Topical Structure and Writing Quality: Some Possible Text-Based Explanations of Readers' Judgments of Student Writing

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The argumentative essays of 48 freshmen were used to form two groups of essays, rated holistically for overall quality by expereinced readers of student writing. One group had been judged "high" in overall quality; one group had been judged "low." The two groups were compared with respect to several text features--length, syntax, and topical structure--to determine those features readers may have associated with quality in student writing. The topical structure variables, which were based on work growing out of Prague School Linguistic theory, were found useful in explaining the quality scores readers assigned to the texts. Particularly significant were the percentages of Type 3 and Type 5 sentences; percentages of t-units in parallel, extended parallel, and sequential progressions; average number of t-units in parallel, extended parallel, and sequential progressions; mean number of t-units per topic, and mean number of words per topic. The limitations of the study are discussed, and its implications for research are suggested.

Writing research has long sought to identify internal features of written discourse that can help to explain qualitative differences among texts. The motivations for this research are many but perhaps most important has been the need to teach students at various levels how to communicate effectively in writing. The assumption has been that if text features influencing readers' judgments of quality could be identified, then instruction in writing could be substantially improved. Apart from studies that examine such features as handwriting (e.g., Remondino, 1959; McColly, 1970) and error (e.g., Shaughnessy, 1977; Grobe, 1981), two approaches have been taken to help explain qualitative differences in student writing, one focusing on intrasentence features and one focusing on intersentence features.

The first approach has attempted to locate the source of qualitative differences in syntactic features. Following the lead of Hunt (1964, 1965, 1970) and--to a lesser extent--Christensen (1963), recent research (e.g., Nold & Freedman 1977; Morenberg, Daiker & Kerek, 1978; Stewart 1978; Faigley,

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1979; and Witte & Faigley 1981b) has looked for correlations between writing quality and such syntactic features as t-unit and clause length, percentage of t-units with nonrestrictive modifiers, and percentage of words in non restrictive modifiers. Although Hunt's research (1964, 1965, 1970) and two 1978 sentence-combining studies (Morenberg, Daiker & Kerek, 1978; Stewart, 1978) suggest a positive and linear relationship between clause length and t-unit length and writing quality, other studies (Nold & Freedman, 1977; Faigley, 1979; Witte & Faigley, 1981) using multiple regression techniques report that t-unit and clause length predict very little of the variance in the quality scores readers assign to student essays. And two recent studies[1] amass considerable evidence to suggest that longer t-units may be negatively associated with writing quality, thus providing *some* evidence to support *some* of the assumptions underlying various readability formulae (e.g., Flesch, 1949; Dale & Chall, 1948) and thus challenging many of the assumptions that underlie sentence-combining research (cf. Kinneavy, 1979; Witte, 1980). The Christensen variables do not fare much better in the literature, as the multiple regression analyses reported in Nold and Freedman (1977), Faigley (1979), and Witte and Faigley (1981a) attest.

Often more theoretical and descriptive than quantitative in nature, the second approach has focused on text features that extend across the boundaries of sentences, features that lie beyond the reach of syntactic analyses. Perhaps the best known of this research is that produced during the 1960's on larger units of meaning such as paragraphs. During the 1960's, for example, Christensen (1965), Becker (1965), Karrfalt (1968), Rodgers (1966, 1967), and Pitkin (1969, 1977a, 1977b) turned to such concepts as functional slots, "stadia," semantic levels of generality, discourse "blocs," and relationships across sentence boundaries to explain how groups of sentences combine to form units of meaning larger than the sentence. During the 1970's, Grady (1971), D'Angelo (1974), Odell (1977), and Nold and Davis (1980) extended and refined some of these concepts. However, while this research has perhaps increased our understanding of extended units of discourse, it has not produced an analytic method that could be applied in studies of large numbers of texts.

More recently, researchers taking this second approach have begun to examine cross-sentence, or intersentence, relationships in other ways. For example, drawing on the work of Halliday and Hasan (1976) on text cohesion, King and Rentel (1979), Witte and Faigley (1981b),[2] Halloway (1981), Welchen (1982), and Cherry[3] have conducted studies or presented theoretical rationales suggesting that the ways writers use cohesive ties can help distinguish between low- and high-quality texts. However, while cohesion analysis shows promise for research on writing quality, it does not adequately depict crucial semantic relationships or important coherence

relationships within texts. As Witte and Faigley (1981b) demonstrate, a text may be highly cohesive and still not be coherent.

A more promising line of research has evolved from the study of *topic* in discourse, particularly by such Prague School Linguists as Mathesius (1929, 1928), Firbas (1964, 1966, 1974), Sgall (1967, 1974, 1979a, 1979b), Sgall and Hajičová (1977, 1978), and Daneš (1964, 1974). Mathesius' work on topic may derive in part from the earlier work of Weil (1844) and Marty (1897), but one of Mathesius' contributions to the analysis of extended texts stems from his emphasis on sentences in the context of whole texts, rather than as autonomous units of discourse. Mathesius used the term *theme* to identify "what the sentence is about" and the term *enunciation* to refer to "what is said about the theme." The context in which individual sentences exist becomes important because the theme not only indicates "what the sentence is about," but also announces "what is known or at least obvious in a given situation and from which the speaker proceeds in his discourse." Thus, for Mathesius, the enunciation of an individual sentence adds new or unknown information to the discourse.

Building on Mathesius' work, Firbas proposed the concept of "communicative dynamism." Firbas argues that the theme of a sentence contributes least to the "communicative dynamism" of the text, primarily because it delivers the least amount of information not recoverable from elsewhere in the text. In place of Mathesius term *enunciation*, Firbas uses the term *rheme*. According to Firbas, the rheme of a sentence contributes most to "communicative dynamism," delivers information new to the text, and usually appears toward the end of the sentence, a claim finding support in some of the recent work of Williams (1979).

Between the time of Mathesius and Firbas, the term *topic* emerged as a synonym for theme. The term *topic* appears to have been first used by Hockett (1959) to refer to what the Prague School Linguists had called *theme* and has since become the more common term; and the term *comment* is now often used in place of the Prague School terms *enunciation* and *rheme*. Indeed, much of the recent work of such Prague School theorists as Sgall and Hajičová employs the terms *topic* and *comment* and treats extensively topic-comment relationships in texts.

Drawing on such concepts as theme-enunciation, theme-rheme, old-new information, given-new information and topic-comment, Danes argues that Prague School theories can be used to identify basic text patterns. In one such pattern, successive sentences express the same theme or topic. In Daneš' second text pattern, the comment or rheme portion of the preceding sentence becomes the topic or theme of the following sentence. In a third text pattern, topics of successive sentences are identified with reference to their relationship to a "hypertheme," in effect a discourse topic not stated explicitly in the text.

