

ANALYZING TOPICAL STRUCTURE IN ESL ESSAYS

Not All Topics Are Equal

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Topical structure analysis (TSA), a text-based approach to the study of topic in discourse, has been useful in identifying text-based features of coherence. It has also been used to distinguish between essays written by groups of native English speakers with varying degrees of writing proficiency (Witte, 1983a, 1983b). More recently, TSA has distinguished between higher and lower rated ESL essays, but with different results from those found with native speakers of English (Connor & Schneider, 1988). The present study replicated the previous ESL study of two groups of essays written for the TOEFL Test of Written English with three groups of essays. Findings indicate that two topical structure variables, proportions of sequential and parallel topics in the essays, differentiate the highest rated group from the two lower rated groups. We offer explanations for the results and propose that all occurrences of a particular type of topic progression do not contribute equally to the coherence of a text.

Research on second language writing skills has undergone a recent revival. Emphasis on the processes of writing, influenced by the prolific research on the writing processes of first language writers, has also brought about a renewed interest in the analyses of student products. Text analyses of written products have been shown to

complement research on writing processes, and are needed for an integrated theory of writing.

The text analysis research of student products has sought to identify internal features of written discourse that can help explain qualitative differences among student texts. The motivation for this research has been the need to be able to teach students how to write effectively. Researchers and teachers have maintained that if the linguistic features of effective texts can be identified, they can be taught to students. These text-internal features can also be incorporated into assessment instruments of student writing. As explained in a recent article (Connor, 1987), two major approaches have been taken to help explain qualitative differences in student writing, one based on process-centered features and one focusing on sentence-based features.

APPROACHES IN TEXT ANALYSIS

The first approach is concerned with the psychological and rhetorical processes involved in the production and comprehension of texts. Research in ESL writing has included analyses of story grammar in narratives (Martin & Rothery, 1980; Söter, 1985), semantic content structure of expository texts (Carrell, 1984, 1985; Connor, 1984a), and structures of argumentative prose (Connor & Lauer, 1985, 1988; Tirkkonen-Condit, 1984). Much of the research has shown the interactive nature of reading and writing skills in L2. For example, Carrell (1987) showed that findings from ESL reading comprehension research and ESL composition research complement each other.

In other words, since reading comprehension research has shown that clear top-level rhetorical structure with appropriate signaling words is an aid for text understanding, the implication is that we should train students to use top-level rhetorical structure for improved quality of writing. This notion assumes, however, that all texts have one preferred top-level structure and that there is an ideal place in the writing process to use this. Before being able to translate the results of the process-based text analyses into instructional practice, future research needs to identify the role of text structures in texts and in the writing process.

The second approach has focused on sentence-level features and intersentential relations dealing with cohesion and coherence. Influenced by the research in L1 by Hunt (1965, 1970), L2 researchers have examined correlations between writing quality and such syntactic features as t-unit and clause length (Gaies, 1980; Patterson & Lindell, 1976; Reid, 1987). Recently, however, researchers have begun to examine the intersentential relationships of texts for a better understanding of the role of discursal constraints in writing. Drawing on the work of Halliday and Hasan (1976), numerous ESL studies have investigated the use of cohesive ties in low- and high-quality essays (Connor, 1984b; Evensen, 1990; Wikborg, 1985, 1987). Although important, cohesion analyses have not been able to depict important coherence relationships within texts. In two empirical studies, Carrell (1984) and Connor (1984b) demonstrated that a text may be cohesive but not coherent. A more promising direction of research is evolving from the study of topic in discourse, including pragmatic functions of topic and topical structure analysis.

While isolated sentences can be analyzed only in terms of syntax and semantics, sentences in context have a pragmatic level as well. Bardovi-Harlig (1990) reviewed pairs of sometimes competing and overlapping terms of discourse pragmatics—topic/comment, background/focus, and old (given) information/new information—and related them to the pragmatic functions of five constructions in written English. Of interest here are her notions of two terms, *topic* and *focus*. Bardovi-Harlig (1990) defined topic as what the rest of the sentence is about. It is context-dependent, it may be given information, and it is probably definite. The focus is the part of the sentence which most advances communication. It is context-independent, it is new information, and it may be indefinite.

The association of *topic* with given information and *focus* with new information is reflected in topical structure analysis, which describes progressions of sentence topics and their relation to the overall discourse topic of a text.

