

## THE RELATIONSHIP BETWEEN READING AND SYNTACTIC SKILLS AMONG NAVAJO AMERICAN INDIAN STUDENTS

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*Reading is a process which requires that the learner deal explicitly with the structural features of language. This relationship appears to be present in bilingual/bicultural children and has been an issue of concern. The purpose of the present study was to determine if training in reading comprehension and oral syntax would improve oral syntax acquisition in a sample of Navajo American Indian children in the United States. Three matched groups with 12 subjects in each group (reading, syntax and a control group) participated in this study. The results revealed statistically significant gains on the Grammatical Comprehension and Reading Comprehension measures. This study seems to suggest that there is no particular advantage of a reading strategy over a syntax strategy, but that both interventions may result in improved oral syntax.*

*Die leesproses vereis dat leerders die strukturele kenmerke van die taal eksplisiet moet aanspreek. Hierdie verhouding tussen die teks en tweetalige/bi-kulturele leerders was die fokus van 'n studie wat gedoen is onder Navajo Amerikaanse Indiane in die VSA. Die doel van dié studie was om te bepaal of spesifieke opleiding in leesbegrip sowel as in mondelinge sintaksis sou lei tot 'n verbetering van mondelinge sintaksis. Drie gelyke groepe van twaalf kinders elk (d.w.s. 'n kontrolegroep, 'n groep wat onderrig in leesbegrip ontvang het en 'n groep wat onderrig in mondelinge sintaksis ontvang het) is gebruik. Statisties beduidende verbetering is gemeet t.o.v. grammatikale begrip en leesbegrip. Die studie dui aan dat die gebruik van 'n leesstrategie nie 'n beduidende voordeel oor 'n sintaksis-strategie inhou nie, maar dat die gebruik van die twee saam eerder die verlangde verbetering in mondelinge sintaksis teweegbring.*

### INTRODUCTION

Reading is said to be the process of translating printed words into language from which a reader is able to derive meaning (Venezky, 1976). A child's fundamental task in learning to comprehend text is to relate the printed text to his/her existing language (Guthrie, 1973). Tunmer and Cole (1985) suggest that reading is a process which requires the ability to deal explicitly with the structural features of language. Understanding structural features of written language is directly related to a child's acquired oral syntactic and grammatical skills, semantic skills, morphological, and phonological skills (Catts, 1986; Kahmi & Catts, 1989; Vogel, 1974; Weinstein & Rabinovitch, 1971).

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Interest in childhood language disorders has focused attention on the relationship between reading disabilities and oral language problems (Catts, 1986; Chesnick, 1992; Kahmi & Catts, 1989; Idol-Maestas, 1980; Menyuk, 1983; Wagner, 1986; Wiig & Semel, 1975). Children with reading disorders have been found to exhibit phonological problems (Catts, 1989; Wagner, 1986), morphological (Vogel, 1974), syntactic and representational problems (Dener, 1970), as well as sentence structure/retention problems (Weinstein & Rabinovitch, 1971). Cook and Sharp (1966) found that many mistakes made by learners of English as a second language could be attributed to their not accurately hearing the sounds that may not be found in the native language (e.g. manner of vowel articulation, nasalization and tonal contrasts). In Navajo and other Athapaskan languages (two American Indian languages of the United States), the voiceless /th/ sound does not exist. The contrast between some voiced and unvoiced stops also does not exist. For example, the English /t/ as in the word "toe" does not have a direct equivalent in Navajo. Other problem sounds for Athapaskan languages including Navajo include /f, r, j, n/ (Saville-Troike, 1974; Young, 1968).

The more traditional orientation to childhood language disorders has often led the speech-language pathologist (SLP), or speech-language therapist, to view language as a set of discrete and independent skills. That is, in the case of a child with diagnosed language deficits, remediation traditionally focuses on those deficits independent of any other medium of communication, such as writing, resulting in a splintering of the targeted remediation goals. The remedial programme frequently seeks to ameliorate the syntactic, semantic, phonologic, or morphologic oral language deficits without providing an environment that will facilitate the integration of these skills into the academic curriculum of the classroom. Thus, incorporating language into a wholistic form becomes the responsibility of the child, as does generalization of learned skills to the classroom.

