The need for English for academic purposes: an analysis of prenominal modification in economics

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THE NEED FOR ENGLISH FOR ACADEMIC PURPOSES: AN ANALYSIS
OF PrenomINAL MODIFICATION IN ECONOMICS

A Thesis
Presented to
the Faculty of the Graduate School
University of the Pacific

As a Partial Requirement
for the Degree of
Master of Arts in Inter-American Studies:
English as a Second Language

by
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Chapter 1
INTRODUCTION

Background

The traditional method of reading instruction in English as a Second Language in the United States consists of presenting a series of short readings. The content of the readings is usually culturally loaded and literature oriented as the following titles suggest: "Tom's First Football Game," "Let's Go Shopping," "Abraham Lincoln Grows Up," "The Role of Women in American Life," "America: A Look at the People," "Southbound on the Freeway," and "Happiness is a Good Job." The emphasis in the reading content is to teach the student about the customs and traditions of the country whose language he is learning.

Vocabulary is drawn from the content of the short readings. Teaching vocabulary for the comprehension of written material is the primary objective of the traditional method. The vocabulary is typically organized into lists that the student is required to memorize. Although the readings and subsequent vocabulary lists equip the student to function in classroom and social situations, the literature orientation and the cultural concentration emphasized create a discrepancy between the university student's knowledge of English upon leaving the English as a Second Language classroom and the attainment required to use English textbooks in his major field courses.

Grammar instruction in reading in the traditional method may be centered around lists of rules and their exceptions for memorization by
the student. Some ESL texts surveyed by this author present graded exercises with no connection to a specific reading content. Others incorporate graded exercises with short passages of prose or poetry. Although the grammatical structures in these ESL textbooks are useful, most of the texts do not contain much instruction in the variety of frequent structures such as affixation and prenominal modification. Furthermore, although all of the texts examined by this author exhibited phrases with prenominal modification, none explained the creation or usage of the phrases, not even the more complex forms of prenominal modification which one would certainly expect ESL students to have trouble with. It is as though the student is expected to innately possess the skills of creating and using these forms without benefit of formal instruction.

Thus, the irrelevancy in content of traditional short readings in ESL texts (as opposed to the content in academic course reading), the inadequate coverage of instruction in the creation and usage of certain common structures encountered in written material, and the internalized rote memorization/parroting learning strategies may account for a student's academic failure in his major field courses.

The burden of expectation that is upon the student is two-fold. Not only is he expected to compete with native speakers in the academic college course, but he is also required to receive and transmit his knowledge through a foreign language. The non-native speaker of English who begins a major field of study is not expected by his ESL teacher nor by his academic course instructor to possess the technical vocabulary, but both instructors seem to expect all students to possess word attack skills. The acquisition of the technical vocabulary is seen as part of
the academic process. However, all students are expected by the professors of their field of study to have attained the appropriate lexical ability to follow lectures, ask questions, take examinations, write papers, and read the required texts. Many people believe that vocabulary can be acquired mainly through a glossary or dictionary, and many do not promote the use of word attack skills in interpreting and comprehending words and phrases. Students who are taught to use the dictionary as the main source by which the meanings of new words can be discovered often become frustrated because of the time involved in the process of reading the text, locating the word in the dictionary, and returning to the text, and often the students seek native-language summaries that may or may not cover the material they are to master. Many students stop trying and eventually fail the course.

To bridge the gap between what the ESL student can do given his English ability and what he must be able to do once he ends his ESL classes, current instructional trends focus upon discovering the means by which the student's academic needs can be satisfied. The current approach is to consider English as a Second Language teaching at the university in that it often has more specific goals and a narrower focus and thus, certainly, a different syllabus from the traditional ESL teaching approach. English for Academic Purposes, as this current approach is called, sets out to provide the student with the skills that will enable him to research, analyze, and evaluate academic material.

There are two alternative ways in which English for Academic Purposes may be taught. Academic English may be taught through a special purpose course after conventional ESL classes and before entry into
the academic course, or it may be taught as a part of the regular ESL program, integrating ESL and academic English in the same course. The second approach is favored by this author for university students for two reasons. First, many students have a limited amount of time to devote to university education, and integration allows the student to enter his major field courses more quickly. Second, integration of the grammatical structures necessary for a student to read academic texts, such as the use of prenominal modification, into the ESL course texts gives the student much practice with these structures. That is, the structures are taught and then continually reinforced throughout the ESL course. Critics of integrating conventional and Academic English within the language teaching syllabus state that the teaching of academic English forces the ESL teacher into academic fields of specialization they may not be qualified to handle. These critics believe that because a typical ESL class is made up of students from different academic disciplines, only a few of the students will benefit from a particular kind of academic English. For example, instruction in the English used in Business and Finance, critics say, would not benefit students interested in Chemistry, Special Education, or Electrical Engineering as much as it would Economics students. On the other hand, many ESL teachers feel that the teaching of academic English within ESL courses does not cause ESL teachers to encroach upon the specialist subject but instead is a way that vocabulary and grammar can be taken from the written material of a subject area that is required in college and taught in a special course.

English for Academic Purposes lessens the responsibility that is upon the teacher because the teacher is not required to be an expert
in the content matter of the course. The focus is on the English used in these academic fields and not on the "truth" of the content. Academic English places emphasis upon teaching the student various skills he will need to comprehend lectures, texts, and the like. It should include teaching word attack skills. The teachers, often a non-expert in fields of study outside that of ESL, is not expected to present to a class of students with a variety of majors, all the vocabulary they will need. If, however, the student is taught word attack skills like those on the identification and uses of affixes, he will be equipped with the strategies to successfully interpret and comprehend words, phrases, sentences, and paragraphs in academic texts without the necessity of all of these words, phrases, sentences, and paragraphs being taught separately in the ESL classroom.

Statement of Purpose

This paper shows the complexity of noun phrases within an academic text and suggests, therefore, the complexity of the reading process that the traditional approach may not cover adequately. In this thesis, we will look at the complexity of the reading and comprehension processes through an analysis of prenominal modification found in Chapter 25 (a chapter chosen at random) of Paul Samuelson's Economics. Samuelson's Economics is a basic text chosen for this analysis because of its introductory level vocabulary and concepts and its wide use by students in the areas of Economics, Business, and the like. Although abundant studies have been done about EST (English for Science and Technology), the studies on other areas of academic English are few.

Samuelson's use of prenominal modification was chosen as the area of focus for this paper for several reasons. First, the frequency
with which noun phrases, and particularly prenominal modifiers, appear in the text is great. Within the 583 sentences in Chapter 25, there are 3,038 noun phrases. Of course, 1,515 are modified prenominally. That is, 49.87% or 50% of the noun phrases in the chapter are modified prenominally with an average of 22.7 words per sentence and an average of 2.598 words within the prenominally modified noun phrase.

Second, there is an enormous variety of prenominal modification found in the text. Most ESL grammar texts explain the use of a noun modified by a single adjective (such as old man, tall boy, and good answer). As this paper will demonstrate, modifiers play a variety of roles. The nouns that are modified (called head nouns) in Samuelson's Economics seem to have an "unlimited" number and variety of modifiers: good news (adjective + noun), market structure (noun + noun), monopoly market structure (noun + noun + noun), effective monopoly market structure (adjective + noun + noun + noun), somewhat effective monopoly market structure (adverb + adjective + noun + noun + noun), etc.

Third, prenominal modification is a prevalent structure in academic textbooks. Indeed, it is true that prenominal modification is a common feature of the English language, as studies by Gleitman and Gleitman (1971), Lees (1968), and Levi (1978) show.

Finally, the main reason for the selection of an analysis of prenominal modification is the difficulty of the structures for non-native English speakers. The term "heavy" is often used to describe noun phrases that contain a large number of prenominal modifiers in a variety of roles (for example, somewhat effective monopoly market structure is a "heavy" noun phrase). Hosenfeld (1977) states of "heavy" noun phrase subjects or objects that:
the use of the term (heavy) with respect to noun phrase subjects or objects ... is intended to suggest that such constructions, although they may not in fact appear very lengthy or complex, are difficult to process.\textsuperscript{14}

Her studies indicate that "heavy" noun phrases appear in different syntactic functions as the subject of the main clause, subordinate clause, or the object of the preposition. As Hosenfeld's studies point out, long groups of words that perform a single grammatical function are "difficult for non-native (English) readers to perceive."\textsuperscript{15}

Prenominal modification is a very typical feature of English. English provides guidelines which require the speaker to select those words and phrases that convey the greatest amount of information through the least amount of structure. Paul Grice's Maxims of Communication advise speakers to make their contribution as informative, and yet as brief, as possible.\textsuperscript{16} Similarly, the Minimax Principle, another guideline that requires English speakers to be selective of the structures they use, states that structures like prenominal modification permit the speaker to optimally minimize the surface complexity of his utterance while maximizing the amount of information he communicates.\textsuperscript{17} Thus, the "economy" of language requires its speakers to convey as much information as is required with the fewest possible words. Prenominal modifiers replace longer phrases/clauses with fewer words that carry equivalent meaning. Indeed, the generative, productive nature of prenominal modifiers and compounds allows the combining of the head noun with any number of other nouns, adjectives, adverbs, or prepositions to create new words and phrases that convey a maximum amount of information into a minimal amount of structure. A tree diagram may be drawn to illustrate
the composition of a noun phrase:

NP = Noun Phrase
Det = Determiner (a, the, this, that, these)
Adv = Adverb (no, regularly, somewhat)
Adj = Adjective (perfect, important, effective)
N = Noun (competition, firm, seller)

Thus, preceding a noun within one noun phrase, there may be one or no determiner (or prearticle such as some of, all of, two of, etc.), any number of or no adverbs, any number of or no adjectives, or any number of or no nouns. For example, the phrase a somewhat effective monopoly market as drawn in a diagram is:

Thus, the generative nature of prenominal modification permits the student to analyze strings of adverbs, adjectives, and nouns while providing the means by which he can create his own language-economic phrases.

