

**INCREASING THE COMPLEXITY OF CHILDREN'S
WRITING USING A MEASURE OF READABILITY**

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Researchers (Mellon, 1969; Vitale, King, Shontz and Huntley, 1971; Combs, 1976) have generally found sentence combining activities useful in increasing the complexity or maturity of children's written composition. This effectiveness has been found at varying grade levels whether or not there is direct instruction in transformational grammar (Combs, 1976).

It was the purpose of this study to explore the idea that activities other than sentence combining could produce the same kinds of results without requiring the preparation and instructional time needed for sentence combining activities. Arthur (Note 1) believed that children could learn to use the Raygor

Graph to rate the "readability" of their written compositions, the idea being that, once the children found out that to increase the "grade level" score of their work they needed to use longer sentences and bigger words, they would automatically, without instruction, use more embeddings and write in a more mature style. The efficacy of this idea was investigated in this study.

METHOD

Subjects:

23 fifth grade subjects, all reading in grade level materials and in an intact language arts class, were volunteered for this study by their teacher. They were students in a public elementary school in a rural community in Northeast Georgia and consisted of three blacks and 20 white, seven boys and 16 girls.

Procedures:

The subjects were divided into two groups. One group was taught to calculate their writing "grade level" based on the Raygor Readability Graph. Using the Raygor graph consists of four basic steps: (1) counting out a 100 word sample; (2) counting the number of sentences in the sample; (3) counting the number of words larger than five letters in the sample; and (4) plotting the number of large words and number of sentences on the graph, resulting in a grade level score. The students in this group each received a copy of the Raygor graph and numbered their plotted attempts so that they could keep track of their progress.

The other group, for the same amount of time, was told to draw pictures of the story they wanted to write. The two groups were each given four thirty minute sessions of writing during their usual language arts class period. During this writing period, they used the procedures described above to write about topics of their own choosing. Pretest and posttest consisted of fifteen minutes of writing on previously agreed upon topics of a narrative descriptive nature. (They were asked to volunteer topics and the researcher wrote the choices on pieces of paper that were "drawn" from a hat.)

Analysis:

The writing samples were then analyzed for total number of words, number of sentences, and number of larger words used, as these were directly related to the use of the Raygor graph. In addition, a syntactic density score was calculated on each pre and post sample using Golub and Kidder's (1974) syntactic density formula with Belanger's (1978) correction. The Golub and Kidder method requires the analysis of each passage for the presence of ten sentence variables, tabulating their frequency of occurrence, and computing them in a syntactic density formula. Belanger's correction factor was added to the formula to correct for the fact that the number of "T units" accounted for most of the variability in the syntactic density score. The ten variables are as follows: number of words divided by the correction factor; number of subordinate clauses divided by the correction factor; average main clause word length; average subordinate clause word length; number of modals; number of forms of be and have which serve to expand predicates; number of prepositional phrases; number of possessive nouns and pronouns; number of adverbs of time; and number of gerunds, participles and absolute phrases.

In addition to being analyzed for syntactic density, the pre-post writing samples were analyzed for number of cohesive ties between sentences. Cohesiveness in text refers to the features which "link component parts" to provide "unity and clarity, either within or between sentences and contribute to the reader's impression of text coherence" (p. 55, Harris and Hodges, 1981). Halliday and Hassan (1976) outline a specific method for analyzing the cohesiveness of text which requires the researcher to look for a number of variables which tie one point in a text with another. These variables are referents, conjunctions, substitu-

tions ("My pen is out of ink. I need a new one."), ellipses ("I only remember two of the names. I need to remember 2 more.), lexical collocations (a cohesive chain of words such as Christmas, presents, tree, Santa) and lexical reiterations (repeating the same word, a synonym or superordinate of a general noun).

T-tests on the two groups pre-post change scores and T-tests comparing the two groups' pre and post writing samples on the above variables were used to analyze differences, if any, between the two groups.

RESULTS

Comparison of the two groups pre-post change scores revealed that the Raygor group made greater gains in syntactic density scores ($p < .001$) and use of larger words ($p < .005$). They also decreased significantly the number of sentences ($p < .01$) when compared with the other group. There were no significant differences on change scores for total number of words (production rate) or for total number of cohesive elements between sentences, although there was a tendency for the picture drawing group to use more cohesive ties, particularly references and ellipses.

