Phonological Analysis of English Phonotactics of Syllable Initial and Final Consonant Clusters by Yemeni Speakers of English

M.A. Dissertation

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PHONOLOGICAL ANALYSIS OF ENGLISH PHONOTACTICS OF SYLLABLE INITIAL AND FINAL CONSONANT CLUSTERS BY YEMENI SPEAKERS OF ENGLISH

by

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Thesis submitted in partial fulfillment of the
requirements for the degree of
Masters of Arts

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Under the Supervision of
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LIST OF ABBREVIATIONS

C	Consonant
CA	Contrastive Analysis
CAL	Classical Arabic Language
EA	Error Analysis
EFL	English as a Foreign Language
ESL	English as a Second Language
FL	Foreign Language
IL	Interlanguage
IPA	International Phonetic Alphabet
L1	First Language
L2	Second Language/Foreign Language
MSA	Modern Standard Arabic
N	Nucleus
NL	Native Language
O	Onset
R	Rhyme
SL	Source Language
SLA	Second Language Acquisition
TL	Target Language
USM	University Science Malaysia
V	Vowel

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ANALISIS FONOLOGI FONOTAKTIK GUGUSAN KONSONAN PADA AWAL DAN AKHIR SUKUKATA BAHASA INGGERIS OLEH PENUTUR BAHASA INGGERIS DARI YEMEN

ABSTRAK

Fenomena sebutan fonotaktik merupakan halagan yang biasa dialami oleh penutur Bahasa Inggeris sebagai bahasa asing di Yemen. Kajian ini telah dijalankan bagi menyiasat tentang fonologi bagi fonotaktik pada awal dan akhir sukukata Bahasa Inggeris yang dihasilkan oleh penutur Bahasa Inggeris dari Yemen. Kajian ini telah dijalankan di beberapa Pusat Pengajian di Universiti Sains Malaysia (USM) ke atas 30 orang pelajar dari Yemen yang sedang melanjutkan pengajian mereka di peringkat sarjana dan Ph. D.

Kajian ini menggunapakal teori 'Antarabahasa' yang disarankan oleh Selinker (1972) sebagai kerangka teori memandangkan ia 'memberi satu gambaran umum tentang bagaimana proses pemerolehan bahasa kedua (Eliss, 1997: 34). Hasil kajian menunjukkan penutur Bahasa Inggeris dari Yemen mengalami kesukaran untuk menyebut gugusan konsonan pada awal dan akhir suku kata Bahasa Inggeris terutamanya yang melibatkan tiga dan empat gugusan konsonan pada akhir suku kata Bahasa Inggeris.

Di samping itu, hasil kajian juga menunjukkan bahawa penutur Bahasa Inggeris dari Yemen lebih cenderung untuk menyisipkan bunyi vokal di antara gugusan konsonan pada awal dan akhir suku kata. Hasil kajian juga mendedahkan satu fenomena yang menarik dalam penghasilan sebutan gugusan konsonan pada awal dan akhir sukukata oleh penutur Bahasa Inggeris dari Yemen, seperti proses pengurangan, penggantian dan pelenyapan. Akhir sekali, implikasi pedagogi serta saranan telah dibuat bagi membantu penutur Bahasa Inggeris, tenaga

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pengajar Bahasa Inggeris dan pereka bentuk kurikulum dari Yemen di dalam pembelajaran

dan pengajaran sebutan gugusan konsonan pada awal dan akhir suku kata Bahasa Inggeris.

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ABSTRACT

The phenomenon of phonotactics pronunciation is a common hurdle amongst Yemeni speakers of English while learning English language as a foreign language. Therefore, the present study was conducted to investigate the phonological phonotactics in English syllable-initial and syllable-final consonant clusters by Yemeni speakers of English. The study was conducted in Universiti Science Malaysia (USM) on 30 Yemeni students who study their Masters and doctoral programmes in different schools.

The present study adopts Selinker's (1972) IL "interlanguage" theory as a framework for the study since it "offers a general account of how L2 acquisition takes place" (Ellis, 1997: 34). Two tasks of the Labovian model, viz, passage reading task and word list reading task were utilized for eliciting data collection for the study. The former task proved to be much more effective than the latter in compiling good data.

The results show that the subjects of the study seem to have difficulties in pronouncing English syllable-initial consonant clusters and syllable-final consonant clusters, particularly the three consonant clusters in the syllable-initial (in the passage reading task only) and the target three consonant clusters and four consonant clusters in the syllable-final. Besides, the results show that Yemeni speakers of English have tendency to insert vowel sounds in the English syllable-initial and syllable-final consonant clusters. The results further reveal interesting phenomena in the production of pronunciation in syllable-initial and

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syllable-final consonant clusters produced by Yemeni speakers of English, such as reduction, substitution and deletion. Last but not least, pedagogical implications and recommendations for further studies were yielded as to assist Yemeni speakers of English, teachers of English and curriculum designers with regard to their production and teaching of English pronunciation particularly the English syllable-initial consonant clusters and syllable-final consonant clusters.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

The purpose of this study is to investigate the phonological phonotactics in English syllable initial and final consonant clusters by Yemeni speakers of English. This introductory chapter presents the background of the study. It introduces the statement of the problem of the study, the objectives of the study and the research questions. Then it progresses to present the significance of the study, the scope and limitations of the study, and the rationale of the study. It also explains the terms involved in the study and eventually gives chapter outlines followed by the conclusion of the present chapter.

1.10   Background of the Study

Arabic language phonology system plays an important role in the production of second language phonology of EFL Arab learners, particularly with regard to language transfer. This phenomenon was assumed by Ellis (1994: 316) who suggests that 'there is a widespread recognition that transfer is more pronounced at the level of the sound system than at the level of syntax'. Yet, Nemser (1960) cited in Selinker (1992: 177), on the other hand, concludes in his study that 'in terms of the learning of phonological unites, classical CA (contrastive analysis) predictions can sometimes lead to correct results and sometimes to incorrect results'. However, the present study adopts Selinker's IL 'interlanguage' theory as a framework for the study since it 'offers a general account of how L2 acquisition takes place' (Ellis, 1997: 34). This is based on the five cognitive processes as postulated by Selinker in his argument in 1972 (see chapter 2 & 3) and elaborated in 1994.

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The pronunciation of English phonotactics is a common hurdle amongst Yemeni learners whilst learning English as a foreign language. This phenomenon of phonotactics is usually experienced in second/foreign language learning as Altenberg (2005: 53) points out in his study that 'phonotactics constraints have been shown to play a role in first and second language acquisition as well as in adult language processing'. To put it simply, phonotactics is 'the set of constraints on how sequences of segments pattern, forms part of a speaker's knowledge of the phonology of his or her language' (Dobrovolsky and Katamba, 1996: 84). Thus, this study aims at investigating the phonological phonotactics in English and in turn provides insights into the pronunciation of English phonotactics particularly syllable-initial and syllable-final consonant clusters produced by Yemeni speakers of English.

In fact, the present study is an exploratory one (Neuman, 2003 & Babbie, 2005) since the researcher uses snowball sampling. The study is conducted on Yemeni speakers of English who have come to Malaysia to pursue their higher studies in Universiti Sains Malaysia (USM). They are thirty in number; all are males, from different schools in USM, namely, the School of Housing and Building Planning, the School of Mathematical Sciences, the School of Biological Sciences, the School of PTPM, the Center for International Technology and Multimedia, the School of Management, the School of Pharmacy, the School of Computer Science, the School of Civil Engineering and the Mechanical School. The study was conducted on males only, for their availability in USM, the place where the study was carried out. However, females of the specific subjects are not available in USM.

1.10.1 Education in Yemen

In Yemen, the medium of teaching is Arabic language (Naif, 2003) in all Yemeni institutions. Al-Sohbani (1997: 29) states that 'Arabic is the official language of the country and it is spoken by all Yemenis'. English language is considered as a foreign language

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utilized in many aspects in Yemeni society. Below is an overview of the two languages, Arabic and English, in Yemeni society and education.

1.10.2 Arabic Language

Arabic language belongs to the Semitic language family spoken by more than 200 million people around the world (Huthaily, 2003; De Young, 1999). It is the official language in all Arab countries as it is the language of the sacred book, the Holy Qur'an; and the official language for all Muslims to practice their religion. Chejne (1969:9) described Arabic language as a language given by God. He said 'Muslims in general and Arabs in particular have long regarded Arabic as a God-given language, unique in beauty and majesty, and the most eloquent of all languages for expressing thought and emotions'. In addition, Awde & Samano (1986:13) added the following:

> its unbroken literary tradition goes back about thirteen centuries, it is the language of one of the world's major religious – Islam – and it is the written and spoken means of communication in a region of steadily rising importance in international affairs: the Middle East. The numerical, geographical, political, and cultural status of the language was formally recognized by the United Nations in 1973, when Arabic was made the sixth official language of that body (the others are English, French, Spanish, Russian, and Chinese).

Modern Standard Arabic (MSA) is an adaptation form from the Classical Arabic Language (CAL). According to Khoja (2002), Arab people adapted MSA as it is an easy form. There are several dialects of MSA to be spoken by Arab people. These dialects are not only spoken from one country to another, but from area to another in the same country. They are used in mass media and official communications daily life such as in schools, academic institutions, trade, etc.

Furthermore, MSA is also deemed as an official language in the United Nations (Huthaily, 2003) and the medium of instruction in most, if not all, Arab countries (Waston, 2004). In short, Arabic language can be defined as the substantial and static language of 21 countries. That is to say, changes, in the passage of time, might take place in the adopted MSA but not in the CAL; since the latter is the language of the Sacred Book and the purest form amongst all the other adapted forms. Arabic language provides a prime instance of the linguistic phenomenon of diglossia – the normal use of two separate varieties of the same language, usually in different social situations. In the case of Arabic, educated Arabs of any nationality can be assumed to speak both their local dialect and their school-taught literary Arabic.

More importantly, Arabic language, like any other Semitic languages, is based on the concept of 'consonantal root system' (Awde & Samano, 1986:15). In other words, Arabic words are derived from a 'root' (usually a verb) comprising of three letters usually. By adding prefixes or suffixes to the root, the root gets alternation to create other new words (ibid). Its vowels are indicated by diacritic marks to show whether the vowel sound is long or short one (Rogers, 2005). As far as the writing system is concerned, Arabic script is cursive; which means, the letters (i.e. initial, medial, and final) are connected to each other; to preceding and following letters. Yet, there are still six in numbers which are deemed as isolated letters – (و ، ز ، ر ، ذ ، د ، ا)that equivalent to ʔ, d, ð, r, z and w respectively. These letters cannot be connected with other letters if they occurred initially (ibid). Unlike English, it is written from right to left having no capital and small letters. Awde & Samano (1986:19) state that this concept of capital and small letter is 'foreign to Arabic' per se.

1.10.3 English Language in Yemen

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In Yemen, English language is taught as a foreign language (Al-Wasy, 2002; Al-Tamimi, 2006) in all institutions (Al-Ghrafy, 1999). It is a compulsory subject in schools as well as universities. English language is introduced to Yemeni learners quite late. That is, students exposed to the language from grade 7; usually at the age of 12-13 year-old. In this respect, Shaker (2004) reports that he interviewed some of Arab learners of English with regard to the starting point and status of the English curricula in their respective countries. He found that the starting point of learning English in Yemen is in level 7. As a result, students have been labeled as weak and unsuccessful learners. They have no ability to communicate properly and successfully with speakers of English or native speakers. Yet, English is deemed a language of 'great respect in Yemen; especially as it is the language of the educated people' (Naif, 2003:7).

Besides, Al-Quyadi (2000) considers English language in Yemen as a second language in the sense that it is dominantly used in official communications and daily life such as in schools, academic institutions, trade, etc. He further adds that English is getting high position in Yemeni education especially at tertiary levels, which makes one step ahead for the country to promote cultural relations and friendships with other nations. In fact, knowledge and mastering English language enables Arab learners in general and their Yemeni peers in particular to have great opportunities in getting better jobs especially in the private sectors. It also becomes a prerequisite of entrance to the university particularly scientific sections i.e. medicine, engineering, dentistry, etc.

English language has been rendered to the students as one of the essential subjects. Teaching English underwent several changes. For instance, the English syllabus was first designed and introduced to the students by Egyptian and Yemeni chancellors. It is called *The Nile Course of English*, which is considered the first syllabus used in Yemen. Then, the

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Gulfian course which is called *The Progress Living English for the Arab World* came to replace the Egyptian one (Al-Wasy, 2002). Consequently, a series of syllabi, called *English for Yemen*, came out to replace the Gulfian syllabus. In 1996, a new design appeared as a developed textbook, designed by a group of British and Yemeni experts. It is called *Crescent English Course for Yemen* (Al-Raymi, 1999).

1.11   Statement of the Problem

A vowel insertion in English consonant clusters by EFL Arab learners is a very common phenomenon. Kharma and Hajjaj (1989: 17) argue that 'consonant sequences in Arabic and English differ greatly' since Arabic consonant clusters sequence cannot be more than two consonant sounds while that of English can have up to four consonant sounds. Dobrovolsky and Katamba (1996: 84) state that 'Native speakers of any language intuitively know that certain words that come from other languages sound unusual and they often adjust the segment sequences of these words to conform to the pronunciation requirements of their own language'. In the same vein, Salim Abu-Rabia and Simona Kehat (2004: 77) state more recently that 'Although some adult learners of a second language may attain a relatively high or even a complete mastery of the language, they do not seem to be able to get rid of their native accent'.

Al-Hattaami (2000: 84) in his phonetic and phonological study of the consonants of English and Arabic stated that phonological differences are 'likely to create problems of pronunciation to native speakers of Arabic learning English as a foreign language'. He went on to add that Yemeni speakers of English 'break the cluster by inserting a vowel between the consonants' (ibid).

Thus, in the view of this, many Yemeni speakers of English while speaking English have the tendency to insert vowel sounds in the syllable-initial consonant clusters and/or the syllable-final consonant clusters in order to harmonize with the pronunciation requirements of their own source language, Arabic, which results in unacceptable consonant sequences in English syllables. Yemeni speakers of English, therefore, who learn English as an EFL, have difficulty to pronounce English syllable-initial and/or syllable-final consonant clusters correctly.

Sahu (1999) argues that Yemeni speakers of English have cracks in their pronunciation. He remarks the following:

> … my impressions of the level of Yemen FL learner competence in English, resulting from my interactions with a cross-section of students at Mahweet and Sanaa, has been particularly disconcerting. A vast majority of learners across grade levels have demonstrated, during in-class and out-of-class interactions, a shaky and perfunctory command of English and those, who seem to possess some competence in the language, make frequent violations of the acceptable grammatical norms, rendering most of their utterances minimally acceptable. In so far as most of their utterances are phonologically flawed, they are, to a considerable extent, unintelligible as well.

Rababah (2003) asserts that many Arab learners have certain difficulties in speaking especially in pronunciation and phonological errors. He cited different learners from different Arab countries such as Yemen, Saudi Arabia, Egypt, Sudan and Jordan. He attributes these difficulties to several reasons, i.e. students start learning English language at level 7; language teachers are native speakers of Arabic; Arabic is used everywhere and English is not used in daily situations and so on and so forth.

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Through the researcher's experience as an instructor in the field of teaching English as a foreign language to Yemeni learners in Yemen, he found that there are several factors affecting students' pronunciation particularly the syllable-initial and final-consonant clusters. Al-Fadly (2004:21) points out that the curriculum is deemed to be among the factors that affect EFL Yemeni learners. He adds, basing his argument on Hutchinson & Waters (1987) and Martin (1992), 'the clear relevance of the English courses to learners' needs would improve the learner's motivations and thereby make learning better and faster'.

Similarly, Sahu (1999) argues that 'curriculum plays a crucial and decisive role to usher in the desired changes in the academic scenario of any country'. He adds that the curricula have many deficiencies. The researcher believes that another factor is potential in not providing specialists in the area of phonology. Such belief is inspired from that of Widdowson and Allen (1979). This belief supported by Al-Haddad (2006: 14) in his recent study on EFL Yemeni learners by saying 'there was an apparent lack of qualified teachers' in Yemeni institutions. He indicates at the lack of non experts teachers of English, as the salient objective of his study, which was an attempt to yield 'the country (Yemen) with qualified teachers in different fields of specialization' (Al-Haddad, 2006:10). This belief is also similar to that of Sahu (1999) as he puts it 'most of their (Yemeni students) utterances are phonologically flawed, they are, to a considerable extent, unintelligible as well'.

1.12 Objectives of the Study

The salient objectives of the study are summarized as follows:

1. To investigate the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters while speaking English.

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2. To identify the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters while speaking English.

3. To identify if there exists the phenomenon of language transfer, i.e. vowel insertion within the pronunciation of English syllable-initial and final-consonant clusters by Yemeni speakers of English.

1.13   Research Questions

To achieve the objectives, the present study therefore attempts to address the following research questions:

1. What are the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters while speaking English?

2. What are the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters while speaking English?

3. To what extent does language transfer exist i.e. the phenomenon of vowel insertion in the pronunciation of English syllable-initial and syllable-final consonant clusters by Yemeni speakers of English?

1.14   Significance of the Study

The first and foremost significance of the study is to identify the phonological errors that Yemeni speakers of English likely commit in the pronunciation of English words, particularly the syllable-initial consonant clusters and/or the syllable-final consonant clusters.

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The study assists these Yemeni speakers of English in producing fluent and accurate pronunciation of English syllables while speaking English. Feedback gathered from the study would pave the way for Yemeni speakers of English to know how to correct their phonological mispronunciation of English syllables while speaking English. In turn, they would be able to improve their performance in English pronunciation.

In fact this study is considered significant since there have been no attempts made to investigate the nature of phonotactics in English syllables produced by Yemeni speakers of English, and there have been no sufficient research regarding Arabic phonology (El-Imam, 2004). In this regard, El-Imam (2004: 341) argues that 'research on Arabic speech is relatively new'. Hence, this study must be exploratory one. Consequently, the researcher attempts to provide some initial investigation in this field. As it is exploratory study, the researcher could 'find at least approximate answers to some' of the phonological phonotactics of the syllable-initial and syllable-final (Babbie, 2005: 89). According to Babbie (ibid) an exploratory study has the following features:

1. to satisfy the researcher's curiosity and desire for better understanding,
2. to test feasibility of undertaking a more extensive study, and
3. to develop the methods to be employed in any subsequent study.

From the findings, suggestions could be made to help Yemeni speakers of English to rectify and better their pronunciation of the English syllable-initial and/or the syllable-final consonant clusters. Moreover, the results of the study would provide pedagogical recommendations for them to be aware of the English phonotactics occurring in English words while speaking English. In other words, Yemeni speakers of English would be

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conscious and vigilant of such phonotactics in the target language especially in their spontaneous speech.

1.15   Scope and Limitations of the Study

This study will be conducted on the phonological phonotactics of syllable-initial consonant clusters and syllable-final consonant clusters by Yemeni speakers of English.

There are different nationalities of Arab speakers of English in Universiti Sains Malaysia (USM) from different schools. Although the problem of the present study is applicable to all these Arab speakers of English (Kharma & Hajjaj, 1989), the study will be carried out only on Yemeni speakers of English since the contribution of this study is related to the Yemeni context; thus, this will narrow down the focus of this investigation.

The subjects of this study are all males only, since there is unavailability of females of the target subjects in the settings of the study. The study limits its scope by focusing on the evaluation of oral communication. That is, no attempts will be made to examine written errors. In addition, only segmental features in the speech of Yemeni speakers of English will be investigated and analyzed. Hence, only the consonant clusters and vowel insertion and errors that occur that will be examined.

1.16   Rationale of the Study

The study attempts to quest for the potentialities that may show how to strengthen the level of Yemeni speakers of English, particularly in pronunciation. Consequently, these speakers could triumph over the phonological phonotactics in English pronunciation that stand in front of them while learning English as a foreign language. A number of Yemeni schoolteachers and lecturers in universities and higher institutions possibly may need to

review their pronunciation as they are deemed to be the essential source for teaching English language to their learners. Hence, this study will feedback the schoolteachers and lecturers in the Yemeni universities. The study attempts to identify the needs and principles for substantiating Yemeni speakers' level in English pronunciation on one hand, and to build up substantial background in them on the other hand. As a result, they would have attained a fluent and accurate pronunciation of English.

1.17 Definition of Terms

1.17.1 Coda

This word is defined by Richards et al (1992: 367) as 'the end' of the syllable. For instance, *texts*, *concept* and *term*; the coda is /ksts/, /pt/ and /m/ respectively. Crystal (1997:66), on the other hand, defines it as 'a term used in PHONETICS and PHONOLOGY to the ELEMENT of a SYLLABLE which may follow the syllabic NUCLEUS, e.g. /p/ of /kʌp/'. In short, coda can be either vowel or consonantal sounds. He adds 'restrictions on the segments or features which may occur in coda position are known as coda constraints'. (ibid)

1.17.2 Interlanguage

This term was coined by Selinker (1972) which refers to language learner's language. According to Richards et al (1992:186) interlanguage is

> the type of language produced by second- and foreign-language learners who are in the process of learning a language. In language learning, learners' errors are caused by several different processes. These include:
> a) Borrowing patterns from the mother tongue.
> b) Extending patterns from the target language, e.g. by analogy.

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c) Expressing meanings using the words and grammar which are already known. Since the language which the learner produces using these processes differs from both the mother tongue and the TARGET LANGUAGE, it is sometimes called an interlanguage, or said to result from the learner's interlanguage system or approximative system.

1.17.3 Language transfer

Language transfer is defined by Odlin (1989: 27) as 'the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired'. Richards et al (1992: 205), on the other hand, define it as 'the effect of one language on the learning of another'. Moreover, Selinker (1988: 39) defines it as 'the apparent application of NL rules to TL forms'. He goes on to say that it is 'the process by which the learner constructs a sentence (or part of a sentence) in the TL in the same way as he would if he were to express the same meaning in his NL' (Ibid).

1.17.4 Nucleus

Crystal (1997:264) defines it as 'a term used by some INTONATION analysts, particularly those working within the British tradition, to refer to the SYLLABLE in a TONE UNIT which carries maximal PROMINENCE, usually due to a major PITCH change'. This term is also called the 'peak' and its definition is given by Richards et al, (1992: 367) as 'the central part of the syllable'. It is 'mostly commonly a vowel' (ibid). For instance, *each*, *pen*, *no* and *oar*; the nucleus is /iː/, /e/, /əʊ/ and /ɔː/ respectively.

