AN ANALYSIS OF ERRORS OF BRAZILIANS IN THE PLACEMENT OF ENGLISH WORD STRESS

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RESUMO

A acentuação vocabular neste estudo se refere à saliência de uma sílaba de uma palavra devido a várias dimensões. Concluiu-se que a maneira mais adequada de prever as dificuldades dos brasileiros na colocação da acentuação vocabular inglesa é por análise de erros. Primeiro aplicou-se um teste de palavras inventadas a um grupo de falantes nativos de inglês para descobrir quais são as regras de acentuação dominadas por eles. De acordo com estes resultados, aplicou-se outro teste de palavras verdadeiras a um grupo de estudantes brasileiros do curso de Letras para descobrir quais das regras dominadas pelos nativos criam mais dificuldade para os brasileiros. Na análise de erros deste teste estabeleceu-se uma hierarquia de dificuldades das regras, e foram definidas seis estratégias de predição aplicadas pelos alunos brasileiros, ora ajudando ora prejudicando a aprendizagem e a aplicação das regras. Os resultados foram aplicados a uma estratégia pedagógica do ensino da acentuação.

ABSTRACT

Word stress in this study refers to the predominance of one syllable of a word due to several different dimensions. It was concluded that the most adequate way of predicting the difficulties of Brazilians in the placement of word stress is by error analysis. First a test of nonsense words was applied to a group of native English speakers to discover which stress rules are applied with consistency by them. According to these results, another test of real words was applied to a group of Brazilian students from the Letras course to find out which of the rules applied by the native speakers cause the Brasilians most difficulty. In the error analysis of this test, a hierarchy of difficulty of the rules was established, and six prediction strategies were discovered which are evidently applied by the Brazilian students, sometimes aiding and sometimes interfering with the learning and application of the stress rules. The results were applied to a pedagogical strategy for the teaching of word stress.

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PHONETIC SYMBOLS USED*

V = vowel
C = consonant

I	= b<u>i</u>t	iy	= b<u>ee</u>t
ɛ	= b<u>e</u>t	ey	= b<u>ai</u>t
æ	= b<u>a</u>t	ay	= b<u>i</u>te
ɔ	= b<u>ough</u>t	ow	= b<u>oa</u>t
a	= b<u>o</u>ther	uw	= b<u>oo</u>t
ʌ	= b<u>u</u>t	yuw	= b<u>eau</u>ty
ʊ	= b<u>i</u>rd		

ˊ = primary stress

* In reviewing stress descriptions, the notation used by each linguist was maintained.

INTRODUCTION

The author was motivated to look into the subject of English word stress by her own experience with Brazilian students of English. During frequent correction of stress placement in the pronunciation of both beginning and advanced students, without accompanying explanation which could avoid similar errors in the future, frustration was both felt by the author and detected in her students.

In all the English teaching material familiar to the author at that time, it was assumed that the foreign student of English would simply have to remember the stress pattern of every word he learned. However, in helping advanced students with technical literature written in English, it was noticed by the author that she, as a native speaker of English, could, with a high degree of confidence, give the stress pattern of totally unfamiliar English words. This led her to believe that, if native speakers of English learn unconsciously some sort of generalizations which enable them to pronounce most unknown words with correct stress placement, then the foreign learner can be taught to do the same.

Less meticulous Brazilian students of English may give little importance to correct stress, rationalizing that the native speaker of Brazilian Portuguese will usually understand a foreigner who says, for example, *sintoma* for *sintoma*. However, English is a different case. As pointed out by Mahandru (1975: 97-8), "The sounds of English vowels being so closely linked with the incidence of stress, a mis-stressed syllable can easily result in an utterance not even remotely

resembling the intended word." He gives as an example the word *adolescent*, which, if wrongly stressed on the second syllable, sounds like *a-dollar-cent*.

The importance of English word stress was recognized as early as 1918 by Daniel Jones,who wrote in detail on the subject in *An Outline of English Phonetics* (1962: 245-62). However, although Jones gave many generalizations about English stress, he concluded that "Generally speaking, there are no rules determining which syllable or syllables of polysyllabic English words bear the main stress. The foreign student is obliged to learn the stress of each word individually." (1962: 248).

Many other more recent linguists have commented on the importance and difficulty of English word stress, most giving as the reason for its importance the influence on the vowels and even the consonants of the word. Furthermore, most linguists today admit that English word stress follows some sort of pattern. The problem is that they differ greatly in the manner of describing this pattern.

The first generalizations made related stress patterns to suffixes and prefixes. Daniel Jones was among the first to see this relationship, but the most complete study to date is *The Groundwork of English Stress* by Roger Kingdon.

The transformational-generativists, lead by Noam Chomsky, assume that it is easier, at least for the native speaker, to apply a succession of complicated rules than to store a bulk of material such as Kingdon's long list of suffixes. The two most complete analyses to date from the TG point of view are found in Chomsky and Halle's *The Sound Pattern of English* (1968) and Halle and Keyser's *English Stress: Its Form, Its Growth, and Its Role in Verse* (1971), the latter analysis being a revised version of the former.

Finally, there has been an attempt at combining these two types of analysis by Lionel Guierre in various articles and in his *Drills in English Stress Patterns*, and by Wayne B. Dickerson in his articles on applying generative grammar and spelling conventions to teaching English Stress and vowel quality.

The ultimate purpose of this study is to give general suggestions for improving the word stress placement of

Brazilian students of English and to give more specific suggestions for a remedial program for advanced students. To do this, it is necessary to know which stress patterns cause the most difficulty and why.

For both of these questions, it was thought that a contrastive analysis would be insufficient, as many contemporary linguists have shown that many errors are not directly due to native language influence. An error analysis was therefore undertaken. This analysis was limited to primary stress for two reasons. The first reason was simply to be able to make a thorough analysis without going beyond the scope of a Master's thesis. The second reason was the difficulty of accurately distinguishing weaker stresses. Trammel (1978: 86) cites Lieberman, who

> "in his article 'On the Acoustic Basis of the Perception of Intonation by Linguists' (*Word*, 1965, 21: 53) has shown, however, that even linguists are 'unable to transcribe accurately more than two degrees of stress, stressed or unstressed' when listening to fixed vowels with modulated fundamental frequency and amplitude contours."

After listening to the tapes, it was felt that the author's identification of weaker stressed syllables would not be sufficiently reliable.

The question of which stress patterns cause the most difficulty involves the problem of different types of description. For the present error analysis, it was necessary to choose among affix generalizations, TG rules, and a combination of the two. Rather than choose one on a theoretical basis, a test of nonsense words was applied to native speakers to see which rules or generalizations were most easily followed.

On the basis of the results of this test, a test of real words was elaborated for advanced Brazilian students of English, using the rules[1] most easily followed by the native speakers. The error analysis was then made in three phases. The

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(1) In SPE the word "rule" refers specifically to TG rewrite rules; Guierre's use of the term is more general. The word "rule" in this thesis, unless otherwise specified, refers to any kind of generalization about the language potentially used by its speakers to produce acceptable utterances.

first step was to establish a hierarchy of difficulty of the stress patterns tested. Then general strategies were hypothesized to explain errors of word stress. Finally the established hierarchy was reexamined in light of the general strategies, in an attempt to explain why some rules are easier than others.

Although the students tested were of two different university levels, the resulting hierarchy cannot be claimed as an order of learning, but only an indication of the difficulty of each rule for students of these two advanced levels. To discover the order in which the rules are learned, a longitudinal study starting from the beginning levels would be needed. However, since ideally the ultimate goal is for all students to reach these advanced levels, it was hoped that the establishment of a hierarchy would do two things: (1) indicate the rules which would need most practice in an advanced level remedial course, and (2) lead to suggestions for teaching stress placement at more elementary levels which could prevent the typical problems encountered later at the advanced levels.

Finally, after examining the approaches used up until now, specific suggestions are given for teaching English stress during a four-year university program, and more general suggestions are given for remedial work.

The thesis is divided into three chapters. Chapter One begins with a definition of word stress and a discussion of its relationship to sentence stress. This is followed by a review of the various descriptions of English stress up to the present including the transformational-generative (TG) controversy about psychological reality.

Chapter Two begins with a discussion of the merits of contrastive analysis and error analysis, leading to an explanation of why error analysis was chosen for this study. This is followed by a review of previous studies, of both the contrastive and error analysis types, and an explanation of how the approach and general methodology adopted here differ from the previous studies and why.

Chapter Three deals with the test of native speakers to see which types of rule are most easily applied. This account includes the methodology, results, and conclusions, with the list of stress rules selected for the error analysis.

The error analysis is described in Chapter Four, including the methodology used in the test of Brazilian students, a hierarchy of difficulty of the rules tested, a statistical analysis showing error causing strategies, a discussion of the effect of these strategies on the hierarchy, and conclusions.

The final chapter discusses the pedagogical application of the discoveries of the previous chapter. First previous approaches of teaching stress, both theoretical and practical, are examined in light of the insights gained in our error analysis. Then a suggested teaching methodology and order of presentation of the stress rules are given for a four-year university program, along with a few general comments about remedial work.

The conclusion gives a synopsis of the discoveries made in the previous chapters and suggestions for experimentation in the pedagogical application discussed in the final chapter. Finally attention is directed toward the need for further research in this and related areas.

CHAPTER ONE

ENGLISH WORD STRESS

1.1. Definition of Word Stress

Stress is a term which, although used more and more frequently by contempory linguists, has not yet lent itself to the formation of a single, simple, clear-cut definition. It is often used interchangeably with words such as accent, prominence, loudness, emphasis, intensity, and so on. Each linguist usually defines it and uses it in a manner convenient for his or her particular study.

The qualities of stress can be described from three different points of view: (1) the physiological, dealing with the type of effort required by the speaker for transmission; (2) the physical, dealing with the measurable acoustic qualities; and (3) the psychological, dealing with the perception by the listener.(2)

1.1.1. Physiological Point of View

From the physiological point of view, stress is described by Jones (1962: 245) as "the degree of force with which a sound or syllable is uttered." He calls it a

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(2) Crystal (1969: 113) groups together the physico-physiological as opposed to the psychological.

"subjective action," rather than specify what kind of force is involved. Kingdon (1958: 1) gives an almost identical definition: "the relative degree or force used by a speaker on the various syllables he is uttering. It gives a certain prominence to the syllables, and hence to the words, on which it is used."

For Gimson (1970: 223) stress is greater breath effort and muscular energy. Vanderslice and Ladefoged (1972: 820), in their binary description use heavy and light stress to refer to "full articulations versus reduced timing;" and accent, which corresponds to primary stress, to refer to the presence versus absense of "increased respiratory energy and laryngeal adjustment." Ladefoged et al. (1973: 212) relate stress specifically to human behavior in production when they say that "the degree of stress is often related to the extra increase in muscular activity."

Finally, Byrne and Walsh (1973: 159) state simply that stressed syllables are those which "are pronounced with more energy than others." All of these definitions give the vague impression that a stressed syllable requires more effort of some sort than other syllables.

1.1.2. Physical Point of View

Although the acoustic properties of stress are rather removed from the study of learning difficulties, one acoustic study is worth mentioning here because it relates the acoustic or physical to the psychological. D.B. Fry, (cited By Crystal, 1969: 117) in his articles "Duration and intensity as physical correlates of linguistic stress" (1955: *Journal of the Acoustical Society of America*, 27: 765-8) and "Experiments in the perception of stress" (1958: *Language and Speech*, 1: 126-52) found that the four physical dimensions duration, intensity, fundamental frequency, and formant structure correspond to the four psychological dimensions length, loudness, pitch, and quality. Of these, he claims that the most important for recognition is frequency, followed by duration, then intensity; which, from the psychological view, would be pitch, length, and loudness respectively. Most linguists agree that stress involves several different properties, but there is no consensus as to the importance of each.

1.1.3. Psychological Point of View

The main difference among the psychological definitions of stress is whether the term refers strictly to loudness or to the overall impression of prominence. Jones (1962: 245-6) uses the terms to refer to the "impression of loudness", which contributes, along with timber, length, and intonation, to give the impression of prominence or a "degree of general distinctness." Gimson (1970: 222-3) takes the same position, with a slight difference in terms. He speaks of syllables receiving accent or prominence, consisting of stress (perceived as greater loudness), pitch, quality, and quantity; pitch being the most efficient clue for the learner. Staub (Staub: 120) gives, for teaching purposes, a definition of stress as the "relative loudness of a syllable as compared to other syllables."

For Crystal, however, (1969: 120) both accent and stress are "reducible to a 'bundle of phonetic features'," pitch being the "dominant perceptual component" of accent (which refers only to primary accent), and loudness being the "dominant perceptual component" of stress (which refers to any accent other than primary).

1.1.4. Definition for this Study

The basic differences of opinion among these linguists are purely semantic, most of them agreeing that the distinctness or prominence of a syllable is due to several variables of perception. Although Jones and Gimson and others prefer to use the word prominence for the effect of one syllable standing out among others and stress only for loudness, they go on to speak of the learner's difficulties in stress placement, not "prominence placement". Since these and most other linguists agree that loudness is generally accompanied by other variables, in this study the term stress will be used to refer to perceived prominence, distinctness, or the effect of one syllable standing out among others. It is further assumed that stress includes loudness and other qualities such as pitch, length, and quality. It is not the purpose of this study to select the most important of these qualities, as this may be up to each individual listener. In

Crystal's words (1969: 116-7),

> "It is claimed that listeners are never concerned with one perceptual dimension only; their linguistic judgements are determined by the interaction of a number of dimensions, though for a particular judgement one dimension may be more important than others."

Up to now, there has been no distinction made here between word and sentence stress. Word stress and sentence stress are closely related by the fact that a stressed syllable, while it stands out among other syllables of a word, can, as mentioned by Kingdon (see 1.1.1.), also make a word stand out among other words a sentence. However, they can, for convenience, be dealt with individually, as nothing concluded about word stress is likely to change significantly when sentence stress is considered. Lado (1957: 29) states that "primary stress may sometimes be reduced in rapid speech, but if present it will normally be on the same syllable". Christophersen (1956: 155), and more recently, Byrne and Walsh (1973: 160) support this view, agreeing that most words generally retain their word-stress within a sentence. Kingdon dealt with both extensively in two different works, *The Groundwork of English Stress*, which is limited almost exclusively to word stress, and *Groundwork of English Intonation*, which links sentence stress to intonation. The present study is limited to word stress; therefore, when the term stress is used without further specification, it is to word stress that it refers.

1.2. Descriptions of English Word Stress

There have been many diverse descriptions of English word stress, particularly in the last three decades. These descriptions vary from simple generalities to very complicated systems of rules. To maintain clarity, they are classified here as pertaining to four basic types: (1) general descriptions, (2) descriptions based on affixes, (3) transformational-generative (henceforth TG) descriptions, and (4) descriptions combining phonological and orthographic cues. Within each category, the descriptions will be mentioned in chronological order. Upon reaching the TG descriptions, the controversy about the psychological reality of these descriptions, will be discussed, along with their usefulness to the foreign learner.

A knowledge of the various ways of approaching stress placement is essential to any study aimed at improving the stress placement of the foreign learner.

1.2.1. General Descriptions

Until recently, most descriptions of the English sound system limited themselves to vague generalities about word stress. They described the different stress levels possible and the existing and most common stress patterns, but did not attempt any rules or generalizations to indicate when each type of pattern is used. Even recent descriptions for foreign learners, though they often admit the existence of rules for stress placement, assume they are too complicated for all but the most advanced learners, and continue giving only the same old generalities.

Daniel Jones, the earliest linguist consulted about English stress (1962: 245-61), felt that it was usually sufficient to distinguish two levels of stress--stressed and unstressed. He mentioned an intermediate stress, but did not distinguish between secondary and terciary. He gave possible combinations (but not patterns) of English stress as follows. Disyllabic simple words usually have one strong and one weak syllable, but some are "double-stressed". Polysyllabics can have (1) one stressed and several unstressed syllables, (2) one primary and one secondary stress, (3) one primary and two secondary stresses, (4) two primary ("double-stressed") and one or more secondary stresses. Since Jones was of the opinion that foreign students would have to learn the stress pattern of each individual word, he gave no stress-placement rules, but only a few generalizations for determining if a word is single or double-stressed.

Trager and Smith's most important contribution (1957: 36-9) was to deliminate the four phonemic levels of stress most commonly used even today. (1) Primary stress is the strongest stress of any word or phrase. (2) Secondary stress exists only in compound words or phrases, and, along with syllable division, distinguishes between pairs such as *nitrate* (1 3) and *night-rate* (1 2). (3) Terciary is phonemically different from secondary, as in the previous example, and from weak stress, distinguishing verbs such as *animate* (1 3) from adjectives like *animate* (1 4). (4) Weak stress

is the stress (or absence of stress) of all syllables which do not receive primary, secondary, or terciary stress. The vowels of weak-stressed syllables are quite different from those of stressed syllables (other linguists call them reduced vowels).[3]

Lado (1957: 28 & 1961: 108) counts the same number of word-stress levels. He states that English words of Latin origin depend on their suffixes for stress placement, and that the syllables are counted from the end of the word. This is potentially useful information, but he gives only three specific examples, the suffixes *-tion*, *-al* and *-ty*. He further states that other words tend toward initial stress when there is no prefix, and second syllable stress when there is a prefix (1957: 34-5). This is true, but it is too general and has too many exceptions to be of much use to the learner. Lado mentions the reduced vowels in weak-stressed syllables, and adds to that the heavier aspiration of consonants in primary stressed syllables (1961: 108-9).

Prator (1967: 16-19) is more specific about vowel quality, stating that the vowel(s) in a stressed syllable may be pronounced [i], [ɪ], [e], [ɛ], [æ], [a], [ɔ], [o], [ʊ], [u], [ə], [aɪ], [aʊ], [ɔɪ], etc, and that the vowel of an unstressed syllable is almost always [ə] or [ɪ]. He then makes four observations about stress: (1) At least three out of four two-syllable words have stress on the first syllable. (2) Compound nouns usually take primary stress on the first component and secondary on the second; compound verbs are just the opposite; intensive relexive pronouns take primary stress on the last syllable; numbers in *-teen* vary their stress. (3) Many noun/verb pairs have alternate stress, the noun being stressed on the first syllable and the verb on the second. Twenty-six pairs are listed. (4) Words formed with suffixes are usually stressed on the same syllable as the basic word, although words ending in *-tion*, *-sion*, *-ic*, *-ical*, and *-ity* almost always take primary stress on the preceding syllable.[4]

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(3) Trager and Smith use /1/, /2/, /3/, and /4/ in place of the numbers one to four.

(4) The first and fourth of Prator's observations have so many exceptions (there are many more than five suffixes which do not retain the stress of the root word) that they often cause error by over-generalization by the foreign learner (see 4.3.3. and 4.3.7.).

Staub continues to use Trager and Smith's stress levels (Staub: 120). He lists possible vowel *phonemes* for stressed syllables (a shorter list than Prator's possible vowel *sounds*): /i/, /e/, /ae/, /ɨ/, /ə/, /a/, /u/, /o/, /ɔ/ (Staub: 2). He further points out that single vowels do not end stressed syllables, but are always followed by a consonant or a glide (Staub: 121).

Gimson (1970: 222-239) reverts back to Jones' three levels of stress, without distinction between secondary and terciary. He gives thirty-five possible stress patterns for simple words and seven for compounds, but the only hints he gives the foreigner for predicting which one to use are (1) the rhythmic tendency of English to alternate accented and unaccented syllables, (2) the noun/verb oppositions, and (3) the fact that derivatives do not necessarily retain the stress pattern of the root word.

The above descriptions were a beginning to an understanding of the English stress system. Although the information was of very little use to the foreign learner of English who wanted to be able to predict the stress patterns of unfamiliar words, it served to head other linguists in the right direction for further research into the matter, from which more detailed, concrete, and useful results were obtained.

1.2.2. Descriptions Based on Affixes

Of the six linguists whose descriptions of English were summarized in the previous sections, two of them, Lado and Prator, mentioned suffixes in passing, but gave them little relative importance. The following authors have given affixes, particularly suffixes, more and more importance as part of the description of English stress. These linguists, some more thoroughly than others, have researched the stress patterns of most of the common English suffixes, and have arranged their findings in such a way as to be useful to the learner or teacher of English. Summaries of their descriptions are presented below in chronological order, which does not necessarily correspond to the degree of usefulness.

Allen in *Living English Speech* wrote mainly about intonation and sentence stress, but reserved Appendix II (1953:

173-93) for "hints and generalizations" about syllable stress (or word stress). The first "hint" has to do with Germanic compounds, which he said were usually stressed on the original root. This "hint" is helpful in words where the root is easily recognized, such as *drunkard*, but of little use for words such as *playwright*, where it is difficult to know which component is the root.

Allen's hints for classical compounds are probably much more useful; not only does he specify the suffixes, but the roots are easier for a romance language speaker to recognize. First he presents a list, with examples and exceptions, of sixteen suffixes which usually cause stress to fall on the preceding syllable: *-ion*, *-ic(al)*, *-ian*, *-ial*, *-cient*, *-ious*, *-eous*, *-ual*, *-uous*, *-ity*, *-ety*, *-itous*, *-itive*, *-itude*, and *-itant*. Then he cites three more, *-ate* (verbs only), *-fy*, and *-ise* (*-ize*), which cause antepenultimate stress. Finally he explains that the previous sixteen suffixes are also part of a general tendency toward antepenultimate stress in longer words, *-ion* and *-ial* being counted as two syllables, and *-ic* being also *-ical*. This generalization is followed by lists of word derivations with stress shift to maintain antepenultimate stress. The list of suffixes should be very helpful to the foreign student of English. However, the generalization, with no restrictions given, about antepenultimate stress, is a potential cause of trouble, as there are many suffixes which do not follow this pattern.

Christophersen could have been included in the group who wrote general descriptions, as much of the information he gives in *An English Phonetics Course* is about the more general aspects of word stress (1956: 155-68). He speaks about secondary stress, the effect of stress on vowel and consonant quality, alternating stress pairs, stress change in derivatives; and he gives a long list of semantic categories causing double stress in compounds.

He was included in the affix group, however, because, although he mentions few specific affixes, the information he gives about them is quite detailed. In speaking about vowel and consonant quality, he mentions specifically the reduced vowels in unstressed *-ent*, *-ar*, *-or*, and *-er*; the voiced *x* of the prefix *-ex* before a stressed vowel; and the various

pronunciations of the prefix *re-*, depending on stress and meaning. The stress patterns of the suffixes *-ate* and *-ment* are given according to part of speech (noun, verb, or adjective) and number of syllables (disyllabic vs. polysyllabic). Finally he mentions the suffixes *-ion* and *-sive*, which cause stress to fall on the previous vowel. This type of information is very useful for the foreign learner. It is unfortunate that Christophersen limited himself to so few affixes.

Kingdon's *The Groundwork of English Stress* is the most complete work to date which deals with stress placement on the basis of affixes. Before elaborating on Kingdon's treatment of stress placement itself, however, it should be mentioned that he departs from Trager and Smith's fairly simple system of four word-stress levels. Although most other linguists agree that stress involves several variables, the levels of stress are usually defined without giving importance to the variables involved. To Kingdon, however, the tone or pitch variable is important. What is called primary stress by most linguists is called "kinetic" stress (ˆ) by Kingdon because of its falling tone. A "full static" or "high level" stress (') is a full stress like the kinetic stress, but the tone is static and high; it can only appear before the kinetic stress. From the examples given, it would appear that this stress can correspond to Trager and Smith's secondary ('half ˆbaked) or terciary ('indi'vidu ˆality). The "partial static" or "low-level" stress (,) is a partial stress with a strong (fully realized) vowel on a low static tone; it usually falls either one syllable before kinetic stress or any number of syllables after kinetic stress. This stress also seems to correspond to both secondary and terciary stresses. Even the unstressed syllable is classified by Kingdon as being of high pitch (-) or low pitch (_) (1958: 4-14).

Kingdon's explanation of stress placement is based on a distinction among three types of compound words (1958: 26). A "Romanic-type" compound has a clearly recognizable root plus prefix(es) and/or suffix(es). A "Greek-type" compound has two or more clearly recognizable roots which are considered separate entities, but do not stand alone as complete words. An "English-type" compound is formed by two or more independent words with or without a hyphen.

For "Romanic-type" compounds, Kingdon explains the influence of both prefixes and suffixes. Prefixes, he says, "do not usually take a kinetic stress" (1958: 32). He gives lists of both disyllabic and monosyllabic prefixes which can take kinetic stress; whether they do or not, and on which syllable (for the disyllabics) it falls, however, depends on the influence of the suffixes. There are some prefixes which demand some sort of strong stress, but there are none which which demand necessarily kinetic or primary stress.

"Suffixes may take the stress themselves ..., or they may throw the stress onto one of the two syllables immediately preceding them" (1958: 57). Some suffixes have no influence on stress. Kingdon gives a very complete list of suffixes, their possible stress pattern or patterns, and exceptions (1958: 60-120). This list is potentially very helpful to the foreign learner; however, it is so long that, in its present form it would be very difficult to memorize all the patterns. What is needed is an organization by similarity of suffix and/or of stress patterns to make this list more useful.

In "Greek-type" compounds, the first element usually takes a pre-kinetic stress on one of its syllables, though it can take a kinetic stress when this is rejected by the second element (1958: 121). The second element frequently takes a Romanic-type suffix, which often is the deciding factor in stress placement. The work includes a list of second elements with their suffixes and possible stress patterns. Many of these could be eliminated by the learner who has already learned the Romanic-type suffix patterns.

"English-type" compounds are the only ones normally called compounds in most other descriptions. According to Kingdon (1958: 146-7) there are three possible stress patterns for these compounds: (1) single stress on the second component (_ˆ or ,ˆ), which is the least frequent; (2) double stress ('ˆ), which is liable to stress adjustment under the influence of intonation; and (3) single stress on the first component (ˆ_ or ˆ,), the most frequent. The grouping of compounds into one of these categories is done by part of speech and semantic differences (1958: 149-74), some of which are too complicated and subtle for all but the most advanced learner. In compounds of three or more components, the stress is usually determined

by identifying which components already formed a compound before adding additional ones (1958: 179-86).

Although *The Groundwork of English Stress* is too complex for use by most English learners, it has served as a basic and indispensable reference for most subsequent research done on the subject of English word stress. It can also be of use to the teacher, particularly for quick reference about particular problem areas.

Pring's *Colloquial English Pronunciation* does not deal with word stress as such in the body of the text. However, the Appendix (1959: 69-83) gives a list of prefixes and suffixes which are normally unstressed. Although this list does not tell us which syllable does take stress, it might be a good way to introduce learners to the effect of suffixes on stress placement and to correct such typical errors as stressing final *-able, -ise (-ize)*, and *-ate*.

Axel Wijk in *Rules of Pronunciation for the English Language* makes the first detailed attempt known to the author to group stress-affecting affixes in a learnable manner (1966: 125-36). First he lists the suffixes which leave stress on the same syllable as the root word: *-dom, -ed, -en, -er, -ern, -ess, -fold, -ful, -hood, -ing, -ish, -le, -less, -like, -ling, -ly, -ment, -ness, -or, -ship, -some, -ward(s), -wise, -y,* and usually *-able* and *-ible*. Then he gives three categories of stress-determining suffixes: (1) Suffixes with *ia, io, iou, iu; ea, eo, eou, eu; ie* almost always cause stress to fall on the preceding syllable. (2) Suffixes *-ic* and *-ical* also cause stress to fall on the preceding syllable (with some very common exceptions). (3) Suffixes *-eer, -ier, -esce, -esque, -ette, -ine, -ique,* and *-oon* (most words are recent French loans) usually cause final stress.

In addition to suffix rules, Wijk gives the most common stress patterns for several categories of words: (1) Words of two or three syllables without an easily recognized prefix most often take stress on the first syllable. (2) Words of two or three syllables with a prefix without its own distinct meaning usually take stress on the syllable following the prefix (many exceptions are stressed on the prefix, especially nouns and adjectives, and trisyllabic verbs ending in *-ate, -ize, -ute*). (3) When the prefix has its own distinct meaning, the word is

usually double-stressed, as are compounds. (4) For words of four or more syllables, the most common stress is on the third syllable from the end (antepenultimate). Secondary stress usually falls two or more syllables before primary stress. These generalizations, all of them having many exceptions, are not nearly as helpful as the more reliable suffix rules.

Haycraft in *The Teaching of Pronunciation: A Classroom Guide* (1971: 153-6) begins with the same types of generalizations about stress: (1) In words of two or three syllables the tendency is toward the beginning of the word. (2) In long words the tendency is toward the middle (*dūal, duālity*). As Wijk, Haycraft has also grouped suffixes by stress patterns, although she has shown no helpful similarities among the suffixes. She gives a list for antepenultimate stress, a list for preantepenultimate, a list for ultimate, and a list for penultimate, indicating in each the suffixes which have many exceptions. Most of the suffixes have been previously mentioned by Wijk, Kingdon, and others.

Mahandru in "The Problem of Word Stress In English" (1975: 96-100) deals mainly with suffixes, but divides them by part of speech. Beginning with verbs because of their importance in English word formations, he gives the following groups: (1) Verbs ending in *-ate* or *-fy* take antepenultimate stress. (2) Disyllabic verbs with prefixes are usually final-stressed, except when they end in *-er, -ish, -el, -al,* and *-it*. (3) Most polysyllabic verbs with *-er, -ish,* and *-it* also have penultimate stress. (4) Other polysyllabic verbs have ultimate stress.

For nouns and adjectives Mahandru gives the following groups: (1) those with suffixes, which cause stress on the preceding syllable (same as those given by Wijk and Allen); (2) those with *-al, -acy, -ure,* etc., which depend on the stress of the verb from which they were formed; (3) disyllabic nouns, which are usually stressed on the first syllable except (a) those formed by change of consonant in disyllabic end-stressed verbs (*advise/advice*), (b) those ending in *-ee, -een, -eer, -oo, -oon,* (c) those ending in a double consonant plus silent *e*, (d) those ending in *-ue* precede by *g* or *q*, and (e) nouns which do not have stress alternation with their identical verbs.

Of these affix-based descriptions of English stress, Kingdon's is obviously the most complete; Wijk's is probably the best organized from a learner's point of view. None of them, however, comes close to solving most of the problems encountered by the foreign learner of English who has difficulty in stress placement.

1.2.3. Transformational-Generative Descriptions

In the early 1950's a group of linguists led by Noam Chomsky began to develop a theory of linguistics which was to have an enormous impact on the field during the last twenty-five years. Based on the belief that human beings are born with an innate capacity for acquiring a language, and thus, that all languages must conform to a "universal grammar"; these linguists saw an inadequacy in the structural grammars, which described each language individually without relating one to another.

The aim of the resulting transformational-generative theory was to describe a language in such a way as to bring out general principles of that language, which would, in turn, lead to the mental processes carried out by the speakers of that language, and ultimately to universal principles of language and universal mental processes.

A transformational-generative description or "grammar" of a language contains a syntactic component, a semantic component, and a phonological component. The syntactic component is

> "a finite system of rules generating an infinite number of rules generating an infinite number of syntactic descriptions of sentences. Each such syntactic description contains a deep structure and a surface structure that is partially determined by the deep structure that underlies it. The semantic component of the grammar is a system of rules that assigns a semantic interpretation to each syntactic description, making essential reference to the deep structure and possibly taking into account certain aspects of surface structure as well. The phonological component of the grammar assigns a phonetic interpretation to the syntactic description, making reference only to properties of the surface structure, so far as we know" (Chomsky & Halle, 1968: 6-7).

This phonetic interpretation is assigned by way of a system of rules of the type "A $\longrightarrow$ B/X__Y $_{V}$", which

> "states that an element of the type A is rewritten as a corresponding element of the type B when A appears in the context X__Y (that is, with X to its left and Y to its right) and when the item in question is a verb, i.e., is dominated by V" (Chomsky & Halle, 1968: 14).

Stress placement rules of the transformational-generativists are usually based on a distinction between "weak clusters" and "strong clusters".

> "A weak cluster is a string consisting of a simple vocalic nucleus followed by no more than one consonant; a strong cluster is a string consisting of either a vocalic nucleus followed by two or more consonants or a complex vocalic nucleus followed by any number of consonants" (Chomsky & Halle, 1968: 29).

The first description of English stress placement of the transformational-generative type was developed by Chomsky and Halle in *The Sound Pattern of English* (1968). Chomsky and Halle consider obligatory the abbreviation, where possible, of all rules by way of conventions involving parentheses and angled brackets. However, for the purpose of clarity, an unabbreviated notation is used in the following summary of their most basic stress rules.

First, the Main Stress Rule states that (i) simple verbs and primary adjectives are stressed on the penultimate vowel if the final vowel is lax (i.e., [-tense]) and followed by no more than one consonant (ex. *astōnish, sōlid*); and that (ii) they are stressed on the final vowel if that vowel is [+tense] or if it is followed by more than one consonant (ex. *maintān, absūrd*):

$$V \rightarrow [\ 1\ \text{stress}] \Big/ \left\{ \begin{array}{ll} \_\_C_o \left[\begin{smallmatrix} -\text{tense} \\ V \end{smallmatrix} \right] C_o^1 & \text{(i)} \\ \left\{ \left[\begin{smallmatrix} +\text{tense} \\ \_\_ \end{smallmatrix} \right] C_2 \right\} C_o & \text{(ii)} \end{array} \right\} \rceil$$

Since these two conditions are mutually exclusive, they can be expressed in a more concise manner, taking advantage of disjunctive ordering (i.e. the condition that if one rule is applied, subsequent rules do not apply) and the elsewhere condition (i.e. the condition that the rule applies in all

contexts other than those previously specified):

$$V \rightarrow [\ 1\ \text{stress}\ ] \ /\_\_ \begin{cases} C_0 \begin{bmatrix} -\text{tense} \\ V \end{bmatrix} C_0^1 \\ C_0 \end{cases} \rrbracket \quad \begin{matrix} \text{(i)} \\ \text{(ii)} \end{matrix}$$

(1968: 70).

(ai) Nouns are stressed on the antepenultimate vowel if the penultimate vowel is [-tense] and followed by no more than one consonant, and the final vowel is [-tense] (ex. *América*). (aii) They are stressed on the penultimate vowel if that vowel is [+tense] or if it is followed by more than one consonant, and the final vowel is [-tense] (ex. *aróma, veránda*):

$$V \rightarrow [\ 1\ \text{stress}\ ] \ /\_\_ \begin{cases} C_0 \begin{bmatrix} -\text{tense} \\ V \end{bmatrix} C_0^1 \\ C_0 \end{cases} \quad \begin{matrix} \text{(i)} \\ \text{(ii)} \end{matrix}$$

$$/\_\_ \begin{cases} \begin{bmatrix} -\text{tense} \\ V \end{bmatrix} C_0 \rrbracket_N \\ \rrbracket \end{cases} \quad \begin{matrix} \text{(a)} \\ \text{(b)} \end{matrix}$$

(1968: 72).

Here the elsewhere condition also allows that (bi) disyllabic nouns with a [-tense] final vowel (even those with a final consonant cluster) are stressed on the penultimate vowel (ex. *lántern*), and (bii) those with a [+tense] final vowel are stressed on that final vowel (ex. *machíne*). (1968: 73, 78).

Finally, the Alternating Stress Rule and the Stress Adjustment Rule state that in final stressed words of three or more syllables, the primary stress moves from the final syllable to the antepenultimate syllable, and all non-primary stresses are weakened by one (ex. *húrricane*):

$$V \rightarrow [\ 1\ \text{stress}\ ] \ /\_\_ C_0 V C_0 \overset{1}{V} C_0 \rrbracket \ \text{NAV}$$

(1968: 77-79).

Many words which would apparently be exceptions to Chomsky and Halle's basic stress rules are made to conform by the use of abstract underlying representations or by various types of artificial boundaries, which often imply the need for additional transformational cycles.

An example of the former are nouns ending in a non-low tense vowel, such as *bŭffalo*, *albĭno*, and *commándo*. These vowels are assumed to be [-tense] in the underlying representations, making it possible to stress these nouns by (ai) and (aii) of the Main Stress Rule. They are then tensed by the Tensing Rule:

$$V \rightarrow [+\text{tense}] \; / \left[\begin{array}{c} \overline{\text{low}} \\ \text{stress} \end{array} \right] \left\{ \begin{array}{l} V \\ \text{※, where } \beta = + \text{ if } \alpha = + \end{array} \right\}$$

(1968: 74).

An example of the latter are verbs such as *permĭt* and *concŭr*, which are given boundary =, identified only as non-formative and non-word. This boundary blocks the application of (bi) of the Main Stress Rule. Case (bii) then assigns stress to the final syllable (1968: 94).

This description of stress placement from *The Sound Patterns of English* (henceforth *SPE*) was modified three years later by one of the same authors, Morris Halle, together with Samuel Jay Keyser in *English Stress: Its Form, Its Growth, and Its Role in Verse* (1971). The main difference in the new version is that Halle and Keyser no longer distinguish between nouns, adjectives, and verbs.

The Main Stress Rule is now given in the following manner. (a) If the last vowel is [-tense], primary stress is assigned to the antepenultimate vowel when the penultimate vowel is [-tense] and followed by no more than one consonant. (b) If the last vowel is [-tense], primary stress is assigned to the penultimate vowel when this vowel is [+tense] or followed by more than one consonant. (c) If the last vowel is [+tense], primary stress is assigned to this vowel. Taking advantage of the disjunctive ordering and the elsewhere concept of *SPE*, the rule can be written as follows (again maximum abbreviation is avoided for the sake of clarity, although adopted by Halle and Keyser):

(a) $V \rightarrow [1 \text{ stress}] \; / \left[X \_\_ C_0 \left[\begin{array}{c} -\text{tense} \\ V \end{array} \right] C_0^1 \left[\begin{array}{c} -\text{tense} \\ V \end{array} \right] C_0 \right]$

(b) $V \rightarrow [1 \text{ stress}] \; / \left[X \_\_ C_0 \left[\begin{array}{c} -\text{tense} \\ V \end{array} \right] C_0 \right]$

(c) $V \rightarrow [1 \text{ stress}] \; / \left[X \_\_ C_0 \right]$

The disjunctive ordering and the elsewhere condition also allow that disyllabics with a [-tense] final vowel receive penultimate stress and that monosyllabics receive stress.

This new Main Stress Rule stresses disyllabic adjectives ending in a lax vowel in the same manner as in *SPE*, with the same assumption that final tense vowels are lax in the underlying representations (ex. *shăllow, cĕrtain*). Halle and Keyser recognized, however, that many adjectives with a final strong cluster (not only those with suffixes) follow *SPE*'s rules for nouns (ex. *eărnest, hŏnest*). They concluded, therefore, that unsuffixed adjectives ending in a strong cluster would have to be lexically subcategorized as to whether or not they undergo (b); all other adjectives would be subject to (b) (1971: 77).