Comparing the groups on pre and post measures, it was found that, even though the picture drawing group initially fared better on syntactic density scores than the Raygor group ($p < .05$), the writing samples for the Raygor group were significantly more syntactically complex than those of the picture drawing group on the post sample. Furthermore, even though there were no significant differences between groups on the prewriting sample as to number of sentences and number of larger words, the post samples were significantly different favoring the Raygor group.

DISCUSSION

For the subjects in this study, it appears that teaching the use of the Raygor group significantly improves the complexity of their writing as measured by Golub and Kidder's (1974) syntactic density formula. In addition, this instructional tool was particularly easy to use and appeared to be motivating to the children using it. Goal oriented comments such as "I'm going to try to write on sixth grade level tomorrow" were common, and the children had little difficulty following the steps laid out for them prior to using the graph.

As to the cohesiveness of their writings, there are several explanations for the failure to increase the number of between-sentence cohesive ties. One is that, because there were more embeddings in their post writings, cohesiveness changed to more within sentence than between sentence. Within sentence ties were not analyzed.

Another explanation may be that, sometimes very immature writing samples may have a large number of cohesive ties in the text. The following paragraph is an example:

I like the dog.
The dog is good to me.
He is friendly.
He is nice.
He is my friend.

This paragraph has a large number of cohesive ties (I-me, dog-he, friendly-nice-friend, etc.), yet the style is not particularly mature. It may be that Halliday and Hassan's measure of cohesiveness may not be amenable to measuring maturity when simple counts are used.

A final explanation may be that, as cohesive ties are said to make text easier to read, it may be that the total number of ties is more a measure of non-complexity rather than complexity. If this is the case, then Christensen's (1968) words of warning need to be heeded. She says, "...we should not in our grammar and composition courses focus on tying syntactic knots that

we must add courses in reading to untie." (p. 576). It would be of interest to have independent judges rate the quality of the pre-post writings to see if the Raygor group's post writing really convey more maturity in style (as Christenson says "pack much into little, but to pack it so that it can readily be unpacked" [Christensen, 1968, p. 576].) or whether the more syntactically complex writings come across as more obscure and, therefore, less able to effectively convey the message. Indeed, there have been conflicting studies as to judgments of quality in the literature, some saying that the quality or maturity has not been improved (Mellon, 1969) while others have found complexity to go hand in hand with judgments of greater quality (i.e. Combs, 1976).

Because of the intriguing results of this study, it is believed that more research needs to be done on this topic. It is suggested that larger sample sizes be used, quality ratings be employed, and the Raygor graph technique be compared to sentence combining techniques as well as control groups. If further research points to the efficacy of the Raygor technique, it may prove to be a valuable instructional tool for classroom use.

NOTE: The idea of teaching children to rate the "readability" of their written compositions using the Raygor Graph is attributed to Sharon Arthur while she was a doctoral student at the University of Georgia.

REFERENCES

- Belanger, J. F. Calculating the syntactic density score: A mathematical problem. *Research in the Teaching of English*, 1978, 12, 149-153.
- Christensen, F. The problem of defining a mature style. *English Journal*, 1968, 57, 572-79.
- Combs, W. E. Further effects of sentence combining practice on writing ability. *Research in the Teaching of English*, 1976, 10, 131-149.
- Golub, L. S. & Kidder, C. Syntactic density and the computer. *Elementary English*, 1974, 51, 1128-1131.
- Halliday, M. and Hassan, R. *Cohesion in English*. London: Longman Group Ltd., 1976.
- Harris, T. and Hodges, R., (eds.) *A dictionary of reading and related terms*. Newark: International Reading Association, 1981.
- Mellon, J. D. *Transformational sentence combining*. NCTE Research Report, No. 10. Champaign, Ill.: NCTE, 1969.
- Vitale, M. R., King, F. J., Shontz, D. W., & Huntley, G. M. Effect of sentence combining exercises upon several restricted written composition tasks. *Journal of Educational Psychology*, 1971, 62, 521-525.