TOPICAL STRUCTURE ANALYSIS

Topical structure analysis, operationalized for text analysis by Lautamatti (1978, 1987), examines how topics repeat, shift, and return to earlier topics in discourse. The analysis draws on the theories of such Prague School linguists as Mathesius (1975), Firbas (1964, 1966, 1974), and Daneš (1964, 1974). Mathesius was influential in making the distinction in sentences between “theme”—what the sentence is about—and “enunciation”—what is said about the theme. Later, the term *topic* emerged as a synonym for theme and the term *comment* for enunciation.¹

Lautamatti developed topical structure analysis (her term) to describe coherence in texts, focusing on semantic relationships that exist between sentence topics and the overall discourse topic. Through topical structure analysis, these relationships can be studied by looking at sequences of sentences and examining how the sentence topics in the sentences work through the text to progressively build meaning. Following Daneš’s notions about how patterns of topic and comment develop meaning in texts, Lautamatti distinguished between three different progressions of topics in sentences: parallel progression, sequential progression, and extended parallel progression.

Sentences (1)–(5), in which sentence topics are in italics, illustrate each of these topic progressions. Very briefly, in parallel progression, adjacent sentence topics are semantically identical, as in (1)–(2). In sequential progression, the sentence topics are always different, as in (3) and (4). Although not in evidence here, the comment of the previous sentence often becomes the topic of the next sentence, and so on. Finally, extended parallel progression occurs when there is a return to an earlier topic that has been temporarily interrupted by a sequential progression, as in (5).

- (1) Over 500 million *bags* are handled on airplane flights each year.
- (2) Sometimes *that luggage* is lost, delayed or damaged.
- (3) *Airline employees* sometimes are to blame.
- (4) In many cases, *passengers* themselves are to blame.
- (5) It is not surprising that *lost luggage* is the number one complaint in the airline industry.

Topical structure analysis has received attention in ESL mainly as a teaching method to help students check for coherence in their own writing and to revise accordingly (Cerniglia, Medsker, & Connor, 1990; Connor & Farmer, 1990; Tipton, 1987). In first language writing research, however, Witte (1983b) used topical structure analysis to explain differences among groups of high- and low-rated college essays. Witte found significant differences between the low- and high-rated essays in the frequency of the three types of progressions. The high-rated essays contained significantly more parallel and extended parallel progressions than low-rated essays, while low-rated essays contained more sequential progression.

In a preliminary ESL study (Connor & Schneider, 1988) following from Witte's research, we also addressed the question: Can topical structure analysis distinguish among readers' judgments of writing quality? We examined two groups of essays that were written for a Test of Written English (TWE) topic in fall 1987 and rated by TWE raters.² The writing assignment asked students to compare and contrast the contributions of artists and scientists in society. We randomly selected 15 essays from a set that had been rated as 6 on the TWE scale (highest score) and 15 essays from a set rated 3 on the TWE scale. Essays that had received 1 or 2 did not have enough development for us to examine the different topical structure progression types.

T tests were used to test for mean differences between the two groups of essays in the number of t-units per essay, and for the proportion of t-units in parallel, sequential, and extended parallel progressions. Results showed that the high-rated essays contained about twice as many t-units as the low-rated essays, averaging 20.7 t-units per essay, as compared to 9.5 t-units (*SD* 3.23 and 3.75, respectively; $t = -8.82, p < .0001$). Contrary to Witte's findings (1983b), there were no significant differences between the groups in proportion of parallel or extended parallel progressions. There was, however, a significant difference between the high- and low-rated essays in proportion of sequential progressions, with high-rated essays exceeding the low-rated essays ($t = -1.89, p < .05$).

We offered several explanations for our findings, including possible differences with Witte in criteria for coding topics as parallel, sequential, or extended parallel; lack of information about interrater reliability; and differences among topics identified as sequential. A remaining question was whether the observed differences in proportion of sequential topics could be accounted for by differences in essay length between the two groups. That is, the longer the essay, the more opportunities the writer would have to use sequential progression. Thus, we wished to determine whether the observed differences in proportion of sequential progression between the high- and low-rated essays were real differences or simply an artifact of length. If differences in length could be discounted, this finding would lend greater support for differences in judgments of writing quality between the two groups due to topical structure variables.

To investigate this possibility, we decided to examine 15 additional essays that had been rated 4 on the TWE scale. Our follow-up study was guided by two questions: (a) Can topical structure analysis distinguish among readers' judgments of writing quality in ESL essays? and (b) If so, are these differences independent of differences due to essay length?