Weinstein and Rabinovitch (1971) argue that an essential component to learning to read is that the student be able to utilize sequential ordering skills. In particular, students need to be able to learn and use grammatical markers. Grammatical markers are devices that signal the meaning of a word according to its structure. For example, nouns or pronouns usually follow an article. Given a complete utterance, the grammatical marker will be identified as one of four forms of a word (i.e. a noun, verb, adjective, or adverb). Grammatical markers, then, impose a predictable order on the production of the elements in a sentence, giving order to the structural features of that sentence. Fletcher (1983) reports that in the Navajo language 356,200 conjugations of the verb "to go" exist, while relatively few exist for the verb "to be". A significant aspect of Navajo language verbs is the notion of progressing through space with little reference to time. If Navajo American Indian (hereafter referred to as Navajo) children have difficulty in conjugating English verbs containing a time reference, some difficulty coding and de-coding these verbs in text may exist.

Reading contributes to the understanding of structural features of written language and the development of syntactic skills through the process of visual cueing. The exposure to the visual cues (print) may transfer to spoken language if the reader is able to internalize and generalize the learning (Menyuk, 1983; Tunmer & Bowey, 1983; Tunmer & Cole, 1985). A reader can internalize the learning of oral syntactic skills through reading if s/he is able to relate the written and spoken forms of language. Such ability requires the application of metalinguistic abilities that allow the child to reflect on and manipulate the syntactic features of language (Tunmer & Bowey, 1983).

To relate the written and oral aspects of syntax, a child must focus attention on discovering structural correspondences between written sentences and oral expression of sentences (Menyuk, 1983; Tunmer & Cole, 1985). For this relationship to be realized, the child must bring previously learned knowledge of syntactic structures to mind while processing written language. Syntactic sentence structure aids the deciphering and comprehending of the written text (Guthrie, 1973; Idol-Maestas, 1980; Menyuk, 1983; Vogel, 1974; Weinstein & Rabinovitch, 1971). For example, the syntactic cues in written text may assist the reader in understanding the semantic aspects of the text, thereby improving reading comprehension.

Thus, there appears to be a relationship between the ability to read printed text and the use of oral syntactic structure. Failure to process the syntax of written text accurately may result in failure to comprehend the intended meaning of text. Similarly, children's oral syntactic performance may often be a reflection of limited exposure to printed material (Kahmi & Catts, 1989).

These relationships are of particular concern in the education of bilingual/bicultural children (Anderson & Anderson, 1983; Rudes, 1988). American Indian students in Arizona (in the southwestern portion of the United States) in fourth and seventh grades (Arizona State Department of Education, 1992) scored below national US averages in reading, language, and mathematics on the Iowa Test of Basic Skills (a standardized basic skills test administered in a group of students) thus placing them at-risk for academic difficulties. Ima and Labovitz (1991) found in a study of language, ethnicity and standardized test performance that performance is strongly related to ethnicity. Reading is the area most susceptible to ethnicity. Oral language is more likely to measure skills based on memorization and learning effort.

The bilingual child learning English as a second language may produce less oral than written language (Dumont, 1972; Hamayan, 1992). Rindone (1988), for instance, found that Navajo students may be more competent in written English than spoken English. The Navajo student may thus show deficits in academic subjects such as reading because of a lessened ability to produce oral language. Stanovich (1980) has argued that the reading process is not an isolated skill, but functions in an interactive manner with various lexical and perceptual components within the bilingual individual. Walker (1989) states that readers continuously interact with text and that bilingual students are at-risk at every point in an interactive reading model. From a service delivery point of view, it would certainly

be most efficacious if improvement of both written and oral language skills could be demonstrated as part of a single teaching/training programme. If the relationship between reading and language is in fact symbiotic, the teaching of one or the other might result in improvement in both skill areas.

The purpose of the present study was to determine if training in reading comprehension or written syntax would improve oral syntax performance in a sample of Navajo American Indian children located on the Navajo reservation in the southwestern area of the United States.

