyɪlləɪ
right-not -emphasis	*not correct?*
col(l)i-iɾu(k)ku	cɔllɪyɪɾʊkkʉ
say-yes	*has been told/informed*
ke:ɭ()ʋɪ(k)k(u)ɾɪ-a	ke:ɭʋɪkkʊɾɪyə
question-able	*questionable*
kudɪ-ɪɾunta	kʊdɪyɪɾʊ̃n̪θ̃ə
live-been	*the occupied…*
pʌɾʌ-a:-illai	pʌɾʌʋa:yɪlləɪ
ok-no	*it is ok*
ʋaɻɪ-illai	ʋʌɻɪyɪlləɪ
way-no	*no way*

b. Insertion of glide /ʋ/

Nominal

Input	Output
i. Lex + Suff (CM)	
Case marker ai ~ əɪ/ə	
amma: - ai	ʌmmã:ʋəɪ
mother-acc	*mother-acc*
appa: - ai	ʌppa:ʋəɪ
father-acc	*father-acc*
Case marker o:du –odu - ~ a	
a:taɾ(a)vu - o:du	a:tʌɾʌʋo:dʉ
support-instr	*with support-instr*
talai - aɾ- o:du	tʌləɪʋʌɾo:dʉ
leader-instr	*along leader-instr.*
ɪl ~ la (a:lʌyəttɪl ~a:lʌyəttɪlə) (locative (loc.)	
ɪla:kka: - il	ɪla:kka:ʋɪl
department-loc	*department-loc.*

ii. PREF + Lex

Input	Output
a - aɭ	ʌvəɭ
that-nom.marker	*she-3rd-place-sg.-imp.*
a - an	ʌvən
that-nom.marker	*who (he)-3rd-place-sg.-imp.*
e - aɭ	evəɭ
that-nom.marker	*who (she)-3rd-place-sg.-imp.*
e - an	əvən
who-nom.marker	*who-he-3rd-place-sg.-intg*
i - aɭ	ɪvəɭ
this-nom.marker	*she-3rd-place-sg.-imp*
i - an	ɪvən
this-nom.marker	*he-3rd-place-sg.-imp*

iii. Lex + Suff (infl.)

Input	Output
aːku - eː	aːgəveː
happen-emphasis	*because of that (emphasis)*
cəyya- eː	cəjjəveː
to do (emphasis)	*to do (emphasis)*
colla- eː	cɔlləveː
say- emphasis	*to say that …(emphasis)*
iːdupadu-eː	iːdʊpʌdəveː
involve-emphasis	*to involve(emphasis)*
kodukka-eː	kɔdʊkkʌveː
to give -emphasis	*to give (emphasis)*

(II) Glide and Gemination

Input	Output
i. PREF + Lex	
a - a:du	ʌvva:du
that - goat	*that goat*
e - a:du	əvva:du
which – goat	*which goat*
e - aɭavu	əvʊʌɭʌʊʉ
how- much	*how much*
e - ʊʌɳɳam	əʊʊʌɳɳʌ̃m̄
which –way	*which way*
i - a:du	ɪvva:du
this-goat	*this goat*

(III) Segment deletion (Deletion of /u/) and gliding

Nominal

Input	Output
i. Lex + Lex	
iḻamai - aɾacu - aɾ	*ɪḻʌʋʌɾʌsəɾ*
young-ruler-nom-marker	prince
ii. Lex + Suff	
kal~kaɽ - u - aɾ	kʌɽɽʌʋʌr̚
learn-nom.marker	*the learned person*
maɽɽu – a – aɾ	mʌ̃ɽɽʌʋʌr̚
other-nom.maaker	*other people*
maɾuntu - aɾ	mʌ̃ɾʊttʉʋʌɾ
medicine-nom.marker	*doctor*
peɽu - a - aɾ	pəɽɽʌʋʌr̚
have-nom.marker	*parent*

Verb

Input	Output
i. Lex + Lex	
ʋeḷɪ-aːku - i	ʋəlɪyaːgɪ
out-make-verbalizer	*being released*
keːḷʋɪkku-uɾɪ-a	keːḷʋɪkkʊɾɪyə
question-abl.marker-ergative	*questionable*

(IV)Augmentative Epentheses

Input	output
i. Lex + Lex	
pattu -in- aiṉ̪tʉ	pʌtĩnə̃ɪṉ̪tʉ
ten- five	*fifteen*
pattu -in- eddu	pʌtĩnə̃ddʉ
ten-eight	*eighteen*
pattu - in- oɾu	pʌtĩnɔ̃ɾʉ
ten- one	*eleven*
pattu –in- onnu	pʌtĩnnɔ̃nnʉ
ten-one	*eleven*

Input	Output
ii. Lex + Suff (CM)	
poɽuppu-in - ai	pɔɽʊppĩnə̃ɪ
responsibility-acc	*responsibility-acc*
ʋaːyppu - in-ai	ʋaːjppĩnə̃ɪ
chance-acc	*chance-acc*
anpu - in-ai	ʌnpĩnə̃ɪ
love-acc	*love-acc*
viɽuppu-in - ai	viɽʊppĩnə̃ɪ
desire-acc	*desire-acc*

(V) Segment epenthesis

i. Lex + FUNCW

oɾu – aɾ	ɔɾʊttəɾ̚
one-nom.marker	*one person*
(oɾu – aɾ	ɔɾʊvəɾ̚
one-nom.marker	*one person*

The data shows a range of interactions between different types of phonological words and the emergence of hiatus conflicts. There are four types of interactions, including i) Lexical + Lexical, ii) Lexical + Suffix, iii) Prefix + Lexical and, iv) Lexical + Function words. The lexical items apparently have a range of moraic qualities: the base lexical items appear to be either bimoraic or polymoraic, while the prefixes are monomoraic. The grammar seems to be resolving hiatus conflicts by consulting the participating lexical words and the segments at the edges.

In what follows, constraint-based analyses for three types of crucial VH resolutions are been offered: Glide Insertion (GI), Vowel Deletion (VD), and Epenthesis Insertion (EI), in that order.

4.6 Glide Insertion in Tamil (/v/ and /y/)

4.6.1 Glide /v/

This section offers analyses for glide /v/ and /y/ insertions, respectively. Tamil inserts glide /y/, if the V_1 is underlyingly high-front lax or tense, /i/, /i:/, or /ai/, or glide /v/ if the underlying vowel of the preceding word is other than a high-front lax or tense vowel. Besides determining the reasons for interactions, it also verifies how syllable consistency is preserved based on SrRS requirements, using a simple set of data.

The data in (6) shows glide insertion to avoid vowel hiatus within the derivation of demonstrative pronouns.

6) Input Output

Input		Output	
/a/+/an/	>	ʌvən	* aan
that – nom. marker		he-singular-third place-distant’	
/i/+/an/	>	ɪvən	*ian[30]
this-nom. marker		he-singular-third place-close	
/e/+/an/	>	əvən	*ean
which – nom. Marker		*who- he-singular-third place*	

The data consists of pronouns, which are derived by attaching the suffix /an/ ‘he-singular-third place’ to different forms of demonstrative pronouns, /a/ ‘that’, /i/ ‘this’, and /e/ ‘which’. The base is in VC syllable form, while the prefix is in V syllable form. Without deleting the participating components the language has inserted glides as both inputs are crucial to render a grammatical structure which avoids hiatus conflicts.

The following diagram may clarify this said phonological reaction in detail.

7) Glide Insertion

↓

/a/ ⇒ /v/ ⇐ /an/ → / ʌvən/ ‘he-singular-third place’

Syllable structure	V.(C) V C
Prosodic word	ʌ v ə n
Grammar word	ʌ (x) ə n

It is apparent from the above diagram that the grammar word lacks an onset, while the prosodic word has one. The unfilled empty syllable skeleton which makes the structure uneven at the level of the grammar word is the cue for proper structural well-formedness.

The diagram also reveals that the language has two privileged requirements. The first requirement is a reminder of the language-specific requirement of avoiding stem/word internal onsetless syllables (c.f §2.9.1), and the other is an unacceptable hiatus

[30] It is obvious that glide /v/ has emerged at the place where glide /y/ should be. It is learned that in every instance involving the combination of demonstrative /i/ with another vowel, the language settles hiatus dispute in by applying /v/ instead of /y/. This issue will be dealt in detail §4.6.3.

environment. Both indicate that two undominated constraints *HIATUS and *[$_\sigma$ V$^{*S/W-I}$ are operative in this context.

8) *HIATUS
No Hiatus

9) ONSET
Syllables must begin with an onset

10) *[$_\sigma$ V^{*WI}
Syllables must have an onset, excluding word-initial positions

The effective role of these constraints justifies why the structure needs an onset, but not the selection of resolution. For example, deleting one of the vowels may also render the same effect as inserting the glide to avoid a hiatus conflict. Yet the grammar has relied on an expensive method to solve the sonority conflict.

The language has avoided deletion, for it might not render the same effect as inserting a glide but cause serious damage to the prosodic structure. As was mentioned previously, retaining both the preceding and succeeding elements is crucial for the new structure to provide its intended meaning. Deleting a vowel would result in an ill-formed structure, /an/, a revelation which deviates from the purpose of structural expansion. The /an/ would remain as a PNG marker. Therefore glide insertion which performs dual functions - avoiding hiatus formation and preserving the prosodic well-formedness of the structure - has been chosen as the right solution.

Yet, there is another question worthier of exploration at this point. Why does the language prefer glide insertion, instead of an obstruent epenthesis? After all, inserting the epenthetic /t/ is not prohibited in this language. A language like Axininca Campa (Kager, 1999, McCarthy, 2008) does this, as can be seen in the following example, *non-koma-i* > *nongkomati*, the best solution in terms of forming a harmonic CV cluster.

The reason for selecting glide probably lies within the requirement of sonority complexity. Selection of glide (y or v) to avoid contact between high sonorous segments, ||*MAR/vowel|| + ||*MAR/vowel||, can be justified in terms of avoidance of sonority clashes, where GI avoided an unnecessary sonority clash. We may justify the selection of glide by referring to the syllable configuration table in (26 & 27 in chapter 2). It verifies that selecting an obstruent epenthesis may promise a harmonic CV cluster that might be obtained from the insertion of a glide, for /ka/ promises a harmonic but less complex syllabification. However, GI enables the language to retain a least harmonic but most complex syllable formation, Glide-Vowel. It also enabled the structure to avoid perceptual obstruction as the glide also behaves similar to a vowel in avoiding closure (Blevins and Pawley, 2010: 26).

Moreover, having an obstruent epenthesis might have caused an additional violation and resolution, as well. A stop within intervocalic environments demands some additional modification also, such as triggering gemination and developing greater sonority fall between the adjacent vowel and consonant (as clarified in (16) chapter 3). GI at the intervocalic position avoids such aural destructions, and also involves less effort in production. The logic behind the selection of glide, which is aimed at keeping collateral problems within a manageable size, can be seen here.

4.6.1.2 Analysis

Before analysing the foregoing examples, we will assemble the general and additional constraints conditioning the environments.

To begin with, there is a Faithfulness constraint. Resolutions involving GI is an instantiation of DEP-IO dominated by markedness constraint, *HIATUS, a main force that triggers glide insertion. Casali (1996) argues that *HIATUS is a cover term, which would refer to all hiatus environments, indifferently. Applying a cover term as such for a language like Tamil may obscure various generalisations, as the language never applies a uniform strategy to avoid hiatus conflicts. Since every hiatus environment is treated individually based on the contextual differences, it is necessary to acknowledge the contextual barriers in each hiatus context. Nevertheless, since the hiatus at hand did not require such a specification, the following constraints are suggested.

11) * HIATUS
No ||*MAR /vowel|| + ||*MAR /vowel||

12) $*[_{\sigma} V^{*WI}$
Word-internal syllable must be an onset

13) DEP-IO
Every output must have representation in the input

There is another pertinent constraint that has been violated in interaction. The diagram in (7) shows that the output experienced misalignment, as well. The syllable boundary of the left-edge lexical word has been redefined to a newer position, when the structure accommodates the glide. This is a typical case of violation against alignment constraint, ALIGN-SUFFIX-LEFT, which insists that the left edge of the syllable must match uncompromisingly.

14) ALIGN-SUFFIX-LEFT (AL-SUFF-LT)
Align left edge of suffixes to prosodic or grammar words

Obviously this constraint is heavily dominated within V-V type of interactions, as the result of GI. GI would interrupt efforts to achieve optimal alignment results.

The constraints we have seen so far can be organized as follows. Since output shows that /*avan/* with glide /v/ appears to be more harmonic than the input-loyal structure, **aan*, obviously the FC and the alignment constraints are heavily dominated by both markedness constraints; *HIATUS, *$[_\sigma$ V^{*WI} » DEP-IO, AL-SUFF-LT. The simple ranking can be applied within the fixed ranking of universal segmental markedness, seen in (§2.14), as shown in the tableau presented below.

Note that the FC is militating against GI and the alignment constraint has been placed within the same ranking, as no competition appeared.

15)

Input: /a-an/	* HIATUS	*$[_\sigma$ V^{*WI}	* LAB	* DOR	* COR	DEP -IO	AL- SUFF- LT
☞a. ʌ.vən			*		*	*	*
b. a.an	*!	*			*		

Candidate (a) emerges as the victor by satisfying high ranking MCs. Candidate (b) loses the competition, though it satisfied the un-dominated constraints, because of fatal violations against the higher ranking constraints. Domination of a faithfulness constraint by a markedness constraint shows that the language resolves the hiatus conflict in language-specific ways. The available constraints account for the success of candidate (a) and the failure of candidate (b).

The situation changes though when an additional candidate is added to the list of competitors. The new candidate (c), which has undergone vowel elision, challenges the victor as we see in the following tableau.

16)

Input: /a-an/	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	DEP -IO	AL- SUFF- LT
☞a. ʌ.vən			*		*	*	*
b. a.an	*!	*					
☞c. an					*		

It is obvious that candidate 9c) is the clear winner, since *LAB dominates *COR, and it does not violate *LAB. Hence, the tableau fails to select the right optimal candidate, between candidates (a) and (c), a failure which is partially due to constraint ineffectiveness. The constraints could not distinguish the optimality of candidate (a) and (c), hence, it calls for an additional Faithfulness constraint which militates against vowel elision, but does not respond to glide as in (16). Because of the nature of MAX-IO which protects components of input from deletion, it deserves a position higher than that of high-ranking constraints. The same also cannot be placed along the constraints militating against hiatus, because they promote deletion. Hence, the MAX-IO deserve a higher ranking than the *HIATUS.

17) MAX-IO
Every segment in the input must be present in the output

18)

Input: /a-an/	MAX-IO	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	DEP -IO	AL- SUFF-LT
☞a. ʌ.vən				*		*	*	*
b. a.an		*!	*					
c. an	*!							

The received ranking order, MAX-IO »*HIATUS,*[$_\sigma$V^{*WI} » DEP -IO may provide a solution for V-V interaction in general, but provides little explanation to justify why candidate (c) which has undergone deletion cannot be selected as a winner for the issue at hand.

However, the ranking is not complete for the issue at hand, as it neither tells why vowel deletion is not permitted, nor why both vowels should be retained in the structure, but it did offer the right solution. To ensure the tableau analysis could offer proper generalisation for phonological structures involving attachment of prefix and lexical base, the tableau is added with a new constraint favouring the input segments.

19) IDENTITY-IO$_{[Func.\ Vowel]}$ [ID-IO$_{FUNC.VWL]}$]
Vowels in the functional words must not be deleted

Since the constraint did not violate high ranking FC, it must be presumed that it must share an equal position as MAX-IO, because they do not compete with each other.

20)

Input: /a-an/	MAX-IO	ID-IO [FUNC.VWL]	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	DEP – IO	AL-SUFF-LT
☞a. ʌ.vən					*		*	*	*
b. a.an			*!	*			*		
c. an	*!	*					*		*

The sole winner is candidate, (a), favoured by all undominated constraints. Candidate (b) is ousted from the competition for fatally violating two of the higher ranking constraints. Candidate (c), on the other hand, skipped for its failure to satisfy two of the highly ranked Faithfulness constraints, IDENT-IO$_{[Func.-Vowel],}$ and MAX-IO. The ranking order illustrated in the final solution clearly tells us why */ʌ.vən /* should emerge as the winner, but not the */an/*.

4.6.2 Glide /y/

Insertion of glide /v/ and /y/ works on the same principle, in Tamil. As has been verified in (4.2), both options have familiar similarities, except for selection requirements. The requirement ensures that only the glide that matches the frontness and heightness of the final vowel segments on the right edge of preceding lexical items is selected. Glide /y/ glide fulfils the requirements selected as a right choice to confront high-front vowels, such as /i/, /i:/, and /ai/, as shown in (21). The selection, once again, is in conformance with the sonority harmony as well.

21)	Input	Output	
	Lex + Suff (Derv)		
	/vaɭai/ - /al/	vʌɭəɪyəl	*vʌɭəɪəl
	bend – nom.marker	*bangles*	
	Lex + Suff (CM)		
	/aʊai – il/	ʌʊəɪyɪl	
	hall-loc.	*in the hall*	
	/tiː - il/	tiːyɪl-loc	
	Fire-loc.	*in the fire.loc*	

Note that the output surface with glide [y], conforms to the frontness and heightness of the final vowels of the preceding terms, regardless of morphological differences. The derived noun must now be observed to verify the foregoing assumption. The example has two output forms, / *vʌɭəɪyə/* and */*vʌɭəɪəl/*, the former surfaces with glide [y] and is considered more harmonic than the latter, an ill-formed structure, which surfaces without it. Insertion of a glide is the only difference that keeps them apart. The structure with glide [y] reconciles harmonically with the high-front vowels /ai/ and /i:/, for the [y] not only matches the height and roundness of the preceding, but also avoids unnecessary sonority collapse between the vowels concerned.

Insertion of glide [y] favours the structure to maintain structural harmony in two ways. One is by retaining the individual components of the vowels, and the other is by bonding a desired tie between the adjacent syllables. Although it is also possible for the structure to avoid weak vowels and retain the strong so as to solve the hiatus conflict, the language does not use deletion, as retaining both vowel segments is necessary for semantic revelation. Insertion of glide [y] rescues the harmony of the structure.

The chosen glide also helped the structure to maintain a harmonic bond with components of the adjacent syllables. This has been performed on the platform of two requirements: having most harmonic on the one hand, and having complex syllable configuration on the other. Based on the scale of the syllable complexity given in Chapter Two (26) & (27), there can be justification for VG and GV syllable configuration postulating two different forms of complexity that are necessary for the new syllable. The VG configuration is treated as fewer complexes, but more harmonic while the GV is treated as more complex and less harmonic. The level of harmony prerequisite clarifies that harmonic ties at the interface aim for a stronger bond between the preceding and succeeding components of the succeeding units in this language.

Moreover, for a language that relies upon the WEIGHT-to-STRESS (Gordon, 2002, 2004) principle, where every word-initial syllable is stressed, strengthening the intervocalic positions is more than necessary, especially when it deals with a situation which is universally marked as weak - intervocalic environments are cross-linguistically weak (Mohanan, 1993: 62).

Analysis

From the foregoing it is apparent that insertions of glide [y] and [v] have a lot of similarities in terms of constraint involvement. Insertion of glide [y] did not acquire additional constraints, or different ranking schema than those seen before for GI of [v]. Therefore, tableau analysis might be conducted in the presence of the same constraint arguments obtained in (20) by excluding IDENTITY-IO$_{[FUNC.VWL]}$, an irrelevant constraint in the current context.

22)

Input: /valai-al/	MAX-IO	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	DEP-IO	AL-SUFF-LT
☞a. vʌɭəɪyəl				*		***	*	*
b. valaial		*!	*	*		**		
c. vʌɭəl	*!			*		**		

Candidate (a) satisfied every high-ranking constraint, but incurred minimal violations against segmental constraints and low-ranking FCs, DEP-IO and AL-σ-LT. The minimal violation against the FCs did not threaten its optimality status. Candidate (b) was ousted for not satisfying the most crucial high-ranking constraints, *HIATUS and *[$_\sigma$V^{*WM}, though it satisfied the lower-ranking constraints satisfactorily. Candidate (c) was ousted by MAX-IO, for insisting deletion of the crucial components, /ai/.

The foregoing analysis clarifies that interaction between two phonologically crucial components must not be deleted in Tamil, but they must present in the output as per se, without violating syllable contiguity.

4.6.3 Glide Gemination (GG)

In the foregoing sections, insertion of /v/ and /y/ glides and their circumscriptions has been shown. In this section another phenomenon relating to GI, Glide Gemination (GG) in Tamil will be introduced. Interestingly, it involves glide /v/ in selective environments, but not glide /y/. Unlike simple glide insertion, GG application is restricted to monomoraic functional words within prefixation alone.

The GG adheres to all requirements and constraints leading towards glide insertion. On top of this it also has its own restrictions, as detailed in the following data.

23) i) Pref + Lex

Input	Output
a) /a/+/a:du/ >	ʌvva:dʊ
that – goat	*that goat*
/i/+/ a:du / >	ɪvva:dʊ
this – goat	*this goat*
/e/+/ a:du / >	əvva:dʊ
which – goat	*which goat*
b) /a/+/ya:nai/ >	ʌvya:nəɪ
that – elephant	*that - elephant*
/i/+ /ya:nai/ >	ɪvya:nəɪ
this – goat	*this elephant*
/e/+ /ya:nai/ >	əvya:nəɪ
which elephant	*which elephant*
c) /a/+/talai/ >	ʌttʌləɪ
that- head	*that head*
/i/+/talai/ >	ɪttʌləɪ
that- head	*that head*
/e/+/ talai / >	əttʌləɪ
which-head	*which head*

Three different kinds of outcome are obvious from the data; i) when monomoraic vowel syllables are attached to vowel initial Feet-Word, a glide is inserted and it geminates to supply a coda aiming at levelling the prosodic shortfall of the prefix, ii) when a monomoraic vowel syllable is attached to a glide initial Feet-Word, glide /v/ is inserted, iii) when a monomoraic vowel syllable is attached to a consonant initial Feet-Word, the initial onset geminates. The data in (23 (c) belong to V versus C type of interactions, therefore they will not be analysed until Chapter 6. The following is the analysis done for the rest of the data in (23 (a) and (b)), which have undergone the usual glide insertion and gemination.

The simultaneous glide insertion and gemination witnessed in the data have a single aim – to avoid the formation of illicit structural forms. Pronouns such as /a/, /i/, and /e/, are monomoraic segments and they do not qualify to be prefixed with stems, simply because Tamil prefers prefixes to be bimoraic. The defective pronouns are supplied with a moraic coda, as in the case of data in (23) to level the shortcomings. In this way, the language manages moraic insufficiency within prefixation of demonstrative monomoraic terms to stems systematically and maintains the structural harmony, as revealed in the following diagram.

24) (*monomoraic) (disyllabic)
(σ) (σ σ)

Grammar word i x a: .d u 'this goat'

μ μ μμ μ

Prosodic word ɪ v v a: d ʊ 'this goat'
(σ) (σ σ)
(monomoraic) (disyllabic)

The diagram shows that all well-formed words are binary forms in Tamil, as are the prefixes. The binarity is attained in the form of mora or syllables. Hence, all well-formed words in Tamil are expected to respect FOOT-BINARITY: words are expected to be either bimoraic or disyllabic, nothing else.

25) FOOT-BINARITY (FT-BIN)
Feet word must be either bimoraic or disyllabic

The same is expected from the prefixes, especially when they fill prominent stress bearing positions in lexical words. The prefixes, therefore, are expected to be bimoraic.

26) BIMORAICITY (Function Word) (BIMOR (FW))
Functional words must be bimoraic

The language expects all functional words must be bimoraic. When this requirement is not fulfilled, the grammar supplies one, through gemination, as can be seen clearly from the diagram in (24).

However, the data in (23) reveal another significant finding - satisfying the moraic significance of the output is more important than respecting the restriction of selecting right glide. Note that the front-high unrounded vowel has preferred insertion of glide [v] that does not match its criteria. In other words, the output did not surface with geminated glide, [yy], but surfaced with [vy]. This is an irregularity caused by an unexplained conspiracy.

As has been seen before, Tamil prefers two types of gliding options - front-high vowels prefer glide [y], and others prefer glide /v/. However, the situation just exemplified does not comply with the V_1 requirement described in (4.2 and 6.i). A possible reason for this irregularity can be traced back to non-optimal lexical items. As the grammar allows only optimal prefixes to be affixed to a lexical an irregular lexical units such as the given prefix with imperfect moraic deposits lost their priority deciding the glide selection. The priority appears to be turned onto the succeeding vowel segment which used to be a passive participator, to choose a glide that works along with it. The result is insertion of glide [v][31]. Gemination, on the other hand, is a regular response of the language to level moraic values or syllable discrepancies within intervocalic environments (cf. (16) in §3.6 for additional information). Selection is another sonority-related relational resolution which cherishes sonority distance between the adjacent syllable candidates and which ensures that the uniformity of the structure is preserved.

Analysis

A productive analysis of GG can be done with the constraints and the ranking argument obtained for GI in the foregoing section. Nevertheless, two additional constraints are needed to execute the task properly. From the data it is apparent that the monosyllabic prefix, /V/, was turned into the closed syllable, /VC/, indicating that Tamil is a NOCODA dominated language, an instantiation which has been initiated at the expense of NO-GEMINATION.

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[31] It is interesting to recall that the point has been made clear by Padurangam (2002) regarding the application of glide in Tamil – there was no systematic preference of glide /v/ and /y/ application in the early Tamil. The irregular behaviour of /v/ and /y/ within monomoraic function words, not only supports his assumption, but also creates doubts as to whether the language has two underlying gliding options.

27) NoCoda
A syllable must be open ended

28) No-Gemination (No-Gem)
Do not geminate

Having a coda segment is crucial for a structure to satisfy the moraic need, and subsequently qualify as an optimal prosodic word. In other words, the language prefers a minimal word or functional word to respect Bimoraicity. Therefore, it is necessary for the analysis to accommodate both well-formedness constraints.

Since the current data and those seen in (23) have a lot of similarities, the ranking obtained for the latter (repeated here as (29)) may also serve well for the current analysis.

29) Max-IO, Id-IO$_{[FUNC.VWL]}$ » * Hiatus, *[$_{\sigma}$ V^{*WI} » * Lab, * Dor »* Cor » Dep-IO , Al- Suff-Lt

To justify the phonological reaction within the given structures is necessary for Bimoraicity (Fw) to dominate NoCoda and No-Gem to allow the prefix surface as VC demisyllable. The previously attained ranking is sandwiched in-between these constraints as follows:

30) BiMor(Fw), Max-IO, Id-IO$_{[FUNC.VWL]}$ » * Hiatus, *[$_{\sigma}$ V^{*WI} » * Lab, * Dor »* Cor » Dep-IO , Al-Suff-Lt, NoCoda, No-Gem

31)

Input: /i-a:dʊ/	BiMor (Fw)	Max-IO	Id-IO [func. vwl]	*Hiatus	*[$_{\sigma}$ V^{*WI}	* Lab	* Dor	* Cor	Dep – IO	Al-Suff-Lt	NoCoda	No-Gem
☞a. ɪv.va:.dʊ /						**		*	**	*	*	*
b. ɪ.va:.du	*					*		*	*	*		
c. ɪ.a:.dʊ	*			*!	*			*				
d. ɪ.dʊ	*	*!						*		*		

Candidate (a), /ɪv.va:.dʊ/ is the unchallenged winner. It has satisfied almost every one of the dominated constraints. Its close rival, candidate (b) with lack of geminated coda lost the competition for not satisfying BiMor(Fw). Candidate (c), which is faithful to the input, lost the competition for allowing an onset within a word-medial syllable, and for being unable to satisfy the moraic requirement. Candidate (d) was ousted because of its inability to protect an essential syllable component of the host lexical.

The received ranking is capable of selecting an optimal candidate for a different set of data showing similar expectations. This can be testified with */a/+/a:du/* → ʌvva:dʊ that goat’.

32)

Input: /a-a:dʊ/	BiMor(Fw)	Max-IO	Id-IO$_{[FUNC.VWL]}$	*Hiatus	*[$_{\sigma}$V^{*WI}	*Lab	*Dor	*Cor	Dep–IO	Al-Suff-Lt	NoCoda	No-Gem
☞a. ʌv.va:.dʊ						**		*	**	*	*	*
b. ʌ.va:.dʊ	*					*		*	*	*		
c. ʌ.a:.dʊ	*			*!	*			*				
d. ʌ.dʊ	*	*!						*		*		

The previous analysis and the present one in (32) offers the same result, though a significant difference prevails between them in terms of acquired glide. In sum, the given ranking is sufficient to account for GG, involving prefixes and lexical terms.

The foregoing analyses were on nVH and a very common GI response to the language. The analyses focused on selective data exhibiting interesting features of glide insertion and other collateral changes, but did not cover every individual case of nVH in Lex + Lex, Lex + Suff and Lex + Fw, simply because they did not show any significant outcome, except for glide insertions. The ranking of constraint obtained in (32) is sufficient to account for the glide insertion elsewhere, simply by avoiding context-sensitive constraints that are irrelevant to other contexts, such as BiMor(Fw), Id-IO$_{[FUNC.VWL]}$ NoCoda and No-Gem.

While the data involving natural vowel hiatus show less complicated reactions at interfaces, the language also acquires deletion in certain environments to avoid hiatus conflicts. It is the topic of discussion to be examined next.

4.7 Vowel Hiatus and Vowel Deletion (VD)

Vowel Deletion (VD), an important mechanism in resolving vowel hiatus, is applied in less prominent environments. Although its application is apparent within: Lexical + Lexical, Lexical + Suffixes and Lexical + Function, its presence is more noticeable within Lexical + Suffixes compared to others, as shown in the following data.

4.7.1 Data of Vowel Deletion in Tamil

33)

Nominal

I. Lex + Lex

a. Deletion of syllable /mai/

Input	Output
iɭa()mai - aɾacu - aɾ	ɪɭʌʊʌɾʌcəɾ
young – king – nom.marker	*prince*
peru()mai - aːcu - iɾi – aɾ	peːɾaːcɪɾɪyəɾ
honour – error - rid -nom.marker	*professor*
n̪a(n)mai - aː(d)ci	n̪ʌ̃llaːdtʃɪ
good - governance	*good governance*

b. Deletion of vowel segment (unstressed /ʉ/)

aːy()vu - aː ɭ(a)n	aːjʊaːɭə̃ɳ
research – nom.marker	*researchers*
aɭa()vu – illaː	ʌɭʌʊɨllaː
size – no	*enormous*
cottu – uda()mai	cɔttʉdʌmə̃ĩ
wealth – posses	*wealth*
eɻu(t)tu - aːɭ()an	eɻʊttaːɭə̃ɳ
write – nom.marker	*writer*
ɪjaŋ()ku - aː()tal	ɪjʌ̃ŋg̃aːtəl
perform – not	*not performing*
ila(k)ku – iy()am	ɪlʌkkɨjə̃m
aim – nature	*literature*

c. Deletion of weak vowel

Input	Output
a(n̪)ta - an̪ta	ãn̪θ̃ʌ̃n̪θ̃ə̃
that – that	*that and that*
appaː - ammaː	appaːmmaː̃
father – mother	*parents*
ennaː - ennaː	ẽnnãːnnaː̃
what – what	*the point is that…*
ennaː - ŋg̃ə̃	ẽnnãːŋg̃ə̃
what – ergative	*hello*
e(n̪)te - en̪te	ẽn̪θ̃ẽn̪θ̃ə̃

which – which	*which one*
n̪iː - u(ŋ)kaɭ	n̪ĩːŋg̃ə̃ɮ̚
you – hon.marker	*all of you*

II. Lex + Suff (Derv)

a. deletion of syllable /mai/

Input	Output
kaɾu()mai - an	kʌɾɪjʌ̃n
black - -nom.marker	*black man*
n̪a(n)mai - a	n̪ʌ̃ɭɭə
good - -nom.marker	*the good…*
pula()mai - an	pʊlʌʋən
genius - -nom.marker	*poet*
putu()mai - a	pʊtɪjə
new - -nom.marker	*the new*

b. Segment deletion (Deletion of weak /ʉ/)

kaɽ(ɽ)ʉ - aɾ	kʌɽɽʌʋʌr̚
learn--nom.marker	*the learned person*
kaɾu(p)pʉ – aɾ()kaɭ	kʌɾʊppʌɾkəɮ̚
black - nom.marker	*black people*
maɽɽʉ – a – aɾ	mʌ̃ɽɽʌʋər̚
other- -nom.marker	*others*
peɽɽʉ - a - aɾ	peɽɽʌʋər̚
have - -nom.marker	*parent*

c. De-nasalization

maɾuntu - aɾ	mʌ̃ɾʊttʉʋəɾ
medicine-nom.marker	*doctor*

d. Multiple suffixations

LEX + FWD + SUff

cel(a)vu - aːku -i	sələvaːgɪ
spend out-verbalizer	*spend out*

III. Lex + Suff (CM)

1. Case marker ai ~ əɪ/ə

Input	Output
aːj()vʉ - ai	aːjʋəɪ
the research-acc	*the research-acc*
anpʉ - ai	ʌnpĩnə̃ɪ
love-acc	*love-acc*
en()patʉ - ai	ẽnpʌtəɪ
so-acc	*so-acc*
kaːdʉ - ai	kaːddəɪ
forest-acc	*forest-acc*
kanavʉ - ai	kʌ̃nʌ̃ʋəɪ
dream-acc	*dream-acc*
maɾa()pʉ - ai	mʌ̃ɾʌpəɪ

custom-acc	*custom-acc*

2. Nouns ending with consonants (this is a special case scenario)

Input	Output
maː ()n̪aːdʉ - ai	maː̃n̪aː̃ddəɪ
conference-acc	*conference-acc*

3.Case marker oːdu –odu - ~ a

Input	Output
aːtaɾavʉ - oːdu	aːtʌɾʌʋoːdʉ
support- with instr.	*with support- instr.*
anpʉ - oːdu	anpoːdʉ
love- with instr.	*with love-instr.*
eː(ʈ)paːdʉ - oːdu	eːʈpaːddoːdʉ
preparation- with instr.	*with preparation-instr.*
paɳpʉ - oːdu	pʌ̃ɳpoːdʉ
politeness- with instr.	*with politeness-instr.*
ʋaːɾttai - oːdu	ʋaːɾttəɪyoːdʉ
words- with instr.	*with words-instr.*
ʋiːdʉ - oːdu	ʋiːddoːdʉ
home-along-instr.	*home-along-instr.*

4. Nouns ending with consonants

Input	Output
kaɾu(t)tʉ - oːdu	kʌɾʊttoːdʉ
thought- with instr.	*with the thought-instr.*

5. ɪn (aːyʊĩn) (ablative/ sociative(abl./soc.)

i. Nouns ending vowels

Input	Output
aːj()vʉ - in	aːjʊĩn
research-abl.	*research-abl.*
kai()taddʉ - in	kʌɪtʌddĩn
clap-abl.	*clap-abl.*
kaɾu(t)tʉ - in	kʌɾʊttĩn
point-abl.	*point-abl.*
mudi -vu - in	mʊ̃dɪʊĩn
the end-abl.	*the end-abl.*
muyal - ci - in	mʊ̃jʌʈccɪyĩn
trial-abl.	*trial-abl.*
n̪aːdʉ - in	n̪aː̃ddĩn
country-abl.	*country-abl.*

6. ɪl ~ la (aːlʌyəttɪl ~aːlʌyəttɪlə) (locative (loc.)

i. Nouns ending vowels

Input	Output
aɾukʉ - il	ʌɾʊɪgɪlə
near-in	*in near-loc.*
cottʉ - il	cɔttɪl
wealth – in	*in the wealth-loc.*

7. ɪdə̃m͞~kɪddə (aʊʌ̃nɪdə̃m͞~ʌʊə̃ŋkɪddə) – locative (loc.)

i. Nouns ending with consonants /m/

Input	Output
aɾac(aː)ŋkam -idam	aɾʌcaː̃ŋg̃əttɪdə̃m͞
government-to (loc.)	*to government – loc.*

IV. Lex + FuncWd

a. Deletion of unstressed /ʉ/

Input	Output
aːy()vʉ – itu	aːjʊɨtʉ
research-this	*this research*
aiṉtʉ - aːvatu	ãĩntaːʊʌtʉ
five-the	*fifth*
anpʉ - aːɾ(n)ta	ʌnpaːɾntə
love-be	*beloved*

Verbs

I. Lex + Suff (Infl)

a. Deletion of unstressed /ʉ/

Input	Output
aːkʉ-a	aːgə
happen-nom.marker	*to create*
adi(k)kɪɾʉ-aːn	ʌdɪkkɪɾaː̃ɳ͞
beat-tense marker-nom.marker	*(he) is beating*
ceyal()padu(t)tu()kɪɾʉ-aːn	cəjʌlpʌdʊttʊkɪɾaː̃ɳ͞
act-do-tense marker-nom marker	*(he) is executing*
cey()kɪɾʉ-aːn	cəjkɪɾaː̃ɳ͞
do-tense marker-nom marker	*(he) is doing*
iɾu(k)kɪɾʉ-aːn	ɪɾʊkkɪɾaː̃ɳ͞
be- tense marker-nom. marker	*(he) is exist*
keːɭ()kɪɾʉ-aːn	keːdkɪɾaː̃ɳ͞
ask- tense marker-nom. marker	*(he) is asking*
kudi()kɪɾʉ-aːn	kudɨɾʊkkɪɾaː̃ɳ͞
drink- tense marker-nom. marker	*(he) is drunken*
ka(ɽ)ɽʉ- aɾ	kʌɽɽʌʊʌɾ͞
learn- tense marker-nom. marker	*the learned person*
ma(ɽ)ɽʉ – a(v)aɾ	mʌ̃ɽɽʌʊʌɾ͞
other- nom. marker	*others*
pe(ɽ)ɽʉ - a(v)aɾ	pəɽɽʌʊʌɾ͞
have -nom. marker	*parent*

b. Deletion of weak vowel

Input	Output
nadu-a	nʌdə
plant-nom.marker	*the planted*
padu-a	pʌdə
feel- nom.marker	*the felt*
todu-a	tɔdə
touch-nom.marker	*the touched*
atu - aːʋʌtu	ʌtəɪyaːʋʌtʉ
that-at least	*at least that…*

II. Lex + FuncWd

a. Deletion of unstressed /ʉ/

Input	Output
aːgʉ - iya	aːgɨjə
happen – adj. mark.	*the happened*
adaŋkʉ - iya	ʌdʌ̃ŋg̃ɨjə
settle – adj. mark.	*the settled*
kuːdʉ - iya	kuːdɨjə
merge- adj. mark.	*the merged*
anu()kʉ - iya	ʌnʊ̃gɨjə
approach - adj. mark.	*the approached*
cuɾu(ŋ)kʉ - iya	cʊɾʊ̃ŋg̃ɨjə
shrink- adj. mark.	*the shrunk*
eɻʊ(tʉ) - iya	əɻʊtɨjə
write- adj. mark.	*the written*
aːctʃʉ - innu	aːctʃɨnnɯʉ
happen- adj. mark.	*the happened*
aːkʉ – iya	aːgɨjə
happen-definitive marker	*the happenned*

b. Deletion of weak vowel

Input	Output
ennaː - iŋg̃ə̃	ẽnnãːŋg̃ə̃
what-hon.marker	*hello*
n̪iː - u(ŋ)kaɭ	n̪ĩːŋg̃ə̃ɮ̚
you-hon.marker	*all of you*

c. Secondary VH

Input	Output
ʋeː(ɳ)dum - iya	ʋeːɳdɨjə
need-ergative	*the needed*

The data[32] reveal different forms triggering and blocking requirements of deletion. Generally, the V_1 is axed while the V_2 is retained, but vice versa preferences are also noticeable in certain circumstances, as described in (34).

34) ...XV_1 + V_2Y...

i.) Delete ...XV_1 instantly than the V_2Y..., except when the XV_1 is heavy

ii) Delete V_2Y if and only if its competitor (XV_1) is heavy. If both have equal moraic value, environment is used as tool to decide the deletion – the first requirement is held. Retain the word-initial vowel (YV_2), and elide the word final vowel (XV_1)

iii) If vowels meeting at the juncture are of similar moraic quality from the same major class – delete the XV_1

iv) Delete the unstressed short vowel /ʉ/ at the edge of (XV_1) in all instances

v) Never retain /(m)ai/ suffix at the edge of the preceding lexical in any circumstances

The data reveals two types of deletion defused at hiatus environments within three different kinds of lexical interactions- Segment Deletion and Syllable Deletion. Between the two of them, the former registers regular application in comparison to the latter. While segment deletion is treated as contextually bound and restricted activity, syllable deletion is provoked whenever a preceding lexical word ends with the syllable, /*mai*/, a suffix denoting a qualitative sense which is usually relinquished in any extension of morphological activity.

The data show that segment deletion is decided by circumstances. Whenever the right and left edges of the lexical words are occupied with vowel segments of the same qualities, or heavy moraic value, one of them is deleted. Syllable deletion is common within Lex + Lex, Lex + SUFF and LEX + FW type of interactions. The PreF + Lex type of interaction does not involve any one of these deletions.

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[32] The collected data consists of close to 1000 words representing various lexical classes which prefer VD to avoid VH. Due to page constraint, only a few of them have been shown here.

Last in the list is secondary vowel hiatus, borne from the deletion of /m/. Upon deletion of word-final coda in *veː(ɳ)dum*, the preceding lexical item behaves like an open ended syllable when it is attached to a vowel initial suffix, /*iya*/. Selection of right glide to avoid hiatus is done based on the quality of vowel segments residing at the left edge.

In short, the presence of VD in Tamil can be detailed as follows:

35) i. Lexical + Lexical
  a. Segment deletion, and Syllable deletion

  ii. Lexical + Functional Word
  a. Segment deletion

  iii. Lexical + Suffix
  a. Segment deletion

4.7.2 Segment Deletion

Deletion of Weak Segment

Two types of segment deletions are common in Tamil - deletion of weak segment and deletion of the unstressed /ʉ/[33]. Deletion of vocalic segments at the juncture is carried out systematically - retaining the heavy and deleting the weak segment to avoid unnecessary sonority and moraic clash. Segment deletion is common within Lex + Lex and Lex + Suff, but not in Pref + Lex.

The role of moraic weight in deciding the right candidate for deletion cannot be underestimated. Retaining the heavy and strong vowel compared to non-heavy and weak vowel is common in this language, as we can see in the two representative piece of data in (36) below.

[33] It is well-known fact that Tamil has six types of unstresses /u/ lexical items, which is defined based on the penultimate consonant. A /u/ preceded by so-called hard consonants /k, c, d, t, p, ṯ/ within a lexical item with not not less two moras is considered unstressed. A /u/ which ends with another than the given consonants within a lexical word are considered as weak /u/.

36) Data

Input	Output Glossary
i. Lex + Lex	
(a)appa: - amma:	ʌppa:mma:
father – mother	*parents*
ii. Lex + FW	
atu - a:ʋʌtu	ʌta:ʋʌtʉ
that – is	*that is*
iii. Lex + Suff	
n̪adu-a	n̪ʌdə
plant – inf.marker	*the planted*
padu-a	pʌdə
feel – inf.marker	the felt
todu-a	tɔdə
touch – inf.marker	*the touched*

Two types of deletion are apparent in the data - i) when heavy sonorous segment meet weak sonorous segments, the latter is deleted regardless of its positional prominence, as in (36(i) and (ii)) when vowels of the same quality meet at the interface, retaining V_2 and deleting V_1, as in (36iii).

At first glance the data in (36(a) may appear to promote feature deletion but the phonetactic alternations at the interface display a different scenario illustrated the diagram in (37).

37)

[+Back] [+Back]
[+Low] [+Low]
[+Long] [-Long]

app**a:** → ← **a**mma:

↓

ʌpp**a:**mma:

[+Back]
[+Low]
[+Long]

The preceding lexical, /appa:/ ends with /a:/, while the succeeding lexical /amma:/ begins with a short vowel /a/. Both /a/ and /a:/ have the same features, as has been illustrated in the diagram, except for one, [+ Long] and [- Long][34]. The language gets rid off the weak nuclei forcefully, a practice which complies with the superseding requirement given in (6) and (37) to delete the weak vowel between $V_1$and V_2. Since coalescene would lead to formation of superheavy vowel with three moras, it is presumed that the lexical has undergone deletion to maintain the maximal requirement of a sound segment. This indicates that a constraint *WEAKNUCLEI is operating in this context. Meanwhile the same data also reveals that Tamil avoids vowel fusion that may lead to the formation of a super heavy nucleus. This shows that *SUPERHEAVYNUCLEUS is also a relevant constraint at this point. Obviously, both of them are undominated.