While the "topic" approach to discourse analysis is not free of terminological, methodological, and theoretical problems (see, e.g., Enkvist, 1974; Grimes, 1978; Chafe, 1976; de Beaugrande, 1980), it has been used successfully in studies of comprehension (e.g., Haviland & Clark, 1974; Clark & Haviland, 1977; Kieras, 1978, 1980, 1981; vande Kopple, 1982; Faigley & Witte, 1983), and used to study student writing.[4] In addition, its importance has been stressed in recent theorectical studies (e.g., van Dijk, 1977a, 1977b, 1980; Grimes, 1975; Li & Thompson, 1976; Dillon, 1981; Prince, 1981; Halloway, 1981).

Using the theoretical and applied research on topic at the level of the sentence and in extended discourse, the present study explores one general question and two subordinate questions. At the most general level, the present study addresses the question, "Can a topic approach to discourse analysis distinguish among readers' judgments of writing quality?" The present study also addresses two more specific questions: "Can a topic approach to discourse analysis distinguish between the sentences of high- and low-quality argumentative texts written by college freshmen?" and "Can a topic approach help distinguish between the structural patterns of such texts?"

Methods and Procedures

Methodology. To explore the relationship between readers' judgments of writing quality and topical structure features of student writing, I chose to do a *post hoc* analysis of high- and low-quality texts that had been previously rated holistically. A different methodology could have, of course, been selected. For example, I might have used the methods of survey research. In that case I could have done one of two things: I could have collected--after the manner of Diederich (Diederich, French & Carlton, 1961; Diederich, 1974)--readers' written responses to student writing and determined whether those comments related to topical structure features in the student texts, or I could have simply asked a large number of experienced readers of student writing to identify the features of student writing which most affected their judgments of writing quality. In the former case, incomplete, cryptic, and ambiguous responses would have been very difficult to relate to topical structure features of texts, thus threatening the validity of the study. If readers, on the other hand, had simply been asked to identify the text cues to which they responded in forming judgments, the responses would very likely have been too general to have been very useful. In addition, Harris (1977) has argued that readers are not aware of the criteria they employ when they rate student writing. A different *post hoc* analysis could also have been conducted. I could have, for example, coded texts representing the full range of quality scores and then used multiple

regression techniques to determine what percentage of the variance in the quality scores could be explained in terms of different topical structure features of texts. This possible procedure was rejected because the mid-range essays would likely obscure the relationship between the higher and lower levels of writing quality and the topic variables entered into the regression equation. Finally, I might have chosen an experimental method or design such as those used by Freedman (1979) and Freedman and Calfee.[5] Experimental designs are, however, most appropriate when existing theory and research suggest specific hypotheses to be tested. Because little previous research has examined student writing in terms of topical structure features, it could not be determined which hypotheses, if any, should be tested experimentally. The present study was thus conceived from the outset as an exploratory one, a study which might identify some hypotheses that could subsequently be tested experimentally. Given this exploratory focus, a *post hoc* analysis of high- and low-quality essays seemed most appropriate.

Sample Selection. The texts examined were chosen from 180 essays written on a controlled assignment as part of an evaluation of the Freshman Writing Program at the University of Texas in 1978 (Witte & Faigley, 1981a). The writing assignment asked students to argue either for or against required high school composition courses. During the fall of 1979, 16 experienced readers of student writing rated holistically the 180 essays according to procedures used by the Educational Testing Service (see Godshalk, Swineford & Coffman, 1966; Cooper, 1977; Alloway, 1980; Stiggins, 1982). Each essay was rated by two readers on a 1-to-4 scale, with "4" being the highest score. Thus each essay could have a summed holistic score ranging from "2" to "8". In the present study, essays that received a summed score from "2" formed a low-quality group (N=24) of texts; and essays that received a summed score of "7" or "8" formed a high-quality group (N=24) of texts. To control for possible extraneous influences, all names were removed from the essays before they were rated. In November of 1981 a workstudy student retrieved the 48 essays from storage, photocopied them, and randomly sequenced them.

Text Analyses. Before any text analyses were performed, I examined the writing assignment carefully and read the 48 essays as a group. This procedure gave me a rather clear sense of the principal main ideas or themes which could be expressed in response to the assignment. Without knowledge of the summed score assigned to any essay, I then analyzed the 48 texts for a number of text features. First, I counted the number of words, clauses, and t-units. These three features allowed me to compute two syntactic variables commonly used in composition research, mean clause

length and mean t-unit length; and the number of words allowed me to compare the two sets of essays with respect to text length.

In addition to these features of either syntax or text length, I analyzed features of topical structure in the 48 texts to determine how the two groups of writers developed their discourse topics, their main ideas, in sequences of sentences, and how they mapped their discourse topics onto individual sentences and sequences of sentences.

The first step in this analysis entailed classifying each t-unit as one of the five types of sentences used in Lautamatti's (1978) research on discourse simplification. These sentence types differ one from another according to the relationship among the initial sentence element, the topical subject, and the grammatical subject. In *Type 1 sentences* the initial sentence element (ISE), the topical subject (TS), and the grammatical subject (GS) are identical. In *Type 2 sentences* the ISE differs from the TS, while the TS and the GS are identical. In *Type 3 sentences* the ISE and the GS are identical, but both differ from the TS. In *Type 4 sentences* the ISE and the TS are identical, but both differ from the GS. In *Type 5 sentences* the ISE, the TS, and the GS are all different.

Distinguishing among the five types of sentences in real discourse obviously presupposes identifying the topical subject of each t-unit, a process partly dependent on one's understanding of the text as a whole. Accordingly, before I marked the topical subjects of any text, I read the essay carefully and tried to create an abstract or gist for it--a procedure much easier to perform for high-score texts than for low-score ones. In effect a summary of an essay's main ideas, the gist provided a global context for interpreting individual sentences and for determining the topical subject of each. Within this larger framework, the semantic relationship between a particular sentence and the previous sentence provided a local context for interpreting individual sentences and thereby also helped to determine the topical subject of each. Both the global and the local contexts influenced the analyses of individual sentences.

Given a local context and a global context for each sentence, I asked the question, "What is this sentence about?" To determine the answer for each sentence, I first looked to the grammatical subject of the main clause. If that particular noun phrase provided a satisfactory answer to the question, I labeled the t-unit either a Type 1 or a Type 2 sentence, depending on whether the subject was preceded by a nontopical initial sentence element such as a participial phrase, a subordinate clause, or a single-word adverb. Adjectives and articles appearing before the grammatical subject of the main clause were not considered as initial sentence elements because they are elements of the subject. However, elements such as conjunctive adverbs, coordinating conjunctions, and subordinate clauses appearing before

the subject of the main clause were considered initial sentence elements because they are not grammatically a part of the subject. If the grammatical subject of the main clause did not provide a satisfactory answer to the question, I then looked for a suitable noun phrase either in an initial sentence element or in matter following the verb of the main clause. If a noun phrase in an initial sentence element other than the grammatical subject of the main clause satisfactorily answered the question, I labeled the t-unit a Type 4 sentence. If the suitable noun phrase appeared after the verb of the main clause, I labeled the t-unit either a Type 3 or a Type 5 sentence, depending on whether the nontopical initial sentence element was the same as the grammatical subject of the main clause. In the essays used in the present study, a Type 3 sentence typically begins with a "dummy" grammatical subject (either "it"or "there") and embeds its topical subject in a relative clause following the verb of the main clause. A Type 5 sentence also usually contains a "dummy" subject and embeds its topical subject in a relative clause following the verb of the main clause; however, the "dummy" subject in a Type 5 sentence follows a nontopical initial sentence element of some kind.