METHODS AND PROCEDURES

Sample Selection

We examined a third group of 15 essays, rated 4 on the TWE scale, in addition to the two other groups we had analyzed in our preliminary study (Connor & Schneider, 1988). All three groups of essays were randomly selected from thousands of essays written on a Test of Written English (TWE) topic in fall 1987 and rated by TWE raters. The writing assignment was the same comparison and contrast topic described in the earlier study. The three groups of 15 essays were rated 3, 4, and 6 on the TWE scale, respectively.

The essays rated 3 suggested a lack of proficiency in writing, those rated 4 suggested proficiency, and those rated 6 demonstrated a high degree of proficiency. All official identification on the essays was removed prior to our analysis. As a result, neither the native country nor the language of the writer could be identified except in cases where the writer referred to them in the essay.

Text Analyses and Procedures

Following Witte's (1983a, 1983b) research with topical structure analysis, we used t-units (Hunt, 1965, 1970) as the unit of analysis instead of sentences. Because t-units distinguish between simple sentences and compound sentences, they provide a more valid basis of comparison among ESL essays of varying degrees of proficiency. When sentences are combined or improperly punctuated, as commonly occurs in ESL writing, the use of sentence units may result in lost or inaccurate information. Additionally, because of their widespread use, the use of t-units in this study allows for comparisons with other studies of first and second language writing (Gaies, 1980).

Analysis of the essays took place in three steps: (a) identifying t-unit topics, (b) determining the progression of t-unit topics, and (c) charting the progression of topics. Example 1 shows an ESL student essay rated 3 on the TWE holistic scale, along with its topical structure diagram (t-units are indicated by slashes, and t-unit topics are in italics).

EXAMPLE 1

1 There are many *different contributions* between artists and scientists to Society./ 2 First, *artists* contribute to society for entertainment./ 3 *Many people* need it for relax after hard work./ 4 *Artists* contribute to society as film artists, singers and so on./ 5 Furthermore *artists* contribute to society with make new-work fields which are related with kind of activity./

6 *Scientists* contribute to society with improve knowledge of the people, especially for the student./ 7 In addition *scientists* contribute their new finding for human wealth./ 8 For example, *they* make transportation easier and faster with new types of jets./ 9 However, sometime *scientists* make new types of weapons which can be used for abolish human life./ 10 In conclusion, *artists* contribute to society with become an film artist, singers and so on./ 11 The other hand *scientist* contribute to society with increase human wealth./ 12 but in contrast *scientists* can make human life to abolish./

1. Different contributions
2. artists
3. many people
4. artists
5. artists
6. scientists
7. scientists
8. they
9. scientists
10. artists
11. scientists
12. scientists

The essay is divided into 12 t-units with topics in italics. By topic, we mean what the t-unit or sentence is about, which often, but not always, coincides with the grammatical subject of the t-unit or sentence. For most essays and texts, a noun phrase expresses the topic. The noun phrase that expresses t-unit topics can occur in many places of the sentence—beginning, middle, and end—as in the sample text in Example 1.³

Topics of sentences or t-units build meaning through either parallel, sequential, or extended parallel progression. As briefly explained earlier, in parallel progression, t-unit topics are semantically identical (T4–T5, T6–T9, and T11–T12 in Example 1). This kind of progression, repetition of a topic, is meant to reinforce the idea on the reader's mind. In sequential progression, the t-unit topics, which are always different, are typically derived from the content of the comment in the previous t-unit (T2, T3, T6, and T11 in Example 1). Sequential progression helps to develop individual topics by adding details to an idea, thus contributing to the coherence of a text. Conversely, sequential topics that do not relate to the previous sentence topic or overall discourse topic of the text detract from coherence. In the third type of progression, extended parallel, the writer returns to a topic mentioned earlier in the essay (T4, T10, and T11 in Example 1). The return to an earlier topic reminds the reader of important topics and provides closure when it occurs at the end of a text. (The Appendix provides guidelines for identifying t-units and coding the three types of topic progressions.)

Statistical Analyses

A one-way analysis of variance (ANOVA) was done to determine whether the three groups of essays—rated 3, 4, and 6 on the TWE scale—differed in mean length of essay as indicated by total t-units per essay. Analysis of covariance, with number of t-units as the covariate, was then used to determine whether there were differences between groups on proportion of parallel, sequential, and extended parallel topics when length was held constant.

