The Effectiveness of Direct Instruction Reading on African American, Caucasian, and Hispanic Students

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Abstract

The purpose of this study was to examine the effectiveness of Direct Instruction (DI) reading on Hispanic students when compared to Caucasian and African American students. The study used an Analysis of Covariance (ANCOVA) statistic to identify any potential differences in reading vocabulary, reading comprehension, and total reading achievement among the subgroups. The findings of this study suggest that statistically significant differences did exist between Hispanic, Caucasian, and African American students in reading vocabulary and total reading achievement using a Direct Instruction reading program. The Hispanic participants had a higher mean achievement gain score in reading comprehension than either Caucasian or African American students. The Hispanic participants also had a higher mean achievement gain score in both reading vocabulary and total reading achievement than the African American participants but a smaller mean achievement gain score than the Caucasian participa

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Introduction

One of the most important priorities of a school is teaching children to read. Teaching a child to read is not an easy task as "reading is a complex process - complex to learn and complex to teach" (Carnine, Silbert, & Kameenui, 1997, p. 2). Reading is the foundation on which all learning is built.

Learning to read is a developmental process and instruction tailored to the needs of each student is paramount (Heilman, Blair, & Rupley, 2002). Schools must improve the effectiveness of instruction and interventions for struggling readers or students will always be at-risk of failure in reading. This failure in reading can lead to failure in other subject areas that rely on reading. Many children will not become successful readers unless their teachers identify the necessary skills, find out what skills the children need, and teach those skills directly (Carnine, et al., 1997).

According to the Center on Instruction (2006), one of the most efficient ways to increase intensity of instruction for struggling readers is to provide instruction in small groups. This allows instruction to target specific needs of students, and allows students to have more opportunities to respond and receive feedback. These intensive interventions work best when teachers of struggling students teach in small groups giving the students more opportunities to participate actively in the lessons. Some children can learn to read regardless of the program used to teach them. However, many students fail to learn to read without explicit instruction and quickly fall behind in their reading achievement (Fredrick, Keel, & Neel, 2002). Therefore, it becomes essential in providing a structured reading program with step-by-step instructions to facilitate the students in overcoming the hurdle of reading. One scientifically research based reading program that has been the focus of many studies is Direct Instruction.

1.2 Theory and Research of Direct Instruction

> The Northwest Regional Educational Laboratory [NWREL], (2005) states: The Direct Instruction Model has evolved from a theory of instruction developed by Siegfried Engelmann of the University of Oregon. Engelmann's theory of instruction is that learning can be greatly accelerated if instructional presentations are clear, rule out likely misinterpretations, and facilitate generalizations (p. 2).

The American Association of School Administrators [AASA] et al., (1999) all agree that the primary goal of Direct Instruction (DI) is to increase student achievement through carefully focused instruction which provides intense efficient lessons that will allow all children—even the lowest performing—to master academic skills. The birth of Direct Instruction began when Engelmann and his colleagues set out to design a reading program for disadvantaged preschoolers in the 1960s. Their premise was the underdeveloped language skills many poor children bought to school and how it made learning to read difficult to almost impossible (Duffrin, 1996).

Engelmann believes that the effectiveness of a teaching strategy is measured by changes or lack of changes in behavior (Athabasca University, n.d.). In this view, when children fail to learn, it has nothing to do with how the brain is wired. Rather, the instruction must be unclear or poorly organized. He believes that if all variables of instruction can be controlled, learning will take place at a faster than normal pace. "The focus on carefully and controlled instruction is fundamental to Engelmann's scientific analysis of learning and development, and it is a cornerstone of his theory of instructional design and practice" (Athabasca University, n.d., para. 3). The goal of Engelmann was to design a program that was clear enough to teach any beginner learner (Duffrin, 1996).