1.17.5 Onset

This word means, according to Richards, et al (1992: 367), 'the beginning' of the syllable. For instance, *spring*, *star* and *pen*; the onset is /spr/, /st/ and /p/ respectively.

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1.17.6 Phonotactics

This term, according to Dobrovolsky and Katamba (1996: 84), means 'the set of constraints on how sequences of segments pattern, forms part of a speaker's knowledge of the phonology of his or her language'. Richards, et al (1992: 275), on the other hand, define it as 'the arrangements of the distinctive sound units (PHONEMES) in a language'. For instance, the possible initial consonant clusters in Arabic is only one consonant while that of English can be three-consonant clusters as in /bɪnt/ which means girl and /sprɪŋ/ respectively.

1.18   Chapter Outlines

Chapter 2 reviews the literature of previous studies related to phonotactics and phonological errors particularly with regard to the syllable-initial and syllable-final consonant clusters. It starts with definitions and structures of English and Arabic syllables and presents a detailed description of English and Arabic consonants. The chapter reviews the past studies with discussion to the present study. It explains 'interlanguage' theory which is adopted and utilized for the present study as a framework giving its birth, definition and characteristics. Finally the chapter introduces a diagram of the conceptual framework as steps and procedures to be followed while the researcher conducts the study.

Chapter 3 discusses the objectives and research design of the study. It justifies the reasons for choosing 'interlanguage' theory which is utilized for the study as a framework and Labovian method which is employed for data collection. A full description of the subjects of the study and their background, instruments, procedures of data collection and data analysis are provided. Eventually, the chapter introduces details of the pilot study.

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Chapter 4 exposes the research results based on the analysis and discussion provided. Tables and graphs are presented in the chapter as to demonstrate the findings of accurate and inaccurate pronunciation produced by Yemeni speakers of English. The chapter also presents the transcription of inaccurate pronunciation produced by Yemeni speakers of English, using IPA (International Phonetic Alphabet) in order to find out whether there exists vowel insertion within the production of the syllable-initial and/or syllable-final consonant clusters and to illustrate the ways of the subjects' pronunciation.

Finally, **chapter 5** summarizes the research findings with reference to the three questions stated in Chapter 1, Section 1.6. Then, the objectives of the study are looked back to see whether they are achieved, and if so, to what extent. Eventually, the chapter gave a summary of the findings followed with pedagogical implications.

1.19   Conclusion

This introductory chapter describes the background of the study. It introduces the statement of the problem of the study, the significance of the study and the scope and limitation of the study. The terms involved in the study are explained and research questions and objectives are stated. In addition, the chapter includes a rationale of the present study. The next chapter will review the past studies that have to do with phonotactics and based on interlanguage theory, and the most important trends and concepts related to the scope of the study.

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CHAPTER 2

REVIEW OF LITERATURE

2.7   Introduction

This chapter reviews the previous studies that were carried out on the phonological phonotactics and the most important trends and concepts in this area. The chapter discusses the existing literature on what is meant by the phenomenon of vowel insertion and presents details of 'Interlanguage' theory which is adopted in this study. Hence, the chapter includes some relevant studies that adopted the same theory to justify the adoption of the theory in the present study. Eventually, the chapter provides the conceptual framework for the study as well as the conclusion of the chapter.

Some of the major phonological problems associated with the pronunciation of English language by Arab speakers of English can be attributed to the interfering effect of the mother tongue on the one hand (Abu-Rabia & Kehat, 2004; McLaughlin, 1991) and English phonological phonotactics on the other. Moreover, previous studies demonstrated that some factors in a syllable of a particular language stand as phonotactic constraints (see Fery & de Vijver, 2003). Fery and de Vijver's (2003: 18) analysis was based on Blevin (1995) to illustrate that it is due to 'consonant clusters'.

As mentioned earlier, Yemeni speakers of English intrude vowel sounds in the English syllable-initial and/or the syllable-final consonant clusters; it is due to the fact that they 'conform to the pronunciation requirements of their own language' (Dobrovolsky and Katamba, 1996: 84). Therefore, consonant sequences in English syllable are adjusted to meet consonant sequences in Arabic syllable by Yemeni speakers of English. So, the mispronunciation of English words experienced by Yemeni speakers of English may be of

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syllable-based, and due to the interference of L1. Since syllables play a significant role in one's pronunciation and in turn 'phonotactics are best stated as syllable-based' (Fery & de Vijver, 2003: 18), it is worth to demonstrate slightly deeper the structure of syllable of both languages – Arabic and English.

2.8 English and Arabic Syllable Structure

The structure of Arabic syllable is to a large extent different from that of English. The syllable onset in Arabic language cannot be more than one consonant sound whereas that of English has up to three consonant sounds. Therefore, Arab speakers of English tend to insert vowel sounds either after the first consonant sound as in 'spring' [sprɪŋ] becomes [sɪprɪŋ], or after the second consonant sound as in 'split' [splɪt] pronounced as [spɪlɪt] (Kharma and Hajjaj, 1989). Roach (2001) maintains that the English syllable coda can consist of four consonant sounds while that of Arabic has only two consonant sounds maximum to be found in paucity either such as, [bɪnt] which means a girl (Kharma and Hajjaj, 1989). Yet, the onset and coda of English syllables could meet together to constitute more problematic situation to Arab speakers of English. For instance, 'texts' [teksts] and 'spread' [spred] or 'prompt' [prɒmpt] and 'strategy' [strætɪdʒɪ]. In short, Arabic language is a very restrictive in terms of its syllable structure, as the possible number of consonant combination in both the onset and coda is far less than that of English.

2.8.1 The Structure of the English Syllable

According to Roach (2001) the structure of the English syllable comprises of three consonants in the onsets maximum. That is, it can be of one, two or three consonant phonemes (see **Figure** 2.1) such as in song, sport and spring respectively. Meanwhile, it comprises four consonants in the codas (see **Figure** 2.2) such as in hat, hats, text and texts

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respectively. According to Lecumberri & Maidment (2000), English has 20 vowel sounds of which 12 sounds are monophthongs (or pure) and 8 sounds are diphthongs (see **Table** 2.1). On the other hand, there are 24 consonants in English – voiced and voiceless consonants. 12 sounds are voiced and the others are voiceless (see **Table** 2.2) (ibid).

```
                        Syllable
                       /        \
                        \        Rhyme
                         \      /      \
                          \    /        \
        Onset            Peak            Coda

         /s/              /ɒ/             /ŋ/

        /sp/              /ɔ:/            /t/

        /spr/             /i/             /ŋ/
```
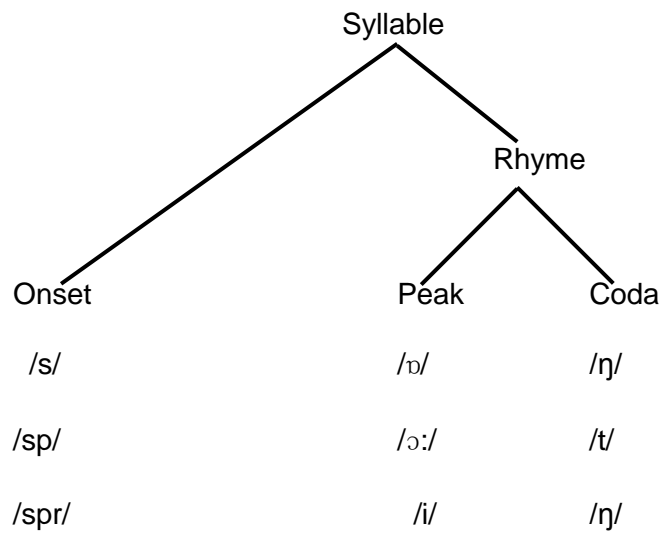
Figure 2.1: The structure of the English syllable in the onset.

```
                        Syllable
                       /        \
                        \        Rhyme
                         \      /      \
                          \    /        \
        Onset            Peak            Coda

         /h/              /æ/             /t/

         /h/              /æ/             /ts/

         /t/              /e/             /kst/
```

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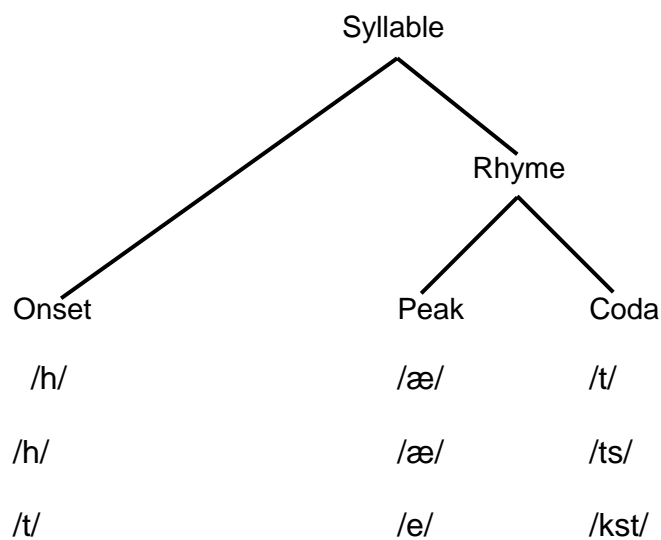
/t/   /e/   /ksts/

Figure 2.2: The structure of the English syllable in the coda.

Table: 2.1: The English Vowel Sounds

Vowels	
IPA Symbols	**examples**
ʌ	c<u>u</u>p, l<u>u</u>ck
ɑ:	<u>a</u>rm, f<u>a</u>ther
æ	c<u>a</u>t, bl<u>a</u>ck
e	m<u>e</u>t, b<u>e</u>d
ə	<u>a</u>way, cin<u>e</u>m<u>a</u>
ɜ:	t<u>ur</u>n, l<u>ear</u>n
ɪ	h<u>i</u>t, s<u>i</u>tt<u>i</u>ng
i:	s<u>ee</u>, h<u>ea</u>t
ɒ	h<u>o</u>t, r<u>o</u>ck
ɔ:	c<u>a</u>ll, f<u>our</u>
ʊ	p<u>u</u>t, c<u>ou</u>ld
u:	bl<u>ue</u>, f<u>oo</u>d
aɪ	f<u>i</u>ve, <u>eye</u>
aʊ	n<u>ow</u>, <u>ou</u>t
oʊ	g<u>o</u>, h<u>o</u>me
eə	wh<u>ere</u>, <u>air</u>

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eɪ	s<u>ay</u>, <u>eigh</u>t
ɪə	n<u>ear</u>, h<u>ere</u>
ɔɪ	b<u>oy</u>, j<u>oi</u>n
ʊə	p<u>ure</u>, t<u>ouri</u>st

Table: 2.2: The English Consonant Sounds

Consonants	
IPA Symbols	**examples**
b	<u>b</u>ad, la<u>b</u>
d	<u>d</u>rink, la<u>d</u>
f	<u>f</u>ind, i<u>f</u>
g	<u>g</u>ive, fla<u>g</u>
h	<u>h</u>ow, <u>h</u>ello
j	<u>y</u>es, <u>y</u>ellow
k	<u>c</u>at, tal<u>k</u>
l	<u>l</u>eg, unti<u>l</u>
m	<u>m</u>an, da<u>m</u>
n	<u>n</u>o, te<u>n</u>
ŋ	si<u>ng</u>, ki<u>ng</u>
p	<u>p</u>et, ma<u>p</u>
r	<u>r</u>ed, t<u>r</u>y
s	<u>s</u>un, mi<u>ss</u>
ʃ	<u>sh</u>e, cra<u>sh</u>
t	<u>t</u>ea, ha<u>t</u>
tʃ	<u>ch</u>eck, fet<u>ch</u>
θ	<u>th</u>ink, bo<u>th</u>
ð	<u>th</u>is, clo<u>the</u>

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v	voice, five
w	wet, slow
z	zoo, buzz
ʒ	pleasure, vision
dʒ	just, large

2.8.2 The Structure of the Arabic Syllable

According to Kharma and Hajjaj (1989) the structure of Arabic syllable consists of one consonant only in the onsets. That is, it cannot be more than one consonant phoneme (see **Figure** 2.3) such as in *kul* (all). While, it consists of one or two in the codas (see **Figure** 2.4) such as in *bent* and *shams* which mean girl and sun respectively. As the vowel sounds concerned, it has six vowel sounds of which three are long sounds and the other three are short ones. The former are represented by /a:/, /u:/ and /i:/ and the latter are represented by /a/, /u/, /i/. What characterized these sounds is that they are represented by diacritics. On the other hand, there are 28 consonant sounds in Arabic (see **Table** 2.3) (El-Imam, 2001; El-Imam, 2004; Rogers, 2005).

Syllable

Rhyme

Onset   Peak   Coda

/k/   /ʊ/   /l/   = all
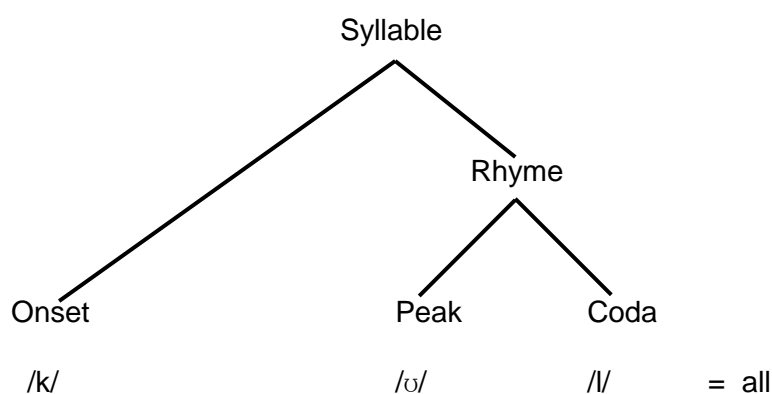
Figure 2.3: The structure of Arabic syllable in the onset.

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```
                          Syllable
                         /      \
                               Rhyme
                              /      \
        Onset            Peak        Coda