RESULTS

Descriptive statistics for t-units and topic progressions appear in Table 1. One essay rated 4, an outlier with nearly twice the number of t-units as the mean of the 4 essays, was removed from analysis. As evident from the table, the high-rated essays (6s) contained an average of just over twice as many t-units per essay as the low-rated

Table 1. Descriptive statistics on t-units and topic progressions

| TWE Rating | <i>n</i> | T-units | | Parallel | | Sequential | | Extended Parallel | |
|------------|----------|--------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|
| | | <i>M</i> | <i>SD</i> | <i>M</i> ^a | <i>SD</i> | <i>M</i> ^a | <i>SD</i> | <i>M</i> ^a | <i>SD</i> |
| 3 | 15 | 9.47 | 3.22 | .24 | .19 | .57 | .16 | .19 | .11 |
| 4 | 15 | 13.53 | 3.94 | .23 | .09 | .57 | .14 | .20 | .13 |
| | 14 | 12.71 ^b | 2.43 | .22 | .09 | .57 | .15 | .21 | .13 |
| 6 | 15 | 20.73 | 3.75 | .16 | .10 | .67 | .12 | .18 | .10 |

^aExpressed as percentages of t-units in each type of topical progression averaged across essays in each rating group.

^bMean t-units with one outlier (t-units = 25) removed.

essays (3s). The middle group (4s) averaged about three more t-units per essay than the low group. The mean differences in t-units across groups were highly significant, $F(2, 41) = 49.18$, $p < .001$, $MSE = 10.23$. Post hoc comparisons of means using the Tukey HSD procedure indicated that all three pairs of comparisons differed significantly ($p < .05$): 3s and 6s, 4s and 6s, and 3s and 4s.

To adjust for differences among groups due to essay length, the number of t-units was used as a covariate in three separate univariate analyses of covariance (ANCOVA).⁴ The dependent variable used in the three separate analyses was proportion of extended parallel topics, proportion of parallel topics, and proportion of sequential topics, respectively. Before evaluating the ANCOVAs, univariate tests were examined to determine whether the data met assumptions of the analysis: (a) a linear relationship between the dependent variable and the covariate and (b) homogeneity of the regression slopes in each group (Stevens, 1986, p. 298).

In the first analysis, there was neither a significant linear relationship between the dependent variable (extended parallel topics) and the covariate (number of t-units), nor a significant univariate F test. Thus, the three groups of essays did not differ in proportion of extended parallel topics.

The second and third analyses, however, revealed a significant linear relationship between each of the dependent variables and the covariate ($F = 6.09$, $p = .018$, $F = 12.21$, $p = .001$, for parallel and sequential, respectively). Results of two univariate F tests, which tested for interaction between t-unit and rating (3, 4, and 6), were also not significant, indicating that the assumption of equal regression slopes was met for both dependent variables, proportion of parallel topics ($p = .136$) and proportion of sequential topics ($p = .185$). Finally, results of the two univariable ANCOVAs showed that the rating groups differed on proportion of parallel topics, $F(2, 40) = 4.69$, $p = .015$, $MSE = .015$, and proportion of sequential topics, $F(2, 40) = 8.91$, $p = .001$, $MSE = .016$. The Bonferroni F procedure was used to control for multiple F tests and indicated that the differences found were significant at $p < .05$.⁵

The adjusted means of the topic variables, parallel and sequential progression, are given in Table 2. (The adjusted means are the predicted dependent variable means we would expect to occur in the three rating groups if the covariate means, namely, t-unit means, in all three groups were the same.) Bonferroni 95% confidence intervals were

Table 2. Adjusted means of topic progression variables*

| TWE | | | |
|--------|----------------------|--|--------------------------|
| Rating | Parallel <i>n</i> | Sequential Progression (<i>M</i>) | Progression (<i>M</i>) |
| 3 | 15 | .31 | .47 |
| 4 | 14 | .25 | .54 |
| 6 | 15 | .06 | .80 |

*The adjusted means are the predicted dependent variable means that would be expected to occur if the covariate means (namely, the t-unit means) in all three groups were equal. They are expressed as percentages of t-units in each type of topical progression.

calculated based on the adjusted means. They indicated significant differences between the essays rated 3 and 6 and those rated 4 and 6. Differences between the essays rated 3 and 4 were nonsignificant. Both the 3s and the 4s contained a greater proportion of parallel topics than did the 6s. Conversely, the 6s had a greater proportion of sequential topics than the 3s or the 4s. The findings on sequential progression support our earlier study but continue to run counter to Witte's findings (1983a, 1983b). Recall that in essays written by native English speakers, Witte found the reverse to be true: lower rated essays exceeded higher rated essays in proportion of sequential progressions. In the next section we consider several explanations for these differences in findings.