Twenty of the high-score and 20 of the low-score texts used in the present study were selected for use in another study, one on the relationship of topical structure and text type. These 40 texts were also coded by a second researcher. In coding the topical subjects of individual t-units, perfect agreement was achieved 86.53% of the time. Most differences in coding topical subjects were attributable to ambiguities either at the sentence level or the discourse level in the 20 low-quality texts. These differences were resolved in conference before the statistical analyses reported in the present study were performed.

The following two passages, selected from the two sets of essays, illustrate the five types of sentences and the results of the coding procedures used. The first passage includes the initial 13 t-units of an essay readers judged to be of high quality, and the second passage includes the first 13 t-units of an essay readers judged to be of low quality. At the beginning of each t-unit, I have identified the sentence type it represents; and within each t-unit, I have indicated the topical subject with italics.

Example: High-Quality Essay

(1-a) (Type 1) Certain *aspects* of composition courses are important and necessary parts of the curriculum in many high schools. (1-b) (Type 1) *They* develop writing skills which serve students well, both in other courses and in the world of work. (1-c) (Type 3) There are *critics*, however, who see these courses as a waste of time and effort. (1-d) (Type 1) *Some* criticize the standards and grading procedures used by composition teachers. (1-e) (Type 1) *Others* contend that these courses

are not related to anything outside the classroom. (1-f) (Type 4) However, when all *aspects* of high school composition courses are examined, it becomes clear that these courses can be useful to anyone who enrolls in them.

(1-g) (Type 1) One important *aspect* is the teacher. (1-h) (Type 2) For example, high school composition *teachers* show students the value of being able to communicate one's thoughts in writing. (1-i) (Type 1) *Teachers* thus help students develop healthy attitudes toward language and toward writing. (1-j) (Type 2) In high school composition courses, *teachers* also help students appreciate good writing. (1-k) (Type 1) *Students* learn to imitate good writing as they read it. (1-l) (Type 5) Most importantly, it is essential that *teachers* show that they really care about the students' writing.

(1-m) (Type 1) Another important *aspect* of composition courses is what is taught....

Example: Low-Quality Essay

(2-a) (Type 1) A *composition* can be any number of written works: essay tests, creative works, and analytic works. (2-b) (Type 3) It is basic to have a good *understanding* of writing because many courses in high school and college concentrate on bringing forth one's ability to assimilate and write down material picked up in the course. (2-c) (Type 1) *Creative writing* is writing works of fiction or non-fiction but without the rigorous following of the rules needed in an analytic essay.

(2-d) (Type 1) The main *purpose* of any type of composition course is to teach one to express his/her thoughts in a more concise and complete manner. (2-e) (Type 2) If one is writing a journal, the *ability* to write down thoughts in a clear way can help a person think in a clear way. (2-f) (Type 1) analytical *writing* helps students understand what they are reading, whether it is a novel or a poem.

(2-g) (Type 1) The *ability* to write any type of composition is important for those who hope to attain a higher education. (2-h) (Type 1) A *freshman* entering college must know how to write in order to do well in most courses. (2-i) (Type 1) Government, History, English, and even Foreign language *courses* demand that a student absorb the facts and can [sic] put them into concise and clear order when the student is tested. (2-j) (Type 2) However, the *student* who does not plan to go to college only needs composition to improve reading skills. (2-k) (Type 1) Many *jobs* people have do not demand writing ability while everything demands reading ability. (2-l) (Type 2) Thus *writing* essays in high school teaches students what to analyze in a work of literature, bettering reading ability.

(2-m) (Type 1) The *High Schools* have problems teaching the right aspects of composition in both the Public and Private schools....

After classifying the t-units in the 48 essays according to Lautamatti's taxonomy of sentence types, I analyzed the texts in terms of a number of features of topical structure. In contrast to the five sentence types, which yield information about the topical focus of individual sentences, this second set of variables indicates how topical material is carried across t-unit boundaries and how t-units are linked to form coherent texts. These topical structure variables are the following: the number of different topics: the number of nonrepeated topics; topical depth; the number of t-units in parallel progressions, extended parallel progressions, and sequential progressions; and the number of parallel, extended parallel, and sequential progressions. These variables are illustrated in Figure 1 and Figure 2, which present graphically the topical structure of the first 13 t-units of the high-quality and low-quality examples, respectively.

Figure 1 shows that the high-quality example contains four different topics, and Figure 2 shows that the low-quality example contains 11 different topics. Because the topical subjects of adjacent t-units (1-a) and (1-b) are the same, together they form a *parallel progression*--as do t-units (1-c) through (1-e), t-units (1-f) and (1-g), and t-units (1-h) through (1-j). The lengths of parallel progressions give some indication of the degree to which a writer develops or extends a topic once it is introduced in the discourse. No parallel progressions appear in the low-quality example. Together t-units (1-b) and (1-c) form a *sequential progression*, because the topical subject of each is different. Other sequential progressions in the high-quality example are the following: (1-g) and (1-h); and (1-j) and (1-k). In the low-score example, sequential progressions are formed by t-units (2-a) through (2-f), by (2-g) through (2-k), and by (2-l) and (2-m). The lengths of sequential progressions suggest the degree to which writers change topics as their texts unfold. Two *extended parallel progressions* appear in the high-quality example, and two appear in the low-quality example. An extended parallel progression results when the same topical subject appears in at least two nonadjacent t-units. That is to say, the sequence of a given sentence topic is interrupted by at least one t-unit containing a different topical subject. In the low-score text, (2-e) and (2-g) form one extended parallel progression, while (2-f) and 2-l) form a second. In the high-score example, (1-a), (1-b), (1-f), (1-g), and (1-m) form one extended parallel progression, and (1-h), (1-i), (1-j), and (1-l) form a second. For further illustration, consider t-units (1-h), (1-i), (1-j), and (1-l). This progression of t-units is called extended because the progression of the same topical subject--"teachers"--through the text leaves off after (1-j) and then resumes with (1-l) following (1-k), which is an intervening t-unit with a different topical subject, in this case "students."