A working definition of prenominal modification as used in this paper is: Prenominal modification is that part of a noun phrase that consists of a head noun modified prenominally by no/one/ several adverb(s), adjective(s), preposition(s), and/or noun(s) that are independently meaningful units linked semantically to context. They are
generative in nature and are derived from underlying relative clauses or complement structures by deletion and movement.
Although both academic and conventional English share such common features as phonology, orthography, and grammar, they have particular features. Specifically, academic writing is marked by special vocabulary, mathematic symbols and numbers, long sentence length, reference forward or backward in text, and variation in the order of the subject in relation to the main verb.\(^1\) Phrases with prenominal modification that appear in academic textbooks are complex, often containing a variety of modification (pre- and post-nominal modification), parts of speech (adverbs, prepositions, etc.), and symbols and coinings within a single phrase. The process of reading and comprehending phrases with prenominal modification by the non-native English speaking student is difficult and requires a number of skills from the student.

The skills that the student needs to successfully read and comprehend phrases with prenominal modification help him to solve difficulties that are of two basic types. The first type of problem has to do with reading the phrases as they appear in context. The content-related difficulties of this type require the student to treat the phrase inseparably from the larger context. Difficulties of reading phrases with prenominal modification that are content-related are:

1. the identification of the phrase with prenominal modification,
2. the identification of the head noun within the phrase,
3. the use of opaque terms within the phrase,
4. the use of non-technical vocabulary that takes on a specialized meaning within the phrase,
5. the order of words within the phrase,
6. the use of symbols within the phrase.
phrase, and (7) the use of coined words within the phrase. The second types of difficulties that the student has in dealing with phrases with prenominal modification are linguistic difficulties. Linguistic difficulties are related to the comprehension of the phrases. In these types, the phrase can be separated from the larger context. Difficulties that are linguistic are: (1) the recognition of semantic relationships among words within the phrase, (2) the grouping of words within the phrase, (3) the reading of the groups within the phrase, and (4) the recovery of deleted material. The focus of content-related problems is on the surface structure of the phrase with prenominal modification, and the focus of linguistic difficulties is on the semantic structure of the phrases. Each difficulty from both basic types exists in the process of reading and comprehending phrases with prenominal modification. Because each difficulty exists in all of these phrases, the student is faced with a total of eleven problems each time he reads such a phrase.

The first content-related difficulty is the identification of the phrase with prenominal modification as it appears in a larger sentence. This is a problem because many students are not able to separate the prenominaly modified phrase from the rest of the sentence. Often there are no hyphens that cue the student into the existence of a phrase with prenominal modification. For example, in the sentence The EG discrepancy in the chart of the previous page allows us to examine the cost levels of monopoly imperfect-competition and the money distribution amounts of the market exchange, there are a total of six phrases with prenominal modification, three of which are two-word Noun + Noun
phrases (EC discrepancy, cost levels, and market exchange). In addition, there is one two-word Adjective + Noun phrase (previous page), one three-word Noun + Adjective + Noun phrase (monopoly imperfect-competition), and one three-word Noun + Noun + Noun phrase (money distribution amounts). The use of the hyphen in monopoly imperfect-competition calls the reader's attention to the phrase. However, none of the other phrases have hyphen cues, and thus, it is not obvious to the student that more phrases with prenominal modification exist in the sentence. The use of hyphens in Chapter 25 of Economics aids the student in recognizing a phrase with prenominal modification and in grouping the words. (Word-grouping is discussed later in this chapter under linguistic difficulties.)

In addition to the nonexistence of hyphen cues that help the student recognize prenominal modification, the forms in which pre-nominally modified phrases, and specifically noun compounds, are written may confuse the student. Noun compounds may be written as one word, as two words joined by a hyphen, or as two words. Thus, one could write cost-level or cost level. The student may not realize that both forms are acceptable in English. When a compound like mailman is written as one word, it is more difficult for the student to identify the word as an example of prenominal modification.

The second content-related difficulty the student faces in reading phrases with prenominal modification is the identification of the head noun within the phrase. The identification of the head noun is important because it is this noun that is the center of focus in the phrase. The modifiers that accompany the head noun serve to clarify the meaning of the head noun. The identification of the head noun
within the phrase is a problem because the head noun is not necessarily the last noun in the phrase. A phrase may consist of both pre- and post-nominal modification. For example, *loss-in-revenue term zero* is a three-word prenominal modification of the head noun *term* (and not necessarily a Noun + Preposition + Noun + Noun as the traditional approach would indicate) with a one-word post-nominal modifier *zero*. In the phrase *green shaded firm demand curve DD*, the head noun *curve* is modified prenominally by four modifiers (**green shaded firm demand**) and post-nominally by one modifier (**DD**). As these examples show, the difficulty lies in identifying the head noun so as to see where prenominal modification ends and where post-nominal modification begins.

The third content-related problem in reading phrases with prenominal modification is the use of opaque terms within the phrase. Opaque words are words that have undergone a petrification of meaning. The meaning of a word becomes petrified when it is created to represent a specific object or concept (**Invisible Hand**, **Big Three**) or when the word is used continually with a specific meaning (**gay** has come to mean "homosexual.") The meaning of opaque phrases cannot be determined by knowing the meaning of each word in the phrase. For example, although **market economy** consists of the words **market** and **economy**, the meaning of the whole phrase cannot be determined by knowing the meaning of **market** and the meaning of **economy**. **Market economy** is, therefore, opaque. Because the meaning of the phrase cannot be discovered by knowing the meaning of each word within the phrase, the student must treat opaque phrases as a single unit. That is, the student must regard opaque phrases as single words.
The fourth content-related problem is the use of non-technical vocabulary that takes on a specialized meaning in context. The use of non-technical vocabulary in academic texts has three purposes. First, such vocabulary may take on a specialized or technical meaning in a particular field (i.e., firm, supply, and demand have a specialized meaning when used in the economics textbook). Second, non-technical vocabulary may function as contextual paraphrases for other words or phrases (i.e., light data is a contextual paraphrase meaning "data that is light in color"). Third, vocabulary may form part of a specialized non-technical vocabulary (such as time sequence, measurement, or truth validity indicators like second, heavy, and true).

The use of non-technical vocabulary items that take on a specialized meaning is a problem for students who may not realize that the meaning of some vocabulary can change when the words are used in a particular context. For example, demand in the field of economics is a commodity or service that is desired by consumers. To understand the phrase demand side, the student must first recognize the specialized meaning the word demand takes on, and second must read the phrase as it appears in context. Divorced from context, the meaning of the phrase is not clear.

The fifth problem that is content-related is the order of the words within phrases with prenominal modification. The order in which the words appear is non-arbitrary. For example, a monopoly good ("a product produced by a monopoly") is not the same as a good monopoly ("a monopoly that is productive"). As this example shows, students must not confuse the order of the words within a phrase with prenominal
modification. Changing the order of the words results in a change of the meaning of the phrase.

The use of symbols in phrases with prenominal modification is the sixth content-related problem. In the phrase \( dd \) curve, the symbols \( dd \) represent points on a curve. Each \( d \) means "demand"; thus, \( dd \) curve means "a curve that is marked by demand-demand." Symbols that appear in academic texts carry a different meaning than do articles (like some, the, this, etc.) and cannot be treated by the students as articles.

The final content-related problem that students may have in reading phrases with prenominal modification in the use of coined words within the phrase. Coinings are opaque in that they are created to be used in a specific context. However, coined words are unlike other opaque words in that many opaque words (such as market economy or Big Three) contain two recognizable words. Coined words in phrases with prenominal modification are a problem for students because words may be coined for use in a specific area. For example, a google is a mathematical term. In linguistics, economics, and other fields of study, minimax is a coined word \((\text{mini} - \text{num} + \text{max} - \text{imum})\) that is used with a specific meaning depending upon the field in which it is used.

