

Linguistic/Rhetorical Measures for International Persuasive Student Writing

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Abstract. This research developed linguistic/rhetorical measures to analyze and evaluate argumentative/persuasive student writing. 150 essays written for the IEA International Study of Written Composition by high school students from three English-speaking countries were used to test these measures. In a multiple regression analysis with an impressionistic holistic rating as the dependent variable, 11 independent variables explained 61 percent of the variation in the holistic score. The Toulmin measure, credibility appeal, and the syntactic factor of *Abstract versus Situated Style* were the best predictors of writing quality.

Implications of this research for the evaluating and teaching of argumentative/persuasive writing are discussed.

Introduction

As national concern about the poor writing skills of American students continues to mount, studies comparing the writing achievement of American students with the writing of students from other countries are under way. The International Study of Written Composition (Purves & Takala, 1982), sponsored by the International Association for the Evaluation of Educational Achievement (IEA), is the largest comparative research project on the writing achievement of school children. Thousands of school children (ages 12, 16, 18) from 14 different countries have participated in this study. Since 1980, students' writing samples for a variety of tasks (e.g., letter of advice, descriptive writing, narrative writing, open writing, argumentative writing, and reflective writing) have been collected. The participating countries were Chile, England, the Federal Republic of Germany, Finland, Hungary, Indonesia, Italy, Netherlands, New Zealand, Nigeria, Sweden, Thailand, the U.S.A., and Wales. For a detailed descrip-

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tion of the theoretical background and history of the project, see Gorman, Purves, and Degenhart (1986). At present, as reported in a number of publications (Gorman, Purves, & Degenhart, 1986; Degenhart, 1987), research is under way to rate the quality of writing performances and to compare national writing styles.

For the purposes of this large-scale cross-national evaluation, Purves, Takala, and Gorman (1986) developed an analytic scoring scheme with a separate scale for each task. The scheme considers quality and scope of content, organization, style, lexical and grammatical features, spelling and orthographic conventions, handwriting and neatness, and affective response of the rater. Although this analytic scoring scheme is useful for making quantitative comparisons across nations and tasks, it is not adequate for detailed descriptions of text features influencing readers' judgment of quality.

The purpose of the present study is to explain a set of linguistic/rhetorical measures which were developed to analyze argumentative/persuasive writing by English-speaking students in the IEA study. Using essays from that study, I found these measures to be valid and reliable indicators of writing quality in persuasive prose. I used a multiple regression analysis with a holistic rating as the dependent variable. These measures explained 61 percent of the variation in the holistic score. Four variables were found to be statistically significant ($p < .05$): the Toulmin measure, word count, credibility appeal, and the syntactic factor of *Abstract versus Situated Style*. One variable alone—the Toulmin measure—explained 48 percent of the variation in the holistic score. In this article, I will first give the background of the present study and explain the development of the measures used to analyze persuasive student writing; second, I will describe the study in which 150 IEA persuasive compositions were analyzed using these measures; and third, I will discuss applications of this system within and beyond the IEA research.

Background to the Study

The research reported in this article has been interdisciplinary in nature (with the present author, a linguist, and Janice Lauer, a rhetorician, as co-principal investigators). There were three different motivations for the research. First, it was designed to identify linguistic and rhetorical features affecting the judgment of teacher raters in holistic rating situations. Little is known about text features that give rise to raters' judgments although the evaluation of student writing is most commonly based on holistic or broadly-based analytic ratings.

Second, this research was aimed at examining linguistic and rhetorical characteristics of persuasive writing because persuasive student writing

has been neglected by text analysts and educational researchers despite the importance placed on its teaching by recent national reports. For example, *The Writing Report Card* (Applebee, Langer, & Mullis, 1986), a report describing a large-scale national assessment of the writing achievement of American school-age children, concludes that writing on a persuasive task was particularly troubling for students. The authors report that a greater percentage of students at all three grade levels in the study wrote at the 'minimal' than at the 'adequate' level. A number of reasons for this neglect of theory-driven research on persuasive student writing have been addressed in a recent publication (Connor & Lauer, 1988). Two foremost reasons for the neglect of persuasive student writing as an interest of study, according to Connor and Lauer (1988), have been (1) the confusion about the nature of the genre that led persuasion to be replaced by argumentation in the writing curriculum in the 18th, 19th, and early 20th centuries and (2) the inherent difficulty of operationalizing and quantifying the new theoretical concepts of persuasion developed by linguists, rhetoricians, and philosophers.

The third motivation for the research was to be able to analyze cross-cultural differences in student persuasive writing at the same age level. The students in the analyzed sample wrote their compositions in English, their first language. This made possible the examination of cross-cultural variation without the interference of different languages. Much of the previous research on contrastive rhetoric has examined potential transfer of first language writing patterns when students write in their second language, as reviewed in depth in Connor and Kaplan (1987). The present research used data with students who spoke and wrote the same language—English—but lived in different cultures, the United States, England, and New Zealand.

This research has recognized that a comprehensive model of persuasive student writing needs to be multi-dimensional, that is, needs to consider both linguistic and discourse-level features of texts. Reflecting the principles underlying the design of the IEA study, the current project has included components related to both *text/linguistic competence* or *code-management*, and *discourse-structuring competence*. Gorman, Takala, and Purves (1986) use *text/linguistic competence* to refer to the ability to produce texts with appropriate grammar, spelling, and punctuation. *Discourse-structuring competence* deals with the ability to "handle the matter of the topic at hand and to organize that matter in an intellectually appropriate fashion" (p. 4).