38) *SUPERHEAVY NUCLEAUS (*SUPHEV NUC)
Nucleus must be monomoraic or bimoraic

* WEAKNUCLEI (*WKNUC)
Syllables must be filled by a strong nucleus

Hiatus environments emerging from interaction between vowels of the same quality but from different major classes behave slight differently at interfaces as shown in the data in (36(iii)). Disyllabic words ending with /u/ are attached to a monomoraic suffix to inflect the meaning of the stem. Instead of applying a glide, the Lex + Suff (Infl) insist on deletion of weak vowels, without disturbing their structural contiguity, disyllabic form. This suggests that the language prefers vowel deletion over glide insertion in order to satisfy structural contiguity.

Apart from structural contiguity, deletion is motivated for another reason. Besides ensuring that the structural well-formedness is preserved, deletion enabled the structure to obtain a crispier nucleus. The terminology of crispy should be interpreted as ‘fully formed and healthier’ form of vowel. The need was preserved by selecting the advantageous nucleus between the ||*MAR/vowel|| of V_1 and ||*MAR/vowel|| of V_2. The

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[34] It must be stressed that feature [±long] corresponds to moras as well. A segment marked with [+long] has two moras while the one marked for [-long] has one mora, presumably, in Tamil. For sake of convenience, we have relied upon the former.

candidate selected for deletion, once again, complied with the principle of deletion narrated in (39(i)).

Analysis

Two separate analyses for segment deletion that have been argued so far will be discussed next. One is for /*app**a: - a**mma:*/, and the other is for deletion of segment in non-prominent position, /*nadu-a*/. Both of them have been selected for casting a significant difference in terms of violation against alignment constraint initiated by the deletion.

The constraint ranking obtained for hiatus blocking in (20) will be relied on to perform a tableau analysis for segment deletion within /*ʌpp**a:**mma:*/ by dropping the irrelevant FC, DEP-IO. The ranking is repeated here as (39).

39) * HIATUS, *[$_\sigma$ V^{*WI} » * LAB, * DOR »* COR »AL-SUFF-LT

The foregoing illustrations reveal that segment deletion is inevitable in selective circumstances. This gives a cue that the language cash-outs structural harmony at the expense of heavily dominated MAX-IO (SEG-IO), a constraint that militates against segment deletion. The undominated status forces the constraint to be ranked low along with alignment constraint, for not showing a competitive nature.

40) MAX-IO(SEGMENT) (MAX-IO(SEG))
Every segment of input must be present in output

The effectiveness of *HIATUS and *[$_\sigma$V^{WM}] are beyond any question. The former avoids collision between two highly-ranked sonorous segments, while the latter ensures the word medial syllable contiguity is not encroached.

To surface the intended structure with promising harmony, it is important for the grammar to rank *SUPHEVNUC and *WEAKNUC above the *HIATUS and *[$_\sigma$V^{WM}] and MAX-IO(SEG), as in (41).

41) *SUPHEVNUC, *WEAKNUC » *HIATUS, *[$_\sigma$ V^{*WI} » *LAB, *DOR »*COR » AL-SUFF-LT, MAX-IO(SEG)

It is noticeable that the constraints militating against vowel fusion have been ranked above the *HIATUS and *[$_\sigma$ _V^{WM}]. Both sets of binary constraints presumably are performing two different functions in a different manner. Therefore, they have been ranked hierarchically.

Deletion of a vowel at a less prominent position over the prominent as shown in (36(iii)) is realised by the ranking of constraints which show no concern against nucleus requirements, as follows:

42) * WKNUC » * HIATUS, *[$_\sigma$ _V^{WM}] » *LAB, *DOR »*COR » MAX-IO(SEG) » AL-SUFF -LT, MAX-IO(SEG)

Tableaux analyses for both of them are as follows:

43)

Input: /appa:- amma/	*SUP HEVNUC	* WEAK NUC	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	AL-SUFF-LT	MAX-IO (SEG)
☞a.ʌpp**a:**mma:					****			*	*
b. ʌppʌmmʌ		*			****				*
c. ʌpp**a:** ʌmma	*!		*	*	****				

44)

Input: /n̪adu-a/	* WEAK NUC	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	AL-SUFF-LT	MAX-IO (SEG)
☞a. n̪ʌdə						**	*	*
b. n̪ʌduə	*	*!	*			**		

In tableau (43), the optimality of candidate (a) is determined by the satisfactory result performed against the higher ranking constraints. However, minimal violation incurred against the low-ranked, MAX-IO(SEG), did not affect the result. Candidate (b) lost the optimal status for fatal violation against the un-dominated, *WEAKNUCLEAUS. The input-friendlier candidate, (c), was penalised for violating three constraints; *SUPHEVNUC, *HIATUS and constraints that require word-internal syllables must have an onset.

The result of the constraint evaluation in tableau (44) is clear cut. Candidate (b), the input friendlier candidate, has been ousted from further evaluation for disfavoured vowel sequence, ||*MAR/vowel||-||vowel/*MAR||. Candidate (a) sustained optimality status for satisfying the high ranking constraints.

It is transparent from the foregoing discussion that segment deletion is a contextually bound phenomenon in Tamil. A fixed strategy, such as delete V_1 or V_2 in particular situations as in Emai (McCarthy, 2008) is not found in Tamil, but the language treats every case of hiatus individually before deciding on the right choice of deletion. Sonority of the vowel segments is also a contributive factor in vowel hiatus resolutions, where the language prefers to preserve sonorous vowels rather than vowels which have been graded as prominent and less prominent by positional strengths.

In sum, we may claim that Tamil warrants heavy vowels to be retained for achieving a sonorous environment at the interfaces as a rule of thumb. Whenever these key positions are filled by vowels belonging to the same major class, or moraic quality, it deletes the vowel that belongs to a less prominent position to avoid unnecessary tension.

To reiterate, VD operation in Tamil follows the rule of thumb: retain the sonorous vowels, regardless of positional prominence, V_1 or V_2, without much consultation.

Deletion of V1 - the unstressed (ʉ)

The outcomes of the foregoing analyses indicate that segment deletion in Tamil is characterised by environments. That is, the moraic and sonority quality of the participating sound segments contribute much in deciding the deletion. In this section, we shall see additional evidence claiming that the sonority of the sound segment makes a crucial contribution in forming deletion. The following investigation revolves around the deletion of the so-called unstressed vowel /ʉ/.

Tamil has more morphological terms ending with the back vowel, /u/, next to mid vowels. Present literature on Tamil (Christdas, 1988, Dass, 2005b, Keane, 2006, Kumaraswami, 1966, Noormaan, 2000, Schiffman, 1999a, Thilagawathi, 1995) and that of classical works (Albert, 1985, Cinnasamy, 1996, Ilakkuvanar, 1994b) on /u/, /a/ and /i/ have verified that they have preserved quality when they occur in word-initial positions but have reduced duration in non-initial syllable. Due to this irregular behaviourism, a few studies such as Caldwell (1987) and Pandurangam (2004) have treated the word-final /u/ as a euphonic element rather than underlyingly /u/. Christdas (1988) claims the unstressed high-back vowels as epenthesis. As has been clarified in §1.5, in reviewing related literature the present study claims the /ʉ/ as a euphonic element, but not epenthesis (cf. §1.5 for more information on euphonic and epenthesis explanation).

The controversy surrounding unstressed /ʉ/ owes its explanation to various linguistic factors. Most grammar literatures argue that the word-final /u/ is believed to be unstressed due to the phonological behaviour of neighbouring segments (Agesthialingam, 2002, Dass, 2005b, Kothandaraman, 1999b). It is believed that the language has at least six environments where the high-back short /u/ vowel attached to voice and voiceless obstruents[35] surface as unstressed vowel, /ʉ/, within selected types of polysyllable and heavy disyllabic terms, V:CV. Within CVCV types of disyllabic words it emerges with full mora. The following data match the foregoing descriptions.

45) Data

Input	Output
i. Lex + Lex	
ku:ddʉ - aɳi	ku:ddʌɳɪ
ally – force	*alliance*
cottʉ - udamai	sɔttʊdʌməɪ
wealth – posses	*wealth*
ii. Lex + Suff (derv)	
karuppʉ - ar	kʌrʊppər
black – nom.marker	*black people*
iii. Lex + FuncW	
ilakkʉ - iyam	ɪləkkɪyəm
aim – nature	*literature*
(a)anpʉ - a:r(n̠)ta	ʌnpa:rn̠tə
love – be	*the beloved*
(a)anpʉ - udai(y)a	ʌnpʊdəɪyə
love – have	*the beloved*

[35] The six environments identified based on the segments which fill penultimate positions of the word-final /u/ attached to an obstruent. The penultimate position may only be filled by the following - obstruent, homorganic nasal, glides, vowels, glottal segment, and word-initial long vowels.

The data consist of three kinds of examples, showing that segment deletion is common in all types of major morphological expansion activities. Deleting the weak vowel, /ʉ/ is common when it is confronted with a full-fledged vowel, as depicted in (46).

46) Input Output

Input	Output
$V_{1.}V_2$	V_2
…dʉ - a…	…da…
... tʉ - u...	...tu...
…pʉ - ar…	…par…
…kʉ - i…	…ki…
…pʉ - a:r…	…pa:r…
... pʉ - u...	...tu...

Deletion in the foregoing is a reminder of the requirements for deletion seen before; deletion of V_1 is common within $V_{1.}V_2$, when two vowels with equal quality confront at the juncture in Tamil. The outputs in (46) have sustained the V_2 accordingly, by deleting all high-back vowels at the right-edge. The motivation for deleting the unstressed vowel can be concluded as two-fold - sustaining cripsnucleus, and avoiding sonority clash. They will now be examined one by one.

The structure achieves CRISPNUCLEI by deleting one of the weak nucleuses. The unstressed vowel /ʉ/ at the right-edge of the lexical items is half the weight of the full-fledged vowels on the left-edge of the succeeding lexical units.[36] Logically, the healthier vowel would serve more as a cripsnucleus than the weaker. Therefore, the heavier vowel, which ensures cripsnucleus, is sustained in a bid to safeguard structural competence in conformance to the 'rule' of deletion highlighted in (34).

47) CRISPNUCLEI (CRISPNUC) Avoid weak nucleus at peak

[36] The assumption on the weight is done based on the following interpretation. A fullfledge vowel which consists of all four stages of production, as claimed in the classical grammar, is considered to have one mora. The four stages are namely, thinking, efforting, initating and releasing, where each one of them would contribute to a quarter of the mora. In the event of producing an unstressed vowel, it is presumed that the last stage is performed in full. Since no segment can be assigned a ¾ mora, it is assumed that the unstressed vowel has half the weight of the stressed vowel.

Analysis

The role-play of the foregoing constraint can be verified within the tableau analysis. Adding the undominated constraint responsible for producing a structure with crisp nucleus among the high-ranking constraints within the ranking obtained in (43) will solve the problem, as follows:

48)

Input: /ku:ddʉ-aɳi/	CRISP NUC	* WEAK NUC	* HIATUS	*[$_\sigma$ V^{*WI}	* LAB	* DOR	* COR	AL - SUFF-LT	MAX-IO (SEG)
☞a. ku:ddʌɳɪ						*	***	*	*
b. ku:ddʉʌɳɪ		*	*!	*		*	***		
c. ku:ddʉɳɪ	*	*!				*	***	*	*

Previously raised expectations are answered in tableau (48). The winner, candidate (a), satisfied all higher ranking constraints, but incurred minimal violation against the constraint militating against deletion, showing that respecting syllable contiguity with a crispier peak is vital when given a choice. This also shows that it necessary for the tableau to have both constraints, CRISPNUCLEI and WEAKNUC, aiming for the same result. Candidate (b) is rejected by *HIATUS and *[$_\sigma$ V^{*WI} for permitting an unacceptable diphthongised form, indicating that diphthongization through lexical conjoining is forcefully rejected and retaining a healthier nuclei is an issue as well. Preference of cripsnucleus over weak nucleus is well-transmitted by the fatality incurred by candidate (c). It is obvious that CRISPNUC is an important role in producing the well-formed lexical structure, and the same can be attested to for other candidates such as, /*ilakkiyam/* and /*karuppar/*, sharing the very environments and requirements. So far, the analysis is fine.

However, the second and last two examples in the Lex + Lex and Lex + FuncW, types of interaction in (45(i) and (iii), respectively, appeared to demand extra care. The inputs, */cottʉ-udamai/*, with the same featural values however, challenge the accuracy of the analysis that has been achieved for the deletion of unstressed /ʉ/. The Tableau analysis in (48) doubts the validity of higher-ranking constraints in selecting the optimal candidate. Candidates (a) and (c), the tie, have incurred the same violation and same satisfaction, and lead to falsified predictions, as the weak vowel does not exist within the word-internal position as seen in (49).

49)

Input: /cottʉ$_{(V1)}$-$_{(V2)}$udamai/	CRISP NUC	* WK NUC	* HIATUS	*[$_{σ}$ V^{*WI}	* LAB	* DOR	* COR	AL-SUFF-LT	MAX-IO (SEG)
☞a. sɔttʊ$_{(V2)}$dʌməɪ					*		****	*	*
b. sɔttʉudʌməɪ		*	*!	*	*		****		
☞c.sɔttʊ $_{(V1)}$dʌməɪ					*		****	*	*

The analysis lacks a crucial constraint which must penalise the word-final unstressed /ʉ/. Replacing the CRISPNUC with HEAVYNUCLEI may offer a remedy, but it will make no vivid differentiation between vowels of heavy moraic values such as, /a:/ and light heavy moraic value such as /u/; both vowels are treated as naturally heavier than the word final unstressed /ʉ/. A new MC, aiming at avoiding the weaker /ʉ/ from the surface as syllable final nuclei within the output, is probably the right choice.

50) *[$_{σ}$ Cʉ#: Word final unstressed ʉ must not surface in output

Since *[$_{σ}$Cʉ# and CRISPNUC perform the same function of avoiding the weak nuclei from filling the weaker position, they must dominate other constraints to initiate deletion of /ʉ/.

51)

Input: /cottʉ$_{(V1)}$-$_{(V2)}$udamai/	*[$_{σ}$ Cʉ#	CRISP NUC	* WK NUC	* HIATUS	*[$_{σ}$ V^{*WI}	* LAB	* DOR	* COR	AL-SUFF-LT	MAX-IO (SEG)
☞a. sɔttʊ$_{(V2)}$dʌməɪ						*		****	*	*
b. sɔttʉudʌməɪ	*!		*	*	*	*		****		
c.sɔttʊ $_{(V1)}$dʌməɪ	*!	*	*			*		****	*	*

The newly added constraint targets the word-final unstressed /ʉ/ and stops it from surfacing. Subsequently it helps in selecting the optimal candidate. This constraint ranking also proves that vowels from the same natural classes do not coalesce in Tamil, but prefer deletion where segment deletion and feature deletion are treated alike. It must be stressed that the present analysis holds for every case involving the vulnerable vowel, /ʉ/, in word-final position.

The discussion on natural vowel hiatus involving deletion ends with this analysis, and will move on to another option in avoiding hiatus - epenthesis .

4.8 Augmentative Epenthesis

The present section examines the application of Augmentative Epentheses (AEs) in resolving hiatus conflict in Tamil. Tamil has two types of infamous Augmentative Epentheses, Syllable Epenthesis and Segmental Epenthesis, applied at interfaces between Lex + Lex and Lex + Lex and Lex + Suff. The following analyses prove that selection of each one of them is decided by the phonological circumstances at the interfaces.

The application of syllable epenthesis and segmental epenthesis serves a different purpose in Tamil. Following Ito and Mester (2004), it is presumed that AE insertion supports the structural requirement – suffixation insisting on crisp edge, an environment which is necessary for establishing proper syllable-contact in accordance to sonority harmony besides avoiding hiatus conflict.

52) Data of Augmentative Epentheses

(a) Morph epenthesis

Input	Output
i. Lex + Lex	
pattʉ - in-aiṉ̪tʉ	pʌtĩnə̃ɪṉ̪tʉ
ten – five	*fifteen*
pattʉ - in - eddu	pʌtĩnə̃ddʉ
ten – eight	*eighteen*
pattʉ - in - oɾu	pʌtĩnɔ̃ɾʉ
ten – one	*eleven…*
pattʉ - in - onnu	pʌtĩnnɔ̃nnʉ̃
ten – one	*eleven*
pattʉ - in - oɾu	pʌtĩnnɔ̃nɽʉ
ten – one	*eleven*

ii. Lex + Suff (CM)

Input	Output
poɽuppʉ- in - ai	pɔɽʊppĩnə̃ɪ
responsible – acc.	*responsibility-acc*
ʋaːyppʉ - in -ai	ʋaːjppĩnə̃ɪ
chance – acc.	*chance-acc*
anpʉ - in -ai	anpĩnə̃ɪ
love – acc	*love-acc*
ʋaːɻʋʉ - in - ai	ʋaːɻʋĩnə̃ɪ
life – acc	*life-acc*
viruppʉ- in -ai	virʊppĩnə̃ɪ
responsible – acc.	*responsibility-acc*

(b) Segment epenthesis

iii. Lex + Suff (Derv)

oɾu -[t]- aɾ	oɾʊttəɾ̚
one – nom.marker	*one person*
(oɾu – aɾ	oɾʊvəɾ̚)
one – nom.marker	*one person*

Data in (52)(i), (52)(ii) and (52)(iii) represent compound words[37], nominal inflections, and derived words, respectively. The compound words are formed by attaching similar base words to various numeral lexical words. In the second set of data, the base noun is attached to the accusative case marker, which is a diphthong. In the third set, a numeral base is attached to a derivational suffix. While the compound and inflected words receive morph epenthesis, [in], the derivational word receives a segmental epenthesis, [t].

The data in (52(ii)) have another variant as well, as presented in (52(i)). Except for the receiving and dropping the epenthesis, /in/, the lexical forms do not display any other differences. As has been stressed, the distinction is prevalent in written and spoken Tamil, where the former prefer a lexical item with /in/ while the later is popular in written and spoken Tamil, as well.

53)

i)Lex + Suff (CM)

Input	Output
poɽuppʉ - ai	pɔɽʊppəɪ
responsibility – acc. marker	*responsibility – acc. marker*
ʋaːyppʉ - ai	ʋaːjppəɪ
chance – acc. marker	*chance – acc. marker*
anpʉ - ai	anpəɪ
love – acc. marker	*love – acc. marker*
ʋaːɻʋʉ - ai	ʋaːɻʋə̃ɪ
life- acc. marker	*life – acc. marker*
viruppʉ - ai	virʊppĩnə̃ɪ
desire – acc. marker	*desire – acc. marker*

[37] Some grammarians believe that the numeral compound did not involve AE. Instead of that, the stem itself is /*patin/* another morph that connotes a sense of ten. The present study presumes that /*patin/* is a combined form of /*pattʉ*/ and /*in*/, an output which is obliged to high-ranking MC, [$_σ$ Cʉ#.

The data in (52(i) favour the 'rule of thumb of VD'- deleting the V_1, and retaining V_2, if the latter is a heavy segment. Needless to say the HEAVYNUCLEI is proven to be active in this context; therefore, analysing the pattern of deletion would not be very complicated. However, such flexibility is not possible within the data hosting AE, /in/. As the grammar has preferred a syllable morph to solve the intensity conflict at the interface, we may expect some additional analytical challenges.

The following tableau clarifies the foregoing assumptions. The ranking obtained in (51) is reapplied with the addition of DEP-IO, a dominated FC which failed to avoid insertion of epenthesis. It has been placed along with MAX-IO, because they do not compete with each other. The tableau also added another undominated constraint which militates against the formation of the super-heavy nucleus, *SUPEREAVYNUCLEI.

54)

Input: /pɔɽʊppʉ-[in]- ai/	*SUP HEVNUC	*[σ Cʉ#	CRISPNUC	*WKNUC	*HIATUS	*[σ V*WI	*LAB	*DOR	*COR	AL-SUFF-LT	MAX-IO (SEG)	DEP-IO
☞a. pɔɽʊppĩnə̃ɪ							***		**	*	*	*
b. pɔɽʊppʉnə̃ɪ		*		*			***		**	*	*	*
c. pɔɽʊppʉə̃ɪ	*!	*	*	*	*	*	***		*			

55)

Input: /pɔɽʊppʉ-ai/	*SUP HEVNUC	*[σ Cʉ#	CRISPNUC	*WKNUC	*HIATUS	*[σ V*WI	*LAB	*DOR	*COR	AL-SUFF-LT	MAX-IO (SEG)	DEP-IO
☞a. pɔɽʊppə̃ɪ							***		*	*	*	*
b. pɔɽʊppʉai	*	*	*	*	*!	*	***		*		*	

The tableau analyses run foul, as both tableaux display the same results, though the output requires additional elements. The output allowing /*in*/ runs across some analytical problems, while the one without it shows a direct result, accurately.

The crucial question which needs to be answered is why the grammar has materialised an unpopular cross-linguistic activity though it could have rectified the structure without

/*in*/. There are two possible answers for which we need some morphological clarification.

Deleting the unstressed high-back at the right edge of the succeeding word whenever they confront heavier vowels appears to be common in Tamil. The vacancy is now filled by /in/, EA, which has supplied a nucleus and onset for the suffix marker, and subsequently resolved the hiatus conflict. It seems that the grammar allows an optional form, /*poɽuppu/* <*in*>- */ai/* >*/pɔɽʊppinə̃ɪ/* ‘responsibility-acc’, while simplex forms are at hand.

There are two possible reasons why the grammar has adopted an alternative strategy. The first reason is that EA insertion is crucial for establishing vowel harmony between the base and suffix. It is obvious that the monosyllable suffix, /ai/ and the vowel of the AE, /*in*/ share the same vowel class, [+high] [+front]. Both of them match in terms of heightness and roundness. This allows both the edge of a lexical word and the suffix to establish distant sonority harmony.

The second reason is that it allows the segment at the edge to sound as crisp as possible. Placing two nuclei from the same region is convenient for a crispier completion than having a cluster as /*pai*/, which leads to a sudden sonority fall. Since this flexibility does not receive priority within rapid speech, AE insertion seems to be neglected. Though it is true that Obsturnet-Vowel onset syllable configuration is harmonic and less complex compared to nasal-vowel (NV) syllabication, as shown in (56), the former seemingly has been avoided because of not providing a crispier environment.

56) Scale of Complexity/Harmony syllable configuration - Onset
nai » pai

The high front vowel performs a dual role in this language, apparently. One is maintaining Vowel Harmony and the other is promoting a crispier edge without violating place specifications. Though it is possible for the grammar to apply the augmentative epenthesis /un/, instead of /in/, it the latter is preferred for articulatory flexibility, the selection of which can be justified as follows.

Between the two structures, /*pɔrʊppʊnəɪ*/ and /*pɔrʊppɪnəɪ*/, the latter promises articulatory ease because of having segments sharing the same place feature – the essential nuclei of the epenthesis and the suffix /ai/. Following Lubowicz (2002a), who refers to Hayes (Clements, 1988, Hayes, 1995), it is presumed that the front high-vowels are coronal sounds. This includes the /ai/. It is to be noted that the alveolar /n/ is also a coronal. The combined nature of these sounds produces a soothing harmony at the final syllable position, which promises the maintenance of a crispier edge without much hassle, clarifying that insertion of /in/ has perceptual motivation. A perceptually more coordinated vowel added along with the coronal /n/ is the formula used by this grammar to promote the structure with a crispier end.

The situation is protected by two constraints. The first constraint is HAVEPLACE, after Ito and Mester (1993) Lombardi (1999) Padgett (1995) Walker (1998).

57) HAVEPLACE (HVPLC)
An output segment must have a Place specification

It must be stressed that the crispier edge has respected the place features, while the other variant disrespected it. As clarified by the definition of HAVEPLACE, high-ranked constraint must dominate IDENT-IO(F). As for the second, a substring of phonological representation is proposed, as in (58).

58) CRISPONSET (CRSPONS)
The onset must be filled by a crisp and sonorous element

This is another high-ranked constraint which pairs with HAVEPLACE to ensure that the sonorous consonant fills the onset, and subsequently promises a crisp-edge. Placing both of these constraints as high-ranking constraints would yield the right outcome, as in (59).

59)

Input: /pɔɽʊppʉ-[in]- ai/	CRSPONS	HVPL	*SUPHEVNUC	*[$_σ$ Cʉ#	CRSPNUC	*WKNUC	*HIATUS	*[$_σ$ V^{*WI}	*LAB	*DOR	*COR	AL-SUFF-LT	MAX-IO (SEG)	DEP-IO
☞a. pɔɽʊppĩnə̃ɪ									***		**	*	*	*
b. pɔɽʊppʉnə̃ɪ				*	*	*			***		**	*	*	*
c. pɔɽʊppʉə̃ɪ	*		*!	*	*	*	*	*	***		*			
d.pɔɽʊppĩyə̃ɪ	*								***		**	*	*	*
e. pɔɽʊppə̃ɪ	*	*							***		*	*	*	

Candidate (a) is the victor, for it satisfies all high-ranking markedness constraints, and incurs minimal violation of faithfulness constraints, which does not affect its optimal status. Candidate (e), the possible optimal choice lost the competition on two grounds; violating CRISPONSET and denying the place which was previously occupied by unstressed /ʉ/. The faithful companion, Candidate (b), loses the optimality status because it failed to satisfy constraints prohibiting unstressed /ʉ/ from surfacing. Candidate (c) is ousted for hosting super heavy nucleus, a strictly prohibited element in spoken Tamil. Candidate (d) loses the opportunity to be optimal for not favouring a crispier onset. The constraints and their ranking are, indeed, sufficient to validate the optional form to surface with AE, /in/, in the grammar.

So far examples of nVH and the language requirements fostering the harmonic settlement between two vowels have been shown. In the following sections, details will be given of how Tamil manages sVH.

4.9 The sVH

4.9.1 Deletion of Syllable and Epenthesis

In this section, another cross-linguistically and less popular choice of hiatus resolution will be analysed, which is relatively popular in Tamil – the deletion of a segment and minimal syllable template. Among the other choices of hiatus resolution, syllable deletion causes serious damage to the structural forms concerned, yet the language applies it as a plausible approach to deal with certain types of suffixes. A look will first be taken at the background of the data, before moving on to analysis.

Deletion of a syllable template is closely attributed to a reserved set of data involving the derivative suffix, /mai/ in Tamil. Tamil derives qualitative adjectives in a conservative way, by suffixing /mai/ and /ai/ to a nominal root or stem. The suffixation usually sustains several internal reconstructions - place assimilation, deletion and boundary realignment or none of them at all as shown in (60).

60)

i. Lex + Suff (Derv)

Input	Output
n̪al - mai	n̪ʌ̃nmə̃ĩ
good – nom.marker	*good*
iɭa - mai	ɪɭəmə̃ĩ
young – nom.marker	*young*
peru - mai	pərʊmə̃ĩ
pround - nom.marker	*proud*
putu - mai	pʊtʊmə̃ĩ
new – nom.marker	*new*
kaɾu - mai	kʌɾʊmə̃ĩ
dark – nom.marker	*dark*
pulam - ai	pʊləmə̃ĩ
geneius - – nom.marker	*genius*

The derived qualitative nouns experienced various phonological changes at interfaces. The first example undergoes coda conditioning and deletions, respectively, while the others remain the same. When these derived lexical forms were applied as stem for morphological extension or compound formation and attached lexical words beginning with the initial vowel (LEX + LEX and LEX + SUFF), /mai/ is dropped. Upon deletion the preceding lexical terms merges as basic nominal roots to succeeding terms, as portrayed in the forthcoming examples.

61) Nominal

i.Lex + Lex

a. Deletion of syllable /mai/

Input	output
iɭa()mai - aɾacu - aɾ	ɪɭʌʋʌɾʌcəɾ
young – king - nom.marker	*prince*
n̪a(n)mai - aː(d)ci	n̪ʌ̃llaːdtʃɪ
good – governance	*good governance*
n̪a(n)mai - aːc(i)ɾi(y)aɾ	n̪ʌ̃llaːcɪrɪyər
good – teacher	*good teacher*
per(u)mai - aːc(i)ɾi(y)aɾ	peːɾaːcɪɾɪyəɾ
honour – teacher	*professor*
per(u)mai – arac(a)ɾ	peːɾa ɾacəɾ
honour – king	*king*

ii. Lex + Suff (Derv)

Input	output
pula()mai - an	pʊlʌʋə̃n
geneius – nom.marker	*poet*
n̪a(n)mai - a	n̪ʌ̃ɭɭə
good – nom.marker	*the good…*

putu()mai - a	pʊtɪjə
new – nom.marker	*the new*
kaɾu()mai - an	kʌɾɪjə̃n
black – nom.marker	*black man*

All six quality nouns, namely; *n̠anmai, iḽamai, perumai, karumai, pulamai* and, *putumai* in the data have gone through such a significant phonological processes. Among them, *n̠anmai, perumai, karumai* and *putumai* have experience additional phonological reconstructions, while the rest do not. When a qualitative noun ending with the suffix /mai/ is attached to a vowel initial lexical or suffix, the /mai/ suffix is deleted, leaving the root word in its original form, through some reversal phonological activities. This is prevalent in every given examples.

The qualitative noun /*n̠anmai/* which surfaces as /*n̠al/* in the output retraces its original form. The qualitative noun /*n̠anmai/* is formed by adding /*n̠al*/ to the suffix /*mai*/, in which the moraic lateral coda /l/ is nasalised to avoid onset/coda asymmetries. This is a typical case involving constraints requiring MINIMAL SONORITY DISTANCE (MMSD) between adjacent consonants, which are investigated in detail in Chapter 5. However, when the qualitative noun forms stem for another complete structural form, /*mai*/ is dropped, while the coda of /*nan*/ is reversed to its underlying form, liquid coda. Such a reversal phonotactic exercise helps the succeeding lexical to be attached to a root word, instead of the lexical word ending with /mai/. However, because of the internal phonetactic nature of the structure, which is not relevant to V-V interaction, the data will not be examined until §6.4.

The second instance, /*perumai*/, casts an interesting outcome as well. Besides relinquishing /*mai*/, the root word also experienced deletion of the final nucleus, /u/, and vowel lengthening to compensate for the moraic imperfection resulting from the deletion of the root final nuclei.

The last examples, /*karumai* and *putumai*/, besides dropped /*mai*/, also received the epenthetic [i] to mediate the interaction for a satisfactory result when they are attached to a lexical or suffix. Interaction between the epenthetic [i] and the root final [u], which leads to the drop-out of the latter, helps the structure to sustain a crispier edge before being attached to a monosyllabic vowel segment, resulting in the insertion of glide [y]. The end result is a harmonic reconciliation between the root word and suffix.

The /*pulamai*/ and /*iḻamai*/ do not show up additional phonological requirements, except for the deletion. The /*mai*/ suffix is dropped to allow the succeeding lexical and suffix to be attached to an open-syllable with a mediating glide. Though the avoidance of the vowel hiatus appeared to be the reason behind the deletion of syllable and sound segment at surface-value, there are more phonological motivations encouraging the deletions.

Analysis

The foregoing description reveals the existence of two types of non-uniform reactions at the interfaces which need to be dealt with differently. Among the six qualitative nouns, /*ilamai* and *pulamai/* are formed by involving nothing more than deletion and glide insertion but /*n̪anmai karumai, putumai and perumai/* acquired additional reactions, and warrant more clarification as well.

In the first two examples the structure maintains its structural formed through the deletion of /*mai*/ and glide insertion. Interaction between open syllables and succeeding vowel initial lexeme and suffix resulted in hiatus conflict and it has been avoided by deleting the entire open syllable. Upon dropping the open syllable, the structure encounters secondary hiatus conflicts, especially when the root word ending with vowels faces a vowel initial succeeding lexical terms. The conflict between the two sonorous segments, ||*MAR/vowel|| + ||*vowel/MAR|| is skipped by inserting a glide, [v], which imitates the quality of vowels (Blevins and Pawley, 2010: 26)[38]. These are cases of avoiding hiatus, but nothing else.

The focus is now on the last four examples at hand. Among them, *karumai* and *putumai* behave alike. The disyllabic root structures received an additional augmentative epenthesis, [i], blocking the word-final /u/ from surfacing. Having /i/ nuclei at the end enables the structure to sustain a crispedge before being added to lexical item or suffix laden with word-initial onsetless syllables, as shown in (62).

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[38] Glides are vowel-like; there is neither closure nor release (Belvins and Pawley, 2010).

62) Lex + Suff (Derv)

Input	Output
kaɾumai - an	kʌɾ[ɪ](y)ə̃n
black – nom.marker	*black man*
putumai - a	pʊt[ɪ](y)ə
new – nom.marker	*the new*

Obviously, the data have experienced chain reactions. The order of the chain reactions is as follows: when the structure ending with the /*mai*/ suffix is attached to another lexical term, /*mai*/ is deleted as part of the reaction of avoiding hiatus, leaving the structure in a vulnerable situation, a disyllabic form ending with the word-final /u/. When the root-word ending with /u/ is attached to the suffix beginning with /a/, an AE, /i/ is inserted. Interaction between /i/ and /a/ of the succeeding suffix resulted in glide insertion, /y/, while interaction between /u/ and AE, /i/ led to deletion of the former.

The chain reaction appears to be motivated by two requirements. That is, having an additional augmentative epenthesis to render, CRISPEDGE, for the smoother suffixation, and to respect the structural demand HAVEPLACE. Needless to say the combination of a coronal segment – flap /r/ and coronal vowel /i/ would form a better pair compared to the [ru], combination of coronal and labial vowel (Hayes, 1995, Lombardi, 2001).

Local Conjunction Constraint, [CRISPEDGE & HAVEPLACE]$_{[rootword]}$ seems to be active at this juncture. The function of LCC, where it is violated, if and only if both component constraints are violated by any candidate in the same domain, can now be extended to guard the structural requirement at the concerned environment. Since the structure involves dual deletion, verifying the right context needing to be guarded is necessary as well. The introduced LCC could directly target the concerned domain, the second syllable of the stem, /ru/, not the other less pertinent context which has undergone deletion, /mai/.

63) [CRISPEDGE & HAVEPLACE]$_{[rootword]}$ [CRSPEDG& HVPLC]$_{[rw]}$
The edge of the root word must be crisp and retain its place

CRISPEDGE (CRSPEDG$_{[rw]}$)
The edge of the root word must be crisp

HVPLC$_{[root\ word]}$ (HVPLC$_{[rw]}$)
Every component of the root word must retain its place

Another motivation for the deletion of /*mai*/ lies in the prosodic requirement. Though deletion of /*mai*/ appears to be caused by hiatus avoidance superficially, factually, it has been motivated by prosodic requirements, simply because it is too costly to drop a syllable to avoid hiatus conflict by undermining MAX-IO (σ).

64) MAX-IO (σ)
Every syllable in the input must present in the output

Syllable deletion is motivated by prosodic requirements, insisting on compounding or suffixation to be established between the edges of grammatical words but not between grammatical words and prosodic words, in order to establish a cohesive structural form, as shown in diagram in (65).

65)

	Input	Output	Glossary
Grammar word	k ʌ ɾ u m a i – a n	*karumaiyan	*black man
Prosodic word (i)	k a r u (y) - ʌ n	*karuyan	*black man
Prosodic word (ii)	k ʌ r (ɪ) (y) - ʌ n	kʌrɪyʌn	black man

The diagram shows matching and mismatching lines between grammar words and prosodic words. The solid lines represent non-violated representations, while the dashed lines represent both mismatched components and unfilled positions, where most of the components of the prosodic word incur unrepresented violations, while grammatical words face none of these violations except for mismatched component. Since the input favours no changes against the root words produced ungrammatical structure, like the prosodic word. The winner, prosodic word (ii), indicates that attaching the suffix with a root word with a crispier edge is essential. The language offers additional evidence of compound words, also insisting on this requirement. So-called verbal-compounds like, *aɳukuɳdu* 'atomic bomb', *vedikuɳdu* 'bomb', *cuduka:du* 'graveyard', preserve the same requirements, attaching the grammatical word to another grammatical word. The possible conclusion at this point is that Tamil does not prefer to retain the /*mai*/ suffix in qualitative nouns when they form the stem word in extended morphology.

The conclusion reached here is that a high-ranking alignment constraint compelling the structure to skip unnecessary burden in-between the stem and suffix is operative at this point. ALIGN(ROOT, σ) which requires the right edge of the root word to be aligned to the left edge of the suffix is active in this context (The detailed explanation of Alignment Constraints has been given in the relevant chapter and section, where it appeared to be play a crucial role, cf. §6.2).

66) ALIGN-ROOT (ROOT, σ) (AL-RT)
Root edge align with edge of a syllable

The given constraint must outrank the FCs, MAX-IO(σ) and MAX-IO(SEG) which fails to protect their presences. DEP-IO is also a heavily dominated constraint in this context. Besides these crucial constraints, constraints militating against the hiatus, such as *SUPERHEAVYNUCLEUS, *HIATUS and $*[_{\sigma}\_V^{WM}]$ are also crucial and need not be dominated by the FCs. These constraints are ranked below the undominated alignment and LCC, but above the dominated FCs, as in (67). The components of LCC also need to be assigned a place higher than the dominated FCs, for their crucial function. Since these constraints perform the same function to avoid hiatus constraints, they have been ranked in between the lower ranked FCs and the hiatus avoiding constraints. The following ranking is essential to allow for the desired output to prevail.

67) AL-RT, $[\text{CRSPEDG \& HVPLC}]_{[rw]}$»*SUPHEVNUC, *HIATUS, $*[_{\sigma}\_V^{WM}]$ » $\text{CRISPEDGE}_{[rw]}$, $\text{HVPLC}_{[rw]}$ » *LAB, *DOR »*COR » MAX-IO(SEG), MAX-IO(σ), DEP-IO

68)

Input: /kaɾumai -an /	AL-RT-	[CRSP EDG & HVPLC]$_{[rw]}$	SUPHEVNUC	*HIATUS	$*[_{\sigma}\_V^{WM}]$	CRISPEDGE$_{[rw]}$,	HVPLC$_{[rw]}$	*LAB	*DOR	*COR	MAX-IO (SEG)	MAX-IO (σ)	DEP-IO
☞a. kʌɾɪyʌ̃n		,**							*	***	***	*	**
b. kaɾumaian	*!		*	*	*	*		*	*	**			
c. kaɾuyan		*,**				*			*	***	**	*	*

d. kʌɾɪʌ̃n		,**		*!	*				*	**	***	*	*
e. kʌɾuʌ̃n		*,**		*!	*	*			*	**	**	*	

Candidate (b), the most faithful candidate to the input fails the survival test and is ousted for serious violation against higher-ranking alignment constraints. Given that AL-RT and [CRSPEDG & HVPLC] are equally ranked, candidates (d) and (e) do equally poorly. They performed even worst against the constraint prohibiting hiatus, and are joint losers. Candidate (a) and (c) though seemed to be equal winner, the former remained favourite choice against the latter because of its poor performance againt the component of LCC, (CRISPEDGE) - one asterisk mark indicating that one of the components has been violated in the same domain and the lowered ranked CRISPEDGE$_{[rw].}$ Candidate (a) emerges as the winner.

It is apparent that the requirements of secondary vowel hiatus resolutions differ from those of natural vowel hiatus resolutions. Concern for maintaining various sub-minimal factors seem to precede the primary efforts to avoid hiatus. Avoiding hiatus at all costs has been the top priority in the cases of natural vowel hiatus resolutions, but secondary hiatus resolutions have also been another important issue.

4.9.2 Syllable Deletion and Vowel Lengthening

The last lexical item, *perumai*, gives rise to some special linguistic speculations. On top of deletion of segment and syllable, it undergoes vowel lengthening, as well. Vowel lengthening, which is an irregular phonological reaction in Tamil, is applied vowel hiatus resolution, in the last two examples, repeated in (69).

69)
i. Lex + Lex

Input	Output
perumai - aːcu - iɾi – aɾ	peːɾaːcɪɾɪyəɾ
honour – error – rid – nom.marker	*professor*
perumai - aracu - aɾ	peːɾa ɾacəɾ
honour – king – nom.marker	*king*

Both examples involve multiple suffixations; lexical – lexical – suffix (– suffix). The first example experiences three phonological processes: multiple deletion, gliding and vowel lengthening, while the second experiences deletion of syllables, segment and vowel lengthening. Deletion of /u/ in both instances necessitates or invokes the principle of ‘retain the heavy and delete the weak nuclei’. Deletion of /mai/ as we have seen in the foregoing is motivated by AL-RT a higher-ranking constraint demanding every grammar word be attached to a grammar word. Both of these examples have experienced almost the same sort of deletions and violated MAX-IO(SEG), and MAX-IO(σ) maximally. The significant difference between them is that the first example receives a glide, /y/, but the second does not.

Vowel lengthening is the signficant revelation of the output stem. The /perumai/ is a perfectly derived polysyllabic form, having a feet-word, /peru/ attached to the suffix /mai/. When this derived qualitative noun is attached to another lexical item, /mai/ is deleted: the structure sustains its original feet-word, /peru/. An additional deletion of the word final /u/, which occurs somewhere before the association of the second lexical item, as illustrated in (70), triggers additional phonological reactions, however.

70) Input Output
Glossary

perumai	-		aːcu	-	iɾi	-		aɾ	peːɾaːcɪɾɪyəɾ	professor
(per -	<u><mai>)		(a:c	<u>)	(iri)		[y]	(ər)	peːɾaːcɪɾɪyəɾ	professor
pe:r -			a:c		iri		yər		peːɾaːcɪɾɪyəɾ	professor

The diagram shows the segments that have been deleted (<x>), and that have been added ([x]). The deletion of <u> for an unknown reason leaves the base stem to suffer moraic imperfection. Since the stem could not emerge as a grammatical word without levelling the shortfall, the grammar initiated vowel lengthens *per>pe:r,* to turn the monomoraic syllable form to bimoraic. This is again another instance of chain effect.

Since deleting /u/ from the stem is considered fatal, the grammar employed a strategic activity to level the gap. The full formed prosodic word, *perumai*, is a polysyllabic word, consisting of a nominal base, /*peru*/ and suffix /*mai*/. Hence, deleting /*mai*/ from the derived word affects neither the prosodic status nor the semantic value, in which case the stem still connotes the meaning of ‘huge/big’. Nevertheless, the structure faces a problem when /*u*/ is deleted, as the deletion turns the nominal base into a monomoraic-syllable, without semantic value. Since the constraint MINIMAL BIMORAICITY is a highly undominated constraint in the language, suffixes are prohibited from being attached to sub-minimal forms.

71) MINIMAL BIMORAICITY (MIBIM)
Feet word must be either bimoraic or disyllabic

It must be this constraint that enforces vowel lengthening to level the prosodic shortcomings. Another MC, IDENT-(μ) that militates against the change of moraic quality, from [μ] to [μμ] is also relevant in this structure.

72) IDENT- (μ)
Word initial segment within input must have identical representation in output

Apparently, this constraint is ranked low in the ranking hierarchy to allow the vowel length to kick start.

Analysis

Tableau analysis for the foregoing representative data can be done by formalising the constraints and their ranking as has been seen up to this point. So far we have seen that the FCs, MAX-IO(Seg), MAX-IO(σ), DEP-IO, IDENT- (μ) are heavily dominated by undominated MINIMAL BIMORAICITY, AL-RT, *WEAKNUCLEI, and HAVEPLACE. Placing the constraints militating against the hiatus and formation of super-heavy nuclei in-between them would yield to proper ranking of the constraints advocating optimal output. Together with universal ranking of the segmental constraints in order will give complete ranking of the constraints as follows:

73) MIBIM, AL-RT, *WKNUC, HVPLC » *SURHEVNUC, *HIATUS, *[$_{\sigma}$_V^{WM}] » *LAB, *DOR »*COR » MAX-IO(SEG), MAX-IO(σ), DEP-IO, IDENT- (μ)

74)

Input: /perumai-a:cu-iri - aɾ/	MIBIM	AL-RT-	*WKNUC	HVPLC	*SUPHEVNUC	*HIATUS	*[σ_V WM]	*LAB	*DOR	*COR	MAX-IO (SEG)	MAX-IO (σ)	DEP-IO	IDENT-μ
☞ a.(pe:r)(a:.cɪ)(rɪ.yəɾ)								*		*****	*	*	*,*	*
b. (pe.ru)(maɪ.a:)(cu. ɪ.)(ɪ.əɾ)		*!			*	*	*	**		***				
c.(pe:.ru)(maɪ.a:)(cu. ɪ.)(rɪ.yəɾ)	*!	*			*	*	*	**		*****			*,*	*
d. (per)(a:.cɪ)(rɪ.yəɾ)	*!	*						*		*****	*	*	*	*

The tableau shows that all constraints are violable in deciding the optimal status of the victor candidate. The input favourite candidates, (b) and (c) are rejected for incurring serious violation against the alignment constraint, indicating that dropping the suffix /mai/ is as crucial as respecting the bimoraicity of the stem. The latter incurs fatal violation against MIBIM, just for oversupplying the moraic value. The optimality between candidate (a) and its close rival candidate (d) is decided by the MIBIM, where the latter fails to satisfy the high-ranking constraint.

