# THE READING-WRITING CONNECTION: AN ANALYSIS OF THE WRITTEN LANGUAGE OF UNIVERSITY FRESHMEN AT TWO READING LEVELS

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## PREFACE

This study is the result of four years of study of language relationships, an area of interest that I have developed through my experiences teaching and observing secondary-level students. Throughout my graduate career, several individuals have provided invaluable support and encouragement.

To Dr. Charles Smith and Dr. Bernard Belden, I am grateful for their contribution to my academic preparation in the field of reading and for their patience, encouragement, and understanding throughout the preparation of this study. I would also like to thank Dr. Barbara Peel for introducing me to the discipline of Learning Disabilities; her inspiration and encouragement have been a source of intellectual as well as personal satisfaction. To Professor of English Dr. Jud Milburn, I extend my gratitude for his interest in research in this related field.

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TABLE OF CONTENTS

LIST OF TABLES

# CHAPTER I

# THE READING-WRITING CONNECTION

## Introduction

Reading and writing are two language skills traditionally considered basic to classroom success at any level. Educators, especially language arts teachers, have long recognized a relationship between reading and writing. The "connection" has often been articulated in the following manner: Most students who are bad readers are also bad writers. Some good readers are also bad writers. But generally speaking, the better readers are also the better writers. Even though the connection is recognized, reasons which account for the relationship between reading and writing are still the subject of much speculation.

Some educational theorists have described the link between reading and writing skills according to principles of linguistic theory. For example, Means (1976) considered the possibility that poor readers have not internalized the "surface features" of the language and, as a result, have difficulty making sense of long narratives or expository passages. The concept of "surface features" refers only to the visual, written representations of language and the grammatical relations inherent in the visual representation.

Some of the more important surface feature cues that a "competent" reader uses include the following:

> 1) word order and internalized knowledge of the relations these reflect, 2) pattern markers, such as inflections and function words, and 3) punctuation which serves to set off phrases, clauses, and complete sentences (Newirth, 1976, p. 29).

Means suggested that such students who have not internalized surface features of the language "have no concept for a series of carefully composed, interrelated ideas, because they have never read and understood such a series and have little idea how to compose one" (p. 82). He further noted that many poor composers write in a "telegraphic style," leaving out many of the inner transitions and repetitions necessary for easy reading. "Such a telegraphic style presents information to the reader without introduction, without context, and often without essential explanatory detail and reader cues" (p. 82). The student who leaves out essential surface feature cues when he writes may also be missing these cues while he is reading. Just as the omission of the key pieces of a puzzle may make its completion impossible, failure to recognize specific surface features (i.e., transitional words) may result in poor general reading comprehension.

Does poor reading comprehension affect written expression? It is logical to assume that students who miss important words and phrases when they read may also, as a result, omit or confuse the use of these same words and phrases in their own writing. Other theorists have sug-

gested the above may indeed be true.

Carkeet (1977, p. 685) discussed the problem of "retention" in both reading and writing and speculated, "If one writes in discrete, unrelated chunks /i. e., Means' 'telegraphic style' concept/, one probably reads in discrete, unrelated chunks." Though there is no empirical evidence to prove his theory, it is nonetheless possible that writers who forget two-thirds of the way into a sentence what has gone on before are likely readers who are poor comprehenders. Carkeet's examples of retention problems in writing focused on the problem of unnecessary redundancy: "He talks about how hardly no one is really, deep down, is happy" (p. 683). The student who wrote the sentence may not have conceptualized the whole sentence before putting pencil to paper. Such "word by word" writing, like "word by word" reading, does not make use of all surface feature cues necessary to convey (or comprehend) the whole meaning.

Reading theorist Frank Smith (1971) discussed the importance of surface feature cues in relation to passage meaning:

> . . . the rules of syntax, the rules by which sentences are ordered, . . . mediate between meaning and surface representation. For the speaker or writer, the rules of grammar are not just the rules he applies to organize his statements--they are the rules he implicitely assumes the receiver knows in order to be able to extract meaning from statements. For the listener or reader, grammar is the key to comprehending language (p. 38).

Smith's point supports Means' suggestion that poor writers

may not have internalized important surface features of the language. If the reader/writer does not know implicitly the grammatical relations of his language which give rise to meaning, then this lack of "linguistic awareness" will interfere with reading comprehension and written expression.

In view of the theories linking reading and writing, some speculations might be made in relation to the "competent" writer. Competent writers may use their internalized (unconscious) knowledge of surface features to convey, as clearly as possible, an intended meaning. In one sense, competent writers may be modeling grammatical structures which they have encountered while reading. Successful reading introduces one to a variety of complex surface features and adds to one's linguistic awareness. Again, there is no empirical evidence to support these conjectures. But researchers have recently begun to analyze written language from the perspective of "maturity." Writing maturity has been described in terms of the surface features of the language. Such a technique for describing written language may provide a basis for comparisons between expressive (writing) and receptive (reading) language skills.

Hunt's Grammatical Structures Written At Three Grade Levels (1965) is considered to be the most definitive written language research in recent years. Hunt's study offers "the possibility of establishing objective criteria for measuring language change that make testing of curricular theories possible" (p. iv). Language change naturally

occurs as children get older; thus, the concept of writing "maturity" refers to those syntactic surface features that ordinarily become more complex and well-ordered as the writer grows older. For example, the sentences of fourth graders characteristically contain significantly greater numbers of coordinated main clauses than those of twelfth graders who, conversely, subordinate their ideas much more often (Hunt, 1965). Subordination is considered to be a more complex structure than coordination, as illustrated below:

Coordination: Mom did the ironing and Dad watched TV.

Subordination: While Mom was ironing, Dad watched TV.

Hunt's description of various syntactic elements of written language characteristic of grade levels four, eight, twelve, superior adult (1965), and average adult (1970) is useful in designing an objective technique for the analysis of writing skills exhibited by good and poor readers. As a result, five provocative questions concerning the relationship between reading and writing may be raised:

1. Is the writing of good readers more syntactically mature than that of poor readers?

2. Can one characterize the writing of good readers?

3. Can one characterize the writing of poor readers?

4. Which syntactic elements of writing are most strongly related to reading?

5. How may one account for the relationship between reading comprehension and related elements of writing?

## Purpose of the Study

The purpose of this study was to examine the relationship between general reading comprehension and twenty-one syntactic elements of written language produced by university freshmen at two reading levels, high and low.

## Statement of the Problem

In order to examine the connection between reading and writing skills of university freshmen, two language skills were sampled. The subjects' silent reading comprehension was measured by a standardized test. Each subject also wrote two expository themes. Themes were subjected to a syntactic analysis of 21 elements of written language. Syntactic writing characteristics were chosen for their known contribution to syntactic maturity and their possible relationship with reading comprehension. Statistical comparisons were made between reading scores and writing scores.

## Establishment of Hypotheses

Whenever a statistical hypothesis predicts a direction--that is, that either higher or lower scores will be significantly exhibited by one group or another--evidence from previous research should exist to support the prediction. In the present study, a direction, "significantly higher scores," was predicted for 13 of the 21 writing variables. The basis for such predictions was founded in

major studies of written language development which show certain writing characteristics to be more or less prevalent as one matures (Hunt, 1965, 1970; O'Donnell et al., 1965; Christensen and Christensen, 1976; Loban, 1976). These and other studies of written language are reviewed in Part II of Chapter II, Review of the Literature.

Since the major questions under consideration in the present study involved the interrelationships among language skills in general, it was hypothesized that competent readers would also be "mature" writers and that less competent readers would produce less mature writing. Where no significant difference was predicted, not enough research existed to support a strong enough link between reading comprehension and writing maturity.

## Hypotheses

Hypothesis I: The "high" reading group will not exhibit significantly higher mean scores than the "low" reading group on each of the following 11 written language variables:

1. Total number of words per T-unit
2. Total number of words per clause
3. Total number of words per subordinate clause
4. Total number of words per main clause
5. Total number of words per sentence
6. Total number of passive verbs

7. Total number of prepositional phrases
8. Total number of gerunds and participles
9. Total number of intra-T-unit coordinators
10. Total number of free final modifiers
11. Total Syntactic Density Score (SDS)

Hypothesis II: The "low" reading group will not exhibit significantly higher mean scores than the "high" reading group on each of the following two written language variables:

1. Total number of T-units per sentence
2. Total number of inter-T-unit coordinators

Hypothesis III: There will be no significant difference between the mean scores of the "high" and "low" reading groups on each of the following eight written language variables:

1. Total number of T-units
2. Total number of clauses per T-unit
3. Total number of subordinate clauses per T-unit
4. Total number of elliptical clauses
5. Total number of modals
6. Total number of "be" and "have" forms in the auxiliary position
7. Total number of possessives

8. Total number of adverbs of time

Hypothesis IV: There is no significant relationship between reading scores and each of the above 21 written language variables for the "low" and "high" reading groups.

## Assumptions

For general purposes of this study, the following was assumed: 1) reading and writing are closely related language skills, but the extent to which they are related and the reasons underlying the relationships have not clearly been established; 2) reading comprehension and syntactic maturity in written expression are traditionally found to be important in college; 3) an examination of specific relationships between general reading comprehension and one or more of the 21 elements of written language established in this study will suggest possible explanations to account for such relationships; 4) an understanding of the reasons underlying relationships between reading and writing skills will enable one to design experimental research to improve the overall effectiveness of language arts instruction; 5) the measures used for general reading comprehension and syntactic analysis, while not including all reading and writing skills, represent fairly the general language skills in question; 6) the instruments used were sufficiently reliable, valid, and objective to measure the skills they were intended to measure.

## Limitations

The findings of this study should not be generalized beyond the university population from which the samples were drawn. Further, the sample size of 17 per ability group was small, though assumed to be representative of "high" and "low" freshmen readers enrolled in beginning composition during the spring semester, 1979.

Other factors which were possibly limiting include such random variables as participants' intelligence, health and emotional well-being, home and educational background, age, sex, and race, all of which were not rigorously controlled. For the most part, time and place of testing was consistent with the students' normal class schedule.

Results were also influenced by the instruments used. Other similar measures of reading comprehension and analysis of writing in the expository mode or in other modes of discourse might have yielded different results. Finally, this study was not concerned with quality of vocabulary (either receptive or expressive), reading rate, spelling, punctuation, variations in syntax among different modes of discourse other than exposition, holistic evaluations of writing quality, or writing quality in general.

## Definition of Terms

Reading Comprehension - Refers to the fundamental intellectual process of understanding what one reads. This process is affected by many factors, including

1) the degree of involvement by the reader, 2) the purpose he/she has established before reading, and 3) experiences and conceptual development the reader has had prior to the reading experience. The ultimate goal of comprehension is "a clear grasp of what is read at the levels of literal meanings, implied meanings and possible applications beyond the author's meanings" (Spache and Spache, 1973, p. 548).

Level of Reading Competency - Refers to "high" and "low" reading comprehension scores achieved by freshmen in the two groups under study. High group students scored at or above the 90th percentile, and low group students scored at or below the 28th percentile on the Nelson-Denny Reading Test (NDRT), Form C (Nelson and Denny, 1973).

The 90th percentile is equivalent to an "above norms" grade equivalency, or grade level 15+. Thus, "good" freshman readers were functioning somewhere beyond college junior level--two or more years above current grade level (mid-year freshman = 13.5).

The 28th percentile is equivalent to a grade level equivalency of 11.5. Thus, "poor" freshman readers were functioning two or more years below current grade level. Most reading authorities regard readers two or more grade levels below average to be "remedial," although they were not referred to as such in this study.

As a result of the cut-off points on the NDRT, a difference of at least four years separated the reading competency levels in the present study. The labels "good"

and "poor" were somewhat arbitrary, in that quality of reading comprehension should be judged on more than a single standardized test. However, an acceptable "developmental range" of reading scores for college freshmen is normally plus or minus two years, or 11.5 to 15.5 (mid-year criteria). Good and poor readers functioned at and beyond the outer limits of this range, therefore justifying the use of the labels for purposes of this study.

Receptive Language - Refers to words, sentences, paragraphs, and larger aspects of oral and printed language which an individual receives (hears or reads) and understands. In this study, the term receptive language will be used in conjunction with reading comprehension.

Expressive Language - Refers to words, sentences, paragraphs, and larger aspects of spoken and written language which an individual produces (speaks or writes) and understands. In this study, the term expressive language will be used in conjunction with expository writing.

Written Language Development - Based upon the assumption that written language changes as one gets older, this term refers to the stages through which an individual's writing characteristically develops from year to year. Some normative data exists related to written language developmental stages, However, typical "norms" of written language for any given age group must be viewed tentatively, since their establishment is based upon very recent research involving small populations.

Exposition - This term is best defined by Thrall and Hibbard (1960) as follows:

> One of the four chief types of composition, the others being argumentation, description, and narration. Its purpose is to explain the nature of an object, an idea, or a theme. Exposition may exist apart from the other types of composition, but frequently two or more of the types are blended, description aiding exposition, argument being supported by exposition, narration reinforcing by example an exposition. The following are some of the methods used in expositon (they may be used singly or in various combinations): identification, definition, classification, illustration, comparison and contrast, and analysis (p. 194).

Syntax - The systematic way in which words are put together to form the structure of phrases and sentences. The syntactic component of a grammar specifies an infinite number of word orders, all of which carry information relevant to the interpretation of a sentence (Chomsky, 1965).

Syntactic Maturity - The observed characteristics of syntax in oral or written language as individuals get older (mature) (Hunt, 1965). The word "maturity" is not meant to connote "better," though some studies have been undertaken to show that language maturity is related to language quality.

Linguistic Awareness - The intuitive, internalized knowledge of a language by the user of that language. An individual's linguistic awareness "is the ultimate standard that determines the accuracy of any proposed grammar" (Chomsky, 1965, p. 21). Through this internalized knowledge of language, one is capable of expressing grammatical utterances and distinguishing between grammatical and ungrammati-

cal utterances. Linguistic awareness involves mental processes that are beyond the level of actual or potential consciousness.

Transformational-Generative Grammar - A grammar that accounts for constructions of a language by grammatical transformations. The syntactic aspect of such a grammar generates "deep and surface structures" for each sentence and interrelates them.

"Surface structure" refers to the observable arrangement of words in a sentence (or phrase). "Deep structure" refers to the underlying meaning of the surface structure. Sentence meaning is generated through the relationship between form (surface structure) and content (deep structure). In actuality, surface and deep structure are the same (Chomsky, 1965). Form is content. For example:

1. Tom was called by the principal.
2. The principal called Tom.

In the above example, the logical meaning of each sentence is the same, even though the surface representations are different. Meaning is generated through syntax and does not stand separate from the surface structure.

Transformational Sentence Combining - The process in which the rules of transformational grammar operate to produce one sentence where otherwise there might have been two or more sentences. The rules of sentence combining transformations may require deletions, substitutions, or expansions, as the following examples illustrate:

1. The junior executive will not be promoted.

2. The junior executive is incompetent.

Deletion transformations are accomplished by deleting one or more words common to sentences one and two above:

3. The incompetent junior executive will not be promoted.

Substitution transformations are accomplished by substituting a word or phrase for one or more words common to sentences one and two:

4. The junior executive who is incompetent will not be promoted.

In sentence four, the relative pronoun "who" is substituted for "The junior executive" in sentence two.

Expansion occurs when any additional words or new information is added to the ultimate sentence, as in:

5. Because the junior executive is incompetent, he will not be promoted.

Any sentence may be exapnded an infinite number of ways. For instance, sentence five may be further expanded by adding the following information: The junior executive is 35 years old. The junior executive worked at IBM.

6. The incompetent 35-year-old junior executive at IBM was not promoted.

Although sentence six is only two words longer than sentence five, it contains much more information and further illustrates the powerful influence of deletion transformations when combining sentences.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Introduction

Surprisingly little educational research has examined the relationship between reading and writing. Only recently have researchers even begun to focus on the connection between the reading and writing skills of college freshmen (Purves, 1976). This research appears to result from concern over reported declines in basic language skills, especially reading and writing (Mellon, 1976; Larson et al., 1976; Newkirk, 1977; Sherwood, 1977; Beaton, 1977; Behrens, 1978; Reinertson, 1978; Monteith, 1978). Myriad reasons have been given to explain why college students are often not competent enough in their own language to perform successfully in college. Much disagreement exists over the nature and cause of the problem. Therefore, research examining language performance, specifically reading and writing, takes many forms.

The research reviewed in this chapter is divided into two parts. Part I contains all research concerned with the relationship between reading and writing. Part II contains major studies of written language development.

In Part I, research relating reading and writing,

studies conducted at all grade levels were included. Inclusion of some elementary and secondary studies adds a perspective to what little knowledge we currently have about reading-writing relationships at the adult level. A review of the major journals and unpublished theses dealing with the teaching of English and/or reading identified the following six general categories of research relating reading and writing:

1. Correlation studies that compared general reading scores achieved on standardized tests with writing scores achieved on subjective theme evaluation techniques.

2. Experimental studies designed to prove that practice in reading facilitates improvement in writing, and vice-versa.

3. Studies that compare student scores on experimental tests of syntax (i.e. identification and understanding of grammatical elements) with general reading scores achieved on standardized tests.

4. Studies that relate the readability of a textbook to the complexity of the book's syntax.

5. Studies that relate the readability of a student's written language to the complexity of the student's syntax and to his/her own reading competency level.

6. Studies of syntactic maturity which identified elements of students' written language most closely related to the same students' reading competency.

Part II, research concerning written language develop-

ment, reviews studies designed to identify typical stages of language development through which individuals pass as they get older. The purposes of this section are: 1) to clarify the method of written language analysis adapted for use in this study, and 2) to justify the descriptive research design utilized. Studies of written language development fell into the following four categories:

1. Major descriptive studies of developmental written language (K-skilled adults).

2. The development of indices of syntactic maturity.

3. Studies relating syntactic maturity to writing quality.

4. Studies showing the effects of written language sample size and mode of discourse on syntactic maturity.

A brief summary of the research reviewed will be given at the end of each part.

## Part I: Research Relating Reading and Writing

### Discussion

A group of researchers have sought to relate reading and writing by comparing students' standardized reading test scores with scores achieved on instruments designed to analyze writing quality. For example, Bippus (1977) compared fourth and sixth graders' Science Research Associates reading scores with the quality of their written language as measured by Diederich's Composition Evaluation Scales

(CES). The CES measures eight categories of writing quality including content factors such as organization and wording and mechanics factors such as usage and spelling. Significant correlations were found between all eight factors of writing quality and reading comprehension. The content factor "flavor" was found to be the best predictor of high reading scores. Bippus concluded that better readers "tended to use more words, more sentences, and more 'difficult' words" and thus scored higher on the writing quality scale than did poorer readers (p. 76).

Some problems exist in studies that attempt to quantify "writing quality," as does Bippus' research. Even though each of the written language characteristics are carefully defined, there is no guarantee that the numerical rating assigned to a student's paper is indicative of anything but the rater's subjective opinion. Interpretation of content factor categories are especially troublesome. For example, "flavor" which correlated highly with reading comprehension was defined in Bippus' study as follows:

> Writing sounds like a person, not a committee . . . reflects sincerity and candidness with the writer writing about something he knows, often from personal experience (p. 80).

Recognition of the above attributes may be possible, but assigning a number on a scale of one to five seems ludicrous. The "objectivity" of rating scales is colored by subjective interpretation of "operational definitions." And some may argue that rating scales are no better than holistic theme evaluations, whereby the rater assigns a

a letter grade to the whole paper.