The seven content-related problems in reading phrases with prenominal modification demonstrate the complexity of the reading process. To understand the phrase, the student must treat it as it appears in the larger context. The second basic type of problems is the linguistic problems. The linguistic problems of the phrases allow the phrases to be divorced from context. The four linguistic problems are interrelated and further show the complexity of the process of reading and
comprehending phrases with prenominal modification.

The first linguistic difficulty is the recognition of the semantic relationships of words within the phrase. Each modifier in a prenominally modified phrase has a particular role it plays in relation to the head noun. Prenominal modification, and particularly the Noun + Noun compound, has traditionally been treated in linguistics non-semantically, the role of vocabulary within the phrase having been ignored. Instead, prenominal modification has been studied in terms of the parts of speech (adverbs, adjectives, etc.) and the way these parts of speech combine. This accounts for the structure of such nominalizations but not for their usage by students.

However, this still is not the clearest approach. Perhaps the best approach we could make to illustrate the complexity of these Noun + Noun combinations would be to put them into "underlying" sentences which serve to paraphrase them. For example, monopoly price may be considered "Object (price) created and regulated by Agent (monopoly)."

These Noun + Noun combinations have also been analyzed by one semantic approach, as in the above example monopoly price, as merely Noun_1 + Noun_2 = Instrument (Agent) + Object. The semantic relationships of the words within the phrase monopoly price may be illustrated by the use of semantic categories that show the role of each modifier to the head noun. Monopoly price may be written as "Noun_2 (price) created and regulated by Noun_1." In the phrase downward tilt, the semantic relationships of the words may be illustrated as "Adjectives (downward) used to indicate the direction of the Noun (tilt)." The difficulty in recognizing the semantic relationships of words within a
The recognition of the semantic relationships of prenominal modifiers to the head noun in a phrase is related to the second linguistic problem in comprehending prenominal modification. This problem is the grouping of words in phrases with more than one prenominal modifier. The problem of identifying groups of semantically related words within the phrase must be solved if the reader is to understand the phrase. Groups are identified by the semantic relationships of the words as they relate to the branching of the phrase. For example, a diagram may be drawn of the branching of the phrase **efficient operating sizes**:

![Diagram](image)

According to this simple diagram, the phrase is grouped as

\[
\text{(efficient) (operating sizes)}
\]

and is read as "operating sizes that are efficient." The semantic relationships of the words may be written as:

1. Head Noun (**sizes**) modified by a derivational Adjective (**operating**),
2. Head Noun + Adjective (**operating sizes**) is equal to Noun that people use to Verb (that is, **sizes** that people use in **operating** something else), and
3. Head Noun + Adjective (operating sizes) modified by an Adjective (efficient) used to compare similar Nouns (sizes).

The processes of recognizing both the semantic relationships of words within the phrase and the grouping of the words within the phrase are difficult for the student because the phrase often provides no guide for the student to be able to accomplish the processes. The importance of the student's being able to accomplish these processes is illustrated by adding the word more to the example phrase on the previous page (more efficient operating sizes). Once the student has recognized the semantic relationships of the words in the phrase, he should group the words as

\[(more\ efficient)\ (operating\ sizes)\]

to be read as "operating sizes that are more efficient." Incorrect grouping,

\[(more)\ (efficient\ operating\ sizes)\]

changes the meaning of the phrase to "more, and not fewer, efficient operating sizes." Incorrect grouping, then, results in incorrect reading of the phrase and incorrect interpretation of the phrase.

The third linguistic problem that students face in reading phrases with prenominal modification is the reading of the groups of words. As the arrows in the following diagram shows, the phrase more efficient operating sizes is left-branching; that is, the reader reads the groups of words from right to left:

\[(more\ efficient)\ (operating\ sizes)\]

However, not all phrases with prenominal modification are left-branching. Some phrases are right-branching and others, especially those
with strings of three or more modifiers, are both left- and right-
branching. For example, common-sense trial-and-error procedure may be
drawn as

\[
\text{(common-sense)} \quad \text{(trial-and-error)} \quad \text{(procedure)}
\]

and may be read as "a procedure of trial-and-error that is based on
common-sense." In this example, the words are grouped (with the aid
of hyphens) and read both from left to right and from right to left.
The actual process of reading the phrase (such as common-sense trial-
and-error procedure) consists of reading the whole phrase from left to
right, grouping the words within the phrase according to semantic rela-
tionships of the words, reading the groups of words back and forth,
and then coming to a decision about the meaning of the phrase.

The final linguistic problem that students have in understand-
ing phrases with prenominal modification is in the recovery of deleted
material. The traditional approach deals with the structure of a
phrase but does not deal with the meaning of a phrase. For example,
headache pills and fertility pills are examined in the traditional
approach as Noun + Noun. However, by examining the semantic relation-
ships of the words in the phrases (headache pills = Noun₂ that prevent
Noun₁; fertility pills = Noun₂ that encourage Noun₁), the reader finds
that although the phrases are similar in structure, they are not
similar in meaning: headache pills are pills "that prevent" headaches
and fertility pills are pills "that enhance" fertility.⁴

Another problem in the recovery of deleted material lies in
knowing exactly what material is deleted. In most cases, exactly what
is deleted is not entirely obvious. The student can only guess about
the appropriate missing nouns, adverbs, adjectives, etc. At the same time, there is a quasi-paraphrastic relation involved. This means that the association between relatives and noun phrases with prenominal modification, especially noun compounds, does not preserve the exact meaning of the longer deleted phrase. For example, *firm demand* might be:

1. a strong demand ("His *firm demand* intimidated them"),
2. a demand placed upon a company ("The *firm demand* was made to them by the major competitor"),
3. a demand made by a company ("The *firm demand* was impossible for them to accomplish"), or
4. a product demanded/distributed by people that is manufactured/distributed by a company ("The *firm demand* is continually in short supply").

In the above examples, there are four possible meanings for *firm demand*. The number of possible meanings that phrases with prenominal modification may have is a problem when interpreting and comprehending the phrase. Teachers should not expect students to instinctively be able to identify and fill in the deleted material and to recognize the semantic relationships of the phrases.

Thus, it has been shown that the traditional approach does not account for the problems that students face in reading and comprehending phrases with prenominal modification. The traditional approach does not explain how native English speakers treat phrases with prenominal modification as a unit. Studies by Lackstrom, Selinker, and Trimble (1974) found that native speakers of English treat phrases
like a chain of seven carbon atoms as a whole unit of meaning. It is, indeed, word-like. Because speakers treat these phrases as whole units, an attempt to clarify the unit produces, as their paper has shown, long paraphrases ("atoms that are made of carbon in a chain of seven in number"). Nonetheless, it appears that native English speakers can easily come up with long paraphrases for these units in contrast with non-native English speakers and "in many cases do so automatically." 

This paper has shown that the processes of reading and comprehending phrases with prenominal modification present difficulties for the non-native English speaker. There are two basic kinds of difficulties. The first kind is content-related and includes seven specific difficulties (identification of the phrase with prenominal modification, identification of the head noun within the phrase, the use of opaque terms within the phrase, the use of non-technical vocabulary items that take on a specialized meaning in context, the use of symbols within the phrase, and the use of coined words in the phrase). The second type is linguistic and includes four specific difficulties (the recognition of semantic relationships, the grouping of words in phrases with more than one prenominal modifier, the reading of the word groups, and the recovery of deleted material). Traditional ESL instruction usually does not teach the student the ways in which these difficulties can be handled. It is as though the student is expected to innately be able to read and comprehend phrases with prenominal modification without formal instruction.

In the following chapter of this paper, phrases with prenominal
modification are examined through examples taken from Chapter 25 of Paul Samuelson's Economics. Content-related and linguistic problems that arise for the non-native English speaking student are explored in the analysis.
Chapter 3

DATA ANALYSIS

The prenominal modification found in Chapter 25 of Samuelson's *Economics* is analyzed in this paper. The phrases with prenominal modification are divided into two basic groups by the number of words per phrase and by the parts of speech of the words in the phrase. The categories under which the phrases are grouped are:

Nouns as Prenominal Modifiers

- Single-word compounds
- Two-word $N + N$ phrases
- Three- and Four-word $N + N + N (+N)$ phrases

Adjectives as Prenominal Modifiers

- Two-word Adj + $N$ phrases
- Three-word Adj + $N + N$ phrases
- Three-word Adj + Adj + $N$ phrases
- Three-word Adv + Adj + $N$ phrases
- Four-word Adj + $N + N + N$ phrases
- Four-word Adj + Adj + $N + N$ phrases
- Four-word Adv + Adj + $N + N$ phrases
- Four-word Adv + Adj + Adj + $N$ phrases
- Other four-word phrases
- Five- and Six-word phrases

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Symbols used in this chapter are:

N = noun
V = verb
Adj = adjective
Adv = adverb
Prep = preposition
Conj = conjunction
* = ungrammatical word or phrase

Lists of examples under each category will be given, followed by a discussion of the content-related and linguistic problems of reading and comprehending phrases with prenominal modification.