The same result is also obtained for, /*perumai-aracu- aɾ/* → *.(pe:r)(a.ra)(car)*, as in the following:

75)

Input: /perumai-aracu-aɾ/	MIBIM	AL-RT	*WKNUC	HVPLC	*SUPHEVNUC	*HIATUS	*[σ_V WM]	*LAB	*DOR	*COR	MAX-IO (SEG)	MAX-IO (σ)	DEP-IO	IDENT-μ
☞ a.(pe:r)(ʌ.rə)(cəɾ)								*		****	***	*	*,*	*
b. (pe.rʊ)(mʌ. ʌ)(rʌ.cʊ)(əɾ)		*!			*	*	*	**		****				

c.(pe:.rʊ) (məɪ. ə) (rə.cʊ)(əɾ)	*!	*			*	*	*	**		** **			*,*	*
d.(per)(ʌ.rə)(cər)	*!							*		** **	****	*	*	*

The final analysis of the chapter, which again revolves around deletion, on top of the addition of features will be shown next.

4.9.3 Segment Deletion and Vowel Lengthening

The last analysis of the chapter deals with Vowel Lengthening (VL), an activity which is opposite in nature to Vowel Shortening to level structural shortfalls. Vowel Lengthening, an unpopular activity in Tamil, is applied in two environments, to supply compulsory moraic value to compensate moraic shortage and maintain the MINIMAL BIMORAICITY of the stem word. VL, which is common in the formation of numeral compound nouns, and can also be equated to establishing MORAIC-HARMONY between primary and secondary stress bearing syllables. In short, this interesting activity is characterized by various linguistic factors, besides sonority requirements.

Compensatory vowel lengthening is a cross-linguistic phenomenon. When a coda segment is deleted, the rhyme of the pre-vocalic segment is usually lengthened. Such a cross-linguistic phenomenon is also noticed in Ancient Greek (Steriade, 1982a, Wallace, 2007), Turkish (Polgardi, 1999) Tiberian Hebrew (Arad, 2003), Malay (Zaharani, 1991, Zaharani, 1998), Libyan Arabic (Yousef, 2010) and so on. However, vowel lengthening in Tamil differs from what is commonly known as compensatory vowel lengthening.

There will be further analysis of the data for more clarification.

76) Data

Input	Output
oru - a:yiram	o:ra:yırəm
one – thousand	*one thousand*
iru - a:yiram	i:ra:yırəm
two – thousand	*two thousand*

Some words are in order on the data. When a heavy vowel collides with a weak vowel at interface, the weak vowel is deleted and the heavy vowel is retained to avoid hiatus conflict. The heavy segment is syllabified with a left hand margin. This is a straightforward interaction between *SuperHeavyNuclei and *WeakNuclei, in which the latter usually wins the competition.

What is not common in the examples at hand is the lengthening of the initial vowel. Since the deletion has degraded the status of the initial stem, from bimoraic to monomoraic, the initial vowel is lengthened to compensate for the moraic shortfall, and sustain the grammaticality of the stem-word. The diagram given in (77) explains this in detail.

77)	BiMST		*BiMST		BiMST	Glossary
	oru - a:…		or. a:…		o:r. a:…	one…
	iru - a:…	→	ir - a:…	→	i:r. a:…	two
	μ μ		μ		μ μ	

The diagram shows clearly that deletion of the weak vowel and lengthening of the initial vowel occurs simultaneously to ensure the structure sustains harmonic output.

Though the reaction does not seem to involve a sonority requirement directly, a link between the sonority and the moraic harmony cannot be overruled. The sonority link between the initial and second-syllable can be explained as follows. Assuming that the short-vowel (7(-)) is ranked lower than the long-vowel (7(+)) in the sonority hierarchy, an order of sonority contact between the segments can be obtained as follows:

78) (i) x (V:(7(+)) (ii) (V(7(+)) x x
(V:(7(+))

(V(7(-)) x x
(r(G6))

x (r(G6))

(……… Sonority link)

Finding 1; attach lexical / suffix to MBiM stem

For the purpose of argument, the long and short vowel has been ranked, respectively, up and down. The numbers that follow after the V (Vowel) and G (Glide) indicate the sonority rank of the sound segments. It is noticeable that having a short vowel followed by another long vowel did not match the sonority link between the vowels in (78(i)), but the link is established successfully in (78(ii)). Hence, it might be concluded that sonority harmony, the motivator of sonority harmony is still active in this context.

Analysis

The language posits a number of constraints to uphold the structural harmony with minimal damages. Obviously, the ranking obtained in (75) is sufficient to account for the structural changes in the given data.

79)

Input: /oru-a:yiram/	MIBIM	ALRT-	*WKNUC	HVPLC	*SUPHEVNUC	*HIATUS	*[$_{\sigma}$_V^{WM}]	*LAB	*DOR	*COR	MAX-IO (SEG)	MAX-IO (σ)	DEP-IO	IDENT-μ
☞ a.(o:)(ra:y)rəm				*				*		***	*			*
b. (ɔru)(a:yɪ)rəm			*		*!	*	*	*		***				
c.(ɔ).(ra:yɪ) rəm	*!		*		*	*	*	*		***				

The tableau has a few constraints irrelevant to the current analysis; MAX-IO(σ), DEP-IO, therefore, they remain inactive. Candidate (c) is the worst performer of all the competitors. It fatally violates MIBIM and most of the higher-ranking constraints in the hierarchy. The input companion, candidate (b), is rejected for registering minimal violation against *WKNUC, and fatal violation against *SUPERHEAVYNUCLEUS, another constraint militating against sequences of vowels. Candidate (a), is the optimal survivor, passes the evaluation test against most of the higher ranking constraints, but incurred minimal violation against one of the high ranking constraint, HAVEPLACE and other lower-ranking FCs. Yet, candidate (a) emerges as the winner for incurring least violations against the high ranking constraints compared to other candidates.

4.10 Conclusion

This chapter has aimed to provide an empirical explanation for two specific hiatus circumstances, nVH and sVH in Tamil. Both have been verified as showing analytical challenges, consequently verifying that V#_#V interaction in Tamil involve various strategies, on top of GI.

The present chapter also clarifies two factors that play crucial role in hiatus management in Tamil. In a broad sense, they can be termed as segmental and non-segmental factors. The visible outcomes of the segmental requirements are very obvious among the nVH, but the sVH are mainly motivated by additional non-visible sub-segmental contributions. The analyses have put forward a variety of factors covering such unpopular resolutions which have never been dealt with in previous studies related to Tamil phonology. The novel findings presented in this chapter show that standard spoken Tamil shares most of the elements of universal grammar as expected and has language-specific ways to deal with unnecessary tensions at M-P interfaces.

Chapter Five
C# versus #C Interfaces and Conflict management in Tamil

5.1 Introduction

The ultimate goal of the present chapter is to examine the characteristics of sonority-related repair strategies (SrRS), the constraints and their ranking responsible for avoiding Onset-Coda Asymmetries (thereinafter referred to as OCA) in a bid to maintain structural well-formedness. Irregularities borne from consonant versus consonant (_C# + #C_) interaction at Morphology-Phonology interfaces (M-P interfaces) have received the overwhelming attention of the research community in comparison to other types of interactions. These studies have investigated various key issues on segmental values, including visible segmental values and sub-segmental properties such as syllables, stress, mora, positional prominences and so on. Nevertheless, the relevance of sonority has not received as much attention as other elements among the sub-segmental elements. However, OCA related studies remain understudied in Tamil, both from segmental perspectives and sub-segmental properties.

5.2 OCA and Positional Remarks in Previous Literatures

In general OCA related studies within OT have been carried out in three perspectives, the origin of which can be traced from pre-OT literatures. The three well-established approaches within OT can be termed as positional faithfulness studies initiated by Beckman (1997, 2004), positional markedness, studies promoted by Ito (Alderete, 2001, de Lacy, 2004, 1994, Ito and Mester, 2004), and lastly, the approach which integrates both approaches suggested by Lombardi (1999, 2001) Walker (2001), and so on. Some of these studies have explored the prominence of positional values and segmental properties from the perspective of the smaller prosodic unit- syllables- while others have approached the same theme from the lexical perspective. On the whole, they have analysed the role of coda and onset, and verified their contrastive nature associated with other linguistic factors, such as morphology, phonetics and so on.

Among the above mentioned approaches, the positional markedness approach can be seen as an extended tradition of pre-OT approaches. Among the pre-OT methods accounting for phonological reactions, Stray Erasure by Streriade (1982b), is considered to be an efficient method. The method argues that most phonological reactions are enforced by stray materials that do not belong to higher categories. For example, an un-syllabified segment within a word is to be erased by a stray syllable, and the process goes on to the second level and so on. The concentration of Stray Erasure and other studies belonging to this era has been on individual sound.

Ito (1986) offered a different perspective on stray erasure effects, claiming that stray erasure is applied as a last resort but not as the only resort. Her emphasis on stray epenthesis as an effect of coda condition licensing the place features of unlicensed segments proved that languages thrive on maintaining prosodic well-formedness in many ways. Studies working along this concept paved the path for formalisation of the positional markedness approach (Parker, 2001, Walker, 2001, and so on) when the Optimality Theory superseded other phonological theories.

Another well-known approach in OCA related studies that of positional faithfulness, argues for a different preference. Arguing along with the evidence of psycholinguistics verified by Padget (1994), Treiman & Kessler (1995), and Pierrehumbert (1995), Beckman claimed that languages utilise few cue positions for licensing purposes as opposed to others. This includes the beginning of a word (first syllable, first foot…), syllable onsets (as opposed to codas), stressed syllables and roots (as opposed to affixes). Presumably, sound segments occupying these prominent positions, are protected by additional phonotactic fortification compared to other positions. While the segments at strategic locations are immune to changes and posit aggressive reactions against the intrusive factors, the segments, at least strategic locations are probed to opposite reactions. Hence, Beckman claims that emphasis should be put on the mentioned positions rather than less prominent positions.

The third proponents offer a different approach which does not negate the relevance of the foregoing approaches. They believe that formalisation of phonological reactions at the interfaces should consider both the factors and the interactions between them in devising the right choice of solution (Lombardi, 2001).

The present chapter is developed along Lombardi's suggestion. It verifies that proper investigation on onset-coda conflicts at the interfaces must consult various segmental and sub-segmental factors belonging to prosodically weak positions and strong positions and their interactions whenever possible. An agglutinative language like Tamil, which depends heavily on morphological concatenation and compounding to enlarge its vocabulary, remains an ideal source to verify the foregoing claim.

However, the present study has made a significant claim as well. It claims that achieving harmonic contact between components of two syllables, namely, coda and onset, is not only achieved through conditioning the place feature of coda, as has been claimed by most of the studies (Crowhurst, 2001, Ito, 1986, Kager, 1999). Harmonic contact can still be achieved by allowing the coda to retain its independent place feature, but it must be done by relegating the sonority alone. As will be shown, the language under investigation offers a handful of evidence for this claim.

This chapter is organized as follows: following the introduction, §5.2 provides the background of coda-condition in Tamil §§5.3 and 5.4 offer analyses of coda-condition associated with assimilation of the place of articulation and sonority relegation, respectively. §§§5.5, 5.6 and 5.7 presents accounts of coda-condition associated with epenthesis, gemination and deletion, in that order. The last section, §5.8, is the conclusion.

5.2 Factors Influencing Coda-Condition in Tamil

Onset-coda asymmetries are avoided in non-similar ways after consulting various triggering and blocking factors, cross-linguistically. Among the various factors, segmental and sub-segmental factors precede the contribution of others, such as morphology, in deciding the right solutions. Based on the combined forces of these norms, languages apply a range of strategies namely coda-condition, deletion of the coda, epenthesis and gemination (Kager, 1999) to avoid OCA between hetero-syllabic words. Tamil also applies these strategies with language specific modifications.

Altogether, five different types of strategies are applied to solve onset-coda irregularities at Morphology-Phonology interfaces in Tamil. On top of the above mentioned strategies, the language applies an additional strategy, so-called sonority relegation, as well. The broad classification of these activities is,

1) i. assimilation of place of articulation (coda-conditioning),
ii. sonority relegation,
iii. epenthesis,
iv. gemination.
v. deletion

Though these strategies appear to share a common goal, avoiding onset/coda asymmetries their acquisitions show no cross-over. Their selection is conditioned by various factors such as contextual differences, phonotactics of the segments, and positional strengths. Therefore, each of them seems to have an equal level of impact in determining the two outcomes of the interactions; deciding the types of SrRS and the directionality of the reactions. In what follows, we shall see the requirements of these external instruments in some detail.

5.2.1 The Coda Syllable in Tamil

The coda syllable, often known as a peripheral component of a syllable is one of the decisive factors in formalising the types of SrRS application at M-P interfaces in Tamil. Tamil has two types of codas belonging to two different environments behaving differently in coda conditioning - the stem/word-initial syllable coda and the non-initial stem/word syllable coda. The stem/word-initial codas are also moraic coda (within the CVC syllable pattern); hence, their deletion is prohibited at all costs. In a bid to avoid deletion, the grammar consults various strategies to protect the moraic codas at stem/word-initial syllable codas compared to others. Therefore, paying more attention to coda segments than that of the onsets becomes crucial in examining the nature of conflicts at M-P interfaces and the involvement of SrRS in Tamil.

Phonotactics of the coda segments is another exclusive factor that matters in deciding phonological changes at M-P interfaces in Tamil. As we have seen in §3.6.2 in Chapter 3, coda positions are exclusively reserved for sonorous segments in this language: non-sonorant segments such as stop segments are forcefully refrained from this position. On top of this restriction, selective sound segments such as the retroflex approximant, /ɻ/ and rhotic /r/ are refrained at stem/word-initial coda positions, while the voiceless stops are refrained from word-final syllable positions at all times. This restriction allows the language to control the behaviour of coda systematically.

5.2.2 Coda-condition in Tamil

Coda-condition in Tamil seems to target two types of sonorous segments at large, nasals and laterals. Though coronal nasals are a prime target of the conditioning exercise, the bilabial nasal /m/ also falls within the trap. Between the two, the latter is prone to adopt place assimilation, while the former is keen on housing sonority relegation. The combined forces of these factors aggravate the contribution of coda in OCA related studies of the language.

The onset, in contrast, is a monotonous instrument having a fixed role-play in understanding the onset-coda irregularities and the selection of SrRS in Tamil. Beckman (1997, 2004) believes otherwise, however. She argues that the directionality of phonological reaction is controlled by onsets and the constraint responsible to protect its existence, IDENT-ONSET (PLACE). In contrast to her claim, the present study argues that onset with its self-protection shield, IDENT-ONSET (PLACE), plays a relatively fixed role but not a comprehensive one in Tamil. The constraint performs a static role in order to preserve the place feature of the onset, and makes a modest contribution to acknowledging the changes taking place in marked places such as coda.

Precisely speaking, selection of the right solution to overcome OCA is decided by various factors, but not the positional strength alone. It is a collaborated effect which is decided by the combined force of the sound segments and position of the coda within morphological words. Inherently, certain sound segments, say, labial nasal /m/ are treated as weaker segments in comparison to coronal nasals, such as /n/. When the weak segments occupy prosodically weak positions such as word-final coda, their weakness is enhanced. The enhanced weakness makes them vulnerable for severe SrRS reactions, such as deletion. Hence the conflict between a weak and strong consonant at interface within a polysyllabic word consults deletion, while the same within privileged coda positions such as stem/word initial positions consults other options such as place assimilation and sonority relegation. Epenthesis and gemination are the last deployed resorts in maintaining structural harmony.

The combined forces of the aforementioned instruments determine the triggering and blocking effect at the interfaces and consequently verify the selection of right SrRS and the directionality of the reactions. The coda is presumed to be an active impact receiver overall compared to onset, as can be seen in the following examples: /*maɾam-kaɭ*/→

/mʌ̃ɾʌ̃ŋg̃ə̃ɭ/, */mʌ̃ɾʌ̃ŋg̃ə̃/* ‘trees’, */kal-ɽu/* → *kʌɽɽʉl* ‘the learning’, */col-na/* → */cɔ̃nnə̃/* ‘the said’, */ɪtan - ku/* → */ɪtʌɽgʉ/* ‘for this’ and so on. The examples show interaction between various onset initial suffixes and lexical stems, in which the onsets of the suffixes have retained their place features, but the codas have been modified.

However, besides coda-condition, onset-condition is also common in this language. In some cases where the language applies a reversal directionality of reactions, the onsets are conditioned according to the coda, as revealed by the following examples: */pan<mai>/ + /n̪i:r/ > /panni:r/* ‘fragrant water’ and */ven<mai>/ + /n̪i:r/ > /venni:r/* ‘hot water’. The changes have been triggered by the codas while the onsets received them. Once again this reaffirms that the contextual differences, participating sound segments and positional prominence are of importance in capturing the generalisation of the phonological changes and the directionality of M-P interactions in Tamil.

The aforementioned illustrations indicate that Tamil consults some extra-prosodic reasons to solve onset-coda irregularities. The examples show that apart from the role of positional strength and the constraints related to them, segmental strength and morphological differences also form part of the ingredients in resolving tension at interfaces. For these reasons, all of these controlling factors have been referred to whenever necessary to offer impartial explanation of issues underpinning the application of SrRS at _C# + #C_, in a bid to avoid onset-coda asymmetries between two hetero-syllable consonants in Tamil.

5.3 Coda-Condition - Assimilation of Place of Articulation (AOPA)

Although Tamil is known for sharing a lot of similarities with other languages in dissolving OCA, it applies two significant SrRS to manage the tension between codas of stem/word initial syllables and onsets. One is place assimilation and the other is sonority relegation. These will be examined one by one.

Assimilation of place of articulation ensures the codas do not have an independent place of articulation (Beckman, 1997, Beckman, 2004, Ito, 1986, Kager, 1999, Lombardi, 1999, Lombardi, 2001) and allow two hetero-syllables to establish harmonic contact between the adjacent syllable components. Place assimilation revolves around two particular sound segments in Tamil - labial nasal /m/ and alveolar lateral. Whenever these segments are preceded by an obstruent, the place feature of the labial nasal is assimilated to the onset so as to evade the illegitimate ordering of two consonants in a row. This section elaborates on assimilation of place of articulation resulting from interaction between:

2) 6.5.1 Labial Nasal Coda versus Non-sibilant Onset (Dorsal)
6.5.2 Lateral Coda versus Sibilant Onset (Stops)

5.3.1 Labial Nasal Coda versus Non-Sibilant Onset (Dorsal Stop)

Tamil has a handful of examples of labial /m/ undergoing place assimilation. Place assimilation is a common reaction at the labial nasal coda, /m/, and dorsal /k/ interfaces. The data in (3) consist of examples of monosyllabic, disyllabic and polysyllabic words attached to dorsal initial suffixes. Regardless of positional restrictions, the codas have experienced place conditioning.

3) LEX + SUFF
Nominal

Input	*Output*
naːm-kaɭ	naːŋg̃ə̃ɮ̚ / naːŋg̃ə̃
we- pl.marker	*we*
maɾam- kaɭ	mʌ̃ɾʌ̃ŋg̃ə̃ɮ̚ / mʌ̃ɾʌ̃ŋg̃ə̃
tree –s	*trees*
aːlayam-kaɭ	aːlʌjʌ̃ŋg̃ə̃ɮ̚ / aːlʌjʌ̃ŋg̃ə̃
temple – s	*temples*
puttakam- kaɭ	pʊttʌgʌ̃ŋg̃ə̃ɮ̚ / pʊttʌgʌ̃ŋg̃ə̃
book –s	*books*
paɭɭɪkkuːdam - kaɭ	pʌɭɭɪkkuːdʌ̃ŋg̃ə̃ɭ /pʌɭɭɪkkuːdʌ̃ŋg̃ə̃
school – s	*schools*
tɪddam - kaɭ	tɪddʌ̃ŋg̃ə̃ɮ̚ / tɪddʌ̃ŋg̃ə̃
plan – s	*plans*
toːddam- kaɭ	toːddʌggə̃ɮ̚ / toːddʌ̃ŋg̃ə̃
estate – s	*estates*

When a suffix with dorsal onset attaches to labial nasal coda, the place of articulation of the latter is assimilated to that of the onset. In other words, when lexical terms ending with bilabial ||*MARGINAL/LABIALNASAL||, /m/, of both, stem/word-initial and non-initial positions, attaches to dorsal velar ||*MARGIN$_{ONSET}$/VELARSTOP||, /k/, the place feature of the labial /m/ is conditioned through local assimilation to achieve a symmetrical place feature between coda and onset in a bid to avoid perceptual violations. In sum, the examples have undergone typical coda conditioning (Beckman, 1997, Beckman, 2004, Ito, 1986, Ito and ArminMester, 2004). Beckman (2004) referred to it as classical parasitic coda-conditioning in Tamil.

The coda-conditioning effort seen in the foregoing has sonority consequences as well. The coda and onset contact, [/m/-/k/] though did not violate SCL. The optimal outcome acquired additional requirements. Note that the positional prominence of coda syllables is ineffective in this example: the inputs of both with different bases, the CVC and disyllabic forms have undergone the same assimilation (as far as bilabial /m/ is concerned), aiming to establish sonority distance as minimal as possible.

The sonority distance between the labial nasal and dorsal is ‘considerably far’. It is divided by a considerable number of coronal nasals which are closer to the dorsal /k/ than the labial /m/. To establish optimal harmonic contact between the components across the syllable boundaries, the structure employed local assimilation not only to ensure that the place feature of the onset is respected, but also to keep the sonority gap as minimal as possible. This requirement is enforced by MSD, a constraint which requires the sonority distance between adjacent segments to be kept minimal at all costs.

Analysis

Before performing a tableau analysis some crucial constraints apart from the identified MCs (SCL and MSD) are necessary. Positional faithfulness constraints and the ranking achieved in §2.14 in (47), which is repeated here as (4) is of importance in acknowledging the positional neutralization initiated between ||*MARGINAL/LABIALNASAL||, /m/, and dorsal velar ||*MARGIN$_{ONSET}$/VELARSTOP||. It may serve as a basis for the argument on ranking.

4) IDENT-ONSET (PLACE) » *LAB, *DOR »* COR » IDENT (PLACE)

The undominated SCL and MSD responsible for minimising the sonority gap deserve a higher ranking than the PF constraint, IDENT-ONSET (PLACE), because they are never violated in Tamil. The complete ranking of the constraints should be as follows:

5) SCL, MSD » IDENT-ONSET (PLACE) » *LAB, *DOR »* COR » IDENT (PLACE)

6)

Input */na:m-kaɭ/*	MSD	SCL	IDENT-ONSET (PLACE)	* LAB	* DOR	* COR	IDENT (PLACE)
☞a.*na:ŋg̃əɭ̆*					**	**	*
b. *na:mkaɭ*	*		*	*	*	**	

The winner has been easily selected by the tableau. It has satisfied every one of the high-ranking constraints, and sustained harmonic sonority contact between the onset and coda. But, the tableau faltered when two new candidates were added to the list.

7)

Input */na:m-kaɭ/*	MSD	SCL	IDENT-ONSET (PLACE)	* LAB	* DOR	* COR	IDENT (PLACE)
☞a.*na:ŋg̃əɭ̆*					**	**	*
b. *na:mkaɭ*				*	*	**	
☞c.*na:<>kaɭ*					*	**	*
d. *na:mpaɭ*			*!	**		**	*

Candidate (C), a sub-optimal candidate apparently performing better against all constraints, has been nominated as a potential winner, challenging the most optimal winner, candidate (a). This indicates that the tableau is lacking in some crucial information.

Candidate (c) sustained the optimality status by favouring NOCODA, a status which has been achieved illegitimately. The candidate obtained the status by favouring deletion, on the expanses of MAX-IO violation. Tamil is not a NOCODA dominated language; therefore, NOCODA is a low-ranked constraint in this language, which deserves a place below the IDENT (PLACE), as both of them are competing with each other.

On top of this, Tamil does not tolerate unnecessary segment deletion. This implicates that MAX-IO, the constraint advocating the existence of every segment of the input in the output in inflected words[1], is a high-ranking constraint in this language. The modified ranking of constraints, as in the tableau (8), selects the optimal candidate correctly.

8)

Input /*na:m-kaɭ*/	MAX-IO	MSD	SCL	IDENT-ONSET (PLACE)	*LAB	*DOR	*COR	IDENT (PLACE)	NOCODA
☞a.*na:ŋg̃ə̃ɮ˺*						**	**	*	**
b. *na:mkaɭ*				*	*	*	**		**
c.*na:<>kaɭ*	*!					*	**	*	*
d. *na:mpaɭ*				*!	**		**	*	**

The high ranking MAX-IO blocked Candidate (c), which favoured its deletion from further evaluation, while the IDENT-ONSET (PLACE) ensured that the directionality of local assimilation targets the coda, instead of the onset, and stopped Candidate (d) from emerging as another potential winner. All of these high ranking constraints ensured that Candidate (a) surfaced as the sole victor, for input */na:m-kaɭ/*.

The efficiency of the achieved ranking order can be attested with a second example, which shows similar requirements to the example in the foregoing.

9)

Input /*na:m-kaɭ*/	MAX-IO	MSD	SCL	IDENT-ONSET (PLACE)	*LAB	*DOR	*COR	IDENT (PLACE)	NO CODA
☞a.*mʌ̃ɾʌ̃ŋg̃ə̃ɭ*					*	**	**	*	**
b. *maɾamkaɭ*				*	**	*	**		**
c. *maɾa<>kaɭ*	*!				*	*	**	*	*
d.*mʌ̃ɾʌ̃mpə̃ɮ˺*				*!	**		**	*	**

As expected the tableau offered the same result, Candidate (a), which satisfied the high-ranking constraints, emerged as the optimal candidate. Other candidates failed to

[1] It must be stressed that inflected words and derived words have different requirement in term of deletion in Tamil. The former rejects unnecessary deletion while the latter promotes it if there is a necessity. It is due to this MAX-IO is applied in a non-similar ranking pattern within analyses involving both types of word classes.

emerge as optimal candidates, for incurring almost the same sort of violations noticed in the foregoing tableau.

Two benefits were obtained from this analysis. One is that labial coda is not allowed to retain its place feature at both stem/word initial and stem/word non-initial positions, and the other is that the attained ranking is sufficient to acknowledge positional neutralization between coda and onset; hence, the same ranking can be applied in the forthcoming analyses.

5.3.2 Lateral Coda versus Non-Sibilant Onset (Labial Stop)

As has been indicated before, Tamil has significant yet less recurring examples showing place assimilation. When an alveolar lateral coda is affixed to a non-sibilant onset, especially labial stop, the language enforces place assimilation to avoid onset-coda irregularity.

Interaction between lateral segments and bilabial /p/ displays additional conditioning efforts compared to previous types of interaction. The additional conditioning efforts are mainly due to the characteristics of the bilabial /p/ and coronal lateral which do not form natural classes. In other words, the illogical order of the onset and coda laterals are repaired not only to avoid violation of place of articulation, but also to avoid violation of sonority distance. Phonological reaction's aim to achieve two results in a single activity is common in suffixation involving stem/word root-initial lexical terms, but elsewhere coda-condition is optional.

10)	*Input*	*Output*
	Lex + FuncW	
	mẽ̤ːl-padda	mẽːmpʌddə
	up – be	*the progressed*
	mẽːl-paddu	mẽːmpʌddʉ
	up - be	*being progressive*
	mẽːl-padu	mẽːmpʌdʉ
	up – be	*be progress*
	Lex + Lex	
	n̠al-pakal	n̠ʌ̃npʌgʰəl
	mid – day	*noon*

Interaction between a non-coronal onset such as bilabial /p/ (+anterior, -coronal) and a stem-initial alveolar lateral (l) coda reveals that besides dropping its lateral feature, the place feature of the coda is also assimilated to that of the Onset. To maintain the harmony between coda and onset, the coronal codas are forced to undergo interlinked changes. The chain effect involves at least two types of simultaneous changes; one is reducing the sonority distance and the second is reducing the feature of place of articulation, as illustrated in the following diagram (11).

11)	*Nasalisation*		*Labialisation*	
/l/	→	/n/	→	/m/
[+ lateral]		[+ nasal]		[+ nasal]
[+ coronal]		[+ coronal]		[+ labial]

On the other hand, the same lateral may also assimilate with place specification of the bilabial, as in */mẽːl-padda/* → */mẽːmpʌddə*/ ‘the progressed’, within Lex + FuncW. There is an exception to this type of place assimilation. Within the Lex + Lex type of interaction the alveolar lateral alternates to a different form of assimilation - alveolar lateral /l/ is nasalised without sharing the place specification when adjoined to a bilabial onset, as in /*n̪ʌ̃npʌg*^{h}*əl*/.

In both cases which have undergone place assimilation, the grammar has retained onset bilabial /p/, while it has nasalised the coda, before its place of articulation is conditioned through labialization, simply to ensure that the place feature of the coda is symmetrical with onset. The rigorous reactions witnessed within both types of examples indicate that interaction between lateral and labial coda prioritises the onset, and refuses the coda from preserving its place feature.

The simultaneous phonological changes witnessed within the data need to be accounted for proper constraints. Local Conjunction Constraints (LCC) introduced by Prince and Smolensky (1993b), which combine two MCs operating within the same domain is appropriate at this context. Applying LCC is absolutely legitimate in this case, as the nasalization and the labialization witnessed in the given examples target the same domain, coda segment.

There are two responsible constraints that have triggered simultaneous reactions. They are proposed as MSD and ||*MAR$_{]\sigma S/W\text{-}I}$/LATERAL||, the accountable constraints enforcing the chain effect experienced by the coda. The MSD, with its requirements, enforced adjacent consonants to maintain sonority distance as minimal as possible: the $||$*MAR$_{]\sigma S/W\text{-}I}$/LATERAL$||$ enforced a prohibition that denies the coronal lateral from surfacing at stem/word-initial coda positions. While the former ensuring labialization is kick-started, the latter ensures that the coronal lateral is blocked from surfacing. The combined force of these two constraints as in (12), targets the domain of the coda segment, ensuring only a component of $C_1.C_2$ that satisfies MSD and $||$*MAR$_{]\sigma S/W\text{-}I}$/LATERAL$||$ is allowed within the surface form.

12) [MSD & $||$*MAR$_{]\sigma S/W\text{-}I}$/LATERAL$||$]$_{\text{coda segment}}$
The segment of coda domain must not be a lateral, which must not violate sonority distance

If any candidate failed to satisfy the LCC, the constraint which deserves a place higher than MSD in the ranking of constraint achieved in (9), must be treated as suboptimal.

13)

Input /mẽ:l-padu/	MAX-IO	MSD & $\|\|$*MAR$_{]\sigma S/W\text{-}I}$/LATERAL$\|\|$	MSD	SCL	IDENT-ONSET (PL)	$\|\|$*MAR$_{]\sigma S/W\text{-}I}$/LATERAL$\|\|$	*LAB	*DOR	*COR	IDENT (PL)	NOCODA
☞a. mẽ:mpʌdʉ							***		*	*	*
b.mẽ:lpadu		*,*	*			*!	**		**		*
c.mẽ:npadu		*,					**		**		*
d.me:<>padu	*!						**		*	*	
e. me:l<>adu	*!	,*			*	*	*		*	*	*

Candidate (d) and (e) lost the competition over their inability to satisfy MAX-IO, an undominated constraint prohibiting unnecessary deletion of any segment from the input. Candidates (b) incurred violation against both components of the LCC constraint, while candidate (c), a close competitor also incurred minimal violation against a component of LCC, MSD. This leaves us with a sole winner, Candidate (a).

In the foregoing section, we have seen two cases of managing OCA in Tamil. Discussions evolved around labial nasal coda and lateral coda at stem/word-initial coda syllable positions. It has been proved that place assimilation is employed as the most spontaneous reaction to avoid onset-coda irregularities at interfaces in Tamil. Although place assimilation is common between coda of stem/word-initial syllables and a coronal and a non-coronal segment voiceless obstruent, it also takes place beyond stem/word-initial syllable levels. As far as the segments are concerned, bilabial nasal /m/, precedes the alveolar lateral in triggering place assimilation, so that the place of articulation of the bilabial coincides with that of the onset. The discussion also put forth the involvement of other segmental and sub-segmental constraints ranging from both plain to complex that zealously guard the requirements of the language. Contributions of these constraints have been verified in the form of tableaux illustrations.

The proven ranking will be applied in the forthcoming analysis with two necessary amendments. One of them is skipping the irrelevant candidates: candidates that delete the coda and onset and have proven not to have challenged the current ranking order will not be included. The second change is avoidance of the universal ranking order of segments (*LAB,*DOR »*COR), that have been compressed within a single column. These changes are necessary to preserve space.

5.4 Coda-Condition – Sonority Relegation

Sonority relegation (SR) or sonority downgrading is an action where the sonority degree of a segment is brought down to another level, as close to that of the onset. SR is a popular strategy of managing onset-coda asymmetries, in respect of avoiding sonority disparity between adjacent consonants. Whenever the sonority distance between two consonants falls apart, and is unable to reach a harmonic agreement, the sonority of the coda is usually relegated to establish harmonic contact between itself and the onset. In other words, coda is conditioned by downgrading the sonority, but not the place.

Two kinds of SR found in the language are represented by the following examples, */koɭ-du/→/koɳdʉ/ 'being having'*, and */kal-ɽu/→/kʌɽɽəl/* ‘the learning’. It is noticeable that the sonority of laterals, the retroflex and the alveolar have been downgraded. The lateral has been nasalised in the first instance, and the same has been turned into an obstruent in the latter instance. Note the sonority of the alveolar lateral /l/, which has been downgraded to two levels, from lateral to nasal /n,/ and from nasal to obstruent /ɽ/.

Interestingly, the relegation has not involved place dislocation, but has involved sonority dislocation alone.

Although the selection of SR is defined by participating onset, its realisation is a collaborative effort of both, the coda and onset. Both coronal coda and non-coronal codas and coronal onsets and non-coronal onsets have equal participation. In the majority of cases, the relegations target four coronal segments at coda positions, namely alveolar lateral /l/, retroflex lateral /ɭ/, alveolar nasal /n/ and retroflex nasal /ɳ/ within stem/word initial syllable codas and non-initial stem/word syllables. Between the two, the former is prone to relegation, while the latter is less preferred in selective environments involving codas with retroflex lateral.

It is apparent from the foregoing that Tamil has two types of sonority downgrading, which are conditioned by participating onsets. For the sake of convenience, they have been branded as Sonority Relegation (SR) and Absolute Sonority Relegation (ASR). Relegation of sonority (SR) to another level, as in */koɭ-du/→/koɳdʉ/ 'being having'*, respects MINIMAL SONORITY DISTANCE (MSD), where the sonority of the coda is relegated to a minimal level. But it appears that the ASR, as in */kal-ɽu/→/kʌɽɽəl/* 'the learning', respects another sonority constraint. A modified version of MSD, the MOST MINIMAL SONORITY DISTANCE (MMSD) is proposed to be responsible for enforcing this effect. This constraint ensures the sonority of the coda is relegated to its least level, as in */kal-ɽu/ → /kʌɽɽʉ/ 'by learning*'.[2] Needless to say this selection of SR or ASR is determined by the participating onset, and so the constraints.

However, the grammar also enforces a selective prohibition on SR. The prohibition is concerned with selective suffixes, so-called plural markers. When a coronal nasal coda, /n/ or /n/ meets a dorsal onset of the plural marker, /*kaɭ*/, the former is prohibited from downgrading its sonority value. The prohibition is applied to stem/word initial and non-initial positions as well, for no other reason than morphological immunity. Since the prohibition involves morphological immunity, examples (in (16) marked with *) will be discarded from the analyses.

[2] It is true that the */kal-ɽu/→/kʌɽɽəl/* 'the learning' might appear to be a case of complete assimilation at first glance, but in reality it involves more than what a complete assimilation can justify. SR is the best way to clarify the changes adequately.

The aforementioned information transpired within the following data.

The Data

14) Sonority Relegation

i. Coronal Lateral - Coronal Stops

LEX + SUFF

Verb

Input	*Output*
koɭ-du	kondʉ
have – inf.marker	*being having*
tɪɾʌɭ-da	tiɾaɳdə
accumulate – inf.marker	*accumulate*
n̪iːɭ - da	n̪ĩːɳdə
long – inf.marker	*the long..*
aːɭ-d()aːn	ãːɳdãːn
rule – nom.marker	*(he) ruled*
uɭ-du	ũɳdʉ
in – inf.marker	*exist (PL ass)*
col-na	cɔ̃nnə̃
say – inf.marker	*the said*
col-naːl	cɔ̃nnãːl
say –if	*if said*
col-n-aːn	cɔ̃nnãːn
say – tense marker – nom.marker	*he said*
n̪il-nu	nĩnnʉ
stop – inf.marker	*by standing*

ii. Coronal nasal - non-coronal Stop

(a) velar stop (/k/)

LEX + SUFF (Case)

Nominal

Input	*Output*
a()t(a)n - ku	atʌɽgʉ
for that – abl.	*for that – abl.*
e()t(a)n - ku	etʌɽgʉ
for what – abl.	*for what – abl.*
i()t(a)n - ku	ɪtʌɽgʉ
for this – abl.	*for this – abl.*

LEX + LEX

Input	*Output*
pon - kaːlam	pɔɽkaːlə̃m̄
gold – period	*golden period*

(b) Bilabial stop (/p/)

LEX + LEX
[n→ɽ]

Input	*Output*
mun - pakal	muɽpʌg^{h}əl
before – day	*noon*
pin - pakal	piɽpʌg^{h}əl
after – day	*afternoon*

PREF + LEX
Nominal
[l→n]

Input	*Output*
n̪al – pakal	n̪ʌ̃npʌg^{h}əl
mid – day	*noon*

LEX + FW
VERB

Input	*Output*
[l→ɽ]	
vil - panai	viɽpanai
sale – nom.marker	*sales*
eːl - paːdu	eːɽpaːdʉ
prepare – nom.marker	*preparation*

[ɭ -> d]	
keːɭ - patu	keːdpʌtəɪ
ask – the do	*the request*
koːɭ - paːdu	koːdpaːdʉ
principe – nom.marker	*principle*

LEX + LEX

Input	*Output*
n̪aːl - pattu	n̪ãːɽpʌtʉ
four – ten	*forty*

(c) Fricative /c/

LEX + SUFF
Nominal

Input	*Output*
[L→d]	
aːɭ - ci	aːdtʃɪ
rule – nom.marker	*ruling*
[l→R]	
muyal - ci	mʊ̃jʌɽctʃɪ

try – nom.marker	*trial*
payil - ci	pʌyɪɽctʃɪ
study – nom.marker	*exercise*

iii.Coronal Lateral + Bilabial Nasal (SR)
LEX + SUFF
Nominal

Input	*Output*
pal - mai	pʌ̃nmə̃
many – nom.marker	*plural*
uɭ - mai	ũɳmʌ̃ɪ̃ / ũɳmə̃
in – nom.marker	*truth*

LEX + LEX
Nominal

Input	*Output*
nal - manam	n̪̺ʌ̃nmʌ̃nə̃m
good – heart	*good heart*
mutal - mutal	mʊ̃tə̃nmʊ̃tʌlɪl
first – first	*at the first*

15) Absolute Sonority Relegation

i. Coronal lateral - non-coronal Stop (SR)

LEX + SUFF
Nominal

Input	*Output*
col - kaɭ	cɔɽgəɭ
word –s	*words*
iyal - kai	ɪjʌɽgəɪ
nature – nom.marker	*nature*
muɭ - kaɭ	mʊ̃dgəɭ
thorn –s	*thorns*
n̪̺ãːɭ - kaɭ	n̪̺ãːdgəɭ
day –s	*days*
kal - kaɭ	kʌɽgə̃ɮ˥ / kʌllʉŋg̃ə̃ɮ˥
stone –s	*stones*
n̪̺ãːɭ - kaɭ	n̪̺aː̃dgəɮ˥ / naː̃ɭʉŋg̃ə̃
day – s	*days*
pal - kaɭ	pʌɽgəɮ˥ / pʌllʉŋg̃ə̃ɮ˥
teeth –s	*tooth*
pul - kaɭ	pʊɽkʰəɮ˥
grass –s	*grass*

VERB

Input	Output
kal-ka	kʌɽgə
study – optative marker	*study (optative)*
kal - ɽal	kʌɽɽəl
study – nom.marker	*the learning*
keːɭ-kɪɾu-aːn	keːdkɪɾa͂ːn
ask – tense – nom.marker	*(he) is asking*
n̪il-ka	n̪ı͂ɽgə
stop – optative marker	*stop (optative)*

LEX + FW
Nominal

Input	Output
mutal - kaɳ	mʊ͂təɽgʌn
first – off all	*first of all*

VERB

Input	Output
me͂ːl-koɭ	me͂ːɽkɔɭ
above – observe	*observe*
me͂ːl-koɭ-da	me͂ːɾkɔɳdə
above – observe – nom.marker	*being observing*

LEX + LEX

Input	Output
n̪aːl - kaːl - i	n̪a͂ːɽkaːlɪ
four – leg – verbalizer	*four legged chair*
mutal - kaddam	mʊ͂təɽkʌddə
first – stage	*at first level*

16) Special case scenario
Coronal liquids + non- coronal stops (None)
LEX + SUFF

Input	Output
*kaːl - kaɭ	kaːlkʰəɮ͡ / kaːlʊŋg͂ə͂
Feet – s	*foot*
*poruɭ -kaɭ	pɔɾʊɭkʰəɮ͡ / pɔɾʊɭʉŋg͂ə͂
thing –s	*things*
*viral - kaɭ	ʋɪɾəlkʰəɮ͡ / ʋɪɾʌlʊŋg͂ə͂
Finger –s	*fingers*
*kaɳ - kaɭ	kʌ͂ngə͂ɭ / kʌ͂ngə͂
Eye –s	*eyes*
*pen - kaɭ	pə͂ngə͂ɭ / pə͂ngə͂
girl – s	*girls*
*miːn - kaɭ	miːngəɮ͡ / miːngə.
fish – s	*fish-pl.*
*varan - kaɭ	varangə͂ɭ / vʌrə͂ngə͂

proposal – s	*proposals*
*tamiɻar - kaɭ	tʌ̃mĩɻʌɾkʰəɮ˥ / tʌ̃mĩɻʌɾʊŋg̃ə̃
Tamilian – s	*Tamilians*

The data posit that sonority relegation has been applied to avoid asymmetry between onset and coda, the selection of which is done based on the following preferences:

17) If the onset is a non-coronal obstruent (other than bilabial /p/), and it is preceded by,

a. the stem-initial syllable coda filled by coronal laterals, alveolar (l) or retroflex lateral (ɭ); sonority of the coda is relegated within initial coda positions, in no-initial stem/word positions the lateral may or may not undergo conditioning in LEX-SUFF, LEX-FW, LEX-LEX type of interactions.

b. when syllable codas are filled by coronal alveolar nasal (n) or the retroflex nasal (ɳ), the nasals may undergo sonority relegation and become obstruents (at any word-internal positions) within LEX-LEX and LEX-FW type of interactions, except in LEX-SUFF type of interaction. If the inflectional suffix is a plural marker, /kaɭ/, the assimilation is blocked in polysyllabic words.

18) If the onset is a coronal obstruent, and it is preceded by,

a. a syllable coda occupied by coronal retroflex lateral (ɭ), the coda syllable is nasalised to ensure the place of articulation is symmetrical with onset. If the syllable coda is filled by the alveolar lateral (l), the lateral is forced to relegate its sonority – to resemble a full geminated form. This sort of reaction takes place within LEX-SUFF type of interaction, in root-initial syllable forms, elsewhere the conditioning is optional.

b. when syllable coda is filled by coronal alveolar nasal (n) or retroflex nasal (ɳ), the sonority is downgraded to imitate that of the onset. This commonly takes place within LEX-LEX and LEX-FW type of interactions.

19) If the onset is a nasal (inclusive of labial and coronal), and is preceded by,

a. stem/word-initial syllable coda filled by coronal laterals, alveolar (l) or retroflex lateral (ɭ), the laterals are nasalised in relevant positions to avoid sonority clash between two sonorous obstruents. This reaction is common within LEX-SUFF and LEX-LEX types of interaction.

20) If a non-coronal bilabial /p/ (+anterior, -coronal) onset is preceded by,

a. stem/word-initial syllable coda filled by coronal laterals, alveolar (l) or retroflex lateral (ɭ), the sonority of the coda syllable is dropped. Both laterals are turned into [-sonorant, -continuant], /d/ and /ɽ/ respectively. This is common within all LEX-FW and LEX-LEX type of interactions. The coronal laterals may or may not undergo coda conditioning elsewhere.