          /b/             / ɪ /        /nt/        = girl

          /ʃ/             /a/          /ms/        = sun
```
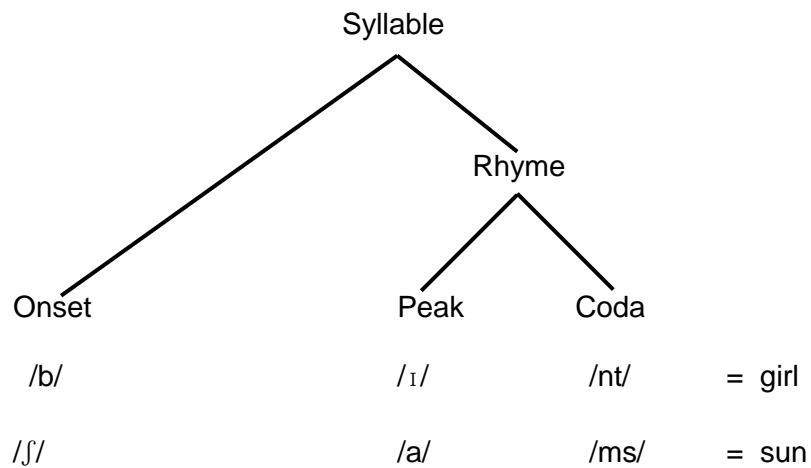
Figure 2.4: The structure of Arabic syllable in the coda.

      Table 2.3 below is adapted from the explanation and illustration of Rogers (2005). It

demonstrates the phonemes of Modern Standard Arabic.

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Table: 2.3: The Standard Arabic Consonant Phonemes

		Bilabial	Inter-dental	Dental (incl. alveolar) plain	Dental (incl. alveolar) Emphatic	Post alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	voiceless			t̪	tˤ			k	q		ʔ
Plosive	voiced	b		d̪	dˤ	dʒ					
Fricative	voiceless	f	θ	s	sˤ	ʃ		x		ħ	h
Fricative	voiced		ð	z	ðˤ			ɣ		ʕ	
Nasal		m		n							
Lateral				l							
Trill				r							
Approximant		w					j				

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2.9   Previous Studies on Phonotactics

Many researchers (e.g., Tarone, 1980; Anderson, 1983; Sato, 1984; Vijayalatshmi, 1985; Selinker, 1988 and Monahan, 2001) conducted their phonological studies utilizing 'interlanguage' theory to account for phonological phonotactics in pronunciation, particularly on the area of syllable structure. For instance, Vijayalatshmi (1985) carried out her study on Malay, Chinese and Tamil university students. Selinker (1988) conducted his study on schoolchildren to examine the phenomenon of language transfer from Hebrew language to English one. Monahan (2001), on the other hand, conducted a study on Brazilian Portuguese coda condition constraint transfer into L2 English. In fact, this might suggest that interlanguage has a significant role in second language acquisition studies.

Barros (2003) investigated in her study the difficulties of pronunciation in the consonant system produced by Arabic speakers when learning English. The salient aim of her study was to identify and analyze the difficulties experienced by those learners while pronouncing English consonant phonemes. She found that there were pronunciation difficulties with consonant sounds faced by Arabic speakers. Basing her argument on an Australian study, she pointed out that Arabic speakers seem to have difficulties in the production of consonant clusters. She exemplified the word *espy* for 'spy'. This claim seems to correspond with that of Al-Hattaami (2000) as he exemplified the word 'street' pronounced by native speakers of Arabic as [ɪstriːt].

Carlsile (1991: 91) conducted a study to investigate the influence of environment on vowel epenthesis in Spanish/English interphonology. He examined the occurrences of vowel epenthesis before the three word-initial onsets /st/, /sp/, and /sk/. His data showed that 'the frequency with which epenthesis occurred was determined by two variable constraints: word-final consonants and word-final vowels, the former inducing a significantly higher frequency

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of epenthesis than the latter'. On the other hand, Anttila (2002: 206) discussed the internal factors in variation. She stated that certain external factors which affect variation are 'sex, age, style, register, and social class'. Basing her explanation on Labov et al. (1968); Wolfarm (1969); Fasold (1972); Guy (1980); Neu (1980); Guy and Boyd (1990); Guy (1991a, 1991b); Kiparsky (1993); Reynolds (1994); Guy (1994); Guy and Boberg (1997) and Labov (1997), she claims that English word-final consonant clusters are variably made simple by omitting a coronal stop such as, *cost me* for *cos me.*

Byrd (1996:209) carried out his experimental study of articulatory timing in English consonant sequences to examine the nature of certain linguistic influences on the articulatory timing of two consonants in sequence. The findings of his study showed reduction in syllable-final position and demonstrated that 'stops are more subject to coda reduction than are fricatives'. These findings seem to correspond with Anttila (2002) as mentioned above. Byrd's (1996:209) findings showed further that 'stops are more overlapped by a following consonant than are fricatives'; meanwhile syllable-initial cluster is shown to be less overlapped than syllable-final. In his 1992 study, on perception of assimilation in consonant clusters, he assumed that a completely articulated alveolar stop i.e. /t/ and /d/ is not perceived by listeners if it is substantially overlapped with a velar stop i.e. /k/ and /g/. In the same vein, Recasens et al. (1993) argue that articulations of consonants in sequences overlap; and may decrease or be incomplete (Barry, 1985, 1991; Kerswill, 1985; Nolan, 1992).

Uffmann (2006:1108) in her very recent study discussed the phenomenon of vowel insertion in loanwords. The discussion was tackled from two perspectives: an empirical and a formal linguistic perspective. The loanword corpora were from Shona, Sranan, Samoan and Kinyarwanda languages. The findings indicated that 'vowel epenthesis in loanword

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adaptation is a more complex process than traditionally assumed'. Uffmann concluded that she identified three strategies to precisely find out the quality of the epenthetic. They are: default insertion, vowel harmony and consonantal spreading. She asserted that these three strategies 'could be shown that in all languages under investigation' (Ibid). She further went on to emphasize that these three strategies are applicable in all languages, 'although in different environments and at different frequencies' (Ibid).

Altenberg (2005) conducted three experiments in his study on Spanish speakers of English. The study examined the acquisition of word-initial consonant clusters to find out the judgment, perception, and production tasks. The study demonstrated that Spanish speakers of English intrude a vowel in the onset of English syllables. Altenberg exemplifies the word 'school' [skuːl] pronounced by them as [ɜskul]. So is the case in English language as some words absorbed into English from other languages. A very good example can be seen in the Greek words 'psychology', 'psoriasis', and 'pterodactyl'. In these words, word-initial two-consonant clusters have been adapted to become word-initial one-consonant to conform to the segments sequence of English (Dobrovolsky & Katamba, 1996).

Accordingly, from the above instances, learners of foreign/second language tend to conform with the sequence of segments pattern in their source language. Likewise, some words were absorbed into Arabic language from other languages. These words were adjusted to Arabic pronunciation phonotactics when they are pronounced in casual speech and non-casualty either. For instance, the word 'strategy' [strætɪdʒɪ] is adjusted as [ɪtrætɪdʒɪ] (Al-Hattaami, 2000). In short, the learners adjust the target language constraints to the first language constraints in casual and non-casual speech to meet the phonotactics patterns of their respective language system.

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Engstrand & Krull (2001) carried out a study on native speakers of a Stockholm variety of Central Standard Swedish. The aim of their study was to examine segment and vowel reduction. The results revealed the phenomenon of deletion for consonant sounds in syllable-initial clusters. Examples from their data show this deletion in words such as *han* (he) and *hade* (had). The two initial consonant sounds were elided by the subjects. In their discussion, they illustrated how the phenomenon of deletion in word-initial consonant clusters takes place causing segmental reduction in casual speaking style.

Kochetov (2004: 351) conducted his study with the aim to examine the perception of place and secondary articulation contrasts in different syllable positions in the two languages – Russian and Japanese. His participants were 20 native speakers of Russian and 10 native speakers of Japanese. The Russian participants graduated from the University of Toronto, while their Japanese counterparts had no exposure to the Russian language. The consonantal sounds used in the experiment of the study were the Russian plain (velarized) and palatalized labial and coronal voiceless stops in initial and final syllable positions. The results revealed 'substantial asymmetries in the perception of the contrasts by both groups of listeners'. The results further showed that lower correct identification rates for consonants were associated to the syllable-final position; than the same consonants in the syllable-initial position.

2.10   Interlanguage Theory

Before discussing interlanguage (IL), knowing what contrastive analysis (CA) and error analysis (EA) terms will help understand how these theories account for errors. A good and precise explanation for these terms is by Lenhardtova (1993: 291-291) as follows:

CA can either be theoretical with the goal of analyzing two language systems on either language levels, or it can be applied when it is of pedagogical relevance in foreign language teaching. EA is a component of CA in the sense that EA uses CA for describing and explaining the manifestation of and reasons for errors in the language performance of learners of a foreign language. IL is widely used by applied CA researchers who understand IL as being the present state of knowledge of the learner's foreign language which is the result of his/her gradual building up of an L2 rule system. It is of a dynamic character, changing as the learner advances in his acquisition of the foreign language.

2.10.1 The Birth of Interlanguage Theory

The term 'interlanguage' was first employed by Selinker (1969, 1972) to describe the linguistic stage second language learners go through during the process of mastering the target language. This term is adapted from Weinreich's (1953) 'interlingual' (Brown, 1994). Selinker (1992: 28) stated that 'Weinreich (1953) presents *the* concept that led me to an initial understanding of language transfer'. Since then, 'interlanguage' has become a major strand of second language acquisition research and theory. However, it was Corder (1967) who is considered responsible for raising issues which became central to studies of IL.

2.10.2 The Definition of Interlanguage Theory

According to Selinker (1972) interlanguage is a temporary grammar which is systematic and composed of rules. Tingstad (1999: 2) describes interlanguage as 'the first major attempt to provide an explanation of L2 acquisition, and many later theories were developments of it'. This theory is based on the five cognitive processes as demonstrated by Selinker. In 1972, Selinker postulated five stages of second-language learning (McLaughlin, 1991: 61). These stages are as follows:

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1) Language transfer: some items, rules, and subsystems of the interlanguage may result form transfer from the first language.

2) Transfer of training: some elements of the interlanguage may result from specific features of the training process used to teach the second language.

3) Strategies of second-language learning: some elements of the interlanguage may result from a specific approach to the material to be learned.

4) Strategies of second-language communication: some elements of the interlanguage may result from specific ways people learn to communicate with native speakers of the target language.

5) Overgeneralization of the target language linguistic material: some elements of the interlanguage may be the product of overgeneralization of the rules and semantic features of the target language.

This study mainly focuses on one of the five stages mentioned above which is 'language transfer', to investigate the problems related to the pronunciation of English syllable-initial and syllable-final consonant clusters produced by Yemeni speakers of English. Like several past studies (i.e., Vijayalatshmi, 1985; Selinker, 1988; Alias Abd Ghani, 2003 and Monahan, 2001), this study adopts interlanguage theory to account for erroneous words and establish phonological phonotactics produced by Yemeni speakers of English.

2.10.3 The Characteristics of Interlanguage Theory

According to Adjemian (1976) interlanguages are natural languages but they are unique in that their grammar is permeable. Adjemian (1976: 298) means by natural languages 'any human language shared by a community of speakers and developed over time by a general process of evolution'. He distinguished between the learning strategies that learners use and the linguistic rules that are 'crucially concerned in the actual form of the language system' (Adjemian, 1976: 302). He concluded that the description of these linguistic rules that will reveal the properties of the learner's grammar should be the primary goal of linguistic research. Moreover, Tarone (1979 & 1982) described interlanguage as a

continuum of speech styles. Learners shift between styles according to the amount of attention they pay to language form from the superordinate style in which attention is mainly focused on language form to the vernacular style in which the least attention is paid to language form. Even though Tarone does not deny that other theories can provide explanations of second language acquisition, she argues that 'any adequate model of SLA must take IL variation into account' (Tarone, 1990: 398).

Ellis (2004) maintained that learners start with forms which are used in free variation during the early stages of second language acquisition (non-systematic variability) until more organizing and restructuring has taken place (systematic variability). In contrast to Ellis' claims, the functional approach to the analysis of interlanguage argues that discourse functions develop before grammatical functions and evidence is provided for the acquisition of function occurring without the acquisition of form (Pfaff, 1987).

As far as the language transfer is concerned (which is the focus of this study), Selinker (1988) conducted a study to examine the phenomenon of language transfer from Hebrew language to English one. In this study seven experiments were carried out on schoolchildren. His subjects were 132 Israeli students who had never lived in an English-speaking country. He showed that there are three levels of transfer that occur. One of these levels is phonological transfer. For instance, Israeli speakers of English substitute a voiced velar fricative for the English retroflex /r/. Moreover, Puppel (1990) carried out his study on Polish students in an attempt to examine vowel spaces. He focused on language transfer to find out the influence of the SL on the TL. He found that there is transfer demonstrated by Polish students while attempting to master the English vowel system.

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Besides, De Angelis (1999) utilized language transfer to investigate the production of Italian by a French-Canadian L1 speaker with three foreign languages: Spanish, English, and Italian. The results show two types of language transfer. The first type was full lexical language transfer and the second one was partial lexical language transfer. De Angelis (1999) discussed her results in reference to phonological similarity between the two languages. In brief, as seen in Selinker's (1988), Puppel's (1990) and De Angelis' (1999) studies, interlanguage transfer occurred in second language acquisition investigations, which demonstrates its suitability and practicability.

2.11   The Conceptual Framework of the Study

Given the discussion on the different trends and concepts related to the phonological phonotactics in English and Arabic, IL theory by Selinker (1972) is adopted and adapted as a framework since it has been found applicable and practical for the present study. Otherwise, it is due to the fact that it accounts for erroneous words and 'offers a general account of how L2 acquisition takes place' (Ellis, 1997: 34). Besides, Interlanguage (IL) theory is adopted for the present study as a framework rather than contrastive analysis (CA) since 'interlanguage hypothesis led to a whole new era of second language research and teaching and presented a significant breakthrough from the shackles of contrastive analysis hypothesis' (Brown, 1994: 204). Moreover, Selinker's work indicated that 'a contrastive perspective of units applying at one and the same time to three linguistic systems – NL, TL and IL – whereas recall that classical CA confined itself to two – NL and TL' (Selinker, 1992: 183; Selinker, 1988). **Figure** 2.5 below traces the steps and procedures for the present investigation on the syllable-initial consonant clusters and syllable-final consonant clusters by Yemeni speakers of English.

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                    ┌─────────────────────────────┐
                    │     Theory: Interlanguage    │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │      Language Transfer       │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │       Vowel Insertion        │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │     Dependent Variables      │
                    └─────────────────────────────┘
                         ╱                  ╲
                        ▼                    ▼
        ┌──────────────────────┐   ┌──────────────────────┐
        │ English Syllable –    │   │ English Syllable –    │
        │ initial consonant     │   │ final consonant       │
        │ clusters              │   │ clusters              │
        └──────────────────────┘   └──────────────────────┘
                  │                          │
                  ▼                          ▼
        ┌──────────────────────┐   ┌──────────────────────┐
        │  • Two consonants    │   │  • Two consonants    │
        │  • Three consonants  │   │  • Three consonants  │
        │                      │   │  • Four consonants   │
        └──────────────────────┘   └──────────────────────┘
                      ╲                  ╱
                       ▼                ▼
                    ┌─────────────────────────────┐
                    │     Independent Variables    │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │   Yemeni Speakers of English │
                    └─────────────────────────────┘
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                                  ▼
                    ┌─────────────────────────────┐
                    │      Research Questions      │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │       Labovian Method        │
                    │ Word lists reading & Passage │
                    │           reading            │
                    └─────────────────────────────┘
                                  │
                                  ▼
                    ┌─────────────────────────────┐
                    │ Answering research questions │
                    │ based on the obtained data   │
                    └─────────────────────────────┘
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2.12   Conclusion

This chapter reviewed some past studies on the pronunciation and phonological phonotactics in English encountered by Yemeni speakers of English while speaking English. It covered different concepts of English and Arabic pronunciation and phonotactics. A number of studies presented were based on interlanguage theory to account for phonological phonotactics in pronunciation such as *The Judgment, Perception, and Production of Consonant Clusters in Second Language* by Altenberg (2005). Like these studies, the present study utilized the interlanguage theory as a theoretical framework. The methodology of the present study will be exposed and discussed in the following chapter.

