Evans tends to support Muehl and Kremenak (1966) who, unlike a number of other investigators, found no influence that could be attributed to that factor. The present study supports Jorgenson and Hyde (1974) in their plea for standardised tests and procedures as even cross-culturally comparison can be made with specific testing procedures, but that it is unsatisfactory where measures of IQ and reading ability are taken indiscriminately.

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THE RELATIONSHIP OF READING COMPREHENSION TO WRITTEN PRODUCTION OF TRANSFORMATIONALLY LENGTHENED PROSE

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Abstracts. No studies have investigated whether the writing of certain transformations can predict comprehension of prose written in them. In studying this possibility, 90 subjects, 30 from each grade level, were asked to read three major prose forms, each written in three transformed versions, and to

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respond to each immediately on Cloze tests. Every subject also rewrote a simple sentence paragraph using his own sentence combining techniques. The Cloze test scores were then compared to sentence-lengthening criteria in a multiple regression analysis. Cloze tests did not satisfactorily predict sentence length. Yet there was strong evidence to suggest that Cloze tests are less valid measures of advanced reading comprehension and that the higher Cloze scores predicted lower sentence-lengthening criteria.

Research over the past ten years has shown with great precision the ways in which specific syntactic structures affect reading comprehension and recall. Still other parallel research has produced inventories of the specific syntactic structures generally used by students from elementary school through college. Little investigation, however, has been carried on to find what relationship, if any, exists between the reading and writing of various syntactic structures through the twelve grades of public school and on into the four years of higher public education.

This study is intended to examine the relationship between structures students write and those they comprehend in reading and, second, to determine whether or not this relationship offers insight into the transitional process between word-by-word reading and chunking.¹

It was hypothesized that there would be no predictive relationship between the comprehension and production of syntactic transformations in the reading and writing of 8th and 12th graders and University Seniors. Eighth graders were expected to score lower on Cloze tests based on prose containing more transformations than they used in their writing and that they would use fewer transformations than either the 12th graders or University Seniors in their writing. It was also expected that 12th graders would be similarly lower in Cloze scores and transformational indices than University Seniors.

Of secondary concern were two further indices: First, the gradual increase of syntactic transformations used in writing would in some way be predictive of the “chunking” process used by readers in their progression beyond word-by-word method. Second, the Cloze test procedure may not be valid for measuring the reading comprehension of subjects whose written transformations shows they are “chunking” information into much larger than single-word units, suggesting they may be doing the same chunking in reading.

PROCEDURE

Materials

To investigate these issues, I studied the relationship between the writing and reading performance of three populations of students: 8th and 12th graders in public school and University Seniors. One design involved required all three groups to read nine common prose passages, to respond to these passages on Cloze tests and to rewrite a paragraph consisting of short, simple sentences on which no transformations had been performed. The Cloze test responses and three factors of syntax were then analyzed to determine if there were any correlations between them.

¹It has been suggested that reading skill develops as the reader moves beyond the word-by-word method. One theory currently offered to explain this development claims that maturing readers “chunk” what they read. According to Carver (1972), “a chunk is a group of words, usually longer than a word and usually shorter than a sentence in length” (p.282).
Nine prose passages were selected from the published work of professional novelists and essayists: three expository prose, three narrative prose and three descriptive prose. Each of the passages was rewritten in three versions using different transformations. That is, the first version contained virtually no transformations, only kernel sentences. The second contained coordinate, subordinate, and relative clause transformations. The third version contained all earlier transformations plus nominalizations, passive voice, and deletion transformations.

Method

Three sets of readings were then compiled using different simplified subordinated-conjoined, and variously transformed selections for each prose version, so that no reader had the same selection in two transformed versions. Following each version was a Cloze test, an exact facsimile of the passage with every fifth word deleted and a blank left to fill in. Each of the three prose types was thematically similar, keeping to a minimum the effect of different concepts on the readers.

All subjects were also asked to rewrite a simplified paragraph entitled “Bee,” developed by Smith (1971). Each sentence in the simplified form averaged 5.08 words, and no transformations had been performed. The directions requested each student to write the paragraph in a better way by combining, rearranging, and deleting sentence parts.

The rewrites were analyzed for three specific criteria. The first was T-Unit Length, a more accurate measure than sentence length. The second was the Subordination Index, simply a ratio of subordinate and relative clause transformations per T-Unit. Third was the Nominalization Index, again simply a ratio of noun clauses or phrases per T-Unit. A tally of each of these three writing criteria was noted. These represented both the extent and the means of written “chunking” for each subject.