Disyllabic verbs ending in vowels, like adjectives, are treated no different than in *SPE*; they undergo (b). Halle and Keyser have noted, however, that many verbs ending in a single consonant (besides those composed of prefix + stem) have final stress (ex. *equĭp, carĕss*), and many verbs ending in a consonant cluster have penultimate stress (ex. *gŏvern, scăvenge* (1971: 78-9). It seems that verbs ending in a consonant will also have to be marked, therefore, as to whether or not they undergo (b).

The modifications made by Halle and Keyser have taken into account a greater part of the English lexicon, but have maintained the same basic principles of disjunctive ordering (and sometimes conjunctive), the elsewhere condition, abstract underlying representations, internal and external boundaries, and cyclic rules.

Ralph Vanderslice and Peter Ladefoged made an interesting contribution to the TG study of stress-placement with the publication in 1972 of "Binary Suprasegmental Features and Transformational Word-Accentuation Rules". In this article they developed a binary system of describing not only word stress, but also sentence stress and intonation, linking all three by means of redundancy.

This binary system consists of the following six features: (1) [± heavy] , or full articulation versus reduced

timing, where a light (i.e. [-heavy]) syllable is unstressed, of briefer duration, and often indicates a reduced vowel; (2) [± accent,] , or presence versus absence of increased respiratory energy and laryngeal adjustment, where an accented syllable corresponds roughly to IPA primary stress; (3) [± intonation] , an abstract feature assigned to a nuclear accented syllable, implying + one or both of the following features (no independent phonetic realizations); (4) [± cadence] , or the presence versus absence of a low (usually falling) pitch pattern affecting the post-nuclear portion of a sense group; (5) [± endglide] , or the presence versus absence of a rising pitch pattern, affecting either the whole post-nuclear portion of a sense group or (with [+ cadence]) only the terminal portion; (6) [± emphasis] , or the presence or absence of an extra-large pitch obstrusion on an accented heavy syllable, corresponding to Trager and Smith's pitch 4 and Halliday's tone 5 (1972: 820).

Using these six binary features, Vanderslice and Ladefoged reformulated the stress rules of *SPE*. Although replacing the levels of stress used by Chomsky and Halle, they have followed the same basic principles of linear application of rules, eliminating, in some cases, unnecessary cycles.

While Vanderslice and Ladefoged found a way to eliminate some unnecessary cycles, George E. Settera, in "English Stress" (1974) preferred to eliminate the transformational cycle altogether. Settera makes two main points: (1) "that the cycle accounts for neither the correct stress contours of many words nor the reduction or non-reduction of certain vowels" (1974: 83), two advantages claimed by Chomsky and Halle; and (2) that the cycle overlooks common stress contours and "masks a generalization by stressing each of these words by different rules" (1974: 85).

Settera gives an alternative to cyclic rules by grouping his rules into three types: (1) main stress rules for all words, (2) alternating stress rules for words with more than one stress, and (3) rules for prefixed words. For his main stress rules, he considers relevant, not whether a final syllable is strong, but whether it has a tense or lax vowel (Halle and Keyser also admitted that final consonant clusters were less

important than they seemed to be in *SPE*). His alternating stress rules give the environments in which the stress contours of words with more than one stress will be 3-3-1, 3-1, 3-1-3, or 1-3. Finally his prefix rule states that prefixes usually receive terciary stress, which usually falls on the first syllable; various exceptions are given. These three groups of rules are applied in this order, with no cycles involved.

Clarence Sloat's main purpose in "Stress in English" (1974) is not only to eliminate Chomsky and Halle's transformational cycle from the generative description of English stress placement, as Settera did, but also to eliminate retraction and destressing rules. Like Settera, he does this by recognizing the difference between derived and non-derived words. Whereas Settera's enphasis was on prefixes, however, Sloat's is on suffixes.

Sloat's Suffix Stress Rule (SSR),

$$S \rightarrow [+\ \text{stress}] \,/\_\__a(VC_b(C_1)_b(r))_a(_{c-}(+\ ic)+ate_c)V_{Suffix}C_o(i)\ \#\#$$

which he considers the most important, classifies suffixes as to nominal or not, the number of syllables, the number of consonants before the suffix; and distinguishes two suffixes in particular. By classifying the suffixes in this manner, Sloat has also eliminated the need for certain *ad hoc* underlying representations such as lax vowels which are later tensed and silent *e*'s. He continues to resort to certain artificial boundaries, though, to explain some exceptional cases (1974: 122-7).

Those words without suffixes are stressed by the Root Stress Rule (RSR):

$$S \rightarrow [+\ \text{stress}] \,/\_\_(Sw)\ (V(s)C)\ (S)\ \#\#$$

where Sw = a weak string and $\breve{V}$ = a short vowel. This rule leaves the final string without stress in words with two or more syllables, and leaves the penultimate string also without stress if it is weak in words with three or more syllables (1974: 127-8).

Foreign type words are marked [-RSR] and receive final stress by the Foreign-Stress Rule (FSR):

$$S_c \rightarrow [+\ \text{stress}] \,/\, \langle S_1 \rangle \_\_ \langle \breve{V} \rangle\ \#\#$$

where S_c is a checked string, terminating in $\bar{V}$ or VC_1. Words which received primary stress by RSR or SSR now receive secondary stress by FSR (eliminating stress retraction). Some words must be marked lexically as to whether they are stressed by RSR, FSR, or both, though many are simply classified according to the suffix (1974: 128-33).

Finally secondary stresses before primary stress are assigned by the Anacrusis Rule (AR):

$$S \rightarrow [+\ \text{stress}] \ /\_\__a(Sw)_aS+(ae\ b)[+\ \overset{S}{\text{stress}}]$$

and by the Pretonic Stress Rule (PSR):

$$S_s \rightarrow [+\ \text{stress}] \ /\ \#\_\_[+\overset{S}{\text{stress}}]$$

(1974: 134-5).

Sloat's description of English stress placement, besides eliminating cyclical application, retraction and destressing rules, has also acknowledged the unpredictability of stress in certain cases rather than resort to unjustified abstract underlying representations.

The modifications in each TG description of stress placement mentioned here show a dissatisfaction, even among supporters of the general TG theory, with parts of the theory developed by Chomsky and Halle. Halle himself, together with Keyser, already admitted in 1971 that stress was not quite as predictable as Chomsky and Halle had claimed, by noting the necessity of marking many verbs and adjectives in the lexicon as to whether or not they followed certain rules.

Cyclical application is probably the convention most criticized among other transformational-generativists, in particular by Settera and Sloat. Sloat also refused to accept stress retraction and destressing rules, which he considered unnecessarily complicated, and unjustified *ad hoc* underlying representations (although he accepted "justified" ones). Moreover, he insisted on acknowledging the unpredictability of stress in some cases.

In spite of these dissatisfactions, *The Sound Pattern of English* became the foundation for most subsequent phonological studies made in the U.S., particularly concerning stress placement, each containing its particular modifications, but

conforming, on a whole, to a series of conventions laid down by Chomsky and Halle.

If the transformational-generativists have had their differences of opinion about certain parts of the TG theory, there have been other linguists objecting to the theory as a whole, or objecting to claims made by certain TG proponents, as to the areas of applicability of the theory. As this thesis is aimed ultimately at a practical application of descriptions of stress placement, the following section reviews some evaluations of the TG theory in general and its application within the field of phonology in particular.

1.2.4. The TG Controversy

Although TG grammar has been accepted enthusiastically by many linguists as a welcome change from the earlier taxonomic linguistics; among many other linguists it has left doubts, ranging from doubts about its theoretical basis to those about the limits of its application. This section gives a summary of the most relevant aspects of three general criticisms, and the results of three experimental studies testing the psychological reality of TG phonological rules.

The earliest thorough criticism of the TG theory known to the author is *Methodological Aspects of Transformational Generative Phonology* (1971) by Rudolf P. Botha. Botha claims not to object to the theory itself, but only to the neglect by the transformational generativists of methodological aspects, which he feels could cause TG grammar the same fate as that of taxonomic linguistics. The three most important areas of phonology in which Botha feels methodological aspects have been neglected are (1) in the justification for formal devices incorporated into the theory of phonology, (2) the arguments for validating TG phonology as a mentalistic theory, and (3) the empirical status of TG phonology as a non-mentalistic theory.

(1) In respect to the first area, transformational generativists claim that a formal device should be incorporated into the theory of phonology if it permits the expression of linguistically significant facts in terms of a linguistically significant generalization and disallows the expression of

linguistically insignificant facts in terms of such a generalization (1971: 85). In order to measure "linguistic significance", TG linguists incorporated into the general theory a "simplicity metric", which says that the most linguistically significant hypothesis is the hypothesis "of the appropriate form" stated in terms of the fewest number of symbols. Botha's criticism is that "of the appropriate form" means "formulated in terms of the formal devices of the general theory" (1971: 102), which cannot be incorporated until we know if the generalization is linguistically significant. The flaw in this argument is its circularity.

(2) The arguments for validating TG phonology as a mentalistic theory are classified by Botha into four basic approaches: "(i) the 'how else" argument, (ii) testing the predictions of grammars, (iii) psycholinguistic experimentation and (iv) reference to sustaining evidence" (1971: 124).

The first two approaches are rejected by analogy to the Ptolemaic system of astronomy, which, although the only known system that worked when first proposed, and although it can still be used today to make correct predictions, is known to be a false hypothesis.

The third approach, psycholinguistic experimentation, is rejected because of "the fallacy of affirming the consequent" (in 1971: 134, Botha quotes from Peter Caws, *The Philosophy of Science. A systematic Account* 1966: 111). The example given by Caws is the hypothesis "If a man takes arsenic, he will die." It cannot be concluded from this that any man who dies has taken arsenic.

The fourth approach, reference to sustaining evidence, is rejected because the sustaining evidence has frequently not been shown to be relevant, reliable, or coherent. Examples of sustaining evidence rejected are facts about linguistic change and intuitions of the linguist.

(3) The third area of methodological weakness is in proving the empirical status of TG phonology, as a non-mentalistic theory. Because of "lack of relevant and reliable evidence which would confirm or disconfirm their test implications" (1971: 176), Botha rejects the empirical status of the evaluation measure, and of phonetic representations. Because of the effect of "blocking devices", which protect a

theory or hypothesis against adverse evidence by "the *ad hoc* elimination of its incorrect consequences," Botha rejects the empirical status of

> "(i) the principle of the transformational cycle, (ii) hypotheses about linguistic universals, (iii) principles of the theory of exceptions [the adoption of abstract underlying representations] , and (iv) the transformational phonological rules generating stress contours, and the hypothesis that stress is not a distinctive lexical category" (1971: 205).

In spite of this very detailed criticism of many aspects of the TG theory of phonology, Botha insists that the theory is not completely unempirical and that there is evidence of an effort to make the theory testable and empirical. He concerns himself with the methodology involved in order to insure the future of TG phonology.

One of the severist critics of TG grammar is Bruce L. Derwing, in his *Transformational Grammar As a Theory of Language Acquisition* (1973). Derwing, as Botha, criticizes the methods used by the transformational generativists. Contrary to Botha, however, he concludes that the resulting TG theory and analyses are also invalid. Derwing believes that

> "current work in linguistics along transformational-generative lines is yielding little in the way of substantive accomplishments of any empirical significance, while offering much in the way of unsupported (and, given present methods of research, unsupportable) speculative assertion, with the larger portion of current metatheoretical discussion being devoted to marginal or irrelevant 'smoke screen' issues which hide deep conceptual and methodological difficulties" (1973: 5).

Derwing's criticism is largely related to three main issues: (1) the nature of language acquisition, (2) the problem of phonological description, and (3) naturalness.

(1) The TG theory of language acquisition is criticized zed from the point of view that a grammar must be learnable by a child solely on the basis of the data available to him. Chomsky's argument for postulating innate linguistic universals is that, without them, his grammar could not be learned. Derwing argues that if they "cannot be learned by any means presently known, such grammars simply *cannot be accepted* as plausible or realistic models of any actual psychological entity or process" (1973: 69). He further contends that

species-specific language can be explained by more general 'innate' abilities such as memory and the ability to symbolize, eliminating the need for a specific 'innate' language ability. Finally Derwing criticizes Chomsky for not distinguishing "between the child's process of learning a language (or 'internalizing' a grammar) and the linguist's process of describing one" since "the linguist has a broader and more diverse range of data and skills to bring to bear ..." (1973: 82).

(2) Most of Derwing's criticism of TG phonological descriptions is against the contention that they represent psychological reality. He quotes Lightner's complaint that most TG analyses use diachronic information to arrive at their conclusions, while most native speakers do not possess that information. Derwing also argues that the morphological relations which TG grammarians assume to be part of a speaker's subconscious knowledge of language, such as the etymology of *sorority*, *lactate*, etc., are often a surprise to the speaker when he discovers them. Finally, Derwing asks why, if English orthography is a "near optimal system" for lexical representations (as claimed by transformational-generativists) English speakers have so much difficulty with spelling and pronouncing new words, compared with speakers of other languages.

(3) Regarding the third issue, naturalness, Derwing believes the transformational-generativists attribute too much sophistication to a child, in assuming he prefers rules expressible in terms of non-homogeneous classes. Furthermore, he criticizes the TG theory for putting "universal constraints" on phonological rules while eliminating all constraints on lexical representations, even that they be "pronounceable" (1973: 148-9). The excuse for these extremely abstract lexical representations is usually to eliminate the "burden" of storing exceptions. Derwing, however, argues that "the most efficient storage-retrieval system is not the one which minimizes storage, but the one which adopts the optimal trade-off between economy of description (storage), on the one hand, and degree of abstractness (or ease of retrieval), on the other" (1973: 152).

Derwing's solution to the problems encountered in TG grammars is to devise a learning strategy in which (1) all rules are true of primary linguistic data; (2) lexical

representations are restricted to (a) alternants which occur within the system and (b) others consistent with the system; (3) the least specific morpheme is chosen as the lexical representation; and (4) the rules are simultaneously ordered to eliminate descriptive "tricks".

Per Linell, in his recent *Psychological Reality in Phonology: A Theoretical Study* (1979), criticizes the Chomskyan views about psychological reality and its application in the TG model of phonology. He gives as a substitute his own views and an outline for developing an alternative phonological model.

Chomsky's psychological reality is characterized as "naive optimism" (1979: 5), where speakers have highly integrated and similar "mental grammars", which can be determined by the linguist through formalistic investigation. These mental grammars are the speaker's competence, which, because of the interference of irrelevant factors, is totally separate from his performance. Linell claims this separation makes Chomsky's theory immune to falsification, and that it is more reasonable to assume a close relationship exists between the two. He further states that Chomsky gives no good argument as to "why speakers must be assumed to possess the same unique grammatical competence" (1979: 25), and that, on the contrary, "Data often indicate that different speakers do make different generalizations, though they may be confronted with largely the same data" (1979: 104).

Linell would replace this "naive optimism" with a "moderate realism", where biological, psychological, and social realities must all be taken into account, and "external" evidence must be exploited. He would replace the TG lexicon with its frequently abstract forms, with a lexicon containing "phonetic plans". A "phonetic plan" is a concrete stem and/or base form which constitutes the "phonological intention" of the speaker and "refers to the most careful pronunciation that the speaker is acquainted with" (1979: 54).

Linell sees no empirical evidence for the TG criteria of "simplicity", and offers, instead, the opinion that a redundant lexicon can be more useful than a non-redundant one because information can be retrieved in many ways. Regarding stress specifically, he says "there is evidence that the prosodic patterns of words are stored in the memory; people often recall

the prosodic better than the segmental structure of words (cf. the so-called tip-of-the-tongue phenomenon, Brown and McNeil, 1965)" (1979: 58). He concludes that "Predictability alone is not necessarily a sufficient condition for removability from phonetic plans" (1979: 60), and that "lexicalized [phonetic] plans need not be recreated (by application of rules) every time the words are used" (1979: 178).

In these three criticisms the recurrence of some of the most common doubts about the TG theory can be seen. Probably the greatest doubt most linguists have about the theory, expressed by all three of these critics, is in reference to psychological reality, referred to by Botha as the "mentalist" claims of the theory. Also mentioned by all three are doubts about "simplicity" or "economy" as an "evaluation measure". Related to this, Botha and Derwing see abstract representations as an unjustified and uneconomical way of preserving simplicity. Also criticized as unjustified by Botha and Derwing are innate linguistic universals and the relevance of historical linguistic data to phonological representations.

The psychological reality of TG grammars was said by Botha to be unprovable by psycholinguistic testing because of "the fallacy of affirming the consequent." Using the example of the hypothesis that "if a man takes arsenic, he will die," it is true that we cannot assume any man who dies has taken arsenic. However, if this hypothesis is true, it can be assumed that if a man does not die, he has not taken arsenic. Thus, on the assumption that the psychological reality of a grammar can be proven false, a review will be made of three studies testing the application of TG phonological rules by native speakers of English. All three deal specifically with rules for stress placement, an area given special attention by transformational generativists.

The first of these studies was made by Mary Lou Walch ("Stress Rules and Performance", 1972), who set out to discover if the stress rules of competence postulated in *SPE* were similar to those of performance. Six experiments were made, three testing production and three testing recognition.

The first experiment on production was to test the hypothesis that rules apply automatically; therefore, the

native speaker should be able to derive the pronunciation of any English word, familiarity affecting only the time of derivation. The results proved the hypothesis false. Almost all non-standard productions were for words which were orally and aurally unfamiliar. Visual familiarity had no effect.

The second experiment tested the hypothesis that alternation in stress and vowel quality between base and derived forms is governed by rules that apply automatically; therefore, a native speaker's ability to produce standard pronunciations should not depend on familiarity with either form. This hypothesis was also proven false. Where the derived form was less familiar than the base form, the subjects tended to maintain the base form stress in the pronunciation of the derived form.

The third experiment used unknown and nonsense words to distinguish between production strategies and learned pronunciations. The results showed little success of production strategies, with no subject producing standard pronunciations in more than three out of thirty unknown English words. In both the unknown and the nonsense words, consonants were easier to derive than stress or syllable structure. The favorite pattern for words of four or more syllables was secondary (or terciary) on the first syllable and primary on the third.

The first experiment on recognition showed that subjects were able to recognize most of their errors. The second experiment showed the ability to recognize standard pronunciations superior to the ability to produce them, and little correlation between the two abilities. In the third experiment the subjects were able to recognize most known words, even when mispronounced, indicating, according to Walch, that rules do not specify only one pronunciation.

Walch concludes from these experiments that the rules of competence will predict a subject's behavior where the underlying form is known. Where the subject has had no previous experience with the word, however, production strategies involve determining the underlying form. Where the rules of the language can produce more than one acceptable pronunciation, depending on the underlying form, competence can tell the speaker the alternatives, but only experience can choose between them. Recognition, inverting the transformations to reach the underlying form, depends less on experience than does

production, and correlates more closely with competence.

The study by Baker and Smith ("A Psycholinguistic Study of English Stress Assignment Rules", 1976) was made because of doubts about the psychological validity of many of the rules of *SPE*. The system was felt to be too complex due to (1) predictions by means of a *post hoc* mixture of morpheme boundaries and underlying forms, and (2) the necessity of a sophisticated knowledge of linguistic structure.

This study involved two experiments, both of them requiring native speakers of English to pronounce nonsense words. In the first experiment the nonsense words were modeled after real English words, but with a structural change that would change the assignment of primary stress by *SPE* rules. The subjects would presumably pronounce the words either (1) according to *SPE* rules, or (2) by analogy to the stress pattern of the model word. The results showed that (1) it was easier to follow a rule pronunciation which brought stress forward from its position in the model word when the nonsense word appeared as a noun, (2) it was easier to follow a rule pronunciation which delayed stress when the nonsense word appeared as a verb, (3) longer words were likely to receive the model pronunciation.

The second experiment was to check Chomsky and Halle's prediction that the lax versus tense vowel distinction is the critical distinction for final syllables of nouns, and that the strong and weak cluster distinction is the critical one for verbs. The subjects were asked to pronounce nonsense words which were dissimilar to any real English word. The results showed these distinctions to be important, but also in contexts which are irrelevant for *SPE* rules; the final and penultimate syllables seemed of roughly equal importance. Baker and Smith conclude that "when subjects are asked to pronounce a nonsense word, they do something more than search for a similar English word to act as a model, but neither do they apply a series of rules in a straight forward manner" (1976: 23).

The third study of this kind was made by Robert L. Trammel ("The Psychological Reality of Underlying Forms and Rules for Stress," 1978) to test the hypothsis:

> "The stress contours of most English words can be generated from underlying forms which are closely related to their traditional orthographic

> representations. If such underlying forms are psychologically real, then native speakers should generally agree in assigning stress to unknown written words" (1978: 79).

Ten native speakers were given thirty words to pronounce, contextualized in sentences. To test also the effect of word origin, since some of the stress rules are based on learned Latinate vocabulary, the words were equally divided among Latin, Greek and Germanic origin. The subjects showed 87.1% agreement on the placement of primary stress and 75.2% on the general stress contour, supporting the psychological reality of the rules for stress and the contention that our orthography is a "near optimal system" for lexical representation with respect to stress placement. However, the orthography was shown to be inadequate for segmental choice, where the average number of different pronunciations per word was five. Trammel concludes that "While the orthography may be 'near optimal' for a formal system of rules, the speakers' internalized rules are not nearly so well defined or consistently applied as those of *SPE*" (1978: 93).

Although these three studies were carried out in three very different manners, they were all basically testing the same thing—the application by native speakers of English of TG rules for stress placement. Their conclusions were as different as their methods, indicating the difficulty of obtaining conclusive results in psycholinguistic testing of this kind.

Both Walch and Trammel were rather optimistic in their conclusions. However, Walch's conclusions constitute a typical example of what Botha calls "the fallacy of confirming the consequent". She attributed the poor performance in locating stress in unknown words to uncertain underlying representations. The fact that the subjects performed well with known words is supposed to indicate a knowledge of the rules. However, this good performance could well be due to other factors, the most obvious possibility being that a knowledge of the words includes a knowledge of the stress patterns.

Trammel's conclusions are based on more positive evidence than Walch's. His high percentages of agreement in stress placement for unknown words do, indeed, indicate that the orthography is a sufficient stimulus, in most cases, for native speakers to apply what appear to be similar sets of

stress rules. There is no way of knowing, nor is it claimed by Trammel, that those rules are the same as Chomsky and Halle's, or even that one speaker's rules are the same as another's. However, they do at least seem to account for the same regularities within the language.

An interesting question is why Trammel's subjects performed so much better than Walch's in assigning stress of unknown words. As Walch's article leaves out many of the details of her study, such as information about her subjects, and the words and rules tested, possible reasons can only be suggested. Three variables which could have had an effect are the age and education of the subjects, the rules illustrated by the real and nonsense words chosen, and the presence or lack of recognizable suffixes (Trammel's words included many suffixes).

Baker and Smith's was the only study where the *SPE* rules strategy was compared to another strategy—the analogy to similar words. Their conclusions are the most modest and the most realistic of the three studies. Although there seems to be evidence that the speakers follow something like *SPE* rules some of the time, it appears that at other times they simply use the stress pattern of a similar word, whether structurally the same or not. Speakers'decisions seemed to be influenced by a variety of factors, as would be expected. Certainly human beings are too unpredictable for one to expect all speakers of a language to develop, let alone consistently apply, a single system of rules as complex as that of *SPE*.

It seems, then, that the TG controversy has yet to be resolved. The experimental studies made to date in the area of English phonology have shown only that, if the TG grammars are psychologically real in the sense of representing the competence of the ideal native speaker, then the performance of many real speakers is frequently far removed from this competence. At the same time, there is evidence that native speakers at times follow some sort of logical strategy which leads them to pronounce words as they would be pronounced by TG rules. It seems it is not possible by known methods of testing to prove just how close the native speaker's strategies come to TG rules, but only that they sometimes lead to the same conclusions. One thing, however, is apparent. The form in which TG rules have been developed so far is too complicated to be followed on a conscious level with any degree of speed. They

are not, therefore, in their present form, very workable models to put to practical use in the field of teaching.

1.2.5. Descriptions Mixing Phonological and Orthographic Cues

In the descriptions of English stress mentioned up to now, we have seen (1) the inadequacy of broad generalizations about stress patterns because of the great number of exceptions (2) the inefficiency of the long lists of affixes because of the difficulty in memorizing the stress patterns of each one, and (3) the cumbersomeness of the complicated TG rules. Evidently aware of these shortcomings, two applied linguists have elaborated descriptions of English stress especially for the foreign learner, combining in modified form the most workable aspects of the affix and TG approaches.

Lionel Guierre has combined some of the notational conventions of TG phonology with orthographic cues to organize into a learnable system many of the suffixes included in the lists of Kingdon and others. The small letters are graphic while the V and C are usually phonetic vowels and consonants.

His most productive rule is the "rule of *lion*" with its extensions. (1) The "rule of *lion*" assigns penultimate stress to words ending in *i* followed by one or more vowels followed by zero or more consonants:

$-iV^{n} \left\{ \begin{matrix} \emptyset \\ C^{n} \end{matrix} \right. =/\_20/.$ (5)

(2) One extension is the same rule with *u*:

$-uV^{n} \left\{ \begin{matrix} \emptyset \\ C^{n} \end{matrix} \right. =/\_20/.$

(3) A modification of this rule is for words where the *i* or *u* is in the first syllable of the word; in these cases the *i* or *u* receives stress and the *i* is pronounced [ai] :

$\ast\ast\ (C^{n})iV^{n}(C^{n}) =/\_20/.$

(4) Another extension includes a single consonant after the *i* or *u*. The stress falls on the same syllable as it would without the consonant, but this syllable is now

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(5) Guierre uses the numeral 2 for primary stress, 1 for secondary or terciary, and 0 for weak stress.
$iV^{n} \left\{ \begin{matrix} \emptyset \\ C^{n} \end{matrix} \right.$ is counted as one syllable, although it is sometimes pronounced as two.

antepenultimate since the consonant separates the *i* or *u* from the last syllable:

$$- \left\{ \begin{matrix} i \\ u \end{matrix} \right\} C - = / \_ 200 /.$$

Examples of the "rule of *lion*" and its extensions are (1) *battālion, enthūsiast;* (2) *habĭtual, perpētuate;* (3) *lĭon, dūal;* and (4) *inquĭsitive, mirāculous* (Guierre, 1966: 34-7; 1970: 78-86).

Guierre's rule for certain suffixes preceded by a consonant cluster (*r* does not constitute a member of a cluster) describes a generalization also pointed out in *SPE* for monosyllabic formatives (Chomsky and Halle, 1968: 81-3). Words ending in suffixes such as *-ive, -al, -um, -us, -ous, -a, -ent, -ence, -ant, -ance, -o, -or,* and *-er* preceded by a consonant cluster receive stress on the penultimate syllable:

$$-C_1C_2 \left\{ \begin{matrix} \text{-ive} \\ \text{-al} \\ \text{-um} \\ \text{-us} \\ \text{-ous, etc.} \end{matrix} \right. \quad = / \_ 20 /.$$

(Words ending in *-ity, -ic, -ical,* receive the same stress whether or not these suffixes are preceded by a consonant cluster). Examples of this rule are *attrāctive* and *insĭstence* (1966: 37-9; 1970: 86-97).

Guierre's rule for the suffix *-ous* states that it causes antepenultimate stress when preceded by a vowel and a single consonant, and penultimate stress in all other contexts (including - Vous, $-C_1C_2$ ous, $-C_1C_1$ ous, and -Crous):

$$-\text{VCous} = / \_ 200 /$$

$$\neq -\text{VCous} = / \_ 20 /.$$

Examples of this rule are *anōnymous, simultāneous, stupēndous* (1966: 39-42).

Guierre's most complicated rule involves what he calls "learned constructions" (1970: 116-7), formed by three types of elements: (1) Class A elements or "quasi-morphemes" (1967: 350) such as *micro-* and *tele-*, which are lexico-semantically independent enough to occasionally be used as complete words (*polio, stereo*); (2) Class B elements, which are weak suffixes such as *-crat* and *-graph;* and (3) Class C elements or "bound

endings", which function as strong endings in combination with the other two. Words composed of A+B are stressed on the first syllable of A (*phōtograph, tēlephone*); words composed of A+B+C are stressed on the last syllable of A (*phŏtŏgraphy, antăgonism*).

In addition to these rules, Guierre gives a rule stressing the last syllable of verbs ending in a consonant cluster[6], and a list of weak suffixes which leave the stress on the syllable of the root word. For all rules, exceptions are listed and treated as such. Guierre's presentation of these rules for students will be discussed in Chapter Five.

Wayne B. Dickerson bases his entire system of foreign learner rules for English (which includes rules for vowel quality) on generative phonology and traditional spelling patterns, but modifies his rules to the extent that they no longer resemble a generative grammar. His explanation for his deviation from formal generative norms in a teaching context is as follows:

> "To begin with, the distance between a technical linguistic rule and a usable student generalization is extremely great. It is clear that the typical learner cannot use rewrite rules framed in a quasi-algebraic symbology and distinctive feature notation. Nor can he handle the complexity of some rules (apart from their formalizations). Second, the distance between the abstract phonological form of words and the vowel and consonant letters of conventional orthography is also very great. The learner simply does not have available to him in spelling all the information found in the abstract form of words to which the technical rules apply. In short, the applied linguist must bridge the theory-to-application gap at two points. First, he must supply a pedagogical translation of the technical rules. Second, he must make practical use of orthography as a deep structure" (1978: 134).

Dickerson first describes three basic skills the foreign learner needs in order to be able to apply his stress rules.

(1) He must be able to identify four basic parts of speech: noun, adjective, verb, and adverb. He has found his university level students generally have this skill already.

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(6) *SPE* gives a similar rule, but in words of three or more syllables applies also the Alternating Stress Rule to move the stress to the antepenultimate syllable, except in the case of certain words given a formative boundary.

(2) He must be able to recognize different types of affixes—the difference between Anglo-Saxon and Latin prefixes; and the difference between what Dickerson calls weak, strong, general, and neutral suffixes. Practice must be given for the student to acquire this skill.

(3) He must be able to recognize the six spelling and vowel quality patterns: (a) VC※and (b) VCC, which suggest lax (or short, the term preferred for students) vowels; (c) VCe※ and (d) VV, which suggest tense (or long) vowels (※indicates the end of a word); (e) VC+, which suggests a tense (or long) vowel (+ indicates a weak, strong, or general ending); (f) and V with no following consonant, which suggests a reduced vowel if the vowel letter is *a* and a tense vowel if the letter is *o*, *a*, *i*, or *y*. In the first five patterns the vowel quality suggested is realized when stressed and reduced when unstressed. In the last patterns only the letters *i* and *y* vary. They are pronounced [ay] when stressed and [iy] when unstressed. This third skill must also be acquired with practice (1978: 136-8).

With these three skills mastered, the learner can procede to the three basic stress rules, all of them based on recognition of the "key syllable", which is the last spelling pattern of the word or the last before its ending.

(1) The Weak Stress Rule (a translation of Chomsky and Halle's Romance Stress Rule) applies to all words with weak endings (*-es*, *-ed*, *-ing*, *-er*, *-or*, *-able*, *-al*, *-en*, *-ary*, *-ory*, *-ive*, *-ure*, adjectival *-ish* and *-y*, etc.), and verbs without endings. This rule states that (a) if the key is V or VC, we stress the syllable to the left unless it is a prefix, in which case we stress the key; and (b) a VC or VCC stressed by the command "stress left" will receive a short vowel sound, except ūC, which receives a long vowel sound (1978: 138-9). Examples of this rule (not given in the article) are *prĭmitive*, *mĭneral*, and *lūcrative*.

(2) The Strong Stress Rule (a translation of another part of Chomsky and Halle's Main Stress Rule) applies to all words with strong endings, including iV-endings and iC-endings and a few eV-, uV-, and uC-endings (these are very similar to Guierre's classifications). The rule states that (a) if the ending is strong, we stress the key; (b) a stressed VC+key

before a strong iV-ending receives a long vowel sound, except *i*, which receives a short vowel sound, as do all other stressed keys; and (c) a stressed key before a strong ïC-ending receives a short vowel sound, except ü and üC, which receive a long vowel sound (1978: 140-1). Examples of this rule are *atrōcious*, *suspīcious*, *incrēdible* and *spectācular* (also not given in the article).

(3) The General Stress Rule (a translation of Chomsky and Halle's Main Stress Rule) applies to words of three or more syllables with a general ending (*-ate*, *-acy*, *-ism*, *-ist*, and *-ize*). The rule states that if the ending is general, we stress to the left of the key, even if that syllable is a prefix. The vowel quality is determined as in the Weak Stress Rule (1978: 142). Examples are *īntricate* and *dēlicacy* (also not given).

In the conclusion about his stress rules, Dickerson echoes Chomsky and Halle's claim that English has "such a good orthographic system" (1978: 143), and points out that it is even more useful when used in place of deep structure information. Although Dickerson clearly makes good use of English orthography, he conveniently ignores (as do Chomsky and Halle) the fact that even with his simplified version of the generative stress rules, the learner has a much greater task in front of him than does, for example, the learner of Spanish or Portuguese. His pedagogical presentation of these rules will be given in Chapter Five.

In the area of word stress, English phonology has evolved considerably since those first linguists who claimed that the foreign learner simply had to learn the individual stress pattern of every word. These most recent descriptions of stress placement predict stress in a large percentage of English words and, though still complicated compared with other European languages, can evidently be learned and applied by the non-native speaker. Guierre experimented with students at the Sorbonne before publishing his *Drills in English Stress Patterns*, and Dickerson has been using his system of rules for a few years with foreign students at the University of Illinois.

1.3. Discussion

This Chapter has traced the evolution of descriptions of English stress-placement through the examination of four

different approaches. Every description mentioned has contributed information which is valuable to a theoretical study. However, the final objective of this thesis is a practical one—that of helping Brazilian students of English improve their stress-placement. We must consider each type of description, then, in light of its possible pedagogical relevance.

The general descriptions give interesting information about broad tendencies of the language. However, if students were taught generalizations such as Prator's statement that three out of four disyllabics take initial stress, they would make a frustrating number of errors before discovering all of the disyllabics which take final stress.

The lists of affixes and their effects on stress placement would give any foreign learner a high degree of accuracy in stress-placement of derived words if he were able to recall every one when needed. Unfortunately, it would take extraordinary motivation for a student to even attempt that task, and a better memory than most to succeed. Prefixes and suffixes are potentially very useful to the foreign learner of English, but they must first be arranged into a learnable system.

The TG descriptions have turned what previously seemed like totally unpredictable stress patterns into an organized system of stress rules. It has not yet been satisfactorily proven whether these rules are actually applied by native speakers, and if so, if they are applied every time a word is pronounced, or only for new words. We have seen that native speakers do not always pronounce unfamiliar words correctly, but they do so with enough frequency for us to agree that some sort of generalization is made, remembered, and applied.

Whether or not a native speaker's generalizations take the form of the TG cyclic rewrite rules is not only probably impossible to discover, but also irrelevant to the purposes of this study. Even if the native speaker, at an unconscious level, goes through all those transformations every time he pronounces a word, it is clearly an inefficient way to go about teaching stress to a non-native speaker of English. Putting aside the question of the form of a native speaker's generalizations, it would certainly be helpful to know just which generalizations he does make, for these are the ones we

must try to teach the non-native. The presentation of these generalizations would have to be made in a much more concrete manner.

The descriptions mixing phonological and orthographic cues are the only ones which have been presented in a learnable manner. Both Guierre's and Dickerson's rules, however, are limited to suffixed words and verbs. Although a large percentage of words are included in these two categories, the task has obviously not been completed.

If the phonological/orthographic rules could be combined with a concrete presentation of the TG rules, this would give a very complete system of stress generalizations for students of English. However, before possibly asking more of the foreign student than the native speaker himself is able to accomplish, it would seem wise to attempt to answer the question of which generalizations the native speaker makes.

It is important, then, first to discover what rules or generalizations the native speaker applies in choosing a word-stress pattern; and second, to find out which of these are most difficult for the non-native speaker to learn or apply and why. Before attempting to answer these two questions, a review will be made of the two principal ways in which the second question has been answered up to now—by contrastive analysis and by error analysis. This review will consider the merits of each, the methodological problems involved, and the various ways in which these problems have been approached in the past. Following this will be a discussion of the ways in which the present study differs in both objectives and conditions available, and an outline of the methodology chosen in light of these differences. Chapter Two deals with these theoretical and methodological considerations.

CHAPTER TWO

THEORETICAL AND METHODOLOGICAL CONSIDERATIONS

2.1. Contrastive Analysis vs. Error Analysis

It was stated in the introduction that an error analysis (EA) would be undertaken because of the inadequacy of contrastive analysis (CA) in predicting errors of the foreign language student. As this subject has been the cause of a great deal of controversy, some of the arguments that led to this conclusion are summarized below.

The original objectives of CA must be considered before judging whether they can be adequately met.

Charles C. Fries, one of the earlier proponents of CA, stressed its importance for text writers and teachers. He held the opinion that only with materials based on an adequate descriptive analysis of both languages could maximum progress toward mastery of the second language be achieved (1945: 4). He also believed that effective teachers must know the native language of the students "for the sake of understanding the precise nature of the difficulties with which the students are struggling" (1945: 14).

Lado emphasized the same objectives, stating that the teacher must be familiar with the similarities and differences of the two languages, as "these differences are the chief source of difficulty in learning a second language," and that

"the results of these contrastive descriptions form the basis for the preparation of language texts and tests, and for the correction of students learning a language" (1964: 21).

Halliday, McIntosh, and Strevens also speak of the usefulness of CA in the preparation of teaching materials, specifying the objectives of (1) finding out which features are the most likely sources of error and (2) describing those features in such a way as to minimize interference (1964: 118). They also saw a usefulness to the teacher for explaining the students' errors and preparing remedial exercises (1964: 119). These linguists went one step further and suggested using contrastive linguistics in a more direct way in the classroom—having the students imagine certain patterns of the foreign language operating in their native language (1964: 122). They caution, however, against describing the foreign language to the students in terms of the native language because of the danger of building "a false appearance of similarity" (1964: 122).

Rivers also favors introducing CA to the classroom, alerting the students to the point of contrast so that they can practice with awareness and concentration (1968: 153). However, she also emphasizes teaching the contrasting elements "emically"; that is, as they fit into the foreign language system, and not merely at the points of contrast (1968: 151).

John B. Carroll wrote in defense of CA, directing his comments particularly to the criticisms by transformational generativists. He denies the difference between a "habit" and a "rule" and between a "response" and a "rule-governed performance" (1968: 114), this difference being basic to the TG criticisms against trying to replace a habit of one language with a contrasting habit of another.

He then bases his argument on the "Osgood transfer surface", according to which (1) the greatest negative transfer takes place when stimuli are identical and responses antagonistic, and (2) the greatest positive transfer takes place when stimuli are different and responses identical (1968: 120). Following from this, Carroll argues that

> "to the extent that these response systems could be brought into the awareness of the student, negative trasfer effects would be considerably reduced, because the student could then better direct his own

> learning to avoid the interference of his first language system. Likewise, pointing out similarities between aspects of the two languages may facilitate learning" (1968: 121).

Among the proponents of CA, then, are those who want to use it only to orient the text writers and the teachers, and those who want to bring conscious attention of the students to the existing contrasts and similarities.