Simmons (1977) used a technique similar to Bippus' when investigating tenth graders' reading and writing skills. Based upon scores achieved on the Iowa Silent Reading Test, Simmons identified three reading competency groups. Each student wrote for 45 minutes on a subject of his choice. Simmons' three raters then applied to each theme a rating scale which he devised especially for the research. Like Dierderich, Simmons defined two levels of writing quality: mechanical and rhetorical. Significant differences were obtained between all reading groups for each writing variable. He also found a correlation of .85 between total rhetorical factors and reading comprehension. The researcher concluded that writing tasks requiring higher levels of thought, organization, and logic were possibly more related to reading ability than mere mechanical aspects of writing.

The reading and writing abilities of university freshmen were studied by Grobe and Grobe (1977) who compared standardized reading scores with grade scores received on one theme holistically evaluated. Grobe and Grobe divided students into three writing ability groups based upon theme grades. They then compared these students' reading scores on the McGraw Hill Basic Skills System Reading Test (MHBSS) with their writing scores. The researchers found the MHBSS useful in discriminating among writing groups. Simple correlations showed that those students with the highest or lowest reading scores were also in the high or low

writing level group, respectively.

Grobe and Grobe speculated that the significant relationship between reading and writing ability could be attributed to several factors. For example, when skilled readers write, they perhaps model what they have read better than poor readers who have not read efficiently enough to model the writing of skilled authors. The direct result of good modeling is better organization and fewer incomplete sentences and grammatical errors, according to the researchers.

Another study which examined university freshmen's reading and writing skills was conducted by Thomas (1976), who examined the connection between amount and type of leisure reading done and writing proficiency. Like Grobe and Grobe, Thomas collected only one theme which had been graded holistically. He compared writing grades with reading scores achieved on both the Scholastic Aptitude Reading Test and SAT Reading Questionnaire. Thomas found a low, only slightly positive correlation between reading and writing achievement and amount and type of leisure reading done. He concluded that because his statistical findings were only negligible, the relationships were not strong enough to be of importance.

The second category of research relating reading and writing included experimental studies designed to show how improvement in reading leads to improvement in writing, and vice-versa. This research often incorporated either

sentence combining strategies, direct teaching of reading skills, or the analysis of literary models.

Hughes (1975) studied the effects of transformational sentence combining practice on the reading comprehension of 7th graders. The researcher contended that practice in sentence combining would give students "a larger repertoire of syntactic constructions from which to draw in matching those contained in the materials they are expected to read" (p. 20). An example sentence combining exercise follows:

A. All the people wondered (SOMETHING).

B. The music had stopped. (WHY)

C. All the people wondered why the music had stopped.

Analysis of pre-post data on reading cloze tests, the Gates MacGinitie Reading Test, and Goodman Miscue Inventories showed significant gains in reading by students in the experimental group. Of particular interest was Hughes' reporting a strong relationship between awareness of grammatical relationships, as measured by the Miscue Inventory and the amount of sentence combining practice completed. Hughes wrote, "there is ample evidence . . . that sensitivity to grammatical relations is characteristic of the better reader" (p. 9). Increasing grammatical awareness through sentence combining appears to have helped improve reading comprehension, especially among middle and lower group readers.

The effects of sentence combining practice were also studied by Shockley (1974). Twenty-five 7th graders were

trained in sentence-combining strategies incorporating twenty grammatical transformations. Among the 20 structures were: passive verbs, possessives, and noun phrase deletion transformations. Students were also tested over 60 fables which had been re-written to reflect the 20 transformations under study. A comprehension quiz was given after each reading.

Results of the Metropolitan Reading Test showed no significant difference between experimental and control groups. However, experimental students did make significant reading gains over the semester. The latter finding suggests that attention to grammatical elements in relation to sentence meaning may be of real importance in overall improvement of reading comprehension.

Sentence combining experiments at the college level have only recently begun to appear in the literature. (Morenberg et al., 1978) investigated the effects of sentence combining practice on college freshmen's reading comprehension. The experimental group exhibited only slightly higher post test scores on the reading section of the Standardized Test of Educational Progress. The researchers also the improvement of writing "quality" over the experimental period. They concluded that the most telling result of the entire study was an observed significant improvement in not only writing quality (holistically evaluated) but also in mean clause length among the experimental group students.

In 1975, Sandra Stotsky reviewed the state of the art of sentence combining as a curricular activity and its effect on reading and writing development. She made an important point regarding the interrelationships among all the language arts, stating it is ". . . theoretically plausible to maintain that growth in one area should be reflected to some extent in other areas" (p. 66). The Hughes (1975) and Morenberg et al., (1978) studies have contributed some empirical evidence to support such a theory. Much research is needed to understand the relationship between sentence combining practice and reading improvement.

Three additional studies attempted to show that practice in reading facilitates writing skills, and vice versa, but not through sentence combining practice. Reed (1968) sought to improve reading and writing skills of average 7th graders by having them analyze the structure and syntax of paragraphs. For one semester, her students were given semi-weekly study sheets designed to emphasize comprehension skills through directed study of syntax and paragraph structure. The experimental group showed significant gains in reading comprehension on the Nelson Reading Test. Additionally, their writing "quality" improved as measured by a holistic evaluation of one composition.

Matt (1977) also studied the effects of teaching students to analyze the structure of their reading material. He taught a group of high school seniors to analyze argumentative and expository essays for such comprehension

factors as essay purpose, main ideas, and supporting details. He wished to learn if students' subsequent writing in argumentative and expository modes would improve as a result of their study of structures written in the same manner. Results of the study showed significant comprehension gains were made by students in the experimental group. Reading skills were measured by informal reading inventories. Of special note was Maat's finding that writing "quality" measured by the same informal critera as reading comprehension was related to reading comprehension "skills of purpose." Setting a purpose before writing may indeed be as beneficial to overall proficiency in theme writing as it is in aiding overall reading comprehension.

The direct teaching of reading comprehension skills in order to improve college freshmen's writing was studied by Schneider (1970). The rationale for her experimental study was similar to Maat's: By concentrating on reading skills, students would become aware of good writing patterns in literature. Experimental group students were given direct instruction in basic developmental reading skills, such as reading for the main idea, inferring writer purpose, making generalizations, etc. Schneider found significant gains in composition scores (holistically evaluated) and reading comprehension as measured by the Test of Academic Progress. She concluded that reading skills can be taught successfully by remedial English

teachers and that emphasis on reading skills can lead to improved writing quality.

Category number three includes educational research which attempted to link students' knowledge and/or understanding of grammatical structures, as measured by experimental tests, with their reading comprehension. Like the correlation studies reviewed under the first category, these research efforts attempt to establish relationships between reading and writing. However, the relationships are much narrower in scope, with the syntax of written language being singled out as an important variable. Unlike the experimental studies reviewed under category number two, the following research only examines the current status of students' skills.

Fourth graders' knowledge and understanding of conjunctions was studied by Stoodt (1972). She hypothesized that students must be able to identify the relationships that conjunctions signal in written language in order to comprehend efficiently when reading. A cloze technique was used to measure the students' understanding of conjunctions typically found in fourth grade reading material. Overall reading comprehension was measured by the Stanford Achievement Test. Stoodt found a significant relationship between knowledge and understanding of conjunctions and general reading comprehension. She learned that the conjunctions most difficult to comprehend were: when, so but, or, where, how, that, if; and among the easiest were:

and, how, for, and as.

Robertson (1968) designed her own "Connectives Reading Test" and examined 4th, 5th, and 6th graders' comprehension of conjunctions. The test was made up of 150 sentences containing seventeen different connectives. She compared results on the connectives test to students' sex, mental age, listening comprehension, reading comprehension, and written language, and she found all to be significantly related to pupil understanding of conjunctions. Also, significance of the relationships increased with grade level. Robertson's study suggests that the importance of understanding conjunctions may be related to the effectiveness with which students use them in written language as they grow older. Results of her study along with Stoodt's provide interesting possibilities for future investigations of the premise that knowledge and understanding of conjunctions in the early grades will likely facilitate good transitional strategies in students' writing during later grades.

In a study which looked at the relationship between syntax and reading on a broader scale than just conjunctions, Shackford (1976) designed and implemented an "English Language Structure Test." This test measured students' ability to recognize grammatical relationships by presenting scrambled sentences to be re-ordered properly. Shackford found a significant correlation (.67) between reading comprehension, as measured by the Stanford Reading Test,

and knowledge of grammatical relationships, insofar as her test measured the syntactic variables.

Similarly, O'Donnell (1975) tested 12th graders' knowledge of grammatical relationships by presenting them with scrambled nonsense word sentences. By using nonsense words, he controlled the lexical meaning clues. O'Donnell identified a correlation between reading comprehension, as measured by the Iowa Reading Test, and awareness of structural relationships, but concluded that it was not high enough "to support the teaching of linguistic structure as a means of developing reading comprehension" (p. 316).

At the college level, freshmen's "syntactic expectations" while reading sentences were studied by Wisher (1976) who addressed the importance of linguistic awareness and reading. He wrote:

> The ability to anticipate structure and meaning is vital to reading, especially to the young reader burdened with rules of identification. For reading to be most efficient, the reader must profit from all cues the language offers (p. 601).

Wisher found that college freshmen who had prior knowledge of syntactic structures in a sentence read faster and with better comprehension. He concluded that "Precise linguistic expectations reduced linguistic computation and its related memory requirements" (p. 601). Thus, the reader is saved time and effort because he needs fewer visual cues to interpret conceptual information.

In relation to understanding complex grammatical structures when reading, Patricia Cunningham (1976) reviewed

research dealing with syntactic complexity and reading difficulties. She found that most investigations suggested a positive relationship between sentence patterns used in speech and writing (expressive functions) and reading (a receptive act). Some of the more difficult to comprehend sentence patterns cited were:

1. Relative clauses, especially those with appositives and wh words. (The girl whom you saw is my sister).

2. Nominalizations and complements (Jogging is fun).

3. Subordinate clauses linked by connectives to main clauses, especially those connectives expressing time or causality. (The class began after the teacher arrived).

Cunningham urged the inclusion of syntactic factors when constructing readability formulas, and suggested that teachers be made aware of sentence patterns that may be a deterrence to comprehension for some children.

Two research studies conducted at the elementary level echoed Cunningham's report. Bormuth et al. (1970) studied fourth graders' comprehension of 25 sentence structures believed to be most difficult for that grade level. The sentences were presented in paragraphs over which the children's comprehension was tested. The researchers found that a large proportion of the children had difficulty with some of the most "basic structures by which information is signaled" (p. 357). For example, 56.1% demonstrated difficulty with subordinate clause construction like, "As we entered, the curtain rose," and

nearly 70% misunderstood adjective compliments as in "He is clever to go" (p. 358).

Takasaki (1975) compared the performance of ninth grade slow and good readers to sixth grade readers on a test of syntactic comprehension. He designed an experimental test of sentence meaning which tested students' understanding of 17 different sentence patterns. Significant differences were found between the performance of slow and good 9th grade readers, but no performance difference was found between slow 9th grade readers and 6th grade readers. Takasaki (like Bormuth) contributed to the notion that "comprehension of syntactic structure is an element in total reading comprehension" (p. 67).

In the fourth category of research relating reading and writing, syntactic complexity and the readability of textbooks has been examined. And some researchers have studied the effects of syntactic alterations on reading comprehension.

William Smith (1970) researched the question: "As a student matures, does he read and comprehend best material written near his own productive (written) syntactic level?" To study his hypothesis, Smith presented students in grades four through 12 with cloze test passages written at levels four, eight, 12, and skilled adult. The syntax of each passage matched the grade level prototypes identified by Kellogg Hunt (1965) in his study of written language development. Results of the study showed 4th grad-

ers' writing was easier to comprehend for lower grade students (4, 5, and 6) than was more mature writing. Fourth graders performed best on the 4th grade passage, while 11th graders read fourth grade writing with least facility. As a whole, however, 10th, 11th , and 12th graders read all passages significantly better than students in grades 4, 5, and 6.

Smith speculated that since 4th grade written language was the most redundant, predicting the correct word on a cloze test was perhaps a function of redundancy for students in the lower grades. But for older, more mature students (i.e. 11th graders) who found 8th grade level reading the easiest, predicting the correct word on a cloze test was more than a function of redundancy. One explanation for this phenomena could be that older students were not used to reading or writing less complex, more redundant language, and therefore performed less well on the lower level cloze test. Smith's final implication was that a student's written productive level may determine the best receptive level for ultimate comprehension success.

A study which examined 12th graders comprehension of simplified passages from the Davis Reading Test was conducted by Evans (1973). Like Smith, Evans used the prototypic 8th grade syntax of Hunt (1965) in re-writing five prose passages on the standardized reading test. Both multiple choice and cloze tests were given over the five passages (simplified and original versions). The experi-

mental group read the simplified version and significantly outscored the control group's mean reading comprehension scores on the original version. Some of the transformational simplifications used by Evans were:

1. Re-writing of subordinate clauses into simple sentences.

2. Changing passive verb constructions to active.

3. Limiting the average sentence length to 12 words (typical 8th grade T-unit length).

Coleman and Blumfield (1963) also used a cloze procedure when studying college freshmen's ability to predict verb forms in both textbook and technical writing passages. These researchers administered ten cloze tests, five containing sentences with verb nominalizations (gerunds) and five containing sentences with the active verb form of the same nominalization. For example:

Gerund: Taking exams is difficult for some freshmen.

Active Verb: Some freshmen take exams with difficulty.

The researchers found that "word patterns written in active verbs are more predictable than those written in nominalizations" (p. 653). Therefore, if passages were written in active verbs, college freshmen would most probably have an easier time comprehending information in textbooks and technical materials, according to Coleman and Blumfield.

To date only one piece of research has attempted to relate the readability of an individual's written language to syntactic complexity and to reading comprehension.

This fifth category of research was conducted by Lazdowski (1976) who developed his own readability formula based upon students (grades 6-13) writing samples. He wanted to show that productive written language ability could be used to predict students' actual reading ability levels. The final formula, called the Lazdowski Sample Survey (LSS) was shown to predict with a reliability of .877 students' reading ability within one grade level. When preparing his formula, Lazdowski's statistical analysis revealed the following tendencies:

1. Mature readers use more simple sentences, more "the's" and longer and more difficult words.

2. They also used more complex sentences with subordinate clauses, but with less coordinate clause structures than less mature readers.

Though no subsequent research has been published on the LSS, its usefulness in helping teachers quickly match suitable reading materials with students abilities seems worth considering. The LSS is a readability formula which, unlike Dale-Chall, FOGG, SMOG, Fry, or Spache, takes syntax into consideration, thus supporting research which emphasizes the importance of grammatical structures in reading and writing.

The final category of Part I contains research most closely related to the present study. The following studies have attempted to identify specific syntactic elements of students' written language that are directly related to

reading comprehension.

Johnson (1976) investigated the relationship between reading comprehension and eleven measures of syntactic writing maturity. Her subjects included 144 third, fourth, and fifth graders whose reading was measured by the SRA Assessment Survey: Reading Section. All children were shown a picture of a dog and asked to "Write a story about this dog." The dog stories constituted the written language sample (less than 100 words in most cases). Johnson's syntactic analysis showed a moderate correlation between Hunt's (1965) measure words per T-unit and reading comprehension scores. She also found that as the incidence of subordination in black children's writing increased, their reading level also increased. The best indicator of increased reading level among white children was the adding of words in free modification.

A similar study was conducted by Evanechko et al. (1974). These researchers studied 118 sixth graders' reading and writing skills in hopes of determining the best combination of indices of writing performance to predict reading performance" (p. 316). Evanechko et al. used the Botel-Granowsky formula for measuring syntactic complexity, which is made up of 40 writing variables. The Bond-Balow-Hoyt New Developmental Reading Tests served as the reading comprehension measure. As in the Johnson study, average number of words per T-unit was found to be a significant predictor of reading achievement. Other construc-

tions which consistently predicted reading success were: passive verbs, paired conjunctions, subordinate clauses, comparatives, participles, infinitives as subjects, appositives, and conjunctive adverbs. These aforementioned characteristics of written language "essentially measure flexibility or complexity and sophistication of expression in language . . ." (p. 324). The researchers noted that "fluency and control of syntactic complexity" perhaps were the key language competencies that underlay reading achievement. And building upon these competencies in writing may facilitate improved reading performance.

The written sentence production of 124 seventh graders was studied by Kuntz (1975) who related students scores achieved on a Sentence Construction Test to reading comprehension scores achieved on the Gates MacGinitie, Survey E reading test. Kuntz's Sentence Construction Test required students to produce sentences of various complexities using transformations such as changing active verbs to passive, combining two independent clauses by subordinating one, or producing a variety of pattern transformations such as noun + verb + direct object or noun + verb + indirect object + direct object.

Kuntz found that transformations involving adverbial modifiers, prepositional phrases, and subordinate clauses exposed many of the differences in the way language was used by her 7th graders. A substantial relationship (.68) was found to be significant at the .001 level between read-

ing scores and syntactic attainment scores. Better readers completed the following constructions best:

1. Embedding a predicate noun to form a possessive subject noun
2. Subordinate clause constructions
3. Gerund constructions
4. Appositives

Kuntz warned that one must not confuse reading comprehension with mastery of sentence structure, though "an understanding of the structure and patterns of language as expressed through the sentence" is an advantage to the reader, so much so that such syntactic understandings may be "antecedent to comprehension" (p. 3).

The final study related to the present one was conducted by Katheryn Fuller (1974) who investigated the relationship between reading achievement and the oral and written language of 30 university freshmen enrolled in beginning composition and 30 enrolled in reading improvement classes. All students viewed a 20-minute animated film, tape recorded an oral summary of the film, then summarized the same film in writing.

Fuller analyzed oral and written transcripts according to several transformational constructions, including infinitives, gerunds, relative and adverbial clauses, and intra-T-unit coordination. She found little or no relationship between reading achievement and oral and written expression for this group of students.

It is important to note that Fuller's written language samples were quite limited in length--less than 200 words. This factor may have contributed to her not finding significant differences, since research into written language development tells us that a written language sample size of at least 400 words is necessary for accurate syntactic analysis (O'Hare, 1973).

Summary

Research relating reading and writing skills appears to be in its infancy, with few relatively recent efforts reported at most grade levels, elementary through college freshman. Studies which attempted to identify a broad relationship between reading and writing did so through statistical correlation of very general reading and writing scores. Grobe and Grobe (1977), for example, found the McGraw Hill Basic Skills System Reading Test to be a good discriminator among college freshmen writing ability groups. Writing ability was based upon holistic evaluations of one theme per student. Other correlation studies of this nature employed similar standardized reading tests and holistic theme evaluations or theme rating scales to establish relationships.

Another approach to relating reading and writing was found in experimental studies designed to show that practice in reading helps to improve writing, and vice versa. Experimental sentence combining studies were aimed at im-

proving students' internal awareness of more and more complex grammatical structures (Hughes, 1975; Morenberg et al., 1978). The direct teaching of reading skills in the composition classes was also a technique used by researchers wishing to improve writing through reading. Both of the above experimental designs lay claim to valid, useful techniques for the improvement of overall language skills within the language arts curriculum.

Some correlation studies focused on the syntax of language when trying to connect reading and writing. Students' knowledge, recognition, and production of various syntactic structures (found either in their reading material or in their own writing) have been compared to reading comprehension scores. Positive relationships have been established between knowledge and usage of complex grammatical structures and reading comprehension (Coleman and Blumfield, 1963; Evans, 1973; Takasaki, 1975; Wisher, 1976; Shackford, 1976).