In developing a set of measures to describe and evaluate student persuasive writing in three cultures at the text/linguistic and discourse-structuring levels, I benefited from recent developments in the research on persuasion by linguists, rhetoricians, and communication theorists. Linguists have studied text structures both at the syntactic and discourse lev-

els and speech-act sequences in persuasion (Aston, 1977; Kummer, 1972; Tirkkonen-Condit, 1985, 1986). Rhetoricians have studied the prevalence of different appeals such as logos, pathos, and ethos (Berlin & Inkster, 1980; Connors, 1981; Kinneavy, 1971), while communication theorists and philosophers have been interested in issues such as the role of informal reasoning in argumentation (Toulmin, 1958) and social-cognitive abilities in persuasion (Delia, Kline, & Burleson, 1979).

The set of six measures I developed for this study addressed three major variables: syntax, coherence (discourse-level feature), and rhetorical features of text (see Table 1).

Table 1

Variables and Measures for Analyzing Persuasive Student Writing

Variable	Measures
1. Syntactic features	Computerized analysis of 12 syntactic features; two underlying dimensions: <i>Interactive vs. Edited Text</i> and <i>Abstract vs. Situated Style</i> (Connor & Biber, 1988)
2. Coherence	Scale including three different variables related to topic development in texts, based on Topical Structure Analysis, a linguistically grounded theory (Connor & Farmer, in press)
3. Persuasiveness	
a. Superstructure	Frequency of four different argument slots (Connor & Takala, 1987; Connor & Lauer 1985, 1988)
b. Reasoning	Scale measuring Toulmin's categories of <i>claim</i> , <i>data</i> , and <i>warrant</i> (Connor & Lauer, 1988)
c. Persuasive appeals	Scale measuring three appeals: rational, affective, and credibility (Connor & Lauer, 1988)
d. Persuasive adaptiveness	Scale measuring levels of audience awareness and persuasive adaptiveness (Connor & Takala, 1987)

Each of these measures and its application will be explained in the order they appear in Table 1.

Analysis of Syntactic Features

Most previous analyses of syntactic variables in student writing have been limited to the narrow definition of syntactic complexity as defined by the length of a T-unit (Hunt, 1965; Mellon, 1969; O'Hare, 1973; Stotsky,

1975). The present study, however, uses a multi-dimensional analysis of syntactic features in student writing. This multi-feature/multi-dimensional computerized method was originally developed by Biber to explain the overall parameters of linguistic variation within spoken and written texts (1985, 1986, 1987). For his analysis, Biber identified 41 potentially important linguistic features. Factor analysis was then used to identify groups of linguistic features that co-occurred with a high frequency in texts, and these groups were interpreted as textual features.

As explained in more detail in Connor and Biber (1988), two underlying dimensions of factors were identified for the present research: (1) *Interactive versus Edited Text* and (2) *Abstract versus Situated Style*. Factor 1 included features related to the level of high personal involvement and interaction as contrasted to features which permitted editing and high precision in lexical choice. Biber (1986) has labeled this distribution of features *Interactive versus Edited Text*. Features that marked a high degree of interaction are *that* clauses, first person pronouns, second person pronouns, contractions, and the pronoun *it*. Factor 2 included features (nominalizations, prepositions, passives, and specific conjuncts) which shared a function of marking a highly abstract content and a formal style. Biber (1986) has labeled these features *Abstract versus Situated Style*. A summary of all 12 features is given in Table 2.

Table 2
Summary of the Factorial Structure of
Linguistic Features

Factor 1	Factor 2
(Interactive versus Edited Text)	(Abstract versus Situated Style)
<i>that</i> clauses	nominalizations
subordinate cause clauses	prepositions
subordinate conditional clauses	specific conjuncts
first person pronouns	agentless passives
second person pronouns	
contractions	
pronoun <i>it</i>	
type/token ratio (negative loading)	

Factors were used to analyze student writing by computing *factor scores*, a single score that represented an entire factor computed for the set of essays. These factor scores were computed by summing the frequencies of the salient features of each factor for each essay. For example, the factor score for Factor 2 was computed by adding together the number of nomi-

nalizations, prepositions, specific conjuncts, and agentless passives. The features with negative weights (e.g., type/token ratio in Factor 1) were subtracted from the feature sum.

Analysis of Coherence

Even though coherence has been of increasing interest to teachers and researchers around the world (e.g., Carrell, 1982; Enkvist, 1985; Kintsch & van Dijk, 1978), it is still an elusive concept. The problem is not so much distinguishing between coherence and cohesion, which has been done, as it is finding an adequate definition of coherence. Phelps (1985) defines coherence as "the experience of meaningfulness correlated with successful integration during reading, which the reader projects back into the text as a quality of wholeness in its meanings" (p. 21). The problem arises, as Phelps admits, when one asks for a definition of "successful integration."

A few researchers have attempted, with varying degrees of success, to describe coherence using linguistic features from the text (Connor, 1984; Lindeberg, 1985; Wikborg, 1985). A particularly promising attempt to describe coherence was developed by Lautamatti (1978/1987), who suggests that *successful integration* refers to the semantic relationships in parallel, sequential, and extended parallel progression that exist between sentence topics and the discourse topic. Through topical structure analysis, these relationships can be studied by looking at sequences of sentences and examining how the sentence topics work through the text to progressively build meaning. Table 3 shows a diagrammed topic progression of a student essay written for an argumentative task.