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CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1   Introduction

This chapter begins with a description of the research design and methods adopted and adapted for collecting the data of the present study. It also provides the setting of the study. A detailed description of the subjects and their profiles and the variables investigated in this study are presented. Instruments and equipments used in the study are explained followed by an explanation of the procedures data, data collection and data analysis of the study. Lastly, the pilot study is exposed and computation of percentage and mean scores are described and calculated.

3.2   Research Design

As stated earlier, this study is conducted to investigate the English syllable-initial consonant clusters and syllable-final consonant clusters. It adopts the 'Interlanguage' theory by Selinker (1972) as a framework to account for the pronunciation phonotactics by Yemeni speakers of English. The researcher adopts this theory as a framework for the study since it 'offers a general account of how L2 acquisition takes place' (Ellis, 1997: 34). This theory is based on the five processes as suggested by Selinker in 1972 and extended in 1994 (see Chapter 2, section 2.4.2).

Furthermore, only the first stage is adopted for the present study. This study mainly focuses on the 'language transfer' of Yemeni speakers of English regarding the pronunciation of words, i.e. problems related to the pronunciation of English syllable-initial and syllable-final consonant clusters. The method employed for data collection in this study is based on the Labovian model. This method is basically based on the sociolinguistic model

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developed by William Labov (1966) and extended by Lorna Dickerson (1974). Alias Abd Ghani (2003: 115) states that the Labovian model 'emphasizes the significant influence of inner psychological (mental) processes upon individual speakers' patterns of stylistic variation'. He goes on to add that this model 'aims at describing accurately the systematically variable patterns of a speaker's speech production in a multiplicity of situations' (Ibid). In this model, Labov has employed four different tasks (Tarone, 1988; Alias Abd Ghani, 2003). These tasks are as follows:

1. *Passage reading.*

2. *Word list reading.*

3. *Casual speech.*

4. *Minimal pairs reading.*

This study utilizes the first and second tasks for collecting the data of this study. The Labovian model is used in this study as a method for data collection, since it has been extensively employed by many researchers on second language acquisition such as, Schmidt (1977); Dickerson (1974); Archibald (1992, 1993); Alias Abd Ghani (1995, 2003); Su-Yin (2001); Al-Fakhri (2003) and Shaker (2004).

Schmidt (1977), for instance, utilized the Labovian model in his study conducted on Arab speakers of English. He employed three tasks: word lists, minimal pairs, and passage reading. On the other hand, Dickerson (1974) employed the same model in her study on Japanese learners of English to examine the presence of interlanguage phonology. Using the same model, Archibald (1992 & 1993) carried out his study on Polish, Spanish, and Hungarian speakers to investigate the acquisition of English stress. He used a basic research design in order to collect data from his subjects. The subjects had to perform both production and perception tasks pertaining to stress.

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In the same vein, Alias Abd Ghani (1995, 2003) employed the Labovian model in his study. In 1995, he carried out his study on variability in the speech performance of Malaysian learners of English to investigate the patterns of style shifting in the Malaysian learners' speech performance. The results indicated that there is 'phonological variation (stylistic stratification) in the subjects' performance of all the phonemes under investigation and this variation seems to be systematic in nature' (Alias Abd Ghani, 2003: 120). This model was used by Su-Yin (2001) in her study on the phonology of voiceless and voiced palato-alveolar fricatives /ʃ/ and /ʒ/ of Malaysian learners of English with Mandarin background. The 30 subjects were asked to articulate words from five word lists consisting of the two target phonemes /ʃ/ and / ʒ /.

Similarly, Al Fakhri (2003: 25) employed one task of the Labovian model in her study 'to elicit data on the subjects' pronunciation' Her subjects were asked to pronounce words from six word lists consisting of the two target phonemes /θ/ and /ð/. Shaker (2004) also used Labovian model in his study to elicit data from his respondents who were 30 postgraduates from three different backgrounds, namely, Libyan, Yemeni (some of them are subjects of this study) and Iraqi.

Tarone (1988: 39) maintained that 'Labov's work with native speakers is very empirical in its orientation'. Beebe (1982) in Tarone (1988: 39) described Labov's methodology as follows:

> His methodology is based on manipulating the situation to elicit shifts in speech style. Fore example, he manipulates verbal task, topic, interlocutor, setting or participant roles. He claims that these affect attention to speech and that a shift in attention brings about a style shift. Verbal task is Labov's primary tool. He uses face-to-face interview conversation to elicit 'careful'

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speech, the reading of passages to get his 'reading' style …
Sometimes Labov's 'casual' style is obtained outside the
interview in, say, an unanticipated telephone call from a close
friend or relative.

The aim of using the two tasks of the Labovian model for collecting data is to explore the variability of the performance of Yemeni speakers of English in their production of the syllable-initial and syllable-final consonant clusters. With regard to collecting data for SLA research, Ellis (2004: 87) remarks the following:

It is evident that language learners do not process their knowledge of language in the same way under all conditions. Their performance varies as a product of the stylistic norm they are drawing on, which in turn depends on whether they are participating in unplanned or planned discourse. In SLA research this variability is manifest in the type of task which the learners perform to supply the researcher with data … It is axiomatic that performance in one set of circumstances does not guarantee an identical or even similar performance in a different situation.

Based on the above, the researcher manipulates the stimuli in the two tasks as 'the nature of the task influences the kind of language that is observed' (Ellis, 2004: 88)

3.3   Setting of the Study

The study was carried out in Universiti Sains Malaysia (USM), Penang, Malaysia. The researcher found that there are Yemeni speakers of English of different majors in this university, who could represent the population for the present study. Hence, the selection of these speakers is based on snowball sampling to conduct this study (Babbie, 2005). The interview sessions were held in a quite room in the main library of the university. This is to avoid any kind of distractions that could affect the recording. Consequently the data collection is obtained from the subjects.

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3.4   Subject Selection

The researcher selected the accessible subjects of the study from Universiti Sains Malaysia (USM) in Penang state, Malaysia, since the study was conducted in Malaysia. They were selected from USM for they are a representative sample of Yemeni speakers of English (target subjects) and as native speakers of Arabic language, as well. They were all Yemeni postgraduate from different schools, namely the School of Housing and Building Planning, the School of Mathematical Sciences, the School of Biological Sciences, the School of PTPM, the Center for International Technology and Multimedia, the School of Management, the School of Pharmacy, the School of Computer Science, the School of Civil Engineering and the Mechanical School. The number of the subjects was thirty postgraduates.

According to Babbie (2005), a researcher may use snowball sampling in an exploratory study to select members from a population for his/her study. Accordingly, this study employed this kind of sampling. In snowball sampling the subjects of the study suggest other members of the population whom they know. This type of sampling method is used primarily in exploratory studies (Babbie, 2005). Likewise, the researcher accumulated the subjects of the present study by asking those previously located individuals to suggest other members for the study. Information of other members of the population is provided from those located individuals until the number becomes 30 subjects.

3.5   Background of the subjects

The participants in this study range between the ages of 29 and 59 year-old. They are pursuing their Masters and Doctoral degrees, by coursework mode, mixed mode and research mode in the different schools mentioned above. Most of them have been exposed to the English language at the age of 13. All the participants had previously received formal

instruction on English as an EFL subject for six years during their preparatory and secondary schools in Yemen, and some of them took some intensive courses in Malaysia. The participants had also spent four years learning English as EFL in their respective universities in Yemen. None is bilingual. They share the same native language, Arabic, and have the same educational background. In short, these participants are, to a large extent, homogeneous. None of them reported any speech or hearing pathology.

3.6   Variable Selection

The variables investigated in this study are the syllable-initial consonant clusters and the syllable-final consonant clusters of English. This is due to the fact that it has been noticed that Yemeni speakers of English have the tendency to impose vowel sounds within the consonant clusters in syllable-initial and/or syllable-final words in English (Kharma & Hajjaj 1989). **Table** 3.1 below shows the classification of the two variables.

Table 3.1: The Variable Selection of English Syllable-initial and Syllable-final Consonant Clusters

Syllable-initial consonant clusters	Syllable-final consonant clusters
Two consonant clusters	Two consonant clusters
Three consonant clusters	Three consonant clusters
	Four consonant clusters

3.7   Measuring Instruments

The measuring instruments for this study are 15 words employed in the two tasks of the Labovian method; word list reading and passage reading, as stated earlier. The same 15

words employed in word list reading are also used in passage reading in order to measure the variability in the pronunciation of the subjects. However, the passage reading is adapted into the mode of separate sentences. This adaptation is based on the same method employed by Monahan (2001). He conducted his study on the native speakers of Brazilian Portuguese to examine coda condition constraint transfer into L2 English. The subjects were asked to read a number of English sentences.

For the word list reading task, two word lists were designed. Word list 1 is designed to test the syllable-initial consonant clusters, that is, onsets and word list 2 is designed to test the syllable-final consonant clusters, that is, codas. Word list 1 contains 6 words distributed in the two respective positions; the first position includes 3 words and the second position also includes 3 words (see Appendix A). Word list 2 contains 9 words distributed in the three respective positions; each position includes 3 words (see Appendix B). The British English spelling was used in the study rather than the American ones since the varieties of the British English are most commonly used in the Arab World (Kharma and Hajjaj, 1989).

As far as passage reading is concerned, the same 15 words used in the word list reading 1 and 2 were also employed in the passage reading (see Appendix C and D). Like word lists 1 and 2, passage reading 1 and 2 are also designed to test both syllable-initial consonant clusters and syllable-final consonant clusters. Passage reading 1 is designed to test syllable-initial consonant clusters (see Appendix C) whereas passage reading 2 is designed to test syllable-final consonant clusters (see Appendix D).

3.8   Measuring Equipment

A lap top computer was used to record the subjects' pronunciation. The programme which was used for recording is called VLC media player. The microphone was placed

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nearby to ensure clarity in the recording and to eliminate irrelevant noise. The microphone is of a high quality, brand SOMIC SM-908. Precisely, the microphone was attached as one single part with speakers (headphone). The programme Windows Media Player, version 10.00.00.3646, was used later on to analyze the speech data.

3.9   Pilot Study

The pilot study was administered by the researcher himself on 10 participants who were not involved in the main study. The purpose of administering the pilot study was to test the suitability and validity of the chosen words in the passage reading and word list reading tasks which were designed by the researcher himself. This was also to avoid unfamiliar words and to choose common everyday words as Hung (2000) has done in his study of Hong Kong participants. This is due to the fact that unfamiliar words in a target language may affect the performance of the participants in the production of pronunciation.

Before recording the speech data, instructions and guidelines were given to the participants in their mother tongue, Arabic, to make the situation of the test free and normal. In doing so, the researcher aimed at making the interviews free of tension and hence good production of speech was attained while recording the data. Some of the participants asked the researcher to have a look to the test materials before recording their speech. In response, the researcher enabled the participants to have a look to both passage reading and word list reading in order to make the situation normal rather than a testing one. They were asked to read the passage reading and word list reading only once. Repetition of the words was not considered and only the first articulation of the words was taken for data analysis. Making the test situation free and enabling the participants to pay attention was based on the Labovian methodological guidelines in data gathering as stated earlier; which is the third methodological guideline.

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Besides, two participants majoring in English were involved in the pilot study. However, it should be mentioned here that there was no participant majoring in English involved in the main study. Nevertheless, the results of the pilot study were informative revealing that Yemeni speakers of English had the tendency to insert vowel sounds in English syllable consonant clusters.

3.10   Procedures of Data Collection

The interview sessions were held in the media room in the USM main library to avoid any distraction and administered by the researcher himself. They were three sessions; in each session 10 subjects were interviewed. Each subject was interviewed individually. Reading the two word list tests (word lists I and 2) and passage reading test, they took approximately 4 minutes and the subjects were asked to read them as loudly and clearly as they could to elicit good speech data. The subjects were told to take time while reading the word list and passage. Most subjects requested to have a look before reading the material tests (word list 1 and 2, and passage 1 and 2). The researcher fulfilled their request and gave them sufficient time. Each interview session lasted approximately from 20 to 30 minutes to interview each subject to pose relevant questions pertaining to English learning and pronunciation. Before the interview sessions started, every subject was given a briefing regarding the aim of the interview session, and prior permission to record their voices was obtained. They were told that the interviews were held to collect data to know the way they pronounce rather than to test them. They were also assured that their particulars and obtained data would be strictly confidential.

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Alias Abd Ghani (2003) and Su-Yin (2001) employed Labov's (1970) methodological axioms in order to elicit good speech data. Labov (1970) cited in Su-Yin (2001: 29-30) listed these axioms as follows:

1. Style shifting: There are no single-style speakers. Speakers shift their linguistic and phonetic variables as the context shifts.

2. Attention: With the amount of attention paid to speech, the researcher is able to range the subjects on a range of styles on a continuous dimension.

3. The Vernacular: Minimum attention is paid to the vernacular and the phonological and grammatical patterns are evidenced.

4. Formality: When the speaker is aware that he is being systematically interviewed, he pays more attention to his speech.

5. Good data: The best method to collect data is through tape-recorded interviews in a formal context.

The researcher utilized and adapted the fifth axiom mentioned above to attain good speech data for data analysis.

3.11   Data Collection

The collected speech data were basically transcribed in narrow phonetic transcription based on the IPA (International Phonetic Alphabet) to identify and explore the phenomenon of vowel insertion in the sequence of segments in English syllable-initial consonant clusters and syllable-final consonant clusters produced by Yemeni speakers of English. The collected speech data are all British English words introduced to the 30 subjects in this study in the two word lists and passage reading in the form of separate sentences, which are 15 words in total.

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3.12 Procedures of Data Analysis

The programme Windows Media Player, version 10.00.00.3646, was used to analyze the raw data. A trained phonetician was consulted to check the accuracy of the transcribed data. From the transcribed speech data, the researcher assigned the transcription and the patterns of phonotactics of the English syllable-initial consonant clusters and syllable-final consonant clusters produced by the subjects. These were then calculated. After that, the percentages and mean scores were calculated and tabulated (see chapter 4). The formula which was used for finding out the percentage score and mean score is as follows:

- **Percentage score:**

$$\frac{\text{The number of accurate pronunciation produced by the subjects}}{\text{The total number of tested pronunciation}} \text{ X } 100$$

For example, S0 scores 2 (two) accurate answers out of 3 (three). Therefore, the percentage score of the accurate pronunciation of the subject is calculated as follows:

$$\frac{}{3} \quad \text{x} \quad 100 \quad = 66.66\%$$

- **Mean score:**

$$\frac{\text{The total of percentage scores}}{30}$$