More specific relationships between reading and writing have been investigated by researchers who utilized syntactic analysis of written language (either free writing or controlled sentence writing). Specific predictors of reading comprehension were identified (Evanechko et al., 1974; Kuntz, 1975; Johnson, 1976). Some of the more promising indicators of reading comprehension appear to be the following elements of students' written language:

1. Number of words per T-unit

2. Prepositional phrases
3. Subordinate clauses
4. Gerunds and participles
5. Passive verbs
6. Conjunctions
7. Appositives
8. Free modifiers

Research most closely related to the present study, as well as most research cited in Part I, may be criticized for its lack of care in controlling written language samples. In all cases, syntactic analysis of free writing was completed on themes or paragraphs of less than 200 words. Further, writing samples were collected on only one occasion. Variations in writing from day to day were not carefully taken into account. Some studies controlled the topic on which students wrote, others left it up to the individual to decide upon. Topic and mode of discourse are important considerations when designing a study involving written language.

The following review of the literature on written language development will help to clarify and support some of the criticisms of weaknesses inherent in studies relating reading and writing.

## Part II: Research Concerning Written Language Development

### Introduction

The purposes of Part II are the following: 1) to clarify the methods of syntactic analysis adopted for use in this study, and 2) to justify the descriptive research design utilized. As was seen in Part I, numerous research designs and methods have been employed to compare reading and writing. Researchers who analyzed the syntax of student writing (Fuller, 1974; Evanechko et al., 1974; Kuntz, 1975; Johnson, 1976) did so according to various methods outlined in developmental studies of written language. The following review of research examining written language development and syntactic maturity (K through skilled adult) will prepare the reader to understand the elements of written language chosen for analysis in the present study. The relationship between writing characteristics and reading comprehension will be discussed.

As indicated in the introduction, the four areas of research into written language development are the following:

1. Major descriptive studies of developmental written language (K-skilled adults).
2. The development of indices of syntactic maturity.
3. Relation of syntactic maturity to writing quality.
4. Studies showing the effects of written language sample size and mode of discourse on syntactic maturity.

## Discussion

Written Language Development. Studies concerned with written language development have attempted to identify definite stages of syntactic growth exhibited by children at various grade levels. Walter Loban (1976) conducted a 13-year longitudinal study (from 1963 to 1966) of 211 children's language development as they progressed from kindergarten through twelfth grade. Among the numerous language samples collected each year were written compositions and standardized reading test scores for each child. At the end of the 13-year period, Loban divided the 211 children into three subgroups: high and low language ability groups and a random "typical" group. He then made comparisons between groups.

The basic unit of syntactic analysis used by Loban was the communication unit, defined as "The natural linguistic unit . . . a group of words which cannot be further divided without loss of their essential meaning" (Watts, Cited in Loban, 1976, p. 9). In other words, a communication unit is an independent clause plus all of its modifiers. Segmenting written language into communication units eliminated the problem of interpreting run-on sentences and fragmented sentences (called mazes by Loban). Loban analyzed each communication unit for various grammatical features including type and function of dependent and independent clauses, strategies of syntax used to expand (elaborate) simple subjects and verbs, and both finite

and nonfinite verb forms.

In describing the differences between those children who used language efficiently and those who did not, Loban reported the following characteristics of the high ability group:

> 1. Both in reading comprehension and in written composition, the proficient subjects excelled, and they were superior in using connectors--like meanwhile, unless-- . . . and in using adverbial clauses of concession and condition.
>
> 2. The superior students averaged more words per communication unit, more elaborate expansion of subjects and predicates, fewer language tangles or mazes, and more embedding in transformational grammar, especially multi-base deletion transformations.
>
> 3. Greater use of adjectival subordinate clauses, more use of dependent clauses of all kinds, and greater variety and depth of vocabulary.
>
> 4. Significantly higher reading scores (pp. 71-89).

Conversely, Loban's low ability students' writing was disorganized, rambling, and revealed a meager vocabulary. Loban also reported that these same students were "painful decipherers rather than fluent readers" (p. 71). Though not all of the mass of data collected in Loban's study has been analyzed, clearly he has contributed a great deal to the body of knowledge relating all language skills.

Other researchers of language development have supported many of Loban's results. O'Donnell (1977) reported that Kellogg Hunt is the researcher most responsible for critical analysis of traditional indices of language development and proposing new indices. In his study of written language at three grade levels (four, eight, and twelve),

Hunt (1965) introduced the concept of the "T-unit" to aid in describing syntactic maturity. T-unit stands for "terminable unit" and represents minimal language units grammatically capable of being terminated with a period and a capital letter. Hunt's T-unit is virtually identical to Loban's communication unit, except that Loban was concerned with both oral and written language.

Hunt collected 1000 words during one school year from each of 18 children in grades four, eight, and twelve (54 total subjects). He also analyzed 1000 words each from 18 "superior adult" writers whose non-fiction appeared in Harper's and Atlantic Monthly magazines. Along with the T-unit, the following structures were analyzed: sentence length, clause length, subordinate clauses per T-unit, kinds of subordinate clauses, and within-clause structures such as coordination, nominals, auxiliary verbs, main verbs and complements, modifiers of verbs, and predicate adjectives.

The best indices of syntactic maturity found by Hunt were mean T-unit length, mean clause length, and number of clauses (dependent and independent) per T-unit. These three indices were interrelated in that T-units may be lengthened by either lengthening clauses or by adding to the number of subordinate clauses. For example, "The 40% gain in T-unit length /from 4th to 12th grade/ is due largely . . . to the whopping 36% gain in clause length" (p. 57). Also noted was the relative decrease in short T-units

(1-8 words long) as students got older. The biggest single difference between superior adults and average 12th graders was clause length. "The superior adult packs into his clauses a larger number of words and a larger number of nonclausal structures" (p. 57).

O'Donnell, Griffin, and Norris (1967) conducted a study of children in grades K, 1, 2, 3, 5, and 7 that in part replicates and extends Hunt's (1965) work to children's oral language as well as their written language. Thirty white, middle class children in each grade viewed an Aesop fable, re-told the story to an interviewer, then wrote a summary of the story and answered some questions about it. Oral and written language samples were then analyzed for T-units, sequential patterns in the main clause, number, kinds, and functions of sentence combining transformations, words per T-unit, and mean number of sentence combining transformations per 100 T-units. Results of the study supported Hunt's conclusions about the T-unit. The researchers noted . . . "the mean length of T-units has special claim to consideration as a single, objective, valid indicator of development in syntactic control" (pp. 98-99). O'Donnell et al. also found significant increments from grade to grade in the use of adverbial infinitives, sentence adverbials, intra T-unit coordination, and modifications of nouns by adjectives, participles, and prepositional phrases. These constructions are typically produced by application of transformational deletion rules.

For example:

"The man who is smoking is my father" may be expressed "The man smoking is my father." The relative pronoun who and the verb is have been deleted, thus eliminating the subordinate adjective clause who is smoking and replacing it with the single participle smoking. The meaning remains the same.

Results that have shown an increase in deletion transformations from grade to grade (such as the 1967 O'Donnell et al. study) support Loban's (1976) similar findings. One may recall that Loban's high group exhibited significantly more multi-base deletion transformations than the low or random groups. Hunt also reported older children's tendency to coordinate less between T-units by deleting elements common to both T-units. An example from his 1965 study serves to illustrate coordination between and within T-units:

| | |
|---|---|
| Inter-T-unit Coordination: | You get hot and you want to go in. |
| Intra-T-unit Coordination: | You get hot and want to go in (p. 9). |

Deletion transformations are indicative of more "mature" writing. As children grow older, they learn to consolidate their ideas through not only deletions but also subordination and more sophisticated modification. Consolidation of ideas usually accounts for more concise, better organized writing. For the writer has learned to relate more efficiently words within sentences and sen-

tences within paragraphs.

The written language of college students has only recently been researched in terms of syntactic maturity. Stewart (1978) compared the writing of college undergraduates to both high school seniors and college graduate students. However, his method of analysis differed somewhat from the studies of free writing cited earlier in Part I of the literature review. Stewart used Kellogg Hunt's Syntactic Maturity Test (SMT) (1970) to measure five indices of language: length of T-units, clauses per T-unit, words per clause, T-units per sentence, and words per sentence. Hunt's experimental test is a single paragraph on the subject of "Aluminum" written in short, simple sentences. The directions to the test are "Rewrite this paragraph in a better way." The norms set up for the Aluminum Test are based upon Hunt's 1965 research and a later 1970 study of syntactic maturity in school children and adults.

Stewart found that undergraduate students did not gain significantly over high school students on the five written language variables. However, graduate students did show significant gains, with number of words per T-unit being the best indicator of maturity.

In a study conducted at Oklahoma State University, Sodowsky and Witte (1978) examined the first and last themes written by a random group of 51 freshman composition students during the academic year 1976-77. The purpose of their research was to determine if university freshmen

would exhibit significant growth in written language after two semesters of composition instruction. Results showed that freshmen writing was more mature, according to Hunt's (1965) five indices of syntactic maturity; however, the only statistically significant change was in number of T-units per sentence. This statistic dropped, as Hunt predicts it should as a writer matures. The researchers found no significant changes in frequency of sentence embeddings, such as prepositional phrases, adjective series, subordinate clauses, adverbials, gerunds, participles, ellipses, and appositives. Witte and Sodowsky concluded that even though only one statistically significant result was found, their group of university freshmen seemed "to be progressing steadily toward . . . optimum levels" of language maturity (p. 7).

Table VI (Chapter IV, p.86 of the present study) contains a comparison of the Witte-Sodowsky results with results of the present study and Hunt's 8th grade, 12th grade, and superior adults scores on each of Hunt's five indices of syntactic maturity.

Indices of Syntactic Maturity. Experimental indices of syntactic maturity have been developed as a result of Hunt's (1965, 1970) studies. Golub (1974) devised the "Syntactic Density Score (SDS)" (Appendix D) as a measure of readability as well as writing maturity. The SDS is made up of ten writing variables, including T-unit length, subordinate clause length, and various verb phrase and

transformational structures. The SDS instrument was developed through a series of studies of children's oral and written language. Initially, 63 linguistic variables were subjected to statistical analysis. Items ultimatley included in the score were those ten structures which correlated most highly with teacher ratings of students' written language samples (Golub and Kidder, 1976).

Through complex statistical analysis, Golub assigned each variable a "relative weight" or loading factor based upon the variable's contribution to overall syntactic complexity. To compute the SDS, frequency raw scores of each of the ten variables are multiplied by the loading factor. The total of all scores times individual loadings is then divided by the number of T-units in the sample. The resulting number is the Syntactic Density Score and may be converted to a grade level score.

In a critique of Golub's "Syntactic Density Score" instrument, O'Donnell (1976, p. 36) reported that the SDS has a "greater capacity to discriminate among various kinds of syntactic constructions" than do indices which only identify mean T-unit length, mean clause length, and mean number of subordinate clauses per T-unit. However, he also pointed out that there is a high degree of redundancy in what the items measure. The overall SDS score appears to correlate highly with number of words per T-unit. O'Donnell (1975) found a correlation coefficient of .88 between Golub's SDS and T-unit length in a study of 32 ninth grade

"average ability" students, none of whom scored above 4th grade on the SDS. The mean T-unit length for the group was 10.0 which seems to be a better indicator of grade level.

Francis Christensen (1967, 1968) approached the subject of syntactic maturity from a different perspective from Hunt or Golub. His basic hypothesis was that mature writing will have a relatively high frequency of free modifiers, especially in the final position, high frequencies of intra-T-unit coordination, and numerous free noun, verb, and adjective phrases. ("Free" in this sense means the modifier is set off by a mark of punctuation on both sides.) Christensen's theory of mature writing style is based upon his analysis of skilled writers' work compared to the writing of school children. Sophistication in modification appears to be a mark of professional writing, according to Christensen and Christensen (1976) who used the following example from The Oxbow Incident to illustrate their point:

> In a top hat and frock coat, his beard combed into two silver-white points so sparce that every hair could be counted, an enlightened Jew was on his way to the German synagogue, escorting a woman in a hat trimmed with ostrich plumes (p. 16).

Of the 318 words contained in the passage from which the above sentence was taken, 193 words were in the added free modifiers. The authors wrote ". . . it is these additions that make the difference between a bare primer style and a rich-textured mature style (p. 16). It should be noted that the Christensen's research is based primarily on fiction writing, though this does not demean its worth.

Syntactic Maturity and Writing Quality. Studies of the relationship between college freshmen's writing quality and syntactic maturity have used parts of Hunt (1965, 1970), Golub (1974), and Christensen's (1968) syntactic indices. Nold and Freedman (1977) analyzed 22 university freshmen's written language on a total of 88 argumentative essays (four essays per student). The researchers adopted Golub's ten writing variables and redefined them to fit their purposes. For example, passive and progressive verbs were counted as well as free final and free medial modifiers. Also included were "dummy variables" for long and short essays.

Results of the Nold-Freedman study revealed five predictors of writing quality. Of the five, free final modification was most indicative of good writing quality, as measured by holistic evaluations of each essay. The remaining four variables predicted poor writing quality. Of the five, free final modification was most indicative of good writing quality, as measured by holistic evaluations of each essay. The remaining four variables predicted poor writing quality among this group of freshmen. These variables include short themes, number of modals, number of "be" and "have" in the auxiliary, and number of "common verbs." The final category was a list of 33 verbs devised by the investigators and based on their personal experience writing elementary curriculum materials. Summing all forms of "be" and "have" in the auxiliary predicted low quality

themes in the argumentative mode. Nold and Freedman explained that constructions like "could have" weaken the credibility of an argument. The vocabulary measure "common verbs" was negatively related to long main clauses, "indicating that students with weak vocabularies are likely also to be writing less complex T-units than their peers" (p. 173).

Gebhard (1978) studied 33 "good" and 21 "poor" freshmen compositions (one theme per student holistically evaluated) along with 25 essays from Atlantic, Harper's, Saturday Review, and The New Yorker. She compared good, poor, and professional written language according to 86 variables adopted from Christensen (1968) and O'Donnell et. al. (1967). Mean clause length was found to be a better predictor of good quality than length of T-unit. Gebhard noted that differences between the groups were not in choice of syntactical forms (i.e. T-unit patterns, type of sentence combining transformations, etc.), but in method or skill in using syntactical items (type of sentence openers, position of free modification). Like Nold and Freedman, Gebhard also found theme length and free final modification to be positively related to writing quality. She also observed that professionals had a "marked fondness for the prepositional phrase" (p. 221). Use of the prepositional phrase is the result of professionals' tendency to economize, to use deletion transformations rather than clausal structures. An example would be the following:

1. The man at the counter is my uncle.

2. The man who is at the counter is my uncle.

Example two contains a relative clause, while example one contains a prepositional phrase which conveys the same message without the clausal components "who is." Gebhard concluded in her study that "the better freshman has internalized the dialect of written English to a greater extent than his less able classmate" (p. 222).

Schmeling (1969) compared the quality of freshman themes (holistically evaluated) to several syntactic characteristics of writing maturity. He found that poor papers most clearly differentiated from average and good papers by total number of headed nominal constructions (noun + adjective, noun + prepositional phrase). Such constructions reflect the student's use of detail and description in his/her writing. Furthermore, in contrast to poor papers, good and average papers contained more subjective complements, appositives, and prepositional phrases. Schmelling noted that content and general organization may have had more bearing on what the raters regarded as varied quality or improved quality. He questioned the possibility that writers of poor papers containing significantly fewer headed nominals might have difficulty perceiving detail in reading and suggested a need for further research in this area.

Syntactic Maturity, Mode of Discourse, and Length of Writing Sample. When conducting research into written lan-

guage, several independent variables must be considered to insure optimum results. For example, Braddock et al. (1963) warned that "variations in mode of discourse may have more effect than variations in topic on the quality of writing" (p. 166). Studies examining the relationship between syntactic maturity and mode of discourse (Crowhurst, 1978; Perron, 1977) have reported the same general order of syntactic complexity with respect to mode. Most often, the complexity of written language decreases as one moves from argument to exposition to narration to description. The studies which confirmed the above order were conducted at grade levels three through ten. No similar research examining college-level writing in various modes currently exists.

Except for the Nold-Freedman (1977) study, none of the research reviewed earlier controlled the type of writing obtained. Crowhurst (1978) suggested "the differences in syntactic complexity among modes indicate the need to control mode of discourse in studies of syntactic development" (p. 15).

Another independent variable of particular importance to syntactic maturity is length of writing sample. No studies have proved without a doubt the ideal sample size for syntactic analysis. O'Hare (1975) cited the following research regarding length of writing sample:

> Chotlas (1944) discovered that 1000-word samples written by junior high students were as reliable as 3000-word samples. Anderson (1937) showed that

> the 150-word samples used by LaBrant were unreliable and suggested samples several times larger. O'Donnell and Hunt (1970), used a 300-word sample for the writing of fourth grader (p. 46).

O'Hare himself found among 7th graders that a sample size "just over 400 words was as reliable an indicator of average T-unit length as was a 1000-word sample" (p. 46). Studies of syntactic maturity reviewed earlier often took into consideration length of the entire theme in relation to theme quality. However, except for the Nold-Freedman study, the group of words analyzed was usually taken from only one language sample, which often fell short of the number of words necessary for reliable analysis.

The day-to-day variation in writer performance was the final independent variable under consideration. Fluctuations in the quality of writing among college students was shown to be significant, especially among better writers, by Kincaid (Cited in O'Hare, p. 46). Therefore, it is important to consider language sampling during more than one class period. Hunt (1965) gathered samples throughout an entire school year, and Nold and Freedman (1977) collected themes over a period of several months. Thus the writer variable should be taken into account when analyzing syntactic maturity.

## Summary

Researchers investigating written language have identified developmental stages through which individuals

pass as they grow older or mature. The concept of syntactic maturity thus refers to characteristics of written language exhibited by progressively older persons, but does not necessarily conote syntactic quality. Kellogg Hunt (1965) was the first to introduce the concept of the T-unit as the most useful segmenting technique when analyzing written discourse. Walter Loban (1976) used a similar technique called the "communication unit" when analyzing both oral and written language. The T-unit, defined as a single main clause plus all modifying structures attached to it, has since become a measure basic to research utilizing syntactic analysis.

Subsequent studies of written language based on Hunt's 1965 Grammatical Structures Written at Three Grade Levels have adopted his indices of syntactic maturity. Among the best indicators of syntactic maturity are: mean T-unit length, mean clause length, and number of clauses per T-unit (Hunt, 1965; O'Donnell et al., 1967; Stewart, 1978). Other more specific syntactic elements which have been shown to increase from grade to grade include sentence adverbials, intra-T-unit coordination, gerunds, modification of nouns by adjectives, participles, prepositional phrases, and free final modification. Writing characteristics formed through deletion transformations were also found to be indicative of mature written language.

Lester Golub's Syntactic Density Score (SDS), based upon the work of Hunt, is designed to measure readability

and syntactic maturity. The SDS has been criticized for the redundancy inherent in its construction. Further, the grade level conversion of the total SDS score was refuted by O'Donnell (1975) in a study which showed the problems with attaching a grade score to students' writing. However, individual items appear to be useful in discriminating among various kinds of grammatical constructions.

The work of Francis and Bonnejean Christensen has contributed the concept of sophistication in modification in reference to writing maturity. Studies have shown that free modification, especially in the final position, is the mark of mature writing style (Nold and Freedman, 1977; Gebhard, 1978).