Table 3 shows that in parallel progression, the sentence topics are semantically identical. In sequential progression, the sentence topics are always different, as the comment of the previous sentence becomes the topic of the next sentence and so on. And, in extended parallel progression, a parallel progression may be temporarily interrupted by a sequential progression.

Research using topical structure analysis to examine the quality of student writing (Witte, 1983a, 1983b; Connor & Farmer, in press; and Cerniglia, Medsker, and Connor, in press) has shown that topical structure analysis is a good predictor of college students' writing quality. Witte (1983b) found that high quality essays had more parallel and extended parallel progression than low quality essays. Witte interprets this as good writers' elaborating on a few crucial ideas. According to Witte, low quality essays, on the other hand, used more sequential progression introducing new topics that may not be relevant to the discourse.

Based on Witte's findings as well as those of other research conducted on the teaching of topical structure analysis (Connor & Farmer, in press;

Table 3

Sample Coherence Analysis Using Topical Structure Analysis

I think that the use of nuclear warfare is useless./ What good could it do for us to nuc the Russians when in turn they would do the same to us./ Why destroy what has taken us thousands of years to create, when in matter of seconds everything would be lost./ If we only weren't so greedy./ We want more and more power/ but by trying to gain that power we have turned our world into a self-destructive game./

I don't think that the president or anyone else has a right to decide when or if it will happen./ They are playing with our lives and making us the ginia pigs./ What about us and our generation/ don't we a right to live and grown and be proud of our country?/ They must think of the future and lay down their weapons./ Or is it already to late?/ (An essay written for a persuasive task by a 16-year-old American high school student; score = 1.6/5)

Topical structure analysis

1. use of nuclear warfare
2. good
3. what
4. we
5. we
6. we
7. president or anyone else
8. they
9. us and our generation
10. we
11. they
12. late

<u>Parallel</u>	<u>Sequential</u>	<u>Extended Parallel</u>
4,5	1,2	8,11
5,6	2,3	
7,8	3,4	
9,10	6,7	
	8,9	
	11,12	

Cerniglia, Medsker, & Connor, in press), I have included three variables related to topic progression in the analysis: parallel, sequential, and extended parallel. In the analysis, I have taken the following steps: (1) identifying of sentence topics, (2) determining topic progression and drawing diagrams, and (3) counting frequencies of each type of progression.

Topics of sentences in a subsample of 30 randomly selected essays were identified by three independent raters. The interrater reliability among the three raters was 82.2 percent. Subsequently, three raters discussed the topic progression of each essay and agreed on one set of topics for each essay. The rest of the analyses were based on this set of topics. One of the three raters analyzed the topic progression in the remaining 120 essays in

the sample. The ratios of different topic progressions over T-units were calculated for subsequent analyses.

Analyses of Persuasiveness

A competent use of syntactic elements and an ability to produce a coherent text are not sufficient to develop a persuasive text. Instead, some features that are genre specific need to be included in most successful prose. For example, an effective story structure is often important for successful narration (Labov & Waletzky, 1967) and exposition often follows particular content structure (Meyer, 1975). Similarly, persuasive prose includes features specific to that genre. To describe and evaluate persuasive features in the sample essays, I identified four distinctly different dimensions of argumentative/persuasive texts: superstructure of argument, strength of logical reasoning, use of persuasive appeals, and adaptation of the text to one's audience.

Analysis of Superstructure

Superstructure is the organizational plan of any text and refers to the linear progression of the text. To analyze the superstructure of argumentative essays, I used Tirkkonen-Condit's theory of the problem-solution structure (1985, 1986). According to this theory, an argumentative text can be described as a sequence in which the structural units of situation, problem, solution, and evaluation can be identified. The situation slot was reserved for background material, that is, facts and views intended for orientation. The evaluation slot was used to evaluate the outcome of the suggested solution.

In the present study, then, the situation-problem-solution-evaluation structure of the essays was identified. The essays received one point for each of the components of superstructure: situation or introduction of the problem, problem development, solution, and evaluation of the solution. Two independent raters achieved a 100 percent agreement in identifying the occurrence of the superstructure components in the sample essays.

Analysis of Reasoning

From the Toulmin model of informal logic (1958), *claim*, *data*, and *warrant* were used. I relied on Toulmin's (1958) definition of claim as "conclusions whose merits we are seeking to establish" (p. 97) and as "assertions put forward publicly for general acceptance" (Toulmin et al., 1979, p. 29). To score the strength of the claims in the essays, I considered whether the claim was relevant to the task, suggested a specific and clear problem, and

presented a consistent point of view. Subclaims, if any, were identified, and their development was also considered.

Data was interpreted as support for the claim in the form of experience, facts, statistics, or occurrences. The quantity as well as the quality of the pieces of data were considered. Good data needed to be based on specific facts or the writers' own experience; they also had to be directly related to the claim to be considered effective persuasion.

