

Some Linguistic Relationships Between Writing and Reading Abilities at the Primary Level — A Longitudinal Study

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This study examines the relationship between the use of grammatical and rhetorical skills in writing and performance in reading. Primary children from southern Vancouver Island were used in the research and their writing and reading performance followed over a three-year period. Writing performance was indexed through the use of a modified Botel and Granowsky Formula for Syntactic Complexity, while reading behavior was examined by means of the Bond-Balow-Hoyt New Developmental Reading Tests. Results of the study revealed that the basic grammatical and rhetorical skills underlying both writing and reading behavior in Grades 1, 2, and 3 vary with age of subject and type of writing stimulus, that the type of writing stimulus affects writing performance, and that continued development of linguistic skills appears to result in an increased relationship between writing and reading. The conclusions drawn point to a need to involve children in more varied writing experiences, to foster both fluency and complexity in use of written language, and to provide more oral experiences in language learning activities.

Cette étude considère les relations entre les aptitudes grammaticales et rhétoriques en composition et les performances en lecture. Pour cette recherche, on a pris des élèves de l'école primaire du sud de l'île de Vancouver et on a suivi leurs travaux d'écriture et de lecture pendant trois ans. On a indexé les performances en composition sur la base d'une formule modifiée de complexité syntaxique du type Botel et Granowsky, tandis qu'on examinait les comportements de lecture en utilisant les nouveaux tests Bond-Balow-Hoyt. Les résultats de l'étude démontrent que les aptitudes grammaticales et rhétoriques de base qui sous-tendent aussi bien le comportement d'écriture et de lecture dans les 1^{ère}, 2^e et 3^e années varient selon l'âge du sujet et le genre de stimulus appliqué à l'écriture; que la performance écrite dépend du genre d'incitation à écrire; et que le développement continu des aptitudes linguistiques semble produire une relation plus intense entre l'écriture et la lecture. On conclut qu'il faut impliquer les enfants dans des expériences d'écriture plus variées, encourager tant l'aisance que la complexité dans l'usage de la langue écrite, et fournir plus d'expériences orales dans l'apprentissage de la langue.

Current psycholinguistic theories of language development in children and of the nature of the reading process emphasize the interrelatedness and commonalities among the expressive and receptive language modalities (Lenneberg, 1967; Smith, 1973; Smith, Goodman, & Meredith, 1976). All language learning, it is hypothesized, occurs through an active inductive process wherein, through experimentation with language, the learner identifies the principles underlying the language system and gains control of its structure enabling him to use it in novel and creative ways. Further, it is posited that the development of language competence in

one modality, such as writing, enhances language ability in another modality, such as reading. Athey (1971) argues that reading is not a skill but is a system of social communication, and in this view the task of learning to read is not a matter of breaking down reading into component skills, but involves the realization that the printed word is another system of communication analogous to speech. She goes on to suggest that learning to read means learning strategies to solve language problems. Chomsky (1957, 1965) postulates the theory of a language acquisition device (LAD) which resides in the child, and which takes information from the child's language experiences to construct language principles which give the child control over language. Thus Chomsky contends the child uses the language universals which he possesses at birth to construct a picture of the language structures being used around him. Since all language, written and spoken, has essentially the same syntactic structure, experiences and learning in any language modality transfer to other modalities. Moffett, in fact, suggests that in order to master the receptive language act of reading, children should develop competence in the expressive function of language, i.e. speaking and writing (Moffett & Wagner, 1976).

In an earlier study conducted at the sixth grade level to examine relationships among language modalities, the authors found that fluency and control of syntactic complexity were the key language competencies underlying reading achievement (Evanechko, Ollila, & Armstrong, 1974). In the present study the authors once more used a modified version of the Botel and Granowsky Syntactic Complexity Formula (Botel & Granowsky, 1972) to examine the nature of the subjects' written compositions. In another study employing this analytic device, Kaiser, Neils, and Floriani (1975) examined the syntactic complexity of primary grade reading materials. Their results showed much variability in syntactic complexity; readers do not follow a progression of difficulty. Kaiser et al. (1975) suggest that teachers be trained to recognize aspects of language development and to be aware of syntactic demands of materials being used in classrooms. Such knowledge of the syntactic characteristics of children's receptive and expressive language is essential to planning developmental programs in language education.