The opponents of CA do not feel it is adequate for either of these purposes.

The dangers of the second way of applying CA are obvious. Halliday et al. (see above) mentioned the danger of making the two languages appear more similar than they are. Another is that "the student is facilitated to make the erroneous association (bekommen-become), an association which he might otherwise not have made" (Levelt, 1978: 68). Both cases show the possibility of causing errors which would otherwise not have appeared.

Even the use of contrastive analysis by textwriters and teachers is strongly criticized, for less obvious reasons, most of them related to the fact that contrastive analysis pays great attention to the grammars of the two languages and none to the performance of the learners themselves (Richards and Sampson, 1974: 4).

W. R. Lee (1968: 186-90) refutes five assumptions often made by CA proponent about teaching: (1) The interference of the native language is *not* the prime or sole cause of error in the foreign language; equally important are generalization, false analogy, and bad teaching or materials. (2) The difficulties are *not* chiefly or wholly due to the differences between the two languages. (3) It is not true that the greater the differences, the greater the learning difficulties will be; on the contrary, a "very great dissimilarity may help lift the learner clear ... of his previous language configuration ... [and] place him in a fresh orbit" (1968: 188). (4) The results of a comparison of the two languages are not needed to predict difficulties and errors; these predictions tell us difficulties which *could* occur and not those which *do* occur. CA would be more useful for explaining the causes of difficulties which do occur and for suggesting remedial action. (5) CA does not tell us what to teach; when the differences are great you

have to teach everything anyway.

William Nemser carried out an experiment testing the English speech of native speakers of Hungarian, which showed shortcomings in the theoretical concepts of CA. His results imply the following: (1) The patterns of association between phoneme categories in the two languages are far less stable and more complex than assumed (example: English *tense* interdental imitated as sibilant, fricative, or stop, in that order of preference; English *lax* interdental imitated in reverse order of preference). (2) The theory failed to account for phoneme blends such as [s͡θ] and [t͡θ], assignable to neither system. (3) Perception and production interference patterns are frequently independent of each other (example: interdentals *perceived* as labial fricatives, but *produced* as apical stops). (4) Interference patterns are far more complex than assumed. (5) The predictions are too vague to be useful. (6) Many predictions are incorrect, especially as related to distribution of phonemes. (7) The error rates are lower than predicted (1971 : 95-6).

From the studies made by these and other linguists, it is clear that if we rely on CA to discover the greatest difficulties in language learning, we risk not only emphasizing contrasts which are either irrelevant or unnecessarily confusing, but also bypassing items which are difficult for reasons other than the differences between the two languages.

Rather than try to predict the errors which will be made, the answer seems to lie in the more time-consuming testing of learners to see what errors are actually made and why.

Selinker mentions as common causes of error: (1) native language transfer, including spelling pronunciations and cognate pronunciations, (2) overgeneralization of the target language, (3) transfer of L_2 training which emphasizes a certain item in neglect of others, (4) the tendency to reduce the target language to a simpler system, and (5) hypercorrection (1974: 37-41). Richards also mentions overgeneralization, and adds to these (1) ignorance of rule restrictions, (2) incomplete application of rules, and (3) false concepts hypothesized (1974: 174-8). Of all of these, only those erros due to native language transfer would be predicted by CA.

This does not mean that CA has lost its place in

contemporary linguistics, but only that it can no longer stand alone. There are those such as Duskova (1969), Jackson (1971), and Corder (1973), who believe EA should be undertaken to supplement or verify CA. Others such as Hamp (1968), Gradman (1971), and Snook (1971), believe CA should be undertaken only after EA, for the purpose of helping to explain the errors committed. Nickel takes the neutral position that "whether one starts with error analysis and then proceeds to a contrastive analysis, or viceversa,is a question of method and objective" (1971: 11).

As the ultimate purpose of this thesis is pedagogical rather than theoretical, and it has been shown that students' errors are due to several other factors besides native language interference, the most logical option would be to go directly to EA, using CA only where helpful to explain errors made. However, as several contrastive studies and one error analysis have already been made in regard to English and Portuguese stress placement, these studies will first be reviewed. Then, in the course of the error analysis, an attempt will be made to verify some of the predictions and conclusions of these studies, and to use them to explain errors made.

2.2. Previous Studies of English and Portuguese Word Stress

Contrastive studies of English and Portuguese word stress have been made by Agostinus Staub, Matos and Cintra (1966), and José Pinheiro de Souza (1969). These studies do not deal with specific stress rules, but with the differences in stress levels, their distribution, and the possible vowel phonemes for each level. These differences and cognates with different stress patterns are used to explain and predict errors made by Brazilian students of English.

Staub and Souza mention the differences in stress levels as a source of difficulty, pointing out that English has four levels of word stress as described by Trager and Smith (see 1.2.1.), while Portuguese has only two, strong and weak. Portuguese weak stress, however, has two or three non-phonemic variants. Staub gives two, the weakest following the stressed syllable (lé̆ité̆), and the less weak preceding it (că̆fé̆) (Staub: 121). Souza gives Câmara's three variants: (1) minimum weak /ˆ"/, which occurs on the first syllable if the word begins

with a consonant (/vô"sé/), and on the second if it begins with a vowel (/iNtê"resáNti/); (2) maximum weak /ˆ/, which occurs on the last syllable (/únikû/); and (3) medium weak /ˆ'/, which occurs in other positions (/fâ"sílî'mu/) (1969: 96).

All three studies note that Portuguese primary stress is limited in distribution to the last three syllables, whereas English primary stress can be followed by three or more weaker stressed syllables. Compound words in English are more commonly stressed on the first element, and in Portuguese on the last.

Another important difference observed by Staub lies in the vowels which can appear in stressed and unstressed s syllables. An English stressed syllable can take the vowel phonemes /i/, /e/, /æ/, /ɨ/, /ə/, /a/, /u/, /o/, and /ɔ/, always followed by a consonant or a glide; while unstressed syllables generally take [ə] , [I] , or [ɨ] . A Portuguese stressed syllable can contain the phonemes /i/, /e/, /ɛ/, /u/, /o/, /ɔ/, and /a/; an unstressed syllable preceding primary stress is, for most speakers, limited to /i/, /e/, /u/, /o/, and /a/; an unstressed final vowel is limited to the front vowel /i/, the back vowel /u/, or the middle vowel /a/, which is frequently weakened to [ʌ] or [ə] (Staub: 2-12).

Staub attributes to these differences of stress level and distribution, besides various minor errors of stressing a syllable too heavily or too weakly, the following more serious errors of stress placement: (1) English terciary stress is often switched with primary, when non-contiguous and after primary (*ēstimāted*); (2) primary stress which should fall on the fourth-to-last syllable is shifted to the penultimate (*apprēciāted*). (Staub: 122-3).

Due to the lack of a constant stress-pattern relationship between English and Portuguese cognates, Matos and Cintra predict the following error of stress placement: (1) transfer of the stress pattern of the Portuguese cognate (*ilustrār* → *illustrāte*); (2) transfer of terciary (minimum weak) stress of the Portuguese cognate (*agrĭcultūra* → *agrĭculture*). They also predict the transfer of the predominant stress pattern of three and four-syllable English words (*tēlephone* → *cōmponent*) (1966: 114-5).

It can be seen from these studies that English stress is much less restricted than Portuguese stress in several

respects: (1) English has a greater number of stress levels, (2) primary stress can fall, essentially, anywhere in the English word, and (3) almost any English vowel phoneme can take primary stress. It is apparent that the additional options of stress in English would confuse the Portuguese speaker to some extent, but it would be difficult, without an error analysis, to predict exactly what errors would be caused by this confusion.

The stress problems mentioned by Staub are presumably not predictions but observations, as they are too specific to have been predicted by his CA. Matos and Cintra speak of "predictions", but then give examples of "frequent" and "common" errors, leaving the impression that theirs are not really predictions either. A methodology has not been given in any of the three studies, but the impression is that these CA studies have been made to explain, and not predict errors. The errors explained, however, have most likely been casual observations and should be verified by a more methodical EA.

The only previous error analysis known to the author involving English stress placement by Brazilian students is Terzi's (1977). Although a detailed methodology for carrying out an error analysis has yet to be agreed upon, Terzi has followed the suggestion of Nemser (1974), Selinker (1974), Richards (1974), and others, of postulating intermediate approximative systems to help in the planning of a pedagogical strategy. These intermediate systems would be derived from both the native language and target language systems, and they would be influenced by outside factors as well.

Terzi mentions several difficulties in the postulation of intermediate systems: (1) students at the same stage of proficiency rarely use exactly the same approximative systems, (2) these systems are constantly being modified, (3) the systems overlap each other, (4) the students are inconsistent in applying the rules of each system (1977: 29-34). Added to these is the methodological difficulty that a study postulating intermediate systems should be longitudinal, a condition which was impossible for her study as it is impossible for this one.

To compensate for the impossibility of a longitudinal study, Terzi tested three different levels of students

following the same program of English—the first three phases of the Yâzigi English Program.

The other four difficulties mentioned were minimized by the fact that the students were following a uniform program of study, and for this reason, were exposed to the same input. Dealing with the most elementary groups of students should also have limited the variations in their approximative systems. Finally, the fact that the Yâzigi promotions from one phase to the next depend on productivity rather than a time table should have kept the groups reasonably homogeneous.

Terzi based her analysis on TG descriptions of the two languages, using Chomsky and Halle's model (1968) for English stress (see 1.2.3.), and Leite's model for Portuguese stress. Leite's rules are summarized below:

(1) Stress the antepenultimate syllable of words marked [+ learned] (example: *político*).

$$V \rightarrow [+\text{ stress}] \;/\; \_\_ C\ V\ C_o\ V\ C_o\ \#\!\#$$

(2) Stress vowel preceding superlative and diminutive suffixes (example: *belíssimo*).

$$V \rightarrow [+\text{ stress}] \;/\; \_\_\ C_o + \begin{Bmatrix} \text{issim} \\ \text{inh} \end{Bmatrix} + V\ \#\!\#$$

(3) Stress final /ɛ/ and /ɔ/ (example: *café*).

$$V \rightarrow [+\text{ stress}] \;/\; \begin{bmatrix} \alpha\ \overline{\text{back}} \\ \alpha\ \text{round} \\ +\ \text{low} \end{bmatrix} \#\!\#$$

(4) Stress final syllable ending in /l/, /z/, or /r/, exceptions marked in lexicon (example: *falar*).

$$V \rightarrow [+\text{ stress}] \;/\; \_\_\ [+\text{ cont}]\ \#\!\#$$

(5) Stress final syllable ending in nasal vowel and penultimate of words ending in a nasal vowel plus oral vowel, exceptions marked in lexicon (examples: *xaxim*, *falarão*).

$$V \rightarrow [+\text{ stress}] \;/\; (X)\ C_o\ [\overline{\text{nasal}}]\ (V)\ \#\!\#$$

Condition: X contains no stress.

(6) General stress assignment: Stress penultimate syllable of words ending in a non-nasal vowel or ending in a continuant and exceptions to Rule (4). Stress monosyllabics (example: *menino*).

$$V \rightarrow [+\text{ stress}] \;/\; (X)\ C_o\ \left(\begin{bmatrix} V \\ -\text{stress} \\ -\text{rule } 4 \end{bmatrix} C_o \right) \#\!\#$$

Condition: X can contain stress only if to left of a /+/ boundary (Terzi, 1977: 49-51; Leite, 1974: 42-3).

A test of fifty known English words was applied to thirty Brazilian students of English, illiciting the desired response by oral and visual stimulus, in order to avoid orthographic interference. From the taped responses the following rules were formulated by Terzi, in an attempt to explain the learning strategies causing errors.

(1) $V \rightarrow [+\text{stress}] \; / \; \left[\frac{}{+\text{low}}\right] C_1 \left(\left[\begin{matrix}V\\-\text{low}\end{matrix}\right] C_o\right)_1 \#\#$,
which stresses a syllable containing /ɛ/ or /ɔ/ (*subjēct*).

(2) $V \rightarrow [+\text{stress}] \; / \; \_\_ \; G \; (C_1 \; V_o)_o \; \#\#$,
which stresses a syllable containing a diphthong (*barbecūe*).

(3) $V \rightarrow [+\text{stress}] \; / \; \_\_ \; nt \; \#\#$,
which stresses a final syllable ending in *nt* (*restaurānt*).

(4) $V \rightarrow [+\text{stress}] \; / \; \_\_ \; C_1 \; VC_o \; \#\#$,
which stresses the penultimate syllable when rules (1), (2), and (3) are inapplicable (*Brāzil*).

(5) $V \rightarrow [+\text{stress}] \; / \; \#\# X \#\# \; Y \; \_\_ \; Z \#\#$,
which gives primary stress to the second element of bisyllabic compounds (*ice crēam*).

(6) $V \rightarrow [+\text{stress}] \; / \; \#\# \; X \; \_\_ \; Y \#\# \; Z \; \_\_ \; W \#\#$,
which gives primary stress to both elements of polysyllabic compounds (*yēsterdāy*). (Terzi, 1977: 69-72).

Terzi then outlined three approximative systems, the first consisting of a mixture of these and the correct stress rules according to *SPE*, and the third consisting only of the correct stress rules.

Analyzing the causes of these rules, Terzi notes the high degree of interference of the native language, which was responsible for rules (1), (4), and (5). She attributes rule (2) to a possible influence of English rules stressing tense vowels, and rules (3) and (6) to the first approximate system itself (1977: 90). It also appears possible, however, for rule (3) to have been influenced by the English rules stressing final syllables with a consonant cluster. Terzi notes the more frequent use of context rules than rules of stress position (1977: 85), and the lack of interference of cognates (1977: 88).

2.3. Discussion

Terzi's EA is without doubt a more adequate way of determining Brazilian students' difficulties in English stress placement than the less methodical contrastive studies which preceded it. These three previous studies showed no clear relationship between the CA and the predictions made. Some of the predictions seemed to be based either on intuition or casual observation, the latter being actually a primitive form of EA, without a defined methodology.

Of the six erroneous rules that Terzi concluded were hypothesized by her students, three can be explained by CA and could possibly have been predicted by CA. The other three, however, could only show up in an EA, and can only be explained in terms of the target language itself.

It is clear from the above that EA is the most efficient way to discover the problems encountered by Brazilian students in the placement of English stress. The approach to EA in the present study, however, is different from Terzi's approach in several respects.

(1) While Terzi opted for the approximative systems approach in spite of its inherent difficulties; this study aims only at showing the relative difficulty of the stress rules, and discovering the principal interfering strategies of advanced Brazilian students. This difference in approach is a result of two basic differences in purpose:

(a) Terzi was interested in the stress difficulties of beginning students, and was therefore able to minimize the previously mentioned difficulties of the approximative systems approach by testing relatively homogeneous groups following a uniform program of study. The present study, however, is concerned with the stress difficulties of advanced students, who vary greatly in proficiency level, and who studied previously in many different institutions by a variety of different methods.

(b) Furthermore, while Terzi's purpose was theoretical— "... to verify the postulations of Error Analysis according to which individuals, during the process of second language learning, exhibit structurally systematic intermediate stages,

resulting from the formulation of hypotheses,"[7]—the purpose here is pedagogical—to help Brazilian students in the placement of English word stress.

(2) The second difference is the fact that Terzi accepted TG phonology without question. This was a logical choice for a theoretical study, as most contemporary linguists admit the usefulness of TG grammar for the study of general linguistic theory. However, as there is considerable controversy about the pedagogical application of TG grammar, and, in particular, of TG phonology, it would be difficult to justify using this approach for the present study without first examining the applicability of this theory. This is done in the following chapter by testing native speakers of English.

(3) The third difference is in choice of stimulus. Terzi chose oral stimulus in order to avoid orthographic influence. Using oral stimulus implies testing only familiar words, which means the results are meaningful only if it is assumed that stress rules are applied every time a speaker utters a word. Because of irregular words, which must be item-learned, it is impossible that all words are pronounced in this manner. Furthermore, as pointed out by Roeper et al (1979: 48), even Halle (1973) and Aronoff (1976) "suggest that people do not newly generate stress patterns for each word but rather remember the stress pattern for each word just as they remember the meaning of each word." Allowing that some words are pronounced by applying the rules, it is impossible to know in a study of this kind which words were item-learned and which show a knowledge of the rules.

There seems to be no way of avoiding orthographic influence without leaving doubt as to whether correct responses indicate rule-following. In the testing of advanced students, however, this is not a problem. Since advanced students acquire the greatest part of their vocabulary through reading, accurate stress placement for them requires the ability to use orthographic clues. Orthographic stimulus is quite appropriate,

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(7) The author's translation of the following: "... verificar as postulações da Análise de Erros, segundo a qual indivíduos, durante o processo de aprendizagem de uma segunda língua, apresentam estágios estruturalmente sistemáticos, decorrentes de formulação de hipóteses" (Terzi, 1977: IV).

then, for the testing of their stress rule applications. In fact, in order to make sure that correct pronunciations were due to rule-following, an attempt was made to choose words which would not be familiar to the students. The author being a native speaker of English, it was assumed that a word which was not a parte of her active vocabulary or used only infrequently would be at least aurally unfamiliar to most of the students.

(4) A difficulty faced by Terzi in the use of oral stimulus was finding a sufficient number of familiar words in each rule category. Because of the limited vocabulary of beginning students, the number of words tested was small and the selection arbitrary. The result was that the knowledge of certain rules was judged by the pronunciation of as few as two words. In the present study, where difficulty was encountered, it was of the opposite kind—finding unfamiliar words for each category. In a few cases, particularly for exceptions to the rules, more common words had to be used. However, it was possible to test exactly six regular and two irregular words for each rule.

In this chapter it has been seen that CA can predict some, but not all of the errors made, and that it often predicts errors that are not made. It is more useful in conjunction with EA to help explain errors. An EA should be more methodical than casual observance. An EA using the approximative systems approach is appropriate for a theoretical study, but possibly irrelevant for pedagogical purposes, especially considering the difficulties involved. TG grammar is also appropriate for a theoretical study, but its adequacy should be compared with that of other types of description and generalization before employing it in a study intended for pedagogical purposes. The corpus for an error analysis should be large enough to minimize the effect of item-learned words. For an EA of advanced students, orthographic stimulus is preferable to oral stimulus.

The following chapter relates the test given to native speakers to compare the validity of TG stress rules with two other types of generalization. Chapter Four deals with the EA of stress-placement by advanced Brazilian students of English, the methodology taking into consideration the conclusions of this chapter and the results of the test of native speakers.

CHAPTER THREE

TEST OF NATIVE SPEAKERS

Before undertaking an error analysis of the English stress-placement of Brazilian learners, a decision had to be made about what types of stress rules would be tested. The straight suffix approach was eliminated because including several examples of a large selection of suffixes would produce a test too long to apply.

Guierre's rules would not be difficult to test, and the fact that they have already been used in a teaching context indicates that they are learnable. However, these rules deal only with suffixed words and one category of verbs, and it was thought that errors in other categories should be checked as well.

The only approach to stress placement which deals extensively with non-suffixed words is the TG approach. However, only one of the three studies made showed consistent application of TG rules by native speakers. As mentioned in 1.2.4., one probable reason for the conflicting results of the three studies was the selection of rules to be tested, since none of the studies gave separate results for each TG rule. A test was therefore applied to native speakers, with *SPE*'s Main Stress Rule broken down according to the different categories of words to which it applies, by part of speech and phonological characteristics.

The application by native speakers of *SPE*'s Main Stress Rule, divided into sixteen smaller rules, was compared with the application of six of Guierre's suffix rules. Three of the latter apply to groups of similar suffixes (one is essentially the same as an *SPE* rule, giving a total of 21 instead of 22 rules tested), and the other three apply to individual suffixes, chosen for their productivity[8]. The rules which seemed to be applied fairly consistently, and others of the same type[9], would be used in the error analysis of Brazilian learners of English. Below is a list of the rules tested.

SPE Rules: Verbs

SPE.V.1: Assign stress to penultimate V if last V is lax and followed by no more than one C.

SPE.V.2. Assign stress to last V if tense.

SPE.V.3. Assign stress to last V if followed by more than one C.

SPE.V.4. Alternating Stress Rule moves final stress back two syllables.

SPE Rules: Nouns

SPE.N.1. If final V is lax, and penultimate V is lax and followed by no more than one C, assign stress to antepenultimate V.

SPE.N.2. If final V is lax and penultimate V is tense, assign stress to penultimate V.

SPE.N.3. It final V is lax and penultimate V is followed by two or more C's, assign stress to penultimate V.

SPE.N.4. If final V is tense, assign stress to this V.

SPE.N.5. Alternating Stress Rule moves final stress back two syllables.

SPE Rules: Adjectives: follow same rules as verbs.

SPE.A.1. Penultimate stress.

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(8) Unfortunately, the author was not yet aware of the existence of Dickerson's publications at the time this test was designed and applied.

(9) To limit the size of this test, already quite extensive, it was assumed that if one rule is easily applied by natives, others of its type would also be easily applied.

SPE.A.2. Final stress.

SPE.A.3. Final stress.

SPE.A.4. Alternating Stress Rule.

SPE Rules: Derived nouns and adjectives with a final monosyllabic formative containing a lax V: pronounced according to rules for nouns ending in a lax V.

SPE.D.1. Antepenultimate stress.

SPE.D.2. Penultimate stress.

SPE.D.3. Penultimate stress. This rule is also given by Guierre.

Guierre's rules for suffix groups

G.S.1. Words ending in a C cluster plus *-ive, -ent, -ence, -ant, -ance, -al,* etc. are stressed on the vowel preceding the cluster. This rule is the same as SPE.D.3.

G.S.2. "Rule of *lion*": Words ending in *i* plus one or more V's plus any number of optional C's are stressed on the preceding syllable.

G.S.3. Extension: When *i* is the only graphic V in the penultimate syllable and followed by one C, it is lax and stress is assigned to the antepenultimate syllable.

Guierre's individual suffix rules

G.I.1. Words ending in *-ic* receive penultimate stress.

G.I.2. Words ending in *-ical* receive antepenultimate stress.

G.I.3. Words ending in *-ity* receive antepenultimate stress.

3.1. Methodology

These rules were tested by giving six nonsense words for each rule, each nonsense word modeled after a real word fitting the pattern, where possible the very words used as examples by the inventors of the rules. Guierre's rule *G.S.3.* was not given its own words, as there were thirteen words from the other rules which already followed the *G.S.3.* patterns.

Where the patterns are purely phonological, as in most of the *SPE* rules, the same vowels and the same number and position of consonants were maintained. The consonants,

however, were replaced by different consonants, with an attempt to maintain pronounceability in the sequence of segments. The placement of *r* as a second consonant of a cluster was avoided except where it appeared in the model word, in which case it was retained.

Where the rules depend on suffixes, the same suffix was maintained, and the rest of the word was modified as above.

All 120 words were contextualized, maintaining the same part of speech of the model word. (See Appendix 1 for list of nonsense words and the sentences used.) In addition to illustrating the part of speech, the contextualizing served to avoid slow unnatural pronunciations with no stress at all[10] and the possibility of falling into a rhythm, stressing each word as the previous one. The sentences were arbitrarily chosen from Clarey and Dixson's *Pronunciation Exercises in English* and Guierre's *Drills in English Stress Patterns*, the nonsense word replacing a real word of the same part of speech.

The test was first applied to seven native speakers who did not take part in the final experiment in order to check for outside influences which could affect the application of the rules. Several nonsense words were then altered to avoid obvious analogy to a real word or to eliminate endings which appeared to be suffixes. The sentences were also modified where the context itself would cause analogy to a particular real word or where it sounded so strange as to be distracting.

These sentences were typed separately on 4" by 6" index cards in order to change the order for each subject who participated. The orders were contrived so that two words of the same patterns never appeared consecutively, and so that two sentences which appeared consecutively for one subject never appeared in that order for another subject.

The test was given to thirty native speakers of English between the ages of fifteen and eighteen, students of the Escola Americana do Rio de Janeiro. Only monolinguals with no more

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(10) Trammel had his subjects read only the test word aloud, which caused, in some cases, slow unnatural pronunciations with little vowel reduction and evenly stressed syllables (1978: 87). Therefore, it was considered preferable to risk the possibility of a stress shift, as this is rare except in the case of compound words.

than two years of exposure to Portuguese were chosen in order to minimize interference of a second language.

Each subject was recorded individually reading the 120 sentences. The subjects were asked to read each sentence silently before reading it aloud and to repeat the entire sentence if they wanted to change their pronunciation of a word. The last pronunciation only would appear in the analysis. They were told only that they were being tested for their pronunciation of a nonsense word in each sentence, but not that it was the stress placement which mattered.

3.2. Results

The compilation of results was complicated by the variety of pronunciations given for each word. This was due mainly to two factors. The first of these factors was the students themselves. Probably because of the age group, the students were very easily distracted, causing the addition and omission of segments or of entire syllables, the transposition of segments, and obvious misreading of segments. Particularly troublesome were a couple of students who appeared to have reading disabilities, as they misread many very common words besides.

The second factor is the English language itself. The number and position of consonants and the same vowels (including, in most cases, silent *e*'s) were maintained on the theory that the resulting nonsense words should rhyme with the model words and follow the same type of phonetic patterns in as much as affects stress according to generative rules. However, English orthography proved to be ambiguous, many segments being interpreted in several different ways. At times, because of a different interpretation of the segments to be pronounced, the word no longer satisfied the conditions for the stress rule to be applied.

To minimize the effect of the distraction factor, Trammell's example was followed, with one modification. Trammel counted as invalid "responses in which sounds were omitted, added, or transposed" (1978: 87). The modification in this study was to accept transposed segments when they did not affect the basic phonological pattern of the word; for example, one consonant in place of another (except *ɾ* after another

TABLE I

NATIVE SPEAKER RESPONSES

Rule	Number of Rule Responses	Number of Valid Responses	Number of Rule Responses Divided by Number of Valid Responses	Number of Valid Responses Satisfying the Conditions for Rule Application	Number of Rul Responses Divided by th Number of Val Responses Satisfying Conditions fo Rule Application
SPE.V.1.	44	170	26%	107	41%
SPE.V.2.	101	173	58%	153	66%
SPE.V.3.	109	155	70%	155	70%
SPE.V.4.	99	130	76%	121	82%
SPE.N.1.	64	166	39%	110	58%
SPE.N.2.	65	154	42%	92	71%
SPE.N.3.	100	156	64%	154	65%
SPE.N.4.	59	151	38%	118	50%
SPE.N.5.	133	160	83%	149	89%
SPE.A.1.	94	161	58%	101	93%
SPE.A.2.	64	156	41%	117	55%
SPE.A.3	83	147	56%	147	56%
SPE.A.4.	135	166	81%	157	86%
SPE.D.1.	81	148	55%	97	84%
SPE.D.2.	26	127	20%	34	76%
SPE.D.3./ G.S.1.	83	119	70%	119	70%
G.S.2.	114	120	95%	120	95%
G.S.3.	254	350	73%	350	73% (11)
G.I.1.	107	150	71%	150	71%
G.I.2.	131	146	90%	146	90%
G.I.3.	125	154	81%	154	81%

(11) Besides the 13 nonsense words formed from model words which follow this rule, there were four whose model words follow the spelling pattern, of G.S.3., but the stress pattern of SPE.V.1., SPE.N.2., and SPE.D.2. Including these words gives 330 G.S.3. rule responses out of 450 valid responses, maintaining the same percentage of 73%. This shows G.S.3. is a much stronger rule and is partly responsible for the low scores of the other three.

consonant), a tense vowel in place of another, or a lax vowel in place of another lax vowel. Since the nonsense words were formed by changing the consonants of a real word anyway, this type of misreading should not affect stress placement. Where the rule depended on a suffix and/or its preceding vowel quality, any change in these items also invalidated the response.

The effect of the ambiguity of English could be eliminated by also invalidating interpretations of vowels which, although possible by traditional orthographic conventions, differed from the correct interpretation of the model word. However, since previous studies have shown that one weakness of TG stress rules is that they depend on underlying representations not always discoverable from the spelling, it was considered important to point out when this occurred.

The solution was to calculate two percentages for each rule. The first would be the number of rule-stressed responses divided by all valid responses (including a vowel which is different from the vowel of the model word, but possible from the spelling); the second would be the number of rule-stressed responses divided by the number of valid responses satisfying conditions for the application of the stress rule (these conditions at times excluding a vowel which is possible by spelling conventions, but different from the vowel of the model word). These percentages are listed in Table I (see Appendix 2 for the scores of individual words).

3.3. Conclusions

The most noticeable tendency which shows up in Table I is the difference between the two columns of percentages for *SPE* rules. In fourteen of the sixteen *SPE* rules tested, the scores are higher for rule pronunciations divided by the number of responses satisfying the conditions for the rule, than for rule pronunciations divided by the number of all valid responses. For eight of the rules this difference is more than 10%, and one rule shows a difference of 56% between the two scores. The reason for these differences is apparent. Before a phonological stress rule can be applied, the speaker must correctly identify the phonological pattern of the word.

The consonants are not difficult to identify; the four *SPE* rules which depend mainly on the identification of consonant clusters (*SPE.V.3.*, *SPE.N.3.*, *SPE.A.3.*, and *SPE.D.3.*) have a maximum difference of 1% between the two scores.

The vowels, however, are ambiguous in many words. All of the rules which depend on the correct interpretation of vowel quality except *SPE.D.3.* show a difference in the two scores. The four rules which depend on the vowel quality in two syllables (*SPE.N.2.*, *SPE.A.1.*, *SPE.D.1.*, and *SPE.D.2.*) shown differences of 19%, 29%, 29%, and 56% between the two scores. These rules can be said to be theoretically valid, but worth very little to the speaker if he does not know the phonological pattern (underlying representation).

Since non-natives are likely to have even more difficulty with ambiguous spelling patterns, it is of little use to expect them to learn to apply a rule which depends on a vowel which is difficult to analyze. Thus, to decide whether or not to include a rule in the error analysis of Brazilian students, the deciding factor will be the percentage of rule responses out of all valid responses, which will be high only where the vowel quality causes little or no difficulty.

In order to apply a suffix rule, the speaker need only recognize the suffix. This being a relatively easy task, all of the valid responses for suffix rules satisfied the conditions for the application of the rule, giving the same percentages in the two columns. These percentages were 70% or more for all six suffix rules. Guierre has already used his rules for teaching stress to non-natives, and 70% accuracy seems to be a reasonable expectation from a heterogeneous group of high school students. Thus, 70% will be used as the minimum score required to include a rule in the error analysis, accepting these six suffix rules and any *SPE* rules which were applied in 70% or more of all valid responses.

Only four of the *SPE* rules (besides *SPE.D.3./G.S.1.*, which is a suffix rule) reached this minimum score. Three of these are practically identical—the Alternating Stress Rules for verbs, nouns, and adjectives. The Alternating Stress Rules, according to Chomsky and Halle, are applied after the application of rules *SPE.V.2.*, *SPE.V.3.*, *SPE.N.4.*, *SPE.A.2.*, and *SPE.A.3.* However, since these five rules were applied only

58%, 70%, 38%, 41%, and 56% of the time respectively, compared to 76%, 83%, and 81% for the three Alternating Stress Rules, the mental processes of these native speakers must have been somewhat different than Chomsky and Halle imagined.

The only one of these five stress rules to reach the 70% minimum was *SPE.V.3.*, which stresses the last syllable of verbs ending in a consonant cluster. The Alternating Stress Rule for verbs, however, was the lowest scoring of the three. Furthermore, it has so many exceptions that Guierre gives a totally conflicting rule which stresses the last syllable of verbs with a final consonant cluster, even those with three or more syllables.

Because of these inconsistencies, the Alternating Stress Rules will be included in the error analysis, but stated so as to apply directly, and excluding verbs ending in a consonant cluster. Thus, included in the error analysis of Brazilians, along with the suffix rules, will be (1) a rule stressing the antepenultimate syllable of adjectives of three or more syllables ending in a consonant cluster or tense vowel, (2) a rule stressing the antepenultimate syllable of nouns and verbs of three or more syllables ending in a tense vowel, and (3) a rule stressing the final vowel of verbs ending in a consonant cluster.

3.4. Discussion

Before proceding to the error analysis of Brazilian students of English, it would be appropriate to make a few comments about the status of the various stress rules, and what has been proved, disproved, or implied about them.

It has not been proved that those rules accepted for the following error analysis constitute the mental processes (psychological reality) of native speakers of English. Rather, it has been shown that these native speakers have arrived at the same conclusions as those rules 70% or more of the time. This is a high enough percentage, under the conditions of this test, to make the rules worth learning, and, therefore, worth testing, in order to identify the greatest stress difficulties of the Brazilian learner.

Likewise, the psychological reality of the eleven *SPE*

rules which were not accepted for the error analysis has not been disproved. It has been proved only that, in an average group of high school students (this group is probably above average, although some may experience a slight second language interference), these rules are not consistently applied to totally unfamiliar words(it is assumed that the reaction to a totally unfamiliar word would be the same as the reaction to an invented word which fits into English orthographic conventions).

For rules *SPE.N.2.*, *SPE.A.1.*, *SPE.D.1.*, and *SPE.D.2.*, where correct stress was given in 70% of the cases in which the vowel quality was correctly analyzed; the possibility of Walch's suggestion, that the rules are applied when the speaker knows the underlying representation, can not be excluded. However, since this knowledge implies at least a vague familiarity with the word, such a rule would not be very helpful to the non-native learner who has never seen or heard the word before.

Rules *SPE.V.1.*, *SPE.N.1.*, *SPE.N.4.*, and *SPE.A.2.* are the ones which are least likely to be valid as representing the mental processes of native speakers; all four scored below 60% in both columns, and the minimum difference between the two columns was 12%. Not only was the vowel quality difficult to analyze in these words, but even where it was correctly analyzed, the rules were not consistently applied. If these rules do indeed represent mental processes of the native speaker, they are processes which are so difficult that he follows them only under the most ideal conditions; including, not only the knowledge of the underlying representation, but the absense of distractions of any sort. In any case, they are evidently not rules which would benefit the foreign learner.

Finally, rules *SPE.V.2.*, *SPE.N.3.*, and *SPE.A.3.* are rules which could be applied without any familiarity with the word, as the analysis of segments caused little or no difficulty. However, the scores ranged only between 56% and 66%, which was not considered high enough to include these rules in the error analysis. The main causes of the non-application of these rules seemed to be a consonant cluster, a double consonant, or a vowel which could be analyzed as tense, in a syllable previous to the one to be stressed.

It appears, therefore, that there is some validity to

these rules, but, as pointed out by Baker and Smith (1976: 25), the tense vowels and consonant clusters influence the native speaker's stress placement in positions other than those mentioned by Chomsky and Halle. This could be due to imperfect performance by the speakers or to imperfect rules or both. Only further experimentation and a statistical analysis of the language can answer that question. From the information at hand, however, the rules do not seem sufficiently valid to warrant testing of the application by Brazilian learners.

In conclusion, it is apparent that suffix rules such as Guierre's are much more easily applied by native speakers than generative phonological rules of the *SPE* type. Exceptions are the Alternating Stress Rules, although evidently applied in a different manner than that stated by Chomsky and Halle, and the rule stressing the final syllable of verbs ending in a consonant. Because of the lack of agreement among the native speakers as to the pronunciation of nonsense words representing most of the generative phonological rules tested, not only as regards analysis of segments, but also as to the placement of stress; it is concluded here that English does not have such an optimal orthographic system as Halle, Dickerson, and others have suggested.

However, in spite of the many irregularities in the English spelling system, which evidently cause difficulties even for the native speaker, advantage must be taken of those regularities which do exist. Native speakers do form and apply generalizations about English stress placement where the language is consistent enough to permit. The goal with non-native speakers should be to bring them as close as possible to a native speaker's level of proficiency in applying these generalizations. In order to accomplish this, one needs to know which generalizations are more easily learned, and which cause more difficulty. This is what the following chapter will attempt to discover about Brazilian learners.

CHAPTER FOUR

ERROR ANALYSIS OF BRAZILIAN STUDENTS OF ENGLISH

4.1. Methodology

The system of word-stress placement in the English language, as mentioned previously, is too idiosyncratic for even native speakers to master perfectly. Thus, the ultimate goal for the non-native speaker is not a perfect command of the English stress system, but a native-like control of the system. Therefore, the rules for the error analysis were chosen according to the results of the test of native speakers. Included are the rules which scored 70% or above and other similar rules, which are considered extensions of these.

There is evidence from Chapter Three that native speakers follow several kinds of generalizations in assigning word stress, depending on three kinds of cues: consonant clusters, vowel quality, and suffixes. The generalizations involving vowel quality were easily followed only in the case of final tense vowels in words of three or more syllables (Alternating Stress Rules), final tense vowels usually being indicated orthographically by two consecutive vowels or by a vowel + consonant + *e* sequence. The rules included in the test for Brazilian students depend on these three types of clues, all of them recognizable from the spelling.

The test consisted of six regular words and two exceptions for each of the sixteen rules tested, giving a total of 128 words[12]. The words chosen were, where possible, either unknown to the author or considered by her to be infrequent in common speech and in the classroom. In some cases this was not possible, particularly in the case of the exceptions. All words were contextualized in short sentences invented by the author. Below is a list of the rules with the words chosen for the test (see Appendix 3 for list of sentences).