Warrants were measured, as described by Toulmin (1958), as bridges from data to claim: that is, they are

rules, principles, inference-licenses or what you will instead of additional items of information. Our task is no longer to strengthen the ground on which our argument is constituted, but is rather to show that, taking these data as a starting point, the step to the original claim or conclusion is an appropriate and legitimate one. At this point, therefore, what are needed are general, hypothetical statements which can act as bridges; and authorize the sort of step to which our particular argument commits us. (p. 98)

Table 4

Criteria for Judging the Quality of Claim, Data, and Warrant

Claim

1. No specific problem stated and/or no consistent point of view. May have one subclaim. No solution offered, or if offered nonfeasible, unoriginal, and inconsistent with claim.
2. Specific, explicitly stated problem. Somewhat consistent point of view. Relevant to the task. Has two or more subclaims that have been developed. Solution offered with some feasibility with major claim.
3. Specific, explicitly stated problem with consistent point of view. Several well-developed subclaims, explicitly tied to the major claim. Highly relevant to the task. Solution offered that is feasible, original, and consistent with major claim.

Data

1. Minimal use of data. Data of the "everyone knows" type, with little reliance on personal experience or authority. Not directly related to major claim.
2. Some use of data with reliance on personal experience or authority. Some variety in use of data. Data generally related to major claim.
3. Extensive use of specific, well-developed data of a variety of types. Data explicitly connected to major claim.

Warrant

1. Minimal use of warrants. Warrants only minimally reliable and relevant to the case. Warrants may include logical fallacies.
 2. Some use of warrants. Though warrants allow the writer to make the bridge between data and claim, some distortion and informal fallacies are evident.
 3. Extensive use of warrants. Reliable and trustworthy allowing rater to accept the bridge from data to claim. Slightly relevant. Evidence of some backing.
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In the sample essays in the present study, *warrants* were rated as to their explicitness, soundness (reliability and trustworthiness), and relevance to the case. The final scale—developed at several rating sessions and given in Table 4—shows that each dimension, *claim*, *data*, *warrant*, had three levels. This was the first effort to quantify and build up reliability for the measure. Interrater reliability was .77 for *claim*, .56 for *data*, and .66 for *warrant*.

Analysis of Persuasive Appeals

The persuasive appeals analysis evaluated the use of three appeals—rational, credibility, and affective appeals as found in Lauer et al. (1985). The rational appeals were informal lines of reasoning categorized under Perelman's (1982) headings of quasi-logical arguments; arguments based on the structure of reality; argumentation by example, illustration, and model; and by analogy and metaphor. The appeals to credibility included the writer's personal experience, knowledge of the subject, and awareness of the audience's values. The affective appeals included the use of concrete and charged language, of vivid pictures, and of metaphors to evoke emotion in the audience. A more detailed discussion of these measures can be found in Connor and Lauer (1985). Table 5 shows the scale for the analysis of appeals.

In the present study, the compositions from each of the three countries were rated for the effectiveness of their appeals on a scale of 0–3 by two trained raters achieving interrater reliabilities of .90 on the rational appeals, .73 on the credibility appeals, and .72 on the affective appeals.

Analysis of Persuasive Adaptiveness

To answer a reader's presumed question, "Why are you saying this?" a logically convincing argumentative structure may not be sufficient. The writer also needs to recognize and adapt to the reader's perspective by dealing implicitly or explicitly with possible counterarguments, and by taking the target's perspective in articulating the advantages of the solution. Thus, a student writer composing an argumentative essay would need to identify the presumed audience, recognize its potential opposition, and be consistent in his/her appeal. I felt that persuasive adaptiveness was not completely measured by the argumentation structure, the Toulmin analysis, and the analysis of persuasive appeals described earlier. Therefore, I selected as an analytic procedure which focuses on the degree of social perspective-taking one which has been widely tested empirically in the field of spoken communication research. Because both speakers and writers are facing the same kind of constraints, I decided to apply the scale by Delia, Kline, and Burleson (1979) and test its applicability in the context of evaluating student writing. The procedure, discussed

Table 5
Persuasive Appeals Scale

<u>Rational</u>	
0	No use of the rational appeal*
1	Use of some rational appeals*, minimally developed or use of some inappropriate (in terms of major point) rational appeals
2	Use of a single rational appeal* or a series of rational appeals* with at least two points of development
3	Exceptionally well developed and appropriate single extended rational appeal* or a coherent set of rational appeals*
*Rational appeals were categorized as (quasi-logical, structure of the real example, analogy).	
<u>Credibility</u>	
0	No use of credibility appeals
1	No writer credibility but some awareness of audience's values or Some writer credibility (other than general knowledge) but no awareness of audience's values
2	Some writer credibility (other than general knowledge) and some awareness of audience's values
3	Strong writer credibility (personal experience) and sensitivity to audience's values (specific audience for the solution)
<u>Affective</u>	
0	No use of the affective appeal
1	Minimal use of concreteness or charged language
2	Adequate use of either picture, charged language, or metaphor to evoke emotion
3	Strong use of either vivid picture, charged language, or metaphor to evoke emotion

by O'Keefe and Delia (1979) and presented in detail by Delia, Kline, and Burleson (1979), has nine levels organized into three major strata, ranging from no discernible recognition of the audience's perspective to explicit recognition and adaptation. The scale is given in Table 6.

One of the scale's original authors (Burleson) trained two raters to apply the scale to the sample student compositions. The persuasive adaptiveness score ranged from 0 to 8. The three major levels (I–III) of the scale were not pertinent to the statistical analysis. The two independent raters scored the 150 compositions achieving an interrater reliability of .69.