The method of analysis of the data in this paper is based on the semantic relationships of words within the phrase with prenominal modification. That is, the role of the noun or adjective prenominal modifier in relation to the way it affects the head noun and the meaning that is derived from phrases with prenominal modification are the basis of this author's method of analysis. Each category of nouns or adjectives as prenominal modifiers begins with a list of semantic categories taken in part from the work of George Dillon (1977). The semantic categories demonstrate how phrases that are similar in structure differ in meaning. Because of the abundance of meanings phrases with prenominal modification may have, the semantic categories used by this author are established solely to illustrate the importance of incorporating semantics in analyzing the phrases and the complexity of deriving meaning from the phrase that the student faces. Following each list of semantic categories, the various prenominally modified
phrases are discussed in terms of the content-related and linguistic problems presented in the preceding chapter of this paper.

**Nouns as Prenominal Modifiers**

**Single-word Compounds**

In Chapter 25 of Samuelson's *Economics*, 31 different single-word compounds were found. A compound is a word that is created by combining two words together to form a single word. Each individual part possesses a meaning that is different from that of the resulting compound. Many of these compounds appear within other N+N compounds. The following are examples from the text:

<table>
<thead>
<tr>
<th>Prep + N</th>
<th>N + N</th>
</tr>
</thead>
<tbody>
<tr>
<td>overview</td>
<td>businessman</td>
</tr>
<tr>
<td>output</td>
<td>saddlepoint</td>
</tr>
<tr>
<td>income</td>
<td>stockholder</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adv + N</th>
<th>Prep + Adj</th>
</tr>
</thead>
<tbody>
<tr>
<td>nothing</td>
<td>bygone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V + Prep</th>
<th>V + N</th>
</tr>
</thead>
<tbody>
<tr>
<td>setup</td>
<td>layman</td>
</tr>
<tr>
<td>payoff</td>
<td>trademark</td>
</tr>
</tbody>
</table>

As the examples show, a compound is created by the non-arbitrary combining of words of different parts of speech that together form a noun. The meaning of each word in the phrase is not the same as the meaning of the final compound, (thus, a *saddlepoint* is not a point on a saddle and a *layman* is not a man who lays things down). The major problem that students have with compounds is dealing with the opacity of meaning of the compounds. Each word must be treated by the student as
### Two-word N + N Phrases

In Chapter 25 of *Economics*, 161 different two-word N + N phrases exist. The semantic categories below are based on the semantic relationship of a noun modified by another noun. Examples to the right of the categories are taken from the text. Following the presentation of the categories and examples is a discussion of problems that are both content-related and linguistic.

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. proper noun</td>
<td>Marshall Plan</td>
</tr>
<tr>
<td>2. person/object that Vs</td>
<td>profit maximizer</td>
</tr>
<tr>
<td>3. N₂ that represents N₁</td>
<td>demand side</td>
</tr>
<tr>
<td>4. N₂ that is marked by symbolic N₁</td>
<td>dd curves</td>
</tr>
<tr>
<td>5. N₂ that results from N₁</td>
<td>pollution problem</td>
</tr>
<tr>
<td>6. N₂ within which N₁ is handled</td>
<td>wheat market</td>
</tr>
<tr>
<td>7. N₂ within which one Vs</td>
<td>auction market</td>
</tr>
<tr>
<td>8. N₂ people place upon/within N₁</td>
<td>toothpaste</td>
</tr>
<tr>
<td>9. N₂ powered by N₁</td>
<td>acid test</td>
</tr>
<tr>
<td>10. N₂ used to preserve/retain N₁</td>
<td>precision equipment</td>
</tr>
<tr>
<td>11. N₂ that resembles N₁</td>
<td>Hitler fashion</td>
</tr>
<tr>
<td>12. N₂ used to measure/judge N₁</td>
<td>cost levels</td>
</tr>
<tr>
<td>13. N₂ used to limit/specify N₁</td>
<td>intersection point</td>
</tr>
<tr>
<td>14. N₂ used to examine/explain N₁</td>
<td>equilibrium analysis</td>
</tr>
<tr>
<td>15. N₂ from which N₁ develops</td>
<td>game matrix</td>
</tr>
<tr>
<td>16. N₂ created to aid/regulate N₁</td>
<td>antitrust department</td>
</tr>
<tr>
<td>17. N₂ distributed by N₁</td>
<td>monopoly swag</td>
</tr>
<tr>
<td>18. N₂ (V) (of) N₁</td>
<td>price drop</td>
</tr>
<tr>
<td>19. N₂ that is done by N₁</td>
<td>individual pursuit</td>
</tr>
</tbody>
</table>
20. N₂ manufactured by N₁ monopoly good
21. N₂ that contains various producers of N₁ nylon industry
22. N₂ based on N₁ conditions value judgements
23. N₂ of N₁ steel output

The data illustrate the obvious difficulties in using the traditional approach to analyze phrases with prenominal modification. One such difficulty is that although all of the phrases above are similar in structure, they are not similar semantically.

The content-related problems that students may have in reading two-word N + N phrases like those listed in the semantic categories exist in these seemingly simple structures. As discussed earlier in this paper, the identification of the phrase with prenominal modification is a problem because many students are not able to separate the phrase from the rest of the sentence. In the example phrases, none contain the use of hyphens that may serve to call the student's attention to the compound. The identification of the head noun in the example N + N phrases is a second content-related problem that these data illustrate because it is not always clear which noun is the head noun. In the example individual pursuit, the head noun is clearly the second noun. However, in the phrase toothpaste, the head noun paste is not written as a separate word from the modifier tooth. In fact, toothpaste is treated by English speakers as a single word without a head noun, or as a head noun in such phrases as new toothpaste. The third problem, the use of opaque terms within the phrase, is also exemplified by these N + N phrases. For example, Marshall Plan is a compound that serves as a "name" for a concept. Marshall Plan is an opaque "name" that must be seen by students as a single word. The fourth
content-related problem the data illustrate is the use of non-technical vocabulary that take on a specialized meaning in context. For example, in monopoly good, the non-technical term good becomes specialized. The word good in economics becomes a noun that means a product and is not an adjective of quality. As monopoly good illustrates, there may be a confusion on the part of the student in deciding upon the role of non-technical vocabulary as specialized terms. Fourth, these N+N phrases are not arbitrary in their combinations. As we have seen, the order of both words in monopoly good, for example, is non-arbitrary. Thus, a monopoly good does not mean the same as a good monopoly. The order of the words within the phrase with prenominal modification cannot be changed by the student. Doing so results in a change of the meaning of the phrase. The final problem these data exemplify is the use of symbols within the phrase. The example dd curves contains the use of symbols as a single prenominal modifier. As discussed in the previous chapter of this paper, dd (demand-demand) is a symbolic representation of points on a curve found in a chart in Economics. The symbols carry a different meaning than do articles like the or some, and the student needs to be able to recognize this fact.

Thus, as we have seen, our N+N phrases illustrate six of the seven content-related problems that were mentioned in Chapter Two of this paper. The data, in addition, illustrate two of the four linguistic problems.

The first linguistic problem is the identification of the semantic relationships of the words within the phrase. Both acid test
from our data and economics test (which may be more familiar to a student) have a similar head noun. However, an acid test is a test that is powered by acid while an economics test is a test given to students to check their knowledge of economics. Also from the data, the examples wheat market and auction market have the same head nouns, yet a wheat market is an organization of buyers, speculators, sellers, and producers of wheat as a commodity and an auction market is an enclosed, sheltered area within which goods are sold at auction. The recognition of semantic relationships of words in N + N phrases is a linguistic difficulty because the relationships are not written out for the student. Instead, the student is expected by the economics teacher to be able to see the semantic relationships.

The second linguistic problem indicated by the data is the recovery of deleted material. Exactly what is deleted is not always evident, as our example, firm demand, shows. A phrase may have a number of possible meanings, and unless the student is able to select the correct meaning, he will not be able to comprehend the phrase or the sentence in which the phrase is found.

The two linguistic problems in N + N phrases and the six content-related problems show how a phrase that is simple in structure (such as a N + N phrase) requires a great deal of knowledge and ability on the part of the student to read and comprehend the phrase. The "simple" N + N phrase with prenominal modification is actually complex. The process of reading and comprehending phrases with noun prenominal modifiers becomes even more complicated when more noun modifiers are added to the phrase.
Three- and Four-word N + N + N (+N) Phrases

A total of 32 three- and four-word phrases of N + N + N (+N) were found in Samuelson's *Economics*, Chapter 25. The following examples are from the text:

1. "game-payoff" matrix
2. Crusoe-Planner optimum
3. sales revenue side
4. consumer money votes
5. MC supply story
6. firm supply levels
7. profit-payoff game matrix

In each of the examples above, the phrase consists of a head noun that is modified by two (or in example 3, by three) nouns. The six content-related problems discussed in the previous section of two-word N + N phrases continue to be difficulties for the non-native English speaking student. The two linguistic problems that were also discussed in the previous chapter exists for students when reading and comprehending N + N + N (+N) phrases, but in addition to these two problems, two more appear when the number of noun prenominal modifiers is increased.