Three independent variables seem to be important to control when designing a study involving syntactic analysis. These variables are 1) mode of discourse, 2) length of writing sample, and 3) day-to-day fluctuations in theme writing. Syntactic complexity in the four modes of discourse has been shown to decrease in the following way: argumentation > exposition > narration > description. A writing sample of just over 400 words in length appears to be long enough for reliable syntactic analysis, though no studies have proved definitively the ideal sample size. The complexity of an individual's writing varies from day to day, especially among good writers. Writing samples taken on different days would help to account for this writer variable.

# CHAPTER III

## METHODS AND PROCEDURES

### Sample and Population

The primary purpose of this study was to examine the relationship between general reading comprehension and 21 syntactic elements of written language produced by university freshmen at two reading levels, high and low.

The subjects for this study were drawn from beginning composition classes offered during the spring semester, 1979, at Oklahoma State University. A mid-size university of approximately 21,000 students, OSU is located in north-central Oklahoma and is typical of state universities found in the southwest.

A total of 21 sections of beginning composition, with an enrollment of 567 students, were available for sampling. Three veteran English instructors volunteered their cooperation in the study. These instructors' four sections, with a total enrollment of 85 students, were utilized throughout the research project.

To insure that freshmen within each class were not singled out for "experimental purposes," all 85 students (70 freshmen, 12 sophomores, and 3 juniors) contributed to the language samples: one silent reading comprehension

test and two in-class expository themes. Thirty-four of the 70 freshmen were identified as "high" or "low" readers, based upon scores achieved the the reading test.

All 70 freshmen's themes were subjected to syntactic analysis, though only those papers by the 17 high and 17 low readers were used for statistical comparisons. The "middle" group was not included as a part of the present study. However, Appendix A contains descriptive data and mean reading and writing scores for the total 70-freshman group.

Students included in either the high or low reading group met the following criteria:

1. All students were either first or second semester freshmen who had never previously completed a beginning college composition course.

2. All students used English as their primary language.

3. All students were informally observed to be free from gross motor or physical impairments which might interfere with learning processes.

4. All students in the high group scored at or above the 90th percentile on a standardized test of silent reading comprehension. The 90th percentile is equivalent to a grade level of 15+ (above college junior level). Thus, all high group students were reading at least two grade levels above average.

5. All students in the low group scored at or below the 28th percentile on a standardized test of silent reading comprehension. The 28th percentile is equivalent to a grade

level of 11.5. Thus, all students were reading at least two grade levels below average.

6. All students completed the silent reading comprehension test and two in-class expository themes. Special testing sessions were arranged for two freshmen absent during the scheduled group testing. Special writing sessions were arranged for five students absent on the scheduled in-class theme days.

## Procedures For Obtaining Language Samples

### Written Language

Prior to the beginning of the spring semester, 1979, the researcher met with three members of the OSU English faculty who had volunteered their classes. The researcher explained the nature of the study and the extent to which each of the four classes would be involved. Factors of importance discussed were the following: 1) control of language sampling (writing and reading); 2) the nature of beginning composition at OSU; 3) agreement upon common expository theme topics; 4) scheduling of in-class themes and reading test; and 5) directions for administering writing assignments.

Students' written language was sampled from two in-class writing assignments. These writing assignments were a part of the normal sequence of themes written in the beginning composition class. Students did not think that

their work was being tested or singled out for experimentation. Two themes were obtained in order to insure that: 1) a total of just over 400 words per student were secured for analysis; 2) day-to-day variation in theme writing proficiency was considered; and 3) syntactic elements were not topic specific.

Since beginning composition at OSU is concerned exclusively with the improvement of expository writing, in-class writing assignments reflected only one mode of discourse, exposition. However, each theme was written using a different method of development. The first theme was developed by classification, the second by comparison/contrast. Syntactic variations between student writers was thus controlled by limiting both topic and mode of discourse.

Theme number one was written during the first week (January 17-21, 1979) and theme number two during the third week (January 29-February 2, 1979) of the spring semester. Make-up themes were written within one week of the regularly scheduled times. Students wrote their make-up papers under the supervision of their respective instructors. Among low and high reading group students, three made up theme number one, and two made up theme number two.

The same directions for each in-class writing assignment were given orally to all students. Each theme was assigned as follows:

> Theme Number One: In a well-organized theme (three to four pages long), classify three types of television programs on TV today and tell why each is popular.

Theme Number Two: In a well-organized theme (three to four pages long), compare and contrast high school classes and college classes.

Students were given a full 50 minutes to complete each assignment. At the end of that period, papers were taken up by the instructor, who in turn gave them to the researcher for xeroxing. Xeroxed theme copies were subsequently used in the syntactic analysis. Instructors graded the individual themes as usual and returned them to each student for corrections. Appendix B contains a sample theme from both high and low group students.

It should be noted that during the time lapse between writing the 1st and 2nd theme, all students were reviewing basic grammar, spelling, and punctuation rules. The purpose of the review was to prepare them to take an English department prepared "Review Guide Test" (RGT). The RGT is an objective test of standard English grammar taken each semester by all beginning composition students. Results of the test are used to help students and instructors become aware of individual needs in the above mentioned areas. No direct instruction was given in theme structure, methods of theme development, or sentence combining during the period under discussion.

## Reading Comprehension

During the fourth week of the semester, February 5-19, 1979, students in each class were administered a standardized test of reading comprehension. The test was adminis-

tered by the researcher. Students were given class credit for having completed the exam. However, they were not told that they were a part of a study until everyone had completed the reading test and both expository themes. Reading test scores were made available to each student during the 8th week of the spring semester. At this time, students were reminded that the syntactic analysis of their papers would be available at the end of the semester, should anyone be interested in visiting with the researcher about the results.

After taking the reading test, students answered a seven-item questionnaire (Appendix C). Items on the questionnaire provided the following descriptive data contained in Table I (high and low group description): age, sex, classification, race, college, and number of students repeating beginning composition and their reasons for doing so.

## Instrumentation

### Reading Test

The comprehension subtest of the Nelson-Denny Reading Test (NDRT), Form C (Nelson and Denny, 1973) was administered by the researcher as a screening procedure to identify high and low reading groups. This subtest is made up of eight non-fiction reading passages and thirty-six multiple-choice questions. Students were given the standard twenty-minute time limit to complete the subtest. The standardized

TABLE I

HIGH AND LOW READING
GROUP DESCRIPTION

| Descriptive Variables | High Group (17 freshmen) | Low Group (17 freshmen) |
|---|---|---|
| Mean Age | 18.5 | 19.3 |
| Sex: | | |
| Male | 9 | 9 |
| Female | 8 | 8 |
| Classification: | | |
| 1st semester freshman | 15 | 13 |
| 2nd semester freshman | 2 | 4 |
| Race: | | |
| American Indian | -- | 1 |
| Black | -- | 2 |
| Caucasian | 17 | 13 |
| Oriental | -- | 1 |
| College: | | |
| Agriculture | -- | 2 |
| Arts & Science | 10 | 6 |
| Business | 1 | 4 |
| Education | 2 | 2 |
| Engineering | 4 | 1 |
| Home Economics | -- | 2 |
| Number Repeating Course | 1* | 7* |

*All students repeating beginning composition had previously dropped the course a maximum of three weeks into the semester.

test directions were modified slightly to exclude the one-minute reading rate test normally given at the beginning of the comprehension subtest. Reading rate was not a factor under consideration in the present study.

The NDRT publishers note in the test manual that forms C and D are intended to "serve predictive, screening, and broadly diagnostic purposes" with students in grades nine through sixteen (Nelson and Denny, 1976, p. 3). Forsyth's (1978) review of the NDRT for Buros' Eighth Mental Measurements Yearbook, indicated that even though the college level norms do not reflect a well-defined population, the test seems quite suitable for college students. The comprehension subtest passages reflect content specifically directed at college students. Reliability coefficients were not reported for grades 13 and 16. However, Forsyth speculated "the test may have some validity as a screening device for . . . identifying college level people who need remedial work" (p. 735). He suggested the development of local norms to insure validity for predictive, screening, and diagnostic purposes.

Raw scores achieved by the students tested were converted to percentile norms and grade level equivalents using beginning of the year freshman norms reported in the test manual, pp. 40 and 43. No mid-year norms were available for college level students.

Syntactic Analysis

No "standardized" analysis of syntax was applied to the written language samples in the study. Rather, 21 written language variables were adopted from the work of Hunt (1965), Christensen and Christensen (1976) and Golub (1974). Golub's experimental Syntactic Density Score instrument (Appendix D) contains 11 of the 21 variables analyzed. All 21 characheristics of written language were chosen for analysis because of their known contribution to syntactic maturity in written expression and their possible connection with reading comprehension (See Chapter II, Review of the Literature). Each variable was operationally defined before theme analysis was undertaken.

Using the Summary of Raw Scores worksheet (Appendix E), the researcher totaled and recorded raw scores for each of the 21 variables in both writing assignments. For example, number of T-units (defined below) for theme one and two were added together and recorded as a single raw score. Each theme's length was limited by counting to the end of the T-unit after the 225th word. Thus, total words analyzed per student was at least 450.

Syntactic analysis of each theme was conducted by the researcher between February 26 and March 16, 1979. Approximately 100 sentences from the 140 themes analyzed contained grammatical structures difficult to label. These sentences were typed out separately by the researcher and analyzed by a linguistics professor in the OSU English

Department. Together they decided how the structures should be labeled. Further, approximately 25 percent of the themes of high and low group readers were re-checked by a language arts professor in the OSU Department of Curriculum and Instruction. Only minor discrepancies were noted.

## Syntactic Elements of Written Language Defined

The following definitions were utilized when analyzing themes in the present study.

Total number of T-units - T-unit refers to "minimal terminable unit" and is defined as "a single main clause (or independent clause) plus whatever other subordinate clauses or nonclauses are attached to or imbedded within that one main clause" (Hunt, 1977, pp. 92-93). T-units were counted within approximately the first 225 words per theme.

Examples: In high school, the student was used to classes consisting of 25 to 30 students. (one T-unit)

In college, the student is his own keeper, and he must set his own priorities. (two T-units)

Total number of words per T-unit - All words in each T-unit were counted. Hyphenated words, such as twenty-five, were counted as one word.

Total number of T-units per sentence - All T-units were totaled and divided by total number of sentences.

Total number of clauses per T-unit - The number of

main clauses plus subordinate clauses were added together and divided by number of T-units.

Hunt (1965, p. 35) advised using the ratio of clauses to T-units as a convenient, direct indication of "how frequently a subordinate clause was added to a main clause." Since each T-unit always contains one main clause, the ratio minus one is the average number of subordinate clauses per main clause. For example: If the ratio of subordinate clauses per T-unit is .50, the ratio of clauses per T-unit will be 1.50, the one (1) being the main clause.

The clauses per T-unit variable reflects a certain amount of reduncancy in what it measures. However, it is a useful statistic in making comparisons between the present study and studies using Hunt's (1965) indices.

Total number of words per clause - All words within main and subordinate clauses were totaled and divided by number of clauses.

Total number of subordinate clauses per T-unit - A subordinate clause, sometimes called a dependent clause, contains a noun and a verb, but it is not grammatically complete apart from the main clause. Subordinate clauses function as nouns, adjectives, or adverbs, and usually are introduced by subordinate conjunctions such as that, when, where, which, how, etc.

Total number of words per subordinate clause - All words within a subordinate clause were counted.

Total number of words per main clause - A main clause

is an independent clause containing a subject and a verb. Main clauses stand alone as grammatically complete structures. All words within the main clause were counted.

Example: Lou Grant is a very popular drama because it deals with real problems that many of us face. (seven-word main clause, one T-unit, two subordinate clauses)

Total number of words per sentence - A sentence contains one or more main clauses and is begun with a capital letter and terminated with a mark of punctuation, such as a period, question mark, or exclamation point. All words within a sentence were counted.

Example: In high school, I could talk to my teachers about problems in class, but I was never able to say what I really felt. (one sentence, 24 words)

Total number of elliptical clauses - Ellipses is the omission of a word or words that are necessary to grammatical analysis of the sentence but not necessary to its meaning" (Pense and Emery, 1963, p. 151). Clausal structures are often reduced by deleting one or more words that may be understood by the reader.

Example: I enjoy college more than /I enjoyed/ high school.

Total number of modals - Modals are auxiliary verbs used with other verbs to express mood or tense. May, can, could, would, and should are some examples of modals.

Example: College courses should be more difficult than high school courses.

Total number of "be" and "have" forms in the auxiliary position - Forms of "be" or "have" accompany the main verb

of a clause to form a phrasal unit expressing voice or aspect of the verb.

Total number of passive verbs - Whenever the subject of a sentence receives the action, the verb is said to be in the passive voice. Passive verbs are formed by using some form of the auxiliary "be" with the past participle.

Example: The Waltons has been cancelled for next season.

Total number of prepositional phrases - A preposition, which shows the relationship between its object and some other word in the sentence, is used with a noun or a pronoun (its object) to form a prepositional phrase. This phrase functions as an adjective, adverb, or a noun.

Example: Mork is rarely off the camera and gets laughs by poking fun at human behavior. (three prepositional phrases)

Total number of possessives - A possessive is a noun or a pronoun which denotes ownership or possession.

Example: My biology class is a snap.

Total number of adverbs of time - Adverbs are words used to modify a verb, an adjective, or another adverb. Adverbs of time are simple one-word adverbs which indicate when an action takes place.

Example: The exam we took today was difficult.

Total number of gerunds and participles - (Two verbal forms) A gerund is a verb form used as a noun. Gerunds always contain an ing ending. A participle is a verb form used as an adjective. Most participles have an ing or ed ending. Gerunds and participles were summed together.

Examples: Going to class only two or three days a week seems strange. (gerund)

Teaching methods in college are quite different from high school. (participle)

Students enrolled in composition 1113 are mostly freshmen. (participle)

Total number of intra-T-unit coordinators - Refers to the total number of coordinate conjunctions found within, not between T-units. Coordinating conjunctions such as and, but, or, for, and nor connect words, phrases, or clauses of equal rank (Pense and Emery, p. 123).

Example: WKRP and MASH present fun and entertainment for young or old. (three intra-T-unit coordinators)

Total number of inter-T-unit coordinators - Refers to the total number of coordinate conjunctions found between, not within T-units.

Example: Gunsmoke is a re-run, but WKRP is new this season.

Total number of free final modifiers - Refers to unbound modifiers which have been attached to but not embedded within the end of a sentence. Such unbound modifiers are set off by a mark of punctuation, the comma being the most common (Christensen and Christensen, 1976).

Example: Many housewives get involved in afternoon soap operas, fantasizing their lives away until hubby returns home from the office.

Syntactic Density Score - Refers to the composite score on Lester Golub's Syntactic Density Score instrument (Appendix D). The ultimate SDS relfects the total syntactic complexity of a given passage.

## Statistical Analysis

Applications of statistical treatments to the data in this study were conducted at the Oklahoma State University Computer Center. The computer center utilizes an IBM System 370/158 computer.

### Procedures for Scoring Reading Tests and Student Questionnaires

Students participating in this study recorded answers to the standardized reading comprehension test and the questionnaire on an IBM standard answer sheet, Form 01. Answer sheets were then scored by the OSU Bureau of Tests and Measurements, using the OSU Computer Center. Both individual and composite group scores were computed.

### Procedures for Scoring Written Language Variables

Raw scores for each of the 21 written language variables were hand tabulated for each individual and recorded on an IBM keypunching form. All figures were double-checked before being submitted for statistical analysis.

### Differences in Writing Variables Between Reading Groups

To determine the statistical difference between mean writing scores of the high and low reading groups, a t-test of significant differences was used.

The formula for t is the following:

$$t = \frac{\bar{M}_1 - \bar{M}_2}{\sqrt{\frac{SS_1 - SS_2}{N(N-1)}}}$$

Where:

$\bar{M}_1$ = mean score on a single writing variable for the high reading group

$\bar{M}_2$ = mean score on a single writing variable for the low reading group

SS = sums of squares for high and low groups

N = number of subjects in each group

The numerator of the t is the deviation of the sample mean from the hypothesized mean. The denominator of t is an estimate of the standard error of the mean (Roscoe, 1975).

For Hypotheses I and II, a one-tailed t-test was used. One-tailed tests are used when a direction has been hypothesized; thus, the rejection region for the null hypothesis is located entirely at one end (tail) of the curve. Hypotheses I and II predict significantly higher scores.

For Hypothesis III, a two-tailed t-test was used. Since no significant difference was predicted, both ends of the curve were considered before rejecting the null hypothesis.

## Relationships Between Reading and Writing Scores

To determine the strength of the relationship between

each of the 21 written language scores and high and low reading scores, the biserial correlation coefficient was computed. The formula for biserial r is the following:

$$r_b = \frac{M_p - M_q}{\sigma_t} \times \frac{pq}{y}$$

Where:

M = mean score on a single writing variable for the high reading group

M = mean score on a single writing variable for the low reading group

p = proportion of the cases in the high group (50%)

q = proportion of the cases in the low group (50%)

y = ordinate of the unit normal distribution curve with surface equal to 1.00, at the point of division between segments containing p and q proportions of the cases (Guilford, 1975, p. 163).

$\sigma$ = standard deviation of the total sample in the continuously measured written language variable.

The biserial coefficient of correlation is appropriate to use when one of the variables (in this study--reading scores) has been dichotomized for some reason. The reading groups, high and low, represent a truncated distribution--"one that has been cut off at either end, with no cases with scale values beyond a certain limit" (Guilford, p. 160). Biserial r is a product-moment coefficient designed to be a good estimate of the Pearson r and may be used in such situations where an artificial dichotomy exists.

Levels of Confidence

All Hypotheses were tested for significance at the .05 level.

# CHAPTER IV

# ANALYSIS OF THE DATA

## Introduction

This study was concerned with the written language produced by 34 university freshmen at two reading levels. Results of the Neslon-Denny Reading Test, Form C (Nelson and Denny, 1973) revealed a mean reading comprehension percentile score of 93.3 for the high group and 17.1 for the low group. The grade level equivalencies for the above percentile scores were 15+ (college junior +) and 10.0 (10th grade), respectively. Thus, there was more than a five year difference in mean reading scores between groups.

A total of 68 themes were analyzed for 21 syntactic elements of written language. The mean number of words analyzed for the high group was 479, and for the low group was 463. Tables II and III contain mean raw scores and standard deviations for each of the writing variables produced by the high and low groups, respectively.

Hypotheses were formulated to test significant differences in syntactic elements of written language between the two groups. Also tested was the relative statistical strength of the relationship between reading competency (high and low) and each of the 21 writing variables.