Instructional activities in writing and reading occur together in classrooms, often on parallel tracks with little integration. Not enough attention appears to be given to joint development of the common elements of language found in both expressive and receptive functions of language. Such integration of activities based on the purpose of enhancement of certain basic language skills might serve to accelerate both understanding and use of language abilities in children. The present study sought to identify the nature and degree of grammatical competence underlying children's behaviors in both writing and reading at the primary level to give direction in planning language arts activities and materials.

PROCEDURES

The Problem

The general purpose of this study was to examine the relationship between the use of grammatical and rhetorical skills in writing and performance in reading. The specific aims were:

1. To determine which of the linguistic skills used in writing may be used to predict reading achievement and the effectiveness of this prediction,
2. To determine the effect of the writing stimulus upon writing performance in terms of the criterion measure used, and
3. To determine the changes in the relationships between writing and reading performance over time.

The Sample

Subjects were all Grade 1 children (approximately 250) from classrooms in the Sooke School District located on southern Vancouver Island, British Columbia. These Grade 1 children were followed through to the third grade, by which time their number was reduced through mobility and other factors to approximately 100. Sooke is a suburb of Victoria, British Columbia, and is a predominantly middle-class community.

The Measures

The New Developmental Reading Test Primary Level (Bond, Balow, & Hoyt, 1968) was used as the criterion measure. This test provides measures of word recognition, comprehension of significant ideas, and comprehension of specific instructions — aspects of reading considered particularly important at the primary levels. These fundamental reading skills need to be developed for the reader to use the reading process as part of a system of social communication where he receives information for use and action. To examine the students' writing, a modified version of the Botel and Granowsky Formula for Syntactic Complexity (Botel & Granowsky, 1972) was employed in scoring the compositions.¹

Administration of Tests

All tests and writing activities were administered by the classroom teachers over a three-week period in May of each year, beginning in 1974, according to specific instructions set out by the researchers. Two writing activities were conducted to determine the effect of stimulus upon performance. The first writing task required the students to complete a story which was begun for them. A beginning of appropriate difficulty and interest was developed for each grade. The second task required the students to write

a story on the topic "The Wishing Stone." Both writing stimuli were in the narrative mode chosen for their relationship to the material found in the children's primary reading programs.

All test results and compositions were turned over to the researchers for scoring.

ANALYSIS AND RESULTS

To fulfill the aims of the study several multiple linear regression models were tested. Generally, the measures within the modified Formula for Syntactic Complexity were included in a regression equation to predict each of the three subtests of the New Developmental Reading Test.

A stepwise regression analysis was employed whereby the predictor variables entered the regression equation in order of their greater contribution to the increase in R^2 . Each entering variable was tested for significance, and optimum predictive ability was present when no additional variable entered at a significant level.

The New Developmental Reading Test, an instrument of established validity and reliability (Buros, 1972, p. 1092), was used as an index of the students' reading performances. Measured against this performance were the students' behaviors in writing as examined through the syntactic complexity formula. Elements of this formula have been validated in other studies (Loban, 1963; Evanechko, Ollila, & Armstrong, 1974). This analysis sought to identify the best combination of measures of writing behavior to predict reading performance.

Tables 1 and 2 summarize the results of the regression analysis for each of the criterion levels.

The results reveal a varied pattern of relationships among writing and reading measures. According to the aims of the study the findings may be started as follows:

1. The basic grammatical and rhetorical skills underlying both writing and reading behavior in Grades 1, 2, and 3 vary with age of subject and type of writing stimulus. On the whole, only about one-half of the writing indices showed a predictive capability with regard to reading. The following variables appear to most powerfully underlie writing and reading performance: Coordinate clauses joined by "and" and Non-sentence Expressions — #3, Noun Modifiers — #5, Other Transformations and Structures — #8, Communication Units — #9, and Average Words per Communication Unit — #11. While other variables also contributed significantly to the prediction of reading performance, their effect did not appear as strong or consistent as that of the variables mentioned above.