The first of the additional problems is the grouping of words within the phrase, and the second is the reading of the groups of words. Both problems are inter-related and occur in phrases with more than one prenominal modifier.

As we have said, the grouping of words within the phrase with prenominal modification involves separating the words of a phrase into
groups according to meaning. Our example sales revenue side is grouped as

\[ \downarrow \]

(sales revenue) (side).

\[ 2 + 1 \]

In this example, the head noun side is modified by a group that consists of two nouns. In effect, the first group (sales revenue) consists of a noun (revenue) modified by another noun (sales), which together modify another noun (side). The groups of words are read from left to right and then from right to left. The whole phrase, then, can be interpreted as "the side (of a chart) that illustrates sales revenue." However, in example (4), consumer money votes, the grouping of the words is not like \( 2 + 1 \) as in sales revenue side, but instead is \( 1 + 2 \):

\[ \downarrow \]

(consumer) (money votes).

\[ 1 + 2 \]

In this example, the head noun, votes, is modified by a single noun money. Both nouns, in turn, are modified by another noun consumer. Thus, the whole phrase may be seen as meaning "money votes (that are made) by consumers." Both sales revenue side and consumer money votes show the complexity of word grouping and the importance of correct grouping for correct interpretation of the whole phrase.

The second additional linguistic problem a student would face with the complex phrases such as our data illustrate is the reading of the groups of words. The arrows in the above two diagrams for sales revenue side and consumer money votes illustrate the direction in which each group is read by the native English speaker. The arrows in both examples point to the left. This means that the phrases are left-
branching. The student reads the whole sentence, groups the words, reads from right to left, and then decides upon the meaning of the entire phrase. Grouping and branching are necessary steps in reading and comprehending phrases with prenominal modification.

The whole process of reading and comprehending phrases with prenominal modification must consist of a number of steps. First, the student must be able to recognize the phrase with prenominal modification as it appears in a sentence. Second, he must be able to identify the head noun within the phrase. This is more difficult now because he has three (or four) nouns from which to choose the head noun. Third, he must deal with the opacity of the meaning of certain N + N + N (+N) phrases. Example (2), Crusoe-Planner optimum, is a phrase that is opaque. Crusoe-Planner is a proper noun that modifies the head noun optimum. To understand the whole phrase, the student must treat Crusoe-Planner as a single noun. Fourth, the student must understand the role of non-technical vocabulary in the phrase. Example (6), firm supply levels, contains two non-technical vocabulary (firm and supply) that take on a specialized meaning in context. Fifth, the student must recognize the importance of the order of the words in the phrase. Instead of two possible combinations that a N + N phrase may have (as monopoly good and good monopoly), there are six grammatically possible combinations in the phrase firm supply level:

firm supply level  level firm supply
supply firm level  level supply firm
supply level firm  firm level supply
Word order is important because, as the above list of combinations shows, a change of word order results in a change of head noun and thus, a change in the meaning of the phrase. Sixth, the student must be able to recognize the use of symbols as representations of other words or concepts. Seventh, the student must identify the semantic relationships of the words within the phrase. Although semantic categories are not listed in this N + N + N (+N) section, the categories given on pages 26 and 27 of this paper can be used to illustrate how phrases that are similar in structure are different in semantic relationships. For example:

N₃ of proper noun N₁ + N₂
N₃ that creates N₁ of N₂ type
N₃ that represents N₂ from N₁
N₃ of N₂ made by N₁
N₃ of N₂ produced by N₁
N₃ of N₂ represented by N₁

Crusoe-Planner optimum
game-payoff matrix
sales revenue side
consumer money votes
firm supply level
MC supply story

As this list shows, the semantic categories are not as simple as those on pages 26 and 27. Eighth, the student must group the words in the phrase according to meaning, and ninth, he must read the groups back and forth. Finally, the student guesses about the appropriate deleted words and comes to a decision about the meaning of the phrase. As these ten steps illustrate, the process of reading and comprehending phrases with prenominal modification of the type found in the data is both difficult and complex. As more modifiers are added to the phrase, more difficulties arise for the student.
Adjectives as Prenominal Modifiers

Two-word Adj + N Phrases

The largest number of phrases with prenominal modification in Chapter 25 of Samuelson's Economics are of the two-word adjective plus noun type. A total of 443 different Adj + N phrases were found in the text. As in the previous discussion of nouns as prenominal modifiers, semantic categories are used to illustrate the semantic relationships of Adj + N phrases and the complexity of deriving meaning the student may have in interpreting the phrases. Unlike the N + N semantic categories, the categories used below deal with the attributive adjective as a noun modifier and the role of the adjective as a prenominal modifier. The categories are established by this author to serve as illustrations of the kinds of semantic relationships the Adj + N phrase may have.

1. Adj used to indicate part of a proper noun Common Market

2. Adj used to compare similar nouns hard question

3. Adj used to indicate similarity or differences without making a comparison with other nouns different firm

4. Adj used to indicate the existence of other nouns without making a comparison other giants

5. Ambiguous Adj used to indicate the existence of some standard good ammunition
6. modalized Adj used to indicate author's opinion
   important concept
7. Adj used to indicate spacio-temporal relationships
   old days
8. Adj used to indicate number, amount, or totality
   scarce land
9. Adj used to indicate direction or location of noun
   downward tilt
10. Adj used as enumerator
    second kind
11. Adj used to express reflexive relationships
    selfish interest
12. Adj used to imply the existence of a hierarchy of structure and/or options
    elementary calculus
13. Adj used as a restatement of simple addition
    electronic computer
14. Adj used to specify a physical property of noun
    light data

As the above categories indicate, the role of the adjective in a phrase with prenominal modification differs from the role of the noun as a prenominal modifier. All of the examples listed above are similar in structure (adj + N), yet the role of the adjective in relation to the head noun is different in each phrase.

The categories listed above are different from those of the N + N phrases because the basic role of an adjective is to give certain attributes or characteristics to the noun in the phrase. The different
roles of the adjectives in the phrase with prenominal modification are difficult for students to recognize because the roles are not written out in the phrase for the student. The relationships are underlying and can only be guessed at.

The semantic relationships are not written out for the student because they are deleted in the phrase. For example, hard question is a phrase in which material has been deleted. The recovered material may be guessed as "a question that is 'harder' or more difficult than another question." The recovery of the material in this example from our data is not difficult. However, in phrases like good ammunition and old days, recovery of the deleted material is more difficult. In good ammunition, the adjective good is ambiguous. Good ammunition may mean ammunition that is inexpensive, appropriate for a specific purpose, convenient in size, or high in explosive quality. The old days requires the reader to place himself within the time and place of the discourse. The old days the textbook's author writes about may not be the same "old days" of the reader. Thus, the reader must place himself within the discourse to understand exactly when and where the old days took place. The recovery of deleted material is not a simple process.

Both the Adj + N and the N + N phrases discussed thus far share the same content-related problems students have in reading phrases with prenominal modification. The linguistic problems that Adj + N phrases hold for the student are different, and these problems were discussed in this Adj + N section. The additional linguistic problems of grouping of the words within phrases with more than one modifier and the
reading of the groups will be included in the remainder of the phrases with adjective and adverb prenominal modifiers.

Three-word Adj + N + N Phrases

A total of 89 different Adj + N + N phrases were found in Chapter 25 of Economics. The following seven phrases are examples taken from Chapter 25:

1. idealized monopoly firm
2. sloping demand curve
3. alternative rail routes
4. permanent government subsidy
5. decreasing cost producers
6. imperfect-competition setup
7. 10-year crimes

The linguistic problems these phrases entail, such as word groups, branching, semantic relationships, and deleted material, are the most difficult problems for the student. These problems are interrelated and illustrate the complexity of the process of comprehending prenominal modification.