TABLE II

SUMMARY OF 21 ELEMENTS OF WRITTEN LANGUAGE
PRODUCED BY THE HIGH READING GROUP

| Writing Variables | Mean Raw Score | Standard Deviation |
|---|---|---|
| T-units | 29.00 | 4.782 |
| Words/T-unit | 16.68 | 2.738 |
| T-units/sentence | 1.07 | .070 |
| Clauses/T-unit | 1.45 | .157 |
| Words/clause | 11.50 | 1.797 |
| Subordinate clauses/T-unit | .45 | .157 |
| Words/subordinate clause | 8.09 | 1.694 |
| Words/main clause | 13.54 | 2.334 |
| Words/sentence | 17.92 | 2.681 |
| Elliptical clauses | 1.70 | 1.212 |
| Modals | 7.88 | 2.803 |
| "Be" and "Have" in auxiliary | 7.82 | 2.811 |
| Passive verbs | 5.29 | 2.616 |
| Prepositional phrases | 53.47 | 7.408 |
| Possessives | 5.70 | 3.531 |
| Adverbs of Time | 1.88 | 1.615 |
| Gerunds and participles | 10.58 | 4.316 |
| Intra-T-unit coordinators | 14.17 | 3.066 |
| Inter-T-unit coordinators | 1.94 | 1.374 |
| Free final modifiers | .64 | .701 |
| Syntactic Density Score | 4.75* | .937 |

Mean Number of Words Analyzed = 479

*Mean grade level equivalent

TABLE III

SUMMARY OF 21 ELEMENTS OF WRITTEN LANGUAGE
PRODUCED BY THE LOW READING GROUP

| Writing Variables | Mean Raw Score | Standard Deviation |
|---|---|---|
| T-units | 31.82 | 5.714 |
| Words/T-unit | 15.03 | 2.643 |
| T-units/sentence | 1.13 | .125 |
| Clauses/T-unit | 1.52 | .226 |
| Words/clause | 9.91 | 1.946 |
| Subordinate clauses/T-unit | .52 | .187 |
| Words/subordinate clause | 7.26 | 1.129 |
| Words/main clause | 12.02 | 2.334 |
| Words/sentence | 16.85 | 2.723 |
| Elliptical clauses | 1.17 | 1.286 |
| Modals | 7.58 | 4.093 |
| "Be" and "Have" in auxiliary | 6.64 | 5.011 |
| Passive verbs | 2.82 | 2.627 |
| Prepositional phrases | 45.17 | 7.324 |
| Possessives | 6.29 | 3.349 |
| Adverbs of Time | 1.94 | .826 |
| Gerunds and participles | 6.58 | 3.742 |
| Intra-T-unit coordinators | 10.11 | 3.689 |
| Inter-T-unit coordinators | 2.52 | 1.374 |
| Free final modifiers | .11 | .332 |
| Syntactic Density Score | 3.75* | .836 |

Mean Number of Words Analyzed = 463

*Mean grade level equivalent

## Report of Findings

### Results Related to One-tailed t-tests of Significant Differences

Hypothesis I: The "high" reading group will not exhibit significantly higher mean scores than the "low" reading group on each of the following 11 written language variables:

1. Total number of words per T-unit
2. Total number of words per clause
3. Total number of words per subordinate clause
4. Total number of words per main clause
5. Total number of words per sentence
6. Total number of passive verbs
7. Total number of prepositional phrases
8. Total number of gerunds and participles
9. Total number of intra-T-unit coordinators
10. Total number of free final modifiers
11. Total Syntactic Density Score (SDS)

The null hypothesis, "no significantly higher writing scores will be exhibited by the high reading group," was rejected for nine of the 11 variables under consideration. Table IV contains the critical valuse of t for each of the 11 writing variables.

Students in the high reading group exhibited signifi-

TABLE IV

RESULTS OF THE T-TEST OF SIGNIFICANT DIFFERENCES BETWEEN MEAN SCORES OF THE HIGH AND LOW READING GROUPS ON EACH OF 21 WRITTEN LANGUAGE VARIABLES

| Writing Variables | t |
|---|---|
| Total number of T-units | -1.5623 |
| Total number of words per T-unit | 1.7890* |
| Total number of T-units per sentence | -1.7247* |
| Total number of clauses per T-unit | -1.7449 |
| Total number of words per clause | 2.4709** |
| Total number of subordinate clauses per T-unit | -1.7499 |
| Total number of words per subordinate clause | 1.6738 |
| Total number of words per main clause | 1.7710* |
| Total number of words per sentence | 1.1506 |
| Total number of elliptical clauses | 1.2348 |
| Total number of modals | 0.2444 |
| Total number of "Be" and "Have" in the auxiliary | 0.8441 |
| Total number of passive verbs | 2.7471*** |
| Total number of prepositional phrases | 3.2824*** |
| Total number of possessives | -0.4983 |
| Total number of adverbs of time | -0.1336 |
| Total number of gerunds and participles | 2.8868*** |
| Total number of intra-T-unit coordinators | 3.4884*** |
| Total number of inter-T-unit coordinators | -1.6912 |
| Total number of free final modifiers | 2.8111*** |
| Syntactic Density Score | 2.7471* |

*p beyond the .05 level of significance
**p beyond the .01 level of significance
***p beyond the .005 level of significance

cantly higher scores at the .05 level on three variables: number of words per T-unit, number of words per main clause, and Syntactic Density Score. Number of words per clause was significantly higher at the .01 level of confidence. And five of the nine significantly higher variables reached significance at the .005 level, indicating a very strong difference between groups. These five variables were: number of passive verbs, number of prepositional phrases, number of gerunds and participles, number of intra-T-unit coordinators, and number of free final modifiers. Number of words per subordinate clause approached significance, but fell short at the .10 level.

Hypothesis II: The "low" reading group will not exhibit significantly higher mean scores than the "high" reading group on each of the following two written language variables:

1. Total number of T-units per sentence
2. Total number of inter-T-unit coordinators

The null hypothesis, "no significantly higher writing scores will be exhibited by the low reading group," was rejected for one of the two variables under consideration. Table IV contains the critical values of t for each of the two variables. For the low group, number of T-units per sentence was the only variable found to be significantly higher at .05. Total number of inter-T-unit coordinators approached significance, but fell short at the .10 level.

Results Related to Two-tailed t-tests of Significant Differences

Hypothesis III: There will be no significant difference between the mean scores of the "high" and "low" reading groups on each of the following eight written language variables:

1. Total number of T-units
2. Total number of clauses per T-unit
3. Total number of subordinate clauses per T-unit
4. Total number of elliptical clauses
5. Total number of modals
6. Total number of "be" and "have" forms in the auxiliary position
7. Total number of possessives
8. Total number of adverbs of time

The null hypothesis of no significant difference was not rejected for all variables. Table IV contains critical values of t for each. Total number of T-units and number of subordinate clauses per T-unit approached significance, but fell short at the .10 level of confidence.

Results Related to the Biserial Correlation Between Reading and Writing Scores

Hypothesis IV: There is no significant relationship between reading scores and each of the above 21 written language variables for the "low"

and "high" reading groups.

The null hypothesis of no significant relationship between the reading and writing scores was rejected for 11 of the 21 writing variables under consideration. Table V contains the biserial coefficients of correlation found in this study.

Correlation coefficients ranged from .18 to .64 among all 21 variables. There were four significant correlations at the .05 level: number of words per T-unit, number of words per main clause, number of words per subordinate clause, and number of T-units per sentence. Two correlation coefficients were significant beyond the .01 level: number of words per clause and the Syntactic Density Score. The remaining five variables were significant beyond the .001 level: number of prepositional phrases, number of gerunds and participles, number of free final modifiers, number of intra-T-unit coordinators, and number of passive verbs. Number of intra-T-unit coordinators yielded the highest correlation coefficient established in the study: .64.

All but one (T-units per sentence) significant coefficeints of correlation were positively related to reading comprehension. A positive coefficient reflects the direction of a relationship: as reading scores increased, so did writing scores, and vice versa. In the case of a biserial correlation, as writing scores increased, the more likely they were reflective of high reading group membership.

TABLE V

RESULTS OF THE BISERIAL CORRELATION OF SILENT READING COMPREHENSION WITH 21 ELEMENTS OF WRITTEN LANGUAGE FOR HIGH AND LOW READING GROUPS

| Writing Variables | $R_b$ = | Coefficient of Correlation |
|---|---|---|
| Total number of T-units | | -.3287 |
| Total number of words per T-unit | | .3723* |
| Total number of T-units per sentence | | -.3600* |
| Total number of clauses per T-unit | | -.2895 |
| Total number of words per clause | | .4942** |
| Total number of subordinate clauses per T-unit | | -.2895 |
| Total number of words per subordinate clause | | .3503* |
| Total number of words per main clause | | .3689* |
| Total number of words per sentence | | .2461 |
| Total number of elliptical clauses | | .2633 |
| Total number of modals | | .0533 |
| Total number of "Be" and "Have" in the auxiliary | | .1822 |
| Total number of passive verbs | | .5394*** |
| Total number of prepositional phrases | | .6197*** |
| Total number of possessives | | -.1083 |
| Total number of adverbs of time | | -.0292 |
| Total number of gerunds and participles | | .5612*** |
| Total number of intra-T-unit coordinators | | .6481*** |
| Total number of inter-T-unit coordinators | | -.2856 |
| Total number of free final modifiers | | .5495*** |
| Syntactic Density Score | | .4587** |

*p beyond the .05 level of significance
**p beyond the .01 level of significance
***p beyond the .001 level of significance

## Discussion of the Results

### Differences in Syntactic Maturity Between Reading Groups

Three of the five major questions under consideration in this study concern the possibility that two groups of university freshmen, assumed to be at the same writing maturity level but found to be at two distinct reading ability levels, would demonstrate significantly different characteristics of written language. The questions were the following:

1. Is the writing of good readers more syntactically mature than that of poor readers?
2. Can one characterize the writing of good readers?
3. Can one characterize the writing of poor readers?

The above questions generally concern a theory of language development which presupposes an interrelationship among all language skills: reading, writing, listening, and speaking. Lack of competency in reading comprehension, as demonstrated by the low reading group, may be reflected in a lack of syntactic maturity in their written language. The opposite may be the case for the high reading group. A discussion of the nine written language variables found to be significantly higher for the high group and the one written language variable found to be significantly higher for the low group will show that the writing of more competent readers is more syntactically mature.

The reliability of number of words per T-unit as a good indicator of syntactic maturity has been demonstrated in major studies of language development (Hunt, 1965, 1970; O'Donnell et al., 1967; Loban, 1976; Stewart, 1978). In the present study, freshmen in the high reading group wrote significantly longer T-units than their peers who were less competent readers. This finding supports Loban's research which showed that students in the "high" language ability groups exhibited more mature writing and better reading skills than their classmates in the "low" or "typical" language groups.

T-units may be lengthened in one of two ways: by lengthening a clause (main or subordinate) or by increasing the incidence of subordination within the T-unit. Both of these two factors are considered to be further indicators of syntactic maturity. However, students in the high reading group demonstrated significantly higher scores only in mean words per clause. This finding supports Gebhard (1978) who found mean clause length to be a better indicator of syntactic maturity than mean T-unit length. Hunt (1965) also noted a remarkable 36% increase in clause length between 12th graders and superior adult writers. In this study, high group students' mean clause length was 11.5, exactly the same as Hunt's superior writers (Table VI).

The following are two examples of T-unit expansion by the addition of words within clauses. A freshman in the high reading group wrote the following:

TABLE VI

SUMMARY OF DATA RELATED TO CLAUSES, T-UNITS AND SENTENCE LENGTH

| Research Group | Words/ Clause | Clauses/ T-unit | Words/ T-unit | T-units/ Sentence | Words/ Sentence |
|---|---|---|---|---|---|
| High Reading Group (Present Study) | 11.50 | 1.50 | 16.68 | 1.07 | 17.92 |
| Low Reading Group (Present Study) | 9.91 | 1.57 | 15.03 | 1.13 | 16.85 |
| 70-Freshman Group (Present Study) | 10.70 | 1.53 | 15.85 | 1.10 | 17.39 |
| Sodowsky-Witte (1978) OSU Study | 9.36 | 1.71 | 15.97 | 1.13 | 18.00 |
| Hunt (1965) | | | | | |
| Grade 8 | 8.10 | 1.42 | 11.50 | 1.37 | 15.90 |
| Grade 12 | 8.60 | 1.68 | 14.40 | 1.17 | 16.90 |
| Superior Adults | 11.50 | 1.78 | 20.30 | 1.23 | 24.70 |

1. High school classes differ greatly from college classes in several areas such as difficulty of course work, number of daily assignments, relationships between teacher and students, and size of class. (30-word T-unit)

2. Those of us who can't afford an occasional jaunt to Vegas to catch live performances of our favorite stars must be satisfied with catching a glimpse of them on television. (30-word T-unit)

Example one illustrates T-unit expansion without subordination. Over 60% of the words in this sentence are contained within prepositional phrases. Example two contains only one subordinate clause, yet this dependent clause makes up just over half the sentence (16 words).

Generally speaking, students in the high group were conservative in their use of subordination within T-units, in contrast to low group students. This observation supports Hunt's (1965) premise that T-unit expansion by increasing the incidence of subordinate clauses may have reached practical limits by grade 12. His superior adults used only a few more subordinate clauses than 12th graders. Thus, no significant difference was predicted for number of subordinate clauses between reading groups in the present study.

No significant difference was found. However, students in the low group did use more subordinate clauses (and as a result, more clauses per T-unit) than high group students. The incidence of subordination only approached significance, falling short at the .10 level. However, it should be pointed out that the less competent readers appeared to misuse subordination when expanding T-units. Low group students often linked numerous subordinate clauses

within one T-unit, thus creating somewhat inflated scores on this variable. The end product was often a winding, uncontrolled sentence. For example:

1. Personally myself I think it's very difficult to compare the two together because there were so many things that you couldn't get away with in high school that you can get away with in college. (35 words)

2. When I came to Stillwater it was only then that I realized that the high school education that followed me was quite lacking which was a big disadvantage that can hurt in the end when I finally came to OSU. (40 words)

Examples one and two illustrate lack of syntactic control. Almost 90% of each sentence is contained within subordinate clause structures, yet the relationships between subordinated ideas reflect unnecessary redundancy. Stereotypic "run-on" sentences are usually made up of conjoined main clauses especially among immature writers. Rosen (Cited in Crowhurst, 1977, p. 16) points out that some young writers with inadequate control of language "spill out subordination awkwardly and inelegantly in the manner in which a younger child spills out coordination." Long, clumsy T-units, as in the above examples, may typify a certain point on the road to mature writing. The immature university freshman writer has not yet learned to be conservative, to consolidate his/her ideas, and to achieve T-unit expansion more discretely. Subordination may need to be studied more closely in terms of error analysis in future research projects.

Five elements of written language discriminated be-

tween the high and low reading groups at the .005 level. Of the five, three are typically produced through application of deletion or substitution transformations: 1) prepositional phrases, 2) intra-T-unit coordinators, and 3) participles and gerunds. Of the remaining two variables, free final modificaiton is a characteristic related to mature writing style, and passive constructions are a form of verb phrase expansion.

Extensive use of prepositional phrases has been shown to be a mark of writing maturity as well as a characteristic of professional writing style (O'Donnell et al., 1967; Schmeling, 1969; Gebhard, 1978). Prepositional phrases function as adjectives, adverbs, and occasionally as nouns. No formal analysis of prepositional phrase function was undertaken in the present study. Freshmen in the high reading group simply used two and one-half times as many of these structures per T-unit as did the less competent readers. Incorporation of an average of two prepositional phrases per T-unit accounted for a large percentage of the words which lengthened clauses. Therefore, for the high group the prepositional phrase is likely a major structure responsible for longer T-units, while the addition of subordinate clausal structures accomplished the same purpose for the low reading group.

The following two T-unit passage contains seven prepositional phrases and is characteristic of high group writing:

1. The success of MASH may be attributed to the utter lunacy of the characters.

2. MASH is about the people who work at an army hospital close to the front during the Korean War.

To understand how deletion transformations operate when forming prepositional phrases, note the following three simple sentences which reflect the deep structure or content of T-unit number one:

1. Mash is successful.

2. The characters are utter lunatics.

3. The crazy characters make MASH a success.

Through transformational sentence combining (unconscious on the part of the writer), using implicit deletion rules, the writer has come up with a more "mature" sentence which expresses the above three ideas. No redundancy remains in the ultimate T-unit "The success of MASH may be attributed to the utter lunacy of the characters."

The incidence of coordinate conjunctions within T-units appears to increase as one becomes a more mature writer (Hunt, 1965; Christensen, 1968; O'Donnell et al., 1967). Intra-T-unit coordinators "connect words, phrases, or clauses of the same rank and usually of the same kind--noun and noun, adjective and adjective, phrase and phrase, clause and clause" (Pence and Emery, 1963, p. 127). The high reading group used one and one-half times as many coordinators within T-units as the low reading group. Coordinated constructions also add to the length of a T-unit. For example:

> During a time when we needed a respite from the horror and fear of Viet Nam, a movie came out showing not only the grisley side of war but also the lighter side.

Coordination implies multiple use of words and phrases to illustrate a point. The addition of details through coordination is often accomplished through deletion transformations. An example from the high group follows:

> Good Morning America presents news and weather, a refreshing satirical look at American life by Erma Bombeck, and interviews by David Hartman and Sandy Davis.

At least six simple sentences underlie the meaning of the student's ultimate 26-word T-unit:

1. Good Morning America presents news.
2. Good Morning America presents weather.
3. Good Morning America presents a refreshing satirical look at American life by Erma Bombeck.
4. Erma Bombeck takes a refreshing satirical look at American life.
5. Good Morning America presents interviews by David Hartman and Sandy Davis.
6. David Hartman and Sandy Davis do the interviews.

By combining details through coordination within a T-unit, the writer's language becomes less redundant and thus more syntactically mature.

Application of deletion and substitution rules are a way of economizing language, while at the same time getting more information into a single T-unit. Participles and gerunds are even more dramatically indicative of mature structures formed through deletion and substitution, respec-

tively. These two verbals were not analyzed separately, and no numerical estimate of their various separate functions within T-units was made in the present study. High group freshmen again incorporate two and one-half times as many of these verbal structures per T-unit as low group students. Unlike the prepositional phrase that helps to lengthen clauses, participles and gerunds may indeed serve to shorten a T-unit. For example:

> Being a widely-viewed children's show, Sesame Street is responsible for good educational and recreational programming.(16 words, two gerunds, and one participle)

The above could have been written:

> Since Sesame Street is viewed by many children the show is responsible for a good format which includes educational as well as recreational entertainment. (24 words, no gerunds or participles)

In creating a gerund or participle, the writer often passes through subordination, eliminating words which could account for unnecessary redundancy. Conciseness of expression may be a direct result of proper verbal usage. Loban (1976) writes:

> In the history of the English language, the use of nonfinite verbal constructions /such as gerunds and participles/ has been increasing for the past five centuries. They are a way of simplifying, and they are forceful; they help us to express and to subordinate thought effectively and directly (p. 69).

Loban's high language ability groups demonstrated an increased use of gerunds and participles in their written language, and his low ability groups demonstrated an increased use of the same verbal forms in their oral lan-

guage. Why the low group had not made use of their obvious oral language capabilities in written expression puzzled Loban. He suggested that a need for further research exists to verify and to explain this phenomena. The present study supports the premise that better readers incorporate more gerunds and participles in their written language than poor readers.

In relation to deletion transformations, the writing variable "total number of elliptical clauses" should be given some consideration. An elliptical clause is formed by deleting a word or words unnecessary to the meaning of a sentence: I liked high school better than college. One would assume that since high group students used a large number of deletions, they would likely score higher on this variable as well. No significant difference was predicted, because no research exists to support the premise. No significant difference was found, though high group readers did produce more elliptical clauses than low group readers.

One factor which could account for no significant difference in the present study is the method of development used in theme two: "Compare and contrast." Clauses of comparison are very likely to be reduced. Since theme two provided numerous opportunities to say things like "College classes are larger than high school classes," low group students most probably took the opportunity to construct many simple comparative clauses, thereby in-

creasing their raw score for elliptical clauses. Results of the present study should be further analyzed to determine if this indeed happened. Future research should examine elliptical clauses in expository themes developed through other methods such as definition, process, or analysis.

The two remaining elements of written language significant at the .005 level are not formed through deletion transformations. The first, free final modification, is a characteristic of not only "quality-rated" writing but also professional writing style (Christensen and Christensen, 1976; Nold and Freedman, 1977; and Gebhard, 1978). An example from the high group serves to illustrate this element of mature writing style:

> In the past two decades, the people of America have turned to their televisions for entertainment, choosing to passively absorb excitement rather than actively participate in such activities as game playing, book reading, or singing and dancing.