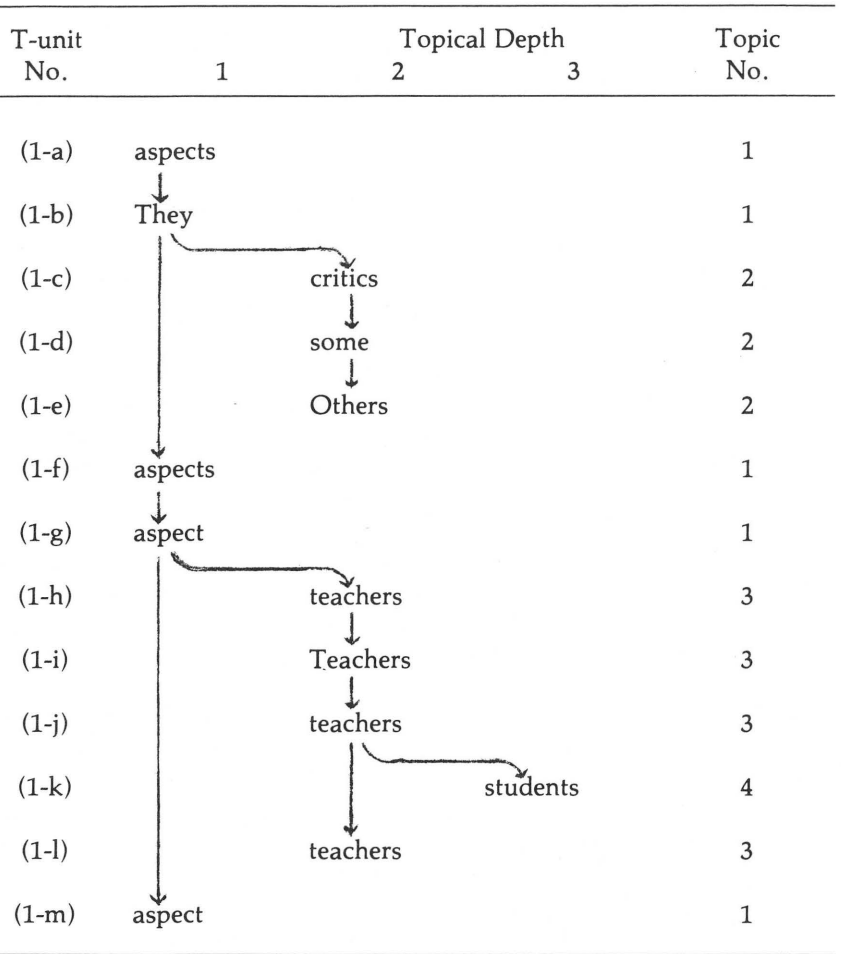

Figure 1. Topical Structure of Example High-Quality Essay.

From this discussion of the three types of progressions, it should be clear that a given t-unit often participates in more than one type of progression. Consider, for illustration, the high-quality example quoted above. In that essay, t-unit (1-b) is part of the parallel progression consisting of (1-a) and (1-b). It is also part of the extended parallel progression consisting of (1-a), (1-b), (1-f), (1-g), and (1-m); and it is part of the sequential progression made up of t-units (1-b) and (1-c). If one were to argue that a particular t-unit should be counted as belonging to only one progression at one time,

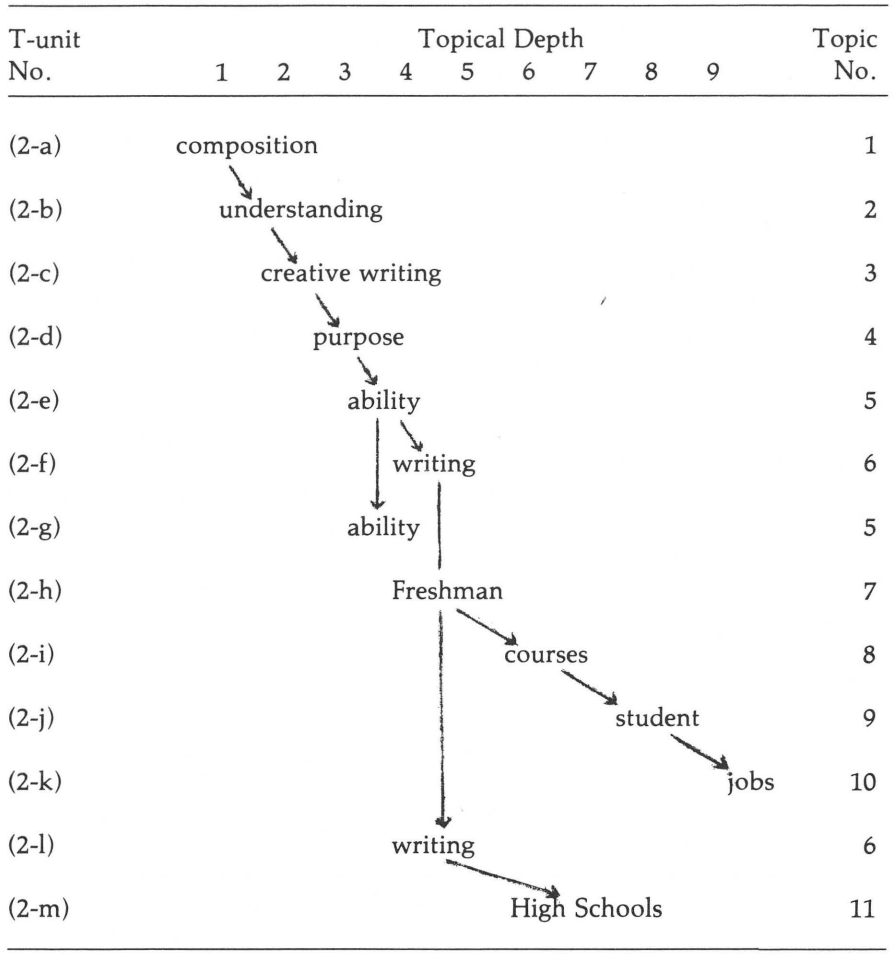

Figure 2. Topical Structure of Example Low-Quality Essay.

then one could not represent accurately topical relations across t-units. In the case of (1-b), one would have to decide whether it belongs primarily to the parallel, the extended parallel, or sequential progression. Such a decision would be an arbitrary one. To count (1-b) as belonging only to the extended parallel progression is to ignore at the local level its relationship to (1-a) and (1-c). To count (1-b) as belonging only to the parallel progression is to ignore its relationship to the larger semantic structure of the text as suggested by the extended parallel progression or to ignore its

relationship to (1-c) at the local level. To count (1-b) as belonging only to the sequential progression is to ignore its relationship at the local level to (1-a) and its relationship at a more global level to (1-a), (1-f), (1-g), and (1-m). Viewing particular t-units as belonging to more than one type of progression may be confusing, but at least doing so seems to represent fairly well the relationship of a single t-unit to the text as a whole.