Within PREF-LEX type of interactions the alveolar lateral alternates to a different form of assimilation - alveolar lateral /l/ is nasalised without sharing the place specification when adjoined to bilabial onset (*n̪ʌnpak^{h}əl*). On the other hand, the same lateral may also assimilate with the place specification of the bilabial, as in */me͂ːl-padda/* → */me͂ːmpʌddə/* 'the progressed'.

b. stem/word-initial syllable coda and non-initial morpheme-internal syllable coda filled by coronal laterals, alveolar nasal (n) or retroflex lateral (ɭ). The coda remains unchanged in all four types of interactions. However, the sonority value of the nasal is relegated in LEX-LEX type of interaction (*muɽpʌk^{h}əl*), especially in hetero-syllable combinations.

21) If the onset is palatal fricative /c/, which is treated as non-coronal, and bilabial /p/ (+anterior, -coronal) are preceded by,

a. stem/word-initial syllable coda filled by coronal laterals, alveolar (l) or retroflex lateral (ɭ), the sonority of the coda syllable is dropped in word-initial coda positions. Both laterals are turned into [-sonorant, -continuant], /d/ and /ɽ/ respectively, in all four types of interactions. Elsewhere the laterals may or may not undergo coda-conditioning.

b. syllable coda filled by coronal nasal of a root-initial and non-initial coda morpheme-internally, they then remained unchanged in all four types of interactions. But, if the nasal belongs to a heterosyllabic formed by LEX-LEX, interaction; the sonority value of the nasal is relegated to resemble the onset (*muɽpʌk^{h}əl*).

In short, SR initiation ensures that the adjacent consonants obey the requirement of MINIMAL SONORITY DISTANCE (MSD) or MOST MINIMAL SONORITY DISTANCE (MMSD) whenever the coda and onset are filled by segments belonging to different natural classes.

The refined generalization of the foregoing, as has been hypothesised in chapter two §2.13, is,

22) If C_1 of C_1C_2 cluster is bilabial /m/ and the C_2 is a stop, the grammar prefers assimilation of the place of articulation: the C_1 assimilates with that of C_2. Data given under the heading of place assimilation belongs to this form of assimilations. (Examples; m-k> ŋk, m-d> nd, m-t> n̪t, m-c> ɲc)

23) If C_1 of C_1C_2 cluster belongs to the natural class of [+coronal, +sonorant], the grammar prefers different strategies, relegating the sonority in the following ways:

If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and C_2 is a bilabial obstruent, the sonority value of C_1 is relegated to the next level (For instance, from liquid to nasal) (l+p >np) to fulfil the requirement of MINIMAL SONORITY DISTANCE

a. If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and C_2 is a bilabial sonorant obstruent, the sonority value of C_1 is relegated to the next level (from liquid to nasal) (l+m>m, ɭ-m>nm). The same is also applicable to bilabial stops in selective environments ((l+p>np as in (nʌnpak^{h}əl))

b. If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and C_2 is a stop, the sonority value of C_1 is relegated to the next level (from [+nasal] to [-nasal]s, then the sonority value of C_1 is dropped to fulfil the requirement of MINIMAL SONORITY DISTANCE (from nasal to stop or liquid to stop)

In what follows the intensive roles of syllable codas and onsets in triggering the above mentioned contextual changes at coda-onset interfaces have been verified in order. The analyses also demonstrate how SR and ASR have been utilized wisely in this language within stem/word-initial syllables and non-initial stem/word syllable coda. Special focus has been given to evaluate the efficiency of moraic-coda and non-moraic coda at M-P interfaces. For the sake of convenience, the analyses have been presented under the following sub-headings.

24) 5.4.1 Coronal Nasal Coda versus Sibilant and Non-Sibilant Onset (Dorsal Stop)
5.4.2 Lateral Coda versus Non-Sibilant Onset (Fricative Stop)
5.4.3 Lateral Coda versus Non-Sibilant Onset (Bilabial Nasal)
5.4.4 Lateral Coda versus Sibilant Onset (Coronal Stops)
5.4.5 Coronal lateral Coda versus Sibilant Nasal Onset

5.4.1 Coronal Nasal Coda versus Sibilant and Non-Sibilant Onsets

The following analysis has been done for SR initiation within interface involving coda lateral and a non-sibilant onset based on the data in (25) which consist of two types of lexical words, compound words and nominal suffixation. The compound word consists of two lexical terms, while suffixed terms consist of demonstrative lexical words ending with coronal nasal codas and case suffixes with dorsal initial onset, and labial stop. Both sets of data demonstrate sonority relegation.

25)

i) Coronal Nasal Coda versus Sibilant Onset

Input	*Output*
pon - kaːlam	pɔɽkaːlə̃m̄
gold- period	*golden period*
atan - ku	ʌtəɽgʉ
for that – abl.	*for that*
etan - ku	ətəɽgʉ
for what – abl.	*for what*
ɪtan - ku	ɪtəɽgʉ
for this – abl.	*for this*

ii) Coronal Nasal Coda versus Non-Sibilant Onset

mun – pakal	mʊɽpʌk^{h}əl
before – day	*noon*
pin – pakal	pɪɽpʌk^{h}əl
after – day	*afternoon*

The outcome of the interactions between base words and suffixes are straightforward; sonority of the alveolar nasal coda has been downgraded to least sonorous levels within both the compound words and the nominal inflections.

SR has been used as an instrument to ensure that the sonority value of the nasal segment and that of the onset reaches a reciprocal agreement. By downgrading the sonority value of the stem/word-initial coda, instead of velarising or labialising the coronal nasal /n/ into becoming /ŋ/ or /m/, the grammar achieves this target easily. Sonority Regulation, in fact, offer an economical measure to avoid asymmetries between onset and coda, simply by assimilating one of the features of the coronal coda with that of the onset – relinquishing the nasality as shown in (26). The nasality drop helped the structure to level the sonority inequality between the sequenced consonants.

26)	_n -	k_	→	_ɽk_	
	+ Coronal	+ Velar		+ Coronal,	+ Velar
	+ Nasal	+ Nasal		- Nasal,	- Nasal
	+ Obstruent	***+ Obstruent***		**+ Obstruent,**	**+ Obstruent**
	+ Voice	- Voice		+ Voice,	- Voice
	+ Sonorant	***- Sonorant***		**- Sonorant,**	**- Sonorant**

Obviously, relinquishing the sonority value of nasal ensured that the segment became [–sonorant] part of a coda conditioning strategy and consequently enabled the coda syllable and onset syllable to form a natural class, [**+Obstruent, -Sonorant].** The description matches the requirement of the end-product, MOST MINIMAL SONORITY DISTANCE (MMSD).

Analysis

Tableau analysis for SR data does not require a different ranking argument from what has been achieved in place assimilation (5) repeated here as (27). The ranking still needs a constraint targeting prohibition of coronal nasal. The following constraint has been proposed to execute this function: ||*MAR$_{]\sigma S/W\text{-}I}$/CORONALNASAL||. Placing this well-formedness constraint above segmental constraints is necessary so as to recognise its undominated function, prohibiting coronal nasal from surfacing in the output.

27) MAX-IO, MSD, SCL» IDENT-ONSET (PLACE) » *LAB, *DOR »* COR » IDENT (PLACE)

||*MAR$_{]\sigma S/W\text{-}I}$/ CORONALNASAL|| (||*MAR$_{]\sigma S/W\text{-}I}$/ CORNAS||)
Stem/word-initial coda coronal nasal coronal syllable coda must not surface

The modified ranking as in (28) is sufficient to predict the novelty of the phonological reaction between stem/word-initial coronal nasal coda and dorsal coda.

28)

Input /pon-kaːlam/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	||*MAR$_{]\sigma S/W\text{-}I}$/ CORNAS|	*L *D» *C	IDENT (PL)	NO CODA
☞ a.pɔɽkaːlə̃m̚								*
b. ponkaːlam		*			*!			*

29)

Input / atan - ku/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	||*MAR$_{]\sigma S/W\text{-}I}$/ CORNAS||	*L *D» *C	IDENT (PL)	NO CODA
☞a. atʌɽgʉ								*
b. atanku		*			*!			*
c. atannu				*!	*		*	*

Apparently, monosyllable and disyllable bases function in similar ways to avoid coronal nasal in surface forms – initiating sonority relegation to maintain structural harmony. Therefore, candidates that failed to satisfy the MMSD were treated as sub-optimal candidates. Candidate (a) which satisfied all higher-ranking faithfulness constraints, emerged as the winner. Candidate (b), the faithfulness choice of input, was ousted for violating MMSD, a crucial constraint establishing harmonic contact between adjacent components. Candidate (c) in tableau (30), in which local assimilation targeted the onset, was ousted by constraints zealously guarding the place of onset, and that of avoiding coronal nasal at stem/word-initial coda. The result implies that achieving sonority harmony between onset and coda is more crucial than avoiding the feature of place of articulation.

Sonority relegation between coronal nasal codas versus non-sibilant onsets can be attested in the tableau form by applying the previous ranking of constraint, as well.

30)

Input /mun-pakal/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	||*MAR$_{]\sigma S/W\text{-}I}$/ CORNAS||		IDENT (PL)	NOCODA
☞a. mʊɽpak^{h}əl								**
b.munpakal		*			*!			**

The tableau offers an anticipated reply - the candidate favouring SR is hailed as the winner, while the input-friendlier candidate has been rejected for violation against sonority constraint, MSD.

5.4.2 Lateral Coda versus Sibilant and Non-Sibilant Onset versus Stop

SR is also apparent in the interaction between non-coronal onsets and coronal lateral coda of stem/word-initial syllables. The stem/word-initial syllable coda filled by alveolar laterals (l) and retroflex lateral (ɭ), drop their sonority value and become [-sonorant, -continuant], /d/ and /ɽ/, respectively, regardless of word-classes in the interaction to avoid sonority violation. Elsewhere, laterals have choice to undergo or not to undergo sonority relegation.

It must be stressed that the fricative /c/ is considered as a non-coronal segment in Tamil (c.f. §3.3.1 for more information). The nature of [+continuant] segment ensures nothing but its own kind or [-continuant] segments to precede it in any context. In other words, it rejects any preceding sonorants.[3] As transpires in the data in (31), the fricatives settle comfortably with plosive obstruents, without the presence of any preceding liquids, with help of constraint enforcing MMSD.

31) Nominal

Input	*Output*
[l→ɽ]	
muyal - ci	mʊ̃jʌɽtʃɪ
try – nom.marker	*trial*
payil - ci	pʌyɪɽtʃɪ
learn – nom.marker	*exercise*
[ɭ →d]	
aːɭ - ci	aːdtʃɪ
rule – nom.marker	*ruling*

The same ranking argument obtained in the previous analysis is sufficient to account for phonological changes in the given data, provided it includes a relevant MC, ||*MAR$_{\sigma S/W-I}$/ LAT||, replacing the irrelevant markedness constraint.

Analysis

32)

Input /aːɭ-ci /	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	(||*MAR$_{]\sigma S/W-I}$/ LAT||	*L *D> *C	IDENT (PL)	NO CO DA
☞a. aːdtʃɪ								*
b.aːɭtʃɪ		*!			*			*

3 Classical Tamil literature provides one instance in which coronal lateral /l/ and the fricative /c/ occur harmonically within a monomoraic word, as in *valci* ‘rice’. However, present-day Tamil does not have anyrelevant example of that kind. Apart from that, the language also allows bilabial nasal /m/ to precede the fricative /c/ freely, when stem/word-initial coda positions.

33) Sonority Relegation within non-initial syllable coda

Input /muyal-ci/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	‖*MAR$_{]\sigma S/W\text{-}I}$/ LAT‖	[illegible]	IDENT (PL)	NO CODA
☞a. mʊ̃.jʌɽ.tʃɪ								*
b. mu.yal.ci		*!			*			*

Both tableaux have selected the right candidates which favour sonority hierarchy as the optimal winner. The ranking of constraints seems sufficient to select the right optimal candidate as winner, and to keep away the sub-optimal candidates, which are faithful to input, from surfacing.

5.4.3 Lateral Coda versus Non-Sibilant Onset (bilabial Nasal)

SR bears on coronal lateral and labial nasal and is commonly seen in two types of morphological concatenation in Tamil. One is within co-compound and sub-compound words and the other is within morphological inflexion, involving lexical and suffix. SR of this kind is initiated within stem/word-initial coronal lateral alone. Non-initial stem/word coronal lateral coda does not undergo SR, as shown by the data in (34).

34) Lex versus Lex

Input	Output
n̪a**l**- **m**anam	n̪ʌ̃nmʌ̃nə̃m
good - heart	*good heart*

When stem/word-initial coronal lateral, /l/, coda is attached to a bilabial nasal, the lateral is nasalised to avoid sonority clashes. Sonority value of the liquid, which is higher in the sonority hierarchy, is downgraded to another level so that the adjacent segments could establish sonority harmony without disturbing its place of articulation, as illustrated in the diagram.

35) n̪al - **m**anam → n̪ʌ̃nmʌ̃nə̃m

n̪a**l**	**m**anam
+ consonant	+ consonant
+ liquid	**+ nasal**
+ voice	+ voice
+ coronal	- coronal
+ sonorant	+ sonorant
⇧	⇧
/**l**/ ⇨ /**n**/	⇦ /**m**/

/**n**/
⇩
+ consonant
+nasal
+ voice
+ coronal
+ sonorant

The distinctive features of the coronal laterals and bilabial /m/ share a lot of similarities and a few differences. The difference lies in the bold-faced features, liquid and nasal. The liquid is nasalised simply by altering the [+ lateral] with that of [+ nasal] feature. The alteration triggered by MSD but not MMSD helped the moraic coda consonant retain its independent place of articulation just like the onset, bilabial /m/. The segmental constraint blocking the emergence of a coronal lateral at surface is ||*MAR$_{]\sigma S/W\text{-}I}$/ LAT||.

Analysis

The orders of constraints at play within the alternation of /*nal-mannam*/ can be demonstrated using the previous ranking achieved in (33),

36)

Input / n̪al-manam/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	||*MAR$_{]\sigma S/W\text{-}I}$/ LAT||		IDENT (PL)	NOCODA
☞a.n̪ʌ̃n.mʌ̃.nə̃m								**
b. n̪al.ma.nam		*!			*			**

The tableau offered an expected result. Candidate (b) has incurred violation against MMSD, while the victor has satisfied it and retained its optimal status.

So far what has been seen is how interaction between nasal and latter coda and non-sibilant onsets settle harmonically through SR. What will be examined next is how grammar initiates the same strategy to avoid sonority tension between adjacent consonants from the same kind, coronal.

5.4.4 Lateral Coda versus Sibilant Onset (Coronal Stops)

Like the interaction between ||*MAR$_{]\sigma S/W\text{-}I}$/LABIALNASAL||, /m/, and dorsal velar ||*MAR$_{]\sigma S/W\text{-}I}$/VELARSTOP||, /k/, seen in 5.4.1, interaction between lateral coda at the stem/word-initial syllable codas and non-initial stem/word coda positions and other onset, also cast a range of phonological changes. The data in (37) show the interaction between lateral codas and coronal onsets which have undergone sonority relegation.

37) Coronal Stop Onsets

Input	*Output*
koɭ-du	**kɔɳdʉ**
have – inf.marker	***being having***
n̪̪iːɭ - da	n̪̪ĩːɳdə
long - inf.marker	*the long..*
aːɭ-d-aːn	ã̃ːɳdã̃ːn
rule – tense marker – nom.marker	*(he) ruled*
uɭ-du	ʊɳdʉ
in – inf. marker	*exist (PL ass)*

When monosyllable stem ending with retroflex lateral (ɭ) and alveolar lateral /l/ coda, which are coronal, are attached to coronal onset /d/, the lateral is nasalised to allow the structure to achieve effective contact between coda and onset. This is simply another example which satisfies the requirement of sonority constraints, MSD.

The foregoing description implies that Tamil disprefers lateral segments to surface at stem/word-initial syllable coda positions. Place assimilation has been triggered by the MC responsible for triggering assimilation by a relatively high ranked constraint as in (38), ||*MARGIN$_{\sigma S/W\text{-}I}$/LATERAL||. It prohibits lateral segments from having an independent place of articulation and ensures that the structure maintains harmonic syllable contact.

38) ||*MARGIN$_{\sigma S/W\text{-}I}$/LATERAL|| (||*MAR$_{\sigma S/W\text{-}I}$/LAT||)
Stem/Word-initial lateral coronal syllable coda must not surface

Assigning a rank below the IDENT-ONSET (PLACE) but higher than IDENT (PL), as in the following tableau is compulsory for this constraint to block retroflex lateral from surfacing in output.

39)

Input /koɭ-du/	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	‖*MAR$_{\sigma S/W\text{-}I}$/LAT‖	*LAB	*DOR	*COR	IDENT-(PL)	NOCODA
☞a. *kondʉ*						*	*	**	*	**
b. *koɭdu*		*!		*	*	**	**	*		**
c. *ko<>du*	*!					*	*	**		*
d. . *koɭ<>u*				*!	*	**		**	*	**

Candidates (c) and (d) have been ousted from further evaluation because they have registered fatal violations for favouring deletion of coda and onset, respectively, as a better way of resolving OCA. This left two candidates, candidates (a) and (b). The candidate faithful to input, candidate (b), is ousted from the competition for registering fatal violation against crucial MC, ‖*MAR$_{\sigma S/W\text{-}I}$/LAT‖. The sole winner, candidate (a) emerged as an optimal candidate for satisfying every one of the higher-ranking constraints which preserve the place feature of onset and which trigger a coda condition.

5.4.5 Coronal Lateral Coda versus Sibilant Nasal Onset

As in the case of lateral coronal and onset interaction, interaction between lateral and coronal nasal also favours an onset friendlier settlement. When a coronal alveolar lateral (l) of both stem/word-initial syllables interact with coronal stop such as coronal nasal stop /n/, it ends up with nasalisation of the coda to avoid sonority disparity between two margins, coda and onset. This is apparent within segments belonging to the same natural class [+ coronal, + sonorant], as clarified by the following data in (40).

40)

Input	*Output*
col-na	cɔ̃nnə̃
say – inf.marker	*the said*
col-n-aːl	cɔ̃nnãːl
say – if	*if said*
col-n-aːn	cɔ̃nnãːn

say – tense marker – nom.marker *he said*
n̪il-nu n̪ĩnnʉ
stop – inf.marker *by standing*

The data consist of two verbal inflections involving two monosyllabic stems, the /*col*/ and /*n̪il*/. The stem /*col*/ is attached with various forms of suffixes - /*na*/ adjectival suffix, /*n̪a:l*/ conditional suffix, /*n̪a:n/* Person-Number-Gender marker, while the /*n̪il*/ is attached with an adverbial suffix, /*nu*/. Interaction between the lateral coda and non-lateral onsets creates sonority conflicts. The conflict is solved by nasalising lateral coda without disturbing its place feature. The reaction is another typical case of sonority relegation, satisfying the requirement of MSD.

What is obvious from the foregoing illustration is that any harmonic contact between adjacent syllables must also show sonority concordance in this language. To sustain harmonic structural contact, the alveolar lateral which occupies a higher scale in the SH is forced to assimilate their place of articulation with that of the onset. This is another case of lateral prohibition which was seen in the foregoing analysis.

Analysis

The ranking obtained in (39) is sufficient to capture the generalization of the foregoing data.

41)

Input /col-na /	MAX-IO	MSD	SCL	IDENT-ONSET (PL)	||*MAR$_{\sigma S/W-I}$/LAT||	* LAB	* DOR	* COR	IDENT-(PL)	NO CODA
☞a. cɔ̃nnə̃							*	**	*	*
b. colna		*!		*	*		*	**		*
c.co<>na	*!						*	*	*	
d.col<>a	*!			*	*		*	*	*	*
e. colla				*!			*	**		*

The tableau portrays an identical result to the previous analysis. Candidate (a) emerged as the winner by satisfying all high ranking constraints. Candidate (b), a favourable choice of input, failed to satisfy MSD and IDENT-ONSET (PL). Candidate (c) incurred fatal violation against MAX-IO, while candidate (d) and (e) were avoided for fatally violating IDENT-ONSET (PL). It is obvious that MSD is an efficient tool in predicting the right choice of candidate.

5.4.6 Interim Conclusion

The foregoing discussion has verified the effective application of sonority relegation to solve possible conflicts at M-P interfaces in Tamil. Tamil appears to guard the moraic coda zealously and to avoid their deletion at all costs. Sonority relegation has been applied as a substitution instead. This section has demonstrated that SR is characterised by the phonotactics of the participating coda and onset of language.

The findings of this section can be briefly highlighted as follows:

42) i. If the coda syllable is a coronal lateral, and the succeeding onset is a coronal obstruent, the sonority value of the lateral is relegated, hence the lateral is nasalized according to the participating lateral

ii. When a stem/word-initial is a non-coronal obstruent preceded by a coronal lateral, the sonority value of the lateral is downgraded to become a voiced obstruent voiced obstruent

iii. If the coda syllable is a coronal lateral, and the succeeding onset is a bilabial nasal, the sonority value of the lateral is partially relegated, hence the lateral is nasalized according to the participating lateral.

iv. If the coda syllable is a coronal nasal, and the succeeding onset is a bilabial nasal, nothing happens.

This ends the discussion on coda-condition and sonority relegation in Tamil. The next section will show how onset-coda irregularities in Tamil are dealt with in different ways.

5.5 Coda-Condition - Epentheses or Segment Insertion

The foregoing discussion centred on place assimilation and sonority relegation, two well-known cross-linguistic methods in avoiding OCA in Tamil. These methods allow the language to retain moraic codas within stem/word-initial syllables. The discussion also established the direct contribution of sonority in formalising phonological changes at M-P interfaces. The present discussion extends the argument to another option for avoiding OCA – epenthesis insertion (EI) aiming for the same goal, avoiding deletion of coda segments and achieving harmonic sonority-contact.

The option is EI, an optional mechanism in avoiding sonority clashes between coda and onset in Tamil, usually triggered so as to avoid weak segments at the coda position. The appealing reasons and conditions leading towards epenthesis application and the previously discussed topics, place assimilation and sonority relegation, are closely connected as both cover identical environments (seen in §5.3 & 5.4) and factors conditioning their application. Therefore, EI may appear redundant on the surface. However, the characteristics of EI which work beyond the requirements of Syllable Contact Law (SCL) in Tamil are worth exploring.

Epenthesis can be defined in many ways. A generic definition reflecting its phonological role would be - a segment not found in the phonological structure, but which does not contradict the established structural harmony, without which the structure cannot sustain its well-formedness. It performs a variety of functions in a language.

Cross-linguistically, epenthesis is found in a few different forms and amounts. Vowel, consonant and syllable epentheses are common among them. The number and quality of the epenthetic segments of a language differ from one another. A language like Tamil has approximately ten of them, comprised of vowels and consonants, and syllable epentheses; a language like Malay, on the other hand, has less than five of them and is comprised of vowel and consonantal epenthesis, but does not have syllable epenthesis (Hassan, 2005). The quantity and the quality of the epentheses of a language, in short, are determined by the morphological complexity of the language.

In general, epenthesis is known for performing three major roles, which can be described with the help of examples in (43). Phonetically, epenthesis is believed to offer articulation flexibility by avoiding complicating articulation. Phonologically, epenthesis known as a syllable repair device an extra element is used to level the syllable shortfall and maintain structural harmony. Morphologically, epenthesis is known as a morphologyl-friendly device, as its insertion always respects morphological boundaries (Kager, 1999: 110). It is usually inserted at either the right or left side of a morphological word by respecting the morphological boundary. These three functions are well-reflected by bold-faced epentheses [e] and [i] in the following:

43) Epenthesis in Japanese

ak.dei	a.k**e**.dei	a throwing contest
ki.tik.men	ki.ti.k**i**.men	rat indefin.

(Ito, 1989b)

The periods indicate syllable boundries. Note that epentheses [e] and [i] have been inserted after base morphemes, respectively, without disturbing the morphological contiguity. By having epenthesis the respective syllables have been turned to become the cross-linguistically preferred syllable forms, CV. Finally, the insertion has also avoided a sonority clash between respective syllables, and in turn, eased the articulate tension at the interface.

In the case of Tamil, selection of right epenthesis and its insertion follows a systematic pattern. Native words receive epenthesis on the right of morphemes, while loan words receive the same as on the left and internally (e.g. rubber /*irappar*/, Christ → *kiristu*, etc.) to avoid unnecessary irregularities. Yet the actual quality of the applied epenthesis segment is decided by the phonotactics of sound segments at the onset and coda. As far as OCA are concerned EI is a contextually bound sensitive activity, as shown in the following analyses.

5.5.1 Epenthesis in Tamil

There are two epenthesis equivalent terms found in Tamil, namely, *ca:riyai* and *urupu to:nṟal*. Tolka:ppiyam (Tolkappiyar, 2003), the classical grammar of Tamil provides a list of close to 40 epentheses applied within closed contexts, between derivational and inflectional suffixes. They are believed to exhibit an underlying relation between the bases and the suffixes (Kothandaraman, 1972b, Subrahmanyan, 1980), within nominal inflection involving case markers, and verbal inflection and nominal derivation. However, present-day Tamil is believed to have about 10 of them only (Cinnasamy, 1996, Dass, 2005b, Noormaan, 2000).

Insertion of epenthesis [u] and its contextual sensitivity have been studied extensively by previous literatures. Most of the previous studies have largely argued for the insertion of [u]. Bright verified that in Tamil enunciative vowels occur generously after obstruents. The controlled application in the old grammar seems overwhelming in modern Tamil, where almost any consonant at the end of a word added [u] (Bright, 1975: 41). However, most of the grammar texts have accepted them as part of the grammar and have made no attempt to formalise them. As a result of this all epenthesis insertion requirements have been treated as a single rule, and have obscured the information about epenthesis, claims Christdas (1988: 293-296).

Christdas in her study attempts to formalise the rules. She claims that Tamil has four rules relating to the insertion of vowel epentheses. They have been formalised as follows:

44) i. Epenthesis 1 - insert a vowel /u/ following obstruent-final stems and suffix
ii. Epenthesis 2 - insert a vowel following monosyllabic consonant-final stems
iii. Epenthesis 3 – insert a vowel following an unsyllabified consonant
iv. Epenthesis 4 - insert a vowel between two fully syllabified consonants in unaccented syllables

(Christdas, 1988: 293-296)

Apart from the formalisation of epenthetic vowels, epenthesis related issues, especially those relating to consonantal epenthesis, received less attention by Christdas, and among other previous studies.

EI in Tamil revolves around selected sound-segments within two environments where place assimilation and sonority relegation failed to operate. It covers M-P interfaces between coronal segments, and between coronal and other segments, such as labial and dorsal. Structurally, epenthesis is applied within two different environments, derived words and inflected words. The data shows that derived words usually host two types of epentheses, vowel and consonantal epenthesis, while the inflected words show a keen insertion of syllable epenthesis. Surprisingly, application of syllable epenthesis became the norm within nominal inflections involving noun and case marker having a dorsal onset.

5.5.2 Epenthesis and Ongoing Disputes

There is an ongoing dispute in defining the motivation for epenthesis insertion in the literatures. Beckman (2004) believes that motivation for epenthesis insertion does not origin from interaction between onset and the coda, but originates from onset which deserves to be preserved at all cost. Therefore, Beckman claims that onset is the active instrument in triggering the right choice of epenthesis. To the contrary, Lombardi (2001) believes that interaction between FC and MC are essential for epenthesis motivation. The present study believes that epenthesis insertion in Tamil works in the way described by Lombardi.

The present study also believes that insertion of the right choice of epenthesis can be justified by arguing along the requirements of sonority agreement. Epenthesis helps the M-P interfaces to meet gradual sonority decline between the adjacent components. In other words, epenthesis satisfies the requirement of a constraint, GRADUAL SONORITY FALL (GSF). This constraint has been introduced in §2.12, Chapter 2 (in 34). The following analyses will clarify this in detail.

The selection of epenthesis to fill the right context is verified by the phonotactics of the onsets and codas. The EI sometimes consults and copies the quality of the vowel segments of the succeeding lexical term in certain cases. The segmental properties of the onsets remain a passive contributor in deciding the quality of epenthesis.

To follow, the quality of epentheses application in Tamil responding to the requirement of GRADUAL SONORITY FALL (GSF) will be elaborated on. Empirical evidences from three exclusive environments, namely, derivational, inflectional and compounding contexts, were supplied to validate the arguments.

Before looking at the analyses, let's observe the data and the distribution of epenthesis in Tamil.

45) Segmental Epenthesis (epenthesis [u])

i. LEX + DER.SUFF (VERB)

Input	*Output*
col-tal	cɔllʊtəl
say - nom.marker	*the saying*
taɭ-tal	tʌɭɭʊtəl
push - nom.marker	*the pushing*
aːɭ-tal	ãː ɭʊtəl
rule - nom.marker	*the ruling*

ii. LEX + Case markers SUFF

a. /u/

Input	*Output*
mun-ku[4]	mʊ̃nnʊ̃kkʉ
front – dat.marker	*to front*
pĩn-ku	pĩnnʊkkʉ
back – dat. marker	*regressive*
n̪aː ɭ - kal - ku	n̪aː̃dgʌɭʉkkʉ
day – s- dat.marker	*to dates-dat.*
n̪aːɭ - ku	n̪aː̃ɭʉkkʉ
day - dat.marker	*to date-dat.*
paːl - ku	paːlʉkkʉ
milk - dat.marker	*to milk-dat.*
peːɾ - ku	peːɾʊkkʉ
name - dat.marker	*name sake -dat.*
aːɭ - ku	aːɭʉkkʉ
person - dat.marker	*to person-dat.*
aʋaɾ - ku	aʋʌɾʉkkʉ
he - dat.marker	*to him-dat.*
ciɾu(v)an -ku	cɪɽʊʋʌ̃nʉkkʉ
kid - dat.marker	*to kid-dat.*
i(v)an -ku	ɪʋʌ̃nʉkkʉ
he - dat.marker	*to him-dat.*
jappaːn -ku	jʌppaːnʉkkʉ
japan - dat.marker	*to Japan-dat.*
makaɭ(iː)r – ku	mʌ̃kəɭiːɾʉkkʉ
ladies - dat.marker	*to ladies-dat.*
pʌɭɭɪ()kaɭ -ku	pʌɭɭɪgʌɭʉkkʉ
school - dat.marker	*to schools-dat.*

46) Homorganic Epenthesis (segment [n̪])

iii. LEX + INF.SUFF (VERB)

Input	*Output*
ceːɾ-tu	ceːɾ̃n̪θ̃ʉ
join – inf.marker	*being joined*
makiɻ-tu	mʌ̃gɪɻ̃n̪θ̃ʉ
enjoy – inf.marker	*being enjoyed*
magiɻ-ta	mʌ̃gɪɻ̃n̪θ̃ə
enjoy – inf.marker	*the enjoyed*

[4] The underlying form of dative case marker is perceived as /-ku/, based on the perception of traditional grammarians, who stressed that all consonants emerge in the form of CV word-initially, but not CC or CCV (Nannu:l, 1996, couplet 89).

pakiɾ-tu	pʌgɪɾn̪θ̃ʉ
share – inf.marker	*being shared*

47) Syllable Epenthesis (Syllable [am])

iv. LEX + LEX (Compound noun)

Input	*Output*
kaɳ - puːctʃɪ	kʌ̃nnaː̃mpũːctʃɪ
eye – cover	*hide and seek game*

48) Multiple Epentheses

Case markers (Nouns ending with consonants /m/)

LEX + SUFF

Option 1

i. Epenthetic /t/ and /u/

Input	*Output*
aːyɪɾam - ku	aːyɪɾəttkkʉ
thousand - dat.marker	*more than thousand-dat.*
aːyɪɾam - tt- ku-um	aːyɪɾəttʉkkʉm
thousand - dat.marker	*more than thousand-dat.*
aɾac(aː)ŋkam - ku	aɾəcaːŋg̃əttukkʉ
government - - dat.marker	*to government-dat.*
caŋkam - ku	cʌ̃ŋg̃əttukkʉ
organization - dat.marker	*to organization-dat.*
eɳɳam - ku	ẽɳɳə̃ttukkʉ
thought - dat.marker	*to though-dat.*
idam - ku	ɪdəttukkʉ
place - dat.marker	*to place-dat.*
kiɾaːmam - ku	kɪɾaːmə̃ttukkkʉ
village - dat.marker	*to village-dat.*
kudumpam - ku	kʊdʊ̃mpəttukkʉ
family - dat.marker	*to family-dat.*
n̪eːɾam - ku	n̪eː̃ɾəttʉkkʉ
time - dat.marker	*in time-dat.*
paːsam - ku	paːsəttʉkkʉ
love - dat.marker	*to love-dat.*
paɻam - ku	pʌɻəttʉkkʉ
fruit - dat.marker	*to fruit-dat.*
ʋaɾusam - ku	vʌɾʊsattʉkkʉ
year - dat.marker	*to the year*

Option 2

ii. Epenthetic /t/ and /in/

Input	*Output*
aːyɪɾam - ku	aːyɪɾəttɪɽkʉm .
thousand - dat.marker	*more than thousand-dat.*
aːyɪɾam - tt- k(u)m	aːyɪɾəttʉkkʉm
thousand - dat.marker	*more than thousand-dat.*

aɾacaːŋkam - ku	aɾəcaːŋg̃əttɪɽkʉ
government - - dat.marker	*to government-dat.*
caŋkam - ku	cʌ̃ŋg̃əttɪɽkʉ
organization - dat.marker	*to organization-dat.*
eɳɳam - ku	ẽɳɳə̃ttɪɽkkʉ
thought - dat.marker	*to though-dat.*
idam - ku	ɪdəttɪɽkkʉ
place - dat.marker	*to place-dat.*
kiɾaːmam - ku	kɪɾaːmə̃ttɪɽkkʉ
village - dat.marker	*to village-dat.*
kudumpam - ku	kʊdʊ̃mpəttɪɽkʉ
family - dat.marker	*to family-dat.*
n̪eːɾam - ku	n̪eː̃ɾəttɪɽkʉ
time - dat.marker	*in time-dat.*
paːsam - ku	paːsəttɪɽkʉ
love - dat.marker	*to love-dat.*
paɻam - ku	pʌɻəttɪɽkʉ
fruit - dat.marker	*to fruit-dat.*
ʋaɾusam - ku	vʌɾʊsətɪɽkʉ
year - dat.marker	*to the year*

In short, the following are the results of interactions i) coronal and non-sibilant (dorsal segment) received, epenthesis [u], as in (45), ii) interaction between coronal coda and sibilant stop, /t/, compelled two kinds of epentheses: the derivative suffix received an epenthetic vowel [u] as in (43), while the inflectional suffix received homorganic epenthesis, [n̪], as in (46), iii) non-coronal coda and non-sibilant onset (m-k), have settled convincingly with syllable epenthesis, as in (47). Insertion of vowel epenthesis between CVC stems/words with moraic-coda has triggered an additional exercise as well, gemination. The CV:C stem/words have avoided gemination. Instead of that, they have maximised the coda as onset.

The data show application of three kinds of epentheses in Tamil. It covers two segment epenthesis [u], homorganic nasal [n̪] and syllable epenthesis [a:m] within both monosyllabic and polysyllabic words. Based on the involvement of different epentheses in different structures, epenthesis acquisition can be divided into two different groups; those having single epenthesis and those having multiple epenthetic applications between lateral, nasal and rhotic codas and coronal, labial or dorsal onset at M-P interfaces.

Lexically, EI is divided into three different contexts - derived, inflected and compound words. While insertion of segmental epenthesis is obvious among the derivational and inflectional interactions, morph epenthesis is applied within, */kaɳ-puːctʃɪ/* → */kã̃nnaːmp̃uːctʃɪ/* ‘hide and seek game’. The data show the interaction between lexical nouns ending with the labial nasal, /m/, inflected for 4^{th} case marker, /*ku*/ with dorsal initial onset contact with additional segmental epenthesis and morph epenthesis, [in]. Other examples harvest a single epenthesis.

The coronal dental stop /t/ is a portmanteau suffix which reacted in two non-identical ways in the data. Grammatically the segment has two crucial grammatical roles: one devises a transitive sense and the other devises intransitive sense. While the transitive verbs usually grasp geminate, /t/, as in */ce:tta:n/*, the intransitive verb acquires homorganic geminate /n̪/, as in /*ceːrn̪ta:n/*. The emergence of /n̪/, however, is restricted compared to geminate /t/, because it may only be followed by another sonorous segment, rhotic /r/. The homorganic nasal hardly occurs within the intervocalic environment compared to /t/, which triggers gemination in intervocalic positions. Since both occur in complementary positions the grammar manages to avoid semantic ambiguity, unwittingly.

Though it is transparent that insertion of morph epenthesis is governed by positional values and the phonotactic quality of the involved consonants, the selection is not blind to the structural status of the stem/word and the suffixes involved in the expansion. How all of these contributive factors are manned in devising the right choice of epenthesis will shortly be seen in some detail.

5.5.3 Insertion of Segmental Epenthesis in Tamil

Five analyses will be offered covering interactions between various lexical words and suffixes to validate the contribution of sonority in modifying the contact harmony between different forms of participating lexical items. These are, analysis of lexical versus derived suffixes, analysis of lexical versus inflectional suffixes, analysis of lexical versus lexical. The discussion has been divided into two parts, data exhibiting insertion of a single epenthesis, and that of involving multiple epentheses, in order, under the following headings.

49) 5.5.3.1 Lateral Coda versus Sibilant Onset (Coronal)
5.5.3.2 Coronal Nasal Coda versus Non-sibilant Onset (Labial)

Lateral Coda versus Sibilant Onset (Coronal Stop /t/)

The first analysis revolves around the insertion of segmental epenthesis, [u]. The following are representative data exhibiting interaction between liquid coda and the sibilant onset and coronal stop, /t/.

50) LEX + SUFF(Derv)

VERB

Input	*Output*
col-tal	cɔllʊtal
say – nom.marker	*the saying*
taɭ-tal	taɭɭutal
push – nom.marker	*the pushing*
aːɭ-tal	aːɭutal
rule – nom. marker	*the ruling*

The data consists of two different bases, CVC and V:C, with lateral coda which are attached to the same derivative suffix form, /*tal*/. The grammar triggers a vowel epenthesis [u] as a bid to achieve coda condition when a coronal onset belongs to the same natural class attached to them. It shows the application of vowel epenthesis [u] avoiding a sonority clash between segments from the same natural class, but which have different sonority ranking. The foregoing significance verifies that both moraic and non-moraic coda segments of lexical words, within CVC and CV:C, respectively, are retained in derivation. Implicitly, this means that retaining both segments is essential in this kind of derived words.

The data display an interesting scenario as well. The monosyllable with moraic coda with CVC type syllable forms, and the non-moraic coda with CV:C type of syllable pattern. They behave in non-similar ways. The former hosts double phonological reactions, gemination (c.f §6.3 for more theoretical explanation on Gemination in Tamil) on top of EI, but the latter does not initiate gemination. The data offers empirical evidence confirming that a voiceless stop in VÇ̥V intervocalic position undergoes gemination, but not the V:Ç̥V in this language. The derived geminate serves as coda, while the original segment is retained as onset. The gemination, which is classified as DERIVED GEMINATION (DERGEM) (cf. §3.6 for definition of this special feature) besides ensuring the structure retains BIMORAICITY (BIMOR), it also sustains harmonic contact between adjacent segments by creating an empty syllable template, combination of geminate /l/ and [u], which promises gradual sonority fall across the morpheme boundaries.

Before offering a tableau analysis for this data, it is appropriate to see the behaviour of dorsal onsets, which behave contrastively from the foregoing and others.

Coronal Coda versus Non-Sibilant Onset (Dorsal)

The following are data exhibiting interaction between two types of coronal coda, lateral and nasal, and non-sibilant onset, dorsal.

51)
LEX + SUFF(Infl. CM)

a. /u/

mun-ku	mʊ̃nnʊ̃kkʉ
front – abl.marker	*to front*
pĩn-ku	pĩnnukku
back - abl.marker	*regressive*

b. Case markers and epenthesis

a. /u/

aːɭ - ku	aːɭʉkkʉ
person - abl.marker	*to person-dat.*
paːl - ku	paːlʉkkʉ
milk - abl.marker	*to milk-dat.*
peːɾ - ku	peːɾʊkkʉ
name - abl.marker	*name sake -dat.*
n̪aːɭ - ku	n̪ãːɭʉkkʉ
date - abl.marker	to date-dat.
n̪aː(d)kal - ku	n̪ãːdgʌɭʉkkʉ
day – s – abl.marker	*to dates-dat.*
pʌɭɭɪ()kaɭ -ku	pʌɭɭɪgʌɭʉkkʉ
school – abl.marker	*to schools-dat.*
aʋaɾ - ku	aʋʌɾʉkkʉ
he – abl.marker	*to him-dat.*
makaɭ()iːɾ – ku	mʌ̃kəɭiːɾʉkkʉ
ladies – abl.marker	*to ladies-dat.*
ciɾu(v)an –ku	cɪɽʊʋʌ̃nʉkkʉ
kid – abl.marker	*to kid-dat.*
i(v)an -ku	ɪʋʌ̃nʉkkʉ
he – abl.dat	*to him-dat.*

jappaːn -ku jʌppaːnʉkkʉ
Japan – abl.dat *to Japan-dat.*

b. Epenthetic /a/
naːm – ku nʌ̃mə̃kkʉ
we – abl.marker *for us*
(case of vowel harmony) feature – deletion) and distant harmony

The data consists of monosyllables of CVC and CV:C type of syllables and polysyllable stem/words ending with four types of coronal segments namely alveolar nasal /n/, alveolar lateral /l/, retroflex lateral /ɭ/ and liquid /r/ attached to a dorsal initial case marker suffix, /ku/. Regardless of types of morphological structures, the grammar has triggered the epenthesis [u] to avoid unnecessary sonority clashes at the interface[5].

Interaction between the ||*MAR[$_{\sigma S/W\text{-}I}$/COR|| and ||*MAR$_{]\sigma S/W\text{-}I}$/DORSAL|| triggered mixed reactions. The CVC lexical bases experienced three simultaneous phonological reactions - insertion of [u] epenthesis and double gemination. But, the CV:C and polysyllable stem/words experienced insertion of an epenthesis and a single gemination. As in the case of previous data, the moraic coda of the CVC stem/word is split into two segments having a single independent place of articulation. The dorsal onset, on the other hand, which became the centre of the intervocalic position showed the same reaction, materialising the situation to derive a geminate, satisfying the DERIVED-GEMINATE (DERGEM) constraint (the explanation of all constraints is given in (52)).

The multiple phonological reactions witnessed within the CVC and CV:C types of syllable stem/words have an additional motivation, as well. It appears that the grammar attaches Case Marker (CM) to a FEET word, but nothing else. Note that all given base words are either bimoraic or bisyllable. Apparently, an alignment constraint, ALIGN-FEET-RIGHT (FT, σ), requiring Feet edge align with edge of a syllable is operating within this context. EI and gemination triggered between the base lexical and the suffixes ensured that the structure underwent self-correction to support the base not only in order to retain its BIMOR, but also FEETWORD. It can be therefore be concluded that

[5] Since *NÇ̥ is not an issue in this language, it will not be argued along this perspective.

inflectional suffix especially the CM, may only be attached to the highly undominated FEETWORD in this language.

Analyses

Having seen the reasons behind the insertion of epenthesis and other collateral phonological activities taking place along them, it is now time to look at the analyses.

So far the following markedness and faithfulness constraints defending positional value have been identified, which have proved to have influenced the phonological reactions in both instances- coronal lateral versus sibilant onset (Stop /t/) and coronal coda (lateral, nasal, rhotic) and non-sibilant onset (Dorsal).

52) DERIVE-GEMINATE (DER-GEM)
A voiceless stop in intervocalic position must geminate

ALIGN (FEET, σ) (AL (FT, σ))
Align edge of Feet word with edge of a syllable

GSF
Sonority fall between adjacent consonants must be gradual

The constraint ranking obtained in (45) is applied here with necessary modification. The MMSD is replaced with GSF, a constraint responsible for deriving the epenthesis. The undominated alignment constraint, AL-FT-R, and MAX-IO, remained higher-ranking constraints. The final ranking for epenthesis avoiding clash between lateral coda and non-sibilant onset should be read as in (53).