## **METHOD**

Three matched groups (two experimental and a control) of 12 subjects each were selected to participate in this study. The matching variables included performance on the Reading Comprehension (RC) subtest of the *Stanford Diagnostic Reading Test (SDRT)* and the Sentence Combining (SC), Word Ordering (WO), and Grammatical Comprehension (GC) subtests of the *Test of Language Development 2 -Intermediate (TOLD 2-I)* and the *Detroit Test of Learning Aptitudes-2 (DTL-2)*. Third and fourth grade classrooms were randomly selected from an elementary (i.e. primary) school on the Navajo reservation in the state of Arizona located in the United States. The subjects were identified by administering the *SDRT* to one third and one fourth grade classroom. The three groups consisted of the following gender breakdown according to grade: third grade with seven girls, eleven boys; fourth grade six girls, twelve boys. In order to account for potential verbal memory bias as a factor in performance that might accrue to one of the experimental groups, the Word Sequencing (WS) subtest of the *Detroit Test of Learning Aptitudes-2 (DTL-2)* was also administered to these potential participants. From this group, all students scoring within the second and third quartile of the normed frequency distribution for their age were placed in a pool of potential participants. Subjects were then matched for age, grade level, reading comprehension, and syntactic performance, then randomly assigned to one of three groups. A one-way analysis of variance (ANOVA) comparing the mean values for each of the matching variables revealed no significant differences ( $p > .05$ ). Thus, all groups were judged to be evenly matched prior to the initiation of the study. Table One presents the mean scaled pre- and post-test scores and standard deviations for each group.

Table One. Pre Treatment Mean Scaled Scores (Standard Deviation)

Group	Sentence Combining	Word Ordering	Grammatical Comprehension	Stanford Reading Comprehension
Reading	10.17 (3.90)	9.17 (4.20)	9.67 (1.88)	43.83 (7.85)
Syntax	10.50 (3.45)	10.25 (4.77)	9.42 (2.23)	46.17 (9.61)
Control	10.00 (5.51)	8.42 (5.74)	10.33 (7.86)	43.08 (9.15)

## PROCEDURE

Within a period of five school days, all students were tested and assigned to one of three groups. The training programme for both experimental groups was implemented within two school days following the completion of the testing and group assignment. Each student received training for 20 minutes twice per week for four consecutive weeks. Although the training period in this study was limited (i.e. a total of 160 minutes for each student), it does, however, restrict the impact of the Hawthorne effect on the training groups. It also demonstrates that significant change can be achieved with non-native English speakers within a short time period. Intervention for speech-language pathology also tends to be limited in duration due to the pull-out method (taking students out of classrooms for small group therapy for half an hour to one hour in length, typically one to three times per week) and the need to mainstream students in a quick time period. The authors do recognize this as a study limitation. Training groups for each experimental condition consisted of three groups of four students each. The control group did not participate in any special training programme.

## **READING GROUP (RG) TRAINING**

During the first training session, the students were given the following grade appropriate paperback books recommended by their classroom teachers:

- Blume, J. 1980. *Superfudge*. New York: Dutton.  
Dahl, R. 1961. *James and the giant peach*. Ontario: Penguin Books.  
Gardiner, J.R. 1980. *Stone fox*. New York: Crowell.

The students took turns reading orally for a total of ten minutes. To encourage interest in the book, all students participated in a discussion following reading time. A reading assignment of 30 to 40 pages was given at the end of each of the eight sessions. A written quiz was administered during each session following each reading assignment. The purpose of the quiz was to determine if the students were fulfilling the reading assignment. The questions required simple answers regarding basic facts from the reading and were designed to be answered with a few key words (one to three word responses). Basic wh-questions (i.e. what, where, why, and who) were used (e.g. "What was Jamie's aunt's name?"). The answer involved a key character in the story that the child would know only if they had read the story.

Performance on the quizzes was charted for the 12 students throughout the training programme. The criteria were met by 10 students on all seven quizzes; the remaining two students met the criteria on six of the seven quizzes. The students read a total of 285 to 310 pages over the four week intervention period.