The *topical depth* of a passage is determined by the number of different topics in the longest sequential progression or combination of sequential progressions. Thus while the high-score example contains four distinct topics, it has a topical depth of three; and while the low-score example contains 11 different topics, it has a topical depth of nine.

The last stage of analysis involved the creation of a number of computed topical structure variables, variables which result from the mathematical transformation of previously quantified raw data. These computed topical structure variables are the following: percentage of t-units falling into each of the five classes of sentences; percentage of topics which are not repeated; percentage of t-units in parallel, extended parallel, and sequential progressions; number of t-units per parallel, extended parallel, and sequential progresion; number of t-units per topic; and number of words per topic.

Results

Syntactic Variables. Group t-tests were performed to determine whether the means for t-unit and clause length differ significantly for the two sets of essays. The high-quality texts contain t-units (mean = 17.0; sd = 4.0) which average 0.9 of a word shorter than those of the low-score texts (mean = 17.9; sd = 4.1). The means for t-unit length do not differ significantly at the .05 level of confidence (T = 0.79). The clauses in the high-score texts (mean = 10.8; sd = 2.4) are on average about 0.1 of a word shorter than those in the low-score texts (mean = 10.9; sd = 1.5). The means for clause length do not differ significantly (T = 0.15).

Text Length. A group t-test was also used to determine whether the essays in the two sets differ significantly with respect to text length. The high-score texts average 530.8 words (sd = 221.4), about 124 words more than the low-quality essays which average 406.5 words (sd = 139.4). The means for the two sets of essays differ significantly (T = 2.33; $p < .05$).

Types of T-Units. The mean percentages of t-units classified under Lautamatti's five sentence types were also compared. The means, standard deviations, t-values, and significance levels are presented in Table I.

As Table I indicates, the mean percentages of total t-units represented by Type 1, Type 2, and Type 4 sentences do not differ significantly across the

Table I. Means, Standard Deviations, T-Values, and Levels of Significance for percent of T-units Classified Under Each of Lautamatti's Five Sentence Types for the High-Quality Texts (N=24) and the Low-Quality Texts (N=24).

	Percentage of T-Units				
Sentence Types	*High-Score Texts Mean*	*SD*	*Low-Score Texts Means*	*SD*	*T Value*
Type 1	52.9	15.8	45.2	17.0	1.64*
Type 2	19.3	11.3	12.9	12.0	1.93*
Type 3	8.7	12.7	17.4	13.0	2.33**
Type 4	9.1	4.5	6.4	5.9	1.75*
Type 5	10.0	7.6	18.2	11.5	2.93**

* Not Significant ** p<.05

Table II. Means, Standard Deviations, T-Values, and Significance Levels for Group T-Tests Used to Compare Topical Structure Variables Analyzed in the High-Score Texts (N=24) and Low-Score Texts (N=24).

Topical Structure Variables	*High-Score Texts*		*Low-Score Texts*		*T Value*
	Mean	*SD*	*Mean*	*SD*	
Topics	10.9	4.1	13.3	5.9	1.65*
Repeated Topics	5.0	2.0	4.6	2.3	0.60*
Nonrepeated Topics	5.9	3.7	8.7	5.8	2.47**
% of Topics Not Repeated	50.6	20.0	61.4	19.5	1.90*
Topical Depth	4.2	1.3	5.9	2.3	2.99***
% of T-Units in Parallel Progressions	50.4	11.7	37.5	23.5	2.41**
% of T-units in Extended Parallel Progressions	68.8	20.2	47.8	23.8	3.29***
% T-units in Sequential Progressions	64.8	9.4	81.5	14.9	4.73****
T-units per Parallel Progression	2.8	0.5	2.3	0.9	2.59**
T-units per Extended Parallel Progression	5.6	1.6	3.5	1.7	4.55****
T-units per Sequential Progression	2.7	0.6	3.7	1.8	2.65**
T-units per Topic	3.04	0.9	1.88	0.64	5.12****
Words per Topic	53.2	22.5	33.7	12.4	3.74****

*Not Significant ***p<.01
**p<.05 ****p<.001

two sets of essays. However, the mean percentages for Type 3 and Type 5 sentences do differ significantly, with a significantly higher percentage of Type 3 and Type 5 t-units appearing in the low-score essays.

Topical Structure Variables. The two sets of essays were also compared in terms of several topical structure variables. Some of these variables are raw data variables, but most are computed variables. The information relevant to the t-tests used to compare the means for these variables appears in Table II.

Table II reveals that the means for two raw data variables (number of topics and number of repeated topics) and for one computed variable (percentage of topics that are not repeated) do not differ significantly, although the difference between the means for the computed variable approaches significance ($p = .064$). However, Table II also shows that the means for the remaining variables all differ significantly across the two sets of essays. The values for three of these variables--the percentages of t-units in each type of progression--require some clarification. The sum of these three values for each of the two groups of texts totals more than 100%--184% for the high-quality texts and 166.8% for the low-quality texts. The reason that the percentages total more than 100% is that some t-units belong to more than one progression at the same time, a matter discussed previously in some detail.

Discussion of the Results

The results of the analyses indicate in what ways the two sets of argumentative essays are different and in what ways they are similar; and they provide the bases for some inferences about text features to which readers respond in forming judgments of writing quality. Whether or why either the differences or the similarities are meaningful or important and how they may have affected readers' judgments are the major questions addressed in this section. In the present discussion I focus primarily on the results reported in Table I and in Table II. I use the results of the analyses of syntax and text length to supplement my discussion.

Use of the Five Types of Sentences. Table I indicates that the two sets of essays are similar with respect to the degree to which they rely on Type 1, Type 2, and Type 4 sentences, but that the two sets of essays differ significantly with respect to the use of Type 3 and Type 5 sentences.

As Table I indicates, writers of both sets of essays display a decided preference for Type 1 sentences. In fact, between about 45% and 53% of all t-units in the two sets are of this type. Typically, Type 1 sentences--t-units in which the initial sentence element, the grammatical subject, and the topical subject coincide--are syntactically the least complex of the five types. Type 1 sentences, for example, never begin with introductory clauses

or phrases, including discourse connectives (such as "first," "obviously," "however," or "consequently"). Although the mean percentages for the two sets of essays do not differ significantly, writers of the high-score essays use Type 1 sentences somewhat more often than their low-score counterparts, a phenomenon which partly explains the difference in mean t-unit length. In addition, the relatively high percentage of Type 1 sentences in both sets of essays indicates a general tendency on the part of both good and poor writers to place topical subjects at the beginning of sentences as subjects of main clauses. Such "fronting" may result from writers' attempts--which need not be completely conscious ones--to identify for readers the topics of sentences as soon as possible, thus increasing the ease with which readers can process a text.