The last 21 words of the above 37-word T-unit are contained within a free final modifier. Clearly, free modification adds to t-unit length as well as to the amount of detail within the sentence. Students in the high reading group incorporated seven times as many free final modifiers per T-unit as the low group students. Modifiers in the final positions are often begun with a verbal. Since freshmen in the high group characteristically use more verbals, they may perhaps be more comfortable

adding a free modifier to the end of a sentence. Less mature writers may not yet know how to form a free modifier without having it "dangle." (Dangling modifiers are placed too far away from the word they modify, thus creating an ambiguous sentence). Therefore, they have not developed this reported characteristic of mature writing style.

The second writing characteristic significant at .005, but not formed by deletion transformation, is the passive verb. Compared to the elements of written language discussed thus far, passive constructions have been examined least in relation to syntactic maturity. Passives are formed by expansion of the main verb using some form of the auxilary "be." For example:

> When one enters the college lecture hall for the first time, he <u>is</u> immediately <u>struck</u> by the large number of students present.

By virtue of verb phrase expansion, T-units are lengthened. Hunt (1965) showed that passives are significantly correlated with clause length (.55 coefficient of correlation). He also determined the percent of increase between grades four, eight, and twelve to be 27 percent to 79 percent to 100 percent, the final percent being an arbitrarily set criteria of "maturity." Potter (Cited in Schmeling, 1969) observed twice as many passives in good 10th grade papers as in poor papers. The present study reveals the high reading group using twice as many passives per T-unit as the low reading group.

In general, more mature writing includes more compli-

cated verb auxiliaries. However, totalling modals and all forms of "be" and "have" in the auxiliary showed only slightly higher usage among the high reading group. Low group students appear to have approximately the same facility in using auxiliary verbs such as have, has, could, would, etc. Because these kinds of verb phrase expansion words appear to be easily used by all students, language arts instructors should consider teaching their usage early in the composition program. However, the present study does not confirm this suggestion. The logical sequence of verb phrase expansion should be the subject of future research. College level composition courses often ignore what student writers can already produce. As Hunt (1965, p. 155) points out, "Grammar is always reviewed but never taught." Reviewing what is already known can kill incentive to write better.

Why passive constructions were significantly higher is still somewhat puzzling. Further research is needed to see if the same finding occurs in modes of discourse other than exposition. By researching argumentation, description, and narration one may learn if passive constructions are more closely associated with writing mode rather than writing maturity.

The final variable under consideration for the high reading group is the Syntactic Density Score (SDS). The SDS is not a single element of written language but rather a composite score based upon a computational formula

developed by Lester Golub (197 ). The SDS reflects overall syntactic complexity of written language and was used in this study to determine if it is a good discriminator between reading groups.

The SDS discriminated between reading groups at the .05 level. The high reading group achieved significantly higher scores, suggesting that their language was significantly more complex. This finding is not surprising in view of the variables just described, especially words per T-unit. As was discussed earlier in Chapter II, Part II O'Donnell (1975) has demonstrated the close reliable relationship between the SDS and T-unit length. Since both figures were significant at the same level of confidence in the present study, one should assume that O'Donnell's findings are supported here.

The question of how useful the Syntactic Density Score is in describing the maturity of written language should also be considered. A problem arises when converting the SDS raw score to a grade level score. In the present study, the mean grade level score was 4.75 (4th grade) for the high reading group and 3.75 (3rd grade) for the low reading group. The numbers bear no relationship to the level of writing observed in either group. Competent readers do not write like 4th graders, and less competent readers do not write like 3rd graders. The average 4th grader might be able to read and comprehend a paper written by a member of the high group, but it is doubtful because of the vocabu-

lary used by college freshmen.

The readability of high and low group papers is always affected by vocabulary, a factor not accounted for in Golub's formula. Just as readability formulas by Dale-Chall or Spache are criticized for not considering a syntactic component (other than sentence length), so the SDS formula may be criticized for not considering a vocabulary component. The resulting total SDS grade level score is misleading and may in fact demonstrate the futility of ascribing a grade level to students' written language.

O'Donnell (1975) showed that among 9th graders mean T-unit length might be a better indicator of grade level than the Syntactic Density Score. The present study supports this. The mean T-unit length for the low reading group was 15.03 vs. 16.68 for the high reading group. Compared to Hunt's 12th graders (Table VI), whose mean T-unit length was 14.4, the college freshmen writers in the present study appear to be steadily maturing. The more competent readers are simply further along then the low group. In spite of these statistics, one should still be cautious in interpreting any numerical writing score in terms of a grade level equivalency. No definitive research exists which suggests that sentence X is purely a college freshman level sentence or a 4th, 5th, or 6th grade sentence.

In all cases discussed thus far, the increased incidence of a writing variable was a sign of writing maturity.

However, two variables were predicted to increase significantly for the low reading group. These elements of written language were number of T-units per sentence and number of inter-T-unit coordinators.

Hunt (1965) has shown that the ratio of T-units to sentences declines as children get older. This phenomena is explained in part by the tendency of younger children to use run-on sentences--strings of T-units joined by ands with commas or no punctuation in-between. Hunt's superior adults used slightly more T-units per sentence than average twelfth graders, but this may be explained in part by the former's extensive use of compound/complex sentences. A compound/complex sentence contains two or more main clauses plus one or more subordinate clauses. Such sentences are long, complex, and should be considered when examining overall T-unit length of superior writers.

Students in the low reading group exhibited significantly more T-units (.05 level) per sentence than high reading group students. More T-units per sentence typically meant the less competent readers were using more run-on sentences, as illustrated below:

> The show that I believe everyone knows about and has seen at least once is Saturday Night Live, this is a program that is different than most comedy shows and the reason it is so popular is that the humor in the program relates to the public.

The student has strung together three T-units with a comma and the conjunction and, the latter being an inter-

T-unit coordinator.

The incidence of inter-T-unit coordination was higher for the low group, but fell short of significance at the .10 level. Low reading group students appeared to join two or more T-units with a conjunction more often than high group students. Conjoined sentences are considered to be immature structures and were found by Hunt (1965) to have reached their peak in the writing of 4th graders. Why the incidence of inter-T-unit coordination failed to reach significance is explained in part by the high group's use of conjunctions to begin sentences. Low group freshmen rarely began a sentence with and, but, for, etc. Results of this and other studies should be analyzed for the incidence of coordinate conjunctions used to begin sentences. Some previous research also suggests the same characteristic among professional writers who are not adverse to beginning a sentence with a conjunction (Christensen and Christensen, 1976).

Other elements of written language the low group exhibited more of were total number of T-units, possessives, and adverbs of time. No direction was predicted for these variables, and no significant difference between groups was found. However total T-units approached significance at .10 and does reveal a tendency for less competent readers to use more and perhaps shorter T-units than the high readers. Short T-units are usually seen more frequently in younger children's writing.

It is difficult to explain why low group students produced more (but not significantly more) possessives and adverbs of time. Extensive use of personal pronouns such as my, mine, our, may be an indication of personal involvement in the essay. However, such involvement often reflects a lack of distance on the part of the writer. Egocentricism in formal exposition can weaken the theme and is discouraged by most college level instructors. Conversely, use of the possessive form of a noun, as in "The program's success is based upon the character Mork," may indicate that proper distance has been achieved by the writer. To conceive of a thing being capable of possession is a task which requires a certain amount of psychological distance on the part of the writer. Further research is needed to analyze the type of possessives used by good and poor readers. An understanding of the rhetoric of the possessive should help one understand egocentricism in writing.

The low group's use of more adverbs of time may be explained in part by their increased use of subordinate clauses. Low group students typically began a subordinate clause with the adverb of time "when," as in the example, "When I was in high school, everything seemed so easy." High group students also began subordinate clauses with when; but since they characteristically did not write as many subordinate clauses, the low group out-scored them on this variable. A closer analysis of adverbs of time used to begin sentences and used within sentences should be made.

By studying how the concept of time is handled in a student's writing, one may also learn something about his personal involvement in relating experiences.

Summary

Themes written by freshmen in the high reading group appear to be more syntactically mature than those written by low reading group students. Based upon statistical application of a t-test, significant differences between the means of ten writing variables were found. Nine were significantly higher for the high group, one was significantly higher for the low group.

The writing of the more competent readers was characterized by longer T-units, more syntactic elements formed through deletion and substitution transformations, the addition of free final modifiers, and more verb phrase expansion using passive constructions. Longer clause length among high group writers was in part attributed to more prepositional phrases, more intra-T-unit coordination of details, and more free final modifiers. Total syntactic density scores supported the general conclusion that high group writing was more mature. But the grade level equivalency of the SDS was questioned in regard to its reliability and usefulness.

The writing of the less competent readers was characterized by shorter T-units expanded through subordination rather than deletion transformations. The low reading group

wrote more T-units per sentence. This latter factor appeared to be a reflection of more run-on and conjoined sentences observed in the low group's papers.

Variables not reaching significance were explained in part by the low group's misuse of subordination and possible egocentric involvement in their writing, and by the high group's non-reluctance to begin a sentence with a conjunction.

## Syntactic Maturity and Writing Quality: A Word of Caution

Those syntactic elements of written language that have been found in this study to be significantly different between high readers and low readers do not in themselves represent adequate criteria for distinguishing good writing from bad. Furthermore, examination of these syntactic elements alone will likely be misleading in trying to determine quality of writing, as the following example illustrates:

Ron was a student in the high reading group who averaged 18.08 words per T-unit. He used 61 prepositional phrases, 17 intra-T-unit coordinators, six verbals, three passives, and one free final modifier. Ron used only .28 subordinate clauses per T-unit. A glance at his profile of scores reveals that his writing is syntactically mature, as defined in this study. However, many other factors affect quality of writing.

Ron's writing looked like this:

> In television today, the subjects of the shows very a great deal. Many stars have specials, their are movies, documentarys and talk shows but most regular weekly shows are divided into three main types the action drama the situation comedy and the shows devoted to sex.

The above example illustrates that spelling and punctuation, two factors normally related to writing "quality," are not reflected through syntactic analysis. An instructor reading Ron's themes will not be aware of the "maturity" inherent in his long T-units. However, he or she will note misused and unused commas and spelling errors: their, very, documentarys. Ron will be penalized for his run-on sentence. The writing may be labeled poor or average, at best. The "comma splice" could even yield an F. Being syntactically mature does not guarantee good writing or good grades.

The purpose of this thesis is not to judge the quality of writing among good and poor readers. However, it is appropriate to note that, generally speaking, high group papers were better than low group papers, as informally observed by the researcher. Spelling, punctuation, vocabulary, paragraph and theme organization, and depth of conceptual thought seemed to be handled with greater ease by high group freshmen. Conversely, low group freshmen's ideas often rambled. Garbles (fragmented, ambiguous sentences) were noted in over half their papers, while none was noted in the high group papers.

Just as the quality of one's writing may not be

accurately reflected through quantitative analysis of syntax, so the quality of one's reading comprehension may not be accurately reflected in a single standardized reading test score. Therefore, interpretation of "high" and "low" reading scores must be approached cautiously, even though the Nelson-Denny Reading Test has been shown to be a fairly good screening test, especially for low-level readers (Forsyth, 1978). Further, a correlation between syntactic maturity and general reading comprehension does not imply causation. "Poor" comprehension does not necessarily cause one to write with less facility, and vice versa. Yet possible reasons given to account for established relationships may reveal insight into how receptive and expressive language is handled by some individuals.

## The Relationship Between Reading Competency and Syntactic Maturity

In the previous section, "Differences in Syntactic Maturity Between Reading Groups," the observed characteristics of written language produced by high and low reading groups indicated that more competent readers exhibited more syntactically mature writing than less competent readers. In the current section, the same elements of written language are discussed in terms of possible explanations of their relationship to reading comprehension. The two remaining questions under consideration in this study are:

4. Which syntactic elements of writing are most

strongly related to reading?

5. How may one account for the relationship between reading comprehension and related elements of writing?

Regarding question four, the original t-test identified ten elements of written expression that were significantly different between high and low reading groups. A biserial correlation formula statistically verified that these ten elements of writing were indeed related to level of reading comprehension. Further, the biserial correlation formula suggested one additional element of writing (words per subordinate clause) was also significantly related to level of reading comprehension. The original t-test identified a strong (.10), but not significant difference. Thus, there may be at least eleven elements of written expression whose relationship to reading comprehension deserves further study.

The biserial formula yielded a coefficient of correlation between reading level (high and low) and each of the 21 elements of written language (Table V). These 21 coefficients reflect the extent, or statistical strength of the relationship between the reading and writing skills under consideration.

Of the eleven syntactic elements of written language found to be significantly related (at .05 or better) to reading comprehension, all but one, T-units per sentence, were positively related to high group membership.

Four writing characteristics were directly related

to clause length: words per T-unit, words per subordinate clause, words per main clause, and words per clause. Of the four cited, number of words per clause bore the strongest statistical relationship to reading comprehension, with a correlation coefficient of .49, significant beyond .01.

Three writing elements formed through deletion or substitution transformations correlated with reading comprehension beyond the .001 level and achieved the three highest correlation coefficients in the study. They were: intra-T-unit corrdinators (.64, the strongest statistical relationship established), prepositional phrases (.61), and participles and gerunds (.56).

The three remaining positively-related characterisics and their coefficients were: free final modification (.54) and passive verbs (.53) both significant beyond .001, and the Syntactic Density Score (.45) significant beyond .01.

Number of T-units per sentence was negatively related (-.36) to reading comprehension (beyond .05). And total number of T-units approached a significant negative correlation at the .10 level of confidence.

Question five, how may one account for the significant relationship between reading comprehension and (these 11) syntactic elements of written language? requires a more extensive discussion of the relationships established. In formulating reasons why good readers produce more syntactically mature writing characteristics, one must consider factors related to both the and reading and writing pro-

cesses. For example, good readers appear to use more detail in their writing, as evidenced by extensive use of prepositional phrases, intra-T-unit coordinators, and free final modifiers. This observation may be related to the reading process as well. Good readers are likely to comprehend better because they note more detail while reading. In turn, their use of detail in written expression may be an unconscious (or conscious) modeling of previous reading experiences.

An examination of the eleven elements of written language significantly related to reading comprehension suggests many possible links between reading and writing processes. The following discussion of observed connections may be useful in future research relating reading and writing skills. Chapter V contains a more extensive discussion of recommendations for further research.

## Discussion

Clause Length. Writing variables directly related to clause length appear to be characteristic of good readers' written expression. Number of words per T-unit, main clause, and/or subordinate clause was significantly and positively related to high group membership. The question arises: Why would more competent readers pack more words into a clausal structure than poor readers? The most simplistic answer that comes to mind is that better readers not only feel more comfortable using longer T-units but also know how to

elaborate their ideas without violating rules of syntax that prevent run-on sentences. If one accepts the premise that better readers have read and comprehended more complex reading material, then one may logically conclude that by virtue of their reading experiences, better readers are likely to have internalized knowledge of grammatical structures. Such a conjecture supports the Models Approach to composition instruction which assumes an individual can develop a skill through imitation, conscious or unconscious (Myers, 1978).

Research has shown that the more aware one is of grammatical structures, the better he/she is able to comprehend them while reading (Shackford, 1976; O'Donnell, 1976; Wisher, 1976). Exposure to numerous models of complex language most probably helps better readers to gain linguistic awareness needed to produce longer clauses in their own written language. Hughes (1975, p. 9) noted that "sensitivity to grammatical relations is characteristic of the better reader," and showed that sentence combining practice improved T-unit length in writing and reading comprehension among 7th graders. Other research has reported a positive correlation between T-unit and/or clause length and reading comprehension (Evanechko, et. al., 1974; Johnson, 1976; Lazdowski, 1976).

The present research lends additional empirical evidence supporting the following observation: Better readers use more words per clausal structure. Longer clausal structures usually reflect greater syntactic control.

"Greater control over language structure" is an important factor in improving reading skills" (Goodman, 1967, p. 132). Therefore, it is probable that good readers not only produce syntactically mature language but also comprehend longer structures more readily. Thus, the better readers in the present study have demonstrated the truth in Goodman's words.

Deletion and Substitution Transformations. The strongest statistical relationships established in the present study were attributed to three elements of written language formed through deletion or substitution transformations. The question "Why do good readers use more of these kinds of deletion and substitution transformation than poor readers? is best approached by examining each variable separately. The three syntactic structures were the following: intra-T-unit coordinators, prepositional phrases, and participles (formed through deletion) and gerunds (formed through substitution and/or deletion).

Intra-T-unit coordinators function to join words, phrases, or whole statements of equal rank. As the incidence of coordination within T-units increases, the more likely one is to find a theme rich in detail. If an individual adds more detail to his/her writing, then this factor may be related to his/her ability to extract and comprehend detail when reading. The present study did not analyze individual comprehension questions on the reading test. Attention to detail, however, is related to any

number of comprehension skills, including literal and inferential tasks. Readers in the high group may have utilized an ability to perceive detail in scoring above the 90th percentile on the Nelson-Denny. Further research is needed to confirm a relationship between more specific comprehension skills and elements of written language.

Schmeling (1969) made a similar observation concerning college freshmen's ability to perceive details. He hypothesized that poor writers who use significantly fewer noun modifiers (i.e. adjective + noun, noun + prepositional phrase) might perceive fewer details in their reading. In the present study, the liberal use of prepositional phrases among high group readers suggests further use of detail in their written language. Though prepositional phrases sometimes function as subjects or objects, they typically modify or describe a person, place, thing, or action. Thus, the reader learns more about a noun rather than being introduced to more nouns, as would be the case in coordinated subjects or objects.

An individual who is capable of perceiving a great variety of detail while reading may include more modification in his/her writing. But such a conjecture needs to be supported by further experimental research. Other factors which might be studied are the following:

1. Are good readers more capable of perceiving and conceptualizing detail in the world around them?

2. What is the influence of vocabulary and concept

development on modification skills in written language?

Participles and gerunds (verbal forms) make up the third category of writing elements formed through deletion or substitution transformations, respectively. A participle is a verb form used as an adjective; a gerund is a verb form used as a noun. Both are considered to be "hybrids," for they take "on the characteristics of two different parts of speech at the same time" (Pence and Emery, 1963, p. 63). This study suggests that better readers use these complex words in their writing more often than poor readers. This observation has also been made in other research relating reading and writing (Evanechenko, et. al., 1974; Kuntz, 1975; Cunningham, 1976; Loban, 1976).

One possible explanation for the relationship between reading comprehension and participles and gerunds centers around the importance of vocabulary and concept development in relation to reading skills improvement. Consider the following examples from a high group writer:

1. Progressing from high school to college is a big step in the lives of many young people.

2. If a TV show doesn't appeal to the viewing audience, it is rapidly booted out of the programming schedule.

Regardless of this writer's conscious knowledge of grammar, he is able to use a present participle like progressing as the subject of a sentence. The deep structure of example one could have been expressed without a gerund, but the student would not have economized his language nearly as well, as the following illustrates:

3. Many young people are progressing from high school to college and, as a result, take a big step in their lives.

In order to transform number three into example one, the word progressing, used as a noun, had to be a part of the student's vocabulary. He needed to have conceptualized the verb "progress" beyond its traditional function as an action. Furthermore, he did not need to know that progressing is a "gerund," but he did have to know that progressing may be a "thing" as well as an expression of an action.