Rule 1 Stress final syllable of verbs ending in a consonant cluster: *diverge, foment, resurrect, suborn, purport, traject.* Exceptions: *implement, patent.*

Rule 2 Stress antepenultimate syllable of adjectives of three or more syllables if last ends in a consonant cluster or has a tense vowel: *rubicund, cuspidate, sinistrorse, saturnine, comatose, termagant.* Exceptions: *impolite, imperfect.*

Rule 3 Stress antepenultimate syllable of nouns and verbs of three or more syllables if last contains a tense vowel: *caterwaul, detonate, velarize, azurite, desmosome, inquiline.* Exceptions: *ascertain, masquerade.*

Rule 4 Words ending in *i* followed by at least one vowel followed or not by one or several consonants receive stress on the syllable preceding the *i*, whether or not *i* is pronounced as a separate syllable: *centurion, retribution, ignominious, pandemonium, percipient, luxuriance.* Exceptions: *dandelion, compliance.*

Rule 5 Words ending in *u* followed by at least one vowel followed or not by one or several consonants receive stress on the syllable preceding the *u*, whether or not *u* is pronounced as a separate syllable: *contiguous, superfluous, constituent, residual, perpetuate, issuance.* Exceptions: *inadequate, spiritual.*

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(12) A seventeenth rule was included in the test, but subsequently omitted from the analysis as irrelevant to this study, the difficulty being vowel quality and not stress. This was Guierre's rule for words ending in *i*, followed by at least one vowel followed or not by one or several consonants, and preceded or not by one or several consonants *initially*: *i* is pronounced [ai] and receives primary stress. Tested words were *pious, client, triumph, dial, friar,* and *prior;* exceptions were *priest* and *trio.*

Rule 6 When *i* is the only graphic vowel in the penultimate syllable and followed by one consonant, it is lax and stress is assigned to the previous (antepenultimate) syllable: *indemnify, comestible, longevity, acquisitive, fortuitous, progenitor.* Exceptions: *dermatitis, explicit.*

Rule 7 When *u* is the only graphic vowel in the penultimate syllable and followed by one consonant, it is pronounced [ju] and stress is assigned to the previous (antepenultimate) syllable: *acidulous, impudent, truculence, attributive, contributors, capitular.* Exceptions: *persecutor, inclusive.*

Rule 8 Derived nouns and adjectives with a final monosyllabic formative containing a lax vowel, preceded by a consonant cluster, receive stress on the penultimate syllable: *despondent, remonstrance, ascendence, disinfectant, reproductive, portentous.* Exceptions: *Protestant, circumstance.*

Rule 9 The suffixes *-ee, -eer, -ese, -oo, -ette* cause final stress: *absentee, buccaneer, kangaroo, macaroon, Burmese, marionette.* Exceptions: *omelette, committee.*

Rule 10 The suffixes *-ic, ish* (verbs), *-ive, -ure, -ation, -mental* cause penultimate stress: *sybaritic, admonish, conducive, conjectures, reiteration, tegumental.* Exceptions: *politics, mature.*

Rule 11 The suffixes *-ery, -ate, -orous, -mentary, -eous* cause antepenultimate stress (or penultimate when two vowels combine to form a diphthong, thus eliminating one of the syllables): *periphery, intercalate, reprobate, inodorous, ligamentary, subcutaneous.* Exceptions: *monastery, imagery.*

Rule 12 The suffixes *-itory, -atory* (four syllable words), *-igible,* and in words of more than three syllables *-ator, -acy, -ary,* cause preantepenultimate stress: *premonitory, predatory, percolator, pulmonary, intricacy, unintelligible.* Exceptions: *conspirator, dispensary.*

Rule 13 Weak suffixes such as *-ly, -er* (except in words formed with Greek elements), *-ness, -ful, -less, -able, -ment* do not affect stress: *fortunately, northerner, respectful, humorless, advisable, devilment.* Exceptions: *unable,*

nevertheless[13].

Rule 14 Words constructed with an element of Class A (*seismo-, micro-, penta-, auto-, dema-, anto-, deca-, peri-*, etc.) plus an element of Class B (*-graph, -phone, -gon, -crat, -gogue, -nym, -logue, -scope*, etc.) are stressed on the first syllable of element A: *seismograph, microphone, pentagon, autocrat, demagogue, periscope*. Exceptions: *electrogram, kaleidoscope*.

Rule 15 Words constructed with an element of Class A plus an element of Class B plus a bound ending (*-y, -er, -ize, -al, -ous, -is, -us*, etc.) are stressed on the last syllable of element A: *telegraphy, biographer, geologize, hexagonal, autonomous, paralysis*. Exceptions: *epilepsy, dinosaurus*.

Rule 16 Compound words most often receive the stronger accent on the first element: *science teacher, pineapple, conference table, fountain pen, cabinetmaker, housekeeper*. Exceptions: *afternoon, percent*.

The sentences were typed double-spaced on five pages and xeroxed so as to be able to record students in the language laboratory. The sentences were ordered so as not to have any word followed by a word of the same rule category. All students read the sentences in the same order; it was assumed that, as long as words of the same rule category were separated, the order of the sentences would not affect the pronunciation of real words.

Thirty-two Brazilian students from the Universidade Federal de Santa Catarina were tested, sixteen from the Master's Degree Program in "Língua e Literatura Inglesa" and sixteen from the sixth (last) semester of the undergraduate "Letras" program. Five native speakers of English were given the same test as a control group.

The students were told to practice each sentence silently before reading aloud in order to read naturally without hesitating. They were also told to repeat any sentence in which they wanted to change the pronunciation of a word or

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(13) Here an attempt was made to choose words whose stem was more common than the derived word to assure that any errors made would be due to the suffix.

if they hesitated in the middle of any word. They were given markers to keep their place.

After transcribing the tested words from the tapes, the errors and correct responses were analyzed from several points of view. First a simple hierarchy of difficulty was established calculating the percentage of correct responses for each rule. The fact that the errors were not evenly distributed among the six words for each rule indicated that each student's performance depended on more than simply knowing or not knowing a rule. In many cases other strategies for stress placement seemed to interfere with a rule otherwise applied consistently.

The second step, then, was to examine these error-causing strategies. Eight different strategies, which either appeared to the author to be affecting the results, or were mentioned in the studies reviewed in Chapter Two, were considered in a statistical analysis.

Finally the hierarchy of difficulty was reconsidered, taking into account the effect of the error-causing strategies, and conclusions were drawn about the implications of these two factors for the planning of a pedagogical approach.

4.2. Resulting Hierarchy of Difficulty

In calculating the percentage of responses with correct stress placement for each rule, responses with mispronounced segments were invalidated. Table 2 lists the rules in order of difficulty with the scores of the undergraduate and graduate students, the average of the two groups, and, for comparison, the scores of the native speakers (see Appendix 4 for stress patterns given for individual words).

By a large margin, the most difficult rule, with only 31% correct responses, was Rule 9, which stresses the final syllable of words ending in *-ee*, etc. The native speakers also scored a relatively low 73% for this rule. However, while the Brazilian students did poorly on all six words, the native speakers scored 100% for three of the words, 80% for *macaroon*, 60% for *kangaroo*, and 0% (zero) for *Burmese*.

The explanation for the variation in the stress assignment by the native speakers seems to lie in the context in which the words appeared. Kingdon notes that most words in

TABLE 2

ERROR ANALYSIS : PERCENTAGE CORRECT STRESS

	UNDERGRAD			GRAD			AVE	NATIVE
Rule Number	Number of Responses with Correct Stress	Number of Responses with Correct Segments	Percentage of Responses with Correct Stress	Number of Responses with Correct Stress	Number of Responses with Correct Segments	Percentage of Responses with Correct Stress	Average Correct Stress: Graduate and Undergraduate	Native Speakers: Percentage of Responses with Correct Stress
9	18	87	21%	39	95	41%	31%	73%
16	48	93	52%	57	96	59%	56%	100%
11	42	89	47%	62	94	66%	57%	62%
7	52	90	58%	51	88	58%	58%	97%
1	66	93	71%	56	95	59%	65%	90%
14	54	94	57%	75	92	82%	69%	100%
12	58	88	66%	75	94	80%	73%	100%
6	57	87	62%	72	87	83%	74%	100%
8	58	82	71%	70	89	79%	75%	97%
10	58	87	67%	77	90	86%	76%	80%
15	61	88	69%	78	93	84%	77%	93%
3	65	91	71%	76	92	83%	77%	93%
2	74	91	81%	79	94	84%	83%	100%
5	71	86	83%	73	88	82%	83%	100%
4	71	87	82%	77	87	89%	85%	100%
13	79	93	85%	89	94	95%	90%	100%

this suffix group take double-stress (1958: 76, 81, 82, 107). It was mentioned previously that compound words, which also take double stress, frequently undergo a stress shift in certain contexts. Chomsky and Halle (1968: 78) also mention a stress shift for these suffixes in certain syntactic constructions.

A stress shift would be possible in *Burmese* because of the semantic context and because of the rhythm of the sentence: "She was very interested in Burmese culture." The speakers might have imagined a contrast between *Burmese* and another culture with the suffix *-ese* (*Chinese, Japanese,* etc.), which would cause a stress for emphasis on the first syllable. A final stress on *Burmese* would cause two consecutive strong stresses (*Burmese culture*), which is frequently avoided to maintain the natural rhythm of English.

Final stress on *kangaroo* would also cause consecutive heavy stresses, as *best* would normally receive heavy stress. The three speakers who maintained final stress on *kangaroo* avoided the consecutive stresses in two ways. One destressed the word *best*; the other two paused between these two words.

The low score of the Brazilian students cannot be attributed solely to this stress shift. Although *Burmese* and *kangaroo* were the lowest scoring of the group, the other four averaged only 41%. The most probable explanation for so many errors is the application of Rule 3, which stresses the antepenultimate syllable of nouns and verbs with a final tense vowel, and to which this group of suffixes constitutes an exception. This is supported by the fact that the word *omelette*, which is an exception to this rule and follows Rule 3, scored 94%; *committee*, which is an exception to both rules, scored 63%, all errors being due to the application of Rule 3.

Rules 16, 11 and 7 appear to be of about the same level of difficulty, with percentages of 56, 57, and 58 respectively.

In Rule 16, which assigns primary stress to the first element of compound words, the context is a factor again, this time for the Brazilian students. One would expect the difficulty of this rule to be due to the fact that the pattern is the inverse of the patterns of Portuguese compounds. However, more important seems to be the fact that, "between two terminals the last stressed syllable carries the heaviest or

primary stress in Portuguese" (Staub: 121), while in English sentence stress depends on semantic and syntactic importance.

All but two of the compound words appeared in sentence final position, making the second element of the compound more likely to receive stress by Brazilian students. *Fountain pen* and *cabinetmaker*, which did not appear in final position, scored considerably higher than the rest with 94% and 86% respectively.

The next highest percentages were for *pineapple* and *housekeeper*, which, as they are written as one word, would not be as prone to interference of Brazilian sentence stress. The exceptions, which follow the Portuguese pattern for compound words, scored better than the regular words, with an average of 72%.

Rule 11, which assigns antepenultimate stress to words with the suffixes *-ery*, etc., was poorly applied by both the Brazilian students and the native speakers, the latter scoring 62%. There was quite a difference, however, in the type of error committed by each group. The native speaker's errors were limited to three of the six words; and with one exception, they were in stressing syllables to the left of the correct one, following the English tendency for early stress. The Brazilians' errors were distributed among all six words; and of a total of seventy-nine incorrect stresses, forty-eight were on syllables to the right of the correct one, twenty-three of these on the suffix itself.

Rule 7, which assigns antepenultimate stress to words with a penultimate *u* followed by a single consonant, showed a big difference in correct response percentages from one word to another. Four of the six words scored above 70%, while *contributors* and *impudent* scored only 16% and 13% respectively. This indicates that the rule has not really been so poorly learned as it seems, but rather that these two words have some interfering factor.

In the word *contributors*, the suffix was possibly analyzed as *-or*, *contribute* being erroneously pronounced with final stress (the most common error of verbs of this type pertaining to Rule 3). The same pattern appeared in most of the responses for the irregular word *persecutor*.

The incorrect stresses for *impudent* could have been caused by analogy to *imprudent*, or the word might have been analyzed as *pudent* (which would have penultimate stress if it existed in English) plus the prefix *im-* (both *pudente* and *impudente* exist in Portuguese).

Next in difficulty, with a score of 65%, was Rule 1, which assigns stress to the final syllable of verbs ending in a consonant cluster. What is interesting about these results is that the undergraduates scored considerably better than the graduate students. Terzi showed in her study that beginning students easily recognized *-nt* as forming a strong syllable and stressed final syllables ending in this combinations (1977: 66). One can probably generalize that Brazilian students learn early to stress verbs ending in final consonant clusters. It is quite likely that as the students are exposed to a larger vocabulary, they learn that final stress is uncommon in English and inappropriate for nouns such as *restaurant* (an example from Terzi's analysis). Instead of narrowing the application of the rule to verbs, they reject the hypothesis altogether.

Rule 14, which assigns stress to the first syllable of the first element of Greek compounds, was next in difficulty with 69% correct responses. As these words are considered "learned" words, it is not surprising that the graduate students scored twenty-five percentage points better than the undergraduates. Most are words that are encountered frequently in reading and infrequently in common conversation.

The following six rules showed very little difference in the percentage of correct responses, and can be considered of the same difficulty.

Rule 12, which assigns preantepenultimate stress to words with the suffixes *-itory*, etc., received 73% correct responses. The rule seems to have been relatively well learned, only *percolator* and *intricacy* scoring below 70%. *Percolator* and *conspirator* received many penultimate stresses, as did *persecutor* and *contributor* of Rule 7 as mentioned above, indicating the same hypothesis of erroneously final stressed verbs plus the suffix *-or*.

It is not certain why *intricacy* scored so low. It could have been due to the prefix *-in* or the initial vowel. The latter factor will be considered in *4.3.4*.

The exceptions, *conspirators* and *dispensary*, scored a very low 0% and 59% respectively, with a total of 40% of the responses assigning stress according to the rule.

Rule 6, which assigns antepenultimate stress to words with a penultimate *i* plus a single consonant, received 74% correct responses. Most incorrect responses stressed the first syllable.

Rule 8, which assigns penultimate stress to derived nouns and adjectives ending in a monosyllabic formative with a lax vowel preceded by a consonant cluster, received 75% correct responses. Most incorrect stresses fell on the previous syllable. The exceptions, *Protestant* and *circumstances*, which are correctly stressed on the antepenultimate syllable, scored better with 81% and 97% respectively.

Rule 10, which assigns penultimate stress to words with the suffixes *-ic*, etc., received 75% correct responses. The native speakers scored only slightly better on this rule with 80% correct responses. The native speaker's errors were limited to the three words of more than three syllables, and consisted of stressing the syllable which should receive terciary stress, two syllables previous to the primary-stressed syllable. The Brazilians' errors were distributed among all words; and while some stressed the syllable of terciary stress, many stressed the syllable immediately preceding the syllable of primary stress. The exceptions received fewer correct responses.

Rule 15, which assigns stress to the last syllable of the first element of Greek compounds plus a bound ending, received more correct responses than Rule 14, which deals with the derivatives of this rule. Many of the errors for this rule, however, were in maintaining the stress of the derivative. The problem is evidently identifying the word with the correct rule.

Rule 3, which assigns stress to the antepenultimate syllable of nouns and verbs in which the last syllable contains a tense vowel, also received 77% correct responses. The three verbs averaged 83%, the most common error being to stress the final syllable.[14] The nouns averaged a lower 71%, the most

(14) This error evidently led to errors in rules 7 and 12, as mentioned above, where some of the words are derived from these verbs.

common error being to stress the penultimate syllable. Evidently the Brazilian students consider the part of speech in their stress strategies, although in this case the distinction was irrelevant.

The two exceptions received very few correct responses, the errors of *masquerade* (6%) being due to rule pronunciations, and most of the errors of *ascertain* (17%) evidently due to analogy to the word *certain*.

Rules 2, 5, and 4 were more consistently applied with 83%, 83%, and 85% correct responses respectively.

Rule 2, which assigns antepenultimate stress to adjectives with a tense vowel or consonant cluster, scored better than both the nouns and the verbs of Rule 3. Most errors for the exceptions *impolite* and *imperfect* were rule pronunciations.

Rule 5 stresses the syllable preceding the *u* in words ending in *u* plus one or more vowels plus zero or more consonants. Although similar to Rule 7, which deals with words having a consonant between the *u* and the final syllable, Rule 5 scored considerably better. Most of the errors made, however, were, as in Rule 7, due to erroneous final stress of verbs with a tense vowel. *Perpetuate* was given final stress; *issuance*, from the verb *issue*, was stressed on the *u*; and *constituents*, from *constitute*, was stressed on the *u* in five responses and on the first syllable (correct stress of *constitute*) in eight responses.

Rule 4 received the highest percentage of correct answers of the four extensions to Guierre's "rule of *lion*" (Rules 4, 5, 6, 7), most incorrect stresses occurring earlier in the word. For the two exceptions, which scored much lower, most incorrect stresses were rule pronunciations.

Rule 13, which maintains the stress of the root in derivatives with weak suffixes, was the most consistently applied rule with 90% correct responses. The high score of this rule was surprising as there are no weak suffixes in Portuguese. Overgeneralization of this rule to other suffixes is probably the cause of many errors of the other fifteen rules. This factor will be examined more closely in the next section.

It was seen in this section that the errors for each

rule are not always distributed evenly among the six words, but that some words are affected by other factors. In the next section the most frequent of these factors will be analyzed, along with influencing factors mentioned in other studies.

4.3. General Prediction Strategies

The distribution of errors indicates that, before actually dominating the rules, the students follow general strategies. These strategies tend to overlap and conflict with each other and with the rules, accounting for inconsistencies in a particular student's performance. They sometimes aid in the learning or following of a particular rule and sometimes interfere. Most of these strategies seem to persist even at the most advanced levels, where they continue to substitute the rules which are not yet thoroughly learned.

The following is a list of factors, either mentioned in previous studies as influencing the English word stress given by Brazilian students, or noted by this author during the error analysis as having possible influence. These factors were carefully considered in a statistical analysis of the pronunciation of the words included in the test in order to determine the most frequent strategies employed by the group as a whole.

1. Number of syllables
2. Cognates' stress pattern
3. Predominant stress patterns of English
4. Initial vowel or consonant
5. Vowel quality and consonant clusters in stressed syllable
6. Verbs with tense vowel in final syllable
7. Terciary stress
8. Stress pattern of derivatives.

4.3.1. Number of Syllables

Terzi concluded from her study (1977: 60) that the rules for disyllabics such as *subjects* were learned faster than those for trisyllabics such as *important;* and therefore, that the number of syllables was an important influencing factor in

TABLE 3

INFLUENCE OF THE NUMBER OF SYLLABLES IN REGULAR WORDS

	Number of Words	Number of Responses	Number of Responses with Correct Segments	Number of Responses with Incorrect Stress	Percentage of Incorrect Stress
2 syllables	6	192	190	92	48%
3 syllables	38	1216	1140	300	26%
4 syllables	39	1248	1178	352	30%
5 syllables	6	192	167	45	27%
6 syllables	1	32	31	1	3%

TABLE 4

INFLUENCE OF THE NUMBER OF SYLLABLES IN IRREGULAR WORDS

	Number of Words	Number of Responses	Number of Responses with Correct Segments	Number of Responses with Incorrect Stress	Percentage of Incorrect Stress
2 syllables	2	64	64	29	45%
3 syllables	14	448	442	102	23%
4 syllables	14	448	435	229	53%

language learning. In order to check the consistency of this tendency and to see if the difficulty continues to increase with words of four, five, and six syllables, the errors of this test were organized in Table 3 according to the number of syllables per word. This table includes regular words only, as Terzi's statement referred to rule-learning.

It is apparent from the above table that the Brazilian students in this test did not exhibit a tendency toward more stress errors in words of more syllables. The percentages of errors in three, four, and five syllable words show a negligible difference. The disyllabics, contrary to what would be expected, show an error rate almost twice as high as the others. This can probably be explained by the fact that all six disyllabics take the relatively uncommon oxitone pattern, which is shown in 4.3.3. to be frequently rejected by advanced Brazilian students. Not much can be inferred about the single six-syllable word, except that that particular word caused little difficulty.

These statistics do not support the hypothesis that the number of syllables in the word affects the difficulty of the learning or application of the rule. However, because of the possibility that the number of syllables affects the item learning of individual words, the irregular words were organized in a similar manner in Table 4.

The difference in the error rate between three and four-syllable words does seem to indicate that the number of syllables affects item learning. However, the two-syllable words again had a disproportionately high error rate, the majority of the errors being due to the oxitone pattern of the word *mature*. Although the high rate of error of disyllabics can be explained, it is not guaranteed that under other conditions it would be lower than the rate for three-syllables words. There were no five or six-syllable irregular words in the test to see if the error rate would continue increasing with the additional syllables.

The conclusion from the above is that while the number of syllables does not affect the difficulty of stress rules for advanced Brazilian students of English; it seems probable, though more evidence is needed, that it does affect the item-learning of individual words.

4.3.2. Cognates' Stress Patterns

Gomes de Matos and Geraldo Cintra take for granted that cognates with different stress patterns will cause difficulty for Brazilian students of English, and notes that there is no constant stress pattern relationship between the two languages (1966: 31-32). Terzi denies the interference of cognates on the stressed syllable, though her evidence is limited to one word, *minutes* and its cognate *minutos* (1977:88).

In checking for interference from the Portuguese cognate, positive as well as negative transfer must be considered. This transfer need not necessarily be a simple duplication of the stress pattern of the cognate. Matos and Cintra mention the probable transfer of what he calls a Portuguese secondary stress (1966: 32). This corresponds to the stress that Mattoso Câmara calls "minimum weak". The term "minimum weak" is rather confusing, and secondary stress is reserved here for referring to compound or phrase stress, so this stress will be called terciary, while recognizing that it is slightly weaker than English terciary stress.

The greatest problem in checking for transfer of Portuguese terciary stress is that, since it is not distinctive, but only demarcative (Câmara, 1976: 36), it varies somewhat from one speaker to another, and possibly even from one utterance to another by the same speaker.

According to Câmara, this terciary (minimum weak) stress falls on the syllable which begins with the first consonant of the word. Matos and Cintra place it two syllables before the syllable of primary stress. In words such as *categoria*, *importante*, *objetivo*, *assistente*, and *instintivo* (examples given by Matos and Cintra, 1966: 30-2), this does not correspond to the syllable beginning with the first consonant. The author herself has noticed an inconsistency in this respect among Brazilian speakers.

The solution to this problem has been to list all the

Portuguese cognates of the test words[15] and classify them as having (1) the same stress pattern as the English word, (2) stress on the syllable immediately after the English stressed syllable, (3) undisputed terciary stress (by both Câmara's and Mato's rules) on the syllable of English primary stress, (4) possible terciary stress (by either Câmara's or Matos' rule, but not both) on the syllable of English primary stress, or (5) other stress (see Appendix 6 for classification).

To check for positive transfer, the average percentage of correct answers for each column was computed and compared with the percentage of correct answers for those words without Portuguese cognates. All of the percentages have been taken first for regular words, then for irregular words, and finally for both because of the possibility of greater or lesser transfer when there is no rule to follow. The results are listed in Table 5.

Very surprisingly, both regular and irregular words whose Portuguese cognates have an identical stress pattern scored considerably lower than those words with no cognate, and lower than any of the other groups. The words whose Portuguese cognates have undisputed terciary stress on the syllable of English primary stress were the highest scoring of all groups, again for both regular and irregular words. They scored nine percentage points higher than the words with no cognates and a minimum of sixteen points higher than any of the cognate groups.

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(15) Because of the fact that some of the words have false cognates, multiple cognates, uncommon cognates, and cognates which are not all that similar; a test of association was applied to six educated Brazilians whose English was considered to be at least as fluent as the English of the thirty-two tested students. Included were four verbs, to check if association is made with the Portuguese infinitive or with a corresponding conjugated form. It was concluded that the association is usually made with the corresponding form of verb cognates. Of the doubtful cognates *despondent, intricacies, ascertain, buccaneer, resurrect, admonish, sinistrorse, ignominious, macaroon, traject, northerner, acidulous, percolator,* and *geologize;* included as associable cognates were *trajeto* for *traject* (associated in spite of the different part of speech), *sinistro* for *sinistrorse* (a false cognate), *ácido* for *acidulous, macarrão* for *macaroon*(a false cognate), *admoestar* for *admonish, intrincado* for *intricacies* (in spite of different part of speech),and *geologia* for *geologize* (different part of speech). A more detailed account of this test is found in Appendix 5.

TABLE 5

POSITIVE TRANSFER FROM PORTUGUESE COGNATE

SA	Same Stress	Adjacent Stress	Terciary Stress	Possible Terciary Stress	Other Stress	No Cognate
REGULAR WORDS	62%	65%	80%	71%	70%	77%
IRREGULAR WORDS	49%	61%	82%	45%	43%	54%
TOTAL	61%	64%	81%	65%	59%	72%

TABLE 6

NEGATIVE TRANSFER FROM PORTUGUESE COGNATE

	Syllable of Cognate's Primary Stress	Syllable Adjacent to Primary Stress	Syllable of Cognate's Terciary Stress	Syllable of Cognate's Possible Terciary Stress (Matos)	Syllable of Cognate's Possible Terciary Stress (Câmara)	Other Syllable
REG: ERRORS	188	168	133	38	64	55
RESPONSES	1560	1426	583	272	433	1015
RATE OF ERROR	12%	12%	23%	14%	15%	05%
IRREG: ERRORS	61	110	96	28	17	8
RESPONSES	537	562	154	126	60	345
RATE OF ERROR	11%	20%	62%	22%	28%	02%
TOTAL: ERRORS	249	278	229	65	81	63
RESPONSES	2097	1988	737	398	493	1360
RATE OF ERROR	12%	14%	31%	16%	16%	05%

The words whose cognates have primary stress on the syllable after the English stressed syllable and those whose cognates have possible terciary stress on the syllable of English primary stress scored approximately the same in their total percentages, just slightly above the words whose stress is the same as the cognates'. Among the irregular words, however, the group with adjacent stress scored considerably higher than the same stress and possible terciary stress groups.

To check for negative transfer, all the words which have Portuguese cognates were listed, and their errors were classified as falling on (1) the syllable of the cognate's primary stress (2) the syllable adjacent (before) to the syllable of the cognate's primary stress, (3) the syllable of the cognate's terciary stress, (4) the syllable of the cognate's possible terciary stress by Matos' rule, (5) the syllable of the cognate's possible terciary stress by Câmara's rule, and (6) any other syllable (see Appendix 7 for classification of errors). The number of errors in each category as then totaled and divided by the number of responses for the words in which that syllable existed as a possible error (i.e. excluding the responses for those words whose correct stress fell on that syllable or which had no such syllable, and excluding misreadings). The resulting percentages for each type of error are shown in Table 6, with separate scores for regular and irregular words.

The above table shows results very similar to those for positive transfer. The least frequent type of error was the syllable of the Portuguese cognate's primary stress. The most common error was to stress the syllable of the cognate's undisputed terciary stress. Matos' and Câmara's rules for terciary stress, when in conflict, seem to have about equal influence, each of them causing only slightly more errors than the syllable adjacent to the syllable of English primary stress. The adjacent syllable was again more influential than the cognate's primary stress only for irregular words.

The "other" column scored low, because of the absense of any particular interference problem, and because most of the "other" syllables come after the syllable of the cognate's primary stress. Syllables after primary stress are totally unstressed in Portuguese, and the Brazilian students have shown an avoidance of late stress in English (see 4.3.3.).

The above statistical evidence implies that the advanced Brazilian learner of English is well aware that English and Portuguese cognates frequently have different stress patterns. When in doubt about the stress of an English cognate, the most common strategy seems to be that English stress is different and cannot fall on the syllable of Portuguese primary stress, so it probably falls on the syllable of Portuguese terciary.

This strategy, operative only where Câmara's and Matos' rules for terciary stress coincide, causes (1) incorrect stress placement for words with stress identical to that of their Portuguese cognates, (2) incorrect stress placement for words with totally different stress patterns, and (3) correct stress placement for words whose primary stress falls on the syllable of the Portuguese cognate's terciary stress. This last group of words is the only one which causes less difficulty than the words with no cognate at all.

Besides avoiding the stress pattern of the Portuguese cognate, the Brazilian students also seem to avoid stress on the syllable immediately preceding that of Portuguese primary stress. This is probably due to Matos' rhythm of stress-weak-stress-weak. For the Brazilians who follow this rhythm in Portuguese, a very difficult syllable to stress in English would be the one between the strong stresses, or before the primary stress in Portuguese.

It is interesting to note, however, that this tendency is weaker for irregular words. A probable explanation is that students frequently sense or remember that these words are irregular, and for this reason deliberately stress the most unlikely syllable.

These conclusions support both Matos and Cintra's statements and Terzi's conclusions. English words with different stress patterns from their Portuguese cognates do cause difficulty, as predicted by Matos and Cintra. As Terzi claimed, however, there is little or no direct transfer, either positive or negative, of the primary stress of the Portuguese cognate. The most common type of cognate transfer is the type mentioned by Matos and Cintra, from Portuguese terciary to English primary stress.

4.3.3. Predominant Stress Patterns of English

Another factor mentioned by Matos and Cintra as influencing stress placement is the pressure of the predominant stress pattern of three and four-syllable English words (1966: 31-2). They give initial stress as a common stress pattern for three-syllable words, but it is not clear to which pattern they are referring for four-syllable words.

The table of examples given by Matos and Cintra includes all four possible stress patterns for four-syllable words because it does not separate the various types of errors mentioned in the article. Eliminating the words which fit into error categories other than that of influence of the predominant stress pattern, we are left with *elevator*, *difficulty*, *responsible*, and *obligatory*. From these examples it is assumed that they are speaking of penultimate and antepenultimate as the predominant stress patterns of four-syllables words.

To see if the influence of the predominant stress patterns is actually causing errors, the syllable distribution of incorrect stresses was calculated. Table 7 and Graph 1 represent the number of errors which fell on each syllable divided by the number of responses for words containing that syllable as a possibility for error (excluding the responses for those words whose correct stress falls on that syllable). The resulting percentages are given separately for each number of syllables and for regular and irregular words.

The syllable distribution of incorrect stresses confirms the predominance of errors on the initial syllable of three-syllable words as suggested by Matos and Cintra. However, the two syllables which received the most incorrect stresses for four-syllables words were antepenultimate and pre-antepenultimate rather than antepenultimate and penultimate. Moreover, a quick look at the graphs shows that the predominant errors for three and four-syllable words are part of a broader tendency of stressing syllables toward the beginning of the word.

This tendency becomes even more apparent looking at the distribution of incorrect stresses in relation to the correct stress. Table 8 and Graph 2 classify the incorrect

TABLE 7

SYLLABLE DISTRIBUTION OF INCORRECT STRESSES

	REGULAR					IRREGULAR			
	5th	4th	3rd	2nd	1st	4th	3rd	2nd	1st
2-SYL									
ERR				37	0			20	9
RESP				190	0			32	32
%AGE				20%	-			63%	28%
3-SYL									
ERR			96	125	79		76	39	14
RESP			380	906	986		284	250	348
%AGE			25%	14%	8%		27%	16%	4%
4-SYL									
ERR		142	54	105	29	77	60	79	13
RESP		1024	340	1019	1145	244	280	376	405
%AGE		14%	16%	10%	3%	33%	21%	21%	3%
5-SYL									
ERR	22	14	2	7	0	-	-	-	-
RESP	171	140	59	143	171	-	-	-	-
%AGE	13%	10%	3%	5%	0%	-	-	-	-

GRAPH 1

SYLLABLE DISTRIBUTION OF INCORRECT STRESSES

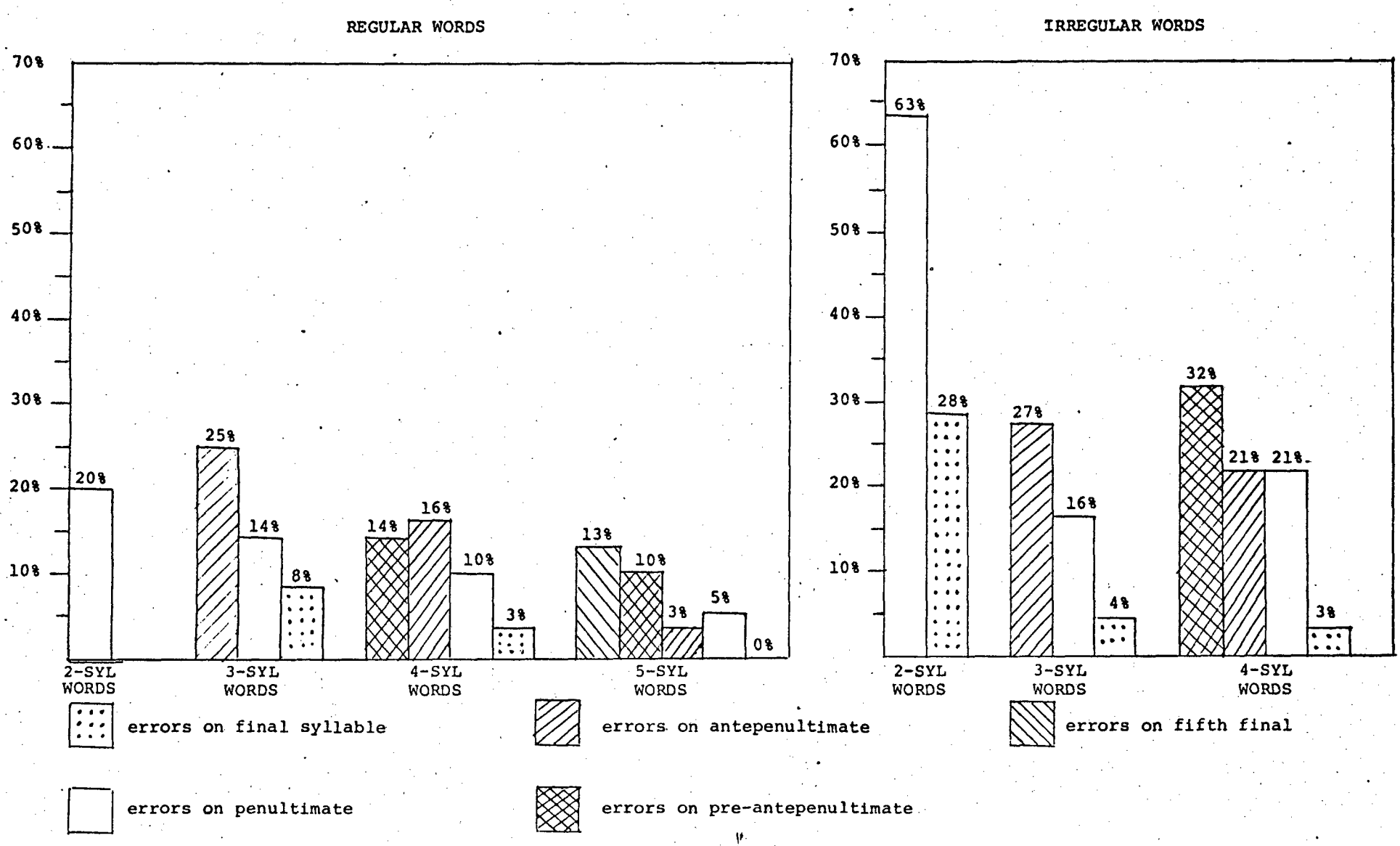


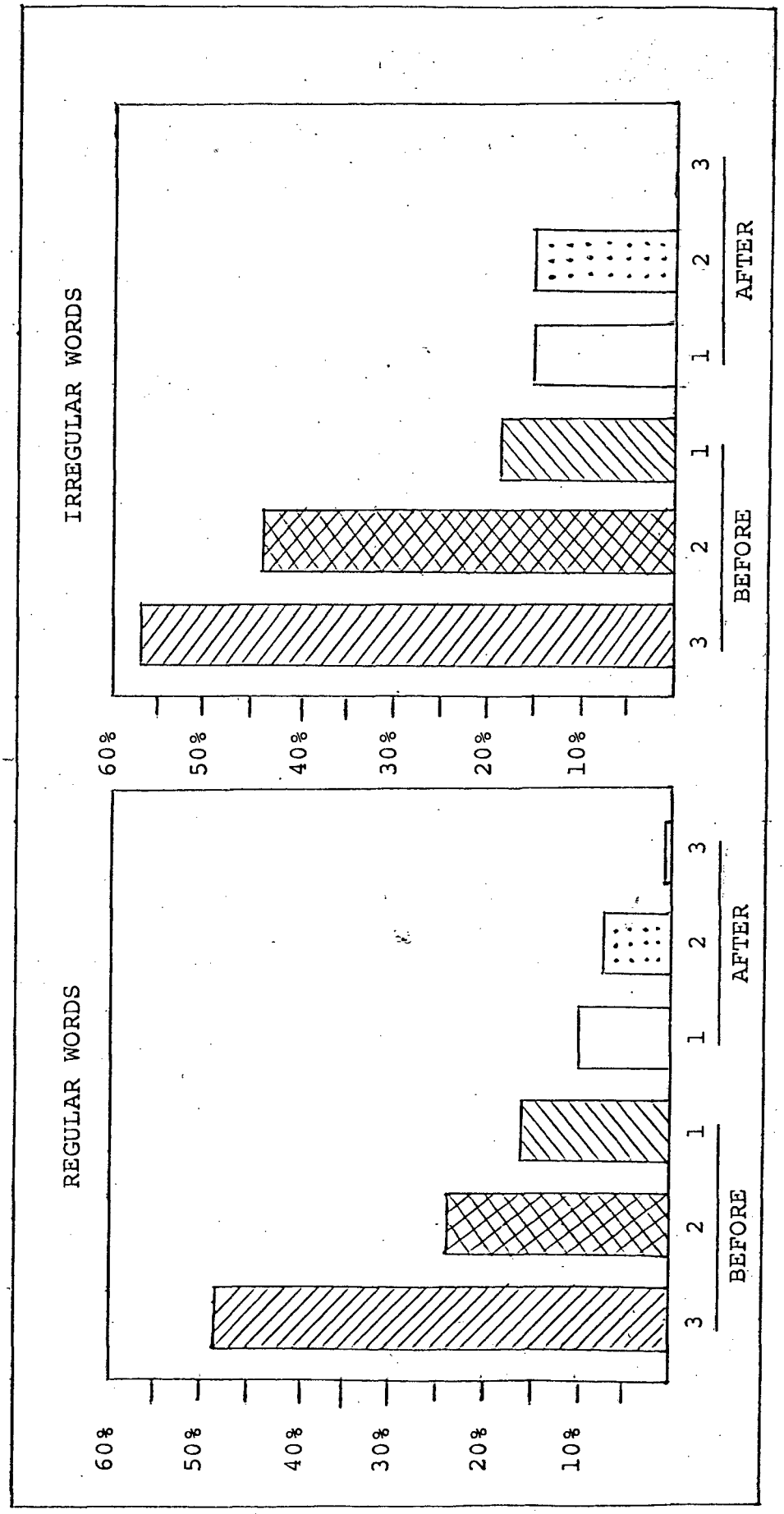
TABLE 8

DISTRIBUTION OF INCORRECT STRESSES IN RELATION TO CORRECT STRESS

	BEFORE			AFTER		
	3 SYL'S	2 SIL'S	1 SYL	1 SYL	2 SYL'S	3 SYL'S
REGULAR WORDS						
ERRORS	15	115	281	237	124	1
RESPONSES	31	474	1817	2330	1917	214
%AGE	48%	24%	16%	10%	7%	0.5%
IRREGULAR WORDS						
ERRORS	17	78	101	114	77	0
RESPONSES	30	182	560	785	503	127
%AGE	57%	43%	18%	15%	15%	0.0%
TOTAL						
ERRORS	32	193	382	351	201	1
RESPONSES	61	656	2377	3115	2420	341
%AGE	53%	29%	16%	11%	8%	0.3%

GRAPH 2

DISTRIBUTION OF INCORRECT STRESSES IN RELATION TO CORRECT STRESS



stresses as falling one, two, or three syllables before or after the syllable of correct stress. The percentages again represent the number of errors in each category divided by the number of responses for words containing that syllable as a possible place for error. Regular and irregular words are separated as before.

Graph 2 shows, for both regular and irregular words, a steady progression from almost no errors on the third syllable after the syllable of correct stress, increasing gradually up to the syllable of correct stress and by greater margins before that syllable, until reaching the third before correct stress, which incorrectly received stress in over 50% of the responses. This is a clear indication that an important cause of errors by advanced Brazilian students of English is their preference for early word stress.