Although the mean percentages do not differ significantly, Table I also suggests a tendency on the part of the writers of the high-score texts to rely more heavily than their counterparts on Type 2 sentences. Like Type 1 sentences, Type 2 sentences contain topical and grammatical subjects which coincide. Unlike Type 1 sentences, Type 2 sentences contain an initial sentence element which is distinct from the grammatical and, in this case, the topical subject. Type 2 sentences, as the two example passages illustrate, often help the reader make semantic connections, or establish meaning-creating relationships, across the boundaries of t-units in extended texts. In the majority of the Type 2 sentences appearing in the two essay sets, the initial sentence element consists of a discourse connective such as the "For example" in (1-h) of the high-score example and the "However" in (2-j) and the "Thus" in (2-l) of the low-score example. Considerably fewer of the initial sentence elements in Type 2 sentences contain a topical adjunct, a phrase or clause which provides a context for the topical subject of the sentence as in (1-j) and (2-e). In (1-j) the phrase "In high school composition courses" is considered a topical adjunct because it reestablishes or reiterates the larger context in which the topical subject of the sentence--in this case "teachers"--is to be considered. Presumably, the introductory phrase in (2-e) is intended to function similarly; but the writer of the low-quality text uses an ambiguous adjunct to invoke the larger context. When topical adjuncts do appear in the initial sentence element of Type 2 sentences, they usually appear in the high-quality texts.

The occurrence of Type 2 sentences may signal another important difference between the two sets of essays, a difference that may have affected readers' responses to them: whereas the Type 2 sentence is the second most frequently used sentence type in the high-score essays (19.3% of all t-units), it is the fourth most frequently used in the low-quality essays (12.9% of all t-units). This observation admits at least two possible interpretations. First, because after Type 1 sentences, Type 2 sentences may be

syntactically the least complex of the five types, the heavier reliance on them in the high-quality essays helps account for the shorter t-units in those essays. Second, the greater frequency of Type 2 sentences in the high-score essays suggests that the writers of those texts are perhaps more conscious of the need to help the reader through an essay by providing initial sentence elements having an adjunct function or purpose.

When the percentages for Type 1 and Type 2 sentences are summed, we find that the writers of the high-score texts use t-units with identical topical and grammatical subjects about 71% (sd=11.5) of the time, while the writers of the low-score texts use such t-units much less frequently, about 58% (sd=17.6) of the time. These mean percentages differ significantly ($T=3.32$, $p=.002$). Perhaps the writers of the high-quality texts operate on the assumption that using sentence types in which the topical and grammatical subjects coincide can facilitate the reader's comprehension of the text. Perhaps these same writers believe that using the sentence types that are usually less complex syntactically than the other three types can also facilitate comprehension.

The mean percentages for Type 4 sentences, like those for Type 1 and Type 2 sentences when those types are considered separately, do not differ significantly. Nevertheless, the uses of Type 4 sentences in the two sets of essays do differ in important ways. Type 4 sentences are those in which the topical subject and the initial sentence element coincide but differ from the grammatical subject. In an extended text, such sentences can be used in two ways: either to introduce a new topic or to create a semantic connection across t-unit boundaries by fronting a topic previously given in the text and then adding new information as a comment in the main clause. This second use is illustrated by (1-f), the only Type 4 sentence in the two example essays. In that t-unit, a previously introduced topic--"aspects"--appears in an introductory subordinate clause. Because "aspect" had itself not been used as a topic in the three immediately preceding t-units, making t-unit (1-f) a Type 4 sentence helps the reader contextualize the new information delivered in the main clause. The writers of the essays that readers found high in overall quality are much more likely to use Type 4 sentences in this way than the writers of the essays judged low in overall quality. In the low-quality essays, 49.4% of the Type 4 sentences introduce a new topic, while only 31.2% of the Type 4 sentences in the high-quality essays do so. To put the matter in another way, in the high-score essays, nearly 70% of the Type 4 sentences contain topical subjects previously introduced, often as a comment in the immediately preceding t-unit, while only about half of the Type 4 sentences in the low-score essays do so. However, neither group relies extensively on Type 4 sentences: they are the least used sentence type in the low-quality essays and the next to the least used in the high-quality essays.

The mean percentages for both Type 3 and Type 5 sentences differ significantly across the two sets of essays, as Table I indicates. It is useful to discuss these two sentence types both collectively and separately, because they are similar in some respects and different in others. In Type 3 and Type 5 sentences, the topical subject appears *after* the grammatical subject of the t-unit. As Table I indicates, 35.6% (sd=16.3) of the t-units in the low-score essays are of these two types while only 18.7% (sd=13.8) of the high-quality t-units are. These collective mean percentages differ significantly ($T=3.87$, $p<001$). In both sets of essays, the grammatical subject of a Type 3 or a Type 5 sentence is usually a "dummy" subject, either "it" or "there" (as in sentences (1-c), (1-l), and (2-b) of the example passages). One effect of "dummy" grammatical subjects is, of course, longer t-units. For example, more words are needed to say "It is basic to have a good understanding of writing" than are needed to say "A good understanding of writing is basic." In addition, the Type 3 and Type 5 sentences in the 48 texts are frequently passives, as in the following sentence from a low-quality paper: "After failing, it was recommended by my councellor [sic] that I take remedial English." Converting this sentence to the active voice saves words, as well as eliminates a grammatical error: "After I failed, my counsellor recommended remedial English." The heavier reliance on Type 3 and Type 5 sentences in the low-quality essays (35.6% compared with 18.7% in the high-score texts) probably accounts for some of the difference in mean t-unit and clause length between the two groups of essays. More importantly, Type 3 and Type 5 sentences may have been more difficult for the readers to process, since they would have had to "search longer to determine what a particular sentence of those types was about. Table I also indicates that the writers of the low-quality texts tend to use both Type 3 and Type 5 sentences with greater frequency than they use Type 2 sentences, sentences that can help the reader make transitions across t-unit boundaries. However, for the writers of the high-score essays, just the opposite is true. Perhaps this finding indicates that the writers of the high-quality essays tend to be more adept than their counterparts in creating coherence relationships across t-unit boundaries, in helping readers establish meaning relationships across t-units, by fronting topical subjects in sentences where readers must depend on initial sentence elements to help bridge the semantic gaps between t-units.

Topical Development and Structure. While Table I directs attention to some important differences in the way the two groups of writers handle topical focus at the sentence level, Table II distinguishes between the ways the two groups of writers structure their essays around the topics they introduce. These differences are reflected in two related aspects of topical development: (1) the way in which a given topic is elaborated on, and (2)

the way topical progressions are used to advance the discourse topic, the main idea or theme of the essay.