Table 6

The Delia, Kline, and Burleson Persuasive Adaptiveness Scale

Level I:	No Discernible Recognition of and Adaptation to the Target's Perspective.
	0 No statement of desire or request; no response given.
	1 Unelaborated request.
	2 Unelaborated statement of personal desire or need.
Level II:	Implicit Recognition of and Adaptation to the Target's Perspective.
	3 Elaboration of necessity, desirability, or usefulness of the persuasive request.
	4 Elaboration of the persuader's or persuasive object's need plus minimal dealing with anticipated counter-arguments.
	5 Elaborated acknowledgment of and dealing with multiple anticipated counter-arguments.
Level III:	Explicit Recognition of and Adaptation to the Target's Perspective.
	6 Truncated efforts to demonstrate relevant consequences to the target of accepting (or rejecting) the persuasive request.
	7 Elaboration of specific consequences of accepting (or rejecting) the persuasive request to one with characteristics of the target.
	8 Demonstrable attempts by the persuader to take the target's perspective in articulating an advantage or attempts to lead the target to assume the perspective of the persuader, another person, or the persuasive object.

The Study

Prompt

The argumentative/persuasive essay prompt required students to discuss a problem and offer solutions to it. As Table 7 shows, students were given neither a specific audience nor a specific problem; instead, students were allowed to create both.

Students

The data in the study were 150 argumentative/persuasive essays randomly selected from among the compositions of the International Association for the Evaluation of Educational Achievement (IEA), *International Study of Written Composition* (Purves & Takala, 1982). Out of thousands of compositions written by United States high school students of 16 years of age, 50 compositions were chosen randomly. Fifty compositions written by students of the same age in England and New Zealand, respectively, were also chosen randomly.

Table 7
Assignment

There are several things people can like or dislike in their life or the world around them. They might have noticed that young people find work or that people smoke in public places, or have noticed problems in their community that certain places are unsafe, that certain opportunities are missing, or that particular groups should get to understand each other better.

In this writing task, you have to explain what you think is an important problem in your community or in the life of the people your age. You can use one of the examples described above or choose a problem of your own.

You have to imagine that you have to write to people who can solve this problem but are not familiar with it.

Therefore, you should explain the problem clearly in order to convince your audience that the problem is an important one. After that, describe your plan for improving the situation in sufficient detail so that they know what you want done. Be sure to give enough details, facts, and examples to support your description and suggestion.

Your composition should be 2 or 3 pages long. Before you give your composition in, reread it in order to see:

1. How clearly you have described the problem and your solution.
2. How convincing you have been in presenting your arguments.

Your composition will be graded according to the above criteria.

If you want to change or correct something you may do it on your original; you do not have to recopy the whole composition.

Scoring

The compositions were rated for their overall impression by three independent raters, who were not connected with the IEA study. The scale was 1–5, one being the lowest and five the highest. The raters were third-year Ph.D. students in Purdue University's Rhetoric and Composition Program who had had several years' experience in the teaching and evaluating of writing. The raters were shown the task description and were asked to work quickly at a single session supervised by the researcher. The agreement among the raters was high; the Cronbach *alpha* coefficient was .83. I decided to rely on ratings of overall impression so that relationships between holistic ratings and independent variables could be examined without interference from the training of raters on specific points in the prompt or in the text.

Analysis

The six linguistic/rhetorical independent variables in the data analyses were: (1) Syntactic factors 1 and 2—*Interactive versus Edited Text* and *Abstract versus Situated Style*, (2) three coherence variables; (3) superstructure,

(4) three variables related to level of reasoning, (5) three persuasive appeals, and (6) persuasive adaptiveness. The dependent variable was the holistic score. The six measures served to measure the independent variables. In addition to the six linguistic/rhetorical measures, a measure of essay length was included (i.e., word count). Previous research has found this variable to be a good predictor of writing quality; it needs to be included in a comprehensive model of persuasive student writing.

Intercorrelations among the independent variables showed one instance of collinearity; the Pearson product moment correlation coefficient between the rational appeal and the *added Toulmin* score was .61. Because of this high intercorrelation and the theoretical assumption that the rational appeal and the Toulmin analysis measure the same factor, I decided to omit the variable of rational appeal in the final analysis. In addition, the separate Toulmin variables—*claim*, *warrant*, and *data*—were excluded, and only the *added Toulmin* score was considered in the final model because of the high correlations among the added score and the separate scores (from .72 to .77). The intercorrelations among the remaining 11 variables are shown in Table 8.

The correlations indicate that collinearity was not a problem. The only correlation higher than .6 was between the word count and the *added Toulmin*. The reason may be that, in order to develop adequate *claim*, *warrant*, and *data*, the students simply had to write more. However, since no previous empirical finding has tested this hypothesis, I considered it important to include both the *word count* and the *added Toulmin* score. (The means and standard deviations for all the variables by country are given in Table 9.)

Results and Discussion

A stepwise multiple regression analysis was conducted to examine the independent but additive effects of the remaining 11 independent variables on the dependent measure. The results of the analysis are shown in Table 10.

In Table 10, the names of the predictors are shown under *Step* in the order they appeared. Table 10 includes associated *F* values and levels of significance for each variable, the estimated coefficient, *R*, the coefficient of multiple determination, R^2 , and the overall *F* value of the model.