The effectiveness of the prediction of the measures was indicated by the percent of variance accounted for. These data revealed that at the Grade 1 and 2 levels only, between 6% and 16% of the variance of the dependent variable could be ascribed to variation in the independent

TABLE 1
*Stepwise Regression for the Formula for Syntactic Complexity
 Components as Predictors of the Bond-Balow-Hoyt Subtest Performance*
 STORY 1

<i>Predictor</i>	<i>Grade</i>	<i>Step No. of Predictor*</i>		
		<i>Vocabu- lary</i>	<i>Compre- hension 1</i>	<i>Compre- hension 2</i>
1. Sentence Patterns (A)	1	4	2	2
	2			
	3	4	11	4
2. Simple Transformations	1	10	7	9
	2			
	3	12	3	2
3. Coordinate Clauses joined by "and" and Non Sentence Expressions	1	7	5	6
	2		2	
	3	2	2	2
4. Sentence Patterns (B)	1			
	2			
	3	10	7	5
5. Noun Modifiers	1	2	8	7
	2		1	
	3	1	1	11
6. Other Modifiers	1	6	4	3
	2	2		
	3	9	9	7
7. Coordinates	1	8	9	5
	2			
	3	7	12	10
8. Other Transformations and Structures	1	1	3	10
	2			
	3	8	5	12
9. Communication Units	1	3	1	1
	2			1
	3	3	8	7
10. Total Words	1	9	10	8
	2	1		
	3		10	3
11. Average Words per C.U.	1	5	6	4
	2			
	3	6	4	9
% Variance	1	11.9	16.6	12.2
	2	11.4	12.2	7.3
	3	29.8	24.2	35.9

* $p < .05$

TABLE 2
*Stepwise Regression for the Formula for Syntactic Complexity
 Components as Predictors of the Bond-Balow-Hoyt Subtest Performance*
 STORY 2

Predictor	Grade	Step No. of Predictor*		
		Vocabu- lary	Compre- hension 1	Compre- hension 2
1. Sentence Patterns (A)	1			4
	2			
	3		9	
2. Simple Transformations	1			
	2			
	3		4	
3. Coordinate Clauses joined by "and" <i>and</i> Non Sentence Expressions	1			7
	2	2		
	3	2	1	2
4. Sentence Patterns (B)	1			
	2			
	3	4		
5. Noun Modifiers	1			
	2			
	3		10	
6. Other Modifiers	1			8
	2			
	3	6	5	1
7. Coordinates	1			
	2			
	3		7	6
8. Other Transformations and Structures	1			
	2	1	1	
	3	1	3	
9. Communication Units	1			5
	2			
	3		6	
10. Total Words	1			3
	2			
	3			
11. Average Words per C.U.	1			
	2			1
	3	5	8	
% Variance	1	NS	NS	6.3
	2	9.7	6.1	NS
	3	14.9	19.2	8.3

* $p < .05$

variables, depending on the subtest in the dependent variable. At the third grade level the percent of variance accounted for ranged from about 8% to about 35%.

2. In terms of the criterion, the New Developmental Reading Test, the type of writing stimulus had dramatic effects upon writing performance. The variables identified in Story 1 had a considerably greater predictive value for the reading subtests than did the same variables in Story 2. In fact, there was no significant predictive relationship, for the most part, between variables in Story 2 and reading performance at the Grade 1 level.

3. Continued development of linguistic skills appears to result in increased and more varied relationships between writing and reading. Overall, the variables showed a greater predictive ability at the Grade 3 level than in either the first or second grades. The use of more varied structures for modification such as Noun Modifiers — #5 and expansion within sentences such as Other Transformations and Structures — #8 were more predictive of reading performance at the Grade 2 and 3 levels than among the younger students. The same result was true for variable #3 — Coordinate Clause joined by "and" and Non-sentence Expressions.

CONCLUSIONS

A number of conclusions can be stated in terms of the three problems posed originally.