## **PROCEDURES FOR THE SYNTAX GROUP (SG)**

The training sessions for the syntax group were divided into four units with each unit being taught for one week (across the two sessions). The training consisted of the following hierarchy of tasks: (a) recognition of appropriately formed sentences in written form, (b) sentence construction with word cards provided, (c) completion of the missing word to form a grammatically correct sentence, and (d) production of written sentences with specific grammatical constructions. All exercises included work on past tense verbs, present tense verbs, future tense verbs, plurals, pronouns, adjective-noun pairing, and adverb-noun pairing. Possessive pronouns (her, his) and pronouns such as "he" or "she" were not used since they do not exist in the Navajo language.

The first unit was an exercise in selecting the correctly constructed sentence from a pair of written sentences with similar content. Two sentences were written on the board, e.g. "The men were working. The men was working", and the students were to identify the syntactically appropriate sentence. At the end of the session, the errors that were common to the group were discussed and the syntactic rules needed to correct the error were taught.

For the second syntactic unit, the students were provided with a group of index cards with printed words on them. The words on the index cards formed a sentence which increased in grammatical complexity. Students were instructed to put the cards into the correct sequence, i.e. syntactic order. The sentences initially consisted of four words building up to seven and eight word constructions. The students worked at their own pace, starting the next syntactic structure upon correct completion of the previous sentence. The highest level of sentence structure written included two subjects, one verb, two objects and an embedded clause.

The third syntactic unit was a forced choice word exercise. Each student was asked to choose the appropriate word from a pair of words and to write the word in the blank provided. For example, students had to choose the correct verb tense in the sentence, "Mike (ate, eat) the apple." At the end of the session, the errors that were common to the group were discussed and corrections were illustrated.

The fourth syntactic unit consisted of a drill and practice exercise focusing on the formation of sentences when the subject was given a specific grammatical construction. Initially, the definition of nouns, verbs, adverbs and adjectives were reviewed. The students were then given a verbal directive to write a sentence with a specific grammatical construction. For example, the students were asked to write their own sentence with a noun-verb-noun construction. After they had written their sentences, each student read his/her sentence to the group. Sentences consisted of the following construction types: [Noun Verb], [Noun Verb Noun], and [Noun Verb Adjective Noun]. Students were reinforced for attention to task, and errors that were common to the group were discussed. The syntactic rules needed to correct the error were taught.

## RESULTS

The analysis of the data for this study utilized the analysis of variance (ANOVA) procedure to assess the gain score differences in the pre-test to post-test conditions. The ANOVA procedure was the most parsimonious and appropriate analysis considering the data and sample size (Gay, 1981). All significant interactions were further analyzed using the Scheffe post hoc method. An initial ANOVA assessed the differences in mean gain scores across sex groupings. These analyses revealed no significant ( $p > .05$ ) performance differences for either males or females on any reading or language performance measure. Thus, all further analysis of mean gain scores were analyzed without regard to gender differences.

The next level of analyses compared overall mean gain scores for each dependent measure for each group. These data indicated significant differences for the Grammatical Comprehension and Reading Comprehension (RC) subtests. A summary of these data is presented in Table Two.

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Table Two. Post Treatment Mean Scaled Scores (Standard Deviation)

Group	Sentence Combining	Word Ordering	Grammatical Comprehension	Stanford Reading Comprehension
Reading	14.50 (4.56)	11.58 (4.96)	11.75 (5.46)	51.17 (3.64)
Syntax	15.50 (2.43)	14.75 (4.62)	12.52 (2.18)	49.00 (8.47)
Control	9.58 (3.70)	8.42 (5.32)	7.92 (1.73)	43.08 (9.15)

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A Scheffe post hoc analysis suggested that the Grammatical Comprehension performance differences between the syntax and the control group were significant at  $p < 0.05$ . Similarly, the Scheffe analysis for the Reading Comprehension performances indicated that both the reading and syntax groups performance was superior to that of the control group

( $p < 0.05$ ). These data are presented in Table Three.