As I have noted, the high-quality essays contain significantly more words than the low-quality texts, about 531 words compared to about 407. Text length alone may suggest that the writers of the high-score texts are more capable than their low-core counterparts of developing their main ideas, that they have better invention skills. Clearly text length seems to be positively associated with writing quality, both in the essays examined in this study and in those examined in other studies (e.g., Nold & Freedman, 1977; Witte & Faigley, 1981). But text length, like t-unit and clause length, is at best only a gross indicator of qualitative differences among texts. Text length cannot tell what features of texts contribute to the qualitative differences readers identify. Neither can text length tell in what ways the invention skills of good writers differ from those of poor ones. And text length cannot tell anything about differences in the ways the two groups of writers arrange or structure the semantic content they decide to include in their texts. To explore such issues, I used the variables reported in Table II to analyze the two sets of essays.

We learn from Table II that the high-quality texts introduce on average about 2.4 fewer distinct topics at the sentence level, 10.9 compared to 13.3, than do the low-quality essays. These means do not themselves differ significantly, and neither do the means for the number of repeated topics nor the percentage of nonrepeated topics. However, the means for the number of nonrepeated topics do differ significantly. These findings suggest that in the texts that readers judged to be of high quality, text length is positively associated with more development or elaboration of fewer topics. Two other variables--mean number of t-units per topic and mean number of words per topic--also indicate that the combined effect of greater length and fewer topics in the high-quality essays is significantly more elaboration of given topics in high-quality texts than in a low-quality ones. Whether seen in terms of the average number of words or t-units per topic, the differences in the extent to which the two groups of writers develop, or "stick to," a given topic once it is introduced is significant beyond the .001-level. Once a topic is introduced in a high-quality essay, it will receive significantly more of the writer's attention than a topic introduced in a low-quality essay. These findings suggest three things about the two groups of essays. First, they suggest that the writers of the high-score texts are more capable of "inventing" or "discovering" content for the topics they introduce. Second, they indicate that the high-score writers prefer to elaborate more on fewer topics. Third, and perhaps most importantly, these findings suggest that the high-score writers can better distinguish than their low-score counterparts between topics that are crucial to the "main idea" of a

text and those that are not, a matter rather well illustrated by the low-quality example. These same results strongly suggest that readers do not respond positively to longer texts *per se*, but that readers respond positively to texts that establish focus by limiting the number of topics introduced and by elaborating on those topics extensively.

The suggestions that the writers of the high-quality essays are more capable of inventing or discovering content for the topics they introduce, that they can distinguish between crucial and non-crucial topics, and that readers respond positively to their efforts find support in the ways the two groups of writers develop the topics they introduce. The percentages of total t-units in the three different types of topical progressions indicate that while both groups of writers rely heavily on sequential progressions, the writers of the low-quality essays do so significantly more often than the writers of the high-quality essays. Whereas about 82% of the t-units in the low-score texts appear in sequential progressions, only about 65% in the high-score texts do. As Table II indicates, these means differ significantly. The difference in the percentages of t-units in sequential progressions indicates that the high-quality essays tend to introduce new topics significantly less often than do the low-quality essays. Usually the result is that the most important topics appear at higher levels of topical depth, an observation supported by the example essays. Maintaining a consistent focus on fewer topics at higher levels of topical depth and elaborating more on those topics appears to affect the ways readers respond to student writing.

The mean percentages for the two groups of texts for parallel and extended parallel progressions also differ significantly. In the low-quality essays, 37.5% of the t-units are in parallel progressions, while in the high-quality essays 50.4% are. As Table II shows, these mean percentages differ significantly. In the low-quality essays, 47.8% of the t-units are in extended parallel progressions, but in the high-score texts, 68.8% are. As the two example passages illustrate, both parallel and extended parallel progressions consist of t-units having the same topical subject. In addition--and this matter is reflected in Figure 1 and Figure 2--the parallel and extended parallel progressions in the low-quality essays sometimes differ from those in the high-score texts. In the high-score texts, parallel and extended parallel progressions typically appear at a higher level of topical depth than in the low-score essays, usually at a topical depth of "1" or "2", as in the case of the high-quality example. In the low quality essays, something quite different happens. In those essays, parallel and extended parallel progressions usually occur at lower levels of topical depth, as is the case with the extended parallel progressions formed by (2-e) and (2-g) and by (2-f) and (2-l). If repeated topics are assumed to be the most important topics in a text, these phenomena may suggest that the writers of texts that readers

judged inferior experience more difficulty in establishing goals and in laying plans for the texts they write, thus providing some evidence for the claim that good and poor writers can be distinguished on a basis of planning strategies (cf. Flower & Hayes, 1980, 1981).

This difference in the use of parallel and extended parallel progressions suggests that when the writers of the low-quality texts choose to elaborate on a given topic that topic is often at a lower level of topical depth than the topics elaborated on extensively by the high-score writers. My reading of the essays suggests that in the low-score essays, such elaborations of topics at lower levels of topical depth either front topical material which is not essential to the development of main idea or that these elaborations bury the most important topics introduced into the discourse. In short, the writers of the high-score texts tend more often than their low-score counterparts to use parallel and extended parallel progressions to highlight important topical material at higher levels of topical depth. In addition, the writers of the high-score texts more frequently return to their important topics after intervening sequential progressions. The greater frequency with which the high-score writers return to their most important topics seems to affect their essays in two ways: the frequent return to the same topic allows them to front consistently the most important topics, and it allows them to elaborate more on those topics. These effects, in turn, help the writers to maintain a consistent and clear focus in the high-quality essays.

Such differences between the two sets of essays are also reflected in the mean number of t-units in each type of topical progression, differences that also suggest how specific text cues may affect readers' judgments of student writing. The mean number of t-units appearing in the three types of progressions perhaps best reflects how the two sets of essays differ. These means tell quite specifically how the writers of the high-quality essays manage to devote more words and more t-units to each of their topics. As Table II shows, the means for each of these three variables differ significantly. In the low-score texts, 2.3 t-units appear on the average in parallel progressions, but in the high-score texts 2.8 t-units do. In the low-score texts, 3.5 t-units appear on the average in each extended parallel progression, whereas 5.6 t-units appear in each extended parallel progression in the high-score essays. In the low-score essays, 3.7 t-units appear on the average in each sequential progression, whereas only 2.7 t-units appear on the average in each sequential progression in the high-score essays. These findings support what we have already observed, namely, that the writers of the high-score texts elaborate much more on a given topic and introduce fewer of them.