These two syllable distributions of incorrect stress indicate that Matos and Cintra were on the right track when they spoke of the influence of the predominant English stress patterns, but their idea can be carried a step farther. Initial stress is a very common stress pattern of three-syllable words in English. Four-syllable words vary a bit more in their patterns. But what is important for the advanced Brazilian learner of English is that English, in general, has much earlier word stress than Portuguese, which is limited to the last three syllables.

Rather than over-generalization of two or three particular stress patterns, the problem here is an overgeneralization by the Brazilian learner of the English tendency for early word stress. The resulting strategy is to stress, when in doubt, the earliest syllable of the word which sounds acceptable to the learner's ear. This means, of course, that the farther from the beginning a word's correct stress is located, the more difficulty that word can be expected to cause among advanced Brazilian students.

4.3.4. Initial Vowel or Consonant

The author noticed during the tabulation of errors what seemed to be a disproportionate number of errors occurring on initially-stressed words beginning with a vowel such as

impudent. If the initial vowel were responsible for these errors, it would have a logical explanation in the native language. Although it is possible to stress an initial syllable beginning with a vowel in Portuguese words of three or fewer syllables, Mattoso Câmara states that, in longer words, an initial syllable beginning with a vowel is noticeably weaker in stress than an initial syllable beginning with a consonant (1970: 48).

To check on the influence of initial vowels on the Brazilian learner's placement of English stress, the test words were classified as beginning with a vowel or a consonant; and as having initial, second-syllable, or third-syllable stress (there were no four-syllable test words beginning with a vowel). Table 9 shows the percentage of correct responses in each category.

TABLE 9

CORRECT STRESSES OF WORDS WITH INITIAL VOWEL OR CONSONANT

	INITIAL V	INITIAL C	TOTAL
INITIAL STRESS	53%	77%	71%
2ND SYL STRESS	78%	69%	71%
3RD SYL STRESS	51%	60%	58%

It can be seen here that where having an initial vowel or consonant makes the biggest difference is with the initially stressed words. Those beginning with a vowel scored 24 percentage points lower than those beginning with a consonant, indicating a tendency for the Brazilian students to give weak stress to initial syllables beginning with a vowel.

Those words with third-syllable stress showed similar results, although the difference was smaller. The words with an initial vowel scored 10 percentage points lower than those with an initial consonant. Since primary stress on the third syllable in English usually implies terciary stress on the first syllable, these results also indicate a tendency for the Brazilian students to give weak stress to initial syllables with initial vowels.

The results for the words with second syllable stress, as would be expected,were just the opposite. Here the words with an initial vowel scored 10 percentage points higher than those with an initial consonant, indicating once more a tendency for weak stress on an initial syllable beginning with a vowel (most words in English with primary stress on the second syllable have weak stress on the first) and a stronger stress on the following syllable.

The above results indicate that the first letter of an English word has a considerable effect on the stress placement the Brazilian student will give that word, due to native language transfer. As in Brazilian Portuguese an initial s syllable beginning with a vowel normally has a weaker stress than the following syllable, the Brazilian student of English tends to avoid an initial strong stress (primary or terciary) on words beginning with a vowel. This is a strategy which causes many errors when in conflict with stress-placement rules.

4.3.5. Vowel Quality and Consonant Cluster in Stressed Syllables

Sylvia Terzi noted the tendency for Brazilian students of English in the early stages of learning to stress syllables with the vowels /ɛ/ or /ɔ/ causing errors such as *insēcts* (1977: 62)[16] and later to stress syllables containing diphthongs causing errors such as *lemonāde* (1977: 64). The first of these tendencies would be due to direct transfer from the native language,since these two vowels are always stressed in Brazilian Portuguese. The second would be an overgeneralization of the target language, since tense vowels play an important part in the placement of stress in English.

To discover whether these tendencies persist with advanced students, the percentage of correct answers was calculated for words containing /ɛ/ or /ɔ/ in the stressed syllable and for words containing a diphthong in the stressed syllable. These were then compared with the percentages for words containing lax vowels, those containing consonant clusters, weak syllables (those containing a lax vowel and no

(16) Terzi erroneously included syllables containing /æ/ with those containing /ɛ/.

consonant cluster), and strong syllables (those containing a tense vowel or consonant cluster). These percentages are listed in Table 10.

TABLE 10

INFLUENCE OF SYLLABLE QUALITY

STRESSED SYLLABLE	%AGE CORRECT ANSWERS
/ɛ/ or /ɔ/	72.1%
DIPHTHONG	62.0% (70.3% without Rule 9)
LAX VOWEL	69.9%
CONSONANT CLUSTER	67.7%
WEAK SYLLABLE	70.8%
STRONG SYLLABLE	65.5% (68.6% without Rule 9).

At an advanced stage of learning, overgeneralization of the target language (i.e. success where the stressed syllable contains a diphthong) would be expected to be greater than transfer from the native language (i.e. success where the stressed syllable contains /ɛ/ or /ɔ/. However, the percentages above show just the opposite; the highest scores were for stressed /ɛ/ or /ɔ/, and the lowest were for stressed diphthongs.

Looking back over the rules, it was seen that the low scores for Rule 9, caused by the avoidance of final stress, were responsible for the low scores for stressed diphthongs, and, therefore, also for stressed strong syllables. Excluding the words from Rule 9 brings the percentage for stressed diphthongs up to 70.3% and for stressed strong syllables up to 68.6%.

Counting the adjusted scores for stressed diphthongs and for stressed strong syllables, there is only a variance of 4.4% between the highest and lowest percentages, indicating a lack of preference for stressing any particular syllable type.

The error check showed similar results. Incorrect stresses were distributed fairly equally among the various syllable types: 30% falling on syllables which were pronounced

with tense vowels, 37% on syllables pronounced as weak syllables, and 33% on syllables with consonant clusters. Of the incorrectly stressed weak syllables, only 25% contained /ɛ/ or /ɔ/ (see Appendix 8 for distribution of errors).

The conclusion from the above is that advanced Brazilian students of English have no general strategy for stressing a particular syllable type comparable to the rules that Terzi's subjects evidently hypothesized.

4.3.6. Verbs with a Tense Vowel in the Final Syllable

Although it was shown above that syllable quality is not a factor in general stress-placement strategies, it may play a part in more specific contexts.

Matos and Cintra (1966: 115) speak of the transfer of Portuguese primary stress in suffixes, and give as examples the Portuguese verbs *economizar*, *separar*, and *satisfazer*, which supposedly cause erroneous final stress in *economize*, *separate*, and *satisfy*. Kingdon (1958: 100) says that students of English in general frequently stress the suffix *-ize* as in *economize*. The impression given by the responses of the Brazilian students in this test is that these errors are part of a broader tendency to give final stress to verbs with a tense vowel in the final syllable. This tendency was noted not only in the verbs themselves, but also in derivatives of these verbs.

In fact, this stress pattern is frequent in disyllabic verbs with a tense vowel (see *SPE.V.2.* in Chapter Three), particularly in British English. Furthermore, verbs of this pattern are frequent in basic English vocabulary—twenty-two appeared in Barnard's "A 'First Thousand' Word List of 1,000 Words" (1971). Of the sixteen rules in the test for Brazilians, only Rule 13 was represented by more words of this list than was the verb pattern *SPE.V.2.*. However, in verbs of three or more syllables, Rule 3 is generally applied to give antepenultimate stress.

To verify the strength of this tendency, a list was made of the verbs in the test with a tense vowel in the final syllable and the derivatives of such verbs (see Appendix 9). The intention was to compare first the average percentage of correct answers of those verbs which have final stress with

the average of those having another stress pattern, then the average of the derivatives which have stress on the final syllable of the verb with those having another stress pattern.

The comparison of derivatives showed a considerable difference —78% correct answers for the derivatives stressing the final syllable of the verb compared to only 50% for the derivatives with another stress pattern. This comparison was not possible, however, for the verbs. With the exception of *ascertain*, which should take final stress but received a majority of penultimate stresses because of analogy to the word *certain*, all of the test verbs in this category take antepenultimate stress. The average percentage for these antepenultimate-stressed verbs was 74%.

This comparison was followed up by a classification of errors for those verbs and derivatives not stressed on the final syllable of the verb. Of all incorrect responses counted for the verbs, 72% stressed the final syllable of the verb. Of the incorrect responses for derivatives, 78% stressed the final syllable of the deriving verb.

The above evidence leaves little doubt that a frequent strategy of advanced Brazilian students of English for the stress assignment of verbs and their derivatives is to stress the final syllable of the verb if that syllable contains a tense vowel. This usually leads to correct stress placement when the verb has only two syllables and the suffix is weak. However, it often leads to incorrect stress placement when the verb has more than two syllables or when the suffix is strong.

4.3.7. Terciary Stress

The influence of terciary stress has been noted by Augostinus Staub and by José Pinheiro de Souza. Souza predicts that the Portuguese speaker "will give strong stress to secondary or terciary stresses and will not give the full length which is due to the English primary stress" (1969: 110). Staub states that since terciary stress is absent in Portuguese (it is not distinctive, but a sort of terciary stress does exist), English terciary stress, when it precedes primary stress, or when it follows and is contiguous, will be reduced to a weak stress. When terciary stress follows primary and is

not contiguous, it will be switched with the primary, causing errors such as *estimated* (Staub: 122-3).

Since this study deals only with wrong placement of primary stress, the switching of primary with terciary was checked, but not the reduction of terciary. First all words with both terciary and weak stresses were listed (see Appendix 10). Then the errors were classified as falling (1) on the syllable of terciary stress, with subcategories for terciary before or after correct primary; or (2) a syllable of weak stress, with subcategories for the number of syllables before or after correct primary.

The total in each category was then divided by the number of responses in which such an error could have been made (i.e. including only responses for those words which contain the syllable in question, and excluding responses which were disqualified for wrong segments). The resulting percentages can be compared in Tables 11 and 12.

TABLE 11

ERRORS ON SYLLABLE OF TERCIARY STRESS

	BEFORE 1^{ary}	AFTER 1^{ary}	TOTAL
ERRORS	229	183	412
RESPONSES COUNTED (POSSIBLE ERRORS)	716	1098	1814
PERCENTAGE (RATE OF ERROR)	32%	17%	23%

TABLE 12

ERRORS ON SYLLABLE OF WEAK STRESS

	BEFORE 1^{ary}		AFTER 1^{ary}			TOTAL
	2 SYL	1 SYL	1 SYL	2 SYL	3 SYL	
ERRORS	3	82	135	1	0	221
RESPONSES COUNTED (POSSIBLE ERRORS)	61	889	1514	140	282	1814
PERCENTAGE (RATE OF ERROR)	5%	9%	9%	1%	0%	12%

A glance at the total percentages shows nearly twice the rate of incorrect stresses on the syllables of terciary stress as on the syllables of weak stress, supporting the claims of Souza and Staub.

This becomes even more significant when the particular syllables of terciary stress are compared with the corresponding syllables of weak stress. In twenty-one of the twenty-four words in which terciary stress precedes primary it occurs exactly two syllables before primary. Among the weak-stressed syllables occurring two syllables before primary, there was only a 5% rate of error, compared to a 32% rate for the terciary-stressed syllables.

Similarly, in all thirty-six words in which terciary stress follows primary stress, it occurs two syllables after it. The weak-stressed syllables occurring two syllables after primary show an error rate of less than 1%, compared to a 17% rate for the terciary-stressed syllables. It is clear that the terciary stress is an important cause of errors made by the advanced Brazilian students of English.

A further look at the tables will show, however, that Staub was not entirely correct in his predictions. He spoke of the problem of switching primary with terciary stress only where terciary stress follows primary, presumably because this is compounded by another problem he mentions, the fact that "not more than two weakly stressed syllables can follow a stressed syllable in Portuguese" (Staub: 122). As can be seen above, not only is the switching problem not limited to terciary stress which follows primary, but it actually causes a higher percentage of errors, with advanced students, where the terciary stress precedes the primary.

The inconsistency of these results with Staub's predictions is probably due to the fact that the predictions were based on contrastive analysis. It is quite probable that Staub's predictions would be proven correct in a test of beginning students, whose errors would be to a greater extent caused by native language transfer. However, as this advanced level, it has been shown (see 4.3.4.) that there is a high degree of overgeneralization of the English tendency for early stress. This explains the fact that the percentage of errors where terciary stress precedes primary is almost twice that of

errors where terciary follows primary.

It is clear that the confusion of terciary and primary stress is a significant problem among advanced Brazilian students of English. The confusion probably originates as a perceptual problem caused by a subtle difference between the two languages. The fact that the nearest equivalent of English terciary stress is somewhat weaker and not distinctive frequently causes English terciary to be perceived as equal to primary.

Where a word to be pronounced or a word to which analogy is being made has been previously heard and perceived as having two stresses, the strategy of an advanced student will most often be one based on target language overgeneralization —to give primary stress to the earlier of the two syllables. Occasionally the advanced speaker will still use a strategy based on native language transfer—to stress the later syllable. Both of these strategies frequently lead to the error of switching primary and terciary stresses in English.

4.3.8. Derivatives

An interesting tendency noted during examination of the errors was that of indiscriminately maintaining the stress pattern of the root word in the pronunciation of derivatives. This led to a score of 90% correct responses for Rule 13, which deals with weak suffixes, and was the most consistently applied of all the rules. However, it also apparently led to many errors among the other rules, especially where stress was also incorrectly placed in the root word (see 4.3.6.).

To see to what extent the weak suffix rule was overgeneralized, a list was made of all test words derived from other English words (see Appendix 11), and this list was divided into three groups: (1) those with the same stress pattern as the root word, (2) those with a different pattern, and (3) those with alternative root word patterns. The third group included four derivatives whose root word had two possible stress patterns, and one word which could be considered a derivative of either of two root words, each having a different stress pattern.

The first check made was based on the supposition that,

if Brazilian students over-generalize the weak suffix rule, then derivatives which maintain the stress pattern of their root word should be easier than those which do not. The average percentage of correct answers was calculated for each of the three groups of derivatives, resulting in (1) 69% for derivatives with the same stress pattern as their root word, (2) 60% for those with a different stress pattern, and (3) 74% for the five words with two possible stress patterns for the root word.

The fact that the derivatives with the same pattern as their root word scored only nine percentage points better than those with a different pattern, and the fact that the derivatives with alternative root word patterns scored the highest of the three groups, leave the results of this check inconclusive.

Pursuing the question further, a check was made on the types of errors made for the words with a stress pattern different from that of the root word. The incorrect stresses of this group were classified (see Appendix II) as falling on the syllable of the root word's stress, or on any of one, two, or three other possible syllables for error, depending on the length of the word. The rate of error for each category was calculated by dividing the total number of errors of that category by the number of possible errors (i.e. the total number of responses counted for every word containing that particular syllable). The totals and error rates for each category can be compared in Table 13.

TABLE 13

DISTRIBUTION OF ERRORS FOR DERIVATIVES
WITH DIFFERENT STRESS PATTERN FROM ROOT WORD

	SYLLABLE OF ERROR				
	ROOT'S STRESS	1ST OTHER	2ND OTHER	3RD OTHER	ALL OTHER
Nº ERRORS	245	48	6	0	54
Nº RESPONSES	737	705	570	60	705
RATE OF ERROR	33%	7%	1%	0%	8%

It can be seen here that the stressed syllable of the root word had a rate of error over four times that of the three other syllables combined. There is little doubt that an important cause of error is the stress pattern of the root word of derivatives.

By previous C.A. theory, the weak suffix rule should be particularly difficult for Brazilians because there are no weak suffixes in Brazilian Portuguese. However, for this very reason the weak suffix rule evidently attracts the attention of the Brazilian student, who fails to notice the cases where the root word's stress is not maintained, and generalizes the rule as being applied to all derivatives.

4.3.9. Summary of General Prediction Strategies

Of the eight factors checked in this study as being possible influencing factors in English stress placement by advanced Brazilian students, only one, the quality of the stressed syllable, was shown to be entirely without influence. If native language interference causes incorrect stressing of syllables containing /ɛ/ and /ɔ/ among beginners, as Terzi concluded, this is no longer a problem by the time students reach a more advanced level. Target language overgeneralization of stress on strong syllables does not seem to be a problem at this level either.

Another factor, found to be of only minor influence, is the number of syllables. At an advanced level, the difficulty of learning or applying a stress-placement rule does not appear to be affected by the number of syllables the word contains. However, the number of syllables does seem to affect stress placement in item-learned irregular words.

The six remaining factors were all shown to have considerable influence in forming learners' strategies. Three are examples of target language transfer, one is a combination of native and target language transfer, and two are examples of native language transfer.

The first of the target language factors is the predominant tendency of early stress in English. It is very noticeable to the Brazilian learner of English that stress placement is usually earlier than it is in Portuguese, where it

only occurs on the last three syllables. This tendency is greatly overgeneralized by the advanced student, who thus follows a general strategy of stressing the earliest syllable which sounds acceptable to his ear. The result is a great deal of difficulty with those rules which stress the later syllables of the word, and relative facility in learning the rules which stress the earlier syllables.

The second target language factor is the influence of the root words on their derivatives. This is another example of a phenomenon which is so different from anything that occurs in Portuguese, that it attracts the attention of the Brazilian student, who then makes both correct and incorrect analogies. Weak suffixes in English do not change the stress pattern of the root word. However, many advanced students do not distinguish between these and the strong suffixes, and indiscriminately follow a strategy of maintaining the root word's stress in any derived word.

The third target language factor is a tense vowel in the final syllable of verbs. Although in most cases the advanced Brazilian student of English will choose, when in doubt, to stress a syllable early in the word; when a verb contains a tense vowel in the final syllable, the strategy is to stress that tense vowel. This strategy being linked with the previous one, he also stresses this tense vowel in derivatives of these verbs, whether or not the derivative ends in a weak suffix.

The fourth factor, due to both target and native language transfer,is English terciary stress, which, because it is stronger than the Brazilian terciary or "strongest weak" stress, is easily perceived as primary. This interferes with the learning of stress placement of individual words, and later of rules, as analogies and generalizations are made. When primary and terciary stress are perceived as having equal strength, either one can be chosen as primary. At an advanced level, the more frequent strategy is to choose the earlier syllable, as a result of the overgeneralization of the English tendency for early stress.

The first native language factor is the cognate's stress pattern. It was shown that advanced Brazilian students of English do not generally transfer the exact stress pattern of the Portuguese cognate to the English word. They do quite

frequently, however, apply the strategy of giving primary stress to the syllable of the English word which corresponds to the syllable of terciary ("strongest weak") stress of the Portuguese cognate.

The final influencing factor, initial phoneme of the word, is also a case of native language transfer. In Brazilian Portuguese there is a tendency to give a weaker stress to initial syllables beginning with a vowel than to initial syllables beginning with a consonant. This tendency is transferred directly to English, causing the strategy of avoiding primary or terciary stress on the first syllable of words beginning with a vowel.

The six strategies mentioned here, the result of both native and target language transfer, will be shown in the next section to interact with each other and with the learning and applying of the stress placement rules tested. These are the strategies which appeared to affect the learning and application of the rules tested in this error analysis. As the rules tested are, by no means, the only English stress rules applied by native speakers, these strategies are certainly not the only ones followed by advanced Brazilian students of English. Others will no doubt appear in future studies of this nature.

4.4. Effect of Strategies on Rule Learning and Application

As mentioned in the beginning of the previous section, the strategies shown here to be followed by advanced Brazilian students of English are not applied consistently as learned rules. They are "feelings" the students have about the new language or habits carried over from the old language. These "feelings" or habits make the learning of the rules of English easier or more difficult; and they are followed in place of a particular rule when that rule has not been thoroughly learned, or when a word is not correctly identified with the rule. The rules tested are reconsidered below in light of these strategies. In some cases the percentage of correct answers is not considered an accurate appraisal of the difficulty of the rule, because one of the strategies has affected the percentage of one or two rather atypical words.

Rule 1, which assigns stress to the final syllable of verbs ending in a consonant cluster, is not an inherently difficult rule, although it scored fifth in difficulty. It is a rule which is most likely learned relatively early in the course of English language study. The problem is that it is contrary to a very strong tendency of the English language for stress near the beginning of the word. This tendency becomes a strategy of the Brazilian student of English after he has been exposed to a wider vocabulary. He then begins to doubt the correct hypothesis formed earlier, and, when confronted with a strange word, will often prefer to apply the strategy of early stress, which has a much larger input to back it up.

Rules 2 and 3, which stress the antepenultimate syllable of certain nouns, verbs, and adjectives, proved to be comparatively easy rules, due to the same strategy of early stress placement. All words tested were trisyllabics, meaning they all receive stress on the first syllable, in harmony with the strategy of early stress placement. This strategy makes the rule quite easy to learn, and probably accounts for correct stress given by a few students who have not learned the rule.

Although the two rules are similar, there are three reasons for the lower score of Rule 3. The fact that nouns and verbs most often take a terciary stress on their final syllable, where adjectives usually take a weak stress, leaves Rule 3 more vulnerable to the confusion of terciary and primary, which in some cases causes final stress. Another reason for the same error is the strategy, totally incompatible with this rule, of giving final stress to verbs with a tense vowel. *Azurite*, and to a lesser extent *inquiline*, were evidently affected by the strategy of giving weak stress to the first syllable of words beginning with a vowel. The particularly low score of *azurite*, an atypical word,probably made the rule seem slightly more difficult than it is.

Rule 4, which deals with words ending in $-iV^{n}(C)$, was the second highest scoring rule, in spite of the interference of three of the student strategies. The early stress strategy was again a negative influence here, since all but one incorrect responses stressed syllables before the syllable of primary stress. In the words *centurion* and *luxuriance*, this strategy worked together with the strategy of maintaining the

stress of the root word, both *century* and *luxury* taking primary stress on the initial syllable. Finally, *ignominious*, the only word receiving incorrect stresses on the second syllable, was affected by the strategy of avoiding stress on initial vowels. This was the only really low-scoring word; without it, this rule would have scored much closer to the percentage of Rule 13.

Rule 5, which assigns stress in words ending in $-uV^{n}(C)$, scored only two percentage points lower than Rule 4. This rule was most affected by the joint interference of the strategy of stressing the final syllable of verbs with a tense vowel in that syllable and the strategy of maintaining the stress of the root word. Most errors for the verb *perpetuate* were in stressing the final syllable; all errors for *issuance* were in stressing the final syllable of the verb *issue*; and the errors for *constituents* were split between maintaining the correct stress of the verb *constitute* and stressing the final syllable of this verb. The errors for *issuance* could also have been caused by the strategy of giving weak stress to initial vowels; and the errors on the first syllable of *constituents*, the lowest-scoring word, could have been caused by the strategy of stressing the syllable of terciary stress in the Portuguese cognate. As many words stressed by this rule are formed from verbs with a tense vowel in the final syllable, the first two strategies mentioned here can be expected to interfere frequently with this rule. The number of errors for *constituents* and possibly for *issuance*, however, most likely made the average percentage lower than the rule deserved.

Rule 6, which assigns stress in words ending in -iC__, of average difficulty, was again affected somewhat by the early stress strategy, thirty-one out of forty-five errors stressing syllables before the syllable of primary stress. *Comestible*, the lowest scoring word, was probably affected also by the strategy of stressing the syllable of terciary stress of the Portuguese cognate *comestível*. *Indemnify*, the only word with incorrect final stresses, was affected by the strategy of stressing the final syllable of verbs with a tense vowel in that syllable. To compensate for these two effects, many correct stresses of *indemnify* and *acquisitive* were probably caused by the strategy of avoiding heavy stress on initial vowels. With positive transfer compensating for the negative,

the average percentage for this rule can be considered valid.

Rule 7, which assigns stress in words ending in -uC__, although very similar to rule 6, was not very much affected by the early stress tendency. Rather, the erred stresses were drawn to the syllable containing the *u*, immediately after the syllable of primary stress. This only occurred, however, in the two derivatives of verbs with final *-ute* and in the word *impudent*. The stresses on the *u* of *contributors* and *attributive* were due to the strategies of stressing the final syllable of verbs with a tense vowel in that syllable and of maintaining the stress of the root word. *Attributive* was less affected by these two strategies, because of the positive effect of the strategy of giving weak stress to initial vowels and the strategy of stressing the syllable of the Portuguese cognate's terciary stress. The strength of the verb strategy and the root strategy can be seen in the two exceptions—they caused the same errors in the word *persecutor* and the high score of the word *inclusive*.

The word *impudent* is a singular case, the number of errors probably due partly to the strategy of giving weak stress to initial vowels and partly to analogy to the word *imprudent* (in fact, some students read it as such). The highest-scoring word, *truculence*, was vulnerable to none of the strategies causing errors, but received the positive effect of the strategy of stressing the syllable of the Portuguese cognate's terciary stress. Without the low score of *impudent*, the rule average would have been much closer to that of Rule 6.

Rule 8, which assigns stress to derived nouns and adjectives ending in a consonant cluster plus a monosyllabic formative with a lax vowel, was most affected by the strategy of early stress, most errors stressing the previous syllable. The rule proved to be of medium difficulty, and the exceptions scored high due to the fact that they receive stress on the first syllable, and to the positive effect of the strategy of stressing the syllable of the Portuguese cognate's terciary stress.

Rule 9, which stresses the final syllable of words ending in *-ee*, etc., is extremely difficult because it is totally contrary to the strategy of early stress and because

this group of suffixes constitutes an exception to the well-learned Rule 3. Working together with Rule 3 and the early stress strategy is the strategy of giving primary stress to the first of two heavy stresses. The word *absentees* may have been further complicated by the strategy of giving weak stress to initial vowels, bringing down the over-all average for this rule.

Rule 10, which assigns penultimate stress to words ending in *-ic*, etc., was most affected by the early stress strategy, working together in the three longer words with the strategy of giving primary stress to the first of two heavy-stressed syllables. The average percentage would most likely have been slightly lower for this rule without the positive effect of the initial vowel strategy on the word *admonish*, which scored 93%.

Rule 11, which assigns antepenultimate stress to words ending in *-ery*, etc., received incorrect stresses at both the beginning and the end of the word. The stresses at the beginning of the word were caused by the strategy of early stress, working together in the two five-syllable words with the strategy of giving primary stress to the first of two heavy stresses. The final stresses of *intercalate* and *reprobate* were caused by the strategy of giving final stress to verbs ending in a syllable with a tense vowel. The only word with many errors not attributable to one of the six student strategies was *inodorous*. This appears to be one of the few cases in which the stress pattern of the cognate was duplicated; this probably made the rule's average lower than it should have been.

Rule 12, which assigns preantepenultimate stress to words ending in *-itory*, etc., received the positive affect of the early stress strategy, particularly in the four-syllable words *predatory* and *pulmonary*. The positive effect of this strategy was neutralized in *percolator* by the strategies of stressing tense vowels in the final syllable of verbs and maintaining the root word's stress. The effect of these three strategies was counteracted in the word *intricacy*, by the strategy of giving weak stress to initial vowels. There were also a few errors caused by giving primary stress to the second of the two heavy stresses. The word *intricacy* made the rule average lower than it should have been.

Rule 13, which maintains the stress of the root word in derivatives with weak suffixes, was the highest scoring of the sixteen rules. It has already been seen that this rule is so well learned that it is generalized to include almost any suffix. The only suffix which evidently was not recognized as a weak suffix was *-ment*, causing quite a few errors for the word *devilment*.

Rule 14, which assigns stress to learned words of Greek origin, was evidently recognized as a rule dealing with words of foreign origin, these words being therefore more strongly identified with their Portuguese cognates. Instead of the application of one of the six usual strategies, the majority of the errors for all six words were due to a direct transfer of the Portuguese cognate's stress pattern. This was the only rule for which this occurred.

Rule 15, which adds a suffix to words of Rule 14, scored slightly better than the previous rule. The most likely explanation is that with the addition of the suffix, the words are less similar to their Portuguese cognates, eliminating the direct transfer which occurred in the previous rule. Of the three words having the same stress pattern as their cognates, only *autonomous* scored higher than the average for this rule; this score of 100% was probably due more to the initial vowel strategy than to cognate transfer.

The most common cause of error here was a combination of the early stress strategy with the strategy of maintaining the root word's stress. In the word *paralysis*, the latter of these was combined with the strategy of stressing a tense vowel in the final syllable of verbs. This strategy for verbs was also responsible for the errors of the word *geologize*. As the verb strategy is not applicable to many words pertaining to this rule, the average percentage is probably slightly lower than it should be.

Rule 16 is the second most difficult rule. This is not due to any of the six usual strategies; the rule deals with compound words, which are evidently approached by the Brazilian students in an entirely different manner. The reasons for the difficulty, already dealt with in 4.2., are the Portuguese stress patterns for compound words and for sentences.

Of the six strategies, the most important,having both a

positive and negative effect on the learning and application of the rules, is the strategy of early stress. Since this strategy is a true tendency of English, the problem is to limit this strategy without discouraging it.

The next most frequently applied strategy, that of avoiding stress on initial vowels, does not affect the learning of any particular rule, but often interferes and occasionally aides in the application of the rules. As this is a native language habit and not a tendency of the English language, it must be pointed out that the initial vowel has no effect in English and must be ignored.

The third most important strategy is that of stressing a final tense vowel in verbs. Although this is a target language strategy, its effect was mostly negative in this test. It is very important for the students to learn that this strategy is valid only for disyllabics, and that even these have many exceptions.

The fourth most important strategy, often applied together with the previous one, is that of maintaining the stress of the root word. The students must learn which are the weak suffixes, turning this error-causing strategy into productive rule application.

The switch of terciary with primary and transferring the terciary of the Portuguese cognate had about equal effect. The former can be controlled by intensive recognition exercises to distinguish between these two levels of stress. The latter, it is hoped, will diminish in effect as the rules are systematically practised.

4.5. Conclusions

In the error analysis, carried out in this chapter, of the stress placement of advanced Brazilian students of English, a hierarchy of difficulty of the rules has been established, six interfering prediction strategies have been discovered, and the effect of the strategies on the rule learning and application has been discussed.

It has been seen that the hierarchy of difficulty, although it gives a general idea of where the problems lie, is far from totally reliable. Several rules scored lower than they

might have because of peculiar problems of one or two words which are not typical of those particular rules. This was the case of the word *impudent* of Rule 7, which scored only 13%, probably mostly because of analogy to the word *imprudent*.

On the other hand, some rules scored high, due more to the application of general prediction strategies than to a knowledge of the rules. Rule 13, for example, which deals with weak suffixes, scored 90% correct responses. However, it was seen that most of the students do not know which suffixes in English are weak, and maintain the root word's stress in many derivatives which have strong suffixes. It cannot be said, then, that this rule has been well-learned, as learning a rule includes learning its limitations. Rather, the pattern of Rule 13 has become a general prediction strategy, applied where the correct rule is not known.

It has also been seen that,even where a rule's difficulty is adequately assessed, it is not generally explicable solely by the nature of the rule or by a comparison with the native language.

If the difficulty of the rules were explicable solely by the nature of the same, then two similar rules should receive similar scores, as in the case of Rules 4 and 5. Words stressed by Rule 4 end in $-iV^{n}(C)$; those stressed by Rule 5 have the same ending with *u* in place of *i*. The scores were 85% and 83% respectively. However, Rules 6 and 7 differ in the same letter, applying to words ending in -iC__ and -uC__ respectively. Rule 6 scored 74% and Rule 7 scored only 58%.

It happens that the difference of one letter is sufficient to cause application of different prediction strategies, which is what occurred in both pairs of rules. Probably by coincidence, the magnitude of effect of the strategies interfering with Rules 4 and 5 was about the same, whereas Rule 7's strategies had a much greater effect than those of Rule 6.

Of all sixteen rules, the only rule which seems to be explicable by a mere comparison with the native language is Rule 16, which assigns the stronger stress to the first element of compound words. Portuguese compounds have the opposite pattern, which is reinforced by the stress pattern of Portuguese phrases, making the English stress pattern for

compounds extremely difficult to learn or to apply consistently.

Being neither reliable nor self-explanatory, a hierarchy of difficulty is of little use by itself in understanding the problems of Brazilian students in English word-stress placement. The students' general prediction strategies are necessary to point out where the hierarchy is misleading and to explain why some rules are more difficult than others.

This has obvious implications for the forming of pedagogical strategies. Is is not sufficient to simply find out which rules are most difficult and give more training time to those rules. Using this approach, it is quite likely that the rules would be learned, but only applied to those words which were not vulnerable to the general prediction strategies. The general prediction strategies are generally simpler, which means they are easier to apply and more difficult to forget.

These strategies cannot, therefore, be ignored in the teaching of stress. However, what to do with these strategies is not an easy question to answer, especially since some of them are due to native language transfer and some to the target language. Chapter Five deals with the problem of teaching stress placement. Previous approaches will be examined in light of what has been learned in this study, and suggestions will be made for improving them, and for dealing with the students' general prediction strategies.

CHAPTER FIVE

PEDAGOGICAL STRATEGIES

5.1. Existing Literature on the Teaching of Stress Placement

Although English stress placement is a subject which has interested more and more linguists during the last twenty years, most of those interested have been theoretical linguists. Thus, there is now an abundance of literature describing the English stress system from the TG approach, the affix approach, or a combination of these; but there has been very little written about the methods of teaching or learning English stress.

One reason is that although each language has its own peculiarities as far as linguistic descriptions are concerned, most of these peculiarities have little effect on the teaching methodology used. Therefore,it is usually assumed that the same methodology can be used for teaching any language, as shown by the number of publications dealing with foreign or second language teaching in general. However, as stress is an area which causes relatively little difficulty in many other languages, there is not enough interest to include it in a general foreign language teaching methodology. The following texts on foreign language teaching were consulted, not one of which gave specific suggestions for the teaching of stress placement:

Billows, F.L. *The Techniques of Language Teaching* (1961).
Halliday et al. *The Linguistic Sciences and Language Teaching* (1964).
Jespersen, Otto. *How to Teach a Foreign Language* (1904).
Lado, Robert. *Language Teaching: A Scientific Approach* (1964).
Mackey, William Francis. *Language Teaching Analysis* (1965).
Rivers, Wilga M. *Teaching Foreign Language Skills* (1968).
Wilkins, D.A. *Linguistics in Language Teaching* (1972).

Nine other texts were consulted which deal specifically with the teaching of English. The five earliest publications, Fries' *Teaching and Learning English As a Foreign Language* (1945), Finocchiaro's *Teaching English As a Second Language* (1958/1969), Morris's *The Art of Teaching English As a Living Language* (1966), the English Language Service's *English Pronunciation: A Manual For Teachers* (1968), and Bright and McGregor's *Teaching English As a Second Language* (1970), do not mention the problem of teaching word stress. John Haycraft's *An Introduction to English Language Teaching* (1978) only suggests representing strong and weak word stress with large and small circles.

The other three, Brita Haycraft's *The Teaching of Pronunciation: A Classroom Guide* (1971), MacCarthy's *The Teaching of Pronunciation* (1978), and Rivers and Temperly's *A Practical Guide to the Teaching of English As a Second or Foreign Language* (1978), deal rather briefly with the pedagogical presentation of word stress and give a few hints for classroom practice.

MacCarthy (1978: 67) continues to adhere to the old opinion that "An English word should be learnt from the outset along with its stress, and should always be said with strong stress correctly placed." He suggests that "Practice material can take the form of English words, classified in lists according to their stress pattern" (1978: 68), saying nothing about the rules which assign these stress patterns. Haycraft also speaks of taking one stress pattern at a time, drawing attention to all words in the text, for example, with initial stress (1971: 62). Only Rivers and Temperly mention rules, referring to Dickerson's "translations" of SPE rules, but noting that they are suitable for intermediate or advanced adults only (1978: 153).

As for stress practice,Haycraft suggests that the teacher exaggerate the pronunciation of stressed syllables in the beginning, reducing the exaggeration as the students' stress habits improve (1971: 61). MacCarthy suggests that the student "accompany each stress, as he pronounces, by a firm visible gesture" (1978: 67), and that he practice short sentences having the same rhythm as the individual words (1978: 68). Finally Rivers and Temperly echo Dickerson's suggestion for pencil and paper exercises out of class (1978: 153), and further suggest insisting "on a clear contrast between strongly and weakly stressed syllables from the beginning" (1978: 161).

Wayne B. Dickerson's article "Generative Theory in TESL Practice" (1977) is the only publication known to the author which gives a thorough and concrete methodology specifically for teaching English word stress. His presentation is by rules, "translated" from Chomsky and Halle's TG rewrite rules into usable student rules (see 1.2.5.). The methodology consists of four phases for each particular topic, involving visual-graphic exercises with pencil and paper out of class, and audiolingual articulatory drills in class.

The first phase is "a brief introduction in class, at which time the teacher draws attention to the endings to be studied and assigns the discovery homework" (1977: 184). In a typical phase 1 lesson, the students mark the endings in a list of words of the same type, then listen to the teacher's pronunciation of each word and mark the stressed syllable.

Phase 2 is done at home by the students and consists of a "programmed discovery section" focusing on "the recognition of endings, the evaluation of spelling patterns, and the use of stress rules," and including "exceptions and special cases" (1977: 184). Where vowel quality is linked with stress placement, it is also marked by the students in these exercises.

Phase 3 is oral work done in class, preferably after the teacher has corrected and commented on the homework. Typical phase 3 exercises include repetition of words and phrases with no graphic stimulus, reading of phrases, sentences, dialogues, and texts, and answering questions about the texts.

Phase 4 is review homework, consisting of a written exercise and an oral exercise done in the language laboratory.

Each lesson is then frequently reviewed during the course.

Dickerson's article was published as recently as 1977, the other three publications mentioned are all from the 1970s, and very little was written about the teaching of stress previously. However, as English students have been learning to pronounce English words for centuries with both correct and incorrect stress placement, it would be interesting to see what kind of guidance they have been receiving, if any, to help them in deciding which syllables to stress. In the next section, available textbooks are examined to see what they offer in the way of stress practice.

5.2. Stress Practice in Existing Textbooks

5.2.1. General Textbooks

Many English courses make use of only one general textbook for each level, with systematic pronunciation practice only if the textbook happens to include such exercises. Therefore, an examination of available general textbooks should give a good indication of the amount and kind of stress practice had by many foreign students of English.

The following general English textbooks were examined:

Abbs, Brian et al. *Realistic English* (1-3) (1968).
Abbs, Brian and Freebairn, Ingrid. *Starting Strategies* (1977).
Abbs, Brian and Freebairn, Ingrid. *Building Strategies* (1979).
Abbs, Brian et al. *Strategies* (1975).
Abbs, Brian et al. *Developing Strategies* (1980).
Alexander, L.G. *Practice and Progress* (1967).
Alexander, L.G. et al. *Target* (1-3) (1974).
Broughton, Geoffrey and Greenwood, Thomas. *Success With English: The Penguin Course* (1969)
Byrne, Donn and Holden, Susan. *Insight* (1976).
Dixson, Robert J. *Complete Course in English* (1968).
Dixson, Robert J. *Modern American English* (1962).
English Language Services. *English 900* (1964).
Granger, Colin and Hicks, Tony. *Contact English* (1977).
Mellgren, Lars and Walker, Michael. *New Horizons* (1973).
O'Neill, Robert et al. *Kernel Lessons Intermediate* (1971).
O'Neill, Robert. *Kernel Lessons Plus* (1972).