As seen in Table 10, the coefficient of multiple determination shows that, by itself, the *added Toulmin* analysis explained 48 percent of the variation in the holistic scores, while the *word count* contributed an additional 7 percent to the prediction. Further, two other independent variables—the credibility appeal and Syntax Factor 2—added statistically significant amounts of explained variation in the holistic score (at the .05 significance

Table 8
Correlations of the Variables in the Regression Model

[illegible]

Table 9
Means and Standard Deviations for All Variables by Country

	England		U.S.A.		New Zealand	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Holistic score (range = 1 – 5) (dependent variable)	2.29	0.81	1.75	0.69	2.48	0.82
Syntactic variables						
Factor 1 (range = 0 –)	-27.94	18.86	4.74	45.55	-23.49	25.35
Factor 2 (range = 0 –)	14.44	3.42	12.39	4.43	14.55	3.71
Coherence variables						
Parallel (range = 0 –)	.24	.12	.22	.14	.22	.15
Sequential (range = 0 –)	.51	.12	.48	.17	.49	.14
Extended Parallel (range = 0 –)	.21	.10	.18	.11	.23	.11
Persuasiveness variables						
Superstructure (range = 1 – 4)	2.78	.82	2.54	.76	2.69	.91
Toulmin						
Added (range = 1 – 9)	1.73	.48	1.17	.52	1.60	.62
claim (range = 1 – 3)	1.89	.69	1.60	.73	1.78	.70
data (range = 1 – 3)	2.00	.68	1.26	.65	1.77	.76
warrant (range = 1 – 3)	1.29	.82	.64	.69	1.16	.95
Persuasive appeals						
Rational (range = 0 – 3)	1.44	.54	1.10	.54	1.80	.69
Affective (range = 0 – 3)	1.00	.83	.46	.68	1.14	.60
Credibility (range = 0 – 3)	1.02	.71	.84	.71	1.20	.45
Persuasive adaptiveness (range = 1 – 8)	3.32	2.55	2.60	1.99	3.51	2.05

Table 10
Results of Stepwise Multiple Regression Analysis

<i>Step</i>	<i>F</i>	<i>Significance</i>	<i>Multiple R</i>	<i>R</i> ²	<i>Overall F</i>
1. Added Toulmin	113.37	.00	.70	.48	113.37
2. Word count	18.66	.00	.74	.55	74.28
3. Credibility appeal	6.78	.01	.75	.58	54.17
4. Syntax factor 2	4.46	.04	.77	.59	42.92
5. Parallel progression	1.08	.30	.77	.60	34.58
6. Syntax factor 1	1.38	.24	.78	.60	29.14
7. Extended parallel progression	.79	.38	.78	.60	25.04
8. Sequential progression	1.49	.23	.78	.61	22.19
9. Superstructure	.58	.45	.78	.61	19.72
10. Affective appeal	.47	.49	.78	.61	17.71
11. Persuasive adaptiveness	.05	.83	.78	.61	15.97

level). These four significant variables together explained 59 percent of the variation in the dependent variable.

These results indicate that the level of reasoning, as measured by the Toulmin analysis, was a powerful predictor of writing quality, even more so than the length of an essay. The results also show that in addition to building up strong *claims*, *data*, and *warrants*, high-rated essays included effective use of credibility appeal. In other words, good essays contained the writer's own personal experiences, a good knowledge of the subject, and an awareness of the audience's values. High-rated essays also favored *Abstract versus Situated Style*; they contained higher frequencies of nominalization, prepositions, passives, and specific conjuncts than did more poorly rated essays. Attitudes associated with *Abstract versus Situated Style*, however, are not clear-cut. Although passive and nominalized style is generally disapproved of in professional writing, teacher-raters tend to be positively influenced by a more frequent use of these features (Williams, 1986).

The remaining seven variables explain insignificant portions of the variance of the dependent variable. It should be noted that these seven variables remained insignificant when the variable "word count" was kept constant in the regression analysis and the other three significant independent variables maintained their original order.

The syntactic factor related to the interactiveness of the style was not a statistically significant variable. Neither did the coherence variables enter into the final model. The statistical insignificance of both of these components may be explained by the fact that the essays in the sample were written in a limited time period with little time for revision. Therefore, the raters might have overlooked problems caused by the informal, interactive style due to the frequent use of personal pronouns and contractions, for example. Further, the raters might not have evaluated the level of coherence associated with topical development (i.e., the coherent flow of subtopics of discourse) as long as students treated a problem in a logical manner with respect to the Toulmin model, as well as used some credibility appeal and showed some sophistication in their use of passives, nominalizations, and other features related to Syntax Factor 2—*Abstract versus Situated Style*.

It is somewhat surprising that such variables so clearly related to persuasion as affective appeal, superstructure, and persuasive adaptiveness were not statistically significant predictors of writing quality. One reason for this finding may lie with the essay prompt. First, three out of four of the components of the superstructure analysis were delineated in the task description. Secondly, affective appeals and persuasive adaptiveness may not have been measurable considering the vague audience specified in the task. Few students created specific audiences and tried to help these imagined audiences see the writer's point of view. Instead, most audiences

were assumed to be general, perhaps because the students simply did not have enough experience to try to imagine their specific audiences' values or objections and engage them. Another kind of persuasive essay topic might demand a more effective use of superstructure and persuasive adaptiveness.