Incorrect grouping results in incorrect reading of the phrase, incorrect interpretation of semantic relationships, and incorrect recovery of deleted material. For example, phrase (4) is correctly grouped as

\[(permanent \ (government \ subsidy)\]

and is read as "a government subsidy that is permanent." The semantic relationships may be written as "Head Noun made by N₂ (government) with an adjective used to indicate a temporal relationship." Incorrect grouping,

\[(permanent \ government) \ (subsidy),\]
results in incorrect reading of recovered material ("a subsidy that is made by a permanent government") and an incorrect semantic category ("Head noun made by N₂ with N₂ modified by an adjective used to indicate a temporal relationship.") In another example, correct grouping,

(10-year) (crimes),

results in correct reading (based on the context in which the phrase is found) as "crimes that result in jail sentences of 10-years." The semantic category from this phrase is "Head Noun that create Adj + N₂ - long sentences with Adj + N serving as a single adjective prenominal modifier." If the student were to group the words incorrectly, such as

(10) (year crimes),

he would incorrectly interpret the phrase as meaning "crimes that last a year that are ten in number" or "ten crimes that result in one year-long jail sentence per crime." The semantic category for this grouping may be written as "Head noun that results in N₂ - long sentences with an adjective used to indicate a temporal relationship."

The discussion of the linguistic difficulties that these phrases hold for the non-native English speaker illustrate once again how complicated the reading and comprehension process or prenominal modification actually is.

Three-word Adj + Adj + N Phrases

In Chapter 25 of Economics, 60 different phrases of the Adj + Adj + N type occurred. The following examples are from the chapter:
1. efficient, perfect competition
2. efficient perfect-competition
3. true Marginal Cost
As in all of the phrases with prenominal modification discussed earlier in this chapter, the content-related and linguistic problems that come up for non-native English speakers illustrate how the process of reading and comprehending the phrases is not as simple as it may seem to the native English speaker. As more modifiers are added to the noun phrase, the process becomes increasingly more difficult and complicated.

The linguistic problems that the student faces with these Adj + Adj + N phrases are, once again, the major obstacles for the comprehension of the phrase. In these phrases, the role of the adjectives poses a great problem. Unlike the semantic categories listed on pages 33 through 34 in which there is only one adjective in the phrase, the Adj + Adj + N phrases contain two adjectives. Each adjective plays a particular role in relation to the other adjective and the head noun. For example, (3) true Marginal Cost is a phrase that contains one adjective used as part of a proper noun (Marginal) and another adjective used as an ambiguous modifier based on some standard.

The role of the adjectives is not the only problem the student faces. The linguistic problems of grouping the words in the phrase and the reading of the groups are also difficult for the student to accomplish. For example, (1) efficient, imperfect competition is grouped as

(efficient) (perfect) (competition)

and is read as "competition that is both perfect and efficient." In this example, grouping is aided by the use of the comma as an indicator of the modifiers as being in a list. Example (2), on the other hand, contains a hyphen that aids the student in the correct grouping of the
phrase. Although this phrase has the same words as example phrase (1), (2) has a different meaning and thus, a different grouping:

\[
\text{(efficient)} \quad \text{(perfect-competition)}.
\]

Grouped as such, the phrase is read as "the concept of perfect-competition that is efficient."

In Adj + Adj + N phrases, the linguistic problems that the student must solve illustrate the complexity of the process of reading and comprehending the various kinds of phrases with prenominal modification.

**Three-word Adv + Adj + N Phrases**

There are 24 different phrases of this type in Chapter 25 of *Economics*. Examples are:

1. somewhat differentiated products
2. truly perfect competition
3. more elaborate ways
4. only safe guarantee

The one consistent feature of phrases with prenominal modification is the existence of the content-related and linguistic difficulties that arise in the reading and comprehension of the phrases. The content-related problems presented in the section of N + N phrases earlier in this chapter continue to create problems for the student. As before, the linguistic problems are the most difficult for the student.

The importance of proper grouping as a linguistic problem is illustrated by example (3) *more elaborate ways*. If the adverb is used as the comparative (i.e., big, bigger, biggest; beautiful, more
beautiful, most beautiful), the grouping of the words in the phrase would be:

\[
\text{(more elaborate) (ways)}
\]

and the recovered material is "ways that are more, and not less, elaborate." However, if the role of the adverb is to indicate number or amount, the grouping would then be:

\[
\text{(more) (elaborate ways)}
\]

and is read "more, and not fewer, ways that are elaborate." Thus, the student needs to understand the intended meaning of the phrase as it appears in the larger context before he can group the words in the phrase.

In most phrases with prenominal modification in which an adverb is used, proper grouping of the words is crucial for grammatical results. That is, unlike other phrases without adverbs, phrases with adverbs as prenominal modifiers require that the student correctly group the words within the phrase because failure to do so results in ungrammatical paraphrases. (1) somewhat differentiated producers may be grouped as

\[
\text{(somewhat differentiated) (producers)}
\]

to be read as "producers that are somewhat differentiated." Incorrect grouping,

\[
\text{(somewhat) (differentiated producers)}
\]

leads to an ungrammatical paraphrase: *"differentiated producers that are somewhat," In another example, (2) truly perfect competition is correctly grouped and read as

\[
\text{(truly perfect) (competition)},
\]
"competition that is truly perfect." Once again, incorrect grouping leads to an ungrammatical paraphrase:

(truly) (perfect competition),

*"perfect competition that is truly."

Thus, the use of the adverb in phrases with prenominal modification illustrates the importance of recognizing the roles of adjectives (and adverbs) in relation to the changes they make in the head noun.

**Four-word Adj + N + N + N Phrases**

Three examples of the 11 Adj + N + N + N phrases found in Chapter 25 of Economics are:

1. real-world market structure
2. stable minimax saddlepoint solution
3. maximum-profit equilibrium position

Because of large number of words that appear in the following sections of four-, five-, and six-word phrases, the complexity of reading and comprehending the phrase with prenominal modification reaches its maximum point. The content-related problems continue in this section. In fact, an additional problem is introduced in this section. Example (2) stable minimax saddlepoint solution contains the coined word minimax. As we have said, coined words, like opaque words, must be treated as single words. Words like minimax, thorms, and smog are words that are created from parts of other words. Minimax was created from mini(mum) + max(imum), thorms from th(under) + (st)orms, and smog from sm(oke) + (f)og. The use of coined words within the phrase with prenominal modification, then, is a content-related problem
that students have.

In the area of linguistic problems, the four difficulties that students face continue to create obstacles to comprehension of the phrase. As more words are used in the phrase, the semantic relationships of the words become less clear and more complex. For example, in real world market structure, the roles of the adjective real and the nouns may be written into a semantic category like "N₃ used to organize N₂; Adj₁ used to restate the N₂." Example (2) stable minimax saddlepoint solution may be written as "N₃ of N₂; N₂ with Adj₁ used to specify a physical characteristic of N₃." The semantic relationships of the adjectives and nouns within a phrase become more complicated for the student to recognize.

The recovery of deleted material in phrases such as real world market structure, stable minimax saddlepoint solution, and maximum-profit equilibrium position is a problem because, as shown earlier in this paper, exactly what is deleted is not necessarily obvious. The recovery of deleted material is based on the problems of grouping of the words within the phrase with prenominal modification and the reading of these groups. To recover the deleted material in, for example, real world market structure, the student must first group the words, such as

(↑)
(↑)

(real world) (market structure),

then reads the groups to recover the deleted material ("the structure of the market as it appears in the real world" and not as it may appear in theory or under ideal conditions). Similarly, to recover the deleted material in maximum-profit equilibrium position, the words are grouped,

(↑)
(↑)

(maximum-profit) (equilibrium position),
and then read back and forth. The resulting paraphrase is "an equilibrium position that marks maximum-profit." As both examples show, the process of recovering deleted material from the phrase with prenominal modification is complex.

Four-word Adj + Adj + N + N Phrases

A total of 12 different phrases of the Adj + Adj + N + N type occurred in Chapter 25 of Samuelson's text. The following examples are taken from the text:
1. green Total Profit curve
2. special large-group case
3. independent integrated steel producers

Linguistically, there are two possible groupings for Adj + Adj + N + N phrases. The proper grouping of the words is important if the student is to comprehend the phrase. One type of grouping separates the head noun from the modifiers. Example (1) and (2) above require this type of grouping:

\[
\begin{align*}
\text{(green) (Total Profit) (curve)} \\
\text{(special) (large-group) (case)}.
\end{align*}
\]

Example (1) can be read as "a green curve of Total Profit" and (2) can be read as "a special case of a large group."

The second type of grouping is illustrated in example (3).

This type of grouping separates the first two modifiers from the rest of the phrase. Thus,

\[
\begin{align*}
\text{(independent) (integrated) (steel producers)}.
\end{align*}
\]

The phrase may be read as "steel producers that are both independent and integrated."
The two groupings show that correct grouping of a phrase is not always clear to the student. It is important that students be able to group the words within the phrase. Proper grouping is facilitated if the student recognizes the semantic relationships of the words within the phrase. For example, if the student recognizes the role of the noun steel as being a direct modifier of producers ($N_2$ of $N_1$), he will group them together as they should be grouped. The semantic relationships of words, then, is directly related to the recovery of deleted material, the grouping of the words within the phrase, and the reading of the groups.