Rossner, R. et al. *Contemporary English* (1979).
White, Ronald V. *Functional English* (1979).

Of this list, only four series and one individual textbook contain pronunciation exercises at all. *English 900* gives only intonation exercises. Dixson's *Complete Course in English* gives practice in segmentals; and his *Modern American English* series includes exercises in segmentals, certain endings such *-ed*, sentence stress and intonation. Abbs and Freebairn's *Starting Strategies* also offers practice in segmentals, sentence stress, and intonation. No general textbook examined contains exercises in word stress.

It is concluded, therefore, that the large number of foreign students of English who learn by a single textbook receive absolutely no guidance in word stress placement, except for the teacher's usually unsystematic correction of stress in individual words. The textbook writers evidently adhere to the opinion that the students must simply learn the stress of every word individually, or they expect the students to make their own generalizations and apply them to words encountered.

5.2.2. Pronunciation Manuals

Fortunately, not all English students are limited to studying from a single textbook for each phase of their course. The more ambitious courses and the teachers who have the time to be inventive frequently supplement their main textbook with separate pronunciation exercises from a pronunciation manual. Of all the pronunciation practice manuals examined, only Clarey and Dixson's *Pronunciation Exercises in English* (1947/1963) and MacKenzie's *Modern English Pronunciation Practice* (1967) give no practice at all in word stress. The others vary greatly in both content and presentation, as can be seen by the reviews given below, in order of publication.

Allen's *Living English Speech* (1953) deals mostly with sentence stress, rhythm, and intonation; but, in the appendix gives a rather extensive treatment of word stress. Although Allen gives some generalizations for predicting word stress by the suffix, the exercises do not require the student to make any predictions, as the stressed syllable is indicated in bold type. The exercises give practice in (1) word derivations with

a stress shift, (2) "disguised words" whose root is not easily recognizable because of a shift to antepenultimate stress, (3) secondary stress in larger words, which are arranged by pattern, (4) compounds, (5) verb and noun/adjective pairs, given in context, and (6) level-stress compounds, whose stress varies according to their place in the sentence.

Pring's *Colloquial English Pronunciation* (1959) also deals more with sentence stress, and leaves word stress for the appendix, where he gives lists of words with unstressed suffixes, to be practiced in whatever manner the student or teacher wishes.

In *A Practice Book of English Speech*, MacCarthy assumes the student either knows or will look up the stress pattern of each individual word, but needs to practice the various stress patterns to gain "control over the muscles that have to be used for stressing" (1965: 1). He therefore gives no suggestions for predicting stress placement, but merely lists of words, arranged by the number of syllables and the pattern to be repeated. The length of each list gives the student an idea of the usefulness of the pattern.

O'Connor's *Better English Pronunciation* (1967) is intended to help the foreign learner improve his English, but contains much more theory than practice. It is suggested that the student practice by listening carefully to English speech whenever possible, trying to distinguish sounds more than meaning, and then imitating. It is also suggested that the student learn the stress pattern of every individual word along with the meaning. Some practice examples are given of a few different patterns, the patterns distinguished by counting from the beginning of the word. A more complete treatment is given of sentence stress.

Prator's *Manual of American English Pronunciation* (1967) begins the stress lesson with perception exercises, where the student must mark the stressed syllable and identify all vowel sounds. The perception exercises are followed by listen-and-repeat type exercises to practice the ability to recognize and and place stress. The words for these exercises are grouped according to the number of syllables and the stress pattern. The student is given a list of five suffixes which usually cause the stress to fall on the preceding syllable, followed by

a derivation exercise including these five suffixes and many weak suffixes. The lesson ends with sentences which the student is to read only after marking the stress of all polysyllabic words.

Guierre's *Drills in English Stress Patterns* (1970) is the only pronunciation manual known to the author which deals exclusively with word stress[17]. The text is organized by suffix rules of the type illustrated in Chapter One. Strong suffixes are grouped by graphic similarity and similarity of stress pattern; and weak and bound endings are added to the strong suffixes, giving a succession of derivations from each root word.

The manual begins each lesson with a pre-test in which the stress patterns are mixed according to the addition or not to the original suffix of weak and bound endings or another strong suffix. The pre-test is followed by lists of words arranged according to the number of syllables, derivation exercises, mixed lists of words, and a final test of nonsense sentences. In all exercises the student must predict the stress pattern by the suffix rule and analogy to the examples given. The commentaries in each lesson include change of vowel quality when relevant.

The stress exercises in Bowen's *Patterns of English Pronunciation* (1975) consist of lists of words of the same number of syllables and same stress pattern with no generalizations for the prediction of these patterns. Noun/verb contrasts are given in lists and contextualized. There is one exercise on derivations with stress shifts, and one contrasting compound nouns with modifier-noun phrases. Although the exercise on derivations shows several examples of each suffix with the same stress pattern, no rules or generalizations are given.

Gimson gives extensive practice in word stress in *A Practical Course of English Pronunciation* (1975). The lessons include perception exercises, where the student must mark the stress in the words he hears, and listen-and-repeat type

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(17) Dickerson evidently has developed quite a bit of practice material, but the author knows of no publication of this material.

production exercises. The words in the exercises are grouped according to the number of syllables and the stress pattern, most groups containing only three words. Also included are noun and adjective/verb contrasts with only the most common words given, a brief exercise showing the effect of five suffixes, with only three or four words given for each one; and an exercise on compound words.

Although all nine pronunciation manuals reviewed above give some sort of practice in word stress, only five give the student suggestions to help him predict the stress of a word without a dictionary, and, of these five, only two give any stress prediction exercises. Of the last two, Prator's manual gives only one exercise of this type, while Guierre's has several in every lesson.

Another weakness in most of these manuals is that they begin directly with the production of stress, assuming that the student is able to recognize a stressed syllable, spoken by himself or someone else. The only ones which give practice in the perception of stress are Byrne and Walsh's *Pronunciation Practice* and Gimson's *A Practical Course of English Pronunciation*.

It can be concluded from the above examination of English pronunciation manuals, that even those students who are receiving systematic practice in word stress placement are not receiving full advantage of linguistic research available, unless a few enlightened and hard-working teachers are further supplementing the supplementary pronunciation manuals. Even Guierre's text, which gives the most complete treatment of word stress, has serious weaknesses. As mentioned above, it has no perception exercises. In addition, all exercises depend on the artificial exercise of reading. In 5.3. general language teaching and learning theory will be applied to the problem of English stress placement, and conclusions will be drawn as to ways of improving existing texts and teaching in this area.

5.3. Language Learning and Teaching Theories

In planning the teaching of any subject, including a foreign language, the decisions to be made fall into four basic categories: *what*, *when*, *why*, and *how*. It is assumed that the question of *why* has been answered, as this study has been

dealing all along with a university program to prepare teachers of English. Two of the three remaining questions, *what* and *how*, cannot be answered without making a decision about the place of rules in language learning.

In order to decide *what* to teach, one has to decide how to categorize the material to be taught or not. In the case of word stress, will the decision about which words to include depend simply on the number of syllables they contain? Will it depend on the stress pattern of the words? Or will it depend on the rules for assigning certain stress patterns to certain words?

In order to decide *how* to teach, one has to decide whether it is sufficient to give maximum exposure, whether the exposure to the language should be programmed, whether the students will learn best by repetition, or whether the students should be taught rules.

5.3.1. Behaviorism or Mentalism

Ever since the emergence of TG grammar in the 1950s, the field of linguistics has been involved in a controversy over language-learning theories, involving the question of rules versus habits.

Behaviorism says that a child learns a language in the same way that a mouse learns to find his way through a maze—through conditioned response to stimulus, immediate reinforcement, a great deal of repetition, and the avoidance of errors. The result is an ingrained set of habits, which constitutes knowledge of a language. The only peculiarly human ability involved is the ability to make analogies.

Mentalism argues that a child learns a language as part of the natural maturation process because of an innate exclusively human "language acquisition device". Rather than stimulus, reinforcement, and repetition, the only requirement is exposure to meaningful and natural language. Rather than habits, language learning consists of the constant formulation and checking of hypotheses; thus, errors are not only desirable, but necessary. The resulting knowledge of a language

consists of the internalization of a system of rules.[18]

Fortunately for foreign-language students, many teachers and methodologists have not found it necessary to make the choice of adopting strictly one or the other of these two theories. Wilkins (1972: 66) notes that "few would try to suggest that no generalizations are made by the learner, even though there are very deep differences of opinion on the manner in which they are made." He later adds (1972: 176):

> "It seems feasible that the rule-producing mechanism is assisted by our programming its exposure to the language. We would wish to retain the results of our efforts to grade language for teaching rather than leave the learner to sort out the rules from a random experience of language. We would also wish to have the learners actively responding in the language, since it seems impossible to deny that learning is not fully effective without 'doing'. But the active responding here must not be confined to analogous sentences. Using language requires choices all the time, and a belief in 'learning through doing' demands that practice in exercising those choices should be an important part of our language teaching. The answer to the question at the beginning of this section then is 'Mentalism *and* behaviourism." And there need be no contradiction."

Rivers (1968: 72) is also of the opinion that "A place must be found for both habit formation and the understanding of a complex system with its infinite possibilities of expression."

From a psychologist's point of view, Levelt (1978: 53) finds both the behaviorist and mental operations theories extreme and inadequate for explaining language performance, and suggests, in their place, the "human performance theory" of skills and attention. In accordance with this theory, Levelt would put language performance in the category of a complex task, which consists of a "variety of operations in accurate temporal integration" (1978: 54). Among these operations is the creation of plans, but this should be kept to a minimum, most plans being available in long-term memory (this is, of course, contrary to TG theory, according to which it is more efficient to follow a series of transformations to form a word than to occupy storage space with the word in ready-to-use form). The acquisition of skill involves the "automation of low level plans or units of

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(18) Wilkins gives a more complete comparison of these two theories and their relevance to language teaching (1972: 160-76).

activity" (1978: 57), in order to be able to expend more effort for higher-level decisions. As to the behaviorists' repetition, Levelt feels that automation through repetition does not necessarily mean that the resulting partial activity will be rigid. It is important, of course, that only the plans, and not the "terminal" activities, be trained in this manner (1978: 58).

Although Levelt calls both language learning theories inadequate, his explanation of the "human performance theory" draws from both of them. Essentially, Wilkins, Rivers, and Levelt have expressed the same opinion, but in different manners and using different vocabulary. Levelt's "creation of plans" would correspond to Wilkins' "exercising choices", both activities requiring "the understanding of a complex system" mentioned by Rivers. These are all "mental operations", consistent with the mentalist theory of applying rules. On the other hand, Levelt's "automation of lower-level plans" and Wilkins' "learning through doing" correspond to Rivers' "habit formation", consistent with the behaviorist theory.

This compromise seems to be the most rational way of explaining both first and second language learning. It is doubtful that intelligent communication would be possible if knowledge of a language consisted merely of a collection of habits. At the same time, communication would no doubt be painstakingly slow and inefficient if speakers had to apply rules or create plans down to the last phonological detail for the simplest utterances. As to the form of rules and habits and the manner in which they are acquired, there is probably quite a difference between a first and a second language. Even within each of these categories there are surely differences. As Wilkins comments (1972: 60), "It is perfectly reasonable to suppose that there are some characteristics that are shared by all learners and others where there is considerable personal variation."

Accepting this compromise in learning theory inherently means accepting a compromise in teaching strategies. Both rules and drills must be needed for effective teaching. However, if there is such a variation in learning strategies among students, how is one to decide what kinds of rules and drills to use in teaching and how to use them?

5.3.2. The Place of Rules in the Teaching of Stress Placement

Few would disagree with Wilkins (1972: 65) when he states, "there can be no question of teaching the pronunciation of *courageous* by working through the derivation from the underlying form." Even Dickerson, the only one known to the author who has put TG rules to use in language teaching, uses simplified "translations" of these rules, as mentioned in 5.1. He does, however, present the rule directly to his students; and the homework exercises include, not only application of the rule, but questions requiring the student to be able to state the rule.

Many contemporary linguists would argue against this method, saying that the function of the rules is simply to help the course designer or teacher "to make the experience of the learner more regular than casual experience of the language would, so that ... the greatest amount of successful prediction is achieved" (George, 1969: 19). Wilkins (1972: 66) comments, along similar lines, that "teaching consists of no more than an arrangement of language data." He is particularly against the use of rules in the teaching of pronunciation, for which he says, "Explicit discussion of the rules, far from being the short-cut that it might arguably be for grammar learning, would prove a very long way round indeed" (1972: 65).

Seliger has done some interesting experimenting on the use of conscious rules by speakers of English as a first and second language, and found no relationship between "good" and "bad" rules and the quality of the learner's performance (1979: 359). However, he came to the conclusion that, although pedagogical rules—those which "attempt to instill someone with the knowledge that native speakers unconsciously have in their mind"—are not production and comprehension devices, they "are useful to get learners to do things with language in an efficient manner, to focus on those aspects of the language phenomenon that must be acquired, and to avoid inefficient testing of false hypotheses" (1979: 360). In other words, "conscious or pedagogical rules make the inductive hypothesis testing process more efficient" (1979: 368).

Seliger's findings about conscious rules should be particularly true for phonological rules such as stress rules,

since pronunciation is usually the most automatic, or least conscious part of language performance. If this is the case, it could be that Dickerson's homework questions are the least productive part of his program.

As with the choice of behaviorism or mentalism, compromise leads to the most rational approach. Dickerson prefers to teach the rules, while George and Wilkins prefer to use the rules only to organize the language data in such a fashion as to allow the student to form his own hypotheses. Why not make this process more efficient, as suggested by Seliger, by presenting the language data in an organized manner together with the rules and pointing out how the rules work to produce certain forms? Once the students have understood, it is up to each one to "recode" the information into his own "internal model", of the form that suits him best.

Using Wilkins' example (1972: 66) of the following derivatives, which he would have the students repeat in order to assimilate the rule—

'alternate	al'ternative	alter'nation
'contemplate	con'templative	contem'plation
'demonstrate	de'monstrative	demon'stration
'indicate	in'dicative	indic'ation
'remonstrate	re'monstrative	remon'stration

—it would be NO more efficient to call the student's attention to the fact that (1) verbs ending in *-ate* take antepenultimate stress, which is not always maintained in their derivatives because (2) adjectives ending in *-ative* also take antepenultimate stress, and (3) nouns ending in *-ation* take penultimate stress. Any of several other ways of expressing these generalizations is valid as long as it is kept simple. It might even be better to ask a student what each column of words has in common. As to the criterion for deciding if a rule is simple enough, the most reasonable might be that it should be possible for a student to infer by induction from a set of organized language data. It is doubtful if a student would induce by himself, for example, a rule of the form of Dickerson's "If key is ⟨V⟩ or ⟨VC⟩ : Stress Left, but not a Prefix. Otherwise: Stress Key" (1977: 183). The important thing is not to assume that each student is making his own

generalization as he is repeating, because repeating is the type of exercise which many students can perform while totally distracted, without noticing anything about what they are repeating.

Before leaving the question of rules, the age factor should be mentioned. Rivers and Temperly expressed the opinion that rule teaching is suitable only for intermediate or advanced adults (1978: 153). However, an adult at any level should be capable of following rules in general. As to stress rules, which ones a particular adult can handle probably depends more than anything on the number of words in his vocabulary to which the rule applies (see 5.5.). Extremely motivated adolescents should also be capable of rule learning. Children, however, not only would have difficulty with rule-learning, but they probably do not even need it, particularly for the rhythmic part of pronunciation, which they learn quite naturally. For children, the emphasis would be on drills, which will be dealt with in the next section.

5.3.3. The Place of Drill in the Teaching of Stress Placement

The arguments usually given against drills in foreign language teaching are the lack of concern with meaning and the lack of transfer to a real language situation. Wilkins comments about the first problem (1972: 168): "To make proper scientific use of the stimulus—response relationship for the teaching of meaning one would have to be capable of identifying the stimuli in any situation *before* the language was uttered, and in practice this is utterly impossible". About pronunciation drilling, he says, "What is achieved in the drill situation may not be transferred to other situations in which the language is used" (1972: 60). Any foreign language teaching strategy using drills must keep these problems in mind.

Many text-writers try to solve both problems by contextualizing the drills. Although George concedes that this may give immediate motivation, he argues that the situation provides redundancy, which reduces the need or motivation to learn the code in order to decode the message (1969: 11). For pronunciation practice in particular, he suggests removing the distraction of meaning for fullest attention to aural/oral

training (1969:90), and adds, "The writers who are most successful in making one "hear actual sounds are successful precisely because they temporarily decontextualize the speech they are representing, using the barrier of unfamiliar transcription" (1969: 147). It appears then, that the first problem may not be a problem at all, at least for pronunciation drills. It is important to notice, however, that George mentioned *temporarily* decontextualizing, presumably because the context would help to solve the problem of tranfer at later stages.

But does contextualizing pronunciation drills insure transfer? The usual ways of contextualizing are to put the practice word into sentences, paragraphs, or dialogues, the latter being the closest to natural speech. However, this brings us back to the problem of meaning. Rivers notes that a pattern is really only considered learned when correctly used in conversational interchanges. It is assumed that she meant *meaningful* conversational interchanges. Since it is quite possible for a student to read or recite a dialogue without paying the least attention to the content of the dialogue, this does not always constitute a *meaningful* conversational interchange.

Although in the beginning it may be desirable to remove the distraction of meaning in order for the student to concentrate all his attention on pronunciation, eventually it is necessary to reintroduce meaning in order to make the transfer. The only way to insure the student is concentrating on meaning is in spontaneous conversation. The problem here, of course, is that of ensuring that the student will include the pattern in question in his spontaneous speech.

Dickerson solved this problem by giving a text containing many words of the pattern being practiced, then asking questions about the text which would elicit the desired words. This is an example of spontaneous, but controlled conversation where the student is obliged to think about meaning and produce the appropriate forms at the same time (1977: 186). In Dickerson's exercise, copies of both text and questions are given to the student. However, at an advanced level, it would be possible to eliminate the graphic stimulus by reading the text and the questions to the students.

The use of script is another debatable question in the

use of classroom drills. The problem with using script, as pointed out by Lado (1961: 84), is that pronunciation in reading does not entirely parallel pronunciation in speaking. For this reason, and to avoid orthographic interference, Finocchiaro (1958/1969: 101), Rivers (1969: 101), and others suggest that the drills be presented first without script. This is probably particularly important for stress placement, as eventual automation of correct stress placement is partially dependent on a "feeling" for the rhythm of the language. It must not be forgotten, however, that one of the objectives of word-stress training is to enable a student to pronounce correctly, without referring to a dictionary, many new words which he comes across in his reading. For this reason it is important to follow up the drills without script with considerable practice in predicting stress from the written word. A reasonable approach would be to give perception and repetition drills without script, and prediction drills with script.

The problem of perception or recognition was mentioned in 5.2.2. Many Brazilian students probably believe that recognition of stressed syllables for them is no problem since Portuguese also has distinctive word stress. However, Lado points out (1961: 113) that the scoring of secondary, terciary and weak stress requires training. Furthermore, the confusion of primary and terciary and of primary and secondary which showed up in the error analysis also indicates that recognition of these two levels causes difficulty for Brazilian students. Keeping in mind George's suggestion of removing all distractions when training students to "hear", the most efficient way to train in recognition would be without script, but only a chart in which the students mark each level of stress in the column of the correct syllable.

Having discussed the main points of controversy about rules and drills in the classroom, the next section gives a suggested teaching sequence for a particular stress rule.

5.4. Suggested Teaching Sequence for a Word-Stress Lesson

A suggested sequence will be given here for a lesson dealing with the strong endings *-ic(s)*, *-ical*, *-icle*, and the weak ending *-ly*. These are the items included in the first

lesson of Guierre's *Drills in English Stress Patterns* (1970: 14-19), but his lesson will be modified in accordance with the discussion in 5.3. The three strong endings fall logically into one group by graphic and phonological similarity and by the similarity of their stress patterns. Guierre's policy of practicing every strong ending with the addition of a weak one is a good constant reminder of the difference between them.

Even if it is already known that the students need training in a particular stress rule, a pre-test such as Guierre's T_1 is a good way to begin every lesson, so that the teacher can judge the students' progress. The pre-test mixes together words of varying lengths with all the endings to be studied in the lesson, such as *classical, mechanically, diplomatic, heroic,* and *magically,* and includes exceptions such as *catholic* and *arithmetic*. If a language laboratory is available, all words should be read individually by each student, preferably at the end of the previous lesson to give the teacher time to listen to the tapes and know how much practice will be required. If a laboratory is not being used, the students could mark the stress of each word in pencil, assuming that they have already had practice in this type of exercise. It might be mentioned here that the author has witnessed students pronouncing words correctly that they marked incorrectly in pencil, indicating that some students become aware of their own oral stress placement only after practice.

The pre-test would be followed by stress recognition practice, including a similar mixture of words, containing especially a large number of words long enough to have terciary stress. Ideally the students should not have the written word in front of them, but would simply mark the stress in the column of the correct syllable in a chart such as the one below; counting the syllables from the end of the word, marking primary and secondary stress with big and small circles, as suggested by John Haycraft (1978: 68), and marking dots for weak stress. The chart shows the correct marking for *diplomatic, parenthetical, pacific,* and *mechanically* (counting *-ically* as two syllables). It is assumed that the students have been trained in this kind of exercise since the first stress lesson, training initially with nonsense syllables such as *lilili, lalala,* etc., as done by Gimson (1975: 34-5). This exercise should be corrected before going on to the next.

TABLE 14

RECOGNITION PRACTICE

5	4	3	2	1
	o	.	0	.
o	.	0	.	.
		.	0	.
	.	0	.	.

Following the stress recognition exercise would be several lists of words of the same pattern, as given by Guierre; for example, first disyllabics in *-ic*, then trisyllabics in *-ic*, etc., followed by derivations changing *-ic* to *-ical* or *-icle*, and finally derivations from *-ic* to *-ically*. These lists would first be read by the teacher and repeated by the students. Ideally the students would be looking at the teacher and not at the words. Then the students would look at their lists, and one student would be asked to say what each list has in common, eventually arriving at the rule. If necessary the teacher should explain the rule. The lists would then be read in chorus by the students, possibly beating time lightly on their desks.

Mackey (1965: 190) implies that drills should be "based on useful words or on the vocabulary already taught." It would certainly be helpful, if possible, to *begin* both the stress recognition and the repetition drills with words already familiar to the students. However,if the purpose of the lesson is not to practice articulation of a particular sound, but to practice *predicting* stress patterns; it is absolutely necessary to drill with unfamiliar words, and the amount of practice usually required makes it impossible to limit the drills to the most useful words.

The lists of words of the same pattern would be followed by, and perhaps interspersed with mixed lists of the patterns practiced up to that point. As these lists involve stress prediction, it would be good to hear each student individually. If a laboratory is not used, alternation of choral and individual response would be suggested.

Guierre ends his lesson with nonsense sentences. However, unless the rules are being easily assimilated by the students, it would be advisable to have the students practice first reading short phrases such as *an authentic tale, biologically speaking*, etc. This is done by Dickerson in his example using the ending *-able* (1977: 185). These phrases would then be followed by nonsense sentences containing as many words as possible of the rules practiced. Although Mackey criticizes "improbable sentences" for pronunciation practice (1965: 264), it must be remembered that the attention here should be on predicting stress, the distraction factor being added only at the end for purposes of transfer and checking the assimilation of the rule (see references to George in 5.3.3.). An example of an appropriate sentence from Guierre's lesson (1970: 19) is— *I know the eccentrically realistic style of these chronicles.* If no laboratory is available, the students would take turns reading individually.

In order to see if the students can apply the rule automatically without the written word in front of them, the lesson should end with an exercise in which the students are required to produce the correct forms spontaneously. A text with questions similar to Dickerson's example (1977: 186) is the most adequate, but also the most difficult to produce. The text should be informational, and include many words of the type being practiced. However, it should be simple enough for the students to be able to produce the correct answer without reading it from the text. This type of exercise is really only useful for laboratory work; otherwise only a handful of students would be able to participate, for it could not be particularly long. Ideally, the student should read the text, not necessarily outloud, and with enough time to absorb the information. He should then answer the questions orally, preferably without looking at the text. If the students have a high level of comprehension, the exercise could be done without script, the text being read by the teacher.

5.5. The Order of Presentation of Stress Rules

Of the four questions mentioned in 5.3. to be answered in planning teaching strategies, *why* and *how* have been answered. Word-stress placement is being taught to prepare

teachers of English, and should be taught in a manner similar to that of the sequence outlined in 5.4. The two remaining questions, *what* and *when*, have to be answered together, as not all the material can be taught at once.

Mackey gives five criteria to help in making decisions as to the order of presentation of items: (1) frequency, (2) range, (3) availability, (4) coverage, and (5) learnability (1965: 176).

5.5.1. Frequency

Frequency refers to the number of times an item appears in a sample of the language. A difficulty in using this criterion as pointed out by Mackey (1965: 182), is that word count lists vary considerably according to the source and size of the corpus, particulary as regards nouns and adjectives. However, it is possible that the frequency of a particular phonological pattern among the words varies less than the words themselves, a word in one list frequently being substituted in another list by a word of a similar pattern. Barnard's "A 'First Thousand' Word List of 1,000 Words" (1971) and the University of Manchester's "1,000 Word List," adapted from Riewald's (1960), were examined for the most frequently represented stress rules. Three of the four most frequent rules of each list were the same, though not in the same order. The most frequent in Barnard's list were Rules 13, 16, 4, and 3 in that order of frequency. The first four in the University of Manchester's list were 4,1, 3, and 16 respectively. It would be reasonable to conclude that at least Rules 3, 4, and 16 are useful rules for beginning students.

A potential problem to using British or American word counts for the frequency of stress rules to be learned by Brazilian students of English in Brazil is that the most commonly used words in these countries may not be the same as the most commonly used words in a Brazilian classroom. Besides the fact that classroom vocabulary (nouns such *blackboard* and *chalk* and verbs such as *repeat* and *answer*) are usual additions, the most frequent classroom vocabulary is often dictated by a textbook whose vocabulary is not selected from word count lists.

5.5.2. Suitability in the Selected Vocabulary

Rivers suggests (1968: 82) that a structure be taught only after having appeared several times in the language material presented to the students. The frequency of a word in word count lists does not guarantee that a word has or has not appeared in the students' lessons. In speaking of the selection of rhythm and intonation patterns, Mackey adds to the five criteria mentioned above "the suitability in the selected structures" (1965: 191). For the selection of stress rules, one might alter this criterion to read "suitability in the selected vocabulary." The selected vocabulary would, of course, not refer to word counts, but to words used in the lessons, usually appearing in the textbook.

The logical prodedure to use this criterion is to check the vocabulary of the textbooks being used. The present "Letras" course in English at the Universidade Federal de Santa Catarina uses the Abbs and Freebairn *Strategies* series in the first semesters. The vocabulary lists of the first two volumes, *Starting Strategies* (1977) and *Building Strategies* (1979) were examined for the most frequently represented stress rules. T This, of course, does not indicate the number of times each rule appears in the lessons or in the textbook, for most words appear more than once; but merely the number of *different* representations of each particular rule. In fact, the actual number of representations of each rule could be higher because the vocabulary lists include only active vocabulary, i.e. vocabulary which the students are required to use in the oral practice of the lessons. Many words which appear in reading selections and in instructions, for example, are not included in these lists.

Nevertheless, these lists are considered to be appropriate for judging the suitability of the rules in the selected vocabulary. Speaking of phonetic sequences, Mackey suggests that "Some courses will wait until enough words containing the same phoneme have been taught before attempting to treat it systematically" (1965: 213). First, it is assumed that teaching a word means expecting the students to use it, thereby referring to active vocabulary. Second, it should be noticed that Mackey does not speak of the frequency of appearance of the words, but only the number. "Enough words"

presumably means a sufficient number for students to see similarities among them and form generalizations.

It was concluded in 2.3. that the stress patterns of irregular words, and possibly of many other words, are item-learned in English. It is obvious that both children learning English as a first language and students learning English as a foreign or second language must learn individually the stress pattern of a certain number of words, before being able to see the similarity of patterns among them and form a generalization or stress rule. The fact that a child or student hears or uses a particular word fifty times is not going to lead him to a generalization about that word unless he hears and uses other words which follow a similar pattern.

A question still to be answered about Mackey's suggestion is what constitutes enough words to be able to form generalizations. Since the discussion is about teaching systematically, the number of words, necessarily somewhat arbitrary, could be simply a convenient number for the first systematic presentation of the rule to the students, presumably in the recognition exercises described in 5.4. A list of eight words should certainly be sufficient for this purpose. Someone learning a language by natural exposure, such as a child or someone taking up residence in a foreign country, might need to learn fifteen or twenty or more words before assimilating a particular rule; or, in the case of the foreigner, he may never learn it. However, this is no reason to delay the systematic teaching of the rule for so long. Fries points out that one can achieve fluency too soon, and that students who are fluent with no basic control over the sound system or structure are usually hopeless (1945: 3). It is important to avoid this problem by presenting a rule systematically before the students have had time to become accustomed to using an incorrect hypothesis in its place.

Accepting that a rule will be presented after it has appeared in eight different vocabulary items means that Rules 16, 4, and 13 should be presented, in that order, before the end of the first semester, during which *Starting Strategies* is used. Rule 16 appeared in a total of thirty-five words, Rule 4 in thirteen words, and Rule 13 in nine words. The appearance of Rule 13, however, was restricted to six words with the

suffix *-ly*, two with *-ful*, and one with *-able*. Since these suffixes have no graphic or phonological similarity, it would be better to teach them separately, leaving the presentation of *-ly* for the beginning of the second semester, after the appearance of a few more words containing this suffix, and leaving the presentation of the other suffixes for later still. This leaves only Rules 16 and 4 for the first semester. This correlates well with the criterion of frequency, Rules 16 and 4 being two of the three rules of high frequency in both word counts examined.

Although Rule 13 is represented by an additional thirty-three words in *Building Strategies*, ten of these are words ending in *-ly* and fifteen are words ending in *-er*, no other suffix being represented by more than three words. The presentation of this rule in the second semester, then, would be limited to these two suffixes.

The other rules to be presented in the second semester would be Rule 3, which appeared in seven words in *Starting Strategies* and in fourteen more in *Building Strategies*; Rule 10, which appeared in three words in *Starting Strategies* and in eleven more in *Building Strategies*; Rule 6, which appeared in seven words in *Starting Strategies* and in six more in *Building Strategies*; and Rule 1, which appeared in two words in *Starting Strategies* and in eight more in *Building Strategies*.

Of the suffixes included in Rule 10, *-ic* and *-ation* appeared in six words each, and no other suffix appeared in more than three. The suffix *-ation* is covered by Rule 4, and need not be dealt with separately, unless for the purpose of showing derivations from verbs ending in *-ate*. If included, these two suffixes might be better left for the beginning of the third semester.

It should be added that since the number eight was chosen arbitrarily, those rules appearing in just under or over eight words could just as well be presented in one semester as in the other. If the rule words were used infrequently, the teacher may decide to leave the rule for the following semester. If they were used frequently, or if other rule words were used in addition to those of the textbook, he might decide to introduce the rule in the previous semester.

It has been established by the criterion of suitability

that Rules 1, 3, 4, 6, the suffixes *-ly* and *-er*, and Rule 16 should be taught during the first two semesters. After the second semester it is difficult to order the teaching of the rules by this criterion. This is partly because the textbooks introduce a large volume of new vocabulary, and what constitutes the *active* vocabulary depends more on the teacher, the books being less structured and containing no vocabulary lists as a guide. It is also due to the fact that the students begin to do a lot more outside reading in supplementary texts, in addition to compositions and oral presentations for which they find the vocabulary on their own. From the fourth semester on, they are also exposed to a large vocabulary in their li literature courses. The remaining rules and suffixes, then, will have to be dealt with by other criteria. It might be suggested, however, that if the teacher notices the appearance of several words pertaining to a particular rule which has not yet been introduced, it is time to introduce it.

5.5.3. Range

Range is"the number of samples or texts in which an item is found" (Mackey, 1965: 182). This would be an extremely relevant criterion if it were possible to calculate, particularly after the students begin their literature courses. However, besides the impracticability of making a stress-rule count of all the literary texts the students read, the texts used in a particular literature course vary from one semester to the next, meaning the list would need constant revision.

5.5.4. Availability

Availability is "the readiness with which it [an item] is remembered and used in a certain situation" (Mackey, 1965: 183). This criterion has relevance only for lexical items and not for stress rules.

5.5.5. Coverage

Coverage is "the number of things one can say with it [an item] " (Mackey, 1965: 184). Since the selection is of

stress rules and not of lexical or structural items, this would correspond to the number of words which one can pronounce with it, i.e. productivity.

Most of the stress rules tested in the error analysis were chosen in part by their productivity, with the exception of a few of the suffixes grouped together in Rules 10, 11, and 12. Rules 1, 2, and 3 were adapted from the most basic of *SPE*'s stress rules, known to apply to a large variety of words. Guierre's rules were shown to be statistically important in the computer analysis made as part of his research. Rules 4 to 8 include extremely large classes, Rule 4 alone applying to thousands of words. Although Rule 9 applies to over two hundred words, according to Kingdon's lists, most of the words are rather rare. Of the suffixes of Rules 10, 11, and 12, *-ic*, *-ation*, *-ate*, *-eous*, *-atory*, *-igible*, and *-ator* were found to be statistically important by Guierre. The suffixes *-ly*, *-er*, *-ness*, and *-able* of Rule 13 were also found to be statistically important by Guierre; and Kingdon gives 86 examples of *-ful*, 39 examples of *-less*, and several hundred of *-ment*. Rules 14 and 15 were found statistically important by Guierre, and there are known to be thousands of compounds which follow Rule 16.

The only suffixes of relatively low productivity are *-ish*, *-ive*, *-ure*, *-mental*, *-ery*, *-orous*, *-mentary*, *-itory*, *-acy*, and *-ary*. These, and Rule 9, because of the rarity of the words, could be left for the last few semesters.

5.5.6. Learnability

The meaning of learnability is clear, but it is important to consider the characteristics that make a rule learnable. Mackey lists (1) similarity, (2) clarity, (3) brevity, (4) regularity, and (5) learning load.

(1) The first of these, similarity, refers to similarity ity to the native language, i.e. cognates or similar structures, the structures in this study being stress rules or patterns.

Cognates are irrelevant to the assessment of learnability of stress rules. All rules include words with Portuguese cognates, some with similar and some with quite dissimilar stress patterns, independent of the rule. It might be suggested, however, to include among the first words

presented for a particular stress rule, several cognates with an identical or similar stress pattern. It was shown in 4.3.2. that when interference from the Portuguese cognate occurs with advanced students, they more commonly give primary stress to the syllable of the cognate's terciary stress than to that of the cognate's primary. Therefore, it would be valid to include, among these first words presented, words with primary stress on the syllable of the Portuguese cognate's terciary stress, in the hope of taking advantage of this interference.

Similarity of rules is also of little use in assessing learnability. The English stress rules for simple words all depend on suffixes, tense vowels, or consonant clusters. Portuguese stress is not affected by suffixes, with the exception of the superlatives and diminutives; it is never affected by consonant clusters; and the only vowels which affect it are /ɛ/ and /ɔ/. Only the rules for compounds have a basis for comparison. Rule 16 assigns primary stress to the first element of compound words, while Portuguese compounds receive primary stress on the last. Rule 16, then, should be difficult to learn; and, in fact, the error analysis showed it to be the second most difficult rule.

As to similarity of patterns, it might be assumed that the most learnable ones are those which stress one of the last three syllables, since those are the only syllables stressed in Portuguese. However, it was shown in 4.3.3. that, for advanced Brazilian students of English the words with stress toward the beginning of the word were more easily learned than those with stress toward the end.

This indicates that there is one more type of similarity to be considered—the similarity of the stress rules or patterns to the students' general strategies. Although it is not known at what point the students acquire the strategies outlined in Chapter Four, the fact that these strategies are still used at an advanced level indicates that they have a strong influence on learning. All of them cause both positive and negative interference, and it would be practical to take advantage of the positive interference where possible.

It should also be noted that two of these strategies, the early stress strategy and the strategy of maintaining the root word's stress, leave doubt as to how much similarity to

the native language increases learnability. Both of these strategies are caused by the effect of a contrast with the native language, which is evidently easier to remember than many similarities. The strategy of giving primary stress to the syllable of the Portuguese cognate's terciary stress rather than to the syllable of its primary stress also indicates that the most similar items are not necessarily the most learnable.

The only student strategy showing items that are more learnable because of similarity to the native language is that of giving weak stress to initial vowels. However, this strategy makes only certain lexical items easier than others and does not affect the learnability of any particular rule.

Three of the six student strategies potentially affect the learnability of particular rules—the early stress strategy, the strategy of maintaining the stress of root words, and the strategy of stressing final syllables of verbs when those syllables contain a tense vowel.

The early stress strategy should increase the learnability of Rules 2 and 3, particularly as regards three-syllable words, which are assigned initial stress by these rules. This same strategy should decrease the learnability of Rules 1 and 9, both of which assign final stress. In the hierarchy of difficulty established in 4.2., Rules 2 and 3 are both among the five most consistently applied rules, and Rules 1 and 9 are among the five least consistently applied, supporting the effect of this strategy on learnability of individual rules.

The strategy of maintaining the stress of root words by definition increases the learnability of Rule 13, which deals with weak suffixes, and should decrease the learnability of all others. Rule 13 was the most consistently applied rule.

The strategy of stressing final syllables of verbs when those syllables contain a tense vowel affects two or three words of several different rules, as discussed in 4.4. It does not, with consistency, however, affect the learnability of any particular rule.

Similarity, or the lack of it, was seen to be a factor affecting learnability in the case of Rule 16, which is difficult because of the contrast with the Portuguese compound rule; in the early stress strategy, which facilitates the

learning of Rules 2 and 3 and interferes with the learning of Rules 1 and 9; and in the strategy of maintaining the root word's stress, which facilitates the learning of Rule 13.

(2) Clarity refers to the facility with which a rule can be understood, due to the manner in which it is explained. All the rules are expressed in basically the same manner, using suffixes and the phonological structure of the word. It could be said that the conditions for applying the suffix rules are more easily recognized from the orthographic stimulus than those for applying the phonological rules, English phonological structure not always being "clear" from the spelling. However, the three phonological rules depend on the phonological structure of only the last syllable, which is the easiest syllable to predict from the spelling. The error analysis does not indicate a greater difficulty with Rules 1, 2, and 3.

(3) Brevity is related to clarity, since a rule that can be worded "briefly" is often easier to understand. Because this means fewer factors for the student to consider, it should also be easier to apply and to remember. The only rules from this study which have more than one variable for the student to consider are Rule 8, which depends on a consonant cluster and a suffix; Rule 14, which depends on two elements of the word; and Rule 15, which depends on the same two elements plus a suffix. It is interesting, however, that Rule 15, with three variables to consider, caused less difficulty for the Brazilian students than Rule 14. All three rules appeared in the middle 40% in the hierarchy of difficulty.