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3.13   Conclusion

This chapter introduced the methodology of the present study and rationalized the research design of the study. It gave full description of research design. Regarding the instruments used, the two tasks of Labovian model were employed. The chapter illustrated the procedures of the data collection and data analysis used in the study. Finally, the chapter explained and gave an account of the pilot study. The next chapter will demonstrate data analysis and discussion of the research findings.

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CHAPTER 4

RESULTS AND DISCUSSIONS

4.1   Introduction

This chapter presents and discusses the results of the data collection of the syllable-initial consonant clusters and syllable-final consonant clusters. The two tasks of the Labovian model were utilized as a methodology to collect the data of the study as discussed in the previous chapter. The chapter proposes to transcribe and analyze the raw speech data obtained from the subjects. The accurate pronunciation is distributed into dots and inaccurate one is transcribed into narrow phonetic transcription based on International Phonetic Alphabet (IPA). The chapter discusses and demonstrates the accurate/inaccurate production by the subjects. The percentage and mean scores were calculated and highlighted using the tool of descriptive statistics. The percentage of the phenomenon of vowel insertion is also reported and explained. Finally, the chapter concludes the discussion of the study.

The presentation of the tables and graphs are divided into two main sections. The first section begins with the results of the subjects' pronunciation of the syllable-initial consonant clusters in the passage reading and word list reading tasks. The second section presents the results of the subjects' pronunciation of the syllable-final consonant clusters in the passage reading and word list reading tasks. Furthermore, examples of both syllable-initial consonant clusters and syllable-final consonant clusters are given and discussed as highlighted in the tables. The patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters as well as English-final consonant clusters are provided according to each position.

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Before presenting tables and discussing the results, it is expedient to demonstrate the formula which is used for finding out the percentage score and mean score of accurate and inaccurate pronunciation of the syllable-initial and syllable-final consonant clusters produced by Yemeni Speakers of English. The formulae of percentage score and mean score are as follows:

- **Percentage score:**

$$\frac{\text{The number of accurate pronunciation produced by the subjects}}{\text{The total number of tested pronunciation}} \text{ X 100}$$

- **Mean score:**

$$\frac{\text{The total of percentage score}}{30}$$

4.2   The Presentation and Discussion of the Results of the Syllable-initial Consonant Clusters in the Passage Reading and Word List Reading

4.2.1 The Presentation and Discussion of the Target Two Consonants

The percentage scores of accurate production of the target two consonants in the syllable-initial cluster produced by the subjects in the passage reading and word list reading are presented in **Table 4.1** below. The inaccurate pronunciation produced by the subjects was transcribed into narrow phonetic transcription and highlighted in **Table 4.2** and **4.3**; while the accurate pronunciation is indicated by dots.

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Table 4.1 illustrates the percentage scores of accurate production of the target two consonants in the syllable-initial cluster produced by the subjects in the passage reading and word list reading. As can be seen from the table, 16 subjects (i.e. 53.33 per cent) and 23 subjects (i.e. 76.66 per cent) score 100 per cent in the passage reading and word list reading respectively. 11 subjects (i.e. 36.66 per cent) and 5 subjects (i.e. 16.66 per cent) recorded the percentage score of 66.66 per cent in the passage reading and word list reading consecutively whilst 3 subjects (i.e. 10 per cent) recorded the percentage score of 33.33 per cent in the passage reading and 1 subject (i.e. 3.33 per cent) recorded the percentage score of 33.33 per cent in the word list reading.

Table 4.1: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading and Word List Reading

Subjects	Passage Reading %	Word List Reading %
S1	66.66	100
S2	33.33	66.66
S3	100	100
S4	100	66.66
S5	66.66	100
S6	66.66	66.66
S7	100	100
S8	66.66	100
S9	100	100
S10	66.66	100
S11	66.66	100
S12	100	100
S13	33.33	33.33
S14	100	100
S15	100	100
S16	66.66	100
S17	100	100
S18	100	100
S19	33.33	100
S20	100	100
S21	100	100
S22	100	66.66
S23	66.66	100
S24	100	100

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S25	66.66	100
S26	100	100
S27	66.66	66.66
S28	100	100
S29	66.66	0
S30	100	100

Figures 4.1 and **4.2** below illustrate the percentage score of accurate production of the target two consonants in the syllable-initial cluster produced by the subjects in the passage reading and word list reading:

Figure 4.1: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading

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Figure 4.2: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Word List Reading

Table 4.2 below demonstrates accurate and inaccurate production of the target two

consonants in the syllable-initial cluster uttered by the subjects in the passage reading. The

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results reveal that there was a vowel insertion in the target two consonant clusters produced by the subjects. This is evident from the subjects' performance of the target words i.e. 'drink', 'please' and 'triple' in the test (see **Table 4.2**). The vowels were /ə/ and /ɪ/. For the target word 'drink', it is interesting to note that S13 and S25 inserted a schwa /ə/ before the onset of the target consonant clusters while S19 inserted a schwa /ə/ between the target initial consonant clusters in the passage reading i.e. [ədrɪnk] and [dərɪnk] respectively. Thus, the percentage of vowel insertion for the target word 'drink' in the passage reading is 10 per cent. These results seem to correspond with that of Altenberg (2005). His subjects inserted a vowel before the onset of English syllables i.e. the word 'school' [sku:l] pronounced by the subjects as [ɜskul].

However, with regard to the word 'please', S2, S5, S19, S23, S27 and S29 (20 per cent) inserted a schwa /ə/ between the target initial consonant clusters in the passage reading while S6, S8 and S11 (10 per cent) inserted vowel /ɪ/ between the consonant clusters i.e. [pəli:z] and [pɪli:z] respectively. The percentage of vowel insertion for the target word 'please' in the passage reading is 30 per cent. As for the word 'triple', 3 subjects i.e. S1, S2, and S16 (10 per cent) inserted a schwa /ə/ between the target initial consonant clusters while S13 (3.33 per cent) inserted a schwa /ə/ before the onset of the target consonant clusters i.e. [tərɪpl] and [ətrɪpl] consecutively. The percentage of vowel insertion for the target word 'triple' in the passage reading is 16.66 per cent. The findings of this study seem to correspond with the claim made by Kharma and Hajjaj (1989) and Al-Hattaami (2000). Thus, it can be observed that the patterns of phonological phonotactics produced by the subjects are in the sequence of *CVC* and *VCC*.

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Table 4.2: The Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading

Subjects	The two consonant sounds in syllable initial cluster (CC)		
	drink [drɪnk]	please [pli:z]	triple [trɪpl]
S1	●	●	[tərɪpl]
S2	●	[pəli:z]	[tərɪpl]
S3	●	●	●
S4	●	●	●
S5	●	[pəli:z]	●
S6	●	[pɪli:z]	●
S7	●	●	●
S8	●	[pɪli:z]	●
S9	●	●	●
S10	●	●	[tərɪpl]
S11	●	[pɪli:z]	●
S12	●	●	●
S13	[ədrɪnk]	●	[ətrɪpl]
S14	●	●	●
S15	●	●	●
S16	●	●	[tərɪpl]
S17	●	●	●
S18	●	●	●
S19	[dərɪnk]	[pəli:z]	●
S20	●	●	●
S21	●	●	●
S22	●	●	●
S23	●	[pəli:z]	●
S24	●	●	●
S25	[ədrɪnk]	●	●
S26	●	●	●
S27	●	[pəli:z]	●
S28	●	●	●
S29	●	[pəli:z]	●
S30	●	●	●

Notation:
- Accurate pronunciation of the word.

The results in **Table 4.3** demonstrate accurate and inaccurate production of the two

consonants in the syllable-initial cluster produced by the subjects in the word list reading.

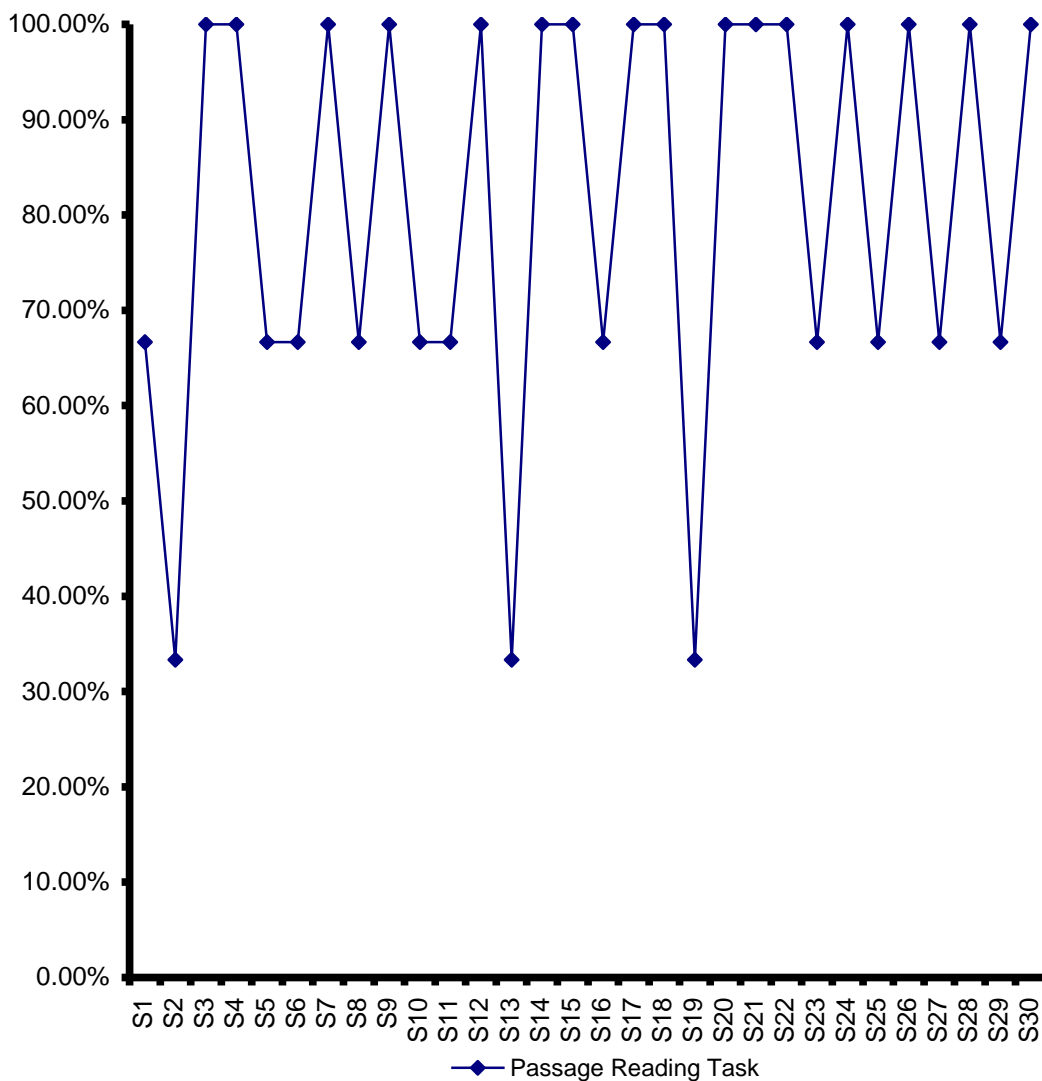Language in India www.languageinindia.com   263
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The results show that there was also a vowel insertion in the target two consonant clusters produced by the subjects. This is evident from the subjects' performance of the target words i.e. 'drink', 'please' and 'triple' in the test (see **Table 4.3**). The vowels were /ə/ and /ɪ/. For the target word 'drink', it is observed that S13 (3.33 per cent) inserted a schwa /ə/ before the onset of the target consonant clusters while S6, S22, S27 and S29 (13.33 per cent) inserted a schwa /ə/ between the target initial consonant clusters in the word list reading i.e. [ədrɪnk] and [dərɪnk] respectively. The percentage of vowel insertion for the target word 'drink' in the word list reading is 16.66 per cent. The findings of the study seem to support the findings of Altenberg (2005).

However, with regard to the word 'please', only 1 subject i.e. S30 inserted a schwa /ə/ between the target initial consonant clusters in the word list reading while all the other subjects i.e. from S1 to S29 (96.66 per cent) uttered this word accurately i.e. [pəli:z] and [pli:z] respectively. The percentage of vowel insertion for the target word 'please' in the word list reading is 3.33 per cent. As for the word 'triple', S2 inserted a schwa /ə/ between the target initial consonant clusters while S4 reduced the consonant cluster by deleting the second consonant i.e. [təri:plɪ] and [teɪpl] consecutively. The results further show that S13 inserted a schwa /ə/ before the onset of the target consonant clusters i.e. [ətraɪpl] whereas S29 substituted the first consonant i.e. [θreɪpəl]. It is interesting to note that S2, S4 and S13 (10 per cent) shifted the nucleus of the word 'triple' i.e. /i:/, /eɪ/ and /aɪ/ respectively. The percentage of inaccurate pronunciation and vowel insertion simultaneously for the target word 'drink' in the word list reading is 13.33 per cent. Consequently, it can be observed that the patterns of phonological phonotactics produced by the subjects in the word list reading are in the sequence of *CVC*, *VCC* and *CV*.

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Table 4.3: The Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Word List
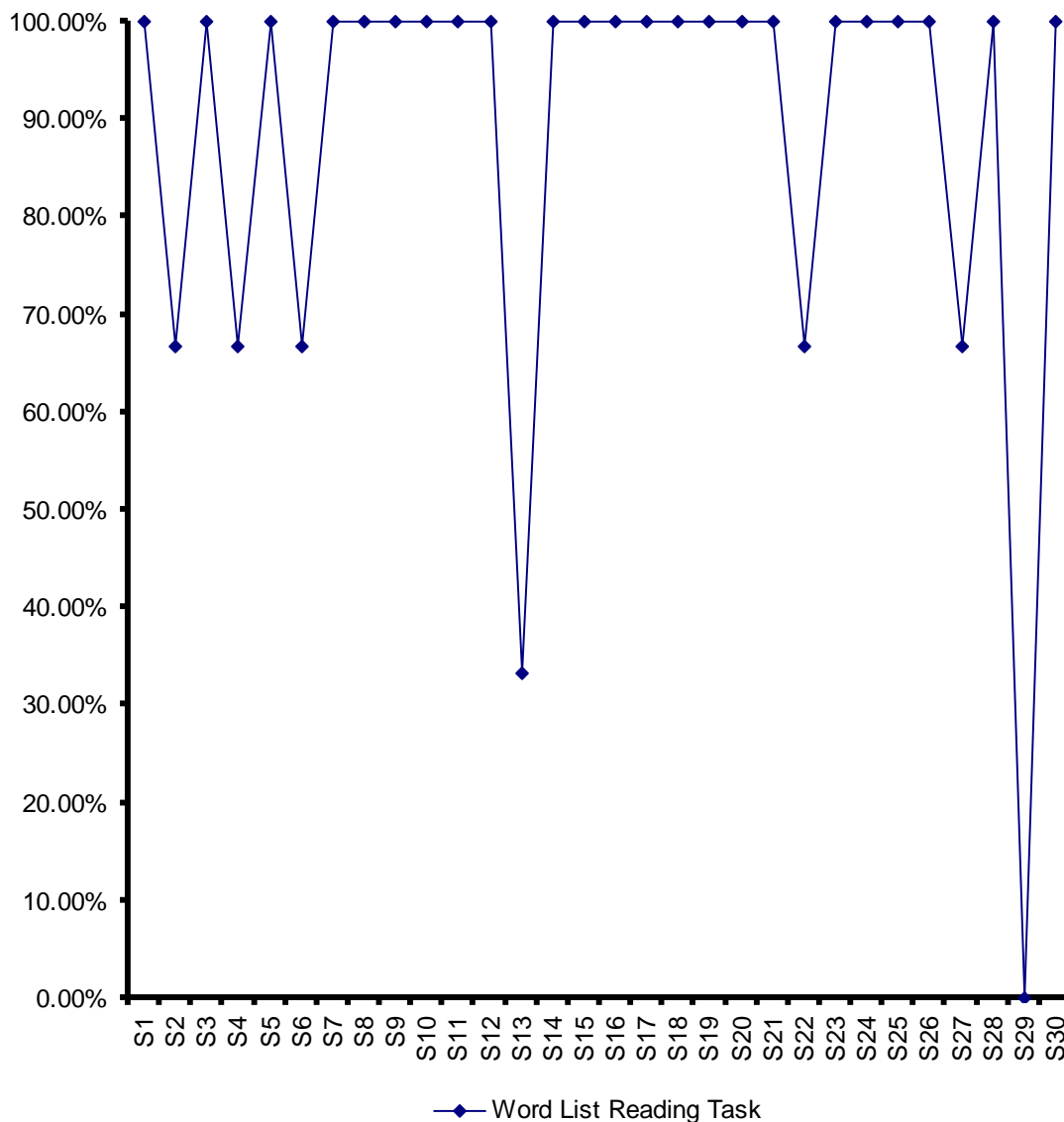
Subjects	The two consonant sounds in syllable initial cluster (CC)		
	Drink [drɪnk]	please [pli:z]	triple [trɪpl]
S1	●	●	●
S2	●	●	[təri:plɪ]
S3	●	●	●
S4	●	●	[teɪpl]
S5	●	●	●
S6	[dərɪnk]	●	●
S7	●	●	●
S8	●	●	●
S9	●	●	●
S10	●	●	●
S11	●	●	●
S12	●	●	●
S13	[ədrɪnk]	●	[ətraɪpl]
S14	●	●	●
S15	●	●	●
S16	●	●	●
S17	●	●	●
S18	●	●	●
S19	●	●	●
S20	●	●	●
S21	●	●	●
S22	[dərɪnk]	●	●
S23	●	●	●
S24	●	●	●
S25	●	●	●
S26	●	●	●
S27	[dərɪnk]	●	●
S28	●	●	●
S29	[dərɪnk]	[pəli:z]	[θreɪpəl]
S30	●	●	●

Notation:
- Accurate pronunciation of the word.

From **Table 4.4**, the results reveal that the subjects preformed very well in their

production of the target two consonants in the syllable-initial cluster in both passage reading

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and word list reading. This is reflected by the mean score of 81.10 and 88.9 consecutively. However, it is interesting to note here that the subjects in this study recorded a higher mean score in the word list reading compared to passage reading.

Table 4.4: The Mean Score of Accurate Production of the Target Two Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading and Word List Reading

Tasks	Mean Score
Passage Reading	81.10
Word List Reading	88.9

4.2.2 The Presentation and Discussion of the Target Three Consonants

Table 4.5 illustrates the percentage score of accurate production of the target three consonants in the syllable-initial cluster produced by the subjects in the passage reading and word list reading. As can be seen from the table, 7 subjects (i.e. 23.33 per cent) and 18 subjects (i.e. 60 per cent) score 100 per cent in the passage reading and word list reading respectively. 10 subjects (i.e. 33.33 per cent) and 8 subjects (i.e. 26.66 per cent) recorded the percentage score of 66.66 per cent in the passage reading and word list reading consecutively whilst 10 subjects (i.e. 33.33 per cent) recorded the percentage score of 33.33 per cent in the passage reading and 3 subject (i.e. 10 per cent) recorded the percentage score of 33.33 per cent in the word list reading.

Table 4.5: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading and Word List Reading

Subjects	Passage Reading %	Word List Reading %
S1	66.66	100
S2	0	33.33
S3	33.33	66.66
S4	100	66.66
S5	33.33	100
S6	66.66	66.66
S7	100	100
S8	100	100
S9	100	100
S10	33.33	100
S11	33.33	100
S12	66.66	100
S13	66.66	66.66
S14	0	100
S15	100	100
S16	66.66	0
S17	66.66	100
S18	100	66.66
S19	33.33	100
S20	66.66	66.66
S21	66.66	66.66
S22	0	66.66
S23	33.33	100
S24	66.66	100
S25	33.33	100
S26	100	100
S27	33.33	33.33
S28	66.66	100
S29	33.33	33.33
S30	33.33	100

Figures 4.3 and **4.4** below illustrate the percentage score of accurate production of the target three consonants in the syllable-initial cluster produced by the subjects in the passage reading and word list reading:

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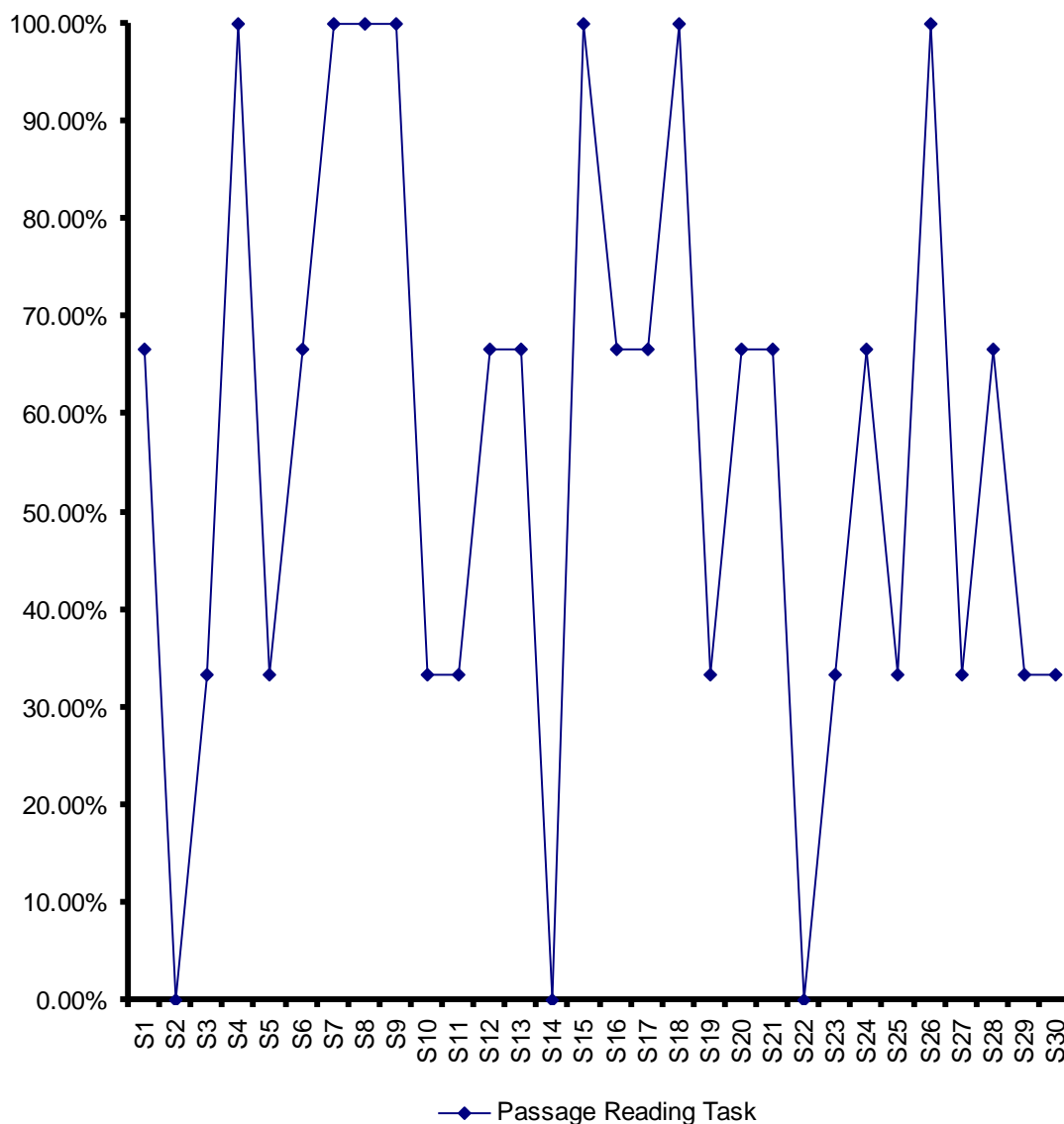
Figure 4.3: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading

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Figure 4.4: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in the Word List Reading

Table 4.6 demonstrates accurate and inaccurate production of the target three consonants in the syllable-initial cluster uttered by the subjects in the passage reading. The

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results reveal that there was a vowel insertion in the target three consonant clusters produced by the subjects. This is evident from the subjects' performance of the target words i.e. 'strategy', 'scream' and 'spring' in the test (see **Table 4.6**). The vowels were /ə/ and /ɪ/. For the target word 'strategy, it is interesting to note that S1, S10, S14 and S30 (13.33 per cent) inserted a schwa /ə/ before the onset of the target consonant clusters while S3, S5, S6, S11, S12, S13, S17, S20, S21, S22, S23, S8 and S29 (43.33 per cent) inserted a vowel /ɪ/ before the target initial consonant clusters in the passage reading i.e. [əstrætədʒɪ] and [ɪstrætədʒɪ] respectively. The percentage of vowel insertion for the target word 'strategy' in the passage reading is 60 per cent. This finding supports the claim of Al-Hattaami (2000) in his contrastive analysis study of Arabic and English particularly consonants of English and Arabic. He exemplified the word 'street' pronounced by native speakers of Arabic as [ɪstriːt]. In short, it seems that the subjects inserted such vowel sounds in the beginning of the onset in order to ease the consonant clusters.

However, with regard to the word 'scream', S2, S10, S19, S22, S25 and S27 (20 per cent) inserted a schwa /ə/ between the target initial consonant clusters in the passage reading i.e. [skəriːm]. The percentage of vowel insertion for the target word 'scream' in the passage reading is 20 per cent. As for the word 'spring', 6 subjects i.e. S2, S3, S5, S16, S22 and S27 (20 per cent) inserted a schwa /ə/ between the target initial consonant clusters while 8 subjects i.e. S11, S14, S19, S23, S24, S25, S29 and S30 (26.66 per cent) inserted a schwa /ə/ before the onset of the target consonant clusters i.e. [spərɪŋ] and [əsprɪŋ] consecutively. The percentage of vowel insertion for the target word 'spring' in the passage reading is 46.66 per cent. Thus, it can be seen that the patterns of phonological phonotactics produced by the subjects are in the sequence of *VCCC* and *CCVC*.

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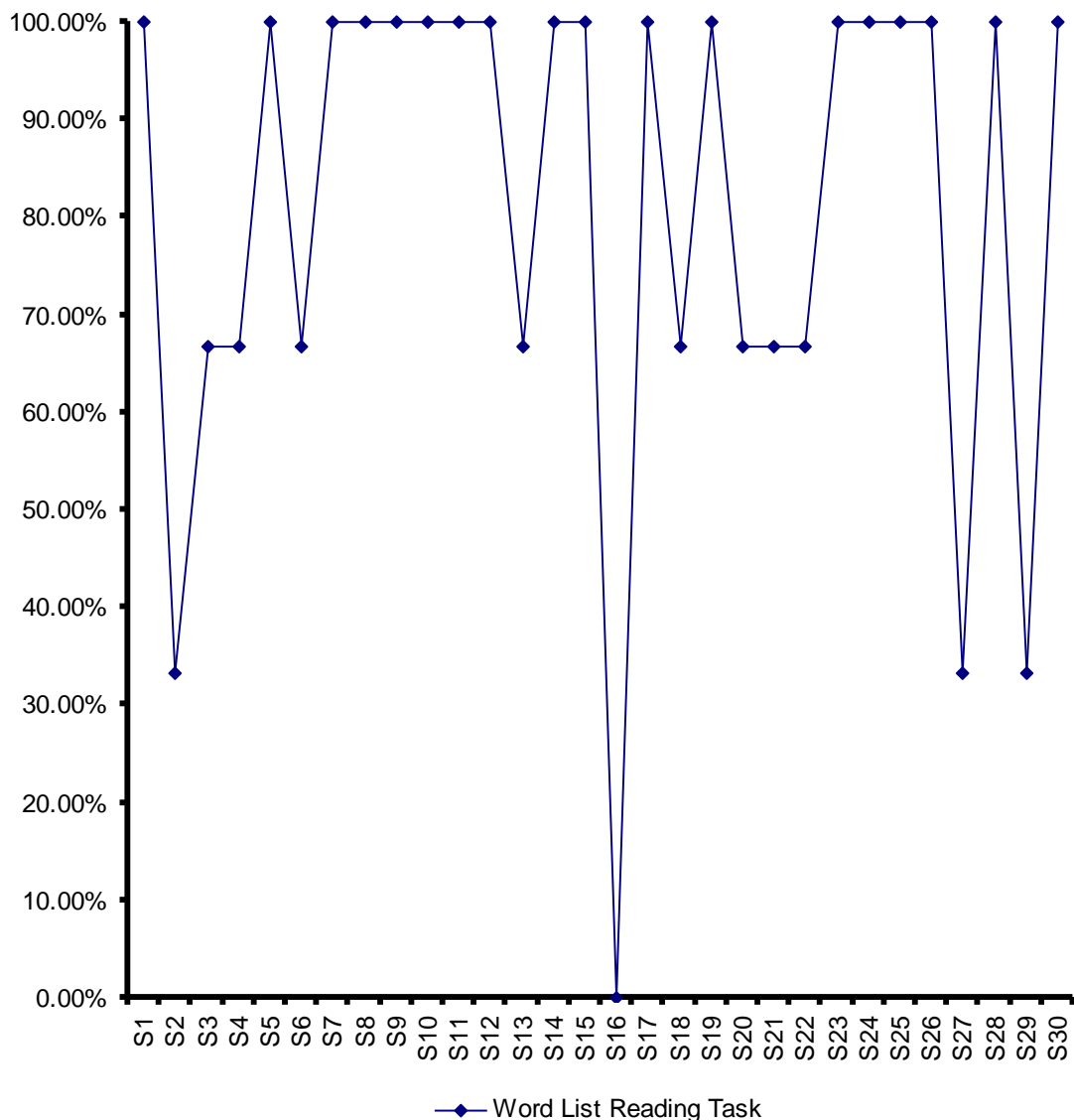
Table 4. 6: The Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in Passage Reading

Subjects	The three consonant sounds in syllable initial cluster (CCC)		
	strategy [strætədʒɪ]	scream [skri:m]	spring [sprɪŋ]
S1	[əstrætədʒɪ]	●	●
S2	[stərætədʒɪ]	[skəri:m]	[spərɪŋ]
S3	[ɪstrætədʒɪ]	●	[spərɪŋ]
S4	●	●	●
S5	[ɪstrætədʒɪ]	●	[spərɪŋ]
S6	[ɪstrætədʒɪ]	●	●
S7	●	●	●
S8	●	●	●
S9	●	●	●
S10	[əstrætədʒɪ]	[skəri:m]	●
S11	[ɪstrætədʒɪ]	●	[əsprɪŋ]
S12	[ɪstrætədʒɪ]	●	●
S13	[ɪstrætədʒɪ]	●	●
S14	[əstrætədʒɪ]	[ʃkri:m]	[əsprɪŋ]
S15	●	●	●
S16	●	●	[spərɪŋ]
S17	[ɪstrætədʒɪ]	●	●
S18	●	●	●
S19	●	[skəri:m]	[əsprɪŋ]
S20	[ɪstrætədʒɪ]	●	●
S21	[ɪstrætədʒɪ]	●	●
S22	[stərætədʒɪ]	[skəri:m]	[spərɪŋ]
S23	[ɪstrætədʒɪ]	●	[əsprɪŋ]
S24	●	●	[əsprɪŋ]
S25	●	[skəri:m]	[əsprɪŋ]
S26	●	●	●
S27	●	[skəri:m]	[spərɪŋ]
S28	[ɪstrætədʒɪ]	●	●
S29	[ɪstrætədʒɪ]	●	[əsprɪŋ]
S30	[əstrætədʒɪ]	●	[əsprɪŋ]

Notation:
- Accurate pronunciation of the word.

The results in **Table 4.7** demonstrate accurate and inaccurate production of the three

consonants in the syllable-initial cluster produced by the subjects in the word list reading.

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The results show that there was also a vowel insertion in the target three consonant clusters produced by the subjects. This obviously can be seen from the subjects' performance of the target words i.e. 'strategy', 'scream' and 'spring' in the test (see **Table 4.7**). The vowels were /ə/ and /ɪ/. For the target word 'strategy', it is found that S2, S13, S16, S21 and S27 (16.66 per cent) inserted a vowel /ɪ/ before the onset of the target consonant clusters while S6 (3.33 per cent) only inserted a schwa /ə/ between the target initial consonant clusters in the word list reading i.e. [ɪstræti:dʒɪ] and [stəræti:dʒɪ] respectively. The percentage of vowel insertion for the target word 'strategy' in the word list reading is 20 per cent. The findings of the study here echo the findings of Barros (2003) as reviewed in Chapter Two. Her results revealed that Arabic speakers seem to have difficulties in the production of consonant clusters. She exemplified the word *espy* for 'spy'. This claim also seems to correspond with that of Al-Hattaami (2000) as he exemplified the word 'street' pronounced by native speakers of Arabic as [ɪstri:t]. Moreover, S4 did not make vowel insertion but reduced the number of the onset by omitting /r/ i.e. [stætədʒɪ].

However, regarding the word 'scream', only 1 subject i.e. S16 (3.33 per cent) inserted vowel /ɪ/ before the target initial consonant clusters i.e. [ɪskri:m] in the word list reading while 2 subjects i.e. S22 and S27 (6.66 per cent) inserted a schwa /ə/ between the target initial consonant clusters i.e. [skəri:m]. The percentage of vowel insertion for the target word 'scream' in the word list reading is 10 per cent. As for the word 'spring', S2, S3 and S29 (10 per cent) inserted a schwa /ə/ between the target initial consonant clusters while S18 and S20 (6.66 per cent) reduced the consonant clusters by deleting /r/ i.e. [spɪŋ]. The results show further that S16 inserted vowel /ɪ/ before the onset of the target consonant clusters i.e. [ɪsprɪŋ]. The percentage of inaccurate pronunciation and vowel insertion for the target word