53) AL (FT, σ), MAX-IO

GSF, SCL, IDENT-ONSET (PLACE), DER-GEM , ||*MAR$_{]\sigma S/W-I}$/ LAT-CODA||

* LAB, DOR »* COR

IDENT-IO(PL)

NOCODA

DEP-IO

The tableaux analyses for lateral coda versus sibilant onset are as follows:

54)

Input /aːɭ-tal /	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DER-GEM	‖*MAR]σS/W-I/LAT-CODA‖	*L *D> *C	IDENT (PL)	NOCODA	DEP-IO
☞a. (aː.ɭʊ)təl									*	*	*
b. aːɭtəl	*		*				*			**	
c. aːtəl	*	*!				*			*	*	
d. aːɭəl	*	*!			*	*	*		*	*	

55)

Input /col-tal/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DER-GEM	‖*MAR]σS/W-I/LAT-CODA‖	*L *D> *C	IDENT (PL)	NOCODA	DEP-IO
☞a. (cɔl.lʊ)təl							*			**	*
b. cɔltəl	*		*				*			**	
c. cɔtəl	*	*!				*			*	*	
d. cɔləl	*	*!			*	*			*	*	

56)

Input /taɭ-tal/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DER-GEM	‖*MAR]σS/W-I/LAT-CODA‖	*L *D> *C	IDENT (PL)	NOCODA	DEP-IO
☞a. (taɭ.ɭʊ)təl							*		*	**	*
b. taɭtəl	*		*				*			**	
c. tatəl	*	*!				*			*	*	
d. taɭəl	*	*!			*	*			*	*	

57)

Input /aːɭ-ku/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DER-GEM	‖*MAR$_{]\sigma S/W-I}$/LAT-CODA‖		IDENT (PL)	NOCODA	DEP-IO
☞a. (aː.ɭʉk)k~~ʉ~~									*	*	*
b. aːɭku	*		*				*			*	

Candidates (c) and (d) in the first three tableaux have performed badly against alignment constraint; they have even behaved badly against MAX-IO, causing their instant ousting. They have been ousted from further evaluation for deviating structural requirements which banish structural deletion within derived words. The friendlier input candidates, candidate (b) incurred minimal violation against the alignment constraints and the constraint requiring sonority fall to be gradual at the interfaces, but not suddenly. It seems that the dental /t/, which remained inactive against DER-GEM owes some part of its explanation to morphological factors. The /*tal*/ derivative suffix for instance is probably immune to phonological changes in this language.

The following are analyses of coronal nasal coda versus non-sibilant onsets. The analyses embrace slight changes, except for the input faithfulness candidate; other candidates favouring deletion and violating the undominated alignment constraint have been skipped.

The following are the tableaux analyses for coronal versus dorsal segments. To maximise the results of the analysis, the *LIQ$_{(\sigma r\text{-}i)}$ is replaced with ‖*MAR$_{]\sigma S/W\text{-}I}$/LAT-CODA‖ is replaced with ‖*MAR$_{]\sigma S/W\text{-}I}$/CORNASCODA‖, accordingly.

58)

Input /pĩn-kʉ/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DEP-GEM	||*MAR]σS/W-I/CORNASCODA||		IDENT (PL)	NOCODA	DEP-IO
☞a. (pĩn.nʊk)kʉ										**	*
b. pĩnkʉ	*		*				*			*	

59)

Input / ivan-kʉ/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DEP-GEM	||*MAR]σS/W-I/CORNASCODA||		IDENT (PL)	NOCODA	DEP-IO
☞a.(i.va)nʊkkʉ										*	*
b. (i.van)kʉ	*		*				*			*	

The tableaux analysis of monosyllabic stem/words and polysyllabic words showed stiff differences. The input companion candidate in tableau (58) incurred minimal violations against GSF and AL-(FT-σ), two crucial undominated constraints, requiring that suffixation may only take place along with FTWD, and the gemination which has been the root cause for the formation of empty syllabic template candidates favouring gradual sonority fall, across the morpheme boundary. Candidate (a) emerged as the winner by satisfying almost all high-ranking constraints, including those violated by the sub-optimal candidate. In tableau (59) the alignment constraint proved remains passive while the GSF determined the optimality result. The input faithfulness candidate which satisfied the alignment requirement still curbed from emerging as winner for not satisfying the sonority constraint.

In this section, we have seen the contribution of AL-(FT-σ), and GSF for harmonic reconciliation between monosyllabic and polysyllabic words, by generating segmental epentheses. The forthcoming analysis provides more evidence for application of different epenthesis, for the same reason - avoid sonority disobedience at M-P interfaces.

5.5.4 Homorganic Epenthesis IV (Stop geminates)

The following analysis evaluates the significant role of homorganic epenthesis (HE) emerging at designated positions in Tamil. It appears that if and only if a monosyllabic or polysyllabic stem/word ends with the rhotic, /r/ and approximant retroflex, /ɻ/ attached to a dental stop, /t/, Tamil generates EI. As has been argued before insertion of /n̪/ is also assumed to be the result of sonority constraint, demanding gradual sonority fall between the adjacent segments, as well.

Since the rhotic, /r/ and approximant retroflex, /ɻ/ tend to show extra-phonological unfolding, their phonotactic characteristics in this analysis will not be argued before verifying the extrametrical descriptions in §6.7.1.

The following are the data analyses of transitive verbs hosting homorganic nasal epenthesis.

60) VERB

Input	*Output*
ʋaːɻ - t()u	ʋaːɻ ɻ̃n̪tu
live – inf.marker	*being lived*
ceːɾ - t()u	ceːr̃n̪θ̃ʉ
join – inf.marker	*being joined*
makiɻ - t()u	mʌ̃gɪɻ̃n̪θ̃ʉ
enjoy – inf.marker	*being enjoyed*
magiɻ - t()a	mʌ̃gɪɻ̃n̪θ̃ə
enjoy – inf.marker	*'the enjoyed…'*
pakiɾ - t()u	pʌgɪɾn̪θ̃ʉ
share – inf.marker	*being shared*

When the suffix begins with a coronal onset attached to a monosyllabic word and the polysyllable ends with rhotic, /r/ and approximant retroflex, /ɻ/, a homorganic epenthesis is inserted between them by default. The insertion allows the structure to fulfil its basic sonority requirement, avoiding sonority disagreement between the consonants at the edges, just like cases in the foregoing examples. Having an intermediate homorganic epenthesis, which is a nasal in this case at the interface, allows the sonority to drop gradually as follows, RHOTICS → NASAL → STOP. Such a gradual sonority fall might not be the case within structures allowing the combination of LIQUID→STOP. In short, the present data supplies additional evidence to claim that Tamil prefers components across the morpheme boundary to comply with gradual sonority drop, but not steep.

The claim can be verified with the help of constraints and the ranking obtained so far, as follows:

61)

Input /ceːɾ-t-u/	AL-(FT-σ)	MAX-IO	GSF	SCL	IDENT-ONSET (PL)	DER-GEM	‖*MAR]σ S/W-I/ LIQ-CODA‖	[illegible]	IDENT (PL)	NOCODA	DEP-IO
☞a. ceːr̃n̪θ̃ʉ									*	**	*
b. ceːɾtu			*							*	
c. ceːn̪θ̃ʉ		*!			*				*	*	

The sub-optimality of candidate (b) is determined by GSF, the constraint requiring sonority harmony between the components of the transitive verb, while candidate (c) lost the status of optimality for deleting the coda syllable. The winner, candidate (a) remained unchallenged and satisfied all higher-ranking constraints.

5.5.5 Double Epentheses

So far, the focus has been on validating the sonority requirement and its significant role in initiating insertions of various forms of individual segmental and syllable epenthesis. The following analysis also offers significant cases showing the initiation of double coronal epentheses, owing some explanation to sonority disagreement. Interaction between an onset initial case marker and labial nasal, /m/, and coda which seemed to hinge on violation of *NÇ, creates a range of phonological reactions in Tamil.

The data in (62) initiated insertion of double epenthesis resulting from the interaction between the labial nasal coda, /m/ and two word-initial onsets, coronal /t/ and dorsal /k/.

62) LEX + SUFF

i. Segment epenthesis /t/

Input	*Output*	*Glossary*
maɾam - tu	mʌ̃ɾʌttʉ	the tree…
pakkam - tu	pʌkkʌttʉ	the next

Case markers (Nouns ending with consonants /m/)

LEX + SUFF

ii) Option 1

Epenthetic /t/ and /u/

Input	*Output*
aːyɪɾam - ku	aːyɪɾəttkkʉ
thousand - dat.marker	*more than thousand-dat.*
aːyɪɾam - tt- ku-um	aːyɪɾəttʉkkʉm
thousand - dat.marker	*more than thousand-dat.*
aɾac(aː)ŋkam - ku	aɾəcaːŋg̃əttukkʉ
government - - dat.marker	*to government-dat.*
caŋkam - ku	cʌ̃ŋg̃əttukkʉ
organization - dat.marker	*to organization-dat.*
eɳɳam - ku	ẽɳɳə̃ttukkʉ
thought - dat.marker	*to though-dat.*
idam - ku	ɪdəttukkʉ
place - dat.marker	*to place-dat.*
kiɾaːmam - ku	kɪɾaːmə̃ttukkkʉ
village - dat.marker	*to village-dat.*
kudumpam - ku	kʊdʊ̃mpəttukkʉ
family - dat.marker	*to family-dat.*
n̪eːɾam - ku	n̪ẽːɾəttʉkkʉ
time - dat.marker	*in time-dat.*
paːsam - ku	paːsəttʉkkʉ
love - dat.marker	*to love-dat.*
paɻam - ku	pʌɻəttʉkkʉ
fruit - dat.marker	*to fruit-dat.*
ʋaɾusam - ku	vʌɾʊsattʉkkʉ
year - dat.marker	*to the year*

Option 2

ii. Epenthetic /t/ and /in/

Input	*Output*
aːyɪɾam - ku	aːyɪɾəttɪɽkʉm .
thousand - dat.marker	*more than thousand-dat.*
aːyɪɾam - tt- k(u)m	aːyɪɾəttʉkkʉm
thousand - dat.marker	*more than thousand-dat.*
aɾacaːŋkam - ku	aɾəcaːŋg̃əttɪɽkʉ
government - - dat.marker	*to government-dat.*
caŋkam - ku	cʌ̃ŋg̃əttɪɽkʉ
organization - dat.marker	*to organization-dat.*
eɳɳam - ku	ẽɳɳə̃ttɪɽkkʉ

thought - dat.marker	*to though-dat.*
idam - ku	ɪdəttɪɽkkʉ
place - dat.marker	*to place-dat.*
kiɾaːmam - ku	kɪɾaːmə̃ttɪɽkkʉ
village - dat.marker	*to village-dat.*
kudumpam - ku	kʊdʊ̃mpəttɪɽkʉ
family - dat.marker	*to family-dat.*
n̪eːɾam - ku	n̪ẽːɾəttɪɽkʉ
time - dat.marker	*in time-dat.*
paːsam - ku	paːsəttɪɽkʉ
love - dat.marker	*to love-dat.*
paɻam - ku	pʌɻəttɪɽkʉ
fruit - dat.marker	*to fruit-dat.*
ʋaɾusam - ku	vʌɾʊsətɪɽkʉ
year - dat.marker	*to the year*

Interaction between final coda /m/ of polysyllabic lexical words and case marker suffixes with coronal and dorsal onsets enforced two reactions simultaneously - deletion of /m/ and insertion of epenthesis [t]. In the case of the succeeding lexical beginning with /t/ initial, the grammar inserts an additional segmental epenthesis, [u]. Interactions between nasal coda and dorsal onset on the other hand have two variances known as non-literary variation, as given in (62(ii), and literary variation as in 62(iii). The non-literary variant and the outcome of the labial nasal and coronal onset show no distinction. But the literary variation shows a significant difference - insertion of a syllable epenthesis [in], instead of [u]. These are examples of $\|{*}\text{MAR}_{]\sigma S/W\text{-}I}/\text{LABNAS}\|$ versus $\|{*}\text{MAR}_{]\sigma S/W\text{-}I}/\text{CORNAS}\|$ and $\|{*}\text{MAR}_{]\sigma S/W\text{-}I}/\ \text{DORSAL}\|$.

The immediate question requiring an answer is why the epenthesis [t] emerges every time when the /m/ gets deleted. Surprisingly, as was seen in §5.3, place assimilation is the popular way of avoiding OCA between /m-k/ in this language. Contrarily, place assimilation has been blocked within these instances. Kothandaraman (1999a) believes that /t/ is an underlying form of /m/, and it surfaces whenever the nasal /m/ undergoes deletion to fill the unfilled vacancy[6]. Looking at the data through his lens justifies that

[6] Kothandaraman believes that the emergence of /t/ and deletion of /m/ in Tamil gives an explanation which can be traced back from the historical linguistics of the language. The emerging /t/ is a subtracted form of post-lexical case marker /attu/, he believes. Although his argument still runs on a number of mischief speculations, no specific justification could be found for the emergence of /t/, other than what has been speculated.

deletion of /m/ and insertion of epenthesis [t] in (62(i), leaves the coronal */mara<>- tu*/ to become /*mara<t>tu*/.

63) mʎ̃ɾʌttʉ » maɾamtu
||* MAR$_{]\sigma S/W\text{-}I}$/LABNAS|| + ||* MAR$_{]\sigma S/W\text{-}I}$/CORNAS|| » MAX-IO

Interaction between the coda /m/ and the dorsal onset, /k/, instigates two types of epentheses, [u] and [in], on top of emerging underlying, /t/, filling the place of coda. The presence of epenthesis [u] in (62(ii) has also triggered an additional phonological reaction, forcing the voiceless segments within the intervocalic environment to geminate, as follows:

64) Deletion of /m/
a:yɪɾa<>-ku →
Emergence of /t/ and /u/
a:yɪɾa<t>-ku →
/t/ - /u/ - /k/ intervocalically
a(t)-(u)-ku →
Self-correction through gemination
a:yɪɾa(t)-(u)-ku ←→ a:yɪɾa(t)(t)-(u)(k)ku

As appears obvious from (64) simultaneous emergence of [t] and insertion of epenthesis [u] favoured the structure to avoid the illogical combination of consonants, /m/ and /k/, from two different sonority hierarchies, 1 and 2, respectively. If there are no simultaneous reactions, upon the realisation of one in the absence of the other, deletion is initiated and the insertion of [u] is obscured, the structure may end up with less harmonic form, such as, */a:yɪɾam-ku/* → */*a:yɪɾəkkʉ/* 'more than thousand-dat.'. The language seems to have applied long-winded exercises to avoid structural ill-formedness.

Analysis

The foregoing illustration implies that a LCC is operative at the said context, besides the DERGEM initiating gemination. Two constraints combine forces to protect the place and prohibit the labial nasal /m/ from surface at the interface. Constraint HAVEPLACE, which protects the emergence of underlying [t] and ||*MAR$_{]\sigma\text{-}S/W\text{-}I}$/LABNAS|| operating at the same domain are responsible for instigating simultaneous reactions. Hence, the following LCC is proposed as a responsible constraint enabling the domain to retain its place while avoiding labial nasal.

65) [HAVEPLACE & ||*MAR$_{]\sigma\text{-S/W-I}}$/LABIALNASAL||]$_{[coda]}$
(& HVPLC & ||*MAR$_{]\sigma\text{-S/W-I}}$/LABNAS||]$_{[coda]}$)
Retain the place of the coda but not coda segment

HAVEPLACE (HVPLC)
Place feature of segment must be retained

||*MAR$_{]\sigma\text{-S/W-I}}$/LABIALNASAL|| (||*MAR$_{]\sigma\text{-S/W-I}}$/LABNAS||
Labial nasal coda of stem/word initial must not surface

Their simultaneous reactions helped the structure to create a buffer circumstance separating the lexical words and the suffix effectively, subsequently satisfying the sonority requirement as well. This can be shown clearly by a sequence of derivational rules as follows.

66) Option 1
Input: aːyɪɾam - ku
aːyɪɾam - ku → aːyɪɾa<Ø> -[u] ku → aːyɪɾa-[u](k)ku → aːyɪɾa<t>-[u](k)ku
Output: aːyɪɾa<t>[t]-[u](k)ku (optimal) *aːyɪɾəkkʉ (sub-optimal)

67) Option 2
Input: aːyɪɾam - ku
aːyɪɾam - ku → aːyɪɾa<Ø> -[in] ku → aːyɪɾa<>-[t][in]ku →aːyɪɾa<t>-[ɪɽ][k]ku
Output: aːyɪɾa<t>-(ɪɽ)ku (optimal) *aːyɪɾəkkʉ (sub-optimal)

Options and resolutions given in (66 & 67) clarify that the LCC and DERGEM, deserve a place higher than that of the HVPLC and ||*MAR$_{]\sigma\text{-S/W-I}}$/LABNAS||, as in the following:

68) [HVPLC & ||*MAR$_{]\sigma\text{-S/W-I}}$/LABNAS||]$_{[coda]}$, DERGEM » HVPLC, ||*MAR$_{]\sigma\text{-S/W-I}}$/LABNAS||
aːyɪɾattʉ » aːyɪɾəmtu
mʌ̃ɾʌttʉ » maɾamtu

A simple tableau analysis for the ranking achieved so far may offer the following result.

69)

Input /maram-tu/	[HvPlc & ‖*Mar]σ-S/W-I/LabNas‖&][coda]	DerGem	HvPlc	‖*Mar]σ-S/W-I/LabNas‖
☞a. mʌrʌttʉ				
b. mʌrʌmtʉ	,*!			*
c. mʌrʌmʉ	*!,*		*	*
d. mʌrʌtʉ	,*	*	*	

Obviously, the constraints are sufficient to select the right optimal candidate from other competing candidates but they are insufficient to offer more clarification about other phonological necessities underpinning the result. This confirms that placing these constraints within the main ranking framework already seen before is crucial.

Yet, before this answers to an additional circumstance that has eluded attention so far must be sought. One is, why the structure has initiated two different types of epentheses, [u] and [in], instead of simply undergoing coda-conditioning, which is more economical. The underlying cause of epenthetic [u] insertion can be answered from the perspective of sonority requirement, i.e., GSF and SCL. The selection of [+high, +back] vowels as epenthesis seems to be influenced by the case suffix, which ends with the same vowel, and allows the structure to establish vowel harmony, as well.

Therefore it might be claimed that insertion of [u] is aimed at achieving vowel harmony between the suffix final vowel and the penultimate syllable. The combined effects of emerged [t] and epenthesis [u] forming a ‘falsified’ syllable template respecting the sonority principle has allowed sonority between two edges to fall gradually at the interface. As a result, the structures such as */mʌ̃ɾʌttʉ/*, */aːyɪɾəttukkʉ/* and */aːyɪɾəttɪɽkʉm/* with mediated syllable forms emerged as harmonic forms as opposed to */maɾamtu/* and */aːyɪɾamku/*, which violated sonority fall between the adjacent components.

The conclusion reached here is that initiation of the morph epenthesis, [in] has additional motivations. On top of avoiding stiff sonority fall, acquisition of [in] enables the lexical word to obtain CrispEdge, a harmonic platform which leads toward cohesive adjoining. Having coronal segments, [i] and [n] sharing the same place of articulation at the interface in the form of epenthesis justifies this requirement. It is noticeable that the base end with /t/, a coronal and the /i and n/ of the epenthetic morph also belongs to the same natural class – coronal (high front vowels are assumed to be coronal segments, Clements (1985), Hayes (1995), Lubowicz (2004) following the principles of Feature Geometry). Unlike the vowel epenthesis establishing harmony between the epenthesis and the suffix, it seems that the morph epenthesis establishes harmony between itself and the lexical base. Therefore, it may be concluded that the variables epentheses [u] and [in] at the interfaces are not accidental but pre-determined in this language.

The last constraint that needs to be highlighted in this analysis is undominated alignment constraints. ALIGN (SUFF, L, PRWD, R) ensuring the left edge suffix be attached with the right edge of the prosodic word also seems to contribute to generating the epenthesis at the interface. This constraint ensures suffixes are attached to the left edge of base the words, but not otherwise.

70) ALIGN- SUFFIX-LEFT (AL-SUFF-LT)
Align (Affix, L, PrWd, R)
Align left edge of each suffix with right edge of a prosodic word.

The constraints reached so far can be assigned within a proper ranking order as seen in the following. For this we repeat the ranking achieved in (53) as (71) for the sake of convenient.

71) AL-GRWD-R » MAX-IO » GSC, SCL, ||*MAR$_{]\sigma S/W-I}$/CORNAS|| + ||*MAR$_{ONSET-S/W-I}$/ LAB|| » IDENT-ONSET (PL)»*LAB, *DOR » COR » IDENT (PL) » NOCODA » DEP-IO

Some modifications are necessary for the ranking to achieve complete plausibility to advocate for phonological changes taking place within the given structures. The constraints needing to be replaced and re-placed will be examined next.

The alignment constraint is replaced with that of the relevant one, AL-SUFF, while the MAX-IO has been ranked low, as deletion is inevitable. The LCC, and the DERGEM have been ranked along with sonority constraints above the positional constraint, IDENT-ONSET (PLC), while the components of the LCC, HVPLC, and ||*MAR$_{]\sigma\text{-}S/W-I}$/LABNAS|| have been assigned along the latter, as follows:

72)

Input /aːyɪɾam-ku/	AL-SUFF-LF	GSC	SCL	[HVPLC&‖*MAR]σ-S/W-I/LABNAS‖][coda]	DERGEM	IDENT-ONSET(PL)	HVPLC	‖*MAR]σ-S/W-I/LABNAS‖		IDENT(PL)	NOCODA	DEP-IO	MAX-IO
☞a. aːyɪɾʌttʊkkʉ										*	**	**	*
b. aːyɪɾʌmkʉ		*		*,				*			*		
c.aːyɪɾʌtukʉ					*!		*			*			*
d. aːyɪɾəkkʉ							*			*	*	*	*
e. aːyɪɾʌkʉ					*	*!				*		*	*!

Constraints and their ranking in tableau (72) provide an anticipated result. Candidate (a) fulfilled all the required qualities to become the optimal candidate. The minimal violation incurred upon the low-ranked constraints did not affect its status at all. Candidate (b) proves that gradual sonority fall is one of the crucial requirements and must be satisfied to emerge as a harmonic candidate. Candidate (c) and (e) were ousted from the competition for fatal violation - not satisfying higher ranking IDENT-ONSET(PLC) and DERGEM, respectively. Candidate (d), which incurred minimal violations against HVPLC, lost the optimal status to the victor.

To run tableau analysis for */aːyɪɾam-ku/*, two additional constraints are needed, CRISPEDGE and MMSD, on top of the constraints seen in the foregoing analysis. Note that GSF is replaced with MMSD in this case, as the issue at hand involves maintaining the minimal sonority disparity but not gradual sonority fall. The latter is responsible for the emergence of geminate, /t/, which led to Absolute Sonority Relegation between adjacent components. Since this constraint has ensured the sonority disparity between the voiceless onset and the coda is as minimal as possible, an anticipated requirement within the context, it deserves a place among the other sonority constraints. The CRISPEDGE is also the motivation for insertion of epenthetic [in], as we have seen before. The following tableau with their inclusion evaluates, /*a:yiram-ku*/.

73)

Input /aːyɪɾam-ku/	AL-SUFF-LF	MMSD	GSC	SCL	[HVPLC & ‖*MAR]σ-S/W-I/LABNAS‖][coda]	DERGEM	CRISPEDGE	IDENT-ONSET(PL)	HVPLC	‖*MAR]σ-S/W-I/LABNAS‖		IDENT(PL)	NOCODA	DEP-IO	MAX-IO
☞a. aːyɪɾʌttɪɽku								*				*	**	***	*
b. aːyɪɾʌmku		*	*		*, *					*			*		
c.aːyɪɾʌtɪnku		*				*!		*	*			***	*	***	*
d. aːyɪɾətɪɽʉ						*		*	*			***	*	**	*
e. aːyɪɾətɪɽkʉ						*		*!				***	*	***	*!

The tableau reveals that both sonority constraints, MMSD and GSF, can play an effective role in the same structure. Selecting candidate (a) as winner, which favours MMSD shows that respecting the minimal sonority distance is as crucial as retaining the crispier edge. Candidate (c) was also grounded for the same reason. The input faithful candidate lost the competition for not respecting the alignment and sonority constraints, MMSD and GSF. Candidate (d) lost the optimal status, for fatal violation against IDENT-ONSET(PLC) and minimal violation against, HVPLC and CRISPEDGE. Lastly, candidate (e) was ousted for not allowing gemination to take place.

5.5.7 Interim Conclusion

Two points have been clarified with empirical evidences in this section. One is selection of epenthesis and its connectedness to gradual sonority-fall, and the other is the role of segmental strengths and their influence in manipulating the choice of epenthesis selection in this section. Overall, application of epenthesis strategies is determined by segmental elements which thrive for harmonising the miniature phonological irregularities between the adjacent components.

The study has also revealed that EI selection is subject to selective restrictions, as the followings show:

74) a. An inflectional suffix may only be attached to a Prosodic Word (FEETWORD).Compound words exhibit this reaction sometimes but not always. (Disyllabic word - a compound word may not respect this demand)
b. Derivational suffixes and inflectional suffixes behave differently; the former is not prone to DERGEM while the latter is
c. The /ttu/ formation involving case marker /tu/ and deletion of /m/ is not initiated by DERGEM but by surfacing underlying segments
d. Selection of epenthesis /u/ is determined by the quality of the vowel of word-final syllables
e. Selection of epenthesis [in] is determined by the quality of the coda consonant of the base lexical, aiming at establishing CRISPEDGE

This concludes the application of epenthesis, a SrRS to avoid OCA in Tamil. Another strategy, deletion, will be examined next, which is largely conditioned by a significant sonority constraint, Gradual Sonority Fall – the Coda Maximisation.

5.6 Coda-Condition - Deletion and OCA in Tamil

This section will use the same line of argument as before to investigate the characteristics of segment deletion as a means of avoiding OAC – that of avoiding sonority clashes/disparity between two marginal segments that are organized consecutively.

Deletion is a cross-linguistic phenomenon and a garner of interest among linguists ever since the era of pre-OT. In the pre-OT era, deletion was associated with the theory of Stray Erasure introduced by Steriade (1982b), which claims that material that does not fit in or form part of higher prosodic structure is deleted. Deletion was associated with unfit material within the structural harmony of a higher prosodic system during this era.

In the latter development of linguistics analysis, the same phenomenon has been treated as case of coda-condition, especially by Junko Ito (1986). She believed that most languages prefer a coda and onset sequence to follow a fixed tenure; the coda should be either homorganic nasal or geminate. Any coda consonant with unassimilated place features to subsequent onset is deleted forcefully. The nature of the coda-onset inter-relationship has well been attested in many languages, including Diolo-Fogny (Sapir, 1965), Akan (Schechter and Fromkin, 1986), Axininca (Payne, 1981) claims Lombardi (2001). The same approach has been extended to OT by Ito.

Within OT, deletion is observed as another option of maintaining syllable well-formedness as well. Kager (1999: 134) argues that languages apply various strategies to maintain the well-formedness of the structure. Deletion is one of them. Kager applied the same data as Ito, in Diola-Fogny to support his claim. Deletion usually targets segments at weak prosodic positions to repair structural ill-formedness, by keeping the incurred damages as minimal as possible (Kager, 1999).

The present study takes the issue a step further, claiming that deletion of a segment can also be associated with sonority-clash and interaction between positional markedness and faithfulness. The data from Tamil supports the claim, as the language enforces deletion to preserve sonority harmony and harmonic contact between adjacent syllables. It usually targets non-moraic coda segments such as liquids and labial nasal /m/ occupying the coda positions of non-stem/word initial syllables to avoid unnecessary sonority tension. Although it can be claimed that the segment deletion is basically motivated by violation of sonority requirements, the language still consults various factors before deciding the right sound segment to be eliminated.

Tamil abides by universal tendencies, preserving positional prominence and deleting coda syllables more liberally. Since Tamil is a language that favours onset which requires all word-internal syllables to have onset, it guards onset at all costs. In short, sonority-related repairing strategies triggered to resolve the phonological shortfall at M-P interfaces, could be identified collectively as onset friendlier, while the codas receive lesser protection and are vulnerable to instant deletion.

Although, coda deletion is more rigorous, onset deletion still can be found in certain circumstances, such as in */vaːn/-/n̪il(a)vu/* → */vaːnĩləʋʉ/* ‘sky moon’, which is represented graphically as follows.

75) i. Deletion of Onset Segment

ʋ a: n - n̪ i l(a) vu
| | | | | | | | |
ʋ a: n – x i l(a) vu → ʋa:nĩləʋʉ
sky - moon ‘sky moon’

ii. Deletion of Coda Segment

ʋ a: n - n̪ i l(a) vu
| | | | | | | | |
ʋ a: x – n̪ i l(a) vu → *ʋa: n̪ i l(a) vu
sky - moon *(come) moon’

The diagram shows that onset deletion is essential to retain the intended semantic relevation in the compound word, which is not fulfilled by coda deletion.

Elimination of sound segments seems to take place based on two criteria in this language. One is positional strength and the other is segmental strength. Both criteria make equal significant contribution in deciding the deletion of moraic coda within root/stem/word-initial syllables. However, when it comes to deletion of non-moraic segments at non-initial syllables of stem/word-initial, it consults the segmental strength, alone.

Sonorous segments, which are the common choice of coda in Tamil, are the primary prey of deletion in all instances. When the weak segments occupy weak positions such as coda syllables, their enhanced weakness guarantees their deletion when the coda segments interact with strong consonants at the perceptually stronger positions, the onset. Interaction between the WEAK and STRONG always favours the latter.

The following section offers an analysis of deletion in two valued positions - root/stem/word-initial syllables and non-initial root/stem/word-initial syllables and their contributing phonotactic factors in studying deletion in OCA.

The Data

When a word-final coda with segments such as liquid and labial nasal interacts with strong segments such as coronal and non-coronal onset, the weak segments are usually deleted in Tamil. The intensity of segmental deletion within stem/word-initial syllables and non-initial stem/word-initial syllables within verbal inflections (76) and compound words (77 and 78) is shown in the following data.

76) i. Deletion of root-initial Coda Segment

a. Deletion of Coda *Liquids* - (ɾ)
LEX + SUFF
Verb

Input	*Output*
ceːɾ - kari	ceːkʌɾɪ
collect – nom.marker	*the collected- inf.*

77) i. Deletion of non stem/word initial Coda Segment
a. Deletion of liquid coda
LEX + LEX

Input	*Output*
maɾu(tt)uvar - manai	mʌ̃ɾʊttʉʋəmʌ̃nə̃
doctor – home	*hospital*

b. Deletion of labial nasal coda
LEX + LEX

Input	*Output*
puɽam - n̪ageɾ	pʊɽʌ̃n̪ʌ̃gəɾ
urban – city/area	*urban area*

78) Deletion of Onset (dental nasal (n)
LEX + LEX
1. Onset

Input	*Output*
ʋaːn - n̪il(a)vu	ʋaːnĩləʋʉ
sky – moon	*sky moon*

Some words on the data are in order. The verbs inflected with different form suffixes in (76) have the same verbal paradigm, the *ceːr* 'reach', a base-stem with CV:C pattern. The rest of the data are co-compound words, derived by attaching two lexical nouns, ranging from monosyllable to polysyllable word. The preceding and successive lexical nouns are equally prominent within these co-compounds. Regardless to different morphological class, the codas and onset experienced deletion.

Deletion within the data cast different requirements and preferences. Coda deletion within inflectional verbs follows the rules of thumb – delete non-moraic coda. But the same within compound words behave differently; monosyllable bases enforced onset deletion, while the disyllabic and polysyllabic lexical terms initiating coda deletion. The latter dropped labial nasal, /m/ and liquid, /r/ within polysyllabic words to avoid onset-coda irregularities.

The unsystematic segment deletion behaviour seen in the foregoing owes some phonotactic explanation. Observation shows that voiceless coronal stops at intervocalic positions are forced to geminate at intervocalic positions to ensure the preceding syllable is closed (or closed by a nasal), as in */ce:ɾ-tu→ce:ttʉ/* 'by adding-inf.'- a restriction which is not applicable to non-coronal voiceless stops, as in */ce:ɾ- kari →ce:kʌɾɪ/* 'the collected- inf.' In other words, to protect the naturally weakened voiceless stops within weakened intervocalic positions, the grammar insisted on a strategic way - voiceless coronal stops at onset are attached to a root-initial closed syllable, while non-coronal voiceless stops are attached to an open syllable.

To put it simply, deletion of coda segments in Tamil can be characterised as follows:

79)

i. Deletion is common in two contexts; verbal inflection and compound word formation
ii. Deletion targets weak consonants, such as laterals, liquids and bilabial nasal at the weak position, coda
iii. Deletion of dental nasal /n/ accounts for additional restrictions. The dental nasal may only cast its strength, if it is preceded by dental /t/, or if it emerges in geminated form, or emerges at the word initial. Elsewhere, the dental nasal / n̪/ does not have an independent place, and it is considered a weak segment[7]. If the dental nasal failed to withhold one of the mentioned environments in morphological concatenation or compound word formation, the segment is subject to deletion
iv. Bilabial nasal, the weakest segment in the phonetic inventory of the language, does not form harmonic contact with another nasal with stronger sonority capacity. The labial nasal /m/ avoids clash by simply being dropped

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[7] Dental nasal is an exclusive sound segment, of which place of occurrence is limited to three environments; word-initial position, homorganic to dental /t/ and geminated form. Dental nasal in intervocalic environment, as in this rare example of the proper noun, /*palan̪*i/ considered a weak segment.

It is not possible to analyse all the given data due to page constraints. Since we have seen deletion of /m/ in the previous section, attention is paid to a significant deletion phenomenon of the language, onset-deletion within stem/word-initial to show the exclusiveness of OCA management in Tamil.

5.6.1 Onset Deletion

The data show segment deletion which targets an onset.

80)	Nasal Deletion	
	LEX + LEX	
	Input	*Output*
	vaːn - n̪ilavu	vaːnĩləvʉ
	sky – moon	*sky moon*

Interaction between coronal segments, ||*MAR$_{]\sigma\text{-S/W-I}}$/CORNAS|| and ||*MAR$_{]\sigma\text{-S/W-I}}$ /DENNAS|| at interface enforces deletion of dental nasal, while the coronal nasal at coda is retained. The outcome not only challenges the language specific requirements, but also cross-linguistic preference, showing typical evidence for failure of positional faithfulness constraint.

The preference of the reversal deletion pattern in Tamil owes its explanation to locality strength. As has been seen in the foregoing evidence, positional faithfulness constraint is unsuccessful in protecting its self-existence, marking IDENT-ONSET (PLACE) and MAX-IO as two heavily dominated constraints in this context. Therefore, deletion of the non-moraic coronal nasal onset of the stem/word non-initial syllable must be seen as an effort to retain segmental strength, but not positional faithfulness.

Another aspect that closely corroborates with onset deletion is sonority strength. The consonantal strength leading towards onset deletion can be corroborated with sonority strength as well. Weak and strong distinctions of consonants can be drawn in a number of ways - classifying the sonority value of the consonant segments, and accounting the difference based on the place of articulation being among them. Combinations of both are appropriate for the current context. Universally, the least sonorous segments are treated as stronger compared to most sonorous segments as indicated in (80). In contrast as far as place of articulation is concerned, coronal segments are treated as stronger than that of labial and dorsal; therefore, deletion of coronal segments are protected compared to labial and dorsal segments.

81)

- Strong
  - Stop
  - Nasal (coronal)/Nasal (non-coronal)
  - Liquid (coronal)
- Weak

Note that both coronal nasals belong to the same hierarchy and share the same strength value; therefore, the strength of the place of articulation became a deciding factor. The dental nasal which was born at the periphery of the coronal region seems to have been treated as having 'less coronal' essence compared to the coronal segment such as alveolar nasal which born within the locus of coronal stronghold, alveolar. The minute difference which accounts for minimal sonority differences between sonorous segments of the same kind is likely to be the driving factor enforcing onset deletion[8].

From this, it is clear that coronal alveolar ought to be treated as a strong segment as opposed to dental nasal; hence, it is subjected to deletion. In sum, we may conclude that onset deletion is enforced by segmental strength, but not by positional prominence.

5.6.1.1 Analysis

In order to run tableau analysis for the data, the constraints identified so far will first have to be assembled in ranking order. Preference of */vaːnĩləvʉ/* against */vaːn̪ilavu/* verifies that faithfulness constraint, MAX-IO, is heavily dominated. The markedness constraints ||*MAR$_{]\sigma\text{-S/W-I}}$ /DENNAS|| responsible for prohibiting emergence of dental nasal onset dominates the FC. The initial ranking sandwiched between universal rankings of segmental markedness constraints may give the following,

82) ||*MAR$_{]\sigma\text{-S/W-I}}$ /DENNAS|| » *LABIAL, *DORSAL » *CORONAL » MAX-IO ||*MAR$_{[\sigma\text{-S/W-I}}$/DENNAS||
Dental nasal should not emerge as onset

[8] There is another nasal, coronal nasal retroflex, /n/, which born at the right edge of coronal region instead of the locus of coronal stronghold, also appeared to be receiving the very same treatment.

The initial ranking is lacking in some additional information, obscuring details of factors controlling the deletion of dental nasal. Any segmental or structural constraint may not offer the effect avoiding dental-nasal in the interaction between coronal and dental nasal, except for a LCC. It is assumed that a LCC, as in (82), targeting the interface as a domain is responsible for the desired output to prevail.

83) [||*MAR$_{[\sigma\text{-S/W-I}}$/ CORONALNASAL|| & ||*MAR$_{[\sigma\text{-S/W-I}}$ /DENTALNASAL||]$_{interface}$
([||*MAR$_{]\sigma\text{-S/W-I}}$/ CORNAS|| & ||*MAR$_{[\sigma\text{-S/W-I}}$ /DENNAS||]$_{int}$)
Avoid interaction between coronal nasal on stem/word initial coda and dental nasal onset at the interface

To allow onset deletion to kick start, the undominated LCC must dominate the constraints seen in (81).

The constraint ranking is complete without the inclusion of crucial sonority constraints such as MMSD and SCL, two undominated constraints. They may be placed along with LCC for their crucial role play and undominated nature in the language.

Deletion of onset also involved the alignment of morpheme boundaries. It is proposed here that the following alignment constraints, following Ito and Mester (2004), ensuring all syllables begin with an onset must have identical representation in input and output, have been violated in this context.

84) ONSET (AL-σ-L)
Align (σ, L, C, L)
Align a consonant to left

The alignment constraint will rule out all consonants from syllable final position vacuously. Yet, a constraint such as this is essential to avoid any mapping favouring onsetless syllables within the word-internal structure as follows, /**va:n.i.lavu/*. Meantime, it also advocates onset-maximisation, which compensates for the role of sonority harmony. Ranking wise, therefore, it deserves a high-ranking place. The complete ranking of the constraints reinforcing the structural harmony without violating sonority harmony is,

85) AL-σ-L, MMSD, SCL, [||*MAR$_{]}$]$_{\sigma\text{-S/W-I}}$/CORNAS||&||*MAR$_{onset}$/DENNAS||]$_{int}$»
||*MAR $_{onset}$/ DENNAS|| » * LAB, *DOR »* CORl » MAX-IO

The tableau illustration of this ranking, is

86)

Input /vaːn-n̪ilavu/	AL-σ -L	MMSD	SCL	[‖*MAR]σ-S/W-I/ CORNAS ‖& ‖*MAR onset/ DENNAS ‖]int	‖*MAR onset/ DENNAS	*LAB	*DOR	*COR	MAX-IO
☞a. vaː.nĩ.lə.ʋʉ						**		**	*
b. vaːn.n̪ɪ.lə.vʉ				*!,*!	*	**		***	
c. vaː.n̪ɪ.lə.vʉ				,*!	*	**		**	*
d. vaːn̪. ɪ.lə.vʉ				*!,		**		**	*

Almost every candidate, except for the (a), incurred either whole or partial violations against the LCC, including the optimal candidate which incurred minimal violations. The tableau shows that Tamil does not prefer CORNAS at the edge of initial syllable in a compound word. At the same time it also clarifies that DENNAS at the word-internal positions are equally fatal as well. The tableau analysis has proved that preserving the strong sonorous consonant as onset is vital for candidates to be optimal, as shown by candidate (a) and it is equally important to avoid weak dental nasal, as proved by candidate (b), (c) and (d), which have been eliminated from the competition for violation components of LCC in or another way.

5.6.4 Interim Conclusion

The foregoing analysis verifies that deletion has been applied to avoid sonority violation between two adjacent consonants, along with other segmental resistance as well. From what has been seen in the foregoing, the conclusion may be made that the language prioritises sonority harmony as being equal to the positional strength in devising the right choice of solution to avoid OCA.

5.7 Conclusion

The present chapter has offered extensive analyses of OCA in Tamil and their correlation to sonority-related repair strategies. The chapter has relied heavily upon positional constraints, including positional faithfulness and markedness, and their universal ranking to examine characteristics of M-P interfaces involving #C_#C interaction. The chapter has also verified universal constraints and language specific constraints plus their ranking responsible for securing structural harmony in Tamil.

It has been verified that the language applies four significant strategies to man OCA within two essential environments. The four essential issues related to SrRS are place assimilation, sonority relegation, epenthesis insertion, and segment deletion. The two exclusive environments that have been reviewed here are stem/word-initial syllables and non-initial stem/word-initial syllables. It has also been argued that the morphophonological reactions between two consonants at M-P interface can be addressed effectively without referring to morphological classes, at large.

The foregoing discussion has also made some theoretical implications. It has been proven that OCA management in Tamil differs from that suggested by Ito (1986) and Linda (2001). Most importantly, OCA resolutions are not related to the significance of coda-condition, alone. The study shows that Tamil relies upon sonority relegation and is treated as important as other options for avoiding OCA.

Chapter Six
Selected Topics in #C_#V and V#_#C_ Interactions

6.1 Introduction

This chapter will discuss sonority-related phonological operations emerging at C#_#V (C-V) and V#_#C (V-C). They both have simplistic appearances but display rigorous and interesting reactions at M-P boundaries. Previous studies of Tamil have not covered most of these phonological reactions on the assumption that they are a 'natural way of forming demisyllables' (Agesthialingam, 1967, Balasubramaniam, 1989b, Christdas, 1988, Karunakar, 1986). The present study claims that they are hosting equally important phonological reactions as in the case of V#_#V (V-V) and C#_#C (C-C) types of M-P interactions which were examined earlier. This chapter will deal with selected topics including, alignment, gemination, deletion, epenthesis, vowel shortening and vowel rising.

It is of interest to note that fundamentally C-V and V-C interactions involve nothing but alignment of syllable boundaries (and morphological as well). This study has discovered a range of alignment constraints favouring the avoidance of sonority-tension at boundaries, i.e. alignments of mora, segment, syllable and morph. These intersections also cover various types of deletions - feature deletions (mora, place, and features), segment deletions (vowel, consonant and diphthong), and syllable deletions to avoid sonority tension. Three types of epentheses, to be specific, vocalic, consonantal and syllable, have also been discovered performing the same role - establishing harmonic sonority settlement. Analyses of the gemination revolve around Derived Gemination, Conditional Gemination (Doubling), and Homorganic Gemination. Apart from these common repairing tactics in C-V and V-C types of interactions, Vowel Shortening and Vowel Rising aiming at sonority agreement between the two segments have also been investigated in this chapter.

Various linguistic factors influence the selection of phonological operations at C-V and V-C interfaces. These include different kinds of lexical items and sound segments such as segmental and sub-segmental elements such as sonority. Among them sonority remains at the top of other triggering and blocking factors in every case. This chapter evaluates the relevance of both rigorous and less popular sonority-related repairing strategies triggered by these factors.

There are some caveats on tableaux illustrations. Unlike the tableaux illustrations seen in the previous chapter which have benefited heavily from the family of constraints belonging to positional faithfulness, the present chapter has relied upon the universal ranking of positional markedness, as was done previously for V#_#V type of interaction. The chosen method is proven to exhilarate the prominent contribution of sonority- related repair strategies within both types of interactions.

The rest of the chapter is organized in the following ways: after this introduction §6.2, §6.3, and §6.4 provide the analyses of Alignment, Gemination, and Deletion within C-V and V-C types of interactions, respectively. §6.5 elaborates on the role of three types of epentheses. Two individual phonological activities, vowel shortening, and vowel rising have been covered under §6.6 and §6.7 and §6.8 is the conclusion of the chapter.

6.2 Alignments and Interactions

The role of alignment at morphological boundaries between Consonant and Vowel (C-V) and Vowel and Consonant (V-C) types of interactions has yet to be ‘officially’ recognized in Tamil. There are almost no previous studies relating alignment to morphophonological alternation in Tamil. These groundbreaking efforts on alignment have been developed on the hypothesis that C-V and V-C types of interactions are instantiations of FCs and MCs interactions as well, which settle in the favour of sonority harmony.

Alignment has never been recognised as a prominent phonological reaction in Tamil as has been the case in languages like Lenakal, Axininca Camba (Kager, 1999, McCarthy and Prince, 1995b) and so on. This invisible phonological reaction has been recognised as ‘natural assimilation’ in previous Tamil phonology; the present study proves that this widely-held impression is certainly not true. The present study has proved that the language hosts at least five types of alignments within the language - alignment of Mora (μ), Segment (Seg), Syllable (σ) and Morph (Morph) and Grammar Word (GRWD). These play different roles in envisaging harmonic structural mapping within M-P interfaces, without violating sonority sequence and SCL. However, emphasis is put on two types of general alignments in this section, while the rest are covered under relevant sections in this chapter.