DISCUSSION OF RESULTS

One possible explanation for our findings that the highest rated essays contained proportionally more sequential topics and proportionally fewer parallel topics than the other essays lies in our criteria for categorizing sentence or t-unit topics as parallel, sequential, or extended parallel. In previous studies analyzing topical structure variables, including the Witte studies, no complete criteria for identifying sentence topics were given. Differences in criteria can result in substantial differences in what counts as a repeated, or parallel, topic, and what counts as a different, or sequential, topic. Clear cases of exact repetition or an entirely new topic pose no problem in coding sentence topics. But occurrences of part-whole relations, word derivations, and partial repetition between previous and following sentence topics are problematic. Are they to be coded as parallel or sequential sentence topics? Our guidelines for coding parallel, sequential, and extended parallel progression appear in the Appendix.

Following previous studies (Lautamatti, 1987; Witte, 1983a, 1983b), we coded a topic as parallel if it was semantically identical with the preceding topic. A parallel topic is commonly a repetition, a pronominalized form, or a synonym of the preceding topic. In addition, as we defined it, a parallel topic may also differ in several other ways from the preceding topic: in number (singular or plural), in polarity (affirmative

or negative), or in postmodifiers that follow the head noun in a noun phrase (see the Appendix for examples).

In contrast, a sequential topic is different from the immediately preceding topic. Additionally, it may include word derivations (*creativity, creation*), part-whole relations (*natural science, biology, chemistry*), and repetition of part but not all of a preceding topic (*jazz and blues, jazz, blues*). Because of our definitions of parallel and sequential progression, the proportion of sequential topics in our study may be inflated compared to other studies.

Related to the issue of criteria for coding topics is a second consideration, the need for interrater reliability in coding. Once again, in previous studies analyzing topical structure variables, the identification of sentence topics was done by one researcher or, if there was more than one researcher, interrater reliabilities were rarely reported. In our study, interrater reliabilities were computed using Pearson product-moment correlations. These correlations compared the two judges' independent coding of parallel, sequential, and extended parallel t-unit topics in the 45 essays. The reliability coefficients for topic types were .92 for parallel topics, .92 for sequential topics, and .88 for extended parallel topics, indicating a high degree of agreement between judges.

A third consideration in interpreting our findings is the existence of qualitative differences in writing between ESL and non-ESL writers. Our study revealed highly significant differences in length between the highest rated essays (6s) and other essays (3s and 4s). Similar results were also found in other studies of ESL writing (Connor, 1984b; Gaies, 1980; Weissberg, 1988).

The relationship between essay length and writing quality appears somewhat less straightforward in research with native English speakers. While many studies support a strong relationship between essay length and rated quality (e.g., Hunt, 1965; McCulley, 1985; Nold & Freedman, 1977; O'Donnell, Griffin, & Norris, 1967; Witte & Faigley, 1981), other studies (e.g., Schneider, forthcoming; Witte, 1983b) do not. The consistently strong association between length and higher ratings in ESL essays may indicate the greater importance of control of syntactic structures and lexical knowledge among ESL writers relative to non-ESL writers. Below college level, length clearly distinguishes between higher and lower rated essays written by native English speakers. However, because older and more educated native speakers generally control the language, other factors, such as style, sophistication of language, and degree of development, are likely to contribute more to judgments of college-level writing than length alone.

Finally, a fourth consideration, prompted by the higher proportion of sequential topics in the highest rated essays, is the need to reinterpret what is meant by sequential topic progression. On the surface, sequential progression simply indicates a change in sentence or t-unit topic from the immediately preceding topic. Witte (1983b) associated a greater proportion of sequential topics in lower rated essays with less coherent writing. The introduction of too many new sentence topics may obscure the discourse topic of the essay or may result in topics that are not adequately developed.

Our preliminary analysis of t-unit topics in the highest rated ESL essays (6s)

suggests just the opposite: sequential topic progression may, in fact, elaborate on previous topics in the form of different, but *related*, t-unit topics that expand on previous ones. This interpretation finds support in the work of Firbas (1964, 1966, 1974), who coined the term "communicative dynamism" (quoted in Witte, 1983b, p. 179). Communicative dynamism refers to the amount of new information conveyed in a text, which typically appears in the comment part of the sentence (at the end). Thus, sequential topics, when related to preceding topics and the overall discourse topic, can actually contribute to the coherence of a text rather than detract from it.

An example of a high-rated essay (6 on the TWE holistic scale) with sequential topic progression that is different but directly related to earlier sentence topics appears in Example 2. (Again, t-units are indicated by slashes, and t-unit topics are in italics.) The essay is divided into 23 t-units. The topics in T5-8 and T11-18 show sequential progression yet directly relate to previous topics or the overall gist of the essay. Although nearly 70% of the topics in this essay are sequential, the text still maintains a sense of coherence. Returning to an earlier topic, *science and art*, in T21, the last paragraph, also reinforces the discourse topic of the essay.