Conclusions

The purpose of the research reported in this article was to develop valid, reliable, and comprehensive measures to describe and evaluate persuasive student writing. This was an attempt to create evaluative instruments based on current theory and research.

Three major areas that predict the quality of student essays were isolated: features of syntax, coherence, and persuasion. For the measurement of these features, quantifiable scales were developed. These scales were found to be reliable and were applied to a sample of 150 essays written by high school students from three different English-speaking countries: England, the United States, and New Zealand. The results were compared to holistic ratings of these essays scored by three independent raters. The correlations showed that three textually based independent variables and word count, out of 11 variables altogether, explained 59 percent of the variation in the holistic score (the dependent variable) at the .05 level of significance. These independent variables were the Toulmin measure, credibility appeal, and the syntactic factor of *Abstract versus Situated Style*.

The linguistic/rhetorical measures explained in this article have implications for both the evaluation and teaching of persuasive writing. First, they have facilitated secondary analyses of persuasive essays in the cross-national IEA study and have enabled detailed comparisons among linguistic and rhetorical features used by students from three English speaking countries. For example, Connor and Lauer (1988) found that the U.S. compositions in the sample, compared with the British and New Zealand compositions, were significantly lower ($p < .01$) on the use of *data* and *warrant* and the three persuasive appeals—rational, credibility, and affective. Connor and Biber (1988) discovered significant differences between the U.S. compositions and the British and New Zealand compositions in the use of certain syntactic features. The U.S. writers preferred colloquial and interactive features associated with Interactive versus Edited Text, while the British and New Zealand writers showed a dispreference for colloquial and interactive features. Associated with *Abstract versus Situated Style*, the U.S. compositions contained less passive and nominalized style than did the British and New Zealand Compositions.

Second, these measures have implications for the theory of writing

evaluation in general. They evaluate features related to a specific type of discourse. Thus, like primary trait scoring, these measures assess a specific kind of discourse but do so by developing analytic scales.

Third, these empirically tested measures have implications for the teaching of persuasive writing. In addition to treating style and mechanics, the results of the present study suggest that it may be advisable to emphasize argumentative structure and the use of persuasive appeals in the teaching of argumentative/persuasive writing.

References

- Applebee, A. N., Langer, J. A., & Mullis, I.V.S. (1986). *The writing report card: Writing achievements in American schools* (Report No: 15-W-02). Princeton, NJ: Educational Testing Service.
- Aston, G. (1977). Comprehending value: Aspects of the structure of argumentative discourse. *Studi Italiani di Linguistici Teoretici ed Applicati*, 465–509.
- Berlin, J. A., & Inkster, R. P. (1980). Current-traditional rhetoric: Paradigm and practice. *Freshman English News*, 8, 1–14.
- Biber, D. (1985). Investigating macroscopic textual variation through multi-feature/multidimensional analyses. *Linguistics*, 23, 337–360.
- Biber, D. (1986). Spoken and written textual dimensions in English: Resolving the contradictory findings. *Language*, 62, 99–119.
- Biber, D. (1987). A textual comparison of British and American writing. *American Speech*, 62, 99–119.
- Carrell, P. L. (1982). Cohesion is not coherence. *TESOL Quarterly*, 16, 479–488.
- Cerniglia, C., Medsker, K., & Connor, U. (in press). Improving coherence using computer-assisted instruction. In U. Connor, & A. M. Johns (Eds.), *Coherence in writing. Research and pedagogical perspectives*. Washington, D.C.: TESOL.
- Connor, U. (1984). A study of cohesion and coherence in English as a second language students' writing. *Papers in Linguistics: International Journal of Human Communication*, 17, 301–316.
- Connor, U., & Biber, D. (1988). *Comparing textual features in high school student writing: A crosscultural study*. Unpublished manuscript.
- Connor, U., & Farmer, M. (in press). The teaching of topical structure analysis as a revision strategy for ESL writers. In B. Kroll (Ed.), *Current issues in second language writing research*. New York: Cambridge University Press.
- Connor, U., & Kaplan, R. B. (Eds.) (1987). *Writing across languages: Analysis of L₂ text*. Reading, MA: Addison-Wesley.
- Connor, U., & Lauer, J. M. (1985). Understanding persuasive essay writing: Linguistic/rhetorical approach. *Text*, 5, 309–326.
- Connor, U., & Lauer, J. M. (1988). Cross-cultural variation in persuasive student writing. In A. C. Purves (Ed.), *Contrastive rhetoric* (pp. 138–159). Newbury Park, CA: Sage Publications.
- Connor, U., & Takala, S. (1987). Predictors of persuasive essay quality. In E. De-genhart (Ed.), *Assessment of student writing in an international context* (Research Report Series B. Theory into Practice No. 9) (pp. 187–206). Jyväskylä, Finland: Institute for Educational Research.