The same process of conceptualizing a verb is true for the participles in example two, "viewing" and "programming." The student was able to use these verbs as adjectives to modify nouns. Again, he did not need to know the label "participle," but must know that viewing and programming are not only actions, but also words that describe things. Participles are another example of sophistication in modification. The increased incidence of participles among high group readers supports earlier observations of generous detail in high group themes. A question for further research might be the following: Will improvement in both vocabulary and conceptualization of verb forms aid both reading comprehension and written expression?

One final note is appropriate regarding deletion transformations in general and high group readers in particular. One may recall that deletion transformations help to economize language, to rid sentences of unnecessary redundancy, and to bring about a clearer relationship between words in

a single T-unit. A competent reader who makes use of economizing techniques in his writing may be one who needs less graphic information (surface feature cues) to comprehend the meaning of a passage he is reading. For example, Goodman (1976) noted that beginning readers need more graphic information in order to decode words than do skilled readers. Skilled readers come to rely on their linguistic "awareness" of redundancy in the language to anticipate words. He/she is capable of processing words in sentences more quickly while still retaining the meaning of a passage. Precise linguistic expectations reduce "linguistic computation and its required memory requirements, which, in turn, saves the reader time and effort" (Wisher, 1976, p. 601). Though reading rate was not a factor considered in the present study, readers with good comprehension usually read faster than poor comprehenders. The relationship between reading rate and deletion transformations of all kinds in written language is a subject for further research.

Passive Constructions. Passive verbs have been shown to cause comprehension problems for some beginning and advanced readers (Coleman and Blumfield, 1963; Evans, 1973). Further, passives are known to be a late development in the oral language of children (Crystal et al., 1976). Evanechko et al. (1974) and Potter (Cited in Schmeling, 1969) have noted a predominance of passive constructions in the writing of good elementary and secon-

dary readers. The current study also suggests that good readers use more passive verb form than poor readers. The question is--Why?

To form a passive, one must write a sentence in which the subject receives the action, the opposite of the traditional agent-action-object structure. In thus making a verb passive, the writer must have conceptualized the subject capable of being acted upon. The direction of the action moves from right to left, instead of left to right. For example:

Active: All freshmen failed the Review Guide Test.



Passive: The Review Guide Test was failed by all freshmen.



The observation that better readers use passives more often than poor readers may be explained in part by their ability to maintain distance from their subject while writing. A crucial element in making the transition from personal narrative to exposition is a decrease in egocentrism, a natural development as one matures (Myers, 1978). Less mature individuals will characteristically write sentences in which "I" or an agent does something. Their view of the world is centered around subjects (including themselves) performing actions. As one matures and is capable of stepping back and viewing subjects being acted upon, his/her view of the world is expanded, allowing for a wider variety of conceptual experiences. His/her writing thus reflects a wider variety of verb phrases.

In relation to reading comprehension, understanding passive constructions requires on the part of the reader a certain amount of psychological distance from the passage. (A similar point was made earlier in relation to possessives.) Developing psychological distance while reading occurs as a process of maturation and is basic to critical reading skills. For example, though sometimes it is helpful to be personally involved in a short story, to identify with characters, situations, etc., personal involvement in reading editorials or political issues may impair objectivity and distort comprehension.

Two questions for further research might be: How do good and poor readers perceive their world? And is this perception related to critical reading skills and verb constructions in written expression?

Free Final Modification. The use of free modifiers attached to the end of a sentence is believed to be a characteristic of professional, "mature" writing style (Christensen and Christensen, 1976). But the Christensens' research was based primarily on the work of fiction writers. Why, then, did good readers in the present study and Johnson's (1976) good elementary readers exhibit more free final modification in expository writing than poor readers?

One explanation echos earlier statements regarding language modeling. Suppose good readers truly model what they have read. What they have read may be any combination of forms, non-fiction to fiction. If the Christen-

sens' theory holds true, that professional writers use more free modification in the final position, then exposure to this model could influence one's writing style.

Research into the reading habits of college freshmen has thus far failed to reveal any significant relationship between amount and kind of reading done and syntactic maturity (Thomas, 1976). However, it would be interesting to examine the possibility that writers who use free final modification extensively also read fiction widely. This hypothesis could be tested at any grade level, and positive results would land support to language modeling theories of composition improvement.

Syntactic Density Score (SDS). The ultimate raw score derived through application of the Syntactic Density formula reflects the total complexity of any passage analyzed. It is not surprising, therefore, that a statistical relationship was established between the SDS and reading comprehension. As has already been stated, better readers' writing seems to be more complex than poor readers' writing. The .46 correlation (significant beyond .01) of syntactic density scores with reading comprehension levels simply verifies this conclusion.

Regardless of this established connection, the following question still remains: How useful is Lester Golub's formula in interpreting maturity of written language? A mathematical relationship between the SDS and reading comprehension tells us no more than we already knew through

analysis of individual writing variables, especially words per T-unit. Thus it seems that one could accomplish the same goal of language analysis without the complexities of Golub's mathematical formula or the ambiguities of his grade-level conversion of the final score.

T-units per Sentence. The total number of T-units per sentence variable was negatively related to reading comprehension. As the incidence of T-units per sentence increased, group membership was contained within the low range of reading scores. This relationship was accounted for in part by low group readers' using more run-on and conjoined sentences than high group readers.

Run-on sentences written by poor readers often not only lack proper punctuation, but also a sense of direction. Meaning is lost by the time one gets to the end, as the relationship between words is spread thin. An example from a low group writer illustrates this point:

> The reason these are popular shows on television, I believe, is that the majority of the public is interested in learning or knowing the past and present of our country or perhaps the interest falls in one particular life that is, the reason for one's believing in something so desparagely, that it motivates and gives him the initiative to follow through is something most people would like to acquire for himself in this modern society we live in today. (one "sentence," three T-units).

The student's inability to relate her ideas logically and smoothly is likely related to reading fluency. "Fluency is broadly defined as the 'smoothness' of both oral and silent reading" (Guszak, 1972, p. 68), and is measured by both

comprehension and rate criteria. Gusak describes a disfluent reader as one who may experience difficulty solving unknown word forms, concepts, and syntactic patterns, and thus not attain substantial speed and comprehension. Further, such readers do not relate well the meaning of words within sentences and sentences within paragraphs, because they are inhibited by decoding, vocabulary, and surface feature complexities.

The example writer from the low group also appears to have become lost in her own thoughts, so that by the end of the "sentence," the relationship between "initiative in one's life" and "public interest in TV" is unclear. Like Carkeet's student writer who had retention problems (Chapter I, p. 3), this student appears to have forgotten halfway into the three-T-unit sequence what has gone on before. Fluency in reading requires adequate short-term memory and concentration to "put it all together," so to speak, and thus read efficiently.

Additionally, conjoined sentences like

> In today's society people are looking for relief from everyday pressures, and by watching humorous TV shows people in society today may forget about everyday pressures.

may be the poor reader's way of expressing the redundancy he needs (but does not get) when reading. Reading material becomes less and less redundant after grade four (Smith, 1970). Therefore constraints on short-term memory is greater as one encounters more complex reading. College level reading is without a doubt complex and non-redundant.

A freshman in the low reading group may comprehend less because of demands placed on his/her memory--coupled, of course, with his/her inexperience in reading complex linguistic structures.

An area for further research is an investigation of the reading comprehension and short-term memory skills of severely writing/reading disabled college freshmen.

## Summary

Through application of the biserial correlation formula, eleven syntactic elements of written language were found to be significantly related to high and low reading comprehension. Significant correlation coefficients ranged from .35 for words per subordinate clause to .65 for intra-T-unit coordination. Ten writing elements were positively related to reading comprehension. Number of T-units per sentence was negatively related.

A discussion of the established relationships included possible explanations which account for the connection between reading and writing skills. Reasons which may account for the observed connections were discussed in terms of theories of modeling in composition, linguistic awareness, deletion and substitution transformations, verb phrase complexity, and the role of redundancy in reading comprehension. Some suggestions for further research were mentioned. These suggestions will be expanded in the final chapter.

# CHAPTER V

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## Summary of Procedures and Results

This study examined the relationship between reading comprehension and 21 syntactic elements of written expression produced by university freshmen at two reading levels, high and low.

The initial sample consisted of 85 students enrolled in four sections of beginning composition at Oklahoma State University. Of the 85, 70 were either first or second semester freshmen who had never previously completed a college composition course. All students contributed to the language samples: one silent reading comprehension test and two expository in-class themes. However, only the freshmen's papers were analyzed for the 21 syntactic characteristics. And only the high and low reading groups (17 freshmen per group) were included in statistical comparisons of reading and writing skills.

During the first and third weeks of the spring semester, 1979, all students wrote an in-class expository theme as part of their regular course requirements. Theme number one was developed through classification: "Classify three types of television programs on TV today and tell why each is

popular." Theme number two was developed through comparison/contrast: "Compare and contrast high school classes and college classes." Topic and mode of discourse was held constant for all students in order to control syntactic variations which might have occurred because of those variables. After the researcher xeroxed each theme, the individual instructors graded and returned them to their students for corrections. At no time did the students think they were being singled out for research purposes.

During the fourth week of the semester, the researcher administered to all four sections the comprehension subtest of the Nelson-Denny Reading Test, Form C (Nelson and Denny, 1973). Students were given class credit for taking the exam. At this time, they also completed a short questionnaire designed to supply such descriptive data as age, sex, race, etc. It was not until after all students had completed both themes and the reading test that they were informed of the researcher's project.

Two reading level groups were identified based upon reading test scores. The criteria for inclusion in the high reading group was a percentile score of 90 or better. For the low reading group, a percentile score of 28 or lower was the standard for inclusion. Each reading group contained 17 freshmen. A total of 34 freshmen, 18 men and 16 women made up the final research sample.

Each of the two themes were limited by counting to the end of the T-unit after the 225th word. Thus, a mini-

mum of 450 words per student were subjected to syntactic analysis of 21 elements of written language. The writing characteristics were chosen for their known contribution to syntactic maturity in written language and for their possible connection to reading comprehension. The researcher, who during analysis procedures utilized the consulting services of an English Department linguistics professor and a Curriculum and Instruction Department language arts professor, calculated the raw scores of the following 21 variables:

1. Total number of T-units
2. Total number of words per T-unit
3. Total number of T-units per sentence
4. Total number of words per sentence
5. Total number of clauses per T-unit
6. Total number of words per clause
7. Total number of subordinate clauses per T-unit
8. Total number of words per subordinate clause
9. Total number of words per main clause
10. Total number of elliptical clauses
11. Total number of modals
12. Total number of "Be" and "Have" in the auxiliary
13. Total number of passive verbs
14. Total number of prepositionsl phrases
15. Total number of possessives
16. Total number of adverbs of time
17. Total number of gerunds and participles
18. Total number of intra-T-unit coordinators
19. Total number of inter-T-unit coordinators
20. Total number of free final modifiers
21. Syntactic Density Score

A statistical t-test of significant differences was used in making comparisons of writing characteristics between the high and low reading groups. A biserial correlation formula was applied to the data to confirm statistical differences and to indicate the relative statistical strength of the reading-writing relationships estab-

lished. Critical values of t are contained in Table IV, and correlation coefficients yielded by the biserial formula are contained in Table V. Appendix A contains written language data compiled on the initial 70-freshmen sample but not subjected to statistical analysis.

Results of the study indicated that students in the high reading group produced significantly higher scores on nine elements of written language, while students in the low reading group scored significantly higher on only one writing variable. The same ten written language variables plus one additional variable (words per subordinate clause) were shown to be statistically related to reading comprehension. The biserial correlation coefficients ranged from .35 for words per subordinate clause to .64 for intra-T-unit coordinators.

The findings of the study are summarized as follows:

1. The written language of college freshmen in the high reading group appears to be more syntactically mature than the written language of low reading group freshmen.

2. Results of the t-test of significant differences and the biserial correlation reveal that high reading group freshmen produced significantly more (at .05 or better) of the following nine characteristics of syntactic maturity:

1. Words per T-unit
2. Words per clause
3. Words per subordinate clause
4. Words per main clause
5. Passive verbs
6. Prepositional phrases
7. Gerunds and participles

8. Intra-T-unit coordinators
9. Free final modifiers

3. High reading group freshmen also achieved a significantly higher (at .05) mean Syntactic Density Score (SDS) than low reading group freshmen. This finding supported the general claim that the writing of better readers is more complex than poor readers' writing. However, the worth of the SDS grade level conversion was questioned, since the high group mean score was 4.75 (4th grade) and the low group mean score was 3.75 (3rd grade).

4. High group freshmen expanded their T-units by adding more prepositional phrases, intra-T-unit coordination of ideas (both variables formed through deletion transformations), and more free final modification.

5. Low group freshmen expanded their T-units by adding more subordinate clauses. However, these same students were observed to often misuse subordinate clauses, the result being a string of uncontrolled ideas.

6. Low group freshmen used significantly more (at .05) T-units per sentence. This finding was attributed to a high incidence of run-on and conjoined sentences observed in the low group's writing.

7. Results of the t-test of significant differences and the biserial correlation indicated that there was no significant difference between reading groups on each of the following ten written language variables:

1. Number of T-units
2. Number of clauses per T-unit

3. Subordinate clauses per T-unit
4. Words per sentence
5. Elliptical clauses
6. Modals
7. "Be" and "have" in the auxiliary
8. Possessives
9. Adverbs of time
10. Inter-T-unit coordinators

## Conclusions and Recommendations For Further Research

### Major Questions in the Study Answered

During the course of this study, five major questions arose concerning the connection between reading comprehension and written expression. In answering the questions, one confronts the many complexities involved in trying to account for observed relationships. Previous research (Coleman and Blumfield, 1963; Smith, 1970; Kuntz, 1975; Johnson, 1976, etc.) has offered many explanations to account for the connection between various reading and writing characteristics. By identifying those previously developed explanations that best account for the findings of this study, the range of explanations has been narrowed, and several productive avenues for further research may now be recommended. Recommendations for further research relate to the following questions considered in this study:

Question 1: Is the writing of good readers more syntactically mature than the writing of poor readers?

Yes, good readers appear to use more mature syntactic structures in their writing than less competent readers.

Furthermore, informal observations of the "quality" of writing between reading groups revealed the high group's themes to be superior to the low group's. "Quality" of written expression was not a variable measured in the present study, but it has been associated with syntactic maturity in studies of college freshmen's writing (Nold and Freedman, 1977; Gebhard, 1978; Schmeling, 1969). The present study neither confirms nor rejects the notion of syntactic maturity as a prerequisite to writing quality. However, the findings do suggest specific elements of syntactic maturity which should be further studied in relation to good and poor writing quality.

Knowledge of the current study's findings should be useful in designing experimental sentence combining activities to improve reading comprehension and writing skills. For example, college freshmen who have been identified as "poor comprehenders," either by Nelson-Denny scores or informal analysis, could be trained in sentence combining exercises to expand T-units through deletion transformations, utilizing prepositional phrases, gerunds and participles, and intra-T-unit coordination of detail. Further, they would likely benefit from sentence combining strategies of subordination which teach them to eliminate redundancy inherent in some coordinated structures. The test of improved writing maturity would be their ultimate production of longer, more controlled, more precise T-units. The test of increased linguistic awareness would be improved reading

comprehension of difficult material.

Better readers are likely to have internalized complex grammatical structures by virtue of their past reading experiences. Thus, the complexity of their written language is, in a sense, a model of language they have come to understand innately through reading. However, language modeling does not occur as a spontaneous product of having read a few professional works, then placing pen to paper. In fact, to ask a college freshman who comprehends poorly to "imitate Gore Vidal" would be ludicrous. An adaptation of the models approach to composition instruction is useful, however, in improving both reading and writing skills.

Paraphrasing and precis writing have long been used in the language arts classroom. Such "summarize in your own words" exercises (when not misused) help students to focus on the main idea and details in a reading passage, as well as to focus on their own sentence structure and vocabulary when translating difficult reading material. I. A. Richards (Cited in Myers, 1978, p. 38) has studied the effectiveness of translation exercises and found that they force students "to focus not only on sentences and paragraph structure, but also on nuances of meaning." Summarizing is not so easy as it may seem. To reduce a six to ten-sentence paragraph to one or two sentences requires good reading comprehension and skill in syntactic control. Experimental studies should be designed to examine the hypothesis that precis writing improves reading comprehension and syntactic

maturity. Research of this nature could incorporate the essays typically used for discussion and analysis in college composition courses.

Poor readers appear to use less mature syntactic structures in their writing than more competent readers. This is not to say, however, that less competent readers' writing is devoid of structures known to be characteristic of mature writing. Indeed, the low reading groups' heavy use of subordination indicates that they know how to reduce main clauses; however, their misuse of subordination often resulted in long strings of ambigous clauses unrelated to each other or to the main clause of the sentence. The same students use all of the structures found more often in the writing of good readers, but, generally speaking, not as efficiently. Their ability to use complex structures at all suggests further research.

Experimental studies should be designed to explore what the poor reader can produce through exposition. For example, the present study revealed the low group's ability to subordinate ideas (a "mature" writing characterstic). Since these freshmen already know how to do this, introducing activities which teach them to go beyond subordination, to write longer T-units using more deletion transformations, seems a logical step.

Further, these writing skills should be reinforced through parallel reading skills. Setting a purpose for one's reading is a study skill basic to the improvement of

general reading comprehension. Reading for details, both descriptive and factual, seems a low-level task. But a poor comprehender is not likely to be picking up details necessary for complete understanding. Therefore, the combining of reading for detail and writing with detail would be a viable method worthy of further research. The descriptive power of the prepositional phrase and participles should be emphasized, along with the addition of detail through coordination of equal structures.

Question 2: Can one characterize the writing of good readers?

Yes, one may characterize the writing of good readers by examining the specific syntactic elements which appear again and again in their written expression. The expository writing of high reading group freshmen typically contained longer, more complex sentences characterized by preciseness of expression and a good deal of detail.

Students in the high reading group wrote long T-units ($\bar{M}$ = 16.68 words per T-unit) expanded by the addition of words in both main and subordinate clauses. The addition of words within clauses was accomplished in part by utilizing prepositional phrases, coordinated structures, and verb phrase expansion through passive constructions. (Other strategies, i.e., adjectival and adverbial modifiers, were not a part of the present study). High group freshmen also produced more participles and gerunds, thus demonstrating the ability to conceptualize many verbs beyond traditional

action functions and to use these verbal forms to consolidate their ideas. (Infinitive constructions, also verbal forms, were not a part of the present study). Finally, competent readers' themes contained several instances of free final modification, a characteristic some theorists believe to be indicative of mature, professional writing style. Appendix B contains a writing sample of a high group member.

In analyzing the characteristics of good readers' writing, one should go beyond mere establishment of statistical relationships in order to understand better how (and if) language is being handled efficiently. For example, findings of the present study should be further examined in terms of type and function of each significant syntactic element. How are prepositional phrases used most often (as adjectives, adverbs, or nouns?). What structures are being coordinated most often (single words, phrases, clauses) and how are these structures used (as subjects, modifiers, or objects?). What kinds of verbs are most likely to be used as adjectives or as nouns? What kinds of subjects are conceptualized as being acted upon? When is free final modification most likely to occur? Through a deeper analysis of the rhetoric of good readers, one will gain even more insight into the intricate relationships between reading and writing.

Question 3: Can one "characterize" the writing of poor readers?

Yes, one may characterize the writing of a poor reader, but it is difficult to accomplish without being negative. Traditionally, "poor" anything is described in terms of error analysis: This writing is bad because of poor spelling, punctuation, etc. This reading comprehension score is bad because the student does not know how to infer main ideas. Except for the observations of misused subordination and over-used coordination, poor readers' writing was not discussed in terms of error. Rather, one may approach a description of this group's writing in terms of what they can produce. Appendix B contains a writing sample of a low group reader.