(4) Regularity means few exceptions to the rules. If a rule has many exceptions, particularly if they are commonly used exceptions, it should be more difficult for students to form the generalization, and the frequent use of irregular words would make the automation of the rule more difficult. Most of the rules have large classes of exceptions, sometimes formed by conflict between two rules. According to Kingdon's lists and Guierre's exercises, only Rules 4, 5, 8, and 13 have very few exceptions. For Rule 4, which applies to literally thousands of words, Guierre lists only seven exceptions, all of them containing a suffix with *-ia* plus one or two consonants. For Rule 5, only nine words are listed by Guierre and Kingdon, five of them having a *q* preceding the *u*. Guierre lists only

nine exceptions to Rule 8, two of them verbs which follow Rule 1. The exceptions to Rule 13 are limited to the suffix *-er* when added to Greek elements, and *-able* when it is not a suffix and in six words which also have a less acceptable, but regular pronunciation. Of these four, Rules 13, 4, and 5 were the most consistently applied in the error analysis, and Rule 8 was of average difficulty.

(5) The last of Mackey's characteristics affecting learning ability is the learning load. It is assumed that learning a rule which is very similar to another rule will not take much more effort. This implies that Rule 2 could be taught after Rule 3, both being versions of *SPE*'s Alternating Stress rule; Rule 5 could be taught after Rule 4, the only difference being a *ă* for an *i*, Rule 7 could be taught after Rule 6, the difference again being a *u* for an *i*; Rules 6 and 7 are also similar to Rules 4 and 5 with the difference of one consonant, and could be taught directly after them; and Rule 8 could be taught after Rule 1, the difference being the addition of a suffix which does not alter the stress pattern of Rule 1.

Completing the discussion of how these characteristics affect the learnability of a rule, the effect of a rule's learnability on the order of presentation has yet to be considered. Remembering Fries' comment about the hopelessness of a student who achieves fluency before phonological control (see 5.2.2.), it is not necessarily a good policy to leave the least learnable rules until last. In particular, a rule of low learnability and high suitability (frequency in the textbooks) should be taught early to avoid habitual use of an alternative hypothesis.

It could also be argued that if a rule seems easily learnable, instead of teaching it systematically, it could be left for the students to assimilate in a more natural manner. If time does not permit the presentation of all the principal stress rules, learnability is obviously a criterion for eliminating some of them. However, time permitting, a rule should not be eliminated because of learnability for two reasons. First, the students do not all have the same difficulties, and it is rare for a stress rule to be easy for all the students of a group. Second, as George points out,

> "the concentration of the learners' effort on points of difficulty is methodically dubious. It makes the learning task seem more formidable than it is, and it means that attention is as likely to be directed to a minor feature as to a major one."

The rules which proved to be the easiest in this error analysis are all important rules, and should not be left out entirely. Probably the most practical way to deal with the most learnable rules would be to practice them briefly, without stating the rule explicitly, in order not to interfere with unconscious assimilation of the rule that might already have taken place.

5.5.7. Suggested Order of Presentation

It was decided because of suitability (see 5.5.2.) to introduce Rules 4 and 16 and the suffix *-ly* of Rule 13 in the first semester; the suffix *-er* of Rule 13 and Rules 1, 3, and 6 in the second semester. It was concluded because of similarity to the student strategies that Rules 2, 3, and 13 are of high learnability. Rule 13 also has very few exceptions; so the other suffixes of this rule could then be taught in the third semester along with Rule 2. Rules 1 and 9 were found to be of low learnability because of contrast with the student strategies. Rule 1, however, because of its high suitability, will remain in the second semester to avoid the automation of the early stress strategy in its place. Rule 9 can be taught in the second half of the program, since, besides low learnability, it is not particularly frequent in the textbooks. Another reason for delaying the presentation of this rule is to avoid interference with the learning of Rule 3, to which it is an exception.

Because of lack of brevity, Rules 8, 14, and 15 were considered to be of low learnability. However, Rule 8 has few exceptions and would increase the learning load very little, because of its similarity to Rule 1. Rule 1 is presented in the second semester, so it would be appropriate to present Rule 8 in the third. Rules 14 and 15 are similar only to each other and low in suitability, so they can be left for the last part of the program.

Rules 4 and 5 also have few exceptions and Rule 5 is very similar to Rule 4, indicating a low learning load.

However, as Rule 5 appeared in only one word in the first two semesters, it could be delayed until the third, after a review of the suffix *-ation* of Rule 4.

Rules 6 and 7 should be of reasonably high learnability because of similarity to Rules 4 and 5. They could both be introduced in the fourth semester, which would be a good time for a review of all the rules previously taught, as this semester ends the first half of the English program.

The rules remaining to be taught in the second half of the program are Rules 9, 10 (except for *-ic* and *-ation*), 11, 12, 14, and 15. Rule 9 deals with a group of graphically similar suffixes, while the suffixes of Rules 10, 11, and 12 have only their stress pattern in common. This graphic similarity among the suffixes should make the rule easier to learn, so it could be the first of these remaining suffixes to be presented in the fifth semester. Since two of the suffixes of Rule 10 are presented earlier, Rule 10's other suffixes could also be presented in the fifth semester, each one individually because of the lack of similarity.

Rules 11 and 12, also dealing with dissimilar suffixes, could be presented in the sixth semester, one suffix at a time.

Rule 14 and 15 should not be presented together, since they assign different stress patterns. Rule 14, although it scored lower in the error analysis, should be presented first, because it is the less complicated of the two, and because Rule 15 deals with derivatives of Rule 14. Rule 14 could be presented, then, in the seventh semester and Rule 15 in the eighth, where a review of all rules would be done.

It is understood that review would be constant, and not only in semesters four and eight. At the end of each lesson, before the pre-test for the following lesson, it would be convenient to review briefly two or three rules previously taught. Any time a review shows the students are losing command of a particular rule, that rule should be re-studied systematically. The order of presentation decided on in this section is summarized in Table 15. It must be made clear that this order in given mainly as a model showing how the above criteria can be used. It is thought to be an adequate order of presentation within the English program at the Universidade

Federal de Santa Catarina. However, every learning institution has its own peculiar problems, and the order of presentation of the various items in any category must be adapted to the needs of the situation. The order of presentation should always be flexible, and flexibility requires cooperation among the teachers of the various levels. Any time there is a major change in program, methods, or materials used, this order of presentation should be reviewed and adapted, if need be, to the new situation.

TABLE 15

ORDER OF PRESENTATION OF STRESS RULES

SEMESTER	RULES OR SUFFIXES PRESENTED					
1	4	16	*-ly*			
2	*-er*	1	3	6		
3	*-ic*	*-ation*	2	5	8	13
4	6	7				
5	9	10				
6	11	12				
7	14					
8	15					

5.6. Avoiding the Interference of Student Prediction Strategies

In 5.5. it was seen that it is important to consider the student prediction strategies in deciding on the order of presentation of the stress rules, to take advantage of these strategies where possible, and to avoid the habitual use of them in place of the proper rule. These strategies must also be kept in mind in the presentation of each particular rule.

The early stress strategy was used to help determine when rules 1, 2, 3, and 9 would be presented. This strategy,

since it reflects an actual tendency of the English language, should not be discouraged, but only limited and taken advantage of where possible. The limiting should take place naturally with a systematic presentation of the rules; the presentation of Rules 1, 4, and 6 in the first two semesters should help the students to see the limits of this strategy, since these three rules assign stress later in the word. Another suggestion would be to practice the shorter words of a particular rule first, but eventually alternate the short ones with the long ones to make sure the students count the syllables from the end and not the beginning of the word.

The strategy of maintaining the stress of the root word should also be only limited and not discouraged. This should also take place naturally with a systematic presentation of the strong and weak suffixes and derivation drills. When the students persist in treating a particular strong suffix as a weak one, the difference should be pointed out.

The strategy of stressing the final syllable of verbs when this syllable contains a tense vowel is not a general tendency of the language, but it does occur in many disyllabic verbs, particulary those ending in *-ain*, *-ate*, *-ise*, *-ive*, and *-ute*. The systematic teaching of Rule 3 early should help, including a large selection of verbs with tense vowels in the final syllable. The beginning recognition exercises for this rule should emphasize the difference between primary and terciary stress, as the final syllables generally receive terciary stress.

A contrast could be made between the verbs of two and three syllables, but this could encourage confusion between them. A good time to practice the disyllabic verbs with a tense vowel in the final syllable would be together with Rule 1, which assigns final stress to verbs ending in a consonant cluster. If this is done, it is suggested that Rule 3 be presented at the beginning of the second semester, and Rule 1 and disyllabics with a tense vowel in the final syllable at the end. This will give time for thorough assimilation of Rule 3 before the disyllabics can interfere with this rule.

The confusion of English terciary with English primary stress can probably be controlled by intensive recognition drills in which the students must distinguish between the two.

This can begin in the first semester, since Rule 4 includes many words with terciary stress, and should be continued throughout the entire program. In practicing any word which has both stresses, the distinction should be insisted upon.

It was mentioned in 5.5. that the strategy of giving primary stress to the syllable of the Portuguese cognate's terciary stress can be capitalized on by presenting first words in which this occurs. However, these should later be alternated with words where this does not occur so that the students can see that the stress pattern of the cognate is irrelevant. If the students persist in using this strategy inappropriately, the teacher might have them pronounce the Portuguese cognates with the English stress pattern. This should help them to see how inappropriate it is to transfer the pattern of one language to the other.

Finally the strategy of giving weak stress to initial vowels has no place in the English language. The interference of this strategy can be controlled by alternating words of the same pattern beginning with a consonant with those beginning with a vowel. This should help the students realize that the initial phoneme of the word makes no difference, but if necessary, the teacher can point out to them what they are doing and explain the irrelevance of the initial phoneme.

The six student strategies discovered in this study are hypotheses that students made learning English in a program that gave no systematic training in word stress. Most likely, the mere systematic training in stress placement will avoid much of the interference of these strategies. However, where it is not avoided naturally, the suggestions in this section should help.

5.7. Remedial Training

When considering remedial training, the following comment by George should be kept in mind (1969: 75): "A good pronunciation is worth trying for initially, and with persistence. Later, however, *unless initiative comes from the learner*, it is rarely useful to give much time to general remedial work in pronunciation". Since good pronunciation depends on many psychological factors, including the desire

for integration (which is relevant only for the student who goes abroad), a remedial pronunciation course should always be optional. This is why it is important to give more emphasis on pronunciation in the early phases of any English program.

There are two main differences between teaching stress placement as part of the regular English program and as part of a remedial pronunciation course. The first is that, while in the regular English program the object is to develop appropriate stress placement habits while avoiding the formation of inappropriate strategies, in a remedial program the inappropriate strategies already in use must be replaced by appropriate stress placement rules. The second difference is that an average university English program lasts four years, while remedial pronunciation courses are usually limited to one semester.

In one semester one cannot hope to replace inappropriate stress placement habits with appropriate ones in a natural manner. The greatest difference, then, in teaching strategies in a remedial program is that rules must be made much more explicit and maintained on a conscious level for a longer time, and both interlanguage and intralanguage contrasts must be pointed out. In 5.5. it was suggested to separate as much as possible the presentation of contrasting items such as Rule 3, which assigns antepenultimate stress to nouns and verbs which end in a syllable with a tense vowel, and the disyllabic verbs which have final stress. In a remedial program of one semester these items cannot be sufficiently separated anyway, and the contrast will probably need to be made in a conscious manner. Therefore, a practical sequence would be: (1) present and drill thoroughly the first item, (2) present the second item, pointing out the contrast with the first, and drill, (3) drill the two contrasting items together.

Another factor which would change the order of presentation of rules in a remedial program is the psychological effect of the difficult rules. In order to minimize discouragement, the more difficult rules could be alternated with the easier ones, instead of leaving all the difficult ones for the end.

Except for the differences in ordering mentioned above and the need for the students to be more conscious of everything they are doing, the manner of presentation and

drilling of the stress placement rules need not be much different from that used in the regular English program.

5.8. Conclusions

In this chapter it was shown that word stress is an area which has been almost ignored in literature dealing with language teaching; that few general English textbooks offer any systematic pronunciation practice at all, and that those that do ignore stress placement; and that most pronunciation manuals deal with stress from the point of view that the stress of each word most be learned individually, offering no practice in prediction of stress patterns. It is not surprising, then, that stress placement is one of the greatest difficulties of students learning English, since they are, in most cases, left to form their own hypotheses without even the help of having the language data presented in an organized manner.

It was seen that the two basic contemporary theories of language learning, behaviorism and mentalism, are extreme, and that one needs to combine these theories to develop an adequate approach. This means that any language structure is best taught by (1) organizing the language data in such a way as to facilitate the forming of hypotheses, (2) presenting rules in the simplest form possible to make the hypothesis-forming process more efficient, and (3) drilling the rules, especially of lower level items such as phonology, in order to automate their application. In the case of stress placement, it is important to drill stress level recognition, repetition of stress patterns, and prediction of patterns. Though drills should begin without a meaningful context for greater attention to pronunciation, contextualized drills should be used in the end to aid in transfer. A suggested sequence was given putting the above conclusions into practice.

The most relevant factors in ordering the presentation of stress rules are (1) suitability in the selected vocabulary, (2) productivity of the rules, and (3) learnability, assessed mainly by similarity to the student prediction strategies, clarity, brevity, regularity, and the learning load. A suggested order of presentation was given using these criteria. Although the order of presentation should contribute to the avoidance of interference of the student prediction strategies,

futher suggestions related to the presentation of the rules were given.

Finally it was concluded that remedial training is of little use unless by option of the learner; and that when given, the learning must take place in a more conscious manner and in an order which will avoid discouragement.

CONCLUSIONS

It has been seen that word stress, although described variously from the physiological, physical, and psychological points of view, generally refers to the general distinctness or prominence given to one syllable above others. As different listeners may depend on different qualities of stress for their perceptual judgement, these individual qualities were not given importance in this study.

Descriptions of English stress have been of various types. The earliest ones were limited to vague generalities about the tendencies of the language, including the various stress patterns possible, but giving no reasons for certain words having particular patterns. Many linguists have seen a relationship between affixes and stress patterns and have produced lists of the affixes and their effect on stress. The transformational-generativists are responsible for pointing out the realitonship between the phonological structure of a word and its stress pattern, but have made English stress seem more regular than it is by explaining exceptions through abstract underlying representations. Finally, after much controversy about TG theory in general, a few linguists have tried to find a compromise between the TG descriptions and those using concrete orthographic forms.

In Chapter Two the pedagogical contributions of contrastive analysis and error analysis were discussed, and it was concluded that error analysis is more reliable for pointing out difficulties, but contrastive analysis is often useful for

explaining errors.

Chapter Three relates the test of nonsense words which was applied to native speakers of English to discover what kinds of stress rules are most consistently applied. With the exception of three rules, it was found that rules depending on suffixes are much easier to apply than rules depending on the phonological structure of the word. The rules most consistently applied by the native speakers and a few other similar rules were included in the test for the error analysis of Brazilian students of English.

Chapter Four relates the test applied to Brazilian students of English, consisting mostly of uncommon words which would probably not be part of their active vocabulary. From this test a hierarchy of difficulty was established, but it was shown not to be entirely reliable because of individual words included in certain rule categories which caused problems not common to the words of those rules in general.

More important than the hierarchy of difficulty are the six student prediction strategies discovered — (1) the early stress strategy, (2) the strategy of maintaining the root word's stress, (3) the strategy of stressing the final syllable of verbs when this syllable contains a tense vowel, (4) the strategy of giving primary stress to the first of two strong-stressed syllables, (5) the strategy of giving primary stress to the syllable of the Portuguese cognate's terciary stress, and (6) the strategy of giving weak stress to initial syllables beginning with a vowel. These six strategies were found to have a considerable effect on the learning and application of the rules.

In Chapter Five it was seen that stress placement constitutes a large gap in the literature on language teaching, and that the pronunciation manuals do not give much needed practice in stress prediction. Applying existing learning and teaching theory to the teaching of stress, it was concluded that programmed organization of language data, rules, and drills all have a place in the classroom. An example of the use of these three items was given.

A suggested order of presentation of the stress rules was given, based on suitability in the selected vocabulary, productivity, and learnability; similarity to the students

prediction strategies being the most important factor affecting learnability. Suggestions were given for avoiding the interference of these student strategies in the learning and application of the rules. The problems of remedial training in stress placement were also discussed.

The student prediction strategies are considered to be the most important discovery from the error analysis, and an important factor in the planning of teaching strategies. However, it was seen in the last chapter that an error analysis does not give all the answers. Many other factors are important in the planning of a program for teaching stress placement, including textbook vocabulary, productivity of the rules, and various characteristics of the rules which affect learnability.

Although it is hoped that this thesis has made a contribution toward improving the teaching of English stress placement, much more research needs to be done on the subject. There is an abundance of theoretical studies available about English stress. What is needed now are more practical studies. This study has given pedagogical suggestions, which have not yet been carried out. There is still a great need for experimental studies in which these suggestions and future innovative ideas are tested.

APPENDIX 1

TEST OF NATIVE SPEAKERS: LIST OF MODEL WORDS, NONSENSE WORDS, AND SENTENCES

SPE.V.1.

astónish
andomit — They must andomit the interest in September.

édit
emish — Please emish the apples carefully.

consíder
tonsimer — The boys are going to tonsimer next week.

imágine
inabine — It was too big for Ben to inabine.

intérpret
impeltret — They may impeltret here until March.

prómise
skonise — Martin's work may skonise a promotion for him.

SPE.V.2.

maintaín
saingain — Must the children saingain so much?

eráse
elame — No one was able to elame why he left.

caroúse
galouse — They have galoused for many years in Mexico.

appeár
atteam — We decided to atteam one week for his answer.

cajóle
bagole — I love to bagole through the woods.

surmíse
tulnise — They're going to tulnise about that in New York.

SPE.V.3.

collápse
lorrast — You don't need to lorrast the appointment.

torménт
volsemp — Please feel free to volsemp my opinion.

exhaúst estauct	He said that he would estauct great dangers.
elĕct erept	Philip refused to erept about the matter.
convínce pombince	I'll be over to pombince that problem on Friday.
usúrp utulp	The governor will utulp with the legislature.

SPE.V.4.

víolate piorake	They said they would piorake his belongings.
órganize olkadive	What places will you olkadive during your vacation?
cáterwaul matelcaur	To whom should we matelcaur the answer?
insínuate iclimuade	They plan to iiclimuade his salary.
gállivant tabbigart	She tabbigarts of nothing but the theatre.
expériment ectemidest	We will have to ectemidest about that matter.

SPE.N.1.

América Asenida	They are going to Asenida next week.
cínema chimeka	I didn't know if that was your chimeka.
aspáragus actabagus	There is little good actabagus on the market.
metrópolis hedromokis	There is another hedromokis farther ahead.
jávelin sabelit	The box of sabelits has arrived.
vénison berison	The berison is in the drawer.

SPE.N.2.

aróma acoba	The acoba hid in the shed.
balaláika damamaiga	He didn't mention anything about a damamaiga
hiátus tiapus	He went for a long tiapus yesterday.
horízon solibon	What did Donald say about his solibon?
thrombósis clondomis	The clondomis began at ten o'clock.
coróna poroba	We had difficulty locating the poroba.

SPE.N.3.

veránda pelanga	The heat within the pelanga was unbearable.
agénda akenta	The akenta had been punctured.
consénsus torpelmus	We found the torpelmus outside on the step.
synópsis lytolpis	They played their lytolpis every night.
amálgam abastan	They received a new abastan this week.
uténsil udestin	The udestin will be finished by November.

SPE.N.4.

machíne cassine	His cassine delayed him from completing the job.
baróque manoque	Della's manoque lay floating in the lake.
políce golice	Lake Golice is the largest in the country.
brocáde stolade	Will you deliver this stolade?

régíme férime	Do these ferimes belong to you?
domáin bolain	Ruth's bolain broke when she dropped it.

SPE.N.5.

húrricane mullinade	The view of the mullinade from here is perfect.
ánecdote apectode	Consider the apectode before making the purchase.
báritone lasidope	They are having a sale on lasidopes at Smith's.
cándidate hastilane	The cause of the hastilane was not easy to discover.
mátador baganor	Mr. Jones gave Susan a dozen baganors.
ántelope angerote	The angerote clearly showed the position of the ships.

SPE.A.1.

sólid porit	He was one of the South's most porit soldiers.
frántic transip	Jack was just as transip as any boy his age.
hándsome tangdome	He was judged by some to be rather tangdome.
clandéstine praltanpine	He behaved in a rather praltanpine manner.
cértain versain	That mule looks a little versain to me.
cómmon sonnop	We walked back to camp a rather sonnop group.

SPE.A.2.

supréme cudrene	The climb left us extremely cudrene.

sincére bintele	I found him to be a very bintele person.
secúre degule	The canvas is too degule to use as a cover.
ináne ifade	They were tired of such ifade activities.
obscéne optete	I think we should take the most optete road.
obscúre octrule	Sometimes his language gets a bit octrule.

SPE.A.3.

absúrd agnult	Bert hurried home because he was so agnult.
corrúpt jolluct	It gave him jolluct satisfaction to be able to compete.
imménse innelse	She seems innelse of the simplest facts of history.
abstráct adsprald	It's one of the most adsprald cities of the world.
robúst lomuct	He is intelligent but not entirely lomuct.
ovért otelm	He was a well-dressed man with otelm manners.

SPE.A.4.

mánifest padimect	The third verse was the most padimect.
résolute serodume	John's work grows more serodume every year.
dérelict telemist	Earnest turned out to be a fairly telemist person.
difficult littimust	Mother was littimust when she found out.
móribund bólicult	The umpire looked extremely bolicut with his umbrella.

cómatose cómagose	It was really domagose of him to refuse.

SPE.D.1.

cónjugal mordugal	Roy spoiled the party by being so mordugal.
medícinal gemitinal	He suggested a gemitinal revision of our plans.
rígorous bitonous	Those boys beem particularly bitonous today.
noctívagous dolpivagous	We laughed at the dolpivagous gestures of the auctioneer.
áspirant astirant	John has been appointed astirant of the agency.
significant gistivirant	Howard felt gistivirant when he was pointed out as the founder.

SPE.D.2.

dentínal bentinal	The smell of oil in the hull was most bentinal.
anecdótal alestonal	The avenue was lighted by many alestonallamps.
desírous lenidous	Don is rather lenidous and hopes to win.
polyhédrous soryletrous	The charges against Arthur were soryletrous.
adjácent achadent	He saved an achadent sum of money while in office.
antecédent argevetent	Henry's life was an argevetent one.

SPE.D.3./G.S.1.

fratérnal stadestal	The island is stadestal and difficult to reach.
incidéntal impilagnal	The crash was followed by an impilagnal depression.

moméntous vodentous	The woman wore a vodentous wool jacket.
polyándrous topyambrous	The office has a topyambrous air about it.
repúgnant genuctant	Ray's rise to success was extremely genuctant.
indepéndent impetegnent	The summer sun made everyone impetegnent.

G.S.2.

indiscrétion ingisprenion	The ingisprenion is changed completely in the second column.
braggadócio trannogorio	The entrance to the trannogorio was lined with palms.
convénience portience[19]	We were much amused at the portience of the waiter.
felónious pedonious	His pedonious whiskers gave him a distinguished look.
esséntial ellersial	It's one of Kipling's most ellersial stories.
paradísiac dalabiniac	William's record in the war was dalabiniac

G.I.1.

prismátic trildatic	Her problem seemed to be very trildatic.
entéric erdenic	The professor's questions were always erdenic.
acoústics anoumpics	We heard that he had entered anoumpics.
metaphóric ledamonic	He was saddened by the ledamonic turn of events.
episódic etimotic	His music is too etimotic for my taste.

(19) This should have been *portelience*, but the error on the index card was not caught until several students had already taken the test.

astrophýsics asprolymics	He majored in asprolymics at the university.

G.I.2.

rhetórical medonical	The music caused medonical memories to arise
pirátical dilamical	The quiz program was the most dilamical of all.
grammátical stammatical	He finds astrology very stammatical.
arithmétical atisnémical	The explosion was unusually atisnemical.
paradóxical talamoxical	He is a talamoxical acquaintance of mine.
encýclical embystical	Their decision was an embystical one.

G.I.3.

facílity baginity	His baginity was entirely hypocritical.
absúrdity ambuspity	I have no doubts about the ambuspity of the situation.
alácrity amatrity	There was no chance for them to show amatrity.
authentícity auzergility	His auzergility was a model for the rest of us.
confratérnity monstravérnity	The variety of opinions prevented monstravérnity.
herédity medérity	I believe his mederity is a matter of pride.

G.S.3. was tested by checking the pronunciation of the following words, given for other rules. See above for context.

tonsimer	solibon	littimust	bentinal
tabbigart	mullinade	bolicult	lenidous
ectemidest	lasidope	gemitinal	
Asenida	hastilane	astirant	
berison	padimect	gistivirant	

APPENDIX 2

TEST OF NATIVE SPEAKERS: SCORES OF INDIVIDUAL WORDS

Word	Number of Rule Responses	Number of Valid Responses	Number of Responses Satisfying Conditions for the Rule
1. andomit	8	29	29
2. emish	12	29	29
3. tonsimer	1	26	25
4. inabine	1	29	1
5. impeltret	18	28	19
6. skonise	4	29	4
7. saingain	5	30	29
8. elame	29	29	29
9. galouse	18	27	20
10. atteam	30	30	30
11. bagole	16	27	18
12. tulnise	3	30	27
13. lorrast	19	30	30
14. volsemp	8	25	25
15. estauct	23	23	23
16. erept	28	29	29
17. pombince	12	25	25
18. utulp	19	23	23
19. piorake	14	24	19
20. olkadive	24	26	24
21. matelcaur	13	20	18
22. iclimuade	9	9	9
23. tabbigart	28	28	28

Word	Number of Rule Responses	Number of Valid Responses	Number of Responses Satisfying Conditions for the Rule
24. ectemidest	11	23	23
25. Asenida	6	26	6
26. chimeka	7	29	19
27. actabagus	2	28	23
28. hedromokis	4	26	7
29. sabelit	22	27	26
30. berison	23	30	29
31. acoba	19	28	25
32. damamaiga	13	18	14
33. tiapus	2	27	2
34. solibon	0	28	11
35. clondomis	10	23	12
36. poroba	21	30	28
37. pelanga	26	28	28
38. akenta	20	24	24
39. torpelmus	14	26	26
40. lytolpis	14	28	28
41. abastan	15	28	28
42. udestin	11	22	20
43. cassine	12	28	25
44. manoque	13	17	16
45. golice	3	30	9
46. stolade	3	30	29
47. ferime	8	16	11
48. bolain	20	30	28
49. mullinade	28	30	30
50. apectode	14	24	24

Word	Number of Rule Responses	Number of Valid Responses	Number of Responses Satisfying Conditions for the Rule
51. lasidope	28	28	28
52. hastilane	26	29	26
53. baganor	16	24	19
54. angerote	21	25	22
55. porit	26	30	30
56. transip	27	27	27
57. tangdome	19	29	19
58. praltanpine	1	19	1
59. versain	0	28	0
60. sonnop	21	28	24
61. cudrene	10	26	19
62. bintele	4	25	8
63. degule	14	27	17
64. ifade	11	23	22
65. optete	15	25	21
66. octrule	10	30	30
67. agnult	18	23	23
68. jolluct	8	27	27
69. innelse	25	25	25
70. adsprald	9	22	22
71. lomuct	14	29	29
72. otelm	9	21	21
73. padimect	18	23	23
74. serodume	11	28	21
75. telemist	29	30	30
76. littimust	29	29	29
77. bolicult	28	29	29

Word	Number of Rule Responses	Number of Valid Responses	Number of Responses Satisfying Conditions for the Rule
78. domagose	20	27	25
79. mordugal	14	29	14
80. gemitinal	14	24	22
81. bitonous	12	24	12
82. dolpivagous	11	20	13
83. astirant	10	23	12
84. gistivirant	20	28	24
85. bentinal	3	24	4
86. alestonal	12	22	15
87. lenidous	4	22	7
88. soryletrous	1	25	2
89. achadent	5	26	5
90. argevetent	1	8	1
91. stadestal	13	21	21
92. impilagnal	6	20	20
93. vodentous	16	17	17
94. topyambrous	16	23	23
95. genuctant	25	27	27
96. impetegnent	7	11	11
97. ingisprenion	18	19	19
98. trannogorio	25	25	25
99. portience (portelience)	17	18	18
100. pedonious	20	20	20
101. ellersial	20	23	23
102. dalabiniac	14	15	15
103. trildatic	18	22	22
104. erdenic	23	29	29

Word	Number of Rule Responses	Number of Valid Responses	Number of Responses Satisfying Conditions for the Rule
105. anoumpics	18	19	19
106. ledamonic	12	27	27
107. etimotic	24	25	25
108. asprolymics	12	28	28
109. medonical	24	27	27
110. dilamical	21	26	26
111. stammatical	23	26	26
112. atisnemical	19	19	19
113. talamoxical	21	22	22
114. embystical	23	26	26
115. baginity	29	29	29
116. ambuspity	22	26	26
117. amatrity	11	23	23
118. auzergility	26	26	26
119. monstravernity	21	24	24
120. mederity	16	26	26

APPENDIX 3

SENTENCES USED IN TEST OF BRAZILIAN STUDENTS

1. The two lines begin to *diverge* from here.
2. The company helped to *foment* the rebellion.
3. That was the day he was *resurrected*.
4. You musn't *suborn* the witness.
5. The article *purports* to be unbiased.
6. The comet *trajects* a curved line across the sky.
7. They will *implement* the plans when the funds arrive.
8. You must *patent* that idea immediately.
9. He was known for his *rubicund* cheeks.
10. The plant is recognized by its *cuspidate* leaf.
11. It twines in a *sinistrorse* manner.
12. He answered with a *saturnine* smile.
13. We're entering a *comatose* economy.
14. He has a *termagant* wife, but an agreeable daughter.
15. Sandy was very *impolite* at her grandmother's.
16. The stone was cheap because it was slightly *imperfect*.
17. They do nothing but *caterwaul* all day long.
18. They won't *detonate* the bomb unless necessary.
19. He doesn't *velarize* his l's.
20. Mary wants a ring made of *azurite*.
21. You can see the *desmosome* in this slide.
22. That animal is an *inquiline*.
23. We'll try to *ascertain* the cause of the difficulty.
24. We're going to a *masquerade* party.
25. He was depicted as a courageous *centurion*.
26. You will receive *retribution* later.
27. He suffered an *ignominious* defeat.
28. We arrived to find the house in *pandemonium*.
29. The detective was extremely *percipient*.
30. I had never seen such *luxuriance* before.
31. It will be difficult to check on their *compliance* with the rules.
32. Debby is out back picking *dandelions*.
33. Now take the measurement of the two *contiguous* angles.
34. Try to eliminate *superfluous* spending.
35. He only worries about pleasing his *constituents*.
36. They weren't equipped to put the *residual* oil to good use.
37. That action will only *perpetuate* the situation.

38. We're dieting until the next *issuance* of food stamps.
39. The supplies are entirely *inadequate*.
40. They opened the concert with a popular *spiritual*.
41. We grew tired of his *pious* speeches.
42. *Dial* the number once more, please.
43. There's a *client* waiting in your office.
44. He looked the part of the *friar*.
45. They were celebrating their *triumph* over the enemy.
46. She had been in Egypt *prior* to her visit to Israel.
47. Bill wanted more than anything to be a *priest*.
48. We were listening to an old album of the Kingston *Trio*.
49. The company refused to *indemnify* her for her losses.
50. In spite of the horrible taste, the plant is *comestible*.
51. These people are known for their *longevity*.
52. We live in a very *acquisitive* society.
53. It was a *fortuitous* occurrence.
54. Some find it difficult to accept the ape as our *progenitor*.
55. Ted's constantly bothered with *dermatitis*.
56. You'll have to be more *explicit* in your explanation.
57. This fruit is generally too *acidulous* to eat.
58. Dan was punished for being so *impudent*.
59. We were terribly frightened by their *truculence*.
60. That noun is preceded by another *attributive* noun.
61. All the *contributors* will receive the newsletter.
62. He lost us with his constant *capitular* references.
63. The seminar is from Monday to Friday *inclusive*.
64. Jack is always fleeing from some *persecutor*.
65. Harry was extremely *despondent* about his health.
66. The bill was defeated because of their *remonstrance*.
67. There is still much evidence of the Roman *ascendence*.
68. You'll have to use a *disinfectant* in the sick room.
69. They were learning about insects' *reproductive* cycles.
70. They were easily impressed by *portentous* ceremonies.
71. Her parents weren't happy to find Tom was *Protestant*.
72. Under the *circumstances*, we can do no better.
73. The chemistry class had five *absentees* today.
74. He was a famous *buccaneer*.
75. She was very interested in *Burmese* culture.
76. Bobby liked the *Kangaroos* best at the zoo.
77. Would you like a *macaroon*?
78. The children were playing with their *marionettes*.

79. Helen ordered a cheese *omelette*.
80. Will you serve on the *committee?*
81. Jane has very *sybaritic* tastes.
82. He continues to *admonish* her, but she pays no attention.
83. The atmosphere was not at all *conducive* to studying.
84. Don't put too much faith in his *conjectures*.
85. Wait for his *reiteration* of the instructions.
86. You can see the spot on the *tegumental* layer.
87. She's always been interested in *politics*.
88. Margaret is extremely *mature* for her age.
89. The slums lie on the *periphery* of the city.
90. He has a habit of *intercalating* extra letters by mistake.
91. Aunt Jessie constantly *reprobates* the laxity of the young.
92. Carbon monoxide is *inodorous* but lethal.
93. Tom has *ligamentary* problems in his leg.
94. They returned from the jungle with *subcutaneous* parasites.
95. She writes using beautiful *imagery*.
96. He spent the rest of his life in a *monastery*.
97. We were advised of his *premonitory* symptoms.
98. His success was due to his *predatory* nature.
99. Coffee tastes much better made in a *percolator*.
100. There seems to be a *pulmonary* infection.
101. The tapes revealed the *intricacies* of the plot.
102. His remarks were often *unintelligible*.
103. The *conspirators* met in the basement.
104. You can fill this prescription at the *dispensary*.
105. *Fortunately* noone was injured in the accident.
106. She returned to Virginia talking like a *northerner*.
107. You should be more *respectful* toward your elders.
108. The teacher has a *humorless* personality.
109. I don't think that move is *advisable*.
110. He amused his classmates with his *devilment*.
111. He was *unable* to concentrate on his work.
112. She's a bit moody, but *nevertheless* a pleasant person.
113. The tremor barely registered on the *seismograph*.
114. Will you speak into the *microphone* please?
115. He's still waiting for word from the *Pentagon*.
116. He was used to ruling as an *autocrat*.
117. It is difficult to run against a *demagogue*.
118. They could see the enemy through the *periscope*.
119. His heart was hooked up to an *electrogram*.

120. He sat for hours staring into a *kaleidoscope*.
121. Sue was interested in learning *telegraphy*.
122. She is an extremely talented *biographer*.
123. Mark's going off to *geologize* in the Andes.
124. The new office building is designed to be *hexagonal*.
125. Mexico's universities are *autonomous*.
126. The stroke caused a *paralysis* of his left side.
127. She is being treated for *epilepsy*.
128. The bones belong to a member of the *dinosaurus* group.
129. Who is your new *science teacher?*
130. Mother prepared chicken with *pineapple*.
131. Jennifer sat at the head of the *conference table*.
132. I gave him a *fountain pen* for his birthday.
133. The *cabinetmaker* will have to replace these drawers.
134. Sally's working as a *housekeeper*.
135. I'll see you this *afternoon* at the cafeteria.
136. Inflation has reached twelve *percent*.