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'spring' in the word list reading is 20 per cent. Consequently, it can be observed that the patterns of phonological phonotactics produced by the subjects in the word list reading are in the sequence of **CCVC**, **CC** and **VCCC**.

Table 4.7: The Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in the Word List

Subjects	The three consonant sounds in syllable initial cluster (CCC)		
	strategy [strætədʒɪ]	Scream [skri:m]	spring [sprɪŋ]
S1	●	●	●
S2	[ɪstræti:dʒɪ]	●	[spərɪŋ]
S3	●	●	[spərɪŋ]
S4	[stætədʒɪ]	●	●
S5	●	●	●
S6	[stəræti:dʒɪ]	●	●
S7	●	●	●
S8	●	●	●
S9	●	●	●
S10	●	●	●
S11	●	●	●
S12	●	●	●
S13	[ɪstrætədʒɪ]	●	●
S14	●	●	●
S15	●	●	●
S16	[ɪstrætədʒɪ]	[ɪskri:m]	[ɪsprɪŋ]
S17	●	●	●
S18	●	●	[spɪŋ]
S19	●	●	●
S20	●	●	[spɪŋ]
S21	[ɪstrætədʒɪ]	●	●
S22	●	[skəri:m]	●
S23	●	●	●
S24	●	●	●
S25	●	●	●
S26	●	●	●
S27	[ɪstrætədʒɪ]	[skəri:m]	●
S28	●	●	●
S29	●	●	[spərɪŋ]
S30	●	●	●

Notation:
- Accurate pronunciation of the word.

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From **Table 4.8**, the results reveal that more than half of the subjects preformed accurately in the production of the target three consonants in the syllable-initial cluster in the passage reading task. As far as the word list reading task is concerned, the subjects performed quite well in their pronunciation. This is reflected by the mean score of 56.66 in the passage reading task and 81.1 in the word list reading. However, it is interesting to note here that the subjects recorded a higher mean score in the word list reading compared to passage reading. This is similar to their performance in the target two consonants in the syllable-initial cluster (see **Table 4.4**).

Table 4.8: The Mean Score of Accurate Production of the Target Three Consonants in the Syllable-initial Cluster produced by the Subjects in the Passage Reading and Word List Reading

Tasks	Mean Score
Passage Reading	56.66
Word List Reading	81.1

4.3   The Presentation and Discussion of the Results of the Syllable-final Consonant Clusters in the Passage Reading and Word List Reading

4.3.1 The Presentation and Discussion of the Target Two Consonants

The percentage scores of accurate production of the target two consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading are presented in **Table 4.9** below. The inaccurate pronunciation produced by the subjects

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was transcribed into narrow phonetic transcription and highlighted in **Table 4.10** and **4.11**; while the accurate pronunciation is indicated by dots.

Table 4.9 illustrates the percentage scores of accurate production of the target two consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading. As can be seen from the table, 16 subjects (i.e. 53.33 per cent) and 17 subjects (i.e. 56.66 per cent) score 100 per cent in the passage reading and word list reading respectively. 9 subjects (i.e. 30 per cent) and 10 subjects (i.e. 33.33 per cent) recorded the percentage score of 66.66 per cent in the passage reading and word list reading consecutively whilst 2 subjects (i.e. 6.66 per cent) recorded the percentage score of 33.33 per cent in the passage reading and 1 subject (i.e. 3.33 per cent) recorded the percentage score of 33.33 per cent in the word list reading.

Table 4.9: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading and Word List Reading

Subjects	Passage Reading %	Word List Reading %
S1	100	100
S2	0	0
S3	100	100
S4	66.66	66.66
S5	100	100
S6	66.66	66.66
S7	100	100
S8	100	100
S9	100	100
S10	100	66.66
S11	100	100
S12	100	66.66
S13	66.66	100
S14	100	100
S15	100	100
S16	0	33.33
S17	66.66	100
S18	66.66	66.66

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S19	100	66.66
S20	100	100
S21	0	0
S22	66.66	66.66
S23	100	100
S24	100	100
S25	66.66	66.66
S26	100	100
S27	33.33	66.66
S28	66.66	100
S29	66.66	100
S30	33.33	66.66

Figures 4.5 and **4.6** below illustrate the percentage score of accurate production of the target two consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading:

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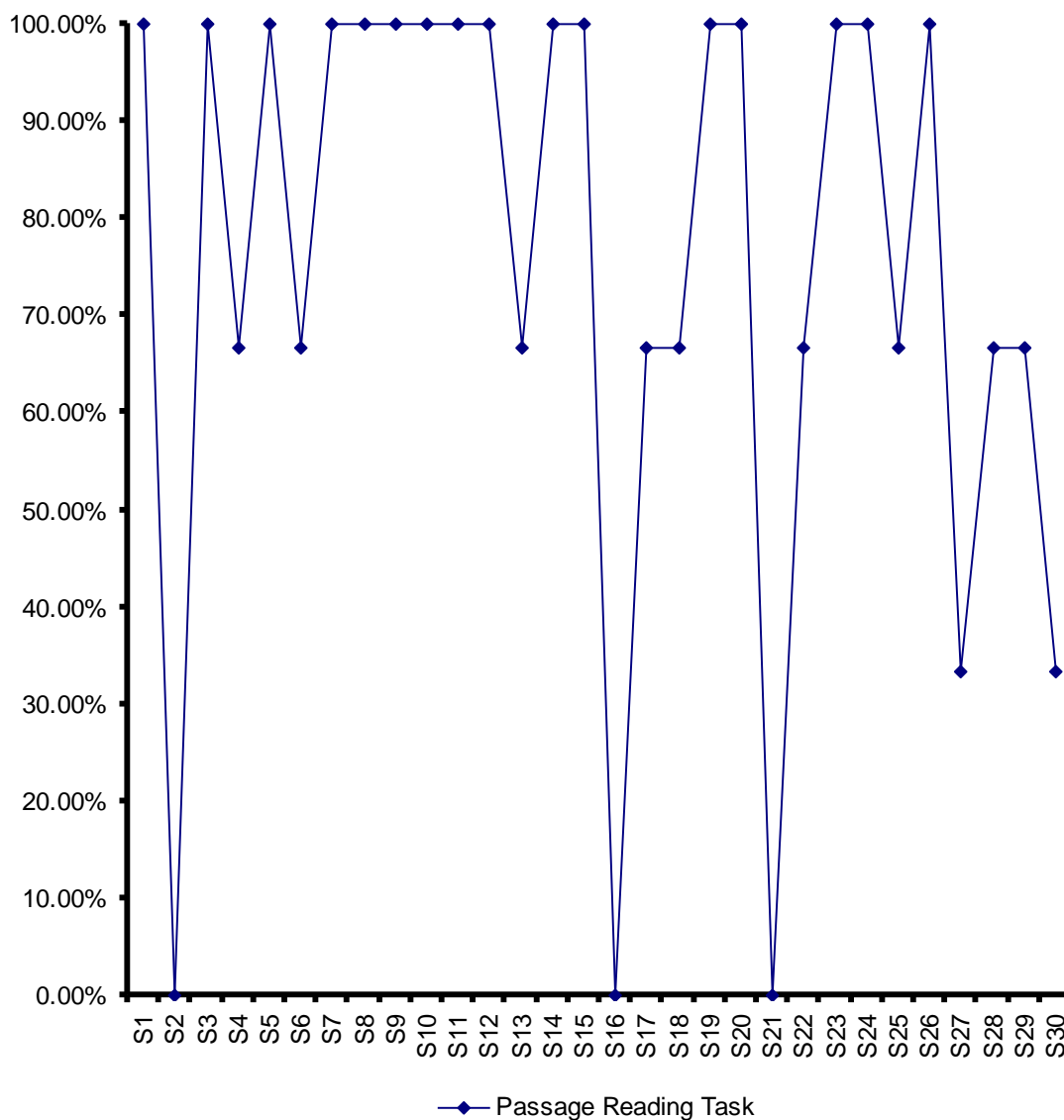
Figure 4.5: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading

—◆— Word List Reading Task
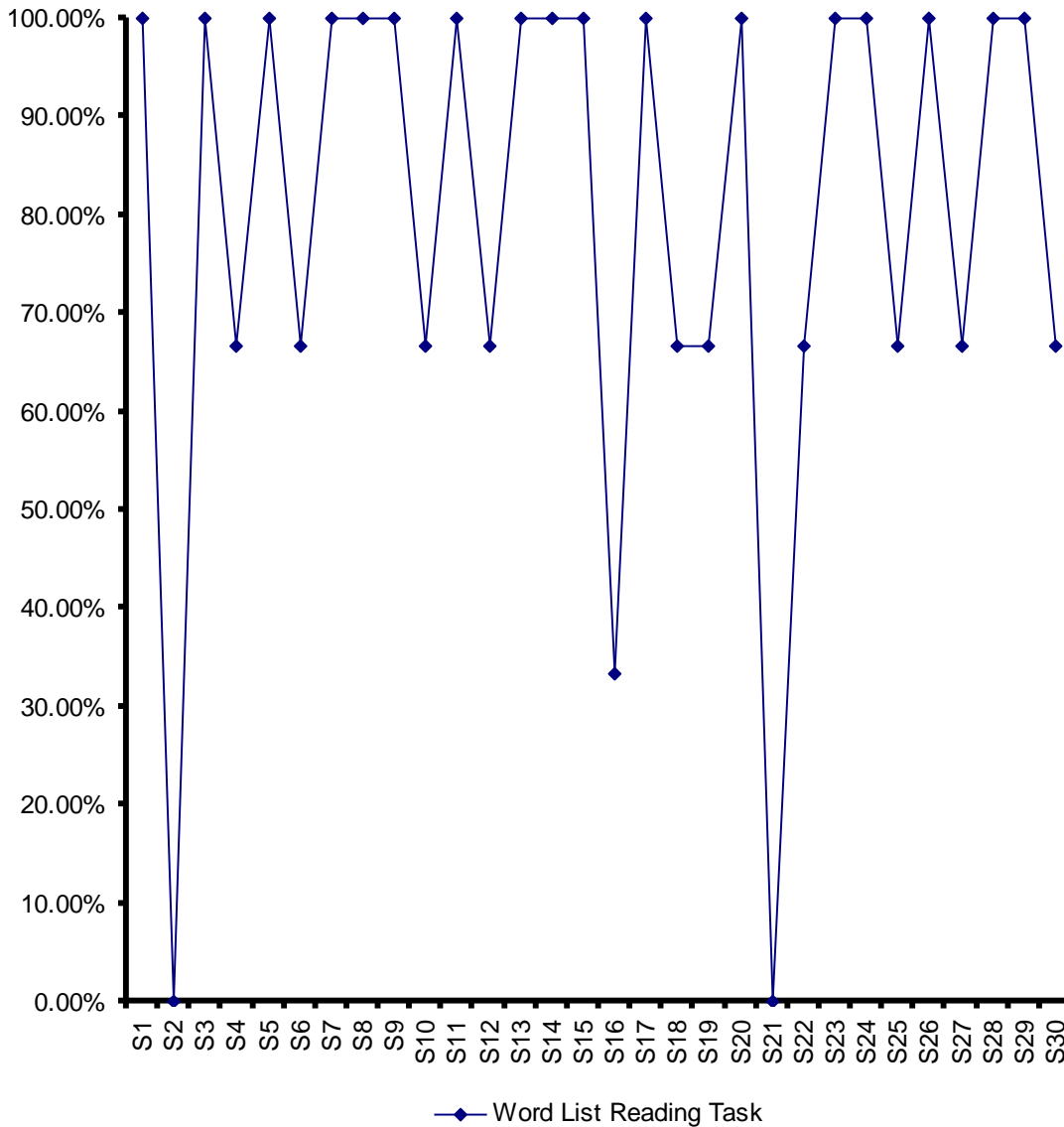
Figure 4.6: The Percentage Score of Accurate Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Word List Reading

Table 4.10 below demonstrates accurate and inaccurate production of the target two consonants in the syllable-final cluster uttered by the subjects in the passage reading. The results reveal that there was a vowel insertion in the target two consonant clusters produced

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by the subjects. This is clearly noticed in the subjects' performance of the target words i.e. 'ethics', 'linguistics' and 'terms' in the test (see **Table 4.10**). The vowels were /ə/ and /ɪ/. For the target word 'ethics', it is interesting to note that S2, S4 and S16 (10 per cent) reduced the consonant cluster of the coda by omitting /k/ i.e. [eθɪs] while S21 (3.33 per cent) substituted the second consonant i.e. [eθɪz]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'ethics' in the passage reading is 13.33 per cent.

With regard to the word 'linguistics', S2, S13, S21, S27, S28 and S29 (20 per cent) reduced the consonant cluster of the coda by deleting the final consonant i.e. [læŋgwɪstɪk] whereas S16, S25 and S30 (10 per cent) reduced the pre-final consonant sound of the coda i.e. [lɒŋgɪstɪs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'linguistics' in the passage reading is 30 per cent. As for the word 'terms', 2 subjects i.e. S2 and S6 (6.66 per cent) inserted a schwa /ə/ between the target final consonant clusters while S16, S17, S18, S22 and S30 (16.66 per cent) inserted vowel /ɪ/ between the coda of the target consonant clusters i.e. [tɜːməs] [tɜːrmɪs] consecutively. Moreover, 2 subjects i.e. S21 and S27 (6.66 per cent) reduced the consonant cluster of the coda by omitting the final consonant i.e. [tɜːrm]. It is interesting to note that S1, S3, S5, S7, S8, S10, S11, S14, S19, S23, S25, S26, S28 and S29 (46.66 per cent) substituted the final consonant sound of the coda, which was indicated by dot and /s/. However, this case was calculated among the accurate production since the subjects did not violate the sequence of the consonant sounds of coda or even insert vowel sounds. The percentage of inaccurate pronunciation and vowel insertion for the target word 'terms' in the passage reading is 30 per cent. Thus, it can be observed that the patterns of phonological phonotactics produced by the subjects in the target two consonants in the syllable-final cluster are in the sequence of *CVC* and *C*.

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Table 4.10: The Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading

Subjects	The two consonant sounds in syllable final cluster (CC)		
	Ethics [eθɪks]	linguistics [lɪŋgwɪstɪks]	terms [tɜːmz]
S1	●	●	● /s/
S2	[eθɪs]	[læŋgwɪstɪk]	[tɜːməs]
S3	●	●	● /s/
S4	[eθəs]	●	●
S5	●	●	● /s/
S6	●	●	[tɜːməs]
S7	●	●	● /s/
S8	●	●	● /s/
S9	●	●	●
S10	●	●	● /s/
S11	●	●	● /s/
S12	●	●	●
S13	●	[læŋgwɪstɪsk]	●
S14	●	●	● /s/
S15	●	●	●
S16	[etɪs]	[lɒŋgɪstɪs]	[tɜːrmɪs]
S17	●	●	[tɜːrmɪs]
S18	●	●	[tɜːmɪs]
S19	●	●	● /s/
S20	●	●	●
S21	[eθɪz]	[lʊgæstɪk]	[tɜːrm]
S22	●	●	[tɜːrmɪs]
S23	●	●	● /s/
S24	●	●	●
S25	●	[læŋgɪstɪs]	● /s/
S26	●	●	● /s/
S27	●	[læŋgwɪstɪstɪk]	[tɜːrm]
S28	●	[læŋgwɪstɪk]	● /s/
S29	●	[lɪŋgwɪstɪk]	● /s/
S30	●	[lɪŋgwɪstɪs]	[tɜːrmɪs]

Notation:
- Accurate pronunciation of the word.

The results in **Table 4.11** demonstrate accurate and inaccurate production of the two

consonants in the syllable-final cluster produced by the subjects in the word list reading. The

results show that there was also a vowel insertion in the target two consonant clusters

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produced by the subjects. This is highlighted in the subjects' performance of the target words i.e. 'ethics, 'linguistics' and 'terms' in the test (see **Table 4.11**). The vowels were /ə/ and /ɪ/. For the target word 'ethics', it is observed that S2 and S21 (6.66 per cent) reduced the pre-final consonant cluster of the coda by omitting /k/ i.e. [eθɪz] and above of that they substituted the final consonant sound by /z/ i.e. [eθɪz] and [iːtʃɪz] while S16 (3.33 per cent) did not insert any vowel but substituted and disordered the consonant cluster of the coda i.e.[etɪst]. The percentage of inaccurate pronunciation for the target word 'ethics' in the word list reading is 10 per cent.

On the other hand, as regards the word 'linguistics', only 1 subject i.e. S4 (3.33 per cent) inserted vowel /ɪ/ between the target final consonant clusters in the word list reading i.e. [lɪŋgwɪstɪkɪs], while 4 subjects i.e. S2, S10, S12 and S27 (13.33 per cent) reduced the final consonant sound of the coda i.e. [læŋgwɪstɪk]. Moreover, S19, S21 and S25 (10 per cent) substituted the final consonant sound of the coda i.e. [lɪŋgwɪstɪkθ]. Only 1 subject i.e. S16 substituted and disordered the consonant cluster of the coda i.e. [lɪŋgɪstɪst]. Therefore, the percentage of inaccurate pronunciation for the target word 'linguistics' in the word list reading is 30 per cent. As for the word 'terms', S3 (3.33 per cent) inserted a schwa /ə/ between the target final consonant clusters while S2, S18, S21 and S30 (13.33 per cnet) inserted vowel /ɪ/ between the coda i.e. [tɜːrməs] and [tɜːrmɪs] consecutively. The results further illustrate that S1, S5, S7, S9, S11, S16, S17, S19, S25 and S29 (33.33 per cent) substituted the final consonant sound of the coda, which was highlighted by dot and /s/. But, this performance was counted among the accurate pronunciation as the subjects did not break the sequence of the consonant sounds of coda or even insert vowels. The percentage of vowel insertion for the target word 'terms' in the word list reading is 16.66 per cent.

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Consequently, it can be seen that the patterns of phonological phonotactics produced by the subjects in the word list reading task in the target two consonants in the syllable-final cluster are in the sequence of **CVC** and **C**.

Table 4.11: The Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Word List

Subjects	The two consonant sounds in syllable final cluster (CC)		
	ethics [eθɪks]	Linguistics [lɪŋgwɪstɪks]	terms [tɜːmz]
S1	•	•	• /s/
S2	[iːtʃɪz]	[læŋgwɪstɪk]	[tɜːrmɪs]
S3	•	•	•
S4	•	[lɪŋgwɪstɪkɪs]	•
S5	•	•	• /s/
S6	•	•	[tɜːrməs]
S7	•	•	• /s/
S8	•	•	•
S9	•	•	• /s/
S10	•	[læŋgwɪstɪk]	•
S11	•	•	• /s/
S12	•	[læŋgwɪstɪk]	•
S13	•	•	•
S14	•	•	•
S15	•	•	•
S16	[etɪst]	[lɪŋgɪstɪst]	• /s/
S17	•	•	• /s/
S18	•	•	[tɜːmɪs]
S19	•	[lɪŋgwɪstɪkθ]	• /s/
S20	•	•	•
S21	[iːθɪz]	[ɪŋgwɪstɪkθ]	[tɜːrmɪs]
S22	•	•	[triːms]
S23	•	•	•
S24	•	•	•
S25	•	[lɪŋʊsɪtɪkθ]	• /s/
S26	•	•	•
S27	•	[lɒŋgʊstɪk]	•
S28	•	•	•
S29	•	•	• /s/
S30	•	•	[tɜːrmɪs]

Notation:
- Accurate pronunciation of the word.

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From **Table 4.12**, the results show that the subjects preformed well in the production of the target two consonants in the syllable-final cluster in the passage reading task. As for the word list reading task, the subjects performed quite well in their pronunciation. This is reflected by the mean score of 75.56 in the passage reading task and 80 in the word list reading. However, it is important to note here that the subjects recorded a higher mean score in the word list reading compared to passage reading.

Table 4.12: The Mean Score of Accurate Production of the Target Two Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading and Word List Reading

Tasks	Mean Score
Passage Reading	75.56
Word List Reading	80

4.3.2 The Presentation and Discussion of the Target Three Consonants

Table 4.13 illustrates the percentage score of accurate production of the target three consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading. As can be seen from the table, 1 subject (i.e. 3.33 per cent) and 2 subjects (i.e.6.66 per cent) score 100 per cent in the passage reading and word list reading respectively. 2 subjects (i.e. 6.66 per cent) and 6 subjects (i.e. 20 per cent) recorded the percentage score of 66.66 per cent in the passage reading and word list reading consecutively whilst 6 subjects (i.e. 20 per cent) recorded the percentage score of 33.33 per cent in the passage reading and 10 subject (i.e. 33.33 per cent) recorded the percentage score of 33.33 per cent in the word list reading.

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Table 4.13: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading and Word List Reading

Subjects	Passage Reading %	Word List Reading %
S1	0	0
S2	0	0
S3	66.66	100
S4	0	33.33
S5	0	33.33
S6	0	33.33
S7	66.66	0
S8	33.33	66.66
S9	33.33	33.33
S10	0	0
S11	0	0
S12	0	33.33
S13	0	0
S14	33.33	66.66
S15	0	0
S16	0	33.33
S17	33.33	66.66
S18	0	33.33
S19	0	33.33
S20	33.33	66.66
S21	0	0
S22	0	0
S23	100	100
S24	0	0
S25	0	66.66
S26	33.33	66.66
S27	0	0
S28	0	33.33
S29	0	33.33
S30	0	0

Figures 4.7 and **4.8** below illustrate the percentage score of accurate production of the target three consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading:

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Figure 4.7: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading

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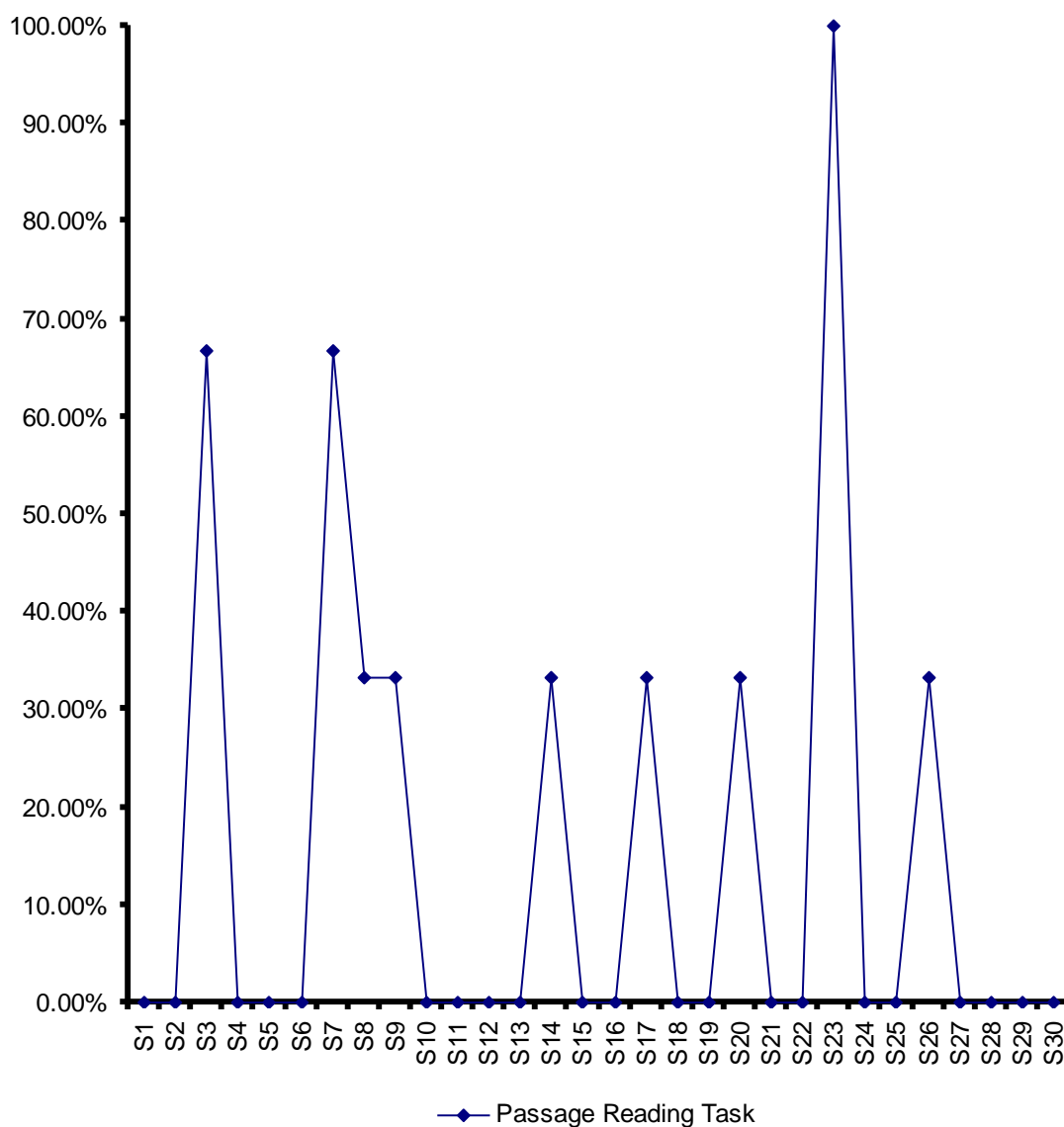Phonological Analysis of English Phonotactics of Syllable Initial and Final Consonant Clusters by Yemeni Speakers of English
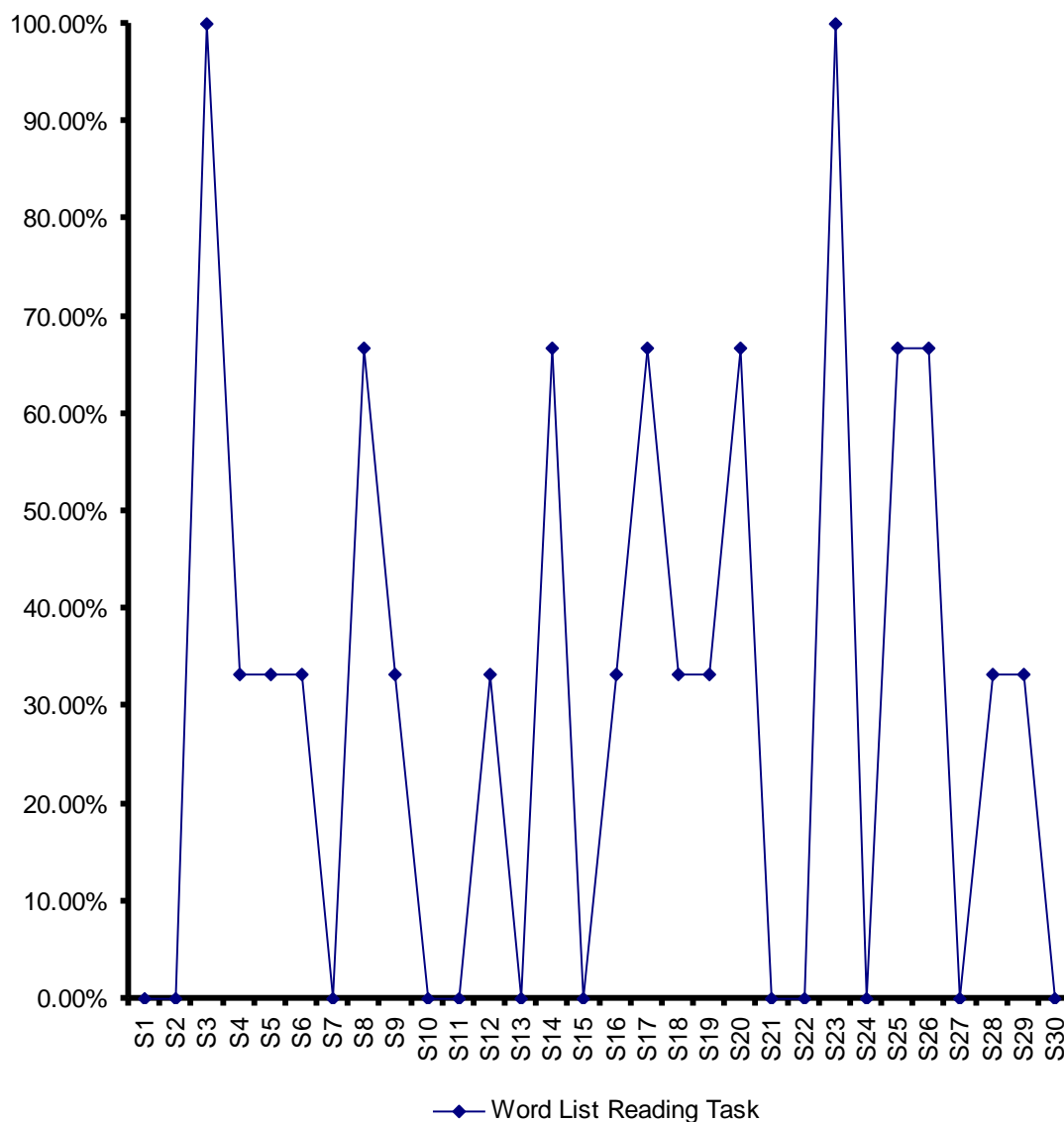
Figure 4.8: The Percentage Score of Accurate Production of the Target Three Consonants in the Syllable-final Cluster produced by the Subjects in the Word List Reading

Table 4.14 demonstrates accurate and inaccurate production of the target three consonants in the syllable-final cluster uttered by the subjects in the passage reading. The results reveal that the subjects inserted a vowel in the target three consonant clusters. This is evident from the subjects' performance of the target words i.e. 'breasts', 'tempt' and 'prompt' in the test (see **Table 4.14**). The most common ones were /ə/ and /ɪ/. For the target word 'breasts, it is interesting to note that S1, S2, S16, S17, S18 and S30 (20 per cent)

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inserted a schwa /ə/ between the target consonant cluster of the coda. This insertion took place before the final consonant sound of the coda. While, S3, S10, S19, S21, S24 and S27 (20 per cent) reduced the consonant cluster of the coda by omitting the final consonant sound i.e. [brest]. In the same manner, S4, S5, S12 and S12 (13.33 per cent) reduced the consonant cluster of the coda by deleting its initial consonant /s/ i.e. [brets]. Besides, S11, S15, S22 and S29 (13.33 per cent) also reduced the consonant cluster of the coda by omitting its pre-final and final consonant sounds i.e. [bres]. Only 1 subject i.e. S6 (3.33 per cent) pronounced the word differently from all the subjects i.e. [bretəs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'breasts' in the passage reading is 76.66 per cent. Again, this finding is in line with the claim of Kharma and Hajjaj (1989). It is worth mentioning that Kharma and Hajjaj (1989:17) stated that Arab speakers of English always 'follow Arabic patterns of speech and add an intrusive vowel which acts as a cluster breaker'. Furthermore, this vowel insertion supports the assumption of Dobrovolsky and Katamba (1996: 84). They state that 'Native speakers of any language intuitively know that certain words that come from other languages sound unusual and they often adjust the segment sequences of these words to conform to the pronunciation requirements of their own language' (Ibid). Accordingly, Yemeni speakers of English in this study were found adjusting segment sequences of English words in the codas to meet that of their source language.

Regarding the word 'tempt', S2, S4, S13, S16, S18, S21 and S22 (23.33 per cent) inserted a schwa /ə/ between the target final consonant clusters in the passage reading i.e. [tempət] whilst S5, S8, S9, S10, S11, S12, S19, S20, S25, S26 and S8 (36.66 per cent) reduced the consonant cluster of the coda by deleting the pre-final consonant sound i.e. [temt]. In addition, S15, S27, S29 and S30 (13.33 per cent) reduced the consonant cluster of the coda by deleting the final consonant i.e. [temp] whereas S14 and S24 (6.66 per cent)

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reduced the pre-final and final consonant sounds of the coda i.e. [tem]. Furthermore, S1 and S6 (6.66 per cent) pronounced the word differently i.e. [tems] and [tempəs] respectively. The percentage of inaccurate pronunciation and vowel insertion for the target word 'tempt' in the passage reading is 86.66 per cent.

As for the word 'prompt', 10 subjects i.e. S1, S2, S5, S6, S9, S10, S13, S15, S16 and S30 (33.33 per cent) inserted a schwa /ə/ between the target final consonant cluster and reduced it by omitting the pre-final consonant i.e. [prɒmət] while 9 subjects i.e. S7, S8, S11, S14, S20, S25, S26, S28 and S29 (30 per cent) did not insert any vowel sound but reduced the consonant cluster of the coda by deleting its pre-final consonant i.e. [prɒmt]. Moreover, 4 subjects i.e. S4, S17, S18 and S2 (13.33 per cent) inserted a schwa /ə/ before the final consonant sounds of the coda i.e. [prɒmpət]. In the same manner, S19 and S24 (6.66 per cent) inserted vowel /ɒ/ between the codas i.e. [prɒmɒt]. Different performances produced by the subjects i.e. S12, S21 and S27 (10 per cent) were [prɒmənt] [prɒpət] and [prɒmp] consecutively. It is important to note here that only 1 subject i.e. S23 produced 3 words out of 3 accurately, and 2 subjects i.e. S3, and S7 produced 2 words out of 3 in the test. The percentage of inaccurate pronunciation and vowel insertion for the target word 'prompt' in the passage reading is 93.33 per cent. Consequently, it can be seen that the patterns of phonological phonotactics produced by the subjects are *C*, *CC*, *CCVC*, *CVCC* and *CVC*.

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Table 4.14: The Production of the Target Three Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading

Subjects	The three consonant sounds in syllable final cluster (CCC)		
	breasts [brests]	tempt [tempt]	prompt [prɒmpt]
S1	[bri:stəs]	[tems]	[prɒmət]
S2	[bərəstəs]	[tempət]	[pərɒmət]
S3	[brest]	●	●
S4	[brets]	[tempət]	[prɒmpət]
S5	[brets]	[temt]	[prɒmət]
S6	[bretəs]	[tempəs]	[prɒmət]
S7	●	●	[prɒmt]
S8	●	[temt]	[prɒmt]
S9	●	[temt]	[prɒmət]
S10	[brest]	[temt]	[prɒmət]
S11	[bres]	[temt]	[prɒmt]
S12	[brets]	[temt]	[prɒmənt]
S13	[bri:sɪsts]	[tempət]	[prɒmət]
S14	●	[tem]	[prɒmt]
S15	[bres]	[temp]	[prɒmət]
S16	[brestəs]	[tempət]	[prɒmət]
S17	[brestəs]	●	[prɒmpət]
S18	[brestəs]	[tempət]	[prɒmpət]
S19	[brest]	[temt]	[prɒmɒt]
S20	●	[temt]	[prɒmt]
S21	[bri:st]	[tempət]	[prɒpət]
S22	[bəres]	[tempət]	[prɒmpət]
S23	●	●	●
S24	[brest]	[tem]	[prɒmɒt]
S25	[brets]	[temt]	[frɒmt]
S26	●	[temt]	[prɒmt]
S27	[brest]	[temp]	[prɒmp]
S28	[brezts]	[temt]	[prɒmt]
S29	[bres]	[temp]	[prɒmt]
S30	[brestəs]	[temp]	[prɒmət]

Notation:
- Accurate pronunciation of the word.

The results in **Table 4.15** illustrate accurate and inaccurate production of the three

consonants in the syllable-final cluster produced by the subjects in the word list reading. The