EXAMPLE 2

1 There often exists in our society *a certain dicotomy* of art and science./ 2 *Supporters* of either disciplines sometimes are of the opinion that one is more valuable to society than the other./ 3 But is this *a fair judgement* to make?/ 4 Should *a judgement* be made at all?/

5 I believe that *art and science* sustain and support each other./ 6 *The developments and knowledge* we gain from science can be used to give us a better understanding of our art forms and even improve existing styles and techniques./ 7 On the otherhand, *art* in its continuous search for new ways to express beauty, often provides the impetus and support for scientific research./

8 An example of *a discipline* where art and science interact is architecture./ 9 *The architectural discipline* makes use of forms, shapes, lines, and other aesthetic components of art./ 10 *It* also involves principles of physics, engineering, and understanding of chemistry in order to build a sound structure and design./ 11 Where will *society* be without the structures and buildings produced from the interplay of art and science?/

12 *Gymanstics* is also a good example of such an interplay./ 13 *Gymanasts* strive to perfect the beauty of human form and grace./ 14 However, this will not be possible without *some understanding of biology, physics, or physiology*./

15 *The examples* are endless./ 16 Even *art forms* which many consider "pure" would not have advanced without science./ 17 *Painting* benefits from chemistry./ 18 *theater* benefits from breakthroughs in acoustics./ 19 and *the list* goes on./ 20 *Einstein* himself was a lover of many art forms./

21 *Science and art* are both integral and inseparable products of society./ 22 *They* come from the same harmonious body of universal knowledge./ 23 *Both* are of tremendous and equal value to humankind./

1. a certain dicotomy
2. supporters
3. a fair judgement
4. a judgement
5. art and science
6. the developments and knowledge

7. art
8. a discipline
9. the architectural discipline
10. it
11. society
12. gymnastics
13. gymnasts
14. some understanding
15. the examples
16. art forms
17. painting
18. theater
19. the list
20. Einstein
21. science and art
22. they
23. both

It is, of course, entirely possible for sequential topics to be indirectly related or even unrelated to preceding topics and the overall topic of the text. Example 3 shows another sample essay rated 4 on the TWE scale, which illustrates these types of sequential progression (t-units are indicated by slashes, and t-units are in italics). Seventy-five percent of its t-unit topics are sequential.

EXAMPLE 3

1 In Hong Kong, *the contribution of scientists* is valued more to society./

2 Firstly, let us have a look for *background of Hong Kong*./ 3 *It's* a colony of Britain./ 4 *but it* will be belonged to China after 1997. 5 *People from different nations* have different culture and religions. 6 *They* may not accept the art of other countries as well as their art/ 7 such as *a American* may not like a chinese painting./ 8 so *the contribution of artists* to society is valued less in Hong Kong./

9 On the other hand, *a modern society* like Hong Kong needs more scientists./ 10 *New technology and skill* are needed in industries, manufacturing and commerce etc./ 11 Especially, in commerce field, *competition* is great./ 12 *If* you don't improve your technology and have a efficient work, *you and your company* will be forgot by the people./

13 Moreover, *the education chances* for the young people is less./ 14 *and the search and pratice of science* for the students is less than the other countries./ 15 Then *the scientists* in Hong Kong are important for research and education./ 16 Oviously, *the contribution of scientists* is valued more than the contribution of artists./

1. the contribution of scientists
2. background of Hong Kong
3. it
4. it
5. people from different nations
6. they
7. a American
8. the contribution of artists
9. a modern society
10. new technology and skill

11. competition
12. you and your company
13. the education chances
14. the search and practice of science
15. the scientists
16. the contribution of scientists

In this sample essay, the second topic (*background of Hong Kong*) is only indirectly related to the first topic (*the contribution of scientists*) through the prepositional phrase, *in Hong Kong*. The topic that follows in T3-4 (*it*) is ambiguous. Although syntactically *it* refers to the previous topic, semantically *it* refers to the country alone, Hong Kong. As such, T3 is coded as sequential. In T5, the next topic, *different nations*, appears entirely unrelated to any previous topic.