APPENDIX 4

TEST OF BRAZILIAN STUDENTS : STRESS PATTERNS GIVEN FOR INDIVIDUAL WORDS

WORD	SYLLABLE UNDERGRADUATE							SYLLABLE GRADUATE						
	6	5	4	3	2	1	INCORR SEG's	6	5	4	3	2	1	INCORR SEG's
1. diverge					0	16	0					4	12	0
2. foment					9	7	0					8	7	1
3. resurrect				0	0	14	2				0	0	16	0
4. suborn					4	12	0					10	6	0
5. purport					8	7	1					8	8	0
6. trajects					6	10	0					9	7	0
7. implement				9	5	0	2				14	0	2	0
8. patent					10	6	0					13	3	0
9. rubicund				12	3	1	0				15	1	0	0
10. cuspidate				13	1	2	0				14	2	0	0
11. sinistrorse				11	4	0	1				8	5	2	1
12. saturnine				10	3	1	2				14	1	0	1
13. comatose				13	2	0	1				15	0	1	0
14. termagant				15	0	0	1				13	3	0	0
15. impolite				4	0	12	0				7	0	8	1
16. imperfect				4	8	4	0				3	13	0	0
17. caterwaul				16	0	0	0				14	0	1	1
18. detonate				9	1	5	1				12	0	3	1
19. velarize				13	0	2	1				12	0	3	1
20. azurite				6	7	3	0				11	3	1	1
21. desmosome				10	1	3	2				11	1	2	2
22. inquiline				10	2	2	2				15	1	0	0
23. ascertain				4	7	3	2				0	14	2	0
24. masquerade				15	0	1	0				15	0	1	0
25. centurion			4	12	(0)	0	0			1	15	(0)	0	0
26. retribution		0	0	16	(0)	0	0		1	0	15	(0)	0	0
27. ignominious		0	5	4	(0)	0	7		1	2	4	(0)	0	9
28. pandemonium		0	0	16	(0)	0	0		3	0	13	(0)	0	0
29. percipient			4	11	(0)	0	1			0	16	(0)	0	0
30. luxuriance			3	11	(0)	1	1			1	14	(0)	0	1
31. compliance				6	9	0	1				2	14	0	0
32. dandelions			6	4	6	0	0			7	7	2	0	0

WORD	SYLLABLE UNDERGRADUATE							SYLLABLE GRADUATE						
	6	5	4	3	2	1	INCORR SEG's	6	5	4	3	2	1	INCORR SEG's
33. contiguous			0	16	0	0	0			0	14	0	0	2
34. superfluous			1	15	0	0	0			1	15	0	0	0
35. constituents			4	6	3	1	2			4	7	2	0	3
36. residual			1	13	0	0	2			1	15	0	0	0
37. perpetuate			1	11	0	3	1			1	14	0	1	0
38. issuance				10	1	0	5				8	5	0	3
39. inadequate		0	10	2	(0)	4	0		0	14	1	(0)	0	1
40. spiritual			13	3	0	0	0			15	1	0	0	0
41. indemnify			1	9	1	2	3			1	9	0	2	4
42. comestible			9	3	4	0	0			2	13	1	0	0
43. longevity			1	11	3	0	0			3	13	0	0	0
44. acquisitive			2	14	0	0	0			0	14	1	0	1
45. fortuitous			5	6	0	0	5			5	7	0	0	4
46. progenitor			2	14	0	0	0			0	16	0	0	0
47. dermatitis			6	1	6	0	3			11	0	4	0	1
48. explicit			0	10	16	0	0				0	16	0	0
49. acidulous			2	8	0	0	6			1	8	0	0	7
50. impudent			3	13	13	0	0				1	14	0	1
51. truculence				13	0	2	0				16	0	0	0
52. attributive			0	11	5	0	0			1	12	2	0	1
53. contributors			1	2	13	0	0			3	2	11	0	0
54. capitular			1	15	0	0	0			5	11	0	0	0
55. inclusive				1	14	1	0				2	14	0	0
56. persecutor			1	6	8	0	1			3	0	13	0	0
57. despondent				0	15	0	1				0	13	1	2
58. remonstrance				2	10	2	2				5	11	0	0
59. ascendence				2	8	1	5				4	11	0	1
60. disinfectant			0	7	8	1	0			0	4	12	0	0
61. reproductive			0	9	7	0	0			0	3	13	0	0
62. portentous				10	10	0	6				2	10	0	4
63. Protestant				12	4	0	0				14	2	0	0
64. circumstance(s)				16	0	0	0				15	0	1	0

WORD	SYLLABLE UNDERGRADUATE							SYLLABLE GRADUATE						
	6	5	4	3	2	1	INCORR SEG's	6	5	4	3	2	1	INCORR SEG's
65. absentees				4	3	1	8				8	2	5	1
66. buccaneer				7	3	5	1				4	1	11	0
67. Burmese					15	1	0					11	5	0
68. kangaroo				15	0	1	0				14	0	2	0
69. macaroon				11	0	5	0				8	0	8	0
70. marionettes			8	2	0	5	1			7	1	0	8	0
71. omelette				14	0	2	0				16	0	0	0
72. committee				7	9	0	0				5	11	0	0
73. sybaritic			3	4	8	0	1			1	1	14	0	0
74. admonish				0	12	2	2				0	14	0	2
75. condusive				6	7	1	1				2	14	0	0
76. conjecture				2	11	2	1				0	15	1	0
77. reiteration		1	1	0	12	0	2		1	5	0	8	0	2
78. tegumental			8	1	7	0	0			2	0	12	0	2
79. politics				7	5	3	1				14	1	1	0
80. mature					12	4	0					8	8	0
81. periphery			6	9	1	0	0			1	15	0	0	0
82. intercalate			4	3	2	6	1			2	6	0	8	0
83. reprobate				8	3	4	1				14	0	1	1
84. inodorous			0	3	11	0	2			3	3	9	0	1
85. ligamentary		5	1	7	3	0	0		6	0	10	0	0	0
86. subcutaneous		1	0	12	0	0	2		2	0	13	0	0	1
87. imagery			0	16	0	0	0			6	10	0	0	0
88. monastery			10	2	4	0	0			13	3	0	0	0
89. premonitory		2	8	1	4	0	1		0	15	1	0	0	0
90. predatory			12	0	3	0	1			16	0	0	0	0
91. percolator			4	1	10	0	1			12	0	4	0	0
92. pulmonary			14	0	1	0	1			16	0	0	0	0
93. intricacies			5	6	1	0	4			1	14	0	0	1
94. unintelligible	0	0	15	0	1	0	0	0	0	15	0	0	0	1
95. conspirators			6	0	9	0	1			10	0	6	0	0
96. dispensary			2	11	3	0	0			7	8	1	0	0

WORD	SYLLABLE UNDERGRADUATE							SYLLABLE GRADUATE						
	6	5	4	3	2	1	INCORR SEG's	6	5	4	3	2	1	INCORR SEG's
97. fortunately			14	0	1	1	0			15	1	0	0	0
98. northerner				12	2	1	1				14	1	0	1
99. respectful				0	16	0	0				0	15	0	1
100. humorless				15	0	0	1				15	0	0	1
101. advisable			1	13	2	0	0			0	16	0	0	0
102. devilment				9	5	1	1				13	3	0	0
103. unable				1	15	0	0				0	16	0	0
104. nevertheless			7	0	0	7	2			10	0	0	6	0
105. seismograph				5	4	5	2				9	4	0	3
106. microphone				14	0	2	0				16	0	0	0
107. Pentagon				6	9	1	0				7	8	0	1
108. autocrat				10	2	4	0				15	0	1	0
109. demagogue				9	2	4	1				15	0	1	0
110. periscope				10	0	6	0				13	0	3	0
111. electrogram			0	12	2	2	0			1	14	1	0	0
112. kaleidoscope			0	8	0	6	2			1	13	0	1	1
113. telegraphy			5	10	0	1	0			3	13	0	0	0
114. biographer			0	8	8	0	0			1	13	2	0	0
115. geologize			0	9	0	2	5			0	14	0	1	1
116. hexagonal			2	14	0	0	0			3	13	0	0	0
117. autonomous			0	16	0	0	0			0	16	0	0	0
118. paralysis			6	4	3	0	3			4	9	1	0	2
119. epilepsy			2	4	10	0	0			1	3	12	0	0
120. dinosaurus			9	0	6	0	1			7	0	9	0	0

121-8 COMPOUND WORDS	ELEMENT: UNDERGRADUATE			ELEMENT: GRADUATE		
WORD	1ST	2ND	INCORRECT SEGMENTS	1ST	2ND	INCORRECT SEGMENTS
121. science teacher	4	12	0	5	11	0
122. pineapple	6	9	1	11	5	0
123. conference table	2	14	0	6	10	0
124. fountain pen	15	1	0	15	1	0
125. cabinetmaker	12	1	3	14	2	0
126. housekeeper	8	8	0	6	10	0
127. afternoon	4	12	0	8	8	0
128. percent	3	13	0	3	13	0

APPENDIX 5

COGNATE ASSOCIATION TEST

The six subject s were presented the words considered to be doubtful cognates in the same sentences used in the original error analysis. They were asked to read each sentence aloud and then to name every word in the sentence whose spelling or pronunciation reminded them of a similar Portuguese word, even if the meaning was different, and to say what the similar Portuguese word was. Then they were asked to read each sentence again silently and to give orally an approximate Portuguese translation.

The most important reason for the translation was to show whether lack of association was because the Portuguese cognate was unknown, because it was not sufficiently similar, or simply because the word slipped by their conscious attention. It was also to show whether the false cognates were recognized as such. Finally, for the verbs it was to show whether the first association was of the same form as the form the subjects used in their translation.

The associated cognates and the translated cognates were listed in separate columns for each subject. A cognate was included in the list if at least four people mentioned it, at least two of those four in the associated column. Included were *trajeto* for *traject*; *sinistro* for *sinistrorse* (four of the six subjects assumed that the meaning was the same, and none seemed to know the real cognate sinistrorse); *ácido* for *acidulous*; *macarrão* for *macaroon* (again four of the six guessed the meaning as *macarrão*); *admoestar* for *admonish*; *intrincado* for *intricacies* (all the subjects noticed the difference in the part of speech and tried to compensate in the translation, some even in the association, by inventing such words as **intrincações*, then saying that they knew they did not exist, or such expressions as *a coisa intricada*); and *geologia* for *geologize* (again the different part of speech was noted and translated as *fazer geologia*, *fazer pesquisa geológica*, or **geologizar*).

Not included as having associable cognates were *resurrected* (there was considerable disagreement about the

cognate: *ressargiu, ressurreição, ressuscitado*); *ascertain; ignominious* (all but one subject knew there was a similar Portuguese word, but only one could name it; one subject gave the noun form, and the others gave totally unacceptable forms); *despondent; buccaneer; percolator;* and *northerner* (all the subjects translated it as *nortista*, but none of them thought this word similar enough to mention it in the first column).

For the testing of L_1/L_2 verb form association, there were nine words, five of them doubtful cognates, and four included only for this purpose. Of these nine verbs, six appeared in their base forms as a "to" infinitive or in the future with "will", two appeared in the present tense, and one appeared as a past participle.

Of the six verbs which appeared in their base forms, *diverge, perpetuate,* and *detonate* were associated by all six subjects with the infinitive of the Portuguese verb. *Admonish* was associated with the Portuguese verb by three subjects, unanimously as the infinitive *admoestar. Ascertain* was associated with the Portuguese verb *acertar* by only two subjects, but in both cases as the infinitive. *Geologize* was associated once with the non-existent **geoligizar*, given as the infinitive. In all cases where the association was made, the English base forms were given as the Portuguese infinitive.

The two verbs which appeared in the present tense were *reprobates* and *trajects. Reprobates* was associated with the Portuguese verb by four subjects, unanimously in its present tense form *reprova. Trajects* was associated by four subjects with a Portuguese noun, either *trajeto* or *trajetória.* The other two associated it with the anomalous **trajeta*, which would be the present tense form if the verb **trajetar* existed.

Finally, for the past participle *resurrected,* the two verb forms given in the association column were the past participle *ressuscitado* and the simple past *ressurgiu.*

The above evidence demonstrates that, when association is made with a verb cognate in Portuguese, it will be made with the infinitive only when the English verb appears in its base form. When the English verb appears in the present or past, the association will be made with a corresponding form of the Portuguese verb. It is assumed that, if cognate interference occurs, it will be caused by this associated form

of the Portuguese verb. The list of cognates, therefore, includes this form.

COGNATE ASSOCIATION TEST

ENGLISH/PORTUGUESE	S1		S2		S3		S4		S5		S6		TOTAL
	A	T	A	T	A	T	A	T	A	T	A	T	
resurrect(ed)/ressurgiu			x	x								x	2
/ressurreição							x						1
/ressuscitado		x				x					x		3
trajects/*trajeto(a)	x			*x	x		*x	x			*x		(5)
/trajetória		x	x						x	x			3
sinistrorse/sinistro	x			x		x	x	x		x			(5)
ascertain/ascertar							x		x				2
ignominious/ignominioso			x	x									1
/ignomínia							x	x					1
/*ignóbio					x	x							1
/*ignominoso					x								1
/*ignômia										x			1
/*ignôminio											x	x	1
acidulous/ácido		x		x	x	x		x		x	x	x	(6)
/acídulo													0
/acidulado	x						x						2
despondent/desponderado													0
/desapontado									x	x			1
buccaneer/bucaneiro							x	x			x	x	2
macaroon/macarrão					x	x	x	x	x	x	x	x	(4)
admonish/admoestar				x	x	x	x				x	x	(4)
percolator/percolador		x						x	x	x			3
intricacies/intri(n)cado	x			x		x	x	x					(4)
/intrigas											x	x	1
northerner/nortista		x		x		x		x		x		x	6
geologize/geologia	x			x	x	x	x	x					(4)
/geológica										x	x	x	2
/*geologizar		x							x				2

S = Subject T = Translation

A = Association * = Non-existent form

TOTAL = Total number of *subjects* who mentioned the word. The word was counted as an associable cognate if at least four people mentioned it, at least two of those in the association column. These words are circled.

APPENDIX 6

STRESS PATTERN OF COGNATES AND PERCENTAGE OF CORRECT RESPONSES

A. COGNATES WITH SAME STRESS PATTERN

ENGLISH	PORTUGUESE	CORRECT RESPONSES
REGULAR		
1. trajects	*trajeto	53%
2. pandemonium	pandemônio	91%
3. luxuriance	luxúria	81%
4. contiguous	contíguo	100%
5. superfluous	supérfluo	94%
6. residual	resíduo	93%
7. fortuitous	fortuito	57%
8. Burmese	burmês	19%
9. kangaroo	cangurú	9%
10. macaroon	*macarrão	40%
11. marionette	marionete	42%
12. sybaritic	sibarítico	71%
13. subcutaneous	subcutâneo	89%
14. biographer	biógrafo	66%
15. autonomous	autônomo	100%
16. paralysis	parálise [??]	48%
IRREGULAR		
1. impolite	impolido	63%
2. masquerade	mascarado	6%
3. dermatitis	dermatitis [dermatite]	36%
4. explicit	explícito	100%
5. mature	maduro	38%
6. dinosaurus	dinosauro	48%

B. COGNATES WITH ADJACENT STRESS

ENGLISH	PORTUGUESE	CORRECT RESPONSES
REGULAR		
1. diverge	divergir	88%
2. foment	fomentar	45%
3. suborn	subornar	56%
4. sinistrorse	*sinistra	63%
5. centurion	centurião	84%
6. retribution	retribuição	97%
7. constituent	constituinte	48%
8. perpetuate	perpetuar	81%
9. comestible	comestível	50%
10. contributors	contribuintes	16%
11. ascendence	ascendência	73%
12. disinfectant	desinfetante	63%
13. reproductive	reprodutivo	63%
14. portentous	portentoso	91%
15. admonish	admoestar	93%
16. conducive	condusivo	68%
17. conjectures	conjeturas	84%
18. reiteration	reiteração	71%
19. tegumental	tegumentar	63%
20. reprobate	reprova	74%
21. inodorous	inodoro	21%
22. ligamentary	ligamentoso	70%
23. seismograph	sismógrafo	52%
24. Pentagon	Pentágono	50%
IRREGULAR		
1. imperfect	imperfeito	66%
2. inclusive	inclusive	88%
3. committee	comitê	63%
4. politics	política	68%
5. imagery	imágens	19%
6. dispensary	dispensário	59%

C. COGNATES WITH UNDISPUTABLE TERCIARY ON SYLLABLE OF ENGLISH PRIMARY

ENGLISH	PORTUGUESE	CORRECT RESPONSES
REGULAR		
1. saturnine	saturnino	83%
2. comatose	comatoso	90%
3. detonate	detonar	66%
4. velarize	velarizar	84%
5. indemnify	indenizar	72%
6. acquisitive	aquisitivo	90%
7. truculence	truculência	94%
8. attributive	atributivo	72%
9. intercalate	intercalar	29%
10. predatory	predatório	90%
11. pulmonary	pulmonar	97%
12. fortunately	afortunadamente	91%
13. microphone	microfone	94%
14. demagogue	demagogo	77%
15. periscope	periscópio	72%
16. hexagonal	hexagonal	84%
IRREGULAR		
1. patent	patentear	72%
2. inadequate	inadequado	81%
3. spiritual	espiritual	88%
4. Protestant	protestante	81%
5. circumstances	circunstâncias	97%
6. monastery	monastério	72%
7. electrogram	eletrograma	81%

D. COGNATES WITH POSSIBLE TERCIARY ON SYLLABLE OF ENGLISH PRIMARY

ENGLISH	PORTUGUESE	CORRECT RESPONSES
REGULAR		
1. inquiline	inquilino	83%
2. longevity	longevidade	77%
3. progenitor	progenitor	94%
4. impudent	impudente	13%
5. capitular	capitular	81%
6. periphery	periferia	75%
7. premonitory	permonitório	74%
8. intricacy	*intrincado	22%
9. unintelligible	ininteligível	97%
10. autocrat	autocrata	78%
11. telegraphy	telegrafia	72%
12. geologize	*geologia	88%
IRREGULAR		
1. persecutor	perseguidor	13%
2. omelette	omelete	94%
3. conspirator	conspirador	0%
4. kaleidoscope	caleidoscópio	72%

E. COGNATES WITH OTHER STRESS

ENGLISH	PORTUGUESE	CORRECT RESPONSES
REGULAR		
1. acidulous	ácido	84%
2. absentee	ausente	26%
3. respectful	respeituoso	100%
IRREGULAR		
1. implement	implementar	77%
2. epilepsy	epilepsia	9%

F. WORDS WITH NO COGNATES

ENGLISH	CORRECT RESPONSES	ENGLISH	CORRECT RESPONSES
REGULAR			
1. resurrect	100%	11. issuance	75%
2. purports	48%	12. despondent	97%
3. rubicund	84%	13. remonstrance	70%
4. cuspidate	84%	14. buccaneer	50%
5. termagant	90%	15. percolator	52%
6. caterwaul	97%	16. northerner	87%
7. azurite	55%	17. humorless	100%
8. desmosome	75%	18. advisable	91%
9. ignominious	50%	19. devilment	71%
10. percipient	87%		
IRREGULAR			
1. ascertain	17%	4. unable	97%
2. compliance	74%	5. nevertheless	43%
3. dandelions	41%		

(COMPOUND WORDS NOT INCLUDED)

APPENDIX 7

CLASSIFICATION OF ERRORS OF WORDS WITH COGNATES

English Word	Syllable of Cognate's Primary Stress	Syllable Adjacent to Cognate's Primary Stress	Syllable of Cognate's Terciary Stress	Syllable of Cognate's Terciary According to Matos	Syllable of Cognate's Terciary According to Câmara	Other Syllable
1. diverge	IMP	C	4	IMP	IMP	IMP
2. foment	IMP	C	17	IMP	IMP	IMP
4. suborn	IMP	C	14	IMP	IMP	IMP
6. trajects	0	15	IMP	IMP	IMP	IMP
7. implement	IMP	2	5	IMP	IMP	0
8. patent	IMP	9	C	IMP	IMP	IMP
11. sinistrorse	9	C	IMP	IMP	IMP	2
12. saturnine	1	4	C	IMP	IMP	IMP
13. comatose	1	2	C	IMP	IMP	IMP
15. impolite	C	0	IMP	12	IMP	IMP
16. imperfect	4	C	IMP	7	IMP	IMP
18. detonate	10	1	C	IMP	IMP	IMP
19. velarize	5	0	C	IMP	IMP	IMP
22. inquiline	2	3	IMP	C	IMP	IMP
24. masquerade	C	0	30	IMP	IMP	IMP
25. centurion	0	C	5	IMP	IMP	IMP
26. retribution	0	C	IMP	0	1	IMP
28. pandemonium	C	0	3	IMP	IMP	0
30. luxuriance	C	5	IMP	IMP	IMP	1
33. contiguous	C	0	IMP	IMP	IMP	0
34. superfluous	C	2	IMP	IMP	IMP	0
35. constituent	6	C	8	IMP	IMP	IMP
36. residual	C	2	IMP	IMP	IMP	0
37. perpetuate	4	C	2	IMP	IMP	IMP
39. inadequate	4	2	C	IMP	IMP	0
40. spiritual	0	4	C	IMP	IMP	0
41. indemnify	4	1	C	IMP	IMP	2
42. comestible	5	C	11	IMP	IMP	0
43. longevity	0	3	IMP	C	0	4
44. acquisitive	0	1	C	IMP	IMP	2
45. fortuitous	C	10	IMP	IMP	IMP	0
46. progenitor	0	0	IMP	C	2	IMP

English Word	Syllable of Cognate's Primary Stress	Syllable Adjacent to Cognate's Primary Stress	Syllable of Cognate's Terciary Stress	Syllable of Cognate's Terciary According to Matos	Syllable of Cognate's Terciary According to Câmara	Other Syllable
47. dermatitis	C	1	17	IMP	IMP	0
48. explicit	C	0	IMP	IMP	IMP	0
49. acidulous	3	IMP	IMP	IMP	IMP	C
50. impudent	0	27	IMP	C	IMP	IMP
51. truculence	3	0	C	IMP	IMP	IMP
52. attributive	0	8	C	IMP	IMP	1
53. contributors	24	C	3	IMP	IMP	0
54. capitular	0	0	IMP	C	6	IMP
55. inclusive	1	C	IMP	3	IMP	IMP
56. persecutor	0	21	IMP	6	C	IMP
59. ascendence	1	C	IMP	6	IMP	IMP
60. disinfectant	1	C	IMP	11	0	IMP
61. reproductive	0	C	IMP	12	0	IMP
62. portentous	0	C	2	IMP	IMP	IMP
63. Protestant	0	6	C	IMP	IMP	IMP
64. circumstances	1	0	C	IMP	IMP	IMP
65. absentees	5	12	IMP	IMP	IMP	C
67. Burmese	C	26	IMP	IMP	IMP	IMP
68. kangaroo	C	0	29	IMP	IMP	IMP
69. macaroon	C	0	19	IMP	IMP	IMP
70. marionette	C	0	IMP	3	15	IMP
71. omelette	2	0	IMP	C	IMP	IMP
72. committee	0	C	12	IMP	IMP	IMP
73. sybaritic	C	5	4	IMP	IMP	0
74. admonish	IMP	2	C	IMP	IMP	0
75. conducive	1	C	8	IMP	IMP	IMP
76. conjectures	3	C	2	IMP	IMP	IMP
77. reiteration	0	C	IMP	0	2	6
78. tegumental	0	0	IMP	1	10	IMP
79. politics	6	C	IMP	IMP	IMP	4
80. mature	C	20	IMP	IMP	IMP	IMP
81. periphery	0	1	IMP	C	7	IMP

English Word	Syllable of Cognate's Primary Stress	Syllable Adjacent to Cognate's Primary Stress	Syllable of Cognate's Terciary Stress	Syllable of Cognate's Terciary According to Matos	Syllable of Cognate's Terciary According to Câmara	Other Syllable
82. intercalate	14	2	C	IMP	IMP	6
83. reprobate	3	C	IMP	IMP	IMP	5
84. inodorous	20	C	IMP	3	IMP	0
85. ligamentary	3	C	IMP	1	11	0
86. subcutaneous	C	0	3	IMP	IMP	0
87. imagery	26	C	IMP	IMP	IMP	0
88. monastery	4	5	C	IMP	IMP	0
89. premonitory	4	2	IMP	C	2	0
90. predatory	3	0	C	IMP	IMP	0
92. pulmonary	1	0	C	IMP	IMP	0
93. intricacies	1	20	IMP	C	IMP	0
94. unintelligible	1	0	IMP	C	IMP	0
95. conspirator	0	15	IMP	C	16	IMP
96. dispensary	4	C	9	IMP	IMP	0
97. fortunately	*2	1	C	IMP	IMP	IMP
99. respectful	*0	C	0	IMP	IMP	IMP
105. seismograph	8	C	IMP	IMP	IMP	5
106. microphone	2	0	C	IMP	IMP	IMP
107. Pentagon	17	C	IMP	IMP	IMP	1
108. autocrat	5	2	IMP	C	IMP	IMP
109. demagogue	5	2	C	IMP	IMP	IMP
110. periscope	9	0	C	IMP	IMP	IMP
111. electrogram	2	3	C	IMP	IMP	1
112. kaleidoscope	7	0	IMP	C	1	IMP
113. telegraphy	1	0	IMP	C	8	IMP
114. biographer	C	IMP	IMP	IMP	IMP	11
115. geologize	3	0	IMP	C	0	0
116. hexagonal	0	0	C	IMP	IMP	5
117. autonomous	C	0	IMP	IMP	IMP	0
118. paralysis	C	10	IMP	IMP	IMP	4
119. epilepsy	0	22	7	IMP	IMP	3
120. dinosaurus	C	0	16	IMP	IMP	0

IMP = impossible--no such syllable C = correct stress falls on this syllable

* = approximate syllable - i.e. stress given to suffix, as in Portuguese, but English suffix has only one syllable, while corresponding Portuguese suffix has two.

APPENDIX 8

DISTRIBUTION OF ERRORS BY SYLLABLE TYPE (STUDENT PRONUNCIATION)

WORD	UNDER-GRADUATE			GRADUATE		
	Tense Vowel	Weak Vowel	Consonant Cluster	Tense Vowel	Weak Vowel	Consonant Cluster
1. diverge				4 ay		
2. foment	3 ow	6 ɔ		8 ow		
3. resurrect						
4. suborn	1 uw	3 ʌ			10 ʌ	
5. purport			8			8
6. traject(s)		6 æ			9 æ	
7. implement	3 ey 1 iy	1 ɛ				2
8. patent			6			3
9. rubicund	1 iy	2 ɪ	1	1 iy		
10. cuspidate	2 ey	1 ɪ		1 iy	1 ɪ	
11. sinistrorse			4			7
12. saturnine	1 ay		3			1
13. comatose	2 ey				1 ɔ	
14. termagant					2 æ 1 a	
15. impolite			4			7
16. imperfect			8			3
17. caterwaul					1 a:	
18. detonate	1 ow 5 ey			3 ey		
19. velarize	2 ay			3 ay		
20. azurite	1 iy	7 ʉ 2 ɪ		1 ay	3 ʊ	
21. desmosome	4 ow			2 ow	1 ʌ	
22. inquiline	2 ay 2 iy			1 iy		
23. ascertain		4 æ	7			14
24. masquerade			15			15
25. centurion			4			1
26. retribution					1 ɛ	
27. ignominious	2 ow	3 a			2 a	1
28. pandemonium						3
29. percipient			4			

WORD	UNDER-GRADUATE			GRADUATE		
	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER
31. compliance			6			2
32. dandelions	6 ay	4 ɛ		1 ey 2 ay	5 ɛ 1 I	
30. luxuriance		1 æ	3			1
33. contiguous						
34. superfluous	1 uw			1 uw		
35. constituents	3 uw	1 I	4	2 uw		4
36. residual		1 I			1 I	
37. perpetuate	3 ey		1	1 ey		1
38. issuance	1 uw			5 uw		
39. inadequate	5 ey	1 ɛ			1 ɛ	
40. spiritual		3 I			1 I	
41. indemnify	2 ay 1 iy		1	2 ay		1
42. comestible	1 ey	8 a 1 ɔ 3 I		1 ow	1 a 1 I	
43. longevity		3 I	1			3
44. acquisitive	1 ey	1 æ			1 I	
45. fortuitous			5			5
46. progenitor		2 ɔ				
47. dermatitis		1 æ	6			11
48. explicit						
49. acidulous		2 æ			1 æ	
50. impudent	3 yuw 10 uw			8 yuw 5 uw	1 ʌ	
51. truculence			2			
52. attributive	5 uw			2 yuw	1 æ	
53. contributors	5 yuw 7 uw	1 ʌ	1	10 yuw 1 uw		2
54. capitular		1 æ			5 æ	
55. inclusive		1 I	1			2
56. persecutor	7 yuw 1 uw	6 ɛ		13 yuw		

WORD	UNDER-GRADUATE			GRADUATE		
	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER
57. despondent			1			
58. remonstrance	1 iy	1 ɛ	2		5 ɛ	
59. ascendence		2 æ	1		4 æ	
60. disinfectant			8			4
61. reproductive	2 ow	7 a			3 a	
62. portentous						2
63. Protestant			4			2
64. circumstance(s)						1
65. absentee(s)			7			10
66. buccaneer	1 uw	7 ʌ 1 a 1 æ		1 u	1 æ 3 ʌ	
67. Burmese			15			11
68. kangaroo			15			14
69. macaroon		11 æ			8 æ	
70. marionette(s)	2 iy	8 æ		1 iy	5 æ 2 ɛ	
71. omelette		2 ɛ				
72. committee		5 ə 1 ʌ 1 ɔ			4 ɔ 1 a	
73. sybaritic	2 ay	1 I 2 a 2 æ			1 I 1 æ	
74. admonish		2 I				
75. conducive			6			2
76. conjecture(s)	2 uw		2	1 uw		
77. reiteration	1 ey	1 ɛ		1 iy 2 ey	3 I	
78. tegumental	1 uw	7 ɛ 1 I			2 ɛ	
79. politics		8 I			2 I	
80. mature	8 ey	4 æ		6 ey	2 ɛ	
81. periphery		2 ɛ 5 ʊ			1 ʊ	

WORD	UNDER-GRADUATE			GRADUATE		
	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER
82. intercalat(ing)	6 ey	2 æ	4	8 ey		2
83. reprobate(s)	2 ow 4 ey	1 a		1 ey		
84. inodorous	9 ow	2 ɔ		9 ow	3 I	
85. ligamentary		5 I 1 ʊ 2 ɛ 1 a		2 ay	4 I	
86. subcutaneous			1			2
87. imagery	3 ey	13 æ		2 ey	8 æ	
88. monastery		2 ʊ 2 ɛ	2			3
89. premonitory	1 iy 4 ow	1 I 1 ɛ			1 I	
90. predatory	3 ow					
91. percolator	10 ey	1 ɔ		4 ey		
92. pulmonary		1 ɛ				
93. intricacy	1 ay	5 I 1 æ		1 iy	13 I	
94. unintelligible		1 I				
95. conspirator(s)	9 ey		6	6 ey		10
96. dispensary		2 ɛ 1 ʊ	2		1 ʊ	7
97. fortunately	1 ey 1 iy			1 uw		
98. northerner		1 ɛ	2			1
99. respectful						
100. humorless						
101. advisable	2 ey		1			
102. devilment			6			3
103. unable		1 ʌ				
104. nevertheless		7 ɛ			10 ɛ	
105. seismograph	1 ey	4 ae 3 a 1 ɔ			4 ɔ	

WORD	UNDER-GRADUATE			GRADUATE		
	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER	TENSE VOWEL	WEAK VOWEL	CONSONANT CLUSTER
106. microphone	2 ow					
107. Pentagon		9 æ 1 ɔ			7 æ 1 a	
108. autocrat		4 æ 2 ɔ			1 æ	
109. demagogue	4 ow 1 ey	1 æ		1 ow		
110. periscope	4 ow	2 a		3 ow		
111. electrogram	1 ow	2 æ 1 ɔ		1 ow	1 ɛ	
112. kaleidoscope	3 ow	3 ɔ		1 ey	1 ʌ	
113. telegraphy	1 iy	5 ɛ			3 ɛ	
114. biographer		8 æ		1 ay	2 æ	
115. geologize	2 ay			1 ay		
116. hexagonal			2			3
117. autonomous						
118. paralysis	2 ay 1 iy	6 æ		1 ay	4 æ	
119. epilepsy	3 iy	1 I	10		3 I	12
120. dinosaurus	8 iy 1 ay			4 iy 1 ay	2 I	

APPENDIX 9

EFFECT OF FINAL TENSE VOWEL IN VERBS AND THEIR DERIVATIVES

A. VERBS WITH STRESS ON FINAL TENSE VOWEL

VERB	CORRECT RESPONSES
1. ascertains	17%

B. DERIVATIVES OF VERBS WITH STRESS ON FINAL TENSE VOWEL

DERIVATIVE	CORRECT RESPONSES	DERIVATIVE	CORRECT RESPONSES
1. compliance	74%	4. reproductive	63%
2. residual	93%	5. reiteration	71%
3. inclusive	88%		

C. VERBS WITH STRESS ON SYLLABLE OTHER THAN FINAL TENSE VOWEL

VERB	CORRECT RESPONSES	ERRORS STRESSING FINAL TENSE VOWEL	OTHER ERRORS
1. detonate	70%	8	1
2. velarize	83%	5	0
3. caterwaul	97%	1	0
4. perpetuate	81%	4	2
5. indemnify	72%	4	3
6. intercalate	29%	14	8
7. reprobate	73%	5	3
8. geologize	88%	3	0

D. DERIVATIVES WITH STRESS ON SYLLABLE OTHER THAN FINAL TENSE VOWEL OF VERB

DERIVATIVE	CORRECT RESPONSES	ERRORS STRESSING FINAL TENSE VOWEL OF VERB	OTHER ERRORS
1. constituents	48%	5	4
2. issuance	75%	6	0
3. attributive	74%	7	1
4. contributors	16%	24	3
5. persecutor	13%	21	6
6. remonstrance	70%	2	7
7. percolator	52%	14	1

APPENDIX 10

ERRORS FALLING ON SYLLABLE OF TERCIARY OR WEAK STRESS

WORD	Number Responses	Syllable of Terciary		Syllable of Weak Stress				
				Before Primary		After Primary		
		Before Primary	After Primary	2 Syl.	1 Syl.	1 Syl.	2 Syl.	3 Syl
3. resurrect	30	0	X	X	0	X	X	X
7. implement	30	X	2	X	X	5	X	X
9. rubicund	32	X	1	X	X	4	X	X
10. cuspidate	32	X	2	X	X	3	X	X
11. sinistrorse	30	X	2	X	X	9	X	X
12. saturnine	29	X	1	X	X	4	X	X
13. comatose	31	X	1	X	X	2	X	X
15. impolite	31	11	X	X	0	X	X	X
16. imperfect	32	7	X	X	X	4	X	X
17. caterwaul	31	X	1	X	X	0	X	X
18. detonate	30	X	8	X	X	1	X	X
19. velarize	30	X	5	X	X	0	X	X
20. azurite	31	X	4	X	X	10	X	X
21. desmosome	28	X	5	X	X	2	X	X
22. inquiline	30	X	2	X	X	3	X	X
23. ascertain	30	4	X	X	21	X	X	X
24. masquerade	30	30	X	X	0	X	X	X
26. retribution	32	1	X	X	0	0	X	X
27. ignominious	16	1	X	X	7	0	0	X
28. pandemonium	32	3	X	X	0	0	0	X
32. dandelions	32	X	8	X	X	11	0	X
37. perpetuate	31	X	4	X	2	0	X	X
41. indemnify	25	X	4	X	2	1	X	X
47. dermatitis	28	17	X	X	1	0	X	X
56. persecutor	31	X	21	X	X	6	X	0
60. disinfectant	32	0	X	X	11	1	X	X
61. reproductive	32	0	X	X	12	0	X	X
64. circumstance(s)	32	X	1	X	X	0	X	X
65. absentee(s)	23	12	X	X	5	X	X	X
66. buccaneer	31	11	X	X	4	X	X	X
68. kangaroo	32	29	X	X	0	X	X	X

WORD	Number Responses	Syllable of Terciary		Syllable of Weak Stress				
				Before Primary		After Primary		
		Before Primary	After Primary	2 Syl.	1 Syl.	1 Syl.	2 Syl.	3 Syl.
69. macaroon	32	19	X	X	0	X	X	X
70. marionettes	31	15	X	3	0	X	X	X
73. sybaritic	31	4	X	X	5	0	X	X
77. reiteration	28	8	X	X	0	0	X	X
78. tegumental	30	10	X	X	1	0	X	X
79. politics	31	X	4	X	X	6	X	X
82. intercalate	31	X	14	X	6	2	X	X
83. reprobate	30	X	5	X	X	3	X	X
85. ligamentary	32	11	X	X	1	3	0	X
86. subcutaneous	29	3	X	X	0	0	0	X
88. monastery	32	X	4	X	X	5	X	0
89. premonitory	31	X	4	X	2	2	X	0
90. predatory	31	X	3	X	X	0	X	0
91. percolator	31	X	14	X	X	1	X	0
92. pulmonary	31	X	1	X	X	0	X	0
94. unintelligible	31	0	X	X	0	0	1	0
102. devilment	31	X	1	X	X	8	X	X
104. nevertheless	30	17	X	0	0	X	X	X
105. seismograph	27	X	5	X	X	8	X	X
106. microphone	32	X	2	X	X	0	X	X
107. Pentagon	31	X	1	X	X	17	X	X
108. autocrat	32	X	5	X	X	2	X	X
109. demagogue	31	X	5	X	X	2	X	X
110. periscope	32	X	9	X	X	0	X	X
111. electrogram	32	X	2	X	1	3	X	X
112. kaleidoscope	29	X	7	X	1	0	X	X
115. geologize	26	X	3	X	0	0	X	X
119. epilepsy	32	X	22	X	X	7	X	0
120. dinosaurus	31	16	X	X	0	0	X	X

X = error not possible

APPENDIX 11

DERIVATIVES

A. DERIVATIVES WITH SAME STRESS AS ROOT

DERIVATIVE	ROOT	CORRECT RESPONSES
9. rubicund	ruby	84%
10. cuspidate	cuspid	84%
11. sinistrorse	sinister	63%
12. saturnine	saturn	83%
15. impolite	polite	65%
16. imperfect	perfect	66%
19. velarize	velar	83%
20. azurite	azure	55%
31. compliance	comply	74%
38. issuance	issue	75%
39. inadequate	adequate	81%
40. spiritual	spirit	88%
44. acquisitive	acquire	90%
53. contributor(s)	contribute	16%
55. inclusive	include	88%
56. persecutor	persecute	13%
57. despondent	despond	97%
59. ascendence	ascend	73%
60. disinfectant	infect	63%
61. reproductive	produce	63%
72. committee	commit	63%
75. conducive	conduce	68%
84. inodorous	odor	21%
86. subcutaneous	cutaneous	90%
87. imagery	image	19%
89. premonitory	monitory	74%
90. predatory	predator	90%
91. percolator	percolate	52%
93. intricacy	intricate	22%
94. unintelligible	intelligible	97%
95. conspirator	conspire	00%
96. dispensary	dispense	59%
97. fortunately	fortune	91%
98. northerner	northern	87%

DERIVATIVE	ROOT	CORRECT RESPONSES
99. respectful	respect	100%
100. humorless	humor	100%
101. advisable	advise	91%
102. devilment	devil	71%
103. unable	able	97%

B. DERIVATIVES WITH DIFFERENT STRESS FROM ROOT

DERIVATIVE	ROOT	CORRECT RESPONSES	ERROR ON ROOT	ERROR ON 1ST OTHER SYLLABLE	ERROR ON 2ND OTHER SYLLABLE	ERROR ON 3RD OTHER SYLLABLE	NUMBER OF RESPONSES COUNTED
23. ascertain	certain	17%	21	4	X	X	30
24. masquerade	masque	6%	30	0	X	X	30
25. centurion	century	84%	5	0	0	X	32
26. retribution	tribute	97%	0	1	0	X	32
30. luxuriance	luxury	83%	4	0	1	X	32
32. dandelions	lions	41%	8	11	0	X	32
34. superfluous	super	94%	2	0	0	X	32
35. constituent(s)	constitute	48%	8	5	1	X	27
46. progenitor	progeny	94%	2	0	0	X	32
47. dermatitis	dermis	36%	17	1	0	X	28
49. acidulous	acid	84%	3	0	0	X	19
62. portentous	portent	91%	2	0	X	X	22
65. absentee	absent	26%	12	5	X	X	23
67. Burmese	Burma	19%	26	X	X	X	32
70. marionette	Marion	42%	15	3	0	X	31
73. sybaritic	Sybarite	71%	4	5	0	X	31
77. reiteration	reiterate	71%	6	2	0	0	28
78. tegumental	tegument	63%	10	1	0	X	30
83. reprobate	probate	73%	3	5	X	X	30
85. ligamentary	ligament	70%	11	1	3	0	32
104. nevertheless	never	43%	17	0	0	X	30
113. telegraphy	telegraph	72%	8	0	1	X	32
116. hexagonal	hexagon	84%	5	0	0	X	32
118. paralysis	paralyze	48%	10	4	0	X	27
120. dinosaurus	dinosaur	48%	16	0	0	X	31

C. DERIVATIVES OF ROOTS WITH ALTERNATE STRESS PATTERNS

DERIVATIVE	ROOT[1]	ROOT[2]	CORRECT RESPONSES	ERROR ON ROOT[1]	ERROR ON ROOT[2]	ERROR ON 1ST OTHER SYLLABLE	ERROR ON 2ND OTHER SYLLABLE	NUMBER OF RESPONSES COUNTED
27. ignominious	ignominy	ignominy	50%	1	7	0	0	-
36. residual	residue	reside	93%	2	C	0	0	-
52. attributive	attribute	attribute	74%	C	1	7	0	31
58. remonstrance	remonstrate	remonstrate	70%	7	C	2	X	30
63. Protestant	protest	protest	81%	C	6	0	X	32

X = no such syllable
C = correct stress, no error possible

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