RESULTS

The results showed consistent gains in two Syntactic-Production criteria. Words Per T-Unit mean gains increased 2.30 between 8th and 12th graders, and 2.24 between 12th graders and University Seniors. Overall mean gain was 4.56. These differences were significant at the .005 level, (F = 9.08, ef = 2.87). The Nominalization Index increased .295 between 8th and 12th graders, and .223 between 12th graders and University Seniors. Overall mean gain was .528. The effect of grade was significant at the .05 level. (F = 3.50, df = 2.67). The subordination index was insensitive to grade, (F > 1.0).

Table 1

<table>
<thead>
<tr>
<th>Criterion</th>
<th>8th</th>
<th>12th</th>
<th>Sr. College</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words per T</td>
<td>12.06</td>
<td>14.36</td>
<td>16.62</td>
<td>9.06**</td>
</tr>
<tr>
<td>Sub. Index</td>
<td>.425</td>
<td>1.07</td>
<td>.764</td>
<td>.01</td>
</tr>
<tr>
<td>Nom. Index</td>
<td>.205</td>
<td>.50</td>
<td>.733</td>
<td>3.50*</td>
</tr>
<tr>
<td>Cloze Test</td>
<td>87.3</td>
<td>84.43</td>
<td>69.97</td>
<td>18.94**</td>
</tr>
</tbody>
</table>

*p < .05
**p < .005
In contrast to these two syntactic production criteria, the results showed significant declines for syntactic comprehension criteria provided by the Cloze test responses, favoring 8th and 12th graders over University Seniors. Mean Cloze test responses declined 14.46 between university seniors and 12th graders, and 2.87 between 12th and 8th graders. Overall decline was 17.33. These declines were significant at the .005 level. \( F = 18.94, \text{df} = 2.87 \).

To assess how well related were the collected measures of comprehension and production, a stepwise regression analysis was performed, using the variable "Words Per T-Unit" as the criterion and two aforementioned indices as well as the nine Cloze tests as predictors. Words Per T-Unit was selected as the dependent variable since the pivotal idea in the study is the relationship between the lengthening of sentences in writing and the comprehension of lengthened sentences in reading. For the initial analysis, data for all 90 subjects was employed. To determine how stable were the relationships between the criterion and predictors, similar analyses were performed for each of three grade level groups.

The results of the initial regression analysis revealed that only the first Cloze test (T-1) served as a satisfactory predictor of the criterion variable, but with several curious qualifications. First, the relationship between the Cloze predictor and the criterion variable was an inverse one, \( B = -7.42 \), meaning that when subjects scored high on the Cloze test, they would, in turn, have low T-Unit length. Second, Cloze test number one only accounted for about 7% \( [R^2 = .07] \) of the variance in the criterion scores, a value only slightly higher than could be achieved by attempting to predict the criterion variable with random numbers.

The second series of stepwise regression analyses, performed within each of the grade levels, provided results which indicate that significant predictive relationships between the criterion and predictor variables exist only for 8th graders. For this grade level, only the Subordination and Nominalization Index satisfied the entry criterion associated with the .05 level of significance. For these data, no meaningful relationship was identified between the set of Cloze tests and the dependent variable, mean number of Words Per T-Unit of prose. The relationship between the two indices of writing complexity, the nominalization and subordination indices, and the criterion, Words Per T-Unit, however, appears to be quite strong as evidenced by the achieved multiple correlation coefficient of .82. These two predictor variables together accounted for slightly over sixty-seven per cent of the variability in the criterion \( (R^2 = .67) \), for the 8th graders.

Interestingly enough, none of the potential predictor variables achieved significance when Words Per T-Unit served as the criterion for 12th graders or College Seniors. Thus, it appears that, although both 12th grade students and College Seniors employ more transformations of the type identified by the indices of nominalization and subordination, these indices themselves do not serve satisfactorily as predictors of the mean number of words composing a syntactic unit of written prose for these two grade levels. As with the 8th grade students, the Cloze tests scores were of no value in predicting Words Per T-Unit for the 12th graders and College Seniors.

With the exception of Cloze tests T2 and T7, (see Table 2) whose means were observed to decline across grade levels, no score trends corresponding to the measures of production of syntactic transformations appeared. This result lends support to the author's belief that the Cloze test procedure may not be valid for measuring the reading comprehension of subjects whose written transformations indicate that they may be "chunking" information into much larger than single-word units.
Table 2
Cloze Test and Sentence Length Criteria (All Respondents)