Table Three. ANOVA Mean Gain Scores Across Groups With Scheffe Post Hoc Analysis

Group	Sentence Combining	Word Order	Grammatical Comprehension	Stanford Reading
Reading	4.33	2.41	2.08	7.34
Syntax	5.00	4.50	-3.10	2.83
Control	-0.42	0.00	-2.41	0.00
F value	1.994	1.177	4.014	6.960
P value	0.152	0.321	0.280*	0.003*
Scheffe			Sy vs. Ctl*	R vs. Sy * R vs. Ctl*

\* Significant at the .05 level

## DISCUSSION

This study set out to assess the effects of reading comprehension and written syntactic training on oral syntactic performances of Navajo American Indian children found in the United States. Analysis of the performance of the three groups showed that the control group did not make significant gains in either reading or syntactic skills. Thus, the gains observed in the experimental groups are attributable to the interventions provided and were effective in teaching the tasks they were intended to teach, especially since the interventions were brief in duration. The fact that improvement was demonstrated in two of the four dependent measures would seem to indicate that there is a moderate relationship between written language and oral language and not a strong relationship as previously indicated in the literature and as the authors had initially suspected (Catts, 1986; Kahmi & Catts, 1989; Idol-Maestas, 1980; Wiig & Semel, 1975). Masterson and Kahmi (1992) found certain trade-off effects among various linguistic components in syntax and phonology. Hence, no singular relationship seemed to exist between syntax and phonology. Chesnick (1992) found that children with oral language and oral and written language difficulties had problems with syntactic processing tasks and recalling random words. Children with only reading problems did better than children with both

oral and written problems. Thus, while reading and syntactic abilities may have some common underlying proficiencies, they appear to have separate yet related language processes.

The results in this study also indicated that, while there was a statistically significant gain from both pre-test to post-test conditions, the syntax group did not perform significantly better than the reading group on the Reading Comprehension (RC) or oral syntax subtests found on the *Test of Language Development 2-1* (i.e., Sentence Combining, Word Ordering, and Grammatical Comprehension subtests). Thus, this study would seem to suggest that there was no particular advantage of one intervention strategy over the other, but both interventions did result in improved oral syntax when compared to the control group. However, the present study does support the notion of a moderate interrelationship between oral and written language to the extent that both dimensions improved as a result of a specific written language training programme.

The data also suggest that children of non-native English speaking backgrounds can improve their reading and syntactic skills if given appropriate instruction. It is suggested that further study of reading and oral syntactic skills be examined over a longer intervention period.

Further, these data argue for a comprehensive curricular collaboration between the classroom teacher and the speech-language pathologist (SLP) for the teaching of oral and written language. Walker (1989) states that because of the years of reading failure and hence school failure that bilingual students experience, instruction needs to utilize strategy training in cooperative learning groups. The following suggestions may assist speech-language pathologists working with classroom teachers and non-native English-speaking students in achieving reading and school success. Seven tips from the Institute for Educational Research (cited in American Teacher, 1990) were adapted and followed:

1. Provide written copies of directions and assignments to complement oral instruction.
2. Be an example of correct language. Correct the student's errors only during formal instruction.
3. Don't restrict to the basics. Keep expectations high and engage students in tasks that require higher level thinking.
4. Students who may seem proficient in conversational English (oral language skills) may still need help with academic language tasks (e.g. reading, writing), including following written instructions and understanding subject specific vocabulary found in texts.
5. Build lessons on understanding background knowledge for textbook readings.
6. Keep students involved by asking prediction questions, such as "What do you think ...?"

7. Teach self-study skills such as note-taking, self-questioning, organizing, and test-taking.

The training program provided in this study was conducted using materials and procedures commonly found in the regular classroom setting. Thus, the use of classroom based reading and written curriculum materials could easily be implemented by the classroom teacher and reinforced by the speech-language pathologist. These activities would be designed to help the child retain and apply the new oral and written language skills across a variety of contexts both in and out of the classroom.

Students must be identified early to prevent reading, writing, and language problems from becoming an overall pervasive difficulty and possibly leading to school failure (Brice-Heath, 1986; Garcia & Ortiz, 1988). Early identification and appropriate instruction for diverse students appear to be critical factors for school success. It is important for school personnel to be aware of reading, writing, and language skills in order to assist non-native English speaking students in their education. Collaboration of school personnel should assist in making proper educational decisions for students. In turn, all students will have increased opportunities to acquire the skills they need to function as competent communicators in their schools and in society. Awareness of and sensitivity to persons who differ in culture, language, or ability are critical for success in all culturally diverse education programmes.

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