6.2.1 Alignment: The Background

Generalised Alignment (GA) in general and AT in particular explain the shift of morpheme boundaries taking place as a result of interaction between morphological and phonological or two grammatical words. GA (McCarthy and Princes, 1986, 1994, 1995a) is a larger scale of instrument examining extrametrical phonological elements associated with the stress pattern of a language. Movement of morphological boundaries from one point to another is common in stress-based languages. The locality of stress moves from one position to another when morphological words with different stress assignments are attached to different classes of affixes. GA and its sub-theory, the Alignment Theory (AT), offer manoeuvrability in order to finalise the movement orderly. The AT makes a relevant contribution to the study of crucial patterns of C#_#V and V#_#C interactions.

Previous studies such as McCarthy (1993b, 1995b, 2004), Kager (1999, 1997) and so on, have established the correlation between alignment and morphophonological processes. They believe that both alignment and morphophonological reactions (such as epenthesis/gemination) work together to enrich the morphological status of a word. For example, function of epenthesis which behaves in favour of preserving contiguity of morphological influence can be highlighted here. Kenstowiz (1994), Spencer (1998, 2002), and Blevins explain that 'cross-linguistic evidence shows that epenthesis applies in a way that morphological constituents are maximally respected'. Kager (1999:110) asserts that epenthesis is added to preserve structural well-formedness and that it 'respects the contiguity of segments' by allowing its placement 'between morphemes rather than inside the morphemes', a strategy which respects the structural order of morphemes. This study believes that in general, insertion of an epenthesis has a common goal, to preserve the syllabic well-formedness in general and provoke the alignment of prosodic structures to some extent.

AT argues that aspects of grammatical and prosodic words must coincide harmonically to some extent. The boundaries of morphological words, the basic words which abide by the basic grammatical elements of the language (GRWD) and the prosodic word (PRWD) must coincide to satisfy harmonic mapping. In other words, the edges of grammatical words and prosodic words are expected to coincide; when this requirement is not fulfilled the structure is said to violate alignment constraint, ALIGN (PRWD, L, GRWD, L).

1) ALIGN-L(AL-L)
Align (PrWd, L, Grwd, L)
The left edge of the prosodic word coincides with the left edge of the grammar word

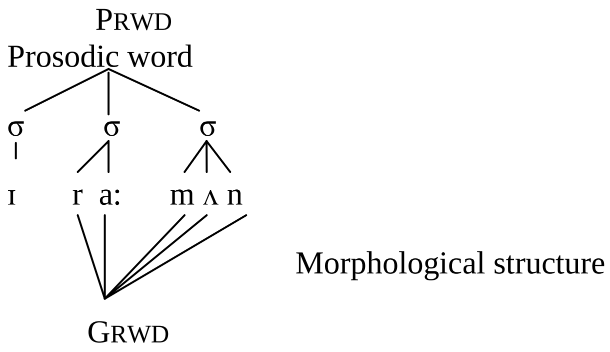
The data in (2) from SST illustrate this scenario in detail. In chapter 3 on the Prosodic Phonology of Tamil we have explained that alveolar lateral /l/ and rhotic /r/ are subjected to a strong distributive prohibition in this language. They are prohibited in key positions such as word initial onset in Tamil (||*MAR$_{\text{ONSET}}$/RHOTICS|| and (||*MAR$_{\text{ONSET}}$/LATERAL||). Any loan words defying this prohibition are often corrected by adding an epenthetic vowel, downgrading the stem-initial onset liquid so that it becomes non-initial onset, while the epenthetic vowel takes over the stem-initial position, as in the following example;

2)	Grammar Word	Prosodic Word
	ra:man	ɪra:mʌn
	Raman	*Raman - name of a person*
	ratam	ɪrʌtʌm
	chariot	*chariot*
	rattam	ɪrʌttʌm
	blood	*blood*
	rappar	ɪrʌppʌr
	latex	*latex*
	laddu	ɪlʌddʊ
	sweet	*a kind of sweet*
	latcumi	ɪlʌtcʊmɪ
	Letchumi	*Letchumi*
	latcam	ɪlʌtcəm
	million	*million*
	la:pam	ɪla:pəm
	profit	*profit*

Note that the grammar words lack of the initial /i/, but the prosodic words (PRWD) have one of them. This is the result of typical phonological alignment without visible changes resulting from interactions between the same or different kinds of morpheme classes. In the pre-OT phonology insertion of prothesis [i] and its necessity is confined to avoid liquids, and nothing more.

However, the Alignment Theory provides a different explanation for alignment related issues, as shown in the following diagram.

3)



The diagram shows that the preferred well-formed PRWD structure has been parsed faithfully, but the GRWD failed to satisfy this basic demand. The PRWD sustained its wellformedness with the help of prothesis /i/, which is left unparsed by the GRWD. Preference of ALIGN-L (PRWD,L,GRWD,L) over ||*MAR$_{\text{ONSET}}$/RHOTIC|| and DEP-IO is a typical instantiation of FC and MC interaction.

The optimal output is decided through three ways of clash between the involved constraints. To be specific, the competition is between the contextual markedness constraint, ||*MAR$_{\text{ONSET}}$/RHOTIC|| and the FC, DEP-IO, which are clearly competing. Among them the former dominates the latter, as in (5), with universal ranking of the sound segments as shown in Prince & Smolensky (1993a), (as in (4) placed in-between the competing constraints.

4) *LABIAL, *DORSAL »*CORONAL (*LAB, *DOR» *COR)

5)

Input: /ra:mʌn/	‖*MAR$_{\text{ONSET}}$/RHOTIC‖	*LAB	*DOR	*COR	DEP-IO
a. raman	*!	*		**	
☞b.ɪra:mʌn		*		**	*

Though the tableau succeeded in deciding a winner, candidate (a), the result is still incomplete. It lacks information appealing for prothesis insertion in avoiding structures beginning with rhotic. This necessity calls for an additional constraint representing a language specific requirement encouraging the left edge of the prosodic word to be matched with a grammar word. Obviously the responding constraint not only needs to be undominated but also needs to focus on the left-edge domain, as the one given in (6). [1]

6) AL-L, ||*MAR$_{ONSET}$/RHOTIC|| »*LAB, *DOR »*COR » DEP-IO
ɪ.ra:.mʌn » ra:.mʌn

Since the alignment constraint and the MCs are not competing with each other, they have been placed together in the same hierarchy.

7)

Input: /ra:mʌn/	AL-L	||*MAR$_{ONSET}$/RHOTIC||	*LAB	*DOR	*COR	DEP-IO
a. ra:.mʌn	*	*!	*		**	
☞b.ɪ.ra:.mʌn			*		**	*

The universal ranking of the constraints reveals that satisfying two of the top ranking constraints which have been violated by the loser is essential to predict the optimality of the candidate. The result shows that avoiding liquids and satisfying prosodic requirements is more essential than being loyal to the input.

As the basic setting of the language's alignment preference has now been examined the next step to be looked at is, the empirical data from SST which displays the priority of alignment constraints in Tamil.

Data

In general, interaction between C#_#V and V#_#C edges surface without serious violations. The edges of the lexical words and the morphemes coincide harmonically without involving non-volatile reactions. The followings are the data of C#_#V and V#_#C types of interactions which involve nothing but alignment.

[1] The necessity of the alignment constraint needs to be clarified at this point. It is true that the given tableau is capable to capture the obvious generalization without the presence of alignment constraint, but the given alignment becomes necessary to predict the non-physical changes that have taken place in the interation.

8) **C-V type of interaction**

Input	Output
Lex (N) + Lex(N)	
kadan – utavi	kʌdʌ̃nʊ̃təʊɪ
loan – help	*loan*
makkaɭ - avai(y)il	mʌ̃kkʌlʌʋəɪyɪl
people – assembly	*in the assembly*
malaɾ - itaɻ	mʌ̃lərɪtəɻ
flower – pedal	*pedal*
Lex (N) + FW	
mutal - aːʋʌt(aː)ka	mʊ̃tʌlaːʋʌtaːgə
first – the	*first of all*
n̪aːl - aːʋatu	n̪ãːlaːʋʌtʉ
four - the	*the fourth*
oːɾ - aɭʌʋ(aː)ctʃum	oːɾʌɭʌʋaːctʃʉm̚
one – something	*at least something*
oːɾ - aɭʌʋu	oːɾʌɭʌʋu
one – least	*at least*
Lex (N)- Fw	
kaːɾaɳam - aːk(a)	kaːɾʌɳə̃mãːgə
reason - for	*for that reason*
manam - aːɾn̪ta	mʌ̃nə̃mãːɾn̪θ̃ə̃
heart – whole	*whole heartly*
Lex (N)- Suff (conj)	
kudumpam - um	kʊdʊmpʌmʊ̃m̚
family –plus	*family-plus*
manam - eː	mʌ̃nə̃mẽː
heart – ergative	*oh heart*
Lex (N) - Suff (CM)	
aʋaɾ – idam(u)m	aʋʌɾɪdəm̚ə̃m̚
he – loc.	*to him – loc.*
mannaɾ - idam	mʌ̃nnʌ̃ɾɪdə̃m̚
king – loc.	*to king – loc.*
e(ŋ)kaɭ - idam	eŋg̃əɭɪdə̃m̚
us – loc.	*to us – loc.*
makkaɭ -idam	mʌ̃kkəlɪdə̃m̚
people – loc.	*to people – loc.*
n̪aɳpaɾ()kal - idam	n̪ʌɳpʌɾgəɭɪdə̃m̚
friends – loc.	*to friends – loc.*
ʋeɭɭai(k)kaːran – idam	ʋeɭɭəɪkkaːɾə̃ŋɪdə̃m̚
whiteman – loc	*to Whiteman – loc.*
a(v)aɾ - in	aʋʌɾĩn
he – abl. marker	*him-abl.*

ci:n(a)ɾ - in	ci:nʌɾĩn
Chinese – abl. marker	*Chinese -abl.*
kaʊi()ɲ()aɾ()kaɭ - in	kʌʊɪɲɲʌ̃ɾgʌɭĩn
poets - – abl. marker	*poets-abl.*
malaɾ()kaɭ - in	mʌ̃ləɪgʌlĩn
mountains - – abl. marker	*mountains-abl.*
kuɳdaɾ ()kumpal - in	kʊ̃ndəɾgʊmpəɭĩn
rowdies – abl. marker	*rowdies-abl.*
kappal - il	kʌppʌlɪl
ship – loc.marker	*in ship-loc.*
ko:yɪl - il	ko:yɪlɪl
temple – loc.marker	*in temple-loc.*
muɭ - il	mʊ̃dgʌɭɪl
thorn – loc.marker	*in thorns-loc.*
pãũn - il	pãũnlə
gold – loc.marker	*in gold-loc.*
tamĩɻ - il	tʌmĩɻɪl
Tamil – loc.marker	*in Tamil-loc.*
caʊa:l - o:du	cʌʊa:lo:dʉ
challeng – with intr.	*with challenge-instr.*
makkaɭ - a:l	mʌ̃kkʌɭa:l
people – with intr.	*by people-instr.*
talai(v)aɾ - o:du	tʌləɪʊʌɾo:dʉ
leader – along intr.	*along leader-instr.*
a:c(i)ɾi(y)aɾ - ai	a:cɪɾɪyəɾəɪ
teacher – acc.marker	*teacher-acc*
makan - ai	mʌ̃gə̃nə̃ɪ
son – acc.marker	*son-acc*
maɲjal - ai	mʌ̃ɲjə̃ləɪ
yellow – acc.marker	*yellow-acc*
manusan - ai	mʌ̃nʊ̃sə̃ŋə̃ɪ
person - – acc.marker	*the person-acc*
n̪a:y - ai	n̪ã:yəɪ
dog – acc.marker	*dog-acc*
tamiɻ - ai	tʌmĩɻəɪ
Tamil – acc.marker	*Tamil-acc*

Lex (V)+ Suff (Infl)

ka:n - a	kã:nə
see – inf.marker	*to see*

Lex (N) + Suff (Pl Mkr)

a:ɳdu - kaɭ	a:ndʉgəɭ
year -s	*years*
a:ɳdu()kaɭ - a:	a:ndʉgəɭa:
year -s -is	*years?*

9) **C-V type of interaction**

Input	Output
Lex (N)- Suff (Derv)	
kaɾu - mai	kʌɾʊ̃məɪ
black – nom.marker	*black*
pacu - mai	pacuməɪ
young – nom.marker	*young*
peɾu – mai	peɾʊ̃məɪ
proud – nom.marker	*proud*
paɻa - mai	pʌɻʌ̃məɪ
old – nom.marker	*old…*
Lex (V)- Suff (Infl)	
adai-v()-oːm	ʌdəɪʋõːm̚
reach – tense marker – PNG marker	*(we) will reach*
aɽɪ-ʋ()-oːm	ʌɽɪʋõːm̚
know –tense marker – PNG marker	*(we) know*
eɻʊtʊ-ʋ()-aːn	əɻʊtʊʋãːɳ̚
write – tense marker – PNG marker	*(he) will write*
ʋaː-ʋ()-oːm	ʋʌɾʊʋõːm̚
come – tense marker – PNG marker	*(we) will come*
piɾi - vu	pɪɾɪʋʉ
split – nom.marker	*split*

The data host two types of interactions, C-V (8) and V-C (9). The right edge of the morphological words and the left edge of the succeeding terms have been realigned at the interfaces in the former. Likewise, within V-C interaction there was calm without noticeable phonological changes, though, it underwent crucial phonological alternations. They will be examined separately.

6.2.2 C-V Interface

The result of C-V interaction, CV, is an instantiation of Onset-Maximisation. Rice (2002) formulates MAXIMISE-ONSET (ONSET-MAXIMISATION (ONSMAX), on the principle that a coda may be retained only if it is of greater sonority compared to the consonant succeeding it. In other words, if the coda is less sonorous than the succeeding segment, then the former is maximised as onset for the subsequent syllable.

The aforementioned sonority preference and that of Tamil shows no differences. Tamil disprefers any succeeding segment across the syllable boundary with greater sonority.

The language promotes C-V into well-formed syllable configurations to avoid sonority clash. To be precise the undominated ONSET-MAXIMISATION in Tamil is a manoeuvre for avoiding sonority clash, economically.

The foregoing claim can be clearly verified. The data in (8) apparently verified that the language disprefers onsetless syllables word-medially, therefore, the *[$_\sigma$V is an undominated constraint in the language. Both the ONSET-MAXIMISATION and *[$_\sigma$V seemingly ranked higher than MC, IDENT(PLACE). It must be dominated by former constraints to promote alignment and avoid unnecessary sonority violation at the interfaces. Ranking the constraints in order along with universal ranking of segment markedness may give the initial ranking as in (13).

10) ONSET-MAXIMISATION (ONSMAX)
Maximize the coda as onset

11) *[$_\sigma$V
No vowel initial syllable

12) IDENT(PLACE) (ID(PL))
Place of the input and out must be identical

13) ONSMAX, *[$_\sigma$V » *LAB, *DOR »*COR » IDENT(PLACE)
…CV » ..C. V

The well-formedness promoted by the minimal ranking in (13) is achieved at the expense of another dominated alignment constraint, as well, ALIGN-σ-L (Ito and Mester, 1994). This constraint ensures that any syllable must be aligned to the left edge of the syllable, as in (14).

14) ONSET (AL-σ-L)
Align (σ, L, C, L)
Align a consonant to left

15) CVC# #V…
| | Violation of AL-σ-L
CVC# #V…

When violation against ALIGN-σ-L becomes inevitable as in (15), the language prefers ONSET-MAXIMISATION at the upper hand, as in (16).

16) CVC #V…

CV CV … Satisfaction of AL-σ-L

The alignment constraint deserves a high ranking because Tamil does not prefer a word-internal syllable preserving an onsetless syllable. Moreover, the AL-σ-L and *[$_{\sigma}$V constraints are also conflicting in nature, because the alignment constraint is context-blind but the latter is not. As a result of this, the alignment constraint enforces the pressure to preserve any segment to be aligned along the line of the left edges. Since, satisfying the alignment constraint is more crucial than preserving the vowel and its place. The language apparently has ranked the alignment constraint along the ONSMAX, and *[$_{\sigma}$V while the MC advocating for its place is ranked low, as in (17). The preliminary ranking of the constraint and the diagram in (15 & 16) clearly illustrate the outcome of the ranking.

17) AL-σ-L » ONSMAX, *[$_{\sigma}$V » LAB, *DOR »*COR » ID(PL)

18) AL-σ-L, ONSMAX, *[$_{\sigma}$V » LAB, *DOR »*COR »

…C |V|…

» ID(PL)

The ranking is sufficient to account for ONSMAX, we have seen in the data. As is transparent from the data belonging to C-V type of interaction in (8) every derived or inflected word satisfies this undominated constraint uncompromisingly.

There is an additional sonority constraint that deserves a position along with the high-ranking constraint yet to be introduced. The role of MSD constraint (Minimal Sonority Distance), an effective constraint at this juncture, cannot be underestimated. Apparently, the intra-syllable configuration of ||*MAR/CONSONANT|| + ||*NUCLEUS/MAR|| (*[$_{\sigma}$V) is permitted on the premise of non-violation of sonority distance. The CV syllabification formation across the morpheme boundaries satisfies the MSD, a crucial evaluator verifying both the syllable harmony and the cohesive bond as shown in §2.11.1 (26 & 27). The final ranking accommodating the MSD is given in (19).

The tabulation is done by the representative data, /kadan-utavi/, with the help of two competitors - one fully assimilated and another unassimilated. The period '.' indicates the unassimilated boundary mark, to illustrate the active role of the mentioned constraints.

19)

Input /kadan-utavi/	AL-σ-L	MSD	ONSMAX	*[$_{\sigma}$V	*LAB	*DOR	*COR	ID(PL)
☞a.kʌ.dʌ̃.nʊ̃.tə.ʋɪ					*	*	***	*
b. ka.dan.u.ta.vi	*	*	*	*	*	*	***	

The result is straightforward; satisfying higher-ranking alignment constraints and non-violating sonority requirements are compulsory for C-V types of interactions to settle harmonically. The loser candidate shows that any candidate violating these requirements is probably sub-optimal.

6.2.3 V-C Type of Interaction

The foregoing explanation showed how intra-syllable contacts between consonant and vowel bonds cohesively. The following analysis verifies that unlike the cohesiveness of the bondage realized within C-V interaction, the V-C inter-syllable contact is materialized less-cohesively and without violating two crucial sonority constraints, SCL and MSD.

The optimal candidate emerges from a V-C type of interaction, and is in fact the result of interaction between two competing alignment constraints; there are no segmental constraints involved in these cases. The first and foremost is undominated ALIGN-STEM-R, an alignment constraint seen in the foregoing. However, its competitor, the lower-ranked ALIGN-σ-R constraint performs a different task within a V-C type of interaction.

20) ALIGN-STEM-RIGHT (AL-STM-R)
Align (Stem, R, Suffix, R,)
Align the right edge of the stem with left edge of the suffix

21) CODA (AL-σ-R)
Align (σ, R, C, R)
Align a consonant to right

The output structures favour suffixation of morph to the right edge of the stem, simply because ALIGN-STEM-R receives priority against ALIGN-σ-R, which calls for consonants to be syllabified as coda as at intersections in Tamil. Motivation for harmonic settlement within V-C types of interactions, as in (22), must therefore be derived from the interaction between both alignment constraints and their competing ranking order.

22) AL STM-R » AL-σ-R
kʌ.ɾʊ̃.məɪ » ka.rum.ai

Interaction between the stem /karu/ and suffix /mai/ and their harmonic settlement is achieved by attaching the left edge of the suffix to that of the stem on the right edge of the stem. If a different ranking was permitted, where ALIGN-σ-R dominates ALIGN-STM-R, the outcome would be an ill-formed structure, /**kʌɾʊm.ai/*.

Besides alignment constraints and their interaction, two more sonority-related constraints warrant acknowledgement as well. First on the list is the Syllable Contact Law (SCL) constraint, a constraint that is satisfied between ||*Nucleus/MAR|| and ||*MAR/Consonant|| interaction. The second constraint is Minimal Sonority Distance (MSD). Sonority distance between the nucleus and the onsets, glide and nasal, are sufficiently greater; hence the sonority constraints are satisfied adequately. Both sonority constraints share a common place with high-ranking constraints, because they are not in competing nature; any violation of these constraints would tarnish the harmony of optimal outputs. Concluding ranking of constraints (advocates) for these requirements then should be,

23) AL-STM-R, MSD, SCL » *LAB, *DOR »* COR » AL-σ-R
kʌ.ɾʊ̃.məɪ » ka.rum.ai

The tableau illustration for */karu-mai/* is as follows:

24)

Input /karu-mai/	AL-STM-R	MSD	SCL	* LAB	* DOR	* COR	AL-σ-R
☞a.kʌ.ɾʊ̃.məɪ				*	*	*	*
b. kʌ.rʊm.ʌɪ	*!	*	*	*	*	*	

Candidate (b) was ousted by higher-ranking AL-STM-R for incurring fatal violation and the winner sustained its optimality status by satisfying it. The result is clear confirmation that the grammar prefers the succeeding morph to be attached on the right edge, compared to the left edge.

6.2.4 Summary

In sum, this section has shown some interesting invisible phonological alternation at the C-V and V-C interfaces in Tamil. Following McCarthy's (1993b, 1995b) suggestion of AT, it has been shown that C-V interaction at intra-syllable levels and V-C interaction at inter-syllable levels are products of alignments. Both types of interaction have been argued about for their different alignment requirements; surfacing outputs are respected to establish the cohesiveness of the syllabification and harmonic contact between the adjacent syllables. Constraints such as AL-STM-R, AL-σ-L, SCL and MSD have been ranked high and play a more effective role than the competing constraints, such as IDENT (PLACE) and AL-σ-R in predicting the right optimal candidate, in both cases.

In general, the discussion has proved that alignment constraints play a crucial role in defining the M-P interface in Tamil. The ranking basis obtained in this section will be used widely in the forthcoming sections to elaborate various kinds of phonological interactions and alignments, whenever necessary.

6.3 Gemination

Gemination is another phonological reaction triggered at the C-V and V-C interfaces which promises remarkable outcomes. Intervocalic environments are strongly avoided in Tamil as in many world languages. Any weak segments falling within 'the trap of intervocalic situations' is forced to undergo self-correction through gemination. By nature both types of interfaces are natural sources of generating intervocalic environments; therefore, the language mans these environments carefully. Any weak segments falling within 'the trap of intervocalic situations' is forced to undergo self-correction through gemination. This section offers evidences of derived geminates triggered at stem/word-initial syllables and elsewhere as a means of avoiding tension at the interfaces and structural ill-formedness.

6.3.1 Gemination in Tamil

Four types of gemination, namely generic, derived, conditional and over-long geminations are found in Tamil. All geminations, except for generic, are related to M-P interactions, though the derived and conditional gemination kick-starts with additional requirements. They emerge naturally from C-V and V-C interactions and from the deletion of a consonant (coda or onset), as well. Depending on the locus of appearance these geminates are called moraic and non-moraic geminates. The over-long geminate performs different functions in non-intervocalic environments, ensuring the moraic weight of the coda is strengthened through coda-maximisation. In this section, the effect of moraic geminates within C -V and V-C types of interactions in Tamil will be examined in some detail.

Unlike gemination in languages like Malayalam, Breton and so on, which have unrestricted appearance; it has a restricted appearance in environments in Tamil. The Malayalam, for instance, has (word and syllable) initial and intervocalic geminates which are tautosyllabic (T.Mohanan, 1989). Mohanan supplied a range of evidences, such as native intuitions regarding syllabification, language games, and stress (postvocalic geminates do not contribute to syllable weight) to validate her claim. Likewise, Patani Malay (Topintzi, 2008) also allows free flow of three types of geminations at syllable-initially, syllable-finally and intervocalically. Unlike these languages, Tamil has geminate consonants which occur word-medially as coda or onset alone.

Christdas (1988) provides some detailed explanations of the phonotactic of geminates in Tamil. Her explanations, centred on the principle of the root-node approach, clarifies that all geminates are bi-positional and share the same root. She also claims that all geminates are moraic in Tamil. Beckman (2004), who studied the coda-condition behaviour of consonants in Tamil assumes that geminates in Tamil resemble the characteristics described by Hayes (1995) and Davis (1994) for moraic geminates, and therefore assumes that all geminates in Tamil are moraic. However, as will be shown not all geminates can be addressed as moraic geminates in whole but should be defined by contextual sensitivity in Tamil.

The following discussion elaborates on the foregoing in detail. As has been mentioned the language has four types of geminates, namely, inherent geminates, conditional geminates, derived geminates and overlong geminates. Inherent geminates are not discussed in this study, as they form part of the generic phonological system, and are found within the phonological inventory of the language within monomoraic words, as in the following: *mʌnnʌn* 'king', *kaɳɳan* 'Kannan', *muttu* 'pearl', *cippi* 'shell', *accu* 'mark', *akka:ɭ* 'sister' and *po:ddi* 'game'. Except for the last which is bi-positional, other inherent geminates within stem/word initial syllables display both behaviourisms, bi-positional and moraic. Depending on the emerging locations, all geminates in stem/word-initial syllables can be well represented as bi-positional but moraic. Likewise, geminates emerging elsewhere other than stem/word-initial syllables are not moraic but bi-positional.

The emergence of geminates either at morpheme internally or at morpheme boundary in Tamil are closely related to the need of morphological extensions. The conditional geminate, for instance, appears as a result of morphological concatenation still bounds to appear within morphological boundary of same lexical word. The bold-faced retroflex and voiced dental segments within the lexical words such as *ka:**dʉ*** 'forest', *ma:**dʉ*** 'cow', *a:**ɽʉ*** 'river' and *co:**ɽʉ*** 'rice' are retained within the lexical boundaries, unless they are preceded by another simultaneous phonological exercise, deletion. This is shown by the followings, /*ka:**dʉ** – il*/ → /*ka:**dd(ʉ)**il*/, 'forest-loc', /*ma:**dʉ**-il*/→/*ma:**dd(u)**il*/ 'com-loc', /*a:**ɽ**u-il*/→/*a:**ɽɽ**(u)il*/ 'river-loc', and /*co:**ɽʉ**-il*/→/*co**ɽɽ**(u)il*/ 'rice-in'. Note that ||*NUCLEUS/WEAK(u)|| in the parentheses have undergone deletion to allow the ||*NUCLEUS/HEAVY|| to be syllabified with geminated coda, and to level the irregularity of syllable formation.

The derived geminates, a special feature of Tamil, emerge exclusively when voiceless stops (*k,c,t,p*) are trapped at CV:C or CVC intervocalic environments (Balasubramaniam, 1989b, Cinnasamy, 1996, D.Albert, 1985, Ilakkuvanar, 1994b, Kameswari, 1978, Thilagawathy, 1995). Voiceless stops trapped in-between intervocalic environments as a result of morphological expansion usually geminate claim these studies. This is shown in the following examples, /*pala:-ka:y*/→/*pʌla:kka:y*/ 'jackfruit' and /*maram-kiɭai*/→ /*mʌrə(k)kɪɭəɪ*/ 'branch of a tree'. While the former represents CV:C, the latter represents a CVC intervocalic environment, an environment derived by deletion of lexical-final syllable coda.

Intervocalic environments emerge at interfaces regardless of the quality of the vowels involved, provided the environment encouraging its existence persists, _V#_#C̥V or VC#_#V. Though all coda segments in the monosyllable (of VC#_#V), including nasals, liquids and laterals within the intervocalic range geminate, the same do not geminate in disyllabic or polysyllabic forms. The same also does not geminate within root/stem/word-initial syllables, if the vocalic segment is heavy (V:), as in */ka:l/–/ai/→/ka:ləɪ/* 'leg-acc.'. This restriction is not applicable to derived gemination in co-compound words, as in the case of *pʌla:kka:y,* however. The derived geminate at intervocalic environments is usually syllabified as coda across the morpheme boundary, the reaction of which appears to be generated by the sonority constraint, MMSD.

Moraic geminates are products of context-sensitivity in Tamil. Tamil has two types of moraic geminates - one which targets sonorous segments occupying the coda position of stem/word-initial short syllable, CVC, while the other targets both the sonorous and non-sonorous[2] onsets of the succeeding lexical terms when they are followed by V type of monosyllable words. Therefore, it must be stressed that other geminates targeting word-initial coda within, CVC and VC syllables are not moraic codas, as illustrated by the diagrams given in (25-27). This will be clarified in detail.

Sonorous segments at intervocalic environments naturally geminate in Tamil. The stem/word-initial coda consonants, such as nasal, laterals and liquids (not rhotic /r/) usually geminate to supply an additional consonant segment to preserve the requirement of syllable well-formedness. The moraic geminates supply required mora to fill MINIMAL BIMORAICITY of the stem or word. Therefore, in other words, the nasal and lateral geminates in the following examples, */kaɳ/-/əɪ/→ /kaɳɳəɪ/*, 'eye-acc.', */pul/-/ai/→ /pʊlləɪ/*, 'grass-acc', */muɭ-ai/ → /mʊɭɭəɪ/* 'thorn-acc', are different from the */i/-/muɽai/→ /immʊɽəɪ/* 'this time' where the latter aims to respect the MINIMAL

[2] The data lack non-sonorous geminates but the grammar of the language insists that non-sonorous segments such as voiceless stops do geminate and supply moraic coda, as in the following example; a-kadai > akkadai 'that shop'

BIMORAICITY (MIBIM), and avoid the structural ill-formedness, but the former aims to avoid syllable ill-formedness alone. The forthcoming diagram clarifies this clearly.

25) *MIBIM MIBIM σ σ (Disyllabic)

ɪ x - m u ɽ əɪ → ɪ (m) m ʊ ɽ əɪ

μ (μ) μ μ μ μ μ μ μ μ

26) MIBIM MIBIM σ σ (Disyllabic)

ɪ l - ə ɪ → ɪ. l. (l) əɪ

μ μ μ μ μ μ μμ

27) MIBIM MIBIM σ σ (Disyllabic)

ka ɳ - a ɪ → ka ɳ. ɳ ə ɪ

μ μ μ μ μ μ μ μ

The diagrams illustrate the distribution of coda and onset within intervocalic environments, involving stem words and prefixes of three different kinds of syllable bases, the V, VC and CVC, in that order. The input-output mappings in (25) show the representation of the moraic coda. The moraic defect within the prefix is levelled with ‘supplied’ moraic value which fills the gaps marked (x). The input-output mappings in (26) and (27) display a different scenario, where an onset is supplied through gemination to respect the ONSET-MAXIMISATION requirement of the language, as Tamil strictly prohibits vowel initial stem/word medially (||*NUCLEUS/MARGIN||). What is apparent from here is that coda geminates are not performing same tasks.

The structural harmony might have been rescued in different ways. For example, epenthesis insertion would have brought about the same effects casted by gemination. However, gemination not only helped to maintain bimoraicity requirements effectively, but also helped to keep the damages minimal. Geminates, as will be shown, seem to be the relied resource for respecting the requirement of MOST MINIMAL SONORITY DISTANCE (MMSD) across morpheme boundaries.

All four types of geminates found in the language can also be classified as classes of full-geminate and half-geminate. The moraic geminates can be equated to full-geminates and the non-moraic geminates can be equated to half-geminates. Nevertheless, it is the positional prominence that serves as the primary deciding criterion of both[3]. How these moraic geminates are applied as strategic SrRS in Tamil will be shown next.

The Data

Since gemination targets intervocalic environments, interaction between C and V, V and C creates promising intervocalic environments for gemination. The data given in (28 & 29) reveal various patterns of gemination resulting from such interactions.

28) **C-V type of Interaction**

Moraic geminate

Input	Output
Lex(N) + Lex (N)	
tan - ada(k)kam	tʌ̃nnʌ̃dʌkkəm̚
self – polite	*being polite*
Lex(N) + Suff (CM)	
en - uɭ	ẽnnʊ̃ɭ
me – in	*within me*
en - idam	ẽnnĩdə̃m̚
me – loc	*to me – loc.*
tuɭ-a	tʊɭɭə
bounce – inf. marker	*to bounce*
uɭ-a	uɭɭə
in – inf.marker	*presence*
man - in	mʌ̃nnĩn
soil. abl. marker	*soil-abl.*
kaɳ - in	kʌ̃nnĩn
eye – abl. marker	*eye-abl.*
col - in	cɔllĩn

[3] It is believed that prominent positions such as stem/word-initial positions are prone to host full-geminates, while elsewhere positions are reserved for half geminates. The general statement is yet been verified in full length. It needs to be verified extensively with proper evidences. However, this issue is not pursuit in this present study due to page limit.

word – abl. marker	*word-abl.*
col - il	cɔllɪl
word – loc. marker	*in word-loc.*
kaɳ - il	kʌ̃nnĩl
eye – loc. marker	*in eyes-loc.*
maɳ - il	mʌ̃ɳɳĩl
soil – loc. marker	*on soil-loc.*
muɭ - il	mʊ̃ɭɭɪl
thorn – loc. marker	*in thorn-loc.*
pal - il	pʌllɪl
teeth – loc. marker	*in teeth-loc.*
pun - il	pʊ̃nnĩl
wound – loc. marker	*in wound-loc.*
kaɳ - oːdu	kʌ̃ɳɳoːdʉ
eye – loc. marker	*eye-along-instr.*

Lex(FW) + Suff (CM)

pĩn-ku - i	pĩnnoː̃kkɪ
back – abl. marker - verbalizer	*regressive*

Lex(FW) + Lex (N)

pin - ani	pĩnnʌ̃nĩ
back - force	*background*

Lex(V) + Suff (Infl)

cel-a	cəllə
go – inf.marker	*to go*
cəy – a(v)eː	cəjjəveː
do – emphasis marker	*to do (emphasis)*
cey-a	cəjjə
do – inf.marker	*to do*
col-a	cɔllə
say – inf. marker	*to say*
col-a(v)eː	cɔlləveː
say – emphasis marker	*to say that …(emphasis)*
kol-a	kɔllə
kill – inf.marker	*to kill*

Lex(FW) + Lex (V)

pĩn- n̪oː̃kk(i)	pinnoː̃kkɪ
back – saw	*being regressive*

Lex(FW) + Suff (Infl)

al-a	ʌllə
no – inf marker	*no*
mun - aːl	mʊ̃nnaː̃l̚
before – nom.marker	*previous*

mun - aɾ	mʊ̃nnʌ̃r̚
before – nom.marker	*before this*
pin - aɾ	pĩnnʌ̃r̚
after – nom.marker	*afterward*
Fw + Lex(V)	
mun - aːdɪ	mʊ̃nnaː̃dɪ
front – nom.marker	*before this*
mun- eː̃ɽ(a)	mʊ̃nneː̃ɽə
front – climb	*to progress*
mun-at(aː)k(a)	mʊ̃nnʌ̃taːgə
before – ergative	*earlier*
mun-eː̃ɽ(i)(y)a	mʊ̃nneː̃ɽə
front – being climb	*being progressive*
pin - aːdi	pĩnnãːdɪ
back – nom.marker	*at the back*
pin-adai	pĩnnʌ̃dəɪ
back – reach	*staying behind*

29) **V- C type of Interaction**

Moraic Geminate

Input	Output
Pref + Lex (N)	
a – padi	ʌppʌdɪ
that – nom.marker	*like that*
a – tak(ai)ya	ʌttʌgʰəɪjə
that – sort	*that sort*
a – tuɳai	əttuɳəĩ
that – much	*that much*
e – padi	əppʌdɪ
which – nom.marker	*how*
e - ʋʌɳɳam	əʊʋʌɳɳʌ̃m̚
which – way	*which way*
i - kaːlam	ɪkkaːlʌ̃m̚
this – period	*current period*
i - maːtɪɾi	ĩmmaː̃tɪɾɪ
this – way	*this way/style*
i - muɽai	ĩmmʊ̃ɾəɪ
this – time	*this time*

There are two types of moraic coda materialisation in the data. When a monosyllable lexical of CVC or VC syllable forms interact with succeeding lexical words with an onsetless syllable, the coda consonant geminates to supply an onset to avoid syllable ill-formedness, *[V_σ (||*NUCLEUS$_{onset}$/MAR||) within the C-V type of interaction. On the other hand, when a monomoraic lexical word with V types of syllable forms interacts with C (Onset) of the succeeding lexical, the onset geminates and supplies a moraic coda for the preceding lexical term to supply a shortfall mora and to level the moraic defect within prefixes. This is common within V-C types of interaction. These exercises enable the structure to fulfil its requirement of MINIMAL BIMORAICTY, within V-C types of interaction. It also reveals that Tamil expects every prefix to be BIMORAIC before being attached to a stem. As is transparent from the data and the description, desire for gemination in both cases is different and not all gemination taking place at the stem initial aims to supply moraic codas.

The striking difference between the C-V (28) and V-C (29) type of interactions is activation of gemination which does not correspond to a particular kind of morphological word or segmental type. Non-moraic and moraic geminates are triggered at the interfaces regardless of morpheme types or the segmental quality of the consonant. Within the C-V types of interactions, there are three types of CVC monosyllabic lexical bases, nouns, verbs and function words demanding the retention of moraic consonants when they are attached to vowel initial lexical words, such as nouns, verbs and suffixes, such as inflexional markers and case-markers.

The issue at hand that needs to be explained is, what has stopped the coda from being maximised as onset or retained as coda in the given examples. This study believes that interaction between the necessity to retain the moraic coda and the language specific requirement to avoid word-medial onsetless syllable, *$[_{\sigma}$V, has triggered violation against NO-GEM at the M-P interface. To capture the intriguing necessity of the coda position, a high-ranking LCC is proposed, as in (30), which combines both MCs operating at the same domain.

30) [IDENT-CODA & IDENT-PLACE]$_{coda}$ ([ID-CD & ID-PL]$_{coda}$)
Retain identical segment with identical place feature at the coda position

Ident-Coda (Id-Cd)
Coda in the input and the output must be identical

Ident-Place (Id-Pl)
Place feature of the input segment and the output segment must coincide

The LCC plays a crucial role in ensuring the stem/word-initial coda is retained at all costs against any intrusive coda-condition factors.

Ranking wise, the undominated LCC deserves a place along the high-ranking constraints for its supportive role in preserving the coda and not competing with its collaborators. The two component constraints of LCC, which do not also compete with each other, are assigned a lower rank but higher than the MC, NO-GEM, functioning against the presence of coda. The hierarchy in (31) represents constraints and their ranking along with the alignment constraints introduced in the foregoing for C-V interactions, and added to other constraints introduced in the foregoing.

31) [ID-CD & ID-PL]$_{coda}$, AL-σ-L, MSD » ONSETMAX, *[$_{\sigma}$V » * LAB, *DOR »* COR » ID-C,D ID(PL) » NO-GEM
ən. nʊɭ > ən. ʊɭ

The V-C types of interactions cast a different scenario. The authoritative grammar of the language claims that only selective V types of vocalic prefixes such as short front high, front mid and mid low vowels trigger the gemination of moraic codas (the list should include the back low short vowel /u/ as well). It has been avoided here as the SST data did not supply evidence for it when they are attached to onset initial phonological word. The moraic geminates, within both types of interactions, is taking place in interfaces between monosyllable lexical word and succeeding terms regardless of morpheme types.

The V-C interaction requires a different tableau evaluation. The ranking in (23) represents V-C interaction, added with the MIBIM and NO-GEM constraints is repeated here as (32). The undominated MIBIM and NO-GEM have been assigned within their respective positions.

32) MIBIM » AL-STM-R, MSD, SCL »* LAB, *DOR »* COR » ALIGN-σ-R » NO-GEM
(ʌp).(pʌdɪ) » (ʌ).(pʌdɪ)

The ranking is incomplete, though. The alignment constraints need some modifications, as the current issue revolves around prefixation but not affixation. The edges of the morph under consideration should be altered to accommodate the prefixation. This can be done without interfering the ranking, but by altering the edges of the concerned alignment constraints as follows:

33) ALIGN-STEM-RIGHT (AL-STM-R)
Align (Stem, R, Suffix, L)
Align the right edge of the stem to the left edge of the suffix

34) ALIGN-STEM-LEFT (AL-STEM-L)
Align (Stem, L, Suffix, R)
Align the left edge of the stem to the right edge of the suffix

The complete ranking to predict the formation of moraic coda within prefixed words should be,

35) MIBIM » AL-STM-L, MMSD, SCL »* LAB, *DOR »* COR » ALIGN-σ-R » NO-GEM
(ʌp).(pʌdɪ) » (ʌ).(pʌdɪ)

The following are the tableaux illustrations for moraic gemination within both types of interactions.

36) Tabulation for C-V Interaction (Lex + Suff(CM))

Input / en-uɭ/	ID-CD & ID-PL	AL-σ-L	MMSD	ONSET MAX	*[σV	* LAB	* DOR	* COR	ID-CD	ID (PL)	NO-GEM
☞a.ən.nʊɭ								***		*	*
b. ən. ʊɭ	*!	*	*		*			**	*		

37) Tabulation for V-C Interaction (PreF + Lex)

Input /a. padi/	MIBIM	AL-STM-L	MMSD	SCL	* LAB	* DOR	* COR	AL-σ-R	NO-GEM
☞a.(ʌp).(pʌdɪ)					**		*		*
b. (ʌ). (pʌdɪ)	*!	*	*	*	*		*	*	

6.3.2 Summary

Regardless of the different kinds of structural conditions motivating gemination, the moraic geminate performs dual roles. One function is maintaining the structural harmony which is performed by supplying a moraic geminate or by supplying a necessary segment to supply a coda or onset. A moraic geminate fulfils the bimoraicity constraint, while a supplied onset or coda fulfils the need of harmonic syllable configuration. The second function is harmonizing syllable contact at the interfaces -

keeping the sonority distance between the onset and coda as minimal as possible. Having minimal sonority distance between the margin and the nuclei or the nuclei and the margin, $\|*\textsc{Mar}_{coda}/X\| + \|*\textsc{Nuc}/X\|$ and $\|*\textsc{Mar}_{onset}/X\| + \|*\textsc{Nuc}/X\|$, where the X may refer to any legitimate consonant allowed to fill the positions concerned, is a language specific preference of maintaining structural harmony.

Last but not least, the role of the alignment cannot also be overseen. As far as the alignment is concerned, there are few predictable yet interesting patterns of alignment that have been identified within the data. It is transparent that both the C-V and V-C types of interaction have been realized at the expense of a few dominated ALIGNMENT constraints seen in the previous analysis on alignment.

6.4 Deletion

This section deals with deletion exercises within V-C types of interaction alone as C-V types of interaction do not encourage deletion. Interaction between V-C involves unnecessary deletion, except when external motivations intrude. Phonological changes that precede the deletion cast a range of interesting analytical challenges. Among the range of deletions witnessed within V-C types of interaction, deletion of syllable /*mai*/ has been focused on, which triggers significant analytical challenges within various types of morphological and compound words. This section can be seen as an extended work of deletion analysis already seen in chapter 5, §5.7.

6.4.1 Deletion of the Syllable /mai/

The syllable /mai/ is a productive adjectival suffix in Tamil. The grammar generates qualitative nouns simply by adding the suffix to nominal stems. For instance, when the suffix /*mai*/ is added to the root /*karu*/ 'black', the derived stem connotes a qualitative sense, /*karumai*/ 'the black'. However, when the same derived word is applied as a stem for further morphological extension, interestingly, /mai/ is deleted to allow the succeeding suffix or stem to be attached to the root words, as in the following instance, /*kaɾu()mai-pan/* > */kʌɾʊppʌ̃n/* 'black man'. The adjectival forms which are left as either open or closed syllables react according to the onset of the succeeding lexical terms upon deletion; interaction between such kind of stem-words and the succeeding lexical words posit various challenging phonological reactions.

The following data cast the foregoing elaboration clearly.

Data

38) Deletion of /mai/ and other changes

Input	Output
i). Lex (Adj) + Lex (N)	
kaɾu()mai - kuɾaŋku	kʌɾʊ̃ŋkʊɾʌ̃ŋɡ̃ʉ
black – monkey	*black monkey*
kaɾu()mai - puɭɭi	kʌɾʊ̃mpʊɭɭɪ
black – dot	*black dot*
paɻa(m)ai - peɾum	pʌɻʌ̃mpəɾʉm̚
old – huge	*evergreen…*
ii). Lex(Adj) + Lex (Fw)	
kada()mai - paːdu	kʌdʌppaːdʉ
responsible – nom.marker	*responsibility*
iii). Lex(N) + Suff (Der)	
kaɾu()mai - pan	kʌɾʊppʌ̃n
black – nom.marker	*black man*

Altogether three different types of morphological situations emerged upon the deletion of /*mai*/ and have resulted in two different types of outcomes. Firstly, deletion of /*mai*/ is followed by the insertion of homorganic epenthesis as in (38)(i). Secondly, deletion of /*mai*/ is followed by gemination as in (38)(ii) and (iii). While the phonological changes taking place within endo-centric compound words show deletion and emergence of homorganic epenthesis, association of /*mai*/ adjectival form to derivational and function word transpire deletion followed by gemination. These will be dealt with in order.