**Four-word Adv + Adj + N + N Phrases**

Five different phrases of this type were found in the chapter of Samuelson's text. Three examples are:

1. essentially horizontal dd curve
2. socially inefficient P-MC discrepancy
3. very large-scale production

The linguistic problems in the phrases are difficult for the student to solve.

Recognition of the semantic relationships of the words within the phrase with prenominal modification is the first linguistic problem for the student. The relationships become more difficult because as more words are added to the phrase, more roles of the added words must be accounted for. In example (1) essentially horizontal dd curve, the head noun (curve) is modified by a noun (dd) that serves as a symbolic representation of another concept, by an adjective (horizontal) used to indicate the direction of the head noun, and an adverb (essentially) that directly modifies the adjective that follows it.
Grouping of the phrase can then be made as
\[ \sqrt{2} + 2 \]
(equally horizontal) (dd curve)
and read as "a dd curve that is essentially horizontal."

Example (3) can be used to demonstrate another type of grouping for Adv + Adj + N + N phrases. The phrase very large-scale production is not grouped as 2 + 2 above. Instead, the phrase is grouped as 3 + 1, or
\[ \sqrt{3} + 1 \]
(very large-scale) (production)
and is read as "production that is very large-scale." If the phrase was grouped as 1 + 2 + 1 or 2 + 2, the results would be as follows:
\[ \sqrt{2} \quad \sqrt{2} \quad \sqrt{2} \]
(very) (large-scale) (production)
*"production that is large scale and very," or
\[ \sqrt{3} \]
(very large) (scale production)
"scale production that is very large."

Thus, in this section, as in other sections, the process of reading and comprehending phrases with prenominal modification becomes more and more complex.

Four-word Adv + Adj + Adj + N Phrases

Of the Adv + Adj + Adj + N phrases found in Chapter 25 of *Economics*, eight different phrases occurred. Examples are:

1. necessarily existent stable saddlepoint
2. lower horizontal green arrow
3. strictly defined perfect competition

In all of the example phrases above, the semantic grouping of the words is the same (2 + 2):
The deleted words are basically the same in all of the phrases. The only, yet not unimportant, difference is the semantic relationships (roles) of the various adverbs and adjectives as they relate to the head noun. In (1), the semantic relationships can be written as "N (saddlepoint) modified by Adj₂ (stable) used to indicate a physical property of the N; Adv (necessarily) used to directly modify Adj₁ (existent); Adj₁ used to indicate the existence of the Adj₂ + N."

(2) can be expressed as "N with Adj₂ used to specify a physical state; Adv used to directly modify Adj₁; Adj₁ used to indicate the direction of N." Finally, (3) can be categorized as "N with Adj₃ used as part of a proper noun; Adv used to directly modify Adj₁; Adj₁ used to indicate an action made by the author upon the N."

Thus, as more adverbs and adjectives are used within a single phrase, not only are content-related skills required of the student, but also linguistic skills are required of the student if he is to comprehend the phrase with prenominal modification.

Other Four-word Phrases

The other four-word phrases found in the chapter of Economics are grouped together in this section. Fourteen such phrases exist, and
the following are examples:

1. green-dot stable saddlepoint
2. long-run average cost
3. not-yet-exhausted economies
4. loss-in-revenue term zero
5. differentiation-of-product convenience

The remainder of the four word phrases are of three basic types. (1) and (2) are of the first basic type. Both phrases consist of Adj + N + Adj + N. Grouping of the phrases is 2 + 2.

The second basic type is (3). The phrase is made of Adv + Adj + Adj + N, and is grouped 3 + 1. The first group (not-yet-exhausted) is treated by native English speakers as a single (word-like) adjective. For this reason, all three words are grouped together.

The third basic type of phrase in this section of "other four-word phrases" are in (4) and (5). Both phrases consist of N + Prep + N + N, and each is grouped as 3 + 1. The role of the first group is to serve as a single (word-like) noun modifier. Furthermore, (4) contains a post-nominal modifier that may cause the content-related problem of the identification of the head noun to be especially difficult.

The three basic types of "other four-word phrases" show how a variety of words from different parts of speech may appear in different combinations within the phrase. In addition, some groups of words are treated by the native English speaker as a single adjective (as Adv + Adv + Adj in not-yet-exhausted or as a single noun modifier (as N + Prep + N as loss-in-revenue and differentiation-of-product). The non-native English speaker may not be able to recognize the use of
the groups of words as individual words, and without prior experience in the ESL classroom with such groups, the student cannot be expected by his teachers to automatically handle such groups with the ease of a native English speaker.

**Five- and Six-word Phrases**

Because of the large variety of combinations of parts of speech that appear in the seven different five- and six-word phrases found in Chapter 25, these phrases are grouped together. The four basic types of five- and six-word phrases are exemplified in these examples:

1. permanent government lump-sum subsidy
2. efficient U-shaped cost curves
3. new H' break-even point
4. identical (or almost identical) product
5. common-sense trial-and-error procedure

The examples above illustrate the different combinations of parts of speech that can appear in phrases with prenominal modification. Example (1) is Adj + N + N + N + N, (2) is Adj + N + Adj + N + N, (3) is Adj + N + V + Adv + N, (4) is Adj + (Prep + Adv + Adj) + N, and (5) is Adj + N + N + Conj + N + N. In addition to the content-related problems that occur in all phrases, the linguistic problems of the semantic relationships of the words, the grouping and reading of the words within the phrase, and the recovery of deleted material are the most difficult problems for the non-native English speaker. These phrases demonstrate the complexity possible with prenominal modification. As more words are placed into the phrase, more information must be accounted for.

The phrases with prenominal modification listed in this chapter
were discussed through problems that students face in reading and comprehending the phrases. Two general problem areas are those problems that are related to the content of the phrase as it appears in the larger context and those problems that are not related to the context of the phrase but instead involve aspects of prenominal modification regardless of the context in which the phrase is found.

It was also shown that combinations of adverbs, adjectives, prepositions, conjunctions, verbs and nouns may appear in the phrase with prenominal modification. Moreover, as more words and combinations of words are added to the phrase, the process of reading and comprehending the phrase becomes more difficult and more complex. Often the student is required to guess the meaning of the phrase, and without benefit of formal classroom instruction, the student may not be able to correctly recover the deleted material. The process of reading and comprehending phrases with prenominal modification is complex, and the ESL teacher must be aware of the problems the non-native student may face.
Chapter 4

FINAL SUMMARY AND CONCLUSION

SUGGESTIONS FOR ESL TEACHERS

The problems faced by the non-native English speaking student in academic, major field courses have been illustrated through an analysis of prenominal modification in an economics textbook. Certain difficulties in the process of recovering deleted material from the phrases have appeared consistently throughout.

Summary

It was the purpose of this paper to illustrate the complexity of the reading and comprehension process of noun phrases with prenominal modification. The major contentions made in this paper are:

1. That reading and comprehending noun phrases with prenominal modification is a complex process involving a number of steps,
2. That the complexity of reading and comprehending these noun phrases cause difficulties that are content-related and linguistic for the non-native English speaking student, and
3. That the student is often not prepared in the ESL classroom to solve these problems.

An analysis of the reading and comprehension process of phrases with prenominal modification was presented through examples taken from Chapter 25 of Samuelson's Economics. It was found that two basic types of problems exist. The first type is the content-related difficulties. Difficulties of this type are (1) the identification of the phrase within the larger context, (2) the identification of the
head noun within the phrase, (3) the use of opaque terms within the phrase, (4) the use of non-technical vocabulary that takes on a specialized meaning within the phrase, (6) the use of symbols within the phrase, and (7) the use of coined words within the phrase. The second type of problems is linguistic, and these difficulties are (1) the recognition of semantic relationships among words within the phrase, (2) the grouping of words within the phrase, (3) the reading of the word groups, and (4) the recovery of deleted material.

It has been suggested in this paper that ESL teachers can best serve their students by giving them basic vocabulary and word-attack skills before they enter academic courses. This author believes that the ESL teacher should be aware of these problems and help students to find ways in which these problems can be solved.

Suggestions for ESL Teachers

The teacher should begin by instructing the students on the basics of the creation and usage of prenominal modification. The function of prenominal modification should be explained to the students. The basic function of prenominal modification is to serve as a naming device to denote relevant categories. As we have seen, a phrase like monopoly price is language-economic rather than clearly descriptive. A description of monopoly price would require the use of at least six words: a price determined by a monopoly. Because English often requires that its speakers communicate as much information as possible in the least amount of structure, the students should learn how they can use prenominal modification to make their English more language-economic.

Another area the ESL teacher should instruct his students is
in the recognition of the phrase with prenominal modification and the recognition of the head noun within the phrase. As we have seen, it is not always evident which noun in a phrase is the head noun. The students, therefore, should become familiar with pre- and post-nominal modifiers within the phrase through exercises that require the students to identify the head noun.