1. There are certain linguistic competencies common to both writing and reading performance and these linguistic skills become more central to both writing and reading as the child matures. As revealed in a previous study which examined Grade 6 students' writing and reading performance (Evanechko, Ollila, & Armstrong, 1974), the variables contributing to prediction of reading performance are those which index the amount or fluency of written expression and the flexibility or complexity and sophistication of writing. The variables Coordinate Clauses and Non-sentence Expression — #3, Communication Units — #9, and Average Words per Communication Unit — #11 are essentially measures of written fluency. The variables Noun Modifiers — #5, and Other Transformations and Structures — #8 are basically measures of sentence complexity. Certain variables in the syntactic complexity formula such as Sentence Patterns A — #1 and B — #4, which are measures of the basic structural forms in writing, do not appear to be highly related to reading performance. This may be due to the tendency of most primary children to use essentially the same basic structures and forms in writing, causing a lack of variability in the data. Measures of fluency and flexibility in writing, therefore, appear to be related to performance in reading, indicating that they are common to both writing and reading performance. The strength of the relationship improves dramatically with age and type

of written language experience. These results suggest the need to involve the younger child in more varied reading and writing experiences and to provide for optimum stimulation of expressive language.

2. Children appear to write with more fluency and sophistication and such writing bears a stronger relationship to reading performance when they are given a written story beginning rather than a topic or idea to write from. Since fluency and complexity in writing are related to reading performance, writing experiences which foster these two characteristics should be encouraged as a means to improve both language functions.

3. More complex elements of written language emerge as predictors of reading performance as the child matures. This increase in predictive ability of these language variables with maturity follows from language learning theories proposed by psycholinguists. As the child masters basic language principles he applies them more surely to all language modalities. In addition, the increase in amount of variance accounted for can be explained in part by the fact that, for children who are at the beginning stages of the primary program, the range of writing and reading experience and performance is so limited that statistical relationships are difficult to establish. As language used in writing and reading expands, so do the relationships between these language functions. If fluency in language use and control of syntactic complexity are the key language competencies related to reading achievement, then building these two abilities may well serve to improve reading performance, particularly at the primary level where so many of the basic linguistic principles are being learned. Further, if providing the child with an increased amount of information from which to write results in use of the kind of fluency and flexibility in writing which is strongly related to reading performance, then it becomes important to select and provide such powerful writing stimuli to children to help develop both their writing and reading abilities.

Finally, since language is learned more readily in oral rather than written form, the development of fluency and flexibility in oral language should be a necessary beginning. When fluency and flexibility are developed in oral expression a systematic move to transfer these competencies to written language can be made.

NOTE

¹ The modified formula may be obtained by contacting the authors directly.

REFERENCES

- Athey, I. Synthesis of papers on language development and reading, *Reading Research Quarterly*, 1971, 7 (1), 9-15.
- Bond, G. L., Balow, B., & Hoyt, C. J. *New developmental reading tests, primary level*. Chicago: Lyons and Carnahan, 1968.
- Botel, M., & Granowsky, A. A formula for measuring syntactic complexity: A directional effort. *Elementary English*, 1972, 49, 513-516.

- Buros, O. K. (Ed.). *The seventh mental measurements yearbook*. Highland Park, New Jersey: The Gryphon Press, 1972.
- Chomsky, N. A. *Syntactic structures*. The Hague: Mouton, 1957.
- Chomsky, N. A. *Aspects of a theory of syntax*. Cambridge, Mass.: M.I.T. Press, 1965.
- Evanechko, P., Ollila, L., & Armstrong, R. An investigation of the relationship between children's performance in written language and their reading ability. *Research in the Teaching of English*, 1974, 8, 315-326.
- Kaiser, R., Neils, C., & Floriani, B. Syntactic complexity of primary grade reading materials: A preliminary look. *The Reading Teacher*, 1975, 29, 262-265.
- Lenneberg, E. H. *Biological foundations of language*. New York: Wiley, 1967.
- Loban, W. D. *The language of elementary school children* (Research Report No. 1). Champaign, Ill.: National Council of Teachers of English, 1963.
- Moffet, J., & Wagner, B. *Student-centered language arts and reading, K-13*. Boston: Houghton-Mifflin, 1976.
- Smith, E. B., Goodman, K. S., & Meredith, R. *Language and thinking in the elementary school*. Toronto: Holt, Rinehart and Winston, Inc., 1976.
- Smith, F. *Psycholinguistics and reading*. Toronto: Holt, Rinehart and Winston, 1973.

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