- Connors, R. J. (1981). The rise and fall of the modes of discourse. *College Composition and Communication*, 20, 297-304.
- Degenhart, R. E. (Ed.) (1987). *Assessment of student writing in an international context* (Research Report Series B. Theory into Practice No. 9). Jyväskylä, Finland: Institute for Educational Research.
- Delia, J. G., Kline, S. L., & Burleson, B. R. (1979). The development of persuasive communication strategies in kindergartners through twelfth-graders. *Communication Monographs*, 46, 241-256.
- Enkvist, N. E. (Ed.) (1985). *Coherence and composition: A symposium*. Åbo, Finland: Publications of the Research Institute of the Åbo Akademi Foundation.
- Gorman, T. P., Purves, A. C., & Degenhart, R. E. (Eds.) (1986). *The IEA study of written composition*. (Vol. 1). The international writing tasks and scoring scales. Jyväskylä, Finland: Institute for Educational Research.
- Hunt, K. W. (1965). *Grammatical structures written at three grade levels*. (NCTE Research Report No. 3). Urbana, IL: NCTE.
- Kinney, J. L. (1971). *A theory of discourse*. Englewood Cliffs, NJ: Prentice-Hall.
- Kintsch, W., & van Dijk, T. A. (1978). Toward a model of text comprehension and production. *Psychological Review*, 85, 363-394.
- Kummer, W. (1972). Aspects of a theory of argumentation. In E. Gulich & W. Raible (Eds.), *Textsorten* (pp. 25-49). Frankfurt: Athenäum.
- Lauer, J. M., Montague, G., Lunsford, A., & Emig, J. (1985). *Four worlds of writing* (2nd ed.). New York: Harper and Row.
- Labov, W., & Waletzky, J. (1967). Narrative analysis: Oral versions of personal experience. In J. Helm (Ed.), *Essays on the verbal and visual arts* (pp. 12-44). Seattle, WA: University of Washington Press.
- Lautamatti, L. (1987). Observations on the development of the topic in simplified-discourse. In U. Connor & R. B. Kaplan (Eds.), *Writing across languages: Analysis of L₂ text* (pp. 92-126). Reading, MA: Addison-Wesley. (Appeared originally in N. E. Enkvist & V. Kohonen (Eds.), *Text linguistics, cognitive learning and language teaching* (pp. 71-104). Publications de l'association Finlandaise de Linguistique Appliquée (AFinLA), no. 22. Helsinki: Akateeminen kirjakauppa, 1978).
- Lindeberg, A. (1985). Cohesion, coherence patterns, and EFL essay evaluation. In N. E. Enkvist (Ed.), *Coherence and composition: A symposium* (pp. 67-92). Åbo, Finland: Publications of the Research Institute of the Åbo Akademi Foundation.
- Mellon, J. C. (1969). *Transformational sentence-combining: A method for enhancing the development of syntactic fluency in English composition*. (NCTE Research Report No. 10). Urbana, IL: NCTE.
- Meyer, B. J. F. (1975). *The organization of prose and its effects on memory*. Amsterdam: North-Holland Publishing Company.
- O'Hare, F. (1973). Sentence combining: Improving student writing without formal grammar instruction. (NCTE Research Report No. 15). Urbana, IL: NCTE.
- O'Keefe, B., & Delia, J. G. (1979). Construct comprehensiveness and cognitive complexity as predictors of the number and strategic adaptation of arguments and appeals in a persuasive message. *Communication Monographs*, 46, 231-240.
- Perelman, C. (1982). *The realm of rhetoric*. (W. Klubuck, Trans.) Notre Dame: University of Notre Dame Press.

- Phelps, L. W. (1985). Dialectics of coherence: Toward an integrative theory. *College English*, 47, 12–29.
- Purves, A. C., & Takala, S. (Eds.). (1982). *An international perspective on the evaluation of written composition*. London: Pergamon Press.
- Purves, A. C., Takala, S., & Gorman, T. P. (1986). The development of the scoring scheme and the scoring scales. In T. P. Gorman, A. C. Purves, & R. E. Degenhart (Eds.), *The IEA study of written composition* (pp. 44–64). Jyväskylä, Finland: Institute for Educational Research.
- Stotsky, S. L. (1975). Sentence-combining as a curricular activity: Its effect on written language development and reading comprehension. *Research in the Teaching of English*, 9, 30–71.
- Tirkkonen-Condit, S. (1985). *Argumentative text structure and translation* (Studia Philologica Jyväskyläensia 18) Jyväskylä, Finland: University of Jyväskylä.
- Tirkkonen-Condit, S. (1986). Text type markers and translation equivalence. In J. House & S. Blum-Kulka (Eds.), *Interlingual and intercultural communication* (pp. 95–114). Tübingen: Gunter Narr.
- Toulmin, S. E. (1958). *The uses of argument*. Cambridge: Cambridge University Press.
- Toulmin, S. E., Rieke, R., & Janik, A. (1979). *An introduction to reasoning*. New York: Macmillan.
- Wikborg, E. (1985). Types of coherence breaks in university student writing. In N. E. Enkvist (Ed.), *Coherence and composition: A symposium* (pp. 93–113). Åbo, Finland: Publications of the Research Institute of the Åbo Akademi Foundation.
- Williams, J. M. (1986). Non-linguistic linguistics and the teaching of style. In D. A. McQuade (Ed.), *Linguistics, stylistics, and the teaching of composition* (pp. 174–191). Carbondale, IL: Southern Illinois University Press.
- Witte, S. P. (1983a). Topical structure and revision: An exploratory study, *College Composition and Communication*, 34, 313–341.
- Witte, S. P. (1983b). Topical structure and writing quality: Some possible text-based explanations of readers' judgments of students' writing. *Visible Language*, 17, 177–205.