In addition to instruction in the recognition of the phrase with prenominal modification and the head noun within the phrase, the students should also understand the use of the phrase as a single unit. An opaque phrase that has undergone a petrification of meaning may have to be explained to the class. These items (market economy, Common Market, Invisible Hand, etc.) are opaque because the meaning of the phrase cannot be determined from the meaning of its parts. As these opaque terms, also called compound lexemes, come up in the reading, the students should be taught to treat them as individual words.

Besides compound lexemes, the students should learn how new words are created in a language and how coined words can be used in phrases with prenominal modification. Examples of more common coined words (smog, gimmick, etc.), as they come up in the reading, should be presented to the students.

A fifth area in which the students should be instructed is the use of symbols, numbers, and non-technical vocabulary in phrases with prenominal modification. There are two basic types of vocabulary: words, symbols, and the like that are seen as part of the economics course and those that can be taught in the ESL reading class. It has been stated that the ESL teacher cannot be expected to know all the vocabulary the students will need. However, because economics and non-
economics English share some terms, ESL teachers should not feel that an English for Special Purposes course is one which presents only specialist terms (such as product differentiation, Marginal Cost competitor, imperfect competitor, etc.) and is, therefore, impractical if there are students from other disciplines within the same class. Indeed, as this paper shows, a great many of the terms are recognizable to the economics major and the non-economics major alike (i.e., firm, demand, low, etc). The use of non-technical vocabulary that takes on a specialized meaning is common in phrases with prenominal modification. Instead of trying to cover all of the vocabulary the students may encounter, the ESL teacher should teach shared vocabulary words as they arise in the reading in a way that encourages students to be receptive to ranges of meaning that a particular word might have. The students should be taught to use context in narrowing in on the correct definition of a word with a wide range of meanings. This learning strategy should help to prevent some of the frustration that comes with learning lists of vocabulary.

The linguistic problems of the identification of semantic relationships of words within the phrase with prenominal modification, the grouping of the words within the phrase, the reading of the word groups within the phrase, and the recovery of deleted material and the ways in which these problems may be solved can be taught to the students. Semantic categories like those used in this paper can be presented and their use demonstrated to the students. The basic types of grouping can be illustrated through examples of phrases with more than one prenominal modifier as they come up in the reading. The process of reading the groups and recovering the deleted material should be taught to the class. These linguistic problems are not easy for the students
to learn initially because there are no set rules that can be taught that govern the process. The students should at least become familiar with the recovery process and should have practice in paraphrasing.

Another area with which the student should be familiar is that of the use of affixes. Many different affixes appear in the phrases with prenominal modification in Chapter 25 of Samuelson's Economics as the following list shows:

Prefixes:
anti- antitrust regulation
co- viable coexistence
cross- effective crosshaulage
im- imperfect competition
in- insufficient amount
inter- interpersonal communication
non- nonhorizontal curve
over- usual overcapacity
pre- premarginal units
rect- shaded rectangle
tele- television channel
tri- green triangle
un- unnatural differentiation

Suffixes:
-able/-ible tolerable difference/invisible point
-age specific wastage
-al technological advance
-an Gilbrathian converts
-ance/-ence unit clearance/notable difference
-ancy/-ency life expectancy/resulting inefficiency
The affixes that appear in a text may help a reader in two ways. First, they may aid in identifying the part of speech (as noun, adjective, etc.) of words, and second, they add a predictable meaning to the words to which they are attached. For example, the -er/-or suffix changes a verb to a noun and means "an object or person that Vs (that does the action of the verb in the phrase)." Thus, the student who knows the meaning of this affix will be able to define words like seller as "one
who sells" and competitor as "one who competes." Knowledge of the use of affixes provides the student with a word-attack skill he can use in and out of the ESL classroom.

In addition to knowledge of the areas discussed above, basic rules on the other aspects of prenominal modification should be included as part of the ESL grammar class syllabus. Students should be familiar with the role and makeup of prenominal modification. They must know the most common parts of speech or words used in these structures. They must be taught nominalization of a verb plus particle and reflexives. In short, the students should begin to discover the means by which phrases with prenominal modification can be read and comprehended.

William Rutherford (1968) has included exercises on compounds and prenominal modification in his ESL texts. The following suggested exercises are based on his work. They serve as a basis from which teachers may create their own exercises and should be accompanied by explanations and follow-up activities.

**Exercise 1: The role of prenominal modification and the deletion of material through noun compounding**

(To begin a study of the purpose and creation of phrases with prenominal modification, a basic exercise should include relevant vocabulary and should gradually be graded to deleted strings of words and go from tangible to abstract objects and concepts.)

1. The people (in the) office were helpful. The office people were helpful.
2. The club is for the faculty. It's a faculty club.
3. The equipment (is for the) farm. It's farm equipment.
4. The company (manufactures) nylon. 
   It's a nylon company.

5. The market (for selling) wheat is increasing. 
   The wheat market is increasing.

Exercise 2: Nominalization of Verb + Particle³ (Nominalization of 
this type should illustrate the relationship of the verb to the nomi-
nalized item.)

1. They're stopping over in Honolulu. 
   It's a stopover.

2. The machines are breaking down. 
   It's a breakdown.

3. They're setting up the plan. 
   It's a setup.

4. They're viewing the situation over. 
   It's an overview.

5. They're putting in ideas. 
   It's input.

Exercise 3: Nominalization of verbs with -er/-or affixes with animate 
or inanimate resulting subjects⁴

1. He teaches Economics. 
   He's an Economics teacher.

2. She paints houses. 
   She's a house painter.

3. They manufacture automobiles. 
   They're automobile manufacturers.

4. It opens cans. 
   It's a can opener.

5. It detects lies. 
   It's a lie detector.

Exercise 4: Nominalization of reflexives⁵

1. He criticizes himself. 
   It's self-criticism.
2. They can govern themselves.  
   It's self-government.

3. They defend each other.  
   It's mutual defense.

4. They support each other.  
   It's mutual support.

Exercise 5: Prenominal modification, -ing form

1. The rain's pouring down.  
   It's pouring rain.

2. The building's burning.  
   It's a burning building.

3. The economy's working.  
   It's a working economy.

4. The costs are deceasing.  
   They're decreasing costs.

5. The country is developing.  
   It's a developing country.

Exercise 6: Prenominal modification, agent nouns

1. It's a standard of living.  
   It's a living standard.

2. It's an edge used for cutting.  
   It's a cutting edge.

3. It's a place of meeting.  
   It's a meeting place.

4. It's a price of selling.  
   It's a selling price.

5. It's a streak of winning.  
   It's a winning streak.

Exercise 7: Nominalization formed by relative marker deletion, front-

ing, and the use of V-ing

1. What's a business that grows fast?  
   A fast-growing business.

2. What's a decision that reaches far?  
   A far-reaching decision.
3. What's a committee that finds facts?
   A fact-finding committee.

4. What's an agency that protects consumers?
   A consumer-protection agency.

5. What are reforms that have a wide range?
   Wide-ranging reforms.

Exercise 8: Deletion of the relative marker + be

1. He is a nurse who was trained by the hospital.
   He's a trained nurse.

2. He is a professor who is visiting the university.
   He's a visiting professor.

3. It is a triangle that is shaded by the author.
   It's a shaded triangle.

4. It is a strategy they use to respond with.
   It's a responding strategy.

Conclusion

The process of reading and comprehending phrases with prenominal modification is complex and difficult. ESL reading and grammar texts found in the field, in this author's opinion, do not adequately provide for teaching of the ways by which students may solve the content-related and linguistic problems. Further research is needed in the development of teaching strategies and materials that ESL teachers can use to help students better accomplish the process of reading and comprehending phrases with prenominal modification.
FOOTNOTES

Chapter 1


2 Ibid., 288.


5 Ibid., p. 41.


9 For a list of ESL grammar textbooks, see Bibliography reference list.

10 For a list of ESL reading texts, see Bibliography reference list.


12 Andrew Cohen and others, "Reading English for Specialized Purposes," TESOL Quarterly, XIII (December 1979), 551-553.

13 Adverbs, adjectives, nouns, prepositions, verbs, and conjunctions in noun phrases with prenominal modification were counted. Articles and proper names were not counted.

14 Cohen and others, op. cit., p. 553.


Chapter 2


Chapter 4


2. William Rutherford, Modern English (New York: Harcourt, Brace and World, 1968), pp. 46-47. The author used this information in exercises 1 and 2 on pages 57 and 58 of this study.

3. Ibid., p. 99. The author used this information in exercise 1 on page 57 of this study.

4. Ibid., p. 113. The author used this information in exercises 4 and 5 on pages 58 and 59 of this study.
6 Ibid., p. 140. The author used this information in exercises 1, 2, 3, and 5 on page 59 of this study.

7 Ibid., p. 223. The author used this information in exercises 1-5 on page 59 of this study.

8 Ibid., p. 223. The author used this information in exercise 1 on page 59 of this study.
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