There are three issues that need to be addressed before proceeding with the analysis. The first is why /*mai*/ has been sacrificed in every instance. Second is why the compound word behaves differently from function words and the suffixes in acquiring geminates. Thirdly, if there was any differences in-between acquiring homorganic epenthesis and derived-geminate. Knowing the specific needs of the grammar would be an advantage in understanding the phonological reaction, and in unravelling the confusion.

Deletion of /*mai*/ is a language-specific inherent requirement. The grammar does not prefer any succeeding lexical terms to be attached to the stem. In order to fulfil this requirement the grammar deletes /*mai*/ in every instance involving the attachment of any morphological word. The deletion allows the succeeding terms to be attached to the stem but not to a suffixed word.

Subsequent phonological reactions, epenthesis and gemination, emerging upon deletion appeared to be two contextually bound sonority-related repair strategies. Homorganic epenthesis within sub-compound words has been applied to avoid undesired sonority fall. Placing a homorganic segment, belonging to sonority hierarchy in-between the ||*MAR/Nucleus|| and ||*$\text{MAR}_{\text{onset}}$/$\text{X}_{\text{consonant}}$|| allows the structure to sustain GRADUAL SONORITY FALL (GSF), as in the example of /*pʌ̃sʊ̃ŋkɪɭɪ*/. The DERIVEDGEMINATE emergence in intervocalic situations has avoided unacceptable minimal sonority gaps, in other words, it satisfies sonority constraint, MOST MINIMAL SONORITY DISTANCE, as in /*kʌɾʊppʌ̃n*/. In short, the subsequent phonological operations emerging upon deletion perform individual tasks, promising optimal structural harmony in every interaction.

The foregoing description can be accounted for in the form of constraint interaction with slight modification done on ranking achieved in (22) (repeated here as (39). Deletion of syllables within the structure is a direct interaction between FCs, DEP-IO, MAX-σ, and ALIGN-STEM-R (ALIGN (STEM, R, PRWD, L) constraints, which eradicates the syllable /*mai*/ suffix in-between the succeeding and preceding lexical words within the compound-word.

39) AL-STM-R, MSD, SCL » * LAB, *DOR »* COR » AL-σ-L

40) MAX-σ
Every syllable of the input must be present in the output

This would lead to the following ranking order.

41) AL- STM-R, GSF, SCL » * LAB, *DOR »* COR » AL-σ-R » DEP-IO, MAX-σ

Note that the MSD has been replaced with GSF, the constraint that is responsible for generating homorganic epenthesis.

However, the ranking needs further qualification on alignment constraints, the AL-σ-R and AL-STM-L. As the present data is a compound-word involving two lexical terms, the AL-SUFF-L constraint must be replaced with the lexical constraint concerned, which allow the prosodic word and suffixes are adjoined consecutively, as follows:

42) AL-PRWD-R (AL-PRWD-R))
Align (PrWd, R, Suffix, L)
Align right edge of the prosodic word with the left edge of the suffix

The modified constraint ranking in (43) may predict the generalization for deletion and homorganic epenthesis correctly.

43) AL-STM-R, MSD, SCL »* LAB, *DOR »* COR » AL-PRWD-R » DEP-IO, MAX-σ

However, the deletion of /*mai*/ and the gemination of /p/, as in /*kʌrʊppʌ̃n*/, forecast a different order of constraint ranking. The ranking needs to give away the irrelevant, DEP-IO, and house-in two relevant constraints, DER-GEM and NO-GEM. This substitution is necessary to allow the former to trigger geminates at intervocalic positions as soon as the deletion takes place, and the latter militates against it. Because of its significant role and non-competing nature, the former deserves a place among the high-ranking constraints, while the latter replaces FC, DEP-IO, as in (44).

44) AL-STM-R, MSD, SCL, DER-GEM »* LAB, *DOR »* COR » AL-PRWD-R »NO-GEM, MAX-σ

The following are tableaux illustrations of both types of data.

45) Tableau analysis for deletion of /mai/ and homorganic epenthesis

Input /pacu()mai-kiḻi/	AL-STM-R	GSF	SCL	*LAB	*DOR	*COR	AL-PRWD-R	DEP-IO	MAX-σ
☞a. pʌ̃sʊ̃ŋkɪḻɪ				*	**	**			*
b. pacu()maikiḻi	*!			**	*	**			

46) Tableau analysis for deletion of /mai/ and DER-GEM

Input /kada()mai-paːdu/	AL-RT-R	MSD	SCL	DER-GEM	*LAB	*DOR	*DOR	AL-PRWD-R	NO-GEM	MAX-σ
☞a. kʌdʌppaːdʉ					**	*	**		*	*
b. kada()maipaːdu	*!		*	*	**	*	**			

In both cases the input faithful candidates suffer massive defection against the constraints responsible for alignment and sonority constraints. This reveals that satisfying the demand of undominated alignment constraint is crucial to envisage the structural well-formedness.

6.4.1 Deletion of /mai/ and Onset Condition

The following data show that deletion of /*mai*/ is also followed by two types of interesting assimilations.

47)

[4]pa(n)mai - n̪ĩːɾ	pʌnnĩːɾ
many types– water	*fragmented water*
ʋe(ɳ)mai - n̪ilavu	ʋeɳɳĩləʋʉ
white – moon	*white moon*

Data in (47) show that the grammar insists on succeeding independent terms being attached to root-to form sub-compound words, a requirement which has been enforced by the deletion of /*mai*/. In sub-compound terms the right-located lexical words are presumed to be prominent, while the left-located stems are presumed to be less prominent, and render common qualitative values. However, the data revealed interesting phonological outcomes beyond the issue of lexical prominence. Onset-Coda asymmetry emerging from the deletion of /mai/ is dealt with in an irregular way- progressive assimilation leading towards onset conditioning, as in /*pa(n)mai/-/n̪ĩːɾ/*→*/pʌnnĩːɾ/* 'fragmented water' and /*ve(n)mai/-/n̪ilavu/*→*/ veɳɳĩləʋʉ/* 'white moon'. It is worth examining why the structure has conditioned the onset instead of undergoing coda-condition.

[4] There is another example sharing the same phonotactics of the given data in (46) but show an irregular phonological reaction; ʋe(ɳ)mai - n̪iːɾ → ʋə̃n̪n̪ĩːɾ 'hot water'. The stem which is left with retroflex nasal upon deletion establishes contact with dental nasal, as in the case of the data given in (46). But the /*ʋə̃n̪n̪ĩːɾ/* underwent regressive assimilation, as a result of interaction between the retroflex nasal /ɳ/ and weak dental nasal /n̪/, showing a typical style of coda-conditioning. The prominence of onset is hailed, unlike in the progressive assimilation where preserving the moraic coda becomes more important. The reason this irregular assimilatory pattern remained unresolved is an issue in this language.

The Onset-Condition witnessed within the data is an economic way of dealing with strong and weak sonorous consonants contact belonging to the same region. In the first instance, */pa(n)mai/ - /n̪ĩːɾ/ → /pʌnnĩːɾ/* 'fragmented water', progressive assimilation ensures that the place feature of the onset, which is dental nasal, is licensed according to the coda, alveolar nasal. In the second example, */ve(ɳ)mai/-/n̪ilavʉ/→/veɳɳĩləvʉ/*, the dental nasal is conditioned according to the retroflex nasal /ɳ/. Both examples indicate that the place feature of the weak dental nasal /n̪/ is conditioned according to the strong coronal segment. This shows that the motivation for onset-condition must have been mooted from the necessity to create harmonic sonority reconciliation in respect of MSD, by having adjacent nasal segments sharing features. This is the only requirement that distinguishes the pair of adjacent nasal from others, where they are known for sharing the same sonority hierarchy. In other words, it is evidence of avoiding sonority harmony (*SONORITYCLASH) between the coda and onset, without harming the properties of the moraic coda.

The foregoing description verifies the following information. The ONSET-CONDITION is undominated, while the IDENT-ONSET constraint is ranked low.

48) ONSET-CONDITION (ONCOND)
Place feature of coda must agree with place feature of the onset

49) IDENT-ONSET (ID-ON)
Onset of the input and output must be identical

However, the foregoing constraints and their functional role do not elaborate why the coda should be retained at such an expensive cost. The grammar might have initiated coda-condition, a universal phenomenon and settled the dispute economically. It seems that coda-condition has been blocked by an undominated, LCC, insisting the moraic coda be retained. It is presumed that Tamil places the $[\text{IDENT-CODA} \ \& \ \text{IDENT-PLACE}]_{coda}$ at the coda domain, as was seen in the case of previous analysis, in order to preserve the feature of the coda from being encroached by the PF constraint, IDENT-ONSET (PLACE).

The ranking of the constraint can be initiated along with the hierarchy reached in (42) (without DEP-IO which is irrelevant here) with slight modification. The LCC and the ONSET-CONDITION is ranked along with high ranked constraints while its components and IDENT-ONSET is ranked low to enable the structure to undergo progressive assimilation. The complete ranking of the constraints that would predict the progressive assimilation is, then,

50) ID-CD & ID-PL, ONCOND, AL-STM-R, MMSD, SCL»* LAB, *DOR »* COR » AL-PRWD-R » MAX-σ, ID-ON, ID-CD, ID-PL

The result of the interaction is depicted in the tableau in (51).

51)

Input /ʋe(n)mai-n̪ilavu/	[ID-CD & ID-PL]coda	ONCOND	AL-STM-R	MMSD	SCL	*LAB	*DOR	*COR	AL-PRWD-R	MAX-σ	ID-ON	ID-CD	ID-PL
☞a.ʋeɳɳĩləʋʉ						*		***		*	*	*	**
b.ʋeɳmain̪ilavʉ		*!	*	*		***		***					**
c. ʋen̪n̪ĩləʋʉ	*!	*				**		***		*		**	**

Candidates (b) and (c) were ousted for not satisfying two of the high-ranking constraints in the list. The results show that retaining the identical coda and its place is more crucial than retaining IDENT-ONSET at the interface. This implies that the language prefers to attain sonority harmony rather than to preserve the universal norm - to preserve the onset and condition the coda.

6.4.2 Deletion of /mai/ and Chain Reactions (Deletion, Metathesis, Coda Condition)

This section deals with two examples showing the chain effects that have eluded the attention of most of the phonological studies in Tamil so far. The present study offers a novel explanation for chain reactions noticed within two data involving V-C type of interaction. It is the belief of this study that a proper generalization for the data can only be rendered by accepting them as instances of chain shift, an approach that has never been formally accepted in Tamil. The data posit a greater challenge to a theory such as OT promoting parallel evaluation, as it involves levels of reactions.

The following are the data involving V-C interaction, exhibiting chain reaction; deletion, metathesis and coda-condition.

52) Metathesis and Coda-Condition
Lex (Adj) + Lex (N)

Input	Output
[5]pacu()mai - kiḻi	pʌĩŋkɪḻɪ
young – parrot	*parrot chick*
pacu()mai - tamiɻ	pʌĩn̪tʌmɪɻ
young – Tamil	*evergreen Tamil*

Two possible solutions will be shown to overcome the puzzle before providing the background of the issue and the derivational possibilities for both of them.

As was seen in the previous section, adjectival forms ending with the syllable /*mai*/ are productive syllables in Tamil, which create various types of phonological reactions within extended morphological words. Similarly, the term /*pacumai*/ cast many phonological alternations when attached to another lexical term. To understand the origin of the dispute, it is necessary to find out the nature of this derived adjectival form.

Present-day grammar manuals in Tamil assume that the underlying form of the dependent stem of sub-compound, /*pʌĩŋkɪḻɪ*/, is /*pacumai*/ rather than /*pai*/. Nannu:l (Cinnasamy, 1996), a well-known grammar of the language, also claims that the surface output is derived from /*pacumai-tamil*/, but not /*pai*/. It argues that the structure incurred irregular assimilatory patterns when attached to a succeeding lexical word, where the vowel of the root syllable altered to /ai/ in the conjoining activity, besides dropping the /mai/ and triggering homorganic epenthesis. However the present study also presumes that /*pacumai*/ in the given data might be derived from the root-word of /*pai*/; the compound formation once again is traced back to the root to establish a well-formed structure.

[5] The given base is argued as having another variation, /pai/. Evidence shows that *Tirukkural* has applied the term /pai/ to render the very same meaning, 'young'. However, application of /pai/ in the sense of 'young' as in /pai-an → paiyan/ 'young boy, is obsolete in present-day usage. Present day grammar manuals assume that the underlying form of the dependent stem in the endo-centric compound words is /pacumai/ rather than /pai/. However, the present study presumes that /pacumai/ is a derived form whose base can be traced to /pai/.

Claims made by *Nannu:l* cannot be taken lightly. It is intriguing and the validity of the claim ought to be attested. Unfortunately, since the manual did not offer information other than the foregoing, the way to configure how the surface output is derived needs to be resolved. There are six other similar forms of interactions registering the same irregular assimilatory patterns highlighted by the author. Almost every one of them that has been analyzed in the previous analysis demonstrated significant relevancies, challenging easier analysis within OT framework.

There are two assumptions on how the well-formed structures are derived. One is a straightforward assumption and the second is a metathesis assumption. Both will be examined.

The first assumption is straightforward; it assumes that the outputs are derived from a different set of inputs. Accordingly, the bases of the input must be as follows:

53) Lex (Adj) + Lex (N)

Input	Output
pai - kiɭi	pʌ̃ĩŋkɪɭɪ
young – parrot	*parrot chick*
pai - tamiɻ	pʌ̃ĩn̪tʌmɪɻ
young- Tamil	*evergreen Tamil*

Note that the base stem of the compound word is /*pai*/ but not /*pacumai*/, as claimed by the classical grammar manual, *Nannu:l* (Cinnasamy, 1996). Analyzing the compounds derived from the foregoing association is not challenging. The structure has not experienced additional phonological reactions, other than insertion of homorganic epenthesis to satisfy GRADUAL SONORITY FALL. As has been seen in §5.5.4 insertion of homorganic epenthesis is a legitimate reaction in this language.

The second option is this. When an adjectival noun ending with the /*mai*/ suffix is added to the dorsal and coronal consonant initial suffix, the word-medial syllable /cu/ of the dependent lexical (the preceding term) is deleted. The labial consonant of the final suffix swaps its position close to the consonant at the interface, which enforces coda-condition to turn the labial nasal /m/ into the homorganic nasal, /ŋ/ and /n̪/, respectively. The heavy syllable /*ai*/, which is close to the root-initial syllable upon the metathesis reaction, enforces deletion of the weak vowel, and forms a well-formed syllable, /*pai*/.

The combination of /*pai*/ and the homorganic coda surface as a well-formed structure. The foregoing description is presented in the form of the diagram as follows:

54)	Input	Output	Glossary
	(pai) (ng) - kiḽi	pʌ̃ĩŋkɪḽɪ	parrot chick
	pa<ai><m> - kiḽi	pʌ̃ĩŋkɪḽɪ	-
	pa<cu> ai <m>- kiḽi	pʌ̃ĩŋkɪḽɪ	-
	pacu()mai - kiḽi	pʌ̃ĩŋkɪḽɪ	parrot chick

Input	Output	Glossary
(pai) (nt) - tamiɻ	pʌ̃ĩn̪tʌmɪɻ	evergreen Tamil
pa<ai><m> - tamiɻ	pʌ̃ĩn̪tʌmɪɻ	-
pa<cu> ai <m>- tamiɻ	pʌ̃ĩn̪tʌmɪɻ	-
pacu()mai - tamiɻ	pʌ̃ĩn̪tʌmɪɻ	evergreen Tamil

Defining the meaning of /*pai*/ is crucial in defending our claim - the chain reactions witnessed in the dependent lexical items are aimed to re-establish the root-word for harmonic structural formation. The /*pai*/ should be addressed as a root word denoting the meaning of 'young', which is transmitted in the compound word as well. Kriya (1997) and Tamil Lexicon (http://dsal.uchicago.edu/cgi-bin/philologic/, accessed on 10 June 2010)[6], two well-referred Tamil dictionaries, did not give any references relating /*pai*/ to young. Instead, both connote /*pacum*/ as fresh, which can be literally associated to young. In present day Tamil, there is a single example that can be found which is derived from the same root word '*paiyan'* young boy' (/*pai-an/*→/*pʌɪyən*/). Therefore, it is obvious that /*pai*/ denotes the sense of /young/. It can therefore be concluded that the ultimate aim of structural changes seen in, /*pacumai*/, is to reach the MINIMALBIMORAIC lexical form. Moreover, after the deletion of /cu/ the only available choice is to bring both segments together and solve the illicit structural formation with minimal damages. The deletion of a weak vowel is common when it faces a heavy vowel according to the

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[6] **பை** pai : (page 2904) (இந்துபாக .308.) பை[1] pai . The compound of ப் and ஐ. பை[2] **pai** , *n*. **<**பசு-மை] .M. *pai*.] 1. Greenness, freshness; பசுமை. (பிங் (.2. Colour; நிறம் .)W.) 3. Youth; இளமை .பைதீர் பாணரொடு) மலைபடு .40). 4. Beauty; அழகு.

fourth principle of the vowel hiatus management of the language - strictly avoid two vocalic segments with high sonority value.

Altogether there are four phonological activities involved in the formation given compound word. The question needing an immediate answer is how many levels have been involved in this derivation. As appears obvious from the description, it involves more than a single, rather it involves more than two levels, at least. Though metathesis and deletion of the lexical medial syllable can be addressed as simultaneous, deletion of the syllable initial /a/ and the formation of /ai/ plus the coda-condition are subsequent reactions to the earlier effects. The latter could not be finalised in the absence of the former activities. Therefore, the reactions seen do not belong to the same level.

As mentioned in the introduction, the present study deals with a parallel analysis within the OT framework. Since the data clearly show the involvement of more than one level, the issue will be left for further research.

6.5 Epenthesis

In this section the essential behaviour of two different types of epentheses applied within V-C interaction, alone (cf. §5.5 for definition and motivation of epenthesis insertion in Tamil) will be analyzed. They are, namely, insertion of homorganic epenthesis and syllable epenthesis. Homorganic epentheses appears to be not only aimed at avoiding syllable ill-formedness, but is also aimed at bridging the sonority distance between two edges, ||*MAR$_{]\sigma}$/V|| and ||*MAR$_{\text{onset/s/w-I}}$||, while the latter is aimed at avoiding structural irregularities. Emergence of both types of epentheses is largely influenced by the phonotactic of the succeeding onsets.

Data

55) V-C

i. Homorganic epenthesis

Input	Output
Lex (V) + Suff(Infl)	
adai-t()a	adə̃ĩn̪θ̃ə
reach – inf.marker	*the reached…*
alai-t()a	alə̃ĩn̪θ̃ə
roam – inf.marker	*the roamed…*
eɻu-t()a	eɻʊ̃n̪θ̃ə
wake – inf.marker	*the awaken…*

kudɪ(y)ɪɾu-t()a	kʊdɪyɪɾʊ̃n̪θ̃ə
occupy – inf.marker	*the occupied…*
kada-t()a	kʌdʌ̃n̪θ̃ə
pass – inf.marker	*the past…*
maɽa – tu	mʌ̃ɽə̃n̪θʉ
forget – inf.marker	*by forgetting…*
padi-t()a	pʌdĩn̪θ̃ə
obey – inf.marker	*the obeyed…*
padi-tu	pʌdĩn̪θ̃ʉ
obey – inf.marker	*being obeyed*
*[7]taː-t()a	tʌ̃n̪θ̃ə
Give – inf.marker	*the given…*
*v(aː)-t()a	ʋʌ̃n̪θ̃ə
arrive – inf.marker	*the arrived…*
Lex (N) + Lex (N)	
maː - paɻam	maː̃mpʌɻʌ̃m̃
big – fruit	*mango*
maː - taɭiɾ	maː̃n̪tʌɭɪɾ
mango – tender leaf	tender leaf of mango
puː - kaː	*puː̃ŋgãː̃*
flower – garden	*garden*
puː - taɭɪɾ	puː̃n̪θʌ̃ɭɪɾ
flower – tender leave	*tender leaf*
ii. Syllable epenthesis	
i. Epenthesis /aːm/	
Lex (N) + Lex (N)	
Input	Output
paddu - puːcc	pʌddaː̃mp̃uːctʃɪ
silk – worm	*butterfly*

The data exhibit two types of phonological reactions, insertion of homorganic morph epenthesis, [a:m], and deletion. Insertion of homorganic epenthesis is witnessed between two different types of morphological extensions in Tamil - inflection and compounding. When a syllable base with NoCoda attached to a suffix forms a morphological extension, say with an initial stop such as, /t/, the structure reacts by inserting a homorganic epenthesis regardless of the quality of participating vowel

[7] Significant phonological behaviour of both, the ta: and va: verbal bases unveil when they form base stem attached to different classes of onsets. One of its significant behaviour, vowel shortening, has been analysed under section x.

segments. In forming a compound word, where two dominant stem words are brought together to form a single form, the generation of homorganic epenthesis is controlled by the quality of the onset of the succeeding stem. Apart from this, the structure also experienced the deletion of the weak vowel.

It is presumed that insertion of the epenthetic morph is enforced by the high ranking constraint, GRADUAL SONORITY FALL (GSF), which ensures the sonority distance between the two edges of the preceding and succeeding segments is kept as minimal as possible. When this requirement is not respected by the participating segments, GSF triggers a mediator which executes its intention, allowing sonority fall gradually, as illustrated in the following diagram.

56) (i)

	V	N	S
V(7)	x		
N(2)		x	
S(1)			x

(ii)

	V:	S
V(7)	x	
N(2)		
S(1)		x

The sonority status of the vowel, nasal and stops are illustrated in the diagram. It shows that having a nasal in-between the vowel, which sits on the 7th rank hierarchy, and the stop, which sits on the 1st rank of hierarchy, allowed the structure to avoid a stiff sonority drop, which is not apprehended by direct contact established between V-C, as in (56(ii). From here it is obvious that homorganic morph epenthesis aimed at promoting gradual sonority fall between the adjacent segments.

Insertion of morph epentheses brings about the very same sonority effect in different forms. The morph epentheses found in the data, such as, [a:m], [in] and [an], perform the same duty in a different manner. For example, in analyzing one of them, the insertion of [a:m] in */pʌddã:mpũ:ctʃɪ/* ‘butterfly’, the morph epenthesis has avoided direct contact between labial and dorsal. The picture would become clear if [u] is accepted as a dorsal segment following Linda (2001), Lubowicz (2004) and Clements (1991, 1985). Distance between labial and dorsal creates an obstacle for unhindered perceptual flexibility in rapid speech. Though deletion of the obstructing syllable might have given the same effect, the grammar insists on the insertion of [a:], a segment belonging to the central region, because compound-words prohibit unnecessary deletion of its components. The convenient position of the low unmarked vowel enables the segment to bridge sonority drop fall, steadily compared to [u]. Moreover, having the labial /m/ also eased the 'unsettled tension' between labial and the widely opened sonority gap created by the long vowel across the syllable boundary. It also has established moraic harmony between the epenthesis and the succeeding stem initial syllable, /*pu*/. In short, the sole motivation for epenthetic insertion is nothing else but minimising the sonority gap between succeeding and preceding edges at the interface and allowing the sonority drop gradually. In other words, it satisfies the undominated GSF.

The constraints seen in the foregoing are insufficient to perform a productive tableau analysis. They need to be accommodated within the basic pattern of V-C type of interactions; two types of high ranking alignment and sonority constraints and the heavily dominated, DEP-IO need to be added. The ranking of the constraint seen in (23) (repeated here for convenience as (57)), has been added along with low-ranked DEP-IO. The ranking is sufficient to predict the right choice of optimal candidate.

57) AL-STM-R, GSF, SCL » * LAB, *DOR, »*COR » AL-σ-R

The following tableaux show the effectiveness of the given ranking within three exclusive examples.

58)

Input /*adai-ta*/	AL-STM-R	GSF	SCL	* LAB	* DOR	* COR	AL-σ-R	DEP-IO
☞a. ʌ.dʌɪn̪.*tə*						***		*
b. ʌ.dʌɪ.tə		*				**	*	

59)

Input /*ma:-pa.ɻam.*/	AL-STM-R	GSF	SCL	* LAB	* DOR	* COR	AL-σ-R	DEP-IO
☞a. ma:mpʌ.ɻəm				****		*		*
b. ma:pʌ.ɻəm		*		***		*	*	

60)

Input /*paddu-pu:cci*/	AL-STM-R	GSF	SCL	* LAB	* DOR	* COR	AL-σ-RL	DEP-IO
☞a. pʌdda:mpu:tʃtʃɪ				***		****		*
b. pʌddupu:tʃtʃɪ		*		**	*	****	*	

The tableaux constructions illustrate that none of the sub-optimal candidates, which are faithful to input may appear as the winner, as long as they fail to satisfy the sonority constraint, GSF. The violation incurred by the winner candidate (a) against the lower candidates however did not affect their optimality status, at all.

6.6 Vowel Shortening

This section offers an independent analysis of special phonological reactions at the interface, Vowel Shortening (+), aimed at avoiding unnecessary sonority-clashes in selective environments. It is restricted to two verbal bases ending with the open syllable, *va:* ‘come’ and *ta:* ‘give’. Besides undergoing moraic modifications from */va:/* to */va/* and */ta:/* to */ta/*, these stems also instigate an additional yet interesting phonological reaction at the interfaces such as homorganic epenthesis and morph epenthesis. Depending on the phonotactics of the participating inflectional suffixes, their selection is modified by phonotactics of the surrounding onsets.

The following are the data exhibiting interesting phonological revelations which take place within V-C types of interaction, but not within C-V types of interaction.

61) V-C

Deletion of feature (mora and place)

Input	Output
Lex (V) (taː→ tʌ) + Suff(Infl)	
taː -t()a	tʌ̃n̪θ̃ə
give – inf.marker	*the given*
taː-t()u	tʌ̃n̪θ̃ʉ
give – inf. marker	*being given*
taː-kiR(aː)n	tʌrukɪɽ(aː)ɳ̚
give – tense marker – PNG marker	*is giving*
taː-v()-aːn	tʌ̃ruvaː̃ɳ̚
give – tense marker – PNG marker	*will give*

Lex (V) + Fw

ʋaː- t()aːccu	ʋʌ̃ñ̪θaːctʃʉ
come – tense marker – emphasis	*has came*

ii. Vowel shortening and Homorganic epenthesis

vaː > ʋʌ and taː tʌ

Input	Output
Lex (V) + Suff (Infl)	
ʋaː-t() aːl	ʋʌ̃n̪θ̃aːl
come – if	*if come*
ʋaː-t()a	ʋʌ̃n̪θ̃ə
come – inf.marker	*the one came*
ʋaː-t()aːn	ʋʌ̃n̪θ̃aː̃ɳ
come –tense marker-PNG marker	*he came*
ʋaː-ki ɽ(aː)n	ʋʌrʊkɪɽ(aː)ɳ
come – tense marker – PNG marker	*is coming*
ʋaː-v()aːn	ʋʌ̃rʊvaː̃ɳ
come – tense marker – PNG marker	*will coming*

The verbal bases, /*va*:/ and /*ta*:/ in the data have responded in two different ways when they are attached to suffixes with different forms of onsets. When succeeded with a coronal onset, the verbal stems instigate a homorganic epenthesis besides relinquishing moraic values but when succeeded by non-coronal segments, the same instigate the insertion of a morph epenthesis, [ru]. Both phonological reactions reveal that interaction between ||*MAR $_{\text{onset}\sigma1}$/V:|| of verbal bases and ||*MAR/CORONAL|| is prohibited in this language; any interactions between a long-vowel from the mid-region to coronal segment are 'repaired' at a costly rate.

However, this is not the case in all types of interactions – it still tolerates interaction between bases with back-low and back-long nucleuses and coronal segments in derived environments. Derived environments created upon deletion of the rhotic in the following, */pa:r-t(a:)n/* → */pa:tta:n/* 'he saw' is tolerated in Tamil. It is noticeable that upon the drop of the liquid /r/, the vacated place is filled by the derived geminate /t/, in a bid to avoid steep sonority fall. Derived geminate in the environment rescued the structure to maintain, MOST MINIMAL SONORITY DISTANCE. Nonetheless, the data at hand show different phonological reactions.

Deletion of mora and insertion of homorganic nasal are aimed to eradicate two shortfalls, apparently. One of them is to avoid moraic shortfall. Tamil prefers all suffixes to be attached to Bimoraic Stems, but not to monomoraic stems.

62) Bimoraic Stems (BiMorSt)
Stem words must be bimoraic

Any stem not fulfilling the requirement is ‘repaired’ by supplying the necessary weight through different ways. Deleting the mora and generating a homorganic moraic coda simultaneously within the examples at hand show that it fits the required requirement exactly, as represented by the following diagram.

63)	BiMorSt		* BiMorSt		BiMorSt	Gloss
	v a: -t…		v a.t…		v ʌ n̪.t…	come
	t a: -t…	→	t a.t…	→	t ʌ n̪.t…	give
	μ μ		μ		μ μ	

Nevertheless, the acquisition of the homorganic epenthesis, [n̪], has another phonological function as well. The epenthesis, besides allowing the structure to regain its BiMoraicity status, also has avoided violation against sonority constraint advocating for gradual sonority fall, Gsf, succinctly. The sonority order of the vowel, nasal and stop, which have been placed in order, allowed the structure to sustain gradual sonority fall, as in (64(i)) than in whole as in (64(ii)).

64)	(i)	V	N	S	(ii)	V:	S
V(7)		x				x	
N(2)			x				
S(1)				x			x

While the interaction between low-long mid vowel bases attached to suffixes with coronal onsets behave in this way, suffixes with non-coronal onset display different revelations but aim for the same output. By inserting the morph epenthesis, [ru], the structure managed bimoraic deficiency, and sustained gradual sonority fall between the two edges, as indicated in the following diagrams.

65)

BiMorSt		* BiMorSt		BiMorSt	Gloss
v a:. k…		v a. k…		vʌ. r ʊ..k…	come
t a: .k…	→	t a. ki…	→	t ʌ. r ʊ.k…	give
μ μ		μ		μ μ	

66)

(i)	V	Liq	S	(ii)	V:	S
V(7)	x				x	
Liq(6)		x				
S(1)			x			x

In both cases, the sonority-related repair strategy not only rescued the harmony of the structure but also helped it to sustain its grammaticality. The ideal interaction between the base and glide initial onset in the sense of sonority distance is still ruled out, on the ground of violation against high ranking GSF. Rejection of ||*MAR$_{onset\sigma1}$/V:|| and ||*MAR/Glide|| interaction forecasting no stiff sonority distance is an evidence that the context prioritizes fall of sonority to be gradual. It is also interesting to note that because the GSF has been sustained through morph epenthesis, DERIVEDGEMINATE, another strategic device usually triggered to minimise sonority distance at intervocalically was inactive, as in *tarukira:n* ‘is giving’ and *varukira:n* ‘is coming’.

The constraint ranking responsible for the aforementioned phonological reactions can be explained as follows. It has been proved that high ranking BiMorSt and ||*MAR$_{onset\sigma1}$/V:|| constraints dominate faithfulness constraint IDENT-IO(F) to allow the deletion to take place at the stem level. Placing the attained ranking as in (67) within the universal ranking of V-C interaction would yield the following ranking order:

67) BiMorSt, ||*MAR$_{onset\sigma1}$/V:|| » IDENT-IO(F)
ta: «tan

68) AL-STM-R, GSF, SCL, BiMorSt, ||*MAR$_{onset\sigma1}$/V:|| »* LAB, *DOR »* COR » AL-σ-R » DEP-IO, IDENT-IO(F)
tan « ta:t « tat

However, the ranking says little about the domain which has motivated the phonological changes in the structure. Since it is apparent that the base structure is the motivator behind all of these changes, it is proposed that an undominated LCC based on the stem domain may capture the intended generalization.

69) [BIMORST & ||*MAR$_{onset\sigma1}$/V:||]$_{\sigma1}$
Retain bimoraicity without involving the long vowel

Placing the undominated LCC within the ranking received in (69) may favour the selection of the right choice of candidate participating in monosyllabic long-vowels and non-coronal segments interaction, as shown by tableaux (70) and (71).

70)

Input /*ta:-t...*/	AL-STM-R	GSF	SCL	[BIMORST & ‖*MAR$_{onset\sigma1}$ /V:‖]$_{\sigma1}$	BIMORST	‖*MAR$_{onset\sigma1}$ /V:‖	*LAB	*DOR	*COR	AL-σ-R	DEP-IO	ID-IO (F)
☞a. tʌn̪.t…									***		*	*
b. tʌ:.t…	*		*	,*!		*			**	*		
c. tʌt.t.			*						***		*	*
d. tʌ.t…	*			*!,	*				**	*		*

71)

Input /*ta:-k...*/	AL-STM-R	GSF	SCL	[BIMORST & ‖*MAR$_{onset\sigma1}$ /V:‖]$_{\sigma1}$	BIMORST	‖*MAR$_{onset\sigma1}$ /V:‖	*LAB	*DOR	*COR	AL-σ-R	DEP-IO	ID-IO (F)
☞a.(tʌ.rʊ.)k …								*	**	*	*	*
b. (ta:).k…			*	,*!		*		*	*	*		
c. (tʌ.)k...			*		*			*	*	*		*
d. (tʌk).k			*	*!,				**	*		*	*

The tableaux did not provide a different result. They proved that the rankings are sufficient to predict the right choice of candidates, and to satisfy sonority requirement is the only choice of being optimal.

6.7 Vowel Raising and Vowel Shortening

Vowel raising, where a low vowel moves towards a higher position, is seen within V-C type of interactions involving a bimoraic verbal root but not within C-V type of interactions. When the bimoraic verbal root /ca:/ is attached to a suffix with an dental onset /t/, the low long vowel of the root-initial syllable becomes mid-front vowel, /a:/→ /e/, with reduced mora. Though it is obvious that the shortening enabled the bimoraic syllable to surface as a monomoraic syllable, the purpose of vowel raising is unclear.

Simultaneous vowel raising and vowel shortening is restricted to the attachment of the bimoraic verbal root and coronal /t/. Elsewhere the bimoraic base is retained when attached to different types of affixes. The quality of the vowel also does not alter, as in /*ca:va:n*/ 'he will die' and /*ca:kira:n*/ 'he is dying'. The dorsal and labial onsets did not show a significant difference. Even the coronal does the same in forms such as /*ca:ttu*/ 'perform', where the /ca:/ and dental /t/ appear within a morphology. This flexibility indicates that Tamil permits the ||*MAR/V:|| and ||*MAR/OBSTRUENT|| clustering form within morphemes but not across the morpheme boundary. Since the latter may create unnecessary perceptual tension, it appears that interaction between the long low back vowel, /a:/, and the coronal is not allowed across the morpheme boundary.

The data in (72) show a representation of examples experiencing vowel raising and vowel shortening in Tamil.

72) V-C type of interaction

caː >> ca

Input	Output
Lex (V) + FW	
caː-t()a̴ːŋg̃ə̃	cəttaː̃ŋg̃ə̃
die – tense marker – PNG marker	*many people died*
caː-t()a()vaŋg̃ə̃	cəttəʋʌ̃ŋg̃ə̃
come – tense marker – PNG marker	*people who died*
Lex (V) + Suff (Infl)	
caː-t()u	cəttʉ
come – tense marker – PNG marker	*being dead*
caː-t()a(v)-aɾ	cəttəʋəɾ
die – tense marker – PNG marker	*person who died*

From the data it is apparent that when an open bimoraic syllable /*ca:/* is attached to coronal onset, besides the moraic value of the vowel being reduced, the vowel of the base raises as close as possible to the high-front vowel. The dental stop appearing within the intervocalic environment, as usual, geminates.

It has been repeatedly seen that an inflectional suffix /t/ undergoes gemination in intervocalic circumstances in this language. This is done in two different ways, self-gemination and gemination of homorganic nasal [n̪]. The revelation, in fact, is a result of the domination of DERIVEDGEMINATE over NO-GEM, which forced the dental /t/ within an intervocalic environment to geminate. The supplied geminate turned the open syllable into becoming a closed /cet../, and subsequently fulfils the requirement of the two sonority constraints, SCL and GSF, in return. In other words, the phonological reactions can be presumed as responding to bring the involved segments within a close range to coronal region, where the mid vowel is much closer to the coronal region than that of the /a:/, following the assumption of Feature Geometry (Clements, 1991, 1985).

Interestingly, vowel raising and vowel shortening is not influenced by the quality of succeeding vowels. The reaction which is due to violation of lower-ranked IDENT-I→O(PLACE) (definition of constraints is given in (75) for convenient purpose) is motivated by the coronal dental. Since vowel raising and vowel shortening are initiated in other cases, as in the succeeding syllable is a monomoraic /ta/ or /tu/ with mid-vowel, like in /*ca:tta:n*/ and /*ca:ttuva:n*/. This leads to the conclusion that the dental /t/ is the motivating factor behind the changes.

This reaction is evidence of sonority interaction, as well. The raising of the vowel from the low region to mid and the reduced mora within the transaction are aimed to form an optimal syllable form with minimal sonority gap. The preferred syllable formation can hardly be achieved by having a nucleus and consonant with a wide open sonority gap. Arguing along the claim that the high-front vowel is a coronal segment (Clements, 1991, Clements, 1985) will shed insight on this claim. Attaching the dental /t/, which is coronal, with a vowel close to that region may provide a perfect ||NUC/OBSTRUENT|| contact.

Furthermore, reduction of moraic value unveils involvement of additional constraints as well. It shows that the REDUCE-μ constraint dominates MAX-μμ and IDENT-I→O(PLACE). Interestingly the enforced moraic reduction also has an additional benefit. Moraic reduction and raising of the low back vowel with two mora, /a:/ to a single moraic mid-high vowel, /e/ established a much needed moraic harmony between the base and the suffix, as well. The raising of the vowel from the low region to mid-region enabled the nucleus to establish sonority harmony between the ||*NUC/CORONAL|| and ||*MAR/CORONAL||.

The foregoing elaboration also reveals that ALIGN-μμ is a dominated constraint. Mismatch between the moraic properties of the input and output segments indicates that retaining the reduced moraic segment is more essential than fulfilling the requirement of matching the mora in the same alignment.

73) c e (x)… output

c a a… input

μ μ

The unattended moraic value in the output (x) is represented by the following ranking.

74) REDUCE-μ » MAX-μμ, IDENT-I→O(PLACE), ALIGN-μμ

[ce] > /ca:/

There is another crucial constraint that warrants a formal introduction before conducting a tableau analysis. The whole phonological reaction is triggered by the prohibition of ||*NUC/V:|| & ||*MAR$_{onset}$/CORONAL|| at the interface, which also needs to be formalized as a constraint.. To formalise this interaction, an undominated LCC is proposed, as in (75), responsible at prohibiting the undesired interaction which is active at the interface domain.)

75)

*[||*NUC/V:|| & ||*MAR$_{onset}$/Cor||]$_{Interface}$
Avoid long vowel nucleus and coronal onset at the interface domain

[||*NUC/V:||
Vowel must not be long

||*MAR$_{onset}$/ CORONAL|| (||*MAR$_{onset}$/ COR||)
Avoid coronal onset as margin

Reduce-μ (Red-μ)
Reduce the mora

Ident-I→O(Place)
Place feature of input to output must be identical

As we have seen in the previous sections, the basis of V-C interaction consists of a defined set of constraints which cannot be avoided in capturing the comprehensive scenario of the constraints involved in producing the optimal candidate. Placing the constraints obtained in (75) within basic ranking arguing for V-C interaction would give the following order.

76) [||*NUC/V:||&||*MAR$_{onset}$/COR||]$_{Int,}$ AL-STEM-R, MSD, SCL, REDUCE-μ, DERGEM

|

||*NUC/V:||, ||*MAR$_{onset}$/COR||

|

*LAB, *DOR »*COR

|

Al-Suff-L

|

Max-μμ, Ident-I→O(Pl), Align-μμ, No-Gem

Note that the given ranking would have been incomplete without assigning the two component constraints of LCC ranked lower than LCC, but above the low-ranking constraints because of their role in vetting disfavoured segments at margins as shown in (77).

77)

Input /ca:-ta:../	[‖*NUC/V:‖&‖*MARonset/COR‖]Int	AL-STEM-R	MMSD	SCL	REDUCE-μ	DERGEM	‖*NUC/V:‖	‖*MARonset/COR‖	AL-σ-R	MAX-μμ	IDENT-IO(PL)	ALIGN-μμ	NO-GEM
☞a. cət.ta:..								*		*	*	*	*
b. cə.ta:…			*			*		*	*	*	*	*	
c. ca:t.ta:..	*!,			*	*		*	*					*
d. ca:.ta:..	*!,*		*	*	*	*	*	*	*				

The sub-optimal candidates, (c) and (d) which incurred fatal violations against two of the high-ranking constraints, MMSD and [‖*NUC/V:‖&‖*MAR$_{onset}$/COR‖]$_{Int}$ have been ousted from further evaluation. Minimal violation incurred by the input faithfulness candidate against MMSD and DERGEM, two crucial constraints compromise to establish sonority harmony across the morpheme boundary, proving that it is a sub-optimal candidate. Candidate (a) emerged as the winner by satisfying high-ranking constraints. The minimal violation incurred against ‖*MAR$_{onset}$/COR‖ does not affect its status at all.

6.8 Conclusion

The primary aim of the present chapter has been to identify the fundamental phonotactics of C-V and V-C type of interactions, which have been sidelined by previous phonological studies in Tamil. The outcome of the study verified that the phonological behaviours of both types of interactions vary from one type to another and lexical words. Beyond the lexical dissimilarities both types of interactions illuminated intriguing similarities in acquiring sonority-related repairing strategies so that the adjoined structures may settle harmonically. This chapter has attempted to formalize those operations and their phonotactics within the constraint based framework.

Among the two types of interactions, the C-V type remained casual without serious resilience at interfaces. Properties of the consonant and vowel showed more inclination towards the formation of a natural cohesive demisyllable than symptoms of conjoining lexes having different morphological boundaries. The end result was nothing more than CV syllabification that complies with a basic sonority dispersion requirement- sonority degree must rise from onset to nucleus. Since the setting of C-V promises non-violable sonority inter-relatedness, it has never violated MSD, MMSD and GSF, three sonority constraints hypothesised in Chapter 2, §2.13.

The V-C interactions have shown different requirements. It has accommodated a variety of less popular yet expensive phonological operations in order to maintain structural harmony. Almost all SrRS seen in the chapter revolved around V-C interaction; this includes alignment, epenthesis insertion, gemination, vowel harmony, vowel rising, vowel shortening and chain shift. Though execution of all of these exercises appeared to be ‘expensive’ at face value, they have been proven to be influential in promoting perceptual friendlier outputs.

In short, it is obvious from the foregoing discussion that C-V and V-C type interactions host various visible and non-visible phonological reactions. These aim to preserve extended lexical structures not violating the requirement of sonority disparity at any point.

Chapter Seven
Overview and Conclusion

As mentioned in the Introduction, the present thesis entitled *Morphophonology of SST: An Optimality Theoretic Study,* has set out to achieve several aims.

The primary aim of this unprecedented study was to develop an economic and comprehensive constraint-based explanation for lexical level morphology-phonology interfaces in spoken Tamil. The present thesis has identified actively participating segmental and sub-segmental constraints at the interfaces. Among sub-segmental elements, the role played by sonority has been verified extensively within a set of empirical data collected from standard spoken Tamil, a dialect widely used in Malaysia. This concluding chapter sums up the descriptive contributions and theoretical implications seen in the foregoing chapters, in the order presented.

Chapter 1 of the thesis lays out the background of the present study. It includes the historical evolution of MP studies and the theoretical assumptions pertaining to the morphophonology of Tamil. Besides giving a brief review of related literatures, the chapter also presents a general overview of the widely applied SST in Malaysia, the source which has provided empirical evidences for the present study and the negative issues underpinning its application. The same chapter also offers a brief review of related literatures, an explanation of methodological issues relating to the current thesis, including research questions, research design and the classification of the chapters.

Chapter 2 offers a description of the theoretical frameworks of sonority-related repairing strategies revolving around the well-formedness of the minimal sound block, syllables. It considers how syllable well-formedness is achieved and maintained in Tamil and across the world's languages. The chapter also provides a universal theoretical assumption on how a balanced and non-violation triggering syllable contact is established. To achieve this target, it was shown how the language adhered to the universal law of syllabification at the intra-syllable level with slight modifications necessary to meet the language specific requirements. Formation of onset initial and coda-final demi-syllables worked along with the requirement of cross-linguistic specifications – sonority rise from the onset before reaching its peak at the nucleus and drop at the coda.

The same chapter also introduces the aspects of relative sonority disparity requirements enforced within this language. It has been hypothesised that the language enforces the sonority disparity requirement using three types of sonority constraints which influence and verify the selection of repairing strategies, both across the syllable boundaries and within the syllables. The three crucial constrains, MINIMAL SONORITY DISTANCE (MSD), MOST MINIMAL SONORITY DISTANCE (MMSD) and GRADUAL SONORITY FALL (GSF) have been identified as factors devising triggering efforts to level the invisible sonority shortfall, originating from morphological extension. The constraints ensure that the M-P interfaces do not fatally violate various sonority requirements.