A good deal of the difference between the ways the two groups of writers elaborate on and structure the topics introduced in their respective texts is suggested by the differences among the average numbers of t-units per each type of topical progression. The highest average number of t-units per type of progression in the low-score texts is 3.7, and that for sequential progressions. On the other hand, the highest average for the high-score essays is 5.6, that for extended parallel progressions. Extended parallel progresions return repeatedly to previously introduced topics, adding new information about a particular topic as the discourse unfolds. In contrast, sequential progressions are formed by introducing new topics to the discourse; and in the low-score texts, these new topics are not always crucial--or sometimes even relevant--to the essay. The topics introduced in sequential progressions contained in the low-score essays frequently suggest either that the writers do not know how to establish connections among topics or that their principal discovery or invention strategy is "free association" or "nondirected and nonselective brainstorming." As a result of their heavier reliance on sequential progressions, the writers of the low-score essays generally produce texts which are less coherent than those of their high-score counterparts. This heavier reliance on sequential progressions, coupled with a tendency to use fewer parallel and extended parallel progressions, suggests that the low-score writers do not know how to use invention strategies to develop a topic or to fit it into a semantic structure appropriate for a particular "main idea." For the writers of the texts that readers judged high in quality, invention seems to have occurred in response to particular plans, to have been guided by the goals the writers had established for their texts. However, for the writers of the low-quality texts, invention and planning appear not to be clearly distinguishable subprocesses of composing. As a result, the low-quality essays frequently lack what Hobbes and others (Hobbes & Evans, 1979; Agar & Hobbes, 1982) have called "local coherence" and what they have called "global coherence."

The problems that the writers of the low-score essays have in creating coherence in their texts is also reflected in the mean "topical depth" of their essays. As Table II indicates, the low-score essays have a mean topical depth of 5.9, compared with a mean topical depth of 4.2 in the high-score essays. These means differ significantly. The difference between these means reflects the greater reliance of the writers of the low-score essays on sequential progressions. More importantly, the difference indicates that the writers of the low-score texts tend to introduce successively a larger number of topics than do the writers of the high-score essays. In this connection, recall that sequential progressions in the low-score texts average 3.7 t-units. Since sequential progressions by definition contain only t-units with

different topics, each sequential progression in a low-score text contains an average of 3.7 different topics, compared with 2.7 in the high-score texts. In the essays readers found to be of inferior quality, greater topical depth, longer sequential progressions, and more topics may have the effect of distracting readers by presenting them with topics which are not immediately germane to the essay's main idea.

The topical structure variables used in the present study help to pinpoint rather precisely some important qualitative differences between the two sets of essays. These variables also provide evidence of the kinds of decisions the writers of the two groups of essays made during composing. For example, writers of the two sets of essays appear to select topics for their essays in somewhat different ways, selection processes that affect both the number of topics and the number of times a given topic appears in a given essay. Both the number of topics and the times each is repeated seem to bear directly on how coherent a given essay is. In the present study, the essays that rely most heavily on sequential progressions--progressions introducing new topics successively--and least heavily on parallel progressions of either type--progressions relying on repeated topics--tend to suffer most from a lack of coherence, tend not to be able to maintain a consistent focus from beginning to end.

The present study was designed as an exploratory one to determine whether aspects of Prague School theories of topic and text structure might provide a useful framework for examining the written texts of student writers and the responses of experienced readers to them. I employed this theoretical framework in an analysis of topical subjects, examining the influence of topical subjects on both sentence structure and discourse structure. At the sentence level, Lautamatti's five types of sentences were able to pinpoint some important differences between the high-quality and low-quality texts of beginning college freshman. It might be said that the analyses of topics at the sentence level yield data about the "style" of the two sets of texts. The variables which looked beyond the sentence to development and structure in extended texts were able to distinguish among the two sets of essays in other important ways. The use of those variables suggests not only that the planning and invention strategies of the low-score writers were perhaps inappropriate to the task at hand, but also that these strategies affect in important ways the patterns of arrangement employed by the low-score writers, particularly as those patterns affect coherence both locally and globally.

Limitations and Implications

The findings reported seem to suggest the value of employing topical structure analysis in the study of student writing and in the study of readers' judgments of that writing. However, the findings reported and the interpretations given of them are subject to a number of limitations that derive from the particular texts used and from the design of the study itself.

As an exploratory study employing a *post hoc* analysis of student writing, the study is limited. It is limited in at least five ways. First, only the essays of college freshman were examined, and those essays represented what Britton (Britton, Burgess, Martin, McLeod, & Rosen, 1975) and others have called "school writing," writing produced in an artificial environment of a classroom or testing center and directed to a teacher or an unknown evaluator. Whether readers would respond similarly to writing produced under different circumstances or directed to different audiences was not addressed in the present study. Second, the texts examined were all written in response to a topic that asked students to take a stand on a particular issue and to argue in support of the stand they took. If the findings are at all generalizable, they are generalizable only to comparable texts. Indeed, Sodowsky and Witte[6] have found that when developed through narrative and descriptive details, the informative texts of college freshman differ substantially in terms of topical structure variables from the texts analyzed in the present study. Third, the study examined only the topics of the student texts; it did not examine what Prague School linguists would call "comments." An examination of comments in the 48 texts used in the present may reveal that the two groups of essays are more alike than the present findings suggest, or that they differ in ways other than those described in the present essay. Fourth, while the 48 essays had all been rated by experienced readers of student writing, the judgments of writing quality by which the two groups of essays were formed are relative ones. The quality score assigned to a particular student text was always made with reference to the other essays in the 180-essay set from which the 48 texts were taken. It is impossible to determine whether a high-quality essay examined in the present study would be a high-quality essay in another study because the holistic score a particular essay receives is always dependent on the relative quality of the complete set essays being rated at one time. Fifth, the findings are largely contingent on the reliability and the validity of the coding procedures. While it has been my experience that continued practice can lead to consistent coding, coding is always to some extent dependent on the coder's understanding of the text at hand. When texts are ambiguous, the reliability of coding suffers most; and coding itself becomes dependent on the inferences the coder makes about what the writer intended the text to mean.

These limitations notwithstanding, the findings appear strong enough to suggest some directions for subsequent research. These findings suggest that topical structure analysis might be usefully applied in seven kinds of studies. First, topical structure analysis might be useful in examining structural differences among kinds of discourse written by writers of varying abilities. It could, for example, be used in a study that crossed, say, Kinneavy's (1971) aims and moded in an examination of differences among text types. Second, topical structure analysis might profitably be used to study the ways writers of different ages structure texts of different types. Third, topical structure analysis of "texts produced so far" might be linked with composing-aloud protocols to determine in what ways planning effects structure of texts. Fourth, topical structure analysis could be used in revision studies to determine not only the effects of revision on text structure but also some of the text cues that cause writers to revise. Fifth, topical structure variables could be systematically manipulated in texts to determine in what ways readers' judgments of texts are affected. Sixth, topical structure analysis might be used in pedagogical studies to determine whether that method of text analysis is useful in teaching students how to examine their own texts critically and to revise them constructively. Seventh, topical structure analysis might be used to explore the relationship between particular cognitive skills and the difficulty levels of writing tasks.

If the concept of topic in extended written discourse is salient enough to allow such studies as these to be carried out, it will have proven itself a most useful one.

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