<table>
<thead>
<tr>
<th></th>
<th>Grade 8</th>
<th>Grade 12</th>
<th>College</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOM</td>
<td>0.2307</td>
<td>0.6480</td>
<td>0.7130</td>
<td>0.5299</td>
</tr>
<tr>
<td>SUB</td>
<td>0.3983</td>
<td>0.5273</td>
<td>0.7823</td>
<td>0.5693</td>
</tr>
<tr>
<td>WDS</td>
<td>11.6566</td>
<td>15.3700</td>
<td>16.4533</td>
<td>14.4933</td>
</tr>
<tr>
<td>T1</td>
<td>0.8260</td>
<td>0.8233</td>
<td>0.6440</td>
<td>0.7644</td>
</tr>
<tr>
<td>T2</td>
<td>0.8640</td>
<td>0.7667</td>
<td>0.6850</td>
<td>0.7719</td>
</tr>
<tr>
<td>T3</td>
<td>0.7633</td>
<td>0.7933</td>
<td>0.7233</td>
<td>0.7667</td>
</tr>
<tr>
<td>T4</td>
<td>0.9363</td>
<td>0.9327</td>
<td>0.8700</td>
<td>0.9130</td>
</tr>
<tr>
<td>T5</td>
<td>0.8800</td>
<td>0.7940</td>
<td>0.8617</td>
<td>0.8452</td>
</tr>
<tr>
<td>T6</td>
<td>0.8233</td>
<td>0.9430</td>
<td>0.6433</td>
<td>0.8032</td>
</tr>
<tr>
<td>T7</td>
<td>0.9177</td>
<td>0.8740</td>
<td>0.6987</td>
<td>0.8301</td>
</tr>
<tr>
<td>T8</td>
<td>0.8753</td>
<td>0.7640</td>
<td>0.8420</td>
<td>0.8271</td>
</tr>
<tr>
<td>T9</td>
<td>0.9100</td>
<td>0.9323</td>
<td>0.7270</td>
<td>0.8564</td>
</tr>
</tbody>
</table>

Discussion
In seeking the supposed relationship between writing behavior and reading comprehension, this study produced interesting seminal ideas. Cloze test number one for example, was a low-value predictor of Words Per T-Unit and the inversion of Cloze scores and T-Unit length is strong. Yet failure of the Cloze tests to serve as satisfactory predictors of Words Per T-Unit strongly suggests that no meaningful relationship exists between the comprehension and the production of syntactic transformations by students, when comprehension is measured by the Cloze procedure. In this context, the research hypothesis (no predictive relationship between the comprehension and the production of syntactic transformations in the reading and writing of 8th, 12th, and college students) must be retained.

Gough (1973) has suggested that, in early stages of development, reading as a word-by-word process is most tenable. Yet other research shows the word-by-word process is only a threshold to a more expeditious, efficient way. Gibson (1972), for example, reports that a mature reader “actively searches for and uses regularities in language structure. His knowledge of the rules tells him where and how far to look and thus assists him to chunk the material in higher order units” (p. 15). In this study the writings of more noun phrases and clauses instead of single nouns reflects the chunking of material into high order units, or into longer T-Units. Such an assumption is further substantiated by the fact that in this study transformational chunking consistently increased through the higher grade levels, where there would be parallel reading development as well. There is reason to infer, then, that where transformational chunking occurs in writing in the form of more nominalizations to increase T-Unit length, there is likely chunking of similar type going on in the reading process.

With regard to Cloze test performance, behavioral studies have shown that mature readers often never perceive individual words in a serial line or print. Schiavone (1974) on research with the Reading Eye Camera reports that of his adult readers that, “they peruse only parts of lines and actually skip complete lines” (p. 27). In this study, Cloze tests required all subjects to have either full recall of all words in serial order of each twelve-word line of print, or ability to infer the correct fill-in word from the clues of surrounding words. In either case, the reader who read word-by-word would have...
benefited. The Cloze scores clearly show that 8th graders exceeded 12th and that both these younger groups exceeded University Seniors, who may be called mature readers. This fact is not only in keeping with Gough's word-by-word theory with young readers, but it also parallels the conclusions of Gibson and Schiavone about older readers not attending individual words as much as larger syntactic or semantic units. Finally, the inverse correlation between high scores on Cloze test number one and low words per T-Unit suggests that Cloze format is a more effective comprehension measure with younger, middle secondary school students.

REFERENCES


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THE RELATIONSHIP BETWEEN COMPREHENSION OF ORAL CONTRASTIVE STRESS AND SILENT READING COMPREHENSION

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In an effort to determine the degree of linear association between comprehension of contrastive stress and silent reading comprehension, a listening test was developed. The test was audio-taped and consisted of 64 multiple choice items utilizing eight sentence types. The speaker manipulated the element of primary stress across each sentence to form meaning changes in otherwise identical groups of sentences. Example:

Let me see the picture.
Let me see the picture
Let me see the picture.

It was the task of the listener to match meaning with the appropriate stress placement. The test was validated for content and construct validity, and the speaker was judged to speak “standard English.” The instrument yielded a Kuder Richardson (K-R20) intratest reliability coefficient of .92. The final version of the listening test was administered to 304 six-graders in two North Florida counties and the results were correlated with the results from that year’s Comprehensive Test of Basic Skills, silent reading comprehension scores for the same youngsters.

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