Poor readers use all of the syntactic elements of written language found to be significantly higher among more competent readers, but they use them less often. Additionally, poor readers know how to subordinate their ideas, but with less control than high group students. They appear to use coordinated main clauses and run-on sentences, two "immature" characteristics, more often than high group readers. They write in significantly shorter T-units, but the length of their T-units has progressed beyond what a high school 12th grader produces (Table VI). All factors considered together, the low group's writing is less syntactically mature, but they appear to have the potential to build upon structures they are already produc-

ing to enhance syntactic maturity.

Just as the rhetoric of good readers should be analyzed further, so the same procedure should be followed in examining the type and function of syntactic elements used by the low group readers. More refined comparisons between groups will lead to a better understanding of what poor readers can produce in relation to competent readers. Some error notations will likely occur as a by-product of an extended rhetorical analysis. But patterns of rhetorical error should be the subject of separate research projects.

Question 4: Are some syntactic elements of writing more strongly related to general reading comprehension than others?

Yes, based upon statistical analysis of the 21 elements of written language, eleven variables appear to correlate significantly with reading comprehension, and ten variables do not.

Good readers used significantly more of the following:

1. Words per T-unit
2. Words per clause
3. Words per subordinate clause
4. Words per main clause
5. Passive verbs
6. Prepositional phrases
7. Gerunds and participles
8. Intra-T-unit coordinators
9. Free final modifiers
10. Good readers also achieved a higher Syntactic Density Score

Poor readers used significantly more of the following:

1. T-units per sentence

Among those writing elements that were not signifi-

cantly related to reading comprehension, good readers used few more of the following:

1. Words per sentence
2. Elliptical clauses
3. Modals
4. "Be" and "have" in the auxiliary

And poor readers used a few more of the following:

1. Total T-units
2. Clauses per T-unit
3. Subordinate clauses per T-unit
4. Possessives
5. Adverbs of time
6. Inter-T-unit coordinators

Question 5: How may one account for the relationship between reading comprehension and related elements of writing?

One may account for the relationship between reading comprehension and syntactic elements of written language by examining characteristics common to both reading and writing processes. For example: Total number of words for each of the following elements: T-unit, main clause, subordinate clause, and clause, generally reflects good readers' syntactic control. The more words put into a clausal structure, the more likely one will find complex, yet precise written language. A good reader's linguistic awareness of complex grammatical structures is most probably a by-product of his/her successful reading experiences. Further research is needed to explore the premise, "The more one reads, the more syntactically mature his/her writing will be."

Such research designs might incorporate three addition-

al variables not measured in the present study. They involve length of T-units and are defined by Hunt (1965, p. 31) as follows: "'short' (1-8 words), 'middle length' (9-20 words), and 'long' (21+ words)." A study to determine which T-unit length is most characteristic of better readers will likely confirm Hunt's findings that more mature writing contains the longest T-units. How short, middle length, and long T-units are developed should also be explored. Hunt predicted that superior adults will use many nonclausal structures per clause to expand and consolidate T-units. The present study also suggests better readers use nonclausal structures similarly. An examination of all nonclausal structures (i.e. modifiers, prepositional phrases, conjunctions) within the three T-unit lengths will lend additional information about reading-writing relationships.

To complete the above research, addition of a reading variable is necessary to test the first part of the hypothesis, "the more one reads . . ." An investigation of how much or how little an individual reads is difficult to control. However, one should be able to incorporate a reading component into a regular college composition class where not much reading is normally required. A survey of leisure and academic reading should also be a part of the study.

Prepositional phrases, gerunds and participles, and intra-T-unit coordination were the three writing variables most strongly related to reading comprehension. Generally,

these variables show that good readers use many deletion transformations in their writing. Combining and consolidating ideas most probably reflects not only economy of writter language but also decreased need for redundancy in reading.

At the same time, number of T-units per sentence most probably reflects the poor reader's lack of syntactic control and increased need for redundancy in reading. The low reading group demonstrated an observed increase in run-on and coordinated main clauses within sentences, which accounted for the inflated T-units per sentence score. These same readers often forgot and/or repeated words and phrases which had been written earlier in a sentence. Thus, one would assume an inadequate short-term memory might be related to poor reading comprehension and immature written language.

Further research is needed to explore the "need for redundancy" hypothesis. Such research should replicate and extend parts of the present study. For example, an analysis of the kinds of structures most likely repeated in run-on and conjoined clauses should be conducted. Such a study should also diagnose specific reading comprehension skills. The relationship between college freshmen's literal interpretation of detail and their over-use of particular words within T-units could provide valuable information about receptive and expressive language processing. The suggested study could include more severely language dis-

abled college freshmen who score at or below the 8th percentile (approximately the 8.1 grade level) on the Nelson-Denny.

Good and poor readers' ability to conceptualize verbs is yet another area which the current study suggests deserves further research. Within a similar sample of university freshmen, the relationship between reading vocabulary and use of participles and gerunds should be examined. If training in the use of verbs as modifiers and nouns can be shown to increase less competent readers' vocabulary (receptive and expressive), then such activities would be beneficial to language arts instruction.

The good readers' increased use of passive verbs is also related to conceptualization tasks. To conceive of subjects receiving actions requires a certain amount of psychological distance on the part of the reader/writer. This stepping back and viewing experiences as a spectator rather than a doer "is basic to any adequate development of skills in transactional writing (writing to convey information to someone) and expressive poetic writing (writing to create a work of art)" (Britton, Cited in Myers, 1978, p. 41). Objectivity is also important to the development of critical reading skills. An analysis of higher level reading skills should be conducted, especially among better readers. Research should be designed to answer the question, "Are good readers also critical readers?" Also, does their written language reflect objectivity

through predication, especially passive constructions?

The importance of predication in writing is the basis of the "theory of the world approach" (Myers, 1978, p. 41) to composition instruction. How students perceive and shape their world is reflected in the verbs they choose to use when writing. "The student who says, 'I do not know what to say,' probably means 'I do not have a predicate for my noun or nouns'" (p. 41). The present study showed that both good and poor readers used about the same number of auxiliary verbs (modals and forms of "be" and "have"), thus illustrating that verb phrase expansion through the addition of "helping verbs" is not necessarily related to reading competency. However, the complexity of the main verb was not studied. Nold and Freedman (1978) compiled a list of "common verbs" (i.e., be, find, give, keep, etc.) and found them to be characteristic of weak theme writing. Research extending the present study's findings should include an analysis of sophistication in verb usage, active and passive. What kinds of verbs do good readers use compared to poor readers? How is verb usage in written expression related to reading vocabulary? What conclusions might be drawn about a student's conceptualization of his world? And how might these findings be used to improve reading and writing skills?

## Replication of the Study

Several recommendations are appropriate regarding

replication of this study. General improvements should be made in the following four areas: sampling procedures, sample size, reading comprehension assessment, and syntactic analysis.

Sampling Procedures. To improve the ability to generalize a future study's results, the initial sample should include a larger number of university freshmen. For practical purposes, more than four composition sections would not have worked in the present study. Future researchers will need to control language sampling, and this may be accomplished by utilizing classes more flexible than beginning freshman composition.

A general reading improvement class or reading lab found in many colleges and universities would seem a logical and advantageous setting for future replications. The curriculum attached to reading improvement courses is normally very flexible. Reading tests are a natural part of such courses, and in-class writing assignments could be included without much adjustment. Variables such as "instruction in theme writing" could still be controlled by sampling writing very early in the semester. The same criteria of "not having previously completed a composition course" should be applied once again. Several reading course sections, six to ten for example, could conceivably be utilized without losing control of important language sampling variables.

Sample Size. Depending upon the number of students enrolled in reading improvement classes or reading labs, one is likely to identify many more good and poor readers than did the present study. A final sample size of from 50 to 100 per ability group is very possible. As the sample size increases, however, so do the advantages and disadvantages of dealing with more subjects.

The larger the sample size, the more easily one may establish more precise criteria for group inclusion. For example, the final two groups of high and low readers could be limited to all Caucasian, to no one over 20 years old, or to all male or all female. The effects of these various descriptive variables could more easily by studied in larger groups as well.

A major problem with increased sample size is the subsequent amount of time necessary to analyze the written language. A minimum of two hours per written language sample (approximately 450 words) is necessary just to compile accurate raw scores. For a 100-student sample, the researcher will need to keep in mind the time factor and perhaps consider fewer students rather than risk inaccurate results.

Reading Comprehension Assessment. The comprehension subtest of the Nelson-Denny Reading Test, Form C (Nelson and Denny, 1973) appears to be a useful screening test. In future studies, the relative competency of good and poor readers should be further confirmed by administering infor-

mal reading inventories. Again, this may be accomplished more easily in a reading class setting where instructors may already use informals as a matter of course.

As the sample size increases, one may be able to limit reading score cirteria even further than did the present study. For example, low group membership could be limited to those achieving at or below the 15th percentile (9th grade level), with high group membership limited to those achieving at or above the 95th percentile (college junior+). The more extreme the criteria, the better the credibility of a "good" and "poor" competency label.

Reading vocabulary and reading rate should be studied by themselves in relation to syntactic maturity. Inclusion of such variables would broaden the scope of the present study beyond practical limits. However, an analysis of reading comprehension skills would be an appropriate addition. Such an analysis should be limited to the broad categories of literal and/or inferential reading skills. The role of the informal reading inventory would then play an important part in assessing reading comprehension, since most college level standardized tests of reading do not break down comprehension skills.

It should be noted that the Nelson-Denny Reading Test appears to be an effective screening instrument for students who produce syntactically "mature" (or not so "mature") writing. The language arts instructor should consider the implications of the NDRT result's identifying students who

function above or below an acceptable developmental reading range (plus or minus two years from current grade level). The distinct possibility exists that college freshman who read below eleventh grade on the NDRT will have difficulties in composition class.

Knowledge of composition students' reading abilities could help the sensitive instructor plan his/her course requirements. For example, if over half of the class were reading well below average, the instructor might consider some summary or precis writing based on "readable" essays as are often found in Time or Newsweek magazines.

Syntactic Analysis. Except for the Syntactic Density Score, it is recommended that all remaining 20 writing variables be included in a replication study. The SDS does not contribute enough information to our knowledge of reading-writing relationships to justify its complex computational procedure. One variation should be considered seriously when analyzing themes for the remaining 20 elements of syntax. That is, gerunds and participles should be counted seaparately (instead of summed together), thus making analysis of the data on these verbal forms even more precise.

A replication could once again hold mode of discourse constant, with students writing at least two expository themes. Other modes of discourse should also be studied, though, in efforts to fully understand how syntactic

maturity is reflected in all kinds of writing. Future researchers should consider a similar study using either descriptive, argumentative, or narrative themes. A combination of all four modes of discourse could be utilized to examine syntactic maturity in a more general way.

Future researchers should consider adding a "quality of theme" variable to the present study. A holistic evaluation procedure utilizing independent raters could be used. Comparisons between theme quality and reading comprehension, theme quality and syntactic maturity, and syntactic maturity and reading comprehension could test the premise that good readers not only produce syntactically mature writing but also good writing.

## Final Comments

Results of this investigation have mostly supported and added to what educators currently know about reading-writing relationships. Though it was beyond the scope of this study to fully explain reasons underlying the established relationships, future researchers may now have a clearer conception of the range of possible connections. Research should continue to unwind the intricate links among all language arts skills. And educators should use their knowledge of the reading-writing connection to enhance language arts instruction.

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# APPENDICES

# APPENDIX A

## SUMMARY OF DATA FOR 70-FRESHMAN GROUP

TABLE VII

70-FRESHMAN GROUP DESCRIPTION

| Descriptive Variables | 70-Freshman Group |
|---|---|
| Mean Reading Score | 60th percentile |
| Mean Age | 19.0 |
| Sex: | |
| Male | 38 |
| Female | 32 |
| Classification: | |
| 1st semester freshman | 58 |
| 2nd semester freshman | 12 |
| Race: | |
| American Indian | 2 |
| Black | 5 |
| Caucasian | 61 |
| Oriental | 2 |
| College: | |
| Agriculture | 6 |
| Arts & Science | 23 |
| Business | 13 |
| Education | 7 |
| Engineering | 15 |
| Home Economics | 6 |
| Number Repeating Course | 16* |

*All students repeating beginning composition had previously dropped the course a maximum of three weeks into the semester.

TABLE VIII

SUMMARY OF 21 ELEMENTS OF WRITTEN LANGUAGE
PRODUCED BY THE 70-FRESHMAN GROUP

| Writing Variables | Mean Raw Score | Standard Deviation |
|---|---|---|
| T-units | 30.01 | 4.780 |
| Words/T-unit | 15.94 | 2.561 |
| T-units/sentence | 1.10 | .105 |
| Clauses/T-unit | 1.49 | .194 |
| Words/clause | 10.91 | 1.962 |
| Subordinate clauses/T-unit | .48 | .184 |
| Words/subordinate clause | 7.78 | 1.307 |
| Words/main clause | 13.05 | 2.331 |
| Words/sentence | 17.72 | 3.012 |
| Elliptical clauses | 1.47 | 1.099 |
| Modals | 7.17 | 3.476 |
| "Be" and "have" in auxiliary | 7.38 | 3.688 |
| Passive verbs | 3.82 | 2.739 |
| Prepositional phrases | 49.21 | 7.471 |
| Possessives | 6.17 | 3.234 |
| Adverbs of Time | 1.81 | 1.516 |
| Gerunds and participles | 8.61 | 4.115 |
| Intra-T-unit coordinators | 12.98 | 4.101 |
| Inter-T-unit coordinators | 2.24 | 1.573 |
| Free final modifiers | .24 | .522 |
| Syntactic Density Score | 3.99 | .847 |

Mean Number of Words Analyzed = 470

# APPENDIX B

## EXAMPLE WRITTEN LANGUAGE SAMPLES FROM HIGH AND LOW READING GROUPS

HIGH GROUP STUDENT WRITING SAMPLE

"Types of Popular Programs on TV"

Television, one of the most far-reaching forms of mass communication, carries a variety of programs designed to appeal to most of the public. Of these many types, the three which seem to have the most appeal are the late-night and early-morning talk/news shows, the police dramas, and the situation comedies.

First of all are the late-night and early-morning talk shows. These include Good Morning America, the Johnny Carson Show, and the Tomorrow Show. These shows appeal to the majority of the public, because they can see their favorite actor, actress, or celebrity in a relaxed, non-rehearsed atmosphere. These shows allow the public to see people the way they really are. Also, these shows are very imformative. For instance, Good Morning America gives news and weather, a refreshing satirical look at American Life by Erma Bombeck, plus good interviews by David Hartman and Sandy Davis.

Another talk show which has a far-reaching impact and audience appeal is the Phil Donahue Show. This show allows average people to interview stars, important people, etc. Donahue is well-known for his ability to get to the root of an issue. And he has little trouble keeping the show flowing.

The second type of program which has great appeal is the police drama. These include Starsky and Hutch, Police Story, Chips, and Police Woman. The public can relate to these shows, because they see crime going on all around them. (232 words)

LOW GROUP STUDENT WRITING SAMPLE

"Comparing High School With College"

Personally myself I think it's very difficult to compare the two together because there were so many things that you couldn't get away with in High School that you can get away with in college. For instants whereas you had to raise your hand in high school if you wanted to get up and leave, and in college you're on your own. Maybe it's just the simple fact that, once you're in College, you have to start paying for your education, whereas in high school it's free. The teachers are very different in high school. I can't compare them in anyway except that, they are both teachers. It seems that the high school teachers have to make you learn whereas the college teachers feels that it's up to the individual. One thing I've really noticed and that is, you take more test in high school than you do in college. I really reel that tests are not necessary in college because I feel that the graduating senior in high school has had enough testing. Also they take your sports a little seriouser in college. It's more like a job than just a activity. There's forsure more politics in college football than in high school. It seems in college who has the best connection than the best ability. I feel that its based on ability in high school. You learn much more in high school because one thing your class rooms are alot smaller whereas in college there're huge what I mean by this is that there're large in size. (235 words)

# APPENDIX C

## STUDENT QUESTIONNAIRE

NAME _____ SECTION _____

Circle your answer to the following questions. Then blacken the corresponding letter on your IBM sheet.

PART II

41. AGE: A. 18
B. 19
C. 20
D. 21
E. Over 21 (Specify age here:____)

42. SEX: A. Female
B. Male

43. CLASSIFICATION: A. 1st semester freshman
B. 2nd semester freshman
C. sophomore
D. junior
E. senior

44. RACE: A. American Indian
B. Black
C. Caucasian
D. Oriental
E. Other (Specify here:_____)

45. COLLEGE: A. Arts & Science)
B. Education )Skip & leave blank if these
C. Business )do not apply

46. COLLEGE: A. Agriculture )
B. Engineering )Skip & leave blank if these
C. Home Economics)do not apply

47. Are you repeating English 1113 this semester? A. Yes
B. No

If yes, please state the reason below:

# APPENDIX D

## SYNTACTIC DENSITY SCORE INSTRUMENT

## BY LESTER GOLUB

| Variable Description | Loading | Freq. | vlxf |
|---|---|---|---|
| Total no. of words / Total no. of T-units | | | |
| 1. Words/T-unit | .95 | _____ | _____ |
| 2. Subordinate clauses/T-unit | .90 | _____ | _____ |
| 3. Main clause word length (mean) | .20 | _____ | _____ |
| 4. Subordinate clause word length (mean) | .50 | _____ | _____ |
| 5. Number of modals | .65 | _____ | _____ |
| 6. Number of Be and Have forms in the auxiliary position | .40 | _____ | _____ |
| 7. Number of prepositional phrases | .75 | _____ | _____ |
| 8. Number of possessives | .70 | _____ | _____ |
| 9. Number of adverbs of time | .60 | _____ | _____ |
| 10. Number of gerunds and participles | .85 | _____ | _____ |
| Total | | | _____ |
| Syntactic Density Score (Total divided by No. of T-units) | | | _____ |
| Grade Level Conversion | | | _____ |

Grade Level Conversion Table

| SDS | .5 | 1.3 | 2.1 | 2.9 | 3.7 | 4.5 | 5.3 | 6.1 | 6.9 | 7.7 | 8.5 | 9.3 | 10.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

# APPENDIX E

## SUMMARY OF RAW SCORES WORKSHEET

| Student Code | No. words: Theme one | No. words: Theme two | Total words Analyzed |
|---|---|---|---|

| Syntactic Variables: | Raw Scores |
|---|---|
| 1. T-units | |
| 2. Words/T-unit | |
| 3. T-units per sentence | |
| 4. Clauses per T-unit | |
| 5. Words per clause | |
| 6. Subordinate clauses/T-unit | |
| 7. Words/subordinate clause | |
| 8. Words/main clause | |
| 9. Words/sentence | |
| 10. Elliptical clauses | |
| 11. Modals | |
| 12. "Be" and "Have" in the auxiliary | |
| 13. Passive verbs | |
| 14. Prepositional phrases | |
| 15. Possessives | |
| 16. Adverbs of time | |
| 17. Gerunds and participles | |
| 18. Intra-T-unit coordinators | |
| 19. Inter-T-unit coordinators | |
| 20. Free final modifiers | |
| 21. Syntactic Density Score(SDS) | |

VITA

Mary F. Heller

Candidate for the Degree of

Doctor of Education

Thesis: THE READING-WRITING CONNECTION: AN ANALYSIS OF THE WRITTEN LANGUAGE OF UNIVERSITY FRESHMEN AT TWO READING LEVELS

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