Skipping to the third paragraph, the topic of T9 (*a modern society*) is followed by six more sequential topics, which vary from being indirectly related to unrelated to the discourse topic. Although the topic of T10 (*new technology and skill*) may be indirectly related to T9, the two topics following T10 are only weakly related, and then only locally across adjacent sentences. In the fourth paragraph, the connecting thread unravels completely with the topic, *the education chances*, which is unrelated to either the previous t-unit topic or the discourse topic. Perhaps sensing this, the writer returns to science-oriented topics in the next three topics, ending with *the contribution of scientists* in T16, a repetition of the first topic.

As demonstrated by the sample text in Example 3, not all sequential topics contribute equally to the coherence of a text. Thus, an important direction for future research is the investigation of different kinds of sequential topic progressions. Our preliminary analysis of the sample essays suggests three categories of sequential topics: directly related, indirectly related, and unrelated topics.⁶ We offer working definitions of these subcategories, with the understanding that they will require some refinement before their use in a study.

Directly related sequential progressions include (a) neighboring topics related by topic-comment patterns (the comment of the previous sentence becoming the topic of the following sentence), (b) word derivations (*science, scientists*), and (c) part-whole relations (*these groups, housewives, children, and old people*). *Indirectly related* sequential topics are related by semantic set (*scientists, their inventions and discoveries, and the invention of the radio, telephone, and television*). Finally, *unrelated* sequential topics are those not clearly related to either the previous sentence topic or the discourse topic. This last type of sequential progression may characterize Witte's (1983b) low-rated writers, who failed to make connections among topics or who appeared to incorporate the invention strategies of "free association" or "nondirected and nonselective brainstorming" directly into their compositions (p. 197).

CONCLUSIONS

Our intent in this article was to report on the usefulness of one text-based theory, topical structure analysis (TSA), as a means of evaluating coherence in ESL compositions. We have described a means of operationalizing what is meant by one aspect of such evaluations: coherence. Our findings revealed that the highest rated TWE essays

(6s) contained more sequential topics and fewer parallel topics, proportionally, than either the low- or middle-rated essays (3s and 4s).

In the rubric of the TOEFL Test of Written English, an essay rated 6 "shows unity, coherence, and progression" and "uses appropriate details to support a thesis or illustrate ideas." But what does "shows unity, coherence, and progression" mean? By describing the ways topics repeat, shift, and return to earlier topics, TSA captures linguistic features of coherence.

Although the three topical progressions—parallel, sequential, and extended parallel—are only gross indicators of text-based coherence, the extension of TSA to ESL writing represents a promising step. It has enabled ESL researchers and teachers to describe student writing by going beyond the sentence to the discourse level. By examining the meaning relations between sentences, it has also encouraged the evaluation of coherence based on textual features and the revision of texts with faulty or inappropriate topic progressions.

However, just how topic progressions contribute to the coherence of a text remains unknown. As with previous studies, our research shows that simply counting occurrences of parallel, sequential, and extended parallel progressions can distinguish between groups of essays. But to understand how these types of topic progression relate to coherence through features such as elaboration, supporting details, and examples requires more subtle distinctions in topic progressions than have been made. Our study suggests some potentially useful distinctions.

If one accepts that coherence is a perceived notion, then it follows that coherence depends on both text-based features and reader variables such as background knowledge, familiarity with the topic, and interest. Thus, there are inherent limitations with TSA, as with any text-based approach, in constructing a complete account of coherence. Nevertheless, within its domain, TSA offers a productive approach to text analysis in composition research and an effective strategy for teaching revision.

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NOTES

1. Although every sentence normally contains both a topic and a comment, the comment part of the sentence is similar to but not always identical with the focus of a sentence. Bardovi-Harlig (1990) distinguished between comment and focus by borrowing an example from Dahl (1974), reproduced here in (1) and (2):

(1) A: What does John drive?

B: John drives a Chevy.

(2)

| | | | |
|------------|--------|-------|-------|
| John | drives | a | Chevy |
| background | | focus | |

The question in (1) provides a context for the response in (2). As a result, *John drives* becomes the background of B's response in (1). The comment differs from the focus in that the comment contains given as well as new information while the focus contains only new information.

2. The TWE essay question is reprinted by permission of Educational Testing Service, the copyright owner. The essays were provided to us by Dr. Jackie Ross, Associate Program Director, TOEFL. They were randomly selected from among hundreds of essays evaluated at a rating session in Berkeley, California, in December, 1987. We wish to thank Educational Testing Service for their cooperation.