The same chapter also offers a basic introduction to two widely applied universal constraint rankings and their internal properties in the present study. The approaches of Positional Faithfulness and Positional Markedness and their appropriateness have also been verified in this chapter: evidences for the claims established in the chapter have been well demonstrated and defended in the analyses chapters.

Chapter 3 provides essential information on prosodic phonology and the morphology of the data. Information on prosodic phonology covers the distribution of vowels and consonants, their characteristics and restrictions. Along with the information on distribution, it also covers aspects of prosodic phonology in close relation to the present research. The description of segmental aspects covered two important issues; the distribution of sound segments and particularly the two different levels, the stem and word, a classification which has been referred to repeatedly in this thesis. The syllabification pattern of the language and structural constraints related to it have been explained extensively under the topic of prosodic phonology. Only minimal morphological descriptions have been included to offer information on the internal organization of lexical words and the existence of multiple interactions at word-level. Besides this, the chapter also consists of a description on phonetic accounts of SST and its variances plus the disputes revolving around the sound segments of the language.

Chapter 4 provides an analysis of V#_#V type of interactions. The chapter covers issues relating to hiatus resolutions involving stem/word-initial syllable and non-initial stem/word syllables, two significant lexical divisions influencing phonological activities aimed at resolving vowel hiatus. The chapter has offered an extended analysis of vowel hiatus management in Tamil in favour of the positional markedness approach to an extent that no previous studies in Tamil have ever offered.

Three significant strategies that have been widely applied within the language have been investigated in this chapter. In Tamil, vowel hiatus resolutions have never been associated with any other phonological operations other than Glide Insertion (GI). By working along the well-established norms, the present study has gone a step further in verifying the justification of glide selection and other available options as well. The study claims that the insertion of glides, [v] and [y] in this language is not random, but influenced by the features of the participating vowel segments and of the perception need. Apart from verifying the contribution of GI, the chapter also argues for feature deletion as an approach to avoid hiatus conflicts. The aspect which has never been associated with vowel hiatus resolutions has been proven to be equally significant to GI in avoiding hiatus conflicts in Tamil. The present study has also identified epenthesis as an influential method of avoiding hiatus conflicts.

The chapter also has identified two constraints which drive the grammar to select the right vowel hiatus resolution at the right places. Among them, the first and foremost is the structural constraint which prohibits a non-onset syllable within the lexical word. The discussion revolves around the high ranking $*[_{\sigma}V^{\text{word-medial}}$ that enforces structural demand. The selection of glide to fill the vacuum has been accounted for with sonority strength and the formation of a harmonic syllable foundation by which the structure obtains a strong onset. GI helps the grammar to maintain the uniformity of word internal syllable and preserve harmonic contact at the M-P interface.

Analysis on the deletion of weak segments in vulnerable positions showed that the language prefers to sustain heavier segments without respecting the requirement of positional prominences. However, what has been learned is that when vowels with the same strength occupy the right and left edges, while the word initial syllable is sustained, the segment on the opposite edge is sacrificed. On top of these basic practices, the deletion is also predominantly controlled by lexical typology, where deletion of the vowel segment is more common than in derived and inflections compared to compound words.

Overall, vowel hiatus management in Tamil can be simplified and is repeated here from chapter 4, (4).

1) Different forms of Vowel Hiatus resolutions in Tamil

i. If V_1 is final in a lexical item and V_2 is initial of a lexical item, retain V_1 and V_2

$[\ldots V_1]_{Lex}\ {}_{Lex}[V_2\ldots] \rightarrow V_1(v/y)V_2$ retain both vowels with glide

v. If V_1 is final in a functional morpheme and V_2 is initial of a functional morpheme, retain V_1 and V_2

$[\ldots V_1]_{Func}\ {}_{Func}[V_2\ldots] \rightarrow V_1(v/y)V_2$ retain both vowels with glide

iii.If V_1 is final in a lexical morpheme and V_2 is initial of a functional morpheme and both have the same moraic value, delete V_1

$[\ldots V_1]_{Lex}\ {}_{Func}[V_2\ldots] \rightarrow V_2Ø(V_1)$

v. Superseding rule: If V_1, the final vowel in the lexical morpheme, and V_2, the initial vowel of the functional morpheme, do not share the same moraic value, retain the heavier moraic segment and delete the light segment

$[\ldots V_{1(Light)}]_{Lex}\ {}_{Func}[V_{2\ (Heavy)}\ldots] \rightarrow Ø\ V_2\ (V_{1\ (Light\ vowel)})$, or
$[\ldots V_{1\ (Heavy)}]_{Lex}\ {}_{Func}[V_{2\ (Light)}\ldots] \rightarrow V_1Ø(V_{2\ (Light\ vowel)})$
$[\ldots V_{1(Light)}]_{Func}\ {}_{Lex}[V_{2\ (Heavy)}\ldots] \rightarrow Ø\ V_2\ (V_{1\ (Light\ vowel)})$, or
$[\ldots V_{1\ (Heavy)}]_{Func}\ {}_{Lex}\ [V_{2\ (Light)}\ldots] \rightarrow V_1Ø(V_{2\ (Light\ vowel)})$

v. Insert epenthesis (Example; /t/ in /oru-ar→ oruttar/)

Chapter 5 deals with a popular topic in Optimality Phonology, _C# versus #C_ interfaces or what is popularly known as Onset and Coda Asymmetries. This chapter also shows the heavy dependency of the language on sonority related constraints. Beckman (1997/2004) claims that root-initial and non-root initial syllables in Tamil behave differently, where the place feature of the former is not conditioned according to the place feature of the onset, without explaining the root cause for the reversal preference against cross-linguistic norms. Finding the answer for the unexplained ‘puzzle’ has always been one of the goals of the present chapter as well.

The present study identifies the requirement of relative sonority distance as the driving force for its resistance against cross-linguistic preferences. Altogether, there are six essential issues relating to OCA and SrRS, which have been analyzed in this chapter.

2) i) Coda condition
ii) sonority relegation,
iii) epenthesis insertion,
iv) gemination and
v) coda maximisation, plus
vi) segment deletion

All of these exercises have been analyzed from two main perspectives, i.e. stem/word-initial syllables and non-initial stem/word-initial syllables. The chapter also verifies that the morphophonological reactions involving OCA within various types of word-classes can be analyzed effectively without relying upon morphological perspectives. The analyses have been done within a most appropriate framework within OT, Positional Faithfulness.

The analyses revealed the following findings. Coda-condition and sonority relegation are envisaged in three contexts,

3) a. If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and the C_2 is a bilabial obstruent, the sonority value of the C_1 is relegated to next level (For instance, from liquid to nasal) (l+p >ɳp) to fulfil the requirement of MINIMAL SONORITY DISTANT

b. If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and the C_2 is a bilabial sonorant obstruent, the sonority value of the C_1 is relegated to next level (from liquid to nasal) (l+m>ɳm, ɮ-m>nm). The same also applicable to bilabial stop in selective environment
((l+p>ɳp as in (nʌnpak^{h}əl))

c. If C_1 of C_1C_2 cluster is a [+Liquid, +sonorant] segment and the C_2 is an Stop, the sonority value of the C_1 is relegated to next level (from [+nasal] to [-nasal]s, then the sonority value of the C_1 is dropped to fulfil the requirement of MOST MINIMAL SONORITY DISTANT (from nasal to stop or liquid to stop)

Sonority relegation is characterised by the phonotactics of the participating coda and onset. Although SR is largely noticed within stem/word-initial syllables, the same activity is also witnessed in stem/word non-initial positions. The study has offered the following findings:

4) i. When a stem/word- initial is a voiceless obstruent, including, a coronal and a non-coronal segment, preceded by a bilabial nasal /m/, place assimilation takes place so that the place of articulation of the bilabial coincides with that of the onset.

ii. If the syllable coda of the stem/word- initial syllable is a coronal lateral, and the succeeding onset is a coronal obstruent, sonority of the lateral is relegated - the lateral is nasalized according to the onset lateral.

vi. When a stem/word-initial is filled by a non-coronal obstruent preceded by a coronal lateral, the sonority of the lateral is downgraded to become a voiceless obstruent.

iv. When a stem/word-initial is a non-coronal obstruent preceded by a coronal nasal, the sonority of the nasal is also downgraded to become a voiceless obstruent.

v. If the coda syllable is a coronal lateral and the succeeding onset is a bilabial nasal, sonority of the lateral is partially relegated hence the lateral is nasalized according to the participating lateral.

iv. If the coda syllable is a coronal nasal and the succeeding onset is a bilabial nasal, nothing happens.

The role of epenthesis has also been verified in this study. It has been claimed as a substitution exercise applied within a context where moraic codas are zealously guarded and where deletion is not permitted. EI allowed the structure to sustain two benefits: to allow gradual sonority fall and to repair syllable ill-formedness. However, the study claims that EI enforcement is subject to certain restrictions.

5) a. An inflectional suffix may only be attached to a prosodic word (FEET-WORD). Some time compound words also exhibit this reaction, but not always. (Disyllabic word - a compound word may not respect this demand)

b. Derivational suffixes and inflectional suffixes behave differently; the former are not prone to DERGEM while the latter do when they receive an epenthesis

c. The /ttu/ formation involving case marker of /tu/ and deletion of /m/ is not initiated by derived gemination but by a surfacing underlying segment

d. Selection of epenthesis [u] is determined by the quality of the vowel of word-final syllables and suffixes

e. Selection of epenthesis [in] is determined by the quality of the coda consonant of the base lexical, aiming at establishing CRISPEDGE

The present chapter also has verified the active role of geminations in Tamil. It has been well-established that Tamil has four types of geminates, namely the i) inherent geminate, ii) derived geminate, iii) conditional geminate and iv) overlong geminate.[1] Apart from inherent geminates the rest of the geminates are a bi-product of morphophonology with fixed behavioural patterns. The moraic coda generally targets stem/word initial coda syllables and supplies moraic coda regardless of participating coda or onset. The derived geminates are exclusively voiceless stops in intervocalic positions. Conditional geminates, on the other hand are an exclusive property of two of the voiced obstruents found within this language. The underlying form of these geminates surfaces within preceding words when attached to another lexical word or suffix. Probably, one of the crucial findings of the study is the identification of overlong geminates in this language, the functional role of which has never been introduced in Tamil before. In general, these geminates have been argued for their association to sonority, where they serve to minimise the sonority discrepancy, either to Most Minimal Sonority Distance or the desired Minimal Sonority Distance.

Lastly, the chapter also verifies application deletion as a strategic manoeuvre to avoid violation of sonority between two adjacent consonants. Altogether, there are three types of deletion taking place, namely,

6) i. Voiceless onsets may only be preceded by a syllable coda; either a homorganic nasal or geminate.

vii. Onsets other than voiceless obstruent stops may not be preceded by a closed syllable, they must be open.

viii. Segment deletion always targets the weak consonants – nasals and liquids
(the bilabial and dental) at the weak position- the coda as opposed to onset, except when the onset is dental nasal in a compound word.

All of these deletions were noted to be targeting two different environments, namely, stem/word-initial syllables and non-stem/word-initial syllables.

Chapter 6 discusses two types of interaction between C#_#V and #V_#C in Tamil and has examined a handful of phonological activities at the interfaces which have been classified as passive in the language. The study shows eight types of such phonological

[1] Discussions in the present study, however, have been focused on the derived and conditional geminates alone. Discussion on overlong geminates and morphophonological correlation has been avoided due to page limits.

operations. Among them, the V-C types of interactions trigger most of the rigorous and interesting phonological reactions, while the C#_#V, and show the formation of a harmonic syllable structure which paves the path for a cohesive structural bondage between two morphological edges.

The same chapter also argues the relevance of two premises involved in the realisation of harmonic demisyllables at the interfaces. One is alignment and another is the sonority related constraints, MMSD and GSF. By involving the alignment constraints, the present study offers basic insight into obtaining a better outlook on the interrelatedness between two edges occupied by two segments. The study has also revealed that along with these primary phonological requirements there are a range of phonological operations i.e. gemination, deletion, diphthong devaluation, epenthesis insertion, vowel harmony, vowel raising, and vowel shortening, which have contributed collaterally to achieving structural harmony. The contribution of these combined force factors have been evaluated from the perspective of constraints dominance.

This last chapter, besides providing concluding remarks on the present thesis, also enumerates and evaluates the findings of the study.

Future works on the morphophonology of Tamil can be done in many areas. The present endeavour is, in fact, a ground-breaking effort exposing the phonological richness of the language to a wider research community. Though, it can be claimed that the study has offered a comprehensive descriptive introduction and theoretical implications relating to M-P interfaces, this has been done from a phonology friendlier perspective alone. The domain of the morphophonology of Tamil hosts a variety of challenging offerings if it is approached from different perspectives especially from the perspective of morphological domains. Analyzing each one of the word-classes and their contribution in modifying the interface context may produce intriguing outcomes.

Future works on the morphophonology of Tamil can also be done for individual word-classes. Nominal and Verbal are two worthwhile domains which promise a deeper and more concise form of analysis. The morpho-syntax of Tamil is another field of study with rich phonological and syntactic irregularities. Inclusion of Morpho-Prosodic aspects would offer more opportunities of exploration. Besides sharing a lot of the mentioned common phonological and syntactic features that can be seen across the languages, it also posits a range of language ‘specific and ‘elsewhere rule’.

Apart from these main domains, future studies may also focus on individual properties of segmental and non-segmental and morphological aspects. For instance, the labial nasal /m/ in the language exhibits interesting phonological behaviour when it takes different positions within word levels. Interaction between labial /m/ and other onsets lead to interesting phonological outcomes, especially the affixed element which has additional grammatical substances such as case markers. As for the non-segmental element, association between the stress pattern of the language and alignment is one of the morphophonological reactions that may have an interesting outcome. Besides giving a comprehensive outlook of the unique stress pattern of the language it may also lead to formalising the role of alignment constraints in full scale. Morphological aspects such as the adjectival suffix /mai/ examined in the last chapter of this thesis is another promising yet challenging area of morphological study which needs more attention. These are a few topics among many that can still be explored and extended to advanced research levels.

For all future research works, this unprecedented work may serve as a primary source to verify and propose premises for realigning the trend of phonological studies related to Tamil. It may also serve as an ‘access key’ providing fundamentals of both, the phonology of the M-P interfaces and the theoretical implications pertaining to Optimality Theory and Tamil, especially those related to the constraints and their functions.

Bibliography

Agesthialingom, S. 1967. *A Generative Grammar of Tamil (A Fragment of Tamil Syntax)*. Annamalainagar: University of Annamalai.

Agesthialingam, S. 2002. *Tamilmoli amaippiyal*. Citambaram: Meyyappan tamilayvakam.

Agesthialingom. 1996a. *Peyariyal*. Annamalainagar: Annamalai University.

Agesthialingom. 1996b. *Vinaiyiyal*. Annamalainagar: Annamalai University.

Albert. 1985. *Tolka:ppiyam: Phonology and Morphology and English*. Madras: ITTS.

Alageesan, C. 1997. 'ɻ̣' karp punarcciyum ma:rrangkalum. *Twenty Eighth Karuttarangku-Aayvukkoovai* 1:pp.55-58.

Alber, B., and Plag, I. 2001. Epenthesis, deletion and the emergence of the optimal syllable in creole: the case of Sranan [Nov]. *Lingua* 111:811-840.

Albert, D. 1985. *Tolka:ppiyam: Phonology and Morphology in English*. Madras: ITTS.

Alderete, John. 2001. Dominance effects as transderivational anti-faithfulness. *Phonology* 18:201-253.

Anttila, Arto. 2002. Morphologically conditioned phonological alternations [Feb]. *Natural Language & Linguistic Theory* 20:1-42.

Arad, Maya. 2003. Locality Constraints on the Interpretation of Roots: The Case of Hebrew Denominal Verbs. *Natural Language & Linguistic Theory* 21:737-778.

Arangkaraasan, Marutuur. 1992. collurupukalul 'anru'. *Twenty Third Karuttarangku-Aayvukkoovai* 42:pp.162-166.

Arden, A.H. 1976. *A Progressive Grammar of the Tamil Language, Revised by A.C.Clayton*. Madras: The Christian Literature Society.

Badriraju, Krishnamoorthy. 2003. *The Dravidian Languages*. Cambridge: Cambridge University Press.

Balasubramaniam, Perumal. 1983. Malay Elements in Spoken Discourse among the Tamil Plantation Workers. In *7th Conference on Asian Association on National Languages*. University of Malaya, Kuala Lumpur: University of Malaya, Kuala Lumpur.

Balasubramaniam, Perumal. 1987. English Elements in Malaysian Tamil. In *National Conference on Modern Languages*. University of Malaya, Kuala Lumpur: University of Malaya, Kuala Lumpur.

Balasubramaniam, Perumal. 1989a. Descriptive Study of Standard Spoken Tamil, Department of Indian Studies, University of Malaya: Unpublished PhD.

Bat-El, Outi. 1996. Selecting the Best of the Worst: The Grammar of Hebrew Blends. *Phonology* 13:283-328.

Beckman, Jill N. 1998. Positional Faithfulness: http://roa.rutgers.edu/files/234-1297/roa-234-beckman-1.doc.

Beckman, Jill N. 1997. Positional faithfulness, positional neutralisation and Shona vowel harmony. *Phonology* 14:1-46.

Beckman, Jill N. 2004. On the Status of CodaCond in Phonology. *International Journal of English Studies* 2:pp.105-134.

Bell, Alan, and Bybee, Joan L. 1978. *Syllables and segments*. Amsterdam ; New York: North-Holland Pub. Co.: sole distributors for the U.S.A. and Canada, Elsevier North-Holland.

Benua, Laura. 1997. Affixes classes are defined by Faithfulness. In *University of Maryland Working Papers in Linguistics 5. Selected Phonology Papers from Hopkins Optimality Theory Workshop 1997 / University of Maryland Mayfest 1997 [In Andries W. Coetzee, 2003]*, ed. Viola Miglio and Bruce Moren, 1-27.

Berg, T., and Niemi, J. 2000. Syllabification in Finnish and German: Onset filling vs. onset maximization [Apr]. *Journal of Phonetics* 28:187-216.

Blevins, Andrew garret and Juliette. Analogical Morphophonology 1.6.2007.

Blevins, J. P. 2006. Word-based morphology [Nov]. *Journal of Linguistics* 42:531-573.

Blevins, Juliette, and Pawley, Andrew. 2010. Typological implications of Kalam predictable vowels. *Phonology* 27:1-44.

Bloomfield, Leonard. 1933. *Language*. New York: Henry Holt. [Reprinted in University of Chigago,1984].

Bonet, Eulàlia., and Lloret, Maria-Rosa. R. 2005. Against serial evaluation in optimality theory [Sep]. *Lingua* 115:1303-1323.

Bright, William. 1975. The Dravidian Enunciative Vowel. In *Dravidian Phonological Systems*, eds. H F Schiffman and C E Eastman. Seattle: University of Washington.

Britto, Gave. 1986. *Diglossia: A Study of the Theory with Application to Tamil*. Washington DC: Georgetown University Press.

Broselow, Ellen. 2003. Marginal phonology: Phonotactics on the edge. *Linguistic Review* 20:159-193.

Bye, Patrick. 1999. Coherence in Finnish consonantal gradation: Towards a theory of phonological lenition Paper presented at *Proceedings of the Chicago Linguistic Society 34*, Chicago IL.

Caldwell, Robert, 1814-1891. 1987. *A comparative grammar of the Dravidian or South Indian family of languages*. New Delhi: Asian Educational Services, 1987. (Reprint. Originally published: 3rd ed.) London : Kegan Paul, Trench, Trubner, 1913.

Carnie, Andrew. 1994. Whence Sonority? Evidence from Epenthesis in Modern Irish*. *MIT Working Papers in Linguistics 21, Papers on Phonology and Morphology* 21:81-108.

Carstairs-McCarthy, A. 2005. Sound mutations: The morphophonology of Chaha [Aug]. *Word-Journal of the International Linguistic Association* 56:255-258.

Carstairs, Andrew Damerell. 1987. *Allomorphy in inflexion*: Croom Helm linguistics series. London ; Wolfeboro, N.H.: Croom Helm.

Casali, Roderic. 1996. Resolving Hiatus, UCLA, University of California.

Chiosain, Maire Ni. 1996. Prosodic well-formedness and sonority constraints: epenthesis in Irish, 15. Dublin: University College Dublin.

Christdas, Prathima. 1988. The Phonology and Morphology of Tamil, Faculty of Graduate School f Cornell University, Routledge.

Cinnasamy, T.P. 1996. *Nannu:l telivuraiyum pilaiyinri tamil elututalum*. Chennai: Sarasu Publication.

Clayton, Mary. 1981. Word Boundaries and Sandhi Rules in Natural Generative Phonology, 571-590: Linguistic Society of America.

Clements, Nick, and Keyser, Samuel. 1983. *CV Phonology: a generative theory of the syllable*. Cambridge: Mass,: MIT Press.

Clements, Nick. 1991. Place of Articulation in Consonants and Vowels: A Unified Theory. In *L'Architecture et la Geometrie des Representations Phonologiques*, eds. B Laks and A Rialland, 283–333. Paris: Edition du C.N.R.S.

Clements, Nick. 1988. The sonority cycle and syllable organisation. Paper presented at *Phonologica 1988: proceedings of the 6th International ..., Volume 1988*.

Clements, Nick. 1985. The Geometry of Phonological Features. *Phonology Yearbook* 2:225-252.

Colina, Sonia, and Diaz-Campos, M. 2006. The phonetics and phonology of intervocalic velar nasals in Galician [Aug]. *Lingua* 116:1245-1273.

Crosswhite, Katherine. 1999. Vowel reduction in Optimality Theory, PhD dissertation.

UCLA.
Crowhurst, Megan. 2001. Coda conditions and um infixation in Toba Batak [Aug]. *Lingua* 111:561-590.
Dass, Ramasamy Mohana. 2005a. Opportunities and Challenges for the Progress of Tamil Language in Malaysia In *National Conference on the Status of Economy, Social and Language of Malaysian Indian* Petaling Jaya, Selangor forthcoming.
Dass, Ramasamy Mohana. 2005b. *Adippadai Tamil Ilakkanam*. Kuala Lumpur: University of Malaya.
Davenport, Mike, and Hannahs, Stephan J. 2005:15. *Introducing Phonetics & Phonology*: Hodder Arnold: London.
David, M.K. 2003. The Pakistani Community in Machang, Kelantan: Reasons for Language Shift. *International Journal of the Sociology of Language* 161:47-53.
Davis, S., and Shin, S. H. 1999. The syllable contact constraint in Korean: An optimality-theoretic analysis [Oct]. *Journal of East Asian Linguistics* 8:285-312.
Davis, Stuart. 1994. Geminate consonants in moraic phonology *WCCFL* 13:32-45.
de Lacy, Paul. 2004. Markedness conflation in Optimality Theory. *Phonology* 21:145-199.
Devaneeyappaavanar, Nja. ed. 2001. *Moli a:ra:ccik kadduraikal*. Madras: Tamilman Publisher.
Donough, Joyce Mc, and Johnson, Keith. 1997. Tamil Liquids: An investigation into the basis of the contrast among five liquids in a dialect of Tamil. *Journal of the International Phonetic Association* 27:1-26.
Draca, Zec. 1995. Sonority constraints on syllable structure. *Phonology* 12:85-129.
Dressler. 1985. *Morphonology: the dynamics of derivation*. Karoma: Ann Arbor.
Editors. 1997. Kriya's Dictionary of Contemporary Tamil, ed. Editorial Team. Chennai: kriya.
Ferguson, Charles. 1959. Diglossia. *Word* 15:pp.325-340.
Ferguson, Charles. and Keating, Paul. 1997. Articulatory strengthening at edges of prosodic Firth, John . . 1934. *Tamil Phonetics*: Appendix to Arden. 1934. London.
Ganesan, M. 1984. Functional Aspects of Standard Spoken Tamil. *Ayvukkovai-16* 2:All India University Tamil Teachers' Association, Annamalainagar, pp60-64.
Gess, Randall. 2004. Phonetics, phonology and phonological change in optimality

theory: Another look at the reduction of three-consonant sequences in Late Latin. *Probus* 16:21-41.

Goldsmith, John. 1999. *Phonological Theory: The Essential Readings*. Oxford. United Kingdom: Blackwell Publishers

Gordon, Mathew. 2002. Weight-by-position adjunction and syllable structure [Nov]. *Lingua* 112:901-931.

Gordon, Mathew. 2004. Positional weight constraints in optimality theory - Introduction [Fal]. *Linguistic Inquiry* 35:692-703.

Gouskova, Maria. 2001. Falling Sonority onsets, loanwords, and Syllable Contact. In *The Main Session. Papers from the 37th Meeting of the Chicago Linguistic Society*, eds. Mary Andronis, Christopher Ball, Heidi Elston and Sylvain Neuvel, 201-250. Chicago Linguistic Society.

Gouskova, Maria. 2004. Relational hierarchies in Optimality Theory: the case of syllable contact. *Phonology* 21:201-250.

Greenberg, Joseph H. 1978. Some Generalisations concerning initial and final consonant clusters'. In *Universals of Human Languages, Vol 2 : Phonology*, ed.

Journal of the Acoustical Society of America 101:3728-3740.

Joseph H Greenberg. Stanford: Stanford University Press.

Halle, Morris. 2000. Marshallese phonology, the phonetics-phonology interface and historical linguistics. *Linguistic Review* 17:241-257.

Halle, Morris, Ora Matushansky. Summer 2006. The Morphophonology of Russian Adjectival Inflection [6.12.2006]. *MIT Press Journal, Linguistics Inquiry* Volume 37:351-404.

Hannahs, Stephen J. 1995. *Prosodic Structure and French Morphophonology*: Linguistische Arbeiten. Tubingen: Max Niemeyer Verlag.

Hassan, Abdullah. 2005. *Linguistik Am Bahasa Melayu (General Linguistics of Bahasa Melayu)* Pahang: PST Professional.

Hayes, Bruce. 1995. *Metrical stress theory: principles and case studies*.vol. 20. Chicago: University of Chicago Press.

Hockett, C F. 1976a. A System of Descriptive Phonology. *Language* 18:20.

Hockett, CF. 1976b. Comments on D.M.Foshi's Morphophonemic Alternations. *IJDL* 5:pp144-153.

Hooper. 1976. *An Introduction to Natural Generative Phonology*. New York: Academic Press.

http://dsal.uchicago.edu/cgi-bin/philologic/. Accessed on 10 June 2010.

Ilakkuvanar, S. 1994. *Tolka:ppiyam in English with critical studies*. Madras: Educational Publishers. [Reprinted in 1994].

Ito, Junko. 1986. Syllable Theory in Prosodic Phonology, Graduate School of the University of Massachuatts University of Massachuatts.

Ito, Junko. 1989a. A Prosodic Theory of Epenthesis [May]. *Natural Language & Linguistic Theory* 7:217-259.

Ito, Junko. 1994. Japanese Phonology. In *Handbook of Phonological Theory*, ed. John Goldsmith, 817-838. Cambridge: Blackwell.

Ito, Junko, and Mester, Armin. 1994. Reflections on Coda-Condition and alignment In *Phonology at Santa Cruz* eds. Jason Merchant, Jaye Padgett and Rachel Walker. Santa Cruz: University of California.

Itô, Junko, and Mester, Armin. 2004. Japanese morphophonemics: markedness and word structure. In *Linguistic Inquiry Monograph* Cambridge: Mass.: MIT Press.

Itô, Junko. 1989. A prosodic theory of epenthesis. *Natural Language & Linguistic Theory* 7:217-259.

Itô, Junko & Mester, Armin 1993. Licensed segments and safe paths. *Canadian Journal of Linguistics* 38:197-213.

Janet, M, Smith, Tanya, L, Flores, Michael, S, and Gradoville. 2010. An Analysis of Vowels across Word Boundaries in Veracruz, Mexican Spanish: Indiana University Bloomington.

Jesperson, O. 1904. *Lehrbuch der Phonetik*: Leipzig and Berlin.

Kager, Ren. 1999. *Optimality theory*. Cambridge: Cambridge University Press.

Kager, Rene. 1997. Generalized alignment and morphological parsing. *Revista di Linguistica* 9:245-282.

Kaisse, Ellen. 1987. Towards a Typology of Post-Lexical Rules. The Phonology-Syntax Connection, ed. by D.Z. Sharon Inkelas, Center for the Study of Language and Information (U.S.), 127-44. Chigago: University of Chicago Press.

Kameswari, T M. 1978. Phonology and Syntax (with special reference to Tolka:ppiyam). In *Seminar on Dravidian Syntax*, pp.321-337. University of Annamalai Annamalainagar.

Kannappanar, T Muthu. 1999. *Tamil collum porulum*. Chennai: Kangai Book Store.

Karunakar, K. 1986. Syllabification Tamil: Spoken and Written. *Eighteenth Karuttarangku-Aayvukkoovai* 2:pp.51-56.

Keane, Elinor. 2004a. Illustration of the IPA. *Journal of the International Phonetic Association* 34:6.

Keane, Elinor. 2004b. Tamil. *Journal of the International Phonetic Association* 34:111-116.

Keane, Elinor. 2006. Prominence in Tamil. *Journal of the International Phonetic Association* 36:1-20.

Kenstowicz, Michael. 1994. Sonority-driven stress. Ms, MIT: Available as ROA-33 from the Rutgers Optimality Archive.

Kentowicz, Michael. 1996. Base-Identity and Uniform-Exponence: alternative to cyclicity. In *Current Trends in Phonology: Models and Methods*, ed. Jacques Durand and Bernard Laks, 363-393. Paris: CNRS.

Kentowicz, Michael. 1994. *Phonology in Generative Grammar*. Cambridge, MA: Blackwell.

Kiparsky, Paul. 1982: 131-176. From Cyclic Phonology to Lexical Phonology, ed. van der Hulst In, H. and Smith, N. (ed.) 1982. .

Kiparsky, Paul. 1985:85-138. Some Consequences of Lexical Phonology, ed. Ewen In, Anderson, J.

Kiparsky, Paul. 2000. Opacity and cyclicity (Phonology-morphology interactions, Optimality Theory). *Linguistic Review* 17:351-365.

Kiparsky, Paul. 1979. Metrical Structure Assignment Is Cyclic. *Linguistic Inquiry* 10:421-441.

Kothandaraman, Ponnusamy. 1977. *Verbs in Modern Tamil* Madras: Pulamai Publication.

Kothandaraman, Ponnusamy . 1980. The verbalizer-i *Linguistic Studies in Tamil*:pp60-63.

Kothandaraman, Ponnusamy. 1972a. Verb Conjugation in Tamil. *Studies in Tamil Linguistic*:pp45-55.

Kothandaraman, Ponnusamy. 1972b. On Sandhi. *Studies in Tamil Linguistic*:pp56-73.

Kothandaraman, Ponnusamy. 1982. *caariyaik koodpaadu* (Rules of empty morpheme application). *Fourteenth Karuttarangku-Aayvukkoovai* 2:pp.79-84.

Kothandaraman, Ponnusamy. 1997. *A grammar of contemporary literary Tamil*. Chennai: International Institute of Tamil Studies.

Kothari, Anubha. September 2009 (10 June 2009). *Hiatus Resolution in Bengali* - An Optimality Theoretic Account. Rutgers University.

Krishnamurti, Bhadriraju. 2003. *The Dravidian Languages (Cambridge Language Surveys)*. Cambridge: Cambridge University Press.

Kumaran, Subramaniam. 2003. Tamil Education in Malaysia: Challenges in the Globalisation Era. Paper presented at *Malaysia and Globalisation: Issues and Challengers in the 21st Century*, Faculty of Arts and Social Sciences. Kuala Lumpur: Universiti Malaya

Kumaraswami, N. Raja. 1966. Tolkaappiyar's Conception of Morphophonemics In *Seminar on Grammatical Theories in Tamil*, pp.59-68. University of Annamalai Annamalainagar.

Lacy, Paul de. 2004. Markedness conflation in Optimality Theory. *Phonology* 21:145-199.

Lehman, Thomas. 1994. *Grammar of Literary Tamil*. Pondicherry: Pondicherry Institute of Language and Linguistics.

Liberman, Mark. and Prince, Alan. 1977. On Stress and Linguistic Rhythm. *Linguistic Inquiry* 8:249-336.

Lombardi, Linda. 1999. Positional Faithfulness and Voicing Assimilation in Optimality Theory [10 June 2009]. *Natural Language and Linguistic Theory* 17:267-302.

Lombardi, Linda. 2001. *Segmental phonology in Optimality Theory: constraints and representations*. New York: Cambridge University Press.

Lubowicz, Anna. 2002a. Derived environment effects in Optimality Theory. *Lingua* 112:243-280.

Lubowicz, Anna. 2004. Derived Environment Effects in Optimality Theory In *Optimality Theory in Phonology A Reader*, ed. John J. McCarthy, 523-532. Oxford: Blackwell Publishing.

Maiden, Martin. 1991. *Interactive Morphonology (Metaphony in Italy)*. London and New York: Routledge.

McCarthy, John, and Prince, Alan. 1993a. Generalised Alignment. In *Year Book of Morphology 1993*. 79-153.

McCarthy, John, and Princes, Alan. 1986. Prosodic morphology. Ms, University of Massachusetts, Amherst & Brandeis University.

McCarthy, John, and Prince, Alan. 1994. The emergence of the unmarked: Optimality in Prosodic Morphology. *NELS 24* 24:333–379.

McCarthy, John. 2002a. *A Thematic Guide to Optimality Theory*: Research Surveys in Linguistics. Cambridge: Cambridge University Press.

McCarthy, John. 2005. Optimal Paradigms.

McCarthy, John. 2008. *Doing Optimality Theory Applying Theory to Data*. Oxford: Blackwell Publishing.

McCarthy, John. 2009. Harmony in Harmonic Serialism. Amherst: University of Massachusetts

McCarthy, John. and Prince, Alan S. 1993b. Generalised Alignment In *Optimality Theory in Phonology*, ed. John Goldsmith, 102-136. Oxford: Blackwell.

McCarthy, John. and Prince, Alan. 1995a. Faithfulness and reduplicative identity. In *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*, eds. Ed. Jill Beckman, Suzanne Urbanczyk and Laura Walsh Dickey, 249-384.

McCarthy, John. and Prince, Alan. 1995b. Faithfulness and Identity in Prosodic Morphology, 66: Rutgers Optimality Archive.

McCarthy, John J. 2002b. On targeted constraints and cluster simplification. *Phonology* 19:273-292.

McCarthy, John. and Prince, Alan. 2004. Generalized Alignment: Introduction and Theory. In *Optimality Theory in Phonology A Reader*, ed. John J. McCarthy. Oxford: Blackwell Publishing.

Meenakshi, K. 1997. *Tolkappiyam and Astadhyayi*. Chennai: International Institute of Tamil Studies.

Meenakshisundaram, T P. 1959. The so-called Inflexional increment in Tamil. *Indian Linguistics* Turner Jubilee II:125-130.

Mitsuhiko, Ota. 2004. The learnability of the stratified phonological lexicon. *Journal of Japanese Linguistics* 20:1-23.

Mohanan, K Putenveettil. 1986. *The Theory of Lexical Phonology*. Dordrecht, Holland: Reidel.

Mohanan, K Putenveettil. 1993. Fields of Attraction in Phonology. In *The Last Phonological Rule Reflections on Constraints and Derivations*, ed. John Goldsmith. Chicago and London: SCL.

Mohanan, Tara. 1989. Syllable structure in Malayalam. *Linguistics Inquiry* 20:589-625.

Murray, R W, and Venneman, T. 1983. Sound change and syllable structure in Germanic phonology. *Language* 59:514-528.

Nespor, Marina. & Vogel, Irene. 1986. *Prosodic phonology* (Studies in Generative Grammar 28). Dordrecht: Foris.

Noormaan, M.A. 2000. *adippadai tamil ilakkanam*. Colombo: Puubaalasingam Bookstore.

Ohala, Jamal. 1993. Coarticulation and Phonology [Apr-Sep]. *Language and Speech* 36:155-170.

Padgett, Jaye. 1994. Stricture and nasal place assimilation [Aug]. *Natural Language & Linguistic Theory* 12:465-513.

Padgett, Jaye. 1995. Partial class behaviour and nasal place assimilation. Paper presented at *The University of Arizona Coyote Papers*, Tucson.

Pandurangan, A. 2004. udampadumey - putiya parvai. *Journal of Tamil Studies* 65:pp.35-48.

Paramasivam, Muthusamy. 2006. Code-switching Among UPM Tamil Students: A Sociolinguistic Perspective, Department of Indian Studies, University of Malaya: PhD.

Parker, Steve. 2001. Non-optimal onsets in Chamicuro: an inventory maximised in coda position. *Phonology* 18:361-386.

Payne, David. 1981. *The phonology and morphology of Axininca Campa*. Arlington: Summer Institute of Linguistics Publications in Linguistics

Pierrehumbert, Janet, and Nair, R. 1995. Word games and syllable structure. *Language and Speech* 38:77-114.

Pike, Kenneth. 1943. Taxemes and immediate constituents. *Language* 19:65-82.

Polgardi, K. 1999. Vowel harmony and disharmony in Turkish (Optimality theory, government phonology, strict cycle condition). *Linguistic Review* 16:187-204.

Prince, Alan, and Smolensky, Paul. 2004. Optimality Theory: Constraint Interaction in Generative Grammar. In *Optimality Theory in Phonology*, ed. John J McCarthy. Malden: Blackwell Publishing.

Prince, Alan, and Smolensky, Paul. 1993a. *Optimality Theory: constraint interaction in generative grammar*. Ms, Rutgers University & University of Colorado, Boulder. Published 2004, Malden, Mass. & Oxford Blackwell

Rajaram, S. 1980. *Tamil Phonetic Reader*: Phonetic Reader Series 3. Mysore: Central Institute of Indian Languages.

Ramaswami, Iyar. 1992. Nasal and Nasal Articulation in Dravidian. Ms. *Collected Papers Vol. I*. Annamalainagar.

Ramaswami, N. 1999. *Diglossia : formal and informal Tamil*.vol. ORW.a.2547. Mysore: Central Institute of Indian Languages.

Ravisankar, G. 1994. *Intonation Patterns in Tamil*. Pondicherry: Pondicherry Institute of Linguistics and Culture.

Renganathan, D. 1983. Sandhi in Modern Tamil, Centre of Advances Study in Linguistics, University of Annamalai.

Rice, Curt. 2007. Gaps and repairs at the phonology-morphology interface. *Journal of Linguistics* 43:197-221.

Rice, Curt. 2002. On Deriving Sonority: a structural account of sonority relationships. *Phonology* 9:61-99.

Romani, Cristina, and Calabrese, Andrea. 1998. Syllabic Constraints in the Phonological Errors of an Aphasic Patient. *Brain and Language* 64:83-121.

Samuel, John. 1996. *Dravida Molikalin Oppaayvu*. Chennai: Institute of Asian Studies.

Sapir, Edward. 1965. *A grammar of Diola-Fogny*. Cambridge: Cambridge University Press.

Schechter, Paul, and Fromkin, Victoria. 1986. A Phonology of Akan: Akuapem, Asante, Fante. *UCLA Working papers in Phonetics* 9.

Schiffman, Harold. 1971a. *A Reader for Advanced Spoken Tamil, Volume 1*. Washington: Department of Asian languages and Literature, University of Washington.

Schiffman, Harold. 1971b. *A Reader for Advanced Spoken Tamil, Volume 2*. Washington: Department of Asian languages and Literature, University of Washington.

Schiffman, Harold. 1979. *A Grammar of Spoken Tamil*. Madras: The Christian Literature Society.

Schiffman, Harold. 1999b. *A Reference Grammar of Spoken Tamil*. Cambridge: Cambridge University Press.

Schiffman, Harold. 2000. Standardization or restandardization: The case for Spoken Tamil. *Language in Society* 27:359-385.

Selkirk, Elisabeth O. 1980. Prosodic domain in phonology: Sanskrit revisited. In *Juncture*, ed. M. Aronoff and M.L.Kean, 107-129. Saratoga, CA: Anma Libri [In Hannahs, 1995].

Selkirk, Elisabeth. 1984. On the major class features and syllable theory. In *Language Sound Structure: Studies in phonology dedicated to Morris Halle by his teacher and students*, eds. Aronoff M and Oehrle R T. Cambridge, Mass: MIT Press.

Sethi, Anjanee. 1997. *Prosodic Phonomorphology Issues at the Interface*. Delhi:

Kalinga Publications.

Shannon, Thoman. 1991. On the relation between morphology and syllable structure: Universal preference laws in Dutch. In *The Berkeley Conference on Dutch Linguistics 1981*, eds. Thoman F Shannon and Johan P Snapper. Lanham, MD: University Press of America (In Fehringer).

Siegel, Dorothy. 1974. Topics in English Morphology. Cambridge: MA: MIT dissertation.

Sievers, Robert. 1881. *Grundzuge der Phonetik*. Leipzig: Breitkopf and Hartel.

Sivalingam. 2000. *Vinaiyiyal*. Chennai: IATS.

Spencer, Andrew. 1991. *Morphological Theory An Introduction to word structure in Generative Grammar*. Oxford: Blackwell.

Spencer, Andrew, and Zwicky, Arnold M. eds. 1998. *The Handbook of Morphology*. Oxford: Blackwell Publishers.

Spencer, Andrew. 2000. *Morphological Theory*. Oxford: Blackwell.

Spencer, Andrew. 2002. *Phonology*. Oxford: Blackwell.

Srinivasa Varma, G. 1980. Different Dialects of Tamil. In *Heritage of the Tamils, Language and Grammar*, ed. K.M.Irulappan & S.V.Subramaniam, 273-281. Madras: International Institute for Tamil Studies.

Statistics. 2006. Department of Census and Statistics (accessed on 10 July 2009) (www.departmentofcensusandstatistics.gov.my)

Steriade, Donca. 1982. Greek Prosodies and the nature of syllabification, PhD Dissertation, MIT.

Steriade, Donca. 1995. Underspecification and markedness. In *The Handbook of Phonological Theory*, ed. John A Goldsmith. Cambridge, MA: Blackwell.

Subrahmanyan, P.S. ed. 1980. *Case relation Sandhi in Old Tamil in The Heritage of the Tamils*. *Language and Grammar*. Madras: IITS.

Subramoniam, V.I. 2003. *A Descriptive analysis of a Dialect of Tamil.* Tirivananthapuram: ISDL.p23-24.

Thilagawathi, K. 1995. *eluttiyalum colliyalum (ma:rivarum ilakkanam)*. Kuala Lumpur: Uma Publication.

Tolka:ppiyam. 1996. *Collatikaaram*. Chennai: South Indian Saiva Sidhantha Cooperation.

Tolkappiyar. 2003. *Tolkaapiyam, Naccinaarkkiniyam*. Madras: Tamilman Publication.

Topintzi, Nina. 2008. On the existence of moraic onset geminates. *Natural Language* *and Linguistic Theory* 26:147-184.

Treiman, R, and Kessler, B. 1995. In defence of an onset-rime syllable structure for English. *Language and Speech* 38:127–142.

Vasanthakumari, T. 1989. *Generative phonology of Tamil*. Delhi: India: Mittal Publications.

Vasanthakumari, T. 2000. *Progress of Phonology*. Thiruvananthapuram: Dravidian Linguistics Associations St. Xavier College P.O.

Vengadesan, P. S. 1995. Tamil pallikalin nilai anru, inru, naalai (The status of Tamil school: yesterday, today and tomorrow). Paper presented at *8th International Conference-Seminar of Tamil Studies*, Thanjavur, Tamil Nadu.

Vennemann, Theo. 1988. *Preference laws for syllable structure*. Berlin: Mouton de Gruyter.

Walker, Rachel. 1998. Nasalization, Neutral Segments, and Opacity Effects. Santa Cruz.: University of California (In Beckman, 2004).

Walker, Rachel. 2001. Positional Markedness in Vowel Harmony, 1-10. California: University of Southern California.

Wallace, R. 2007. Using morphophonology in elementary ancient Greek [Win]. *Classical World* 100:133-141.

Yeo, S. 2008. Morphosyntax of predicates and syntactic categories in Korean [Mar]. *Lingua* 118:332-369.

Young-Scholten, Martha. 1994. *Acquisition at the Interfaces.* Unpublished PhD thesis, University of Washington, Seattle.

Zaharani, Ahmad. 1991. *The Phonology and Morphology of the Perak Dialect*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Zaharani, Ahmad. 1998. *Phonology and Morphology Interface in Malay: An Optimality Theoretic Account*, University of Essex.

Zvelebil, Kamil. 1964. Spoken Language of Tamil Nadu. *Archive Orientalni* 32/2.

Zvelebil, Kamil. 1970. *Comparative Dravidian Phonology*. Paris: The Hague.