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results show that there was also a vowel insertion in the target three consonant clusters produced by the subjects. This is evident from the subjects' performance of the target words i.e. 'breasts', 'tempt' and 'prompt' in the test (see **Table 4.15**). The intrusive vowels were /ə/ and /ɪ/ and /ɒ/. For the target word 'breasts', it is found that S1, S2, S6, S16, S18, S21. S22 and S30 (26.66 per cent) inserted a vowel /ə/ between the coda of the target consonant clusters while S10, S15, S24, S25, S7 and S29 (20 per cent) did not insert vowel sounds but reduced the target final consonant clusters by omitting its final consonant in the word list reading i.e. [bri:stəs] and [bri:st] respectively. In a different manner from other subjects, S4, S7 and S13 inserted vowel sounds and pronounced the words [bresət], [bri:sɪs] and [bresɪst] consecutively. The percentage of inaccurate pronunciation and vowel insertion for the target word 'breasts' in the word list reading is 60 per cent.

With regard to the word 'tempt', 4 subject i.e. S2, S17, S21 and S22 (13.33 per cent) inserted a schwa /ə/ between the target final consonant clusters of the coda i.e. [tempət] in the word list reading while 16 subjects i.e. S1, S7, S8, S9, S10, S11, S12, S13, S17, S19, S24, S26, S7, S28, S29 and S30 (53.33 per cent) did not insert any vowel sound between the target final consonant clusters but reduced the consonants of the coda by deleting the pre-final consonant sound i.e. [temt]. Moreover, S5 reduced the consonant clusters of the coda whilst S15 reduced and substituted the coda i.e. [tem] and [temθ] respectively. The percentage of inaccurate pronunciation and vowel insertion for the target word 'tempt' in the word list reading is 73.33 per cent. As for the word 'prompt', S2, S4, S12, S21 and S22 (16.66 per cent) inserted a schwa /ə/ between the target final consonant clusters while S5, S7, S10, S11, S14, S15, S16, S20, S24, S27, S28 and S30 (40 per cent) did not insert any kind of vowel sounds but reduced the consonant clusters by omitting the pre-final consonant sound of the coda i.e. [prɒmpət] and [prɒmt] consecutively.

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The results show further that S1 and S9 inserted the vowel /ɒ/ and reduced the consonant clusters of the target coda simultaneously i.e. [prɒmɒt]. In a different manner from other subjects, S9 and S19 did not insert any vowel sounds but they reduced the consonant cluster of the coda by deleting the pre-final and final consonant sounds i.e. [prɒm]. While, S13 inserted a schwa vowel /ə/ and reduced the consonant cluster by deleting the pre-final consonant sound, and substituted the final consonant sound i.e. [prɒməθ]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'prompt' in the word list reading is 73.33 per cent. Thus, it can be observed that the patterns of phonological phonotactics produced by the subjects in the word list reading are ***CCVC***, ***CC***, ***CVC***, ***CVCC*** and ***C***.

Table 4.15: The Production of the Target Three Consonants in the Syllable-final Cluster produced by the Subjects in the Word List

Subjects	The three consonant sounds in syllable final cluster (CCC)		
	breasts [brests]	tempt [tempt]	prompt [prɒmpt]
S1	[bri:stəs]	[temt]	[prɒmɒt]
S2	[bri:stəs]	[tempət]	[prɒmpət]
S3	•	•	•
S4	[bresət]	•	[prɒmpət]
S5	•	[tem]	[prɒmt]
S6	[brestəs]	•	[prɒm]
S7	[bri:sɪs]	[temt]	[prɒmt]
S8	•	[temt]	•
S9	•	[temt]	[prɒmɒt]
S10	[bri:st]	[temt]	[prɒmt]
S11	[bres]	[temt]	[prɒmt]
S12	•	[temt]	[prɒmpət]
S13	[bresɪst]	[temt]	[prɒməθ]
S14	•	•	[prɒmt]
S15	[bri:st]	[temθ]	[prɒmt]
S16	[bri:stəs]	•	[prɒmt]
S17	•	[temt]	•
S18	[bri:stəs]	[tempət]	•

S19	•	[temt]	[prɒm]
S20	•	•	[prɒmt]
S21	[bri:stəs]	[tempət]	[prɒmpət]
S22	[brestəs]	[tempət]	[prɒmpət]
S23	•	•	•
S24	[brest]	[temt]	[prɒmt]
S25	[bri:st]	•	•
S26	•	[temt]	•
S27	[brest]	[temt]	[prɒmt]
S28	•	[temt]	[prɒmt]
S29	[brest]	[temt]	•
S30	[bri:stəs]	[temt]	[prɒmt]

Notation:
- Accurate pronunciation of the word.

From **Table 4.16**, the results reveal that the subjects did not perform well in the production of the target three consonants in the syllable-final cluster in the passage reading task. As far as the word list reading task is concerned, the subjects seem to perform better in their pronunciation compared to the passage reading task. This is reflected by the mean score of 14.43 in the passage reading task and 31.1 in the word list reading. However, it is interesting to note here that the subjects recorded lower mean scores in both passage reading and word list reading tasks compared to the target three consonants in the syllable-initial. (see **Table 4.8**).

Table 4.16: The Mean Score of Accurate Production of the Target Three Consonants in the Syllable-final Cluster by the Subjects in Passage Reading and Word List Reading

Tasks	Mean Score
Passage Reading	14.43
Word List Reading	31.1

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4.3.3 The Presentation and Discussion of the Target Four Consonants

Table 4.17 illustrates the percentage score of accurate production of the target four consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading. As can be seen from the table, 7 subjects (i.e. 23.33 per cent) and 12 subjects (i.e. 40 per cent) score 33.33 per cent in the passage reading and word list reading respectively. About 5 subjects (i.e. 16.66 per cent) recorded the percentage score of 33.33 per cent in the word list reading.

Table 4.17: The Percentage Score of Accurate Production of the Target Four Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading and Word List Reading

Subjects	Passage Reading	Word List Reading
S1	0	33.33
S2	0	33.33
S3	33.33	0
S4	0	0
S5	0	66.66
S6	0	33.33
S7	0	33.33
S8	33.33	33.33
S9	0	0
S10	0	0
S11	0	0
S12	0	0
S13	0	0
S14	33.33	66.66
S15	0	0
S16	0	66.66
S17	0	33.33
S18	0	0
S19	0	0
S20	0	33.33
S21	33.33	0
S22	0	33.33
S23	33.33	66.66
S24	33.33	33.33
S25	33.33	0
S26	0	33.33
S27	0	33.33

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S28	0	66.66
S29	0	33.33
S30	0	0

Figures 4.9 and **4.10** below illustrate the percentage score of accurate production of the target four consonants in the syllable-final cluster produced by the subjects in the passage reading and word list reading:

— Passage Reading Task

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Figure 4.9: The Percentage Score of Accurate Production of the Target Four Consonants in the Syllable-final Cluster produced by the Subjects in Passage Reading

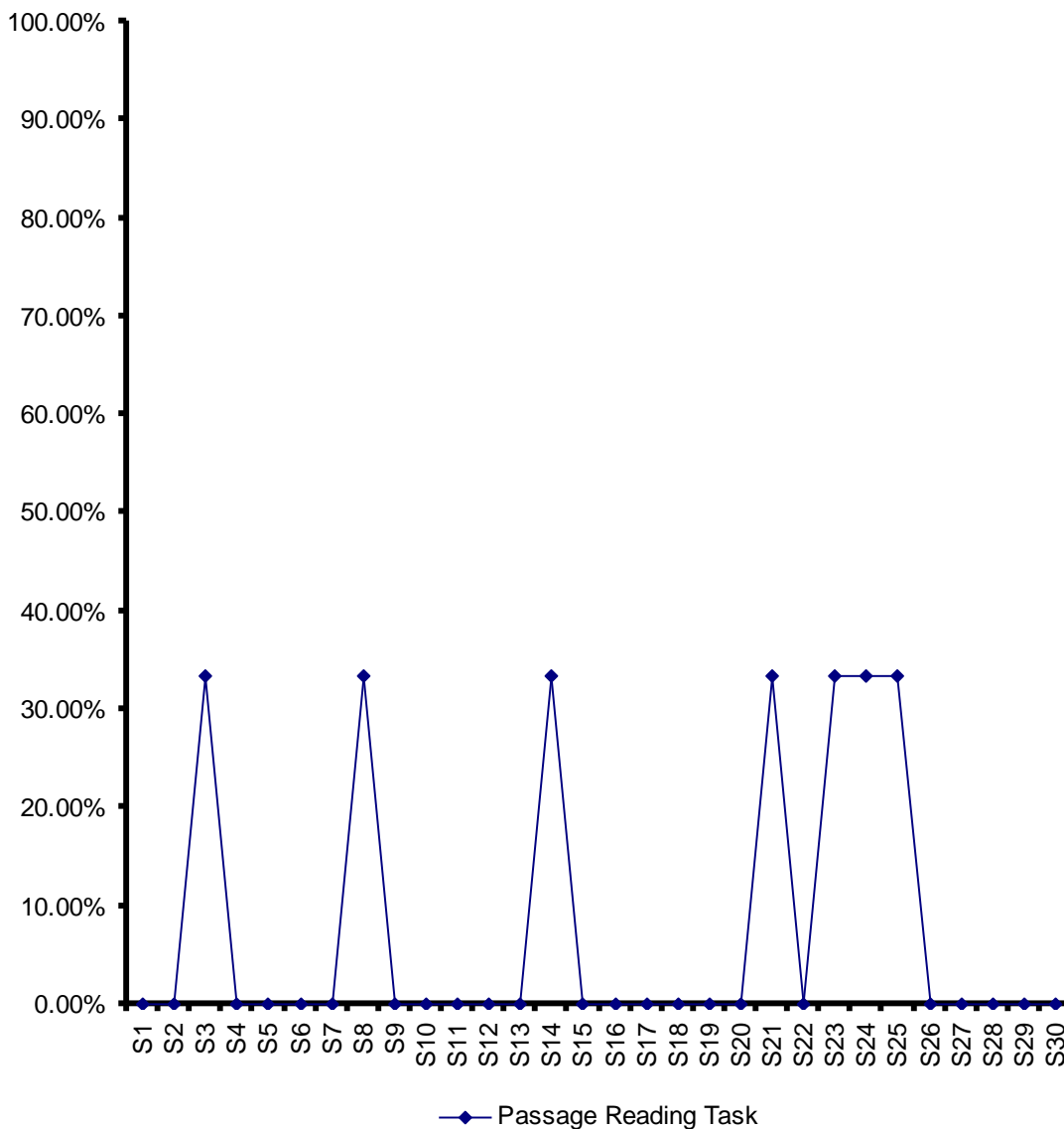**Figure 4.10**: The Percentage Score of Accurate Production of the Target Four Consonants in the Syllable-final Cluster produced by the Subjects in Word List Reading

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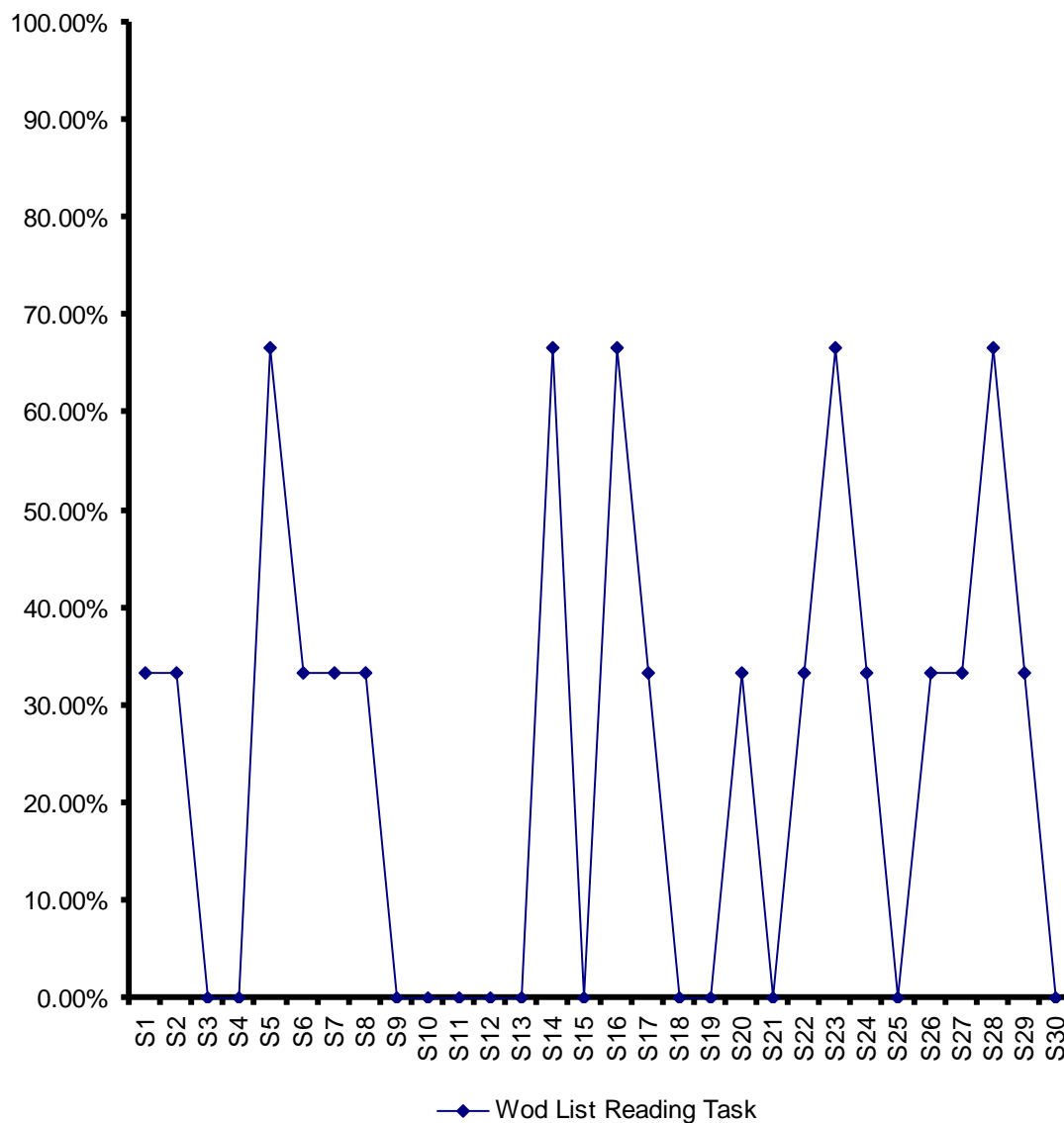**Table 4.18** demonstrates accurate and inaccurate production of the target four consonants in the syllable-final cluster uttered by the subjects in the passage reading. The results reveal that there was a vowel insertion in the target four consonant clusters produced by the subjects. This is reflected in subjects' performance of the target words i.e. 'attempts', 'tempts' and 'texts' in the test (see **Table 4.18**). The vowels were of two kinds: /ə/ and /ɪ/. For the target word 'attempts, it is noted that 4 subjects i.e. S14, S16, S18 and S22 (13.33 per cent) inserted a schwa /ə/ between the consonant clusters of the coda of the target four consonants whilst 14 subjects i.e. S5, S6, S7, S8, S9, S10, S11, S12, S15, S17, S20, S24, S26 and S30 (46.66 per cent) did not insert any vowel sounds but they reduced the consonant cluster by deleting the second consonant sound of the coda i.e. [ətempəts] and [ətemts] respectively. In addition, S2, S4, S13 and S21 (13.33 per cent) inserted a schwa /ə/ between the consonant clusters of the coda and reduced it simultaneously i.e. [ətempət] whereas S25, S27, S28 and S29 (13.33 per cent) did not insert vowel sound but reduced the second and fourth consonant sounds of the coda i.e. [ətemt]. Other different cases which involved insertion and reduction i.e. [ətempəs] and [ətems] were produced by S1 and S19 consecutively. The percentage of inaccurate pronunciation and vowel insertion for the target word 'attempts' in the passage reading is 93.33 per cent.

As far as the word 'tempts' is concerned, S2, S4, S13, S18 and S22 (16.66 per cent) inserted a schwa /ə/ between the consonant clusters of the coda of the target four consonants i.e. [tempəts] whereas S3, S7, S8, S9, S10, S12, S14, S17, S20, S23, S26, S28 and S29 (43.33 per cent) did not insert any vowel sounds but they reduced the consonant cluster by deleting the second consonant sound of the coda i.e. [temts]. In the same manner, S5, S25 and S27 (10 per cent) did not insert vowel sound but reduced the consonant cluster

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i.e. [temt]. Moreover, S11, S15, S19 and S24 (13.33 per cent) also did not insert any vowel sound but reduced the consonant cluster of the coda by omitting the second and third consonant sounds of the cluster i.e. [tems]. It is worth mentioning to note here that S6 inserted two different vowels in the consonant clusters simultaneously i.e. [tempɪtəs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'tempts' in the passage reading is 100 per cent.

As for the word 'texts', the results illustrate that only 1 subject i.e. S13 inserted a schwa /ə/ between the target final consonant clusters and reduced the final sound as well i.e. [tekəst], while all the other subjects did not insert any vowel sounds but they reduced the target final consonant cluster i.e. [teks] and [tekst]. The former was produced by S1, S5, S6, S7, S11, S12, S17, S18, S20, S3, S26, S27 and S30 (43.33 per cent), whilst the latter was produced by S2, S3, S4, S9, S10, S15, S19, S22, S28 and S29 (33.33 per cent). In fact, these findings seem to be in contradiction with the assumption of Byrd (1992: 209) as he used articulatory synthesis to demonstrate that a completely articulated alveolar stop i.e. /t/ and /d/ is not perceived by listeners if it is substantially overlapped with a velar stop i.e. /k/ and /g/. Moreover, he claimed that 'stops are more subject to coda reduction than are fricatives' which is not the case in the findings of the present study i.e. [teks] and [tekst]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'texts' in the passage reading is 83.33 per cent. Consequently, it can be seen that the patterns of phonological phonotactics produced by the subjects are *CCVC*, *CCC*, *CCVCC*, *CC*, *CCVCVC* and *CVCC*.

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Table 4.18: The Production of the Target Four Consonants in the Syllable-final Cluster produced by the Subjects in the Passage Reading

Subjects	The four consonant sounds in syllable final cluster (CCCC)		
	attempts [ətempts]	tempts [tempts]	texts [teksts]
S1	[ətempəs]	[tempəs]	[teks]
S2	[ətempət]	[tempəts]	[tekst]
S3	•	[temts]	[tekst]
S4	[ətempət]	[tempəts]	[tekst]
S5	[ətemts]	[temt]	[teks]
S6	[ətemts]	[tempɪtəs]	[teks]
S7	[ətemts]	[temts]	[teks]
S8	[ətemts]	[temts]	•
S9	[ətemts]	[temts]	[tekst]
S10	[ətemts]	[temts]	[tekst]
S11	[ətemts]	[tems]	[teks]
S12	[ətemts]	[temts]	[teks]
S13	[ətempət]	[tempəts]	[tekəst]
S14	[ətempəts]	[temts]	•
S15	[ətemts]	[tems]	[tekst]
S16	[ətempəts]	[tempəst]	[test]
S17	[ətemts]	[temts]	[teks]
S18	[ətempəts]	[tempəts]	[teks]
S19	[ətems]	[tems]	[tekst]
S20	[ətemts]	[temts]	[teks]
S21	[ətempət]	[tempət]	•
S22	[ətempəts]	[tempəts]	[tekst]
S23	•	[temts]	[teks]
S24	[ətemts]	[tems]	•
S25	[ətemt]	[temt]	•
S26	[ətemts]	[temts]	[teks]
S27	[ətemt]	[temt]	[teks]
S28	[ətemt]	[temts]	[tekst]
S29	[ətemt]	[temts]	[tekst]
S30	[ətemts]	[temtəs]	[teks]

Notation:
- Accurate pronunciation of the word.

The results in **Table 4.19** below demonstrate accurate and inaccurate production of the four consonants in the syllable-final cluster produced by the subjects in the word list reading. The results show that there was vowel insertion in the target four consonant clusters produced by the subjects. This obviously can be seen from the subjects'

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performance of the target words i.e. 'attempts', 'tempts' and 'texts' in the test (see **Table 4.18**). The vowels were /ə/ and /ɪ/. For the target word 'attempts', it is found that S4, S18, S21 and S22 (13.33 per cent) inserted a schwa /ə/ before the pre-final consonant sound of the target consonant clusters i.e. [ətempəts] while S3, S5, S7, S8, S9, S9, S12, S14, S15, S17, S20, S24, S26, S28 and S30 (50 per cent) did not insert vowel sound but they reduced the consonant cluster by omitting the second sound of the coda i.e. [ətemts]. In the same manner, S11, S13, S25, S27 and S29 (16.66 per cent) did not insert any vowel sounds but they reduced the consonant cluster by deleting the second and fourth consonant sounds of the coda i.e. [ətemt]. It is interesting to find here that S2 inserted two different sounds in the target coda i.e. [ətempətɪs], whilst S1 inserted a vowel /ɪ/ and reduced the pre-final consonant sound of the cluster of the target coda i.e. [ətempɪs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'attempts' in the word list reading is 90 per cent.

With regard to the word 'tempts', 14 subjects i.e. S3, S7, S8, S10, S11, S12, S15, S17, S20, S24, S26, S27, S29 and S30 (46.66 per cent) produced this word without inserting vowel sounds in the same manner i.e. [temts]. However, they reduced the consonant cluster of the coda by deleting the second consonant sound /p/. In the same way of pronunciation, S4, S21 and S22 (10 per cent) inserted a schwa /ə/ whereas S6, S13 and S18 (10 per cent) inserted vowel /ɪ/ i.e. [tempəts] and [tempɪts] respectively; while S9 and S25 (6.66 per cent) did not insert any vowel but reduced the consonant cluster of the coda i.e. [tempt]. It is worth mentioning to note here that S2 inserted two different sounds in the target coda i.e. [tempətɪs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'tempts' in the word list reading is 80 per cent.

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As for the word 'texts', S1, S3, S4, S9, S11, S15, S16, S18, S19, S21 and S25 (36.66 per cent) did not insert vowel sound but they reduced the final consonant sound of the consonant cluster of the coda i.e. [tekst], whilst S10 and S23 (6.66 per cent) reduced the pre-final and final consonant sounds of the coda i.e. [teks]. However, S13 (3.33 per cent) inserted a schwa /ə/ in the consonant cluster of the coda and reduced the final consonant sound i.e. [tekəst]. In a different manner from all the subjects, S30 inserted three vowel sounds: one vowel /e/ and two schwas /ə/ i.e. [tekestəkəs]; while S6 inserted two vowels i.e. [tekəstəs]. The percentage of inaccurate pronunciation and vowel insertion for the target word 'texts' in the word list reading is 56.66 per cent. Thus, it can be observed that the patterns of phonological phonotactics produced by the subjects in the word list reading are *CCVC*, *CCVCVC*, *CCC*, *CCVCC*, *CC*, *CVCC*, *CVCCVC* and *CVCCVCVC*.

Table 4.19: The Production of the Target Four Consonants in the Syllable-final Cluster produced by the Subjects in the Word List

Subjects	The four consonant sounds in syllable final cluster (CCCC)		
	attempts [ətempts/	tempts [tempts]	texts [teksts]
S1	[ətempɪs]	●	[tekst]
S2	[ətempətɪs]	[tempətɪs]	●
S3	[ətemts]	[temts]	[tekst]
S4	[ətempəts]	[tempəts]	[tekst]
S5	[ətemts]	●	●
S6	●	[tempɪts]	[tekəstəs]
S7	[ətemts]	[temts]	●
S8	[ətemts]	[temts]	●
S9	[ətemts]	[tempt]	[tekst]
S10	[ətemts]	[temts]	[teks]
S11	[ətemt]	[temts]	[tekst]
S12	[ətemts]	[temts]	[tekts]
S13	[ətemt]	[tempɪts]	[tekəst]
S14	[ətemts]	●	●
S15	[ətemts]	[temts]	[tekst]
S16	●	●	[tekst]
S17	[ətemts]	[temts]	●
S18	[ətempəts]	[tempɪts]	[tekst]
S19	[ətemps]	[tempθ]	[tekst]
S20	[ətemts]	[temts]	●

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S21	[ətempəts]	[tempəts]	[tekst]
S22	[ətempəts]	[tempəts]	•
S23	•	•	[teks]
S24	[ətemts]	[temts]	•
S25	[ətemt]	[tempt]	[tekst]
S26	[ətemts]	[temts]	•
S27	[ətemt]	[temts]	•
S28	[ətemts]	•	•
S29	[ətemt]	[temts]	•
S30	[ətemts]	[temts]	[tekestəkəs]

Notation:

- Accurate pronunciation of the word.

From **Table 4.20** below, the results reveal that the subjects seem to have difficulty in their production of the target four consonants in the syllable-final cluster in both passage reading and word list reading. This is reflected by very low mean scores of 7.76 and 24.44 consecutively. However, it is interesting to note here that the subjects in this study recorded the lowest mean scores in both passage reading task and word list reading task compared to other target consonant clusters in both syllable-initial and syllable-final.

Table 4.20: The Mean Score of Accurate Production of the Target Four Consonants in the Syllable-final Cluster by the Subjects in Passage Reading and Word List Reading

Tasks	Mean Score
Passage Reading	7.76
Word List Reading	24.44

To sum up, the results reveal that Yemeni speakers of English experience the difficulty in the production of pronunciation of the syllable-final consonant clusters more than in the syllable-initial consonant clusters except the target three consonant clusters of the

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syllable-initial in the passage reading as well as the target two consonant cluster of the syllable-final in both passage reading and word list reading tasks. This is reflected, for instance, by the mean scores of 81.10 and 88.9 in the production of the target two consonant clusters in the syllable-initial, and 56.66 and 81.1 in the production of the target three consonant clusters in the syllable-initial (see **Table 4.21**). However, the subjects scored 75.56 and 80 in the production of the target two consonant clusters in the syllable-final, and 14.43 and 31.1 in the production of the target three consonant clusters in the syllable-final respectively. On the other hand, they scored the lowest mean scores of 7.76 and 24.44 in the production of the target four consonant clusters in the syllable-final (see **Table 4.22**). Interestingly, the results also reveal that the subjects in this study perform better in the word list reading task compared to that of passage reading.

Table 4.21: The Percentage Score and Mean Score of Accurate Production of the Target Two Positions of the Syllable-initial in the Passage Reading and Word List Reading

Syllable-initial	Tasks	Mean Score
Two consonant clusters	Passage Reading	81.10
	Word List Reading	88.9
Three consonant clusters	Passage Reading	56.66
	Word List Reading	81.1

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Table 4.22: The Percentage Score and Mean Score of Accurate Production of the Target Three Positions of the Syllable-final in the Passage Reading and Word List Reading

Syllable-final	Tasks	Mean Score
Two consonant clusters	Passage Reading	75.56
	Word List Reading	80
Three consonant clusters	Passage Reading	14.43
	Word List Reading	31.1
Four consonant clusters	Passage Reading	7.76
	Word List Reading	24.44

4.4 Conclusion

The chapter presented the results of the syllable-initial consonant clusters and syllable-final consonant clusters produced by Yemeni speakers of English. The chapter aimed at providing a full description and discussing the results in particular reference to research methods; viz, passage reading and word list reading. The percentage score and mean score in passage reading and word list reading were presented and highlighted. Then, the patterns of phonological phonotactics in the syllable-initial and syllable-final were reported and discussed. In short, it was the aim of this chapter to establish the importance of good production of English pronunciation amongst Yemeni speakers of English. The following chapter will conclude and account for research questions of the study to achieve the objectives of the study.