3. Interrater agreement in identifying t-unit topics was 90%. Because it was not our purpose to debate different linguistic notions of "topic," an admittedly complex problem, we relied on examples given in Witte

(1983a, 1983b) to develop simplified notions of "topic" suitable for empirical testing. Our guiding principle was to identify what the t-unit or sentence was about. The topic often corresponded to the grammatical subject of the t-unit. However, there were systematic cases in which it did not, e.g., cleft sentences, the anticipatory pronoun *it*, the introductory word *there*, and introductory phrases such as *I believe*, *I think*, or *we can see*. In each of these cases, the initial word fills the subject position and signals that the topic will be expressed later in the sentence (Quirk, Greenbaum, Leech, & Svartvik, 1985, p. 89). Sentences (1)–(4), with topics italicized, provide examples from the sample essays:

- (1) Cleft sentence:
It is *the scientist* who ensures that everyone reaches his office on time.
- (2) Anticipatory pronoun *it*:
It is well known that *a society* benefits from the work of its members.
- (3) Existential *there*:
There often exists in our society *a certain dichotomy* of art and science.
- (4) Introductory phrases:
I believe that *art and science* sustain and support each other.

4. Multivariate analysis of covariance (MANCOVA) with multiple dependent variables could have been used rather than three separate univariate analyses. However, because parallel, sequential, and extended topics were expressed as proportions of total topics that summed to 1.00, only two of the three topic types could be included in any one analysis to ensure independence of observations. Rather than perform one univariate analysis (one dependent variable) and one multivariate analysis (two dependent variables), three univariate analyses were completed as a more straightforward method of analysis.

5. To control for multiple univariate *F* tests, the Bonferroni *F* procedure was used (Huitema, 1980). There are two ways of controlling for multiple univariate tests. First, the overall alpha (.05) may be divided by the number of univariate *F* tests to determine the individual error rate permissible for each analysis, that is, $.05/3 = .017$ or less in our study. Second, the *F* values obtained from each univariate ANCOVA may be compared to the Bonferroni *F* statistic based on *p* dependent variables and *J-1* and *N-J-C* degrees of freedom. In our study, a three-group experiment with three dependent variables, one covariate, and *N* = 44, the associated degrees of freedom are 3, 2, and 40. The Bonferroni *F* critical value is 4.54; and obtained *F* value that equals or exceeds the critical value is significant.

6. In "Toward a Taxonomy of Given-New Information," Prince (1981) proposed a somewhat different scheme for identifying topics, resulting in seven different topic types. Using a three-way taxonomy based on new, inferable, and evoked topics, Prince identified NP topics in two sample texts, one oral and one written. Prince's taxonomy holds promise for analyzing small numbers of texts by native English speakers. However, it poses problems for analyzing topical structure in large numbers of ESL essays for several reasons: (a) overly detailed level of analysis (all NP topics as contrasted with t-unit or sentence topics), (b) as acknowledged by Prince, blurred distinctions between topic types in written texts, (c) difficulties in identifying topic types because of imperfect control of the grammar in ESL texts, and (d) a problem of comparability because of differences between Prince's taxonomy and Lautamatti's topical progressions.

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APPENDIX

CODING GUIDELINES FOR TOPICAL STRUCTURE ANALYSIS

T-Units (T)

1. Any independent clause and all its required modifiers.
2. Any non-independent clause punctuated as a sentence (as indicated by end punctuation).
3. Any imperative.

Parallel Progression (P)

1. Any sentence topic that exactly repeats, is a pronominal form, or is a synonym of the immediately preceding sentence topic.
2. Any sentence topic that is a singular or plural form of the immediately preceding sentence topic.
3. Any sentence topic that is an affirmative or negative form of the immediately preceding sentence topic (e.g., *artists*, *no artists*).
4. Any sentence topic that has the same head noun as the immediately preceding sentence topic (e.g., *the ideas of scientists*, *the ideas of artists*; *the contributions made by scientists*, *the contributions made by artists*).

Sequential Progression (S)

1. Any sentence topic that is different from the immediately preceding sentence topic, that is, not (1)–(4) in P.
2. Any sentence topic in which there is a qualifier that so limits or further specifies an NP that it refers to a different referent (e.g., *a nation*, *a very small, multi-racial nation*, referring to two different nations).
3. Any sentence topic that is a derivation of an immediately preceding sentence topic (*science*, *scientists*).
4. Any sentence topic that is related to the immediately preceding sentence topic by a part-whole relationship (e.g., *these groups*, *housewives*, *children*, *old people*).
5. Any sentence topic that repeats a part but not all of an immediately preceding sentence topic (e.g., *science and art*, *science*, *art*).

Extended Parallel Progression (Ex)

Any sentence topic that is interrupted by at least one sequential topic before it returns to a previous sentence topic.