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CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter proposes to summarize the results reported, in the preceding chapter, on the syllable-initial consonant clusters and syllable-final consonant clusters produced by Yemeni speakers of English. The results will be discussed in the context of the objectives of the present study and in accordance to the following research questions:

4. What are the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters while speaking English?

5. What are the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters while speaking English?

6. To what extent does language transfer exist the phenomenon of vowel insertion within the pronunciation of English syllable-initial and syllable-final consonant clusters produced by Yemeni speakers of English?

The summary of the results is assigned into three main parts. The first part accounts for research question (1) and describes the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters while speaking English. The second part accounts for research question (2) and illustrates the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters while speaking English. The third part gives an account for research question (3) and explains

whether or not there was language transfer that exists the phenomenon of vowel insertion within the pronunciation of English syllable-initial and syllable-final consonant clusters produced by Yemeni speakers of English. If there was vowel insertion; then what type is it and what are the sequences of segments produced by them.

Lastly, the chapter recaps the objectives of the study, research methods employed for the study, and the results of the study. In addition, the statement of the problem is highlighted in accordance to the results. More importantly, pedagogical considerations and recommendations will be presented in an attempt to feedback Yemeni speakers of English regarding phonological phonotactics in their pronunciation.

5.2   Summary of the Results

The summary of the results in this study are presented according to the research questions posited in Chapter One, Section 1.6. To recapitulate, one of the main objectives of this study is to find out whether or not there is language transfer, i.e., vowel insertion in the syllable-initial consonant clusters and syllable-final consonant clusters. In doing so, research questions will be answered and consequently objectives of the study will be achieved. The three subsections below present a summary of the results to account for research questions of the study.

5.2.1 Summary of the Results of Research Question 1

As illustrated in **Tables 4.2**, **4.3**, **4.6** and **4.7** in Chapter Four, the patterns of phonological phonotactics produced by Yemeni speakers of English in the pronunciation of English syllable-initial consonant clusters are as follows:

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The patterns of phonological phonotactics in the target two consonant clusters in both tasks passage reading and word list reading were in the sequence of ***CVC***, ***VCC*** and ***CV*** (see **Tables 4.2** and **4.3**). On the other hand, the patterns of phonological phonotactics in the target three consonant clusters in passage reading and word list reading tasks were in the sequence of ***VCCC***, ***CCVC*** and ***CC*** (see **Tables 4.6** and **4.7**), However, the English sequence in the syllable-initial consonant clusters is ***CCC*** (Roach, 2001). Therefore, these different sequences which were found in the pronunciation of Yemeni speakers of English suggest that they tend to conform to the pronunciation requirements of their own source language, Arabic, by inserting vowel sounds in consonant clusters which results in unacceptable consonant sequences in English syllables. This underpins the claim of Kharma and Hajjaj (1989) as well as Dobrovolsky and Katamba (1996) as mentioned earlier. In short, finding out such sorts of patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters achieve the first objective of the study and in accordance account for the first research question.

5.2.2 Summary of the Results of Research Question 2

As illustrated in **Tables 4.10**, **4.11**, **4.14**, **4.15**, **4.18** and **4.19** in Chapter Four, the patterns of phonological phonotactics produced by Yemeni speakers of English in the pronunciation of English syllable-final consonant clusters are as follows:

The patterns of phonological phonotactics in the target two consonant clusters in both tasks passage reading and word list reading were in the sequence of ***C***, ***CVC*** and ***VC*** (see **Tables 4.10** and **4.11**). On the other hand, the patterns of phonological phonotactics in the target three consonant clusters in the passage reading task were in the sequence of

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CCVC, ***CC***, ***CVC***, ***C***, ***CVCCC*** and ***CVCC*** (see **Table 4.14**), while the patterns of phonological phonotactics in the target three consonant clusters in the word list reading task were in the sequence of ***CCVC***, ***CVC***, ***CVCC***, ***CC*** and ***C*** (see **Table 4.15**). The patterns of phonological phonotactics in the target four consonant clusters in the passage reading task produced by the subjects were in the sequence of ***CCVC***, ***CCC***, ***CCVCC***, ***CC***, ***CCVCVC*** and ***CVCC*** (see **Table 4.18**), whereas in the word list reading task were in the sequence of ***CCVC***, ***CCVCVC***, ***CCC***, ***CCVCC***, ***CC***, ***CVCC*** and ***CVCCVC*** (see **Table 4.19**).

Consequently, this sequence produced by Yemeni speakers of English in the syllable-final consonant clusters (i.e., two consonant clusters, three consonant clusters and four consonant clusters) demonstrates that they have the tendency to harmonize the pronunciation requirements of their first language with that of English, which violates consonant sequences in English syllables. In brief, inducing such sorts of patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters achieve the second objective of the study and account for the second research question accordingly.

5.2.3 Summary of the Results of Research Question 3

As demonstrated in **Tables 4.2**, **4.3**, **4.6**, **4.7**, **4.10**, **4.11**, **4.14**, **4.15**, **4.18** and **4.19** in Chapter Four, it can be observed that language transfer exists the phenomenon of vowel insertion within the pronunciation of English syllable-initial and syllable-final consonant clusters produced by Yemeni speakers of English. The vowel insertion was found in three types of vowel sounds. They are /ə/, /ɪ/ and /ɒ/. However, the most common ones are /ə/ and /ɪ/. The former took place much more than the latter. Finding out this vowel insertion within the pronunciation of English syllable-initial and syllable-final consonant clusters

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produced by Yemeni speakers of English supports the contention of Kharma and Hajjaj (1989: 17) that Arab speakers of English always 'follow Arabic patterns of speech and add an intrusive vowel which acts as a cluster breaker'. In fact, it achieves the third objective of the study and accordingly accounts for the third research question.

In conclusion, phonological phonotactics were found to play a significant role in second/foreign language acquisition as Altenberg (2005: 53) stated in his study that 'phonotactics constraints have been shown to play a role in first and second language acquisition as well as in adult language processing'. This led different researchers e.g. (Carlsile, 1991; Dobrovolsky & Katamba, 1996; Engstrand & Krull, 2001; Anttila, 2002; Kochetov, 2004; Altenberg, 2005; Uffmann, 2006) to conduct several studies and investigations where diverse conclusions were reached.

Empirical researches on phonological phonotactics have focused on language transfer; many of which adapted interlanguage theory as framework (i.e., Vijayalatshmi, 1985; Selinker, 1988; Alias Abd Ghani, 2003 and Monahan, 2001) and Labovian model (i.e. Schmidt, 1977; Dickerson, 1974; Archibald, 1992, 1993; Alias Abd Ghani; 1995, 2003; Su-Yin, 2001; Al-Fakhri, 2003 and Shaker, 2004) as a methodology for their studies. Likewise, the present study employed interlanguage theory with regard to language transfer as a framework for the study, and the two tasks of Labovian model, viz, passage reading and word list reading. These two tasks were utilized for data collection. The adaptation of the passage reading into separate sentences was basically based on that of Monahan (2002). In short, both of the interlanguage theory and Labovian model were adopted due to their applicability and practicability to the present study.

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The 15 words which employed in the two tasks of Labovian model; passage reading and word list reading were also used to collect the speech data from the subjects as to achieve the following objectives:

1. Investigate the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-initial consonant clusters while speaking English.

2. Identify the patterns of phonological phonotactics produced by Yemeni speakers of English in the production of pronunciation of English syllable-final consonant clusters while speaking English.

3. Identify if there exists the phenomenon of language transfer, i.e. vowel insertion within the pronunciation of English syllable-initial and final-consonant clusters produced by Yemeni speakers of English.

Based upon the above objectives, the three research questions of the study were answered according to the results found in the data analysis. Therefore, Yemeni speakers of English, who learn English as an EFL, were found to have difficulty in the production of pronunciation of English syllable-initial and/or syllable-final consonant clusters particularly involving three and four consonant clusters in the syllable-final.

The compiled data, from the two tasks of Labovian model, administered on 30 Yemeni speakers of English, and discussed in Chapter 4, reveal that Yemeni speaker of English have the tendency to insert vowel sounds in the syllable-initial consonant clusters and/or the syllable-final consonant clusters in order to harmonize with the pronunciation requirements of their own source language, Arabic, which results in unacceptable consonant sequences in English syllables. Hence, this highlights all the claims and contentions in the statement of the problem of the present study. For instance, Al-Hattaami (2000: 84)

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contended that phonological differences between Arabic and English systems are 'likely to create problems of pronunciation to native speakers of Arabic learning English as a foreign language'. He further stated that Yemeni speakers of English 'break the cluster by inserting a vowel between the consonants' (ibid).

Moreover, Dobrovolsky and Katamba (1996: 84) state that 'Native speakers of any language intuitively know that certain words that come from other languages sound unusual and they often adjust the segment sequences of these words to conform to the pronunciation requirements of their own language'. In the same vein, Salim Abu-Rabia and Simona Kehat (2004: 77) state further saying that 'Although some adult learners of a second language may attain a relatively high or even a complete mastery of the language, they do not seem to be able to get rid of their native accent'.

Interestingly, each task of Labovian model elicited different data. For instance, passage reading task showed that the subjects pronounced the stimuli spontaneously and in a casual manner, meanwhile word list reading task showed that the subjects pronounced the stimuli attentively and in a careful manner. This is clearly reflected in the mean scores of 56.66 and 81.1 in the production of the target three consonant clusters in the syllable-initial (see **Table 4.21**).The former might be attributed as the stimuli were given in separate sentences, whilst the latter the stimuli were rendered to them individually. In short, it would be of use to elicit good data to employ the passage reading task only, since it demonstrates the real articulation of the subjects. However, this does not mean that word list reading task is not valid or expedient for data collection.

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5.3   Pedagogical Implications

The results of the present study show some pedagogical implications in the pronunciation of the target language, English. The target subjects of the study had difficulties in the production of pronunciation particularly in the syllable-initial consonant clusters (only in the three consonant clusters in the passage reading task) and the syllable-final consonant clusters (except the two consonant clusters in both tasks). Hence, there is a need to consider teaching, at least, section of pronunciation. Consequently, it would be advantageous to include a pronunciation unite within curricula to be taught to students. Sahu (1999) argues that 'curriculum plays a crucial and decisive role to usher in the desired changes in the academic scenario of any country'. He adds, in a hint to Yemeni English curriculum, that the curricula have many deficiencies. Including pronunciation unite within curricula will help boost students' performance in achieving fluency. In this regard, Rababah (2003) asserts that many Arab learners have certain difficulties in speaking especially in pronunciation and phonological errors. Sahu (1999), on the other hand, argued that Yemeni speakers of English have difficulties in their pronunciation saying that 'most of their utterances are phonologically flawed, they are, to a considerable extent, unintelligible as well'.

Regarding English syllable, Roach (2001:74) points out 'English has a more complex syllable structure than most languages'. He adds 'it is advisable to discover exactly which types of consonant cluster are difficult for learners of a particular native-language background and construct exercises to give practice in them. There is practice material on consonant clusters in Mortimer (1984)' (ibid). Based on Roach's recommendation, the results show that the English syllable-final two consonant clusters, syllable-final three consonant clusters and syllable-final four consonant clusters are more difficult than the English syllable-initial two consonant clusters and syllable-initial three consonant clusters. Hence, Yemeni

speakers of English can make 'practice material on consonant clusters in Mortimer (1984)' (ibid).

Last but, certainly, not the least, the researcher does agree with Al-Hattaami (2000:85) in his conclusion that 'the remedial measures are in the hands of the teachers' with taking into considerations 'the dissimilarities between the two language systems' and hence teachers would be capable to prepare remedial drills to teach the pronunciation of English to the learners who learn English as a foreign language (Ibid). In addition, the researcher goes for the same claim of Puppel (1990: 241) that 'the difficulties of learning the sounds of a target language (TL), resulting from the differences between the source language (SL) and the target language sound systems, represents a well-known area of failure in second language learning'.

It seems that there is a need for reviewing English curricula, since there are claims (e.g., Sahu, 1999; Al-Fadly, 2004) considering the curriculum one of these factors that affects Yemeni learners' proficiency. Therefore, 'the clear relevance of the English courses to learners' needs would improve the learner's motivations and thereby make learning better and faster' (Al-Fadly, 2004: 21). Taking this in an account, the students will receive accurate pronunciation and attain fluency in English.

5.4   Recommendations for Further Research

The present study has given invaluable insights into the role of phonological phonotactics of pronunciation of English syllable-initial and syllable-final consonant clusters by Yemeni speakers of English. According to the thorough search by the researcher and eventually to the report obtained from NIC (National Information Center, 2005) in Yemen

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before conducting the present study, this study has been labeled to be as the first investigation of its kind on Yemeni speakers of English.

However, as this study was conducted in non-Yemeni context, viz, in Malaysia; in Universiti Sains Malaysia (USM), it is, therefore, recommended to replicate the present study in the Yemeni context. Replication of this study on students who are majoring in English would be useful and might reveal advantageous insights, since the subjects of the present study were not English major. Since the present study was restricted to Yemeni speakers of English, it would be expedient to carry out similar study on Arab speakers of English in the Arab World. It is recommended to investigate syllable-medial consonant clusters which were not involved in the present study. It is also recommended to investigate the production of vowel sounds by Yemeni speakers of English or Arab speakers of English.

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APPENDICES

Appendix A

Test Material

Word List 1 for syllable-initial consonant clusters

Please, read these words ONCE only, clearly and loudly

Symbol	syllable-initial consonant (onset)
CC	**dr**ink **pl**ease **Tr**iple
CCC	**str**ategy **scr**eam **spr**ing

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Appendix B

Test Material

Word List 2 for syllable-final consonant clusters

Please, read these words ONCE only, clearly and loudly

Symbol	syllable-final consonant (coda)
CC	ethi**cs**
	linguisti**cs**
	ter**ms**
CCC	brea**sts**
	te**mpt**
	te**xt**
CCCC	atte**mpts**
	te**mpts**
	te**xts**

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Appendix C

Test Material

Passage Reading1 for syllable-initial consonant clusters

Please, read the following sentences as clear as you can

The syllable-initial two consonant clusters (CC)

- John and Mary **drink** tea.

- Come in **please**

- You can **triple** your income

The syllable-initial three consonant clusters (CCC)

- I used one **strategy**.

- I **scream** with laughter.

- She can **spring** quickly.

Appendix D

Test Material

Passage Reading 2 for syllable-final consonant clusters

Please, read the following sentences as clear as you can

The syllable-final two consonant clusters (CC)

- Every profession has its own **ethics**.

- I am a student of **Linguistics**.

- It has three **terms**.

The syllable-final three consonant clusters (CCC)

- She has prominent **breasts**.

- New movies **tempt** people to watch them.

- I can read easy **text** very fast.

The syllable-final four consonant clusters (CCCC)

- He did successful **attempts**.

- The weather **tempts** us to go for a swim.

- They can write **texts** so fast.

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