The theory underpinning the Direct Instruction model has fundamental features of a behaviorist theory of learning that seeks scientific, demonstrable explanations for simple behaviors. Behaviorists believe: (a) learning is defined as a change in behavior, (b) a teacher can change children's behaviors by leading them through a given set of activities, and (c) the proper activities can be identified by measuring the response of the learners at each step and then by making appropriate adjustments (Duffrin, 1996). The idea is to eliminate misinterpretations, which can greatly improve and accelerate learning (AASA, et al., 1999). The two basic principles of Direct Instruction are:

1. All children can learn when taught efficiently, regardless of their learning history.
2. All teachers can be successful, given effective teaching materials and presentation techniques (McGraw-Hill Education, n.d.).

In all Direct Instruction programs, lessons are designed to be taught in small groups that involve brisk pace, a high rate of student opportunities to respond, group and individual turns, and immediate error correction to prevent students from developing gaps of knowledge. Classroom scripts are a hallmark of Direct Instruction—written, tested, rewritten, retested—polished in a cycle of classroom field testing and revision that ends only when trials show 90% of students grasp a lesson the first time presented (Directing Direct Instruction, 1997; J/P Associates, Inc., 2006c). Pacing is very important in a lesson because at-risk students need to move at a faster than normal pace to catch up. To facilitate learning, the use of signals keeps the children on task and responding together. Frequent interactions and chances to respond occur between the teachers and students throughout each DI lesson. Teaching the entire allocated time for reading every day by maximizing instructional time may be one way to ensure success for some students.

There is strong evidence that quality teaching makes a difference in the educational outcomes of the students (Marchand-Martella, et al., 2004). Effective instruction is a crucial part of any Direct Instruction lesson and is evident when the children are tested for mastery every five or ten lessons. Sanders and Rivers (1996) found that students who have strong effective teachers for three years in a row achieved 50 percent more learning than those students in classes with poor, weak teachers over the same period. Teacher training and in-classroom coaching are major features of a successful DI implementation.

As with other programs, a full implementation is the key to a program's success (Lindsay, 2004). A full Direct Instruction implementation advocates that all staff members, certified and non-certified, receive training in Direct Instruction generating more personnel for reading instruction. Training everyone allows smaller, more flexible ways to group students for reading.

1.3 Cultural Diversity and Achievement Gaps between Hispanics, African Americans, and Caucasians

In multiracial and multiethnic societies such as the United States, the many ways in which race, ethnicity, and culture influence student learning in formal educational settings is a wide spread issue (Morris, 2007). According to Willis (2000), the enrollment of children that are culturally and linguistically different from what is considered the mainstream U.S. culture will continue to increase as part of the rapidly and shifting demographics of school-aged children. A child's cultural background affects the skills, knowledge, and expectations that they bring to school. In fact, gender differences, ethnic origin, ability levels, primary language, and socioeconomic factors constitute the cause of low performance and achievement gaps among students (Mubenga, 2006).

Regardless of the student's race or culture, they may be at risk and therefore, must achieve more than the average student to catch up or jeopardize falling further and further behind as they go through school (Condon & Blaney, 1995). Students who are educationally disadvantaged include those we might suspect: those in poverty, minority race groups, those with disabilities, and English language learners (Merchand-Martella, et al., 2004). Students may be at risk because of "poverty, cultural and language differences, race differences, family and community differences, and schools that do not yet consistently make a difference in these children's learning" (Stringfield & Hollifield, 1996, p.1). There is persistent poverty among African American and Hispanic populations that influences the academic achievement levels of the groups. The cycle of poverty and low-literacy functioning is well documented, as is the achievement gap between Caucasian students and students of color (Corley, 2003). A significant correlation exists between race and poverty, with African Americans and Hispanics three times more likely to be impoverished than Caucasians (Proctor & Dalaker, 2002). Conditions of poverty, health and other social problems have made it difficult for some Hispanics living in the U.S. to improve their educational status (Padron, Waxman, & Rivera, 2002). The most recent reading assessment by the National Institute for Literacy (2002) found dramatic differences between Hispanic students and non-Hispanic white students: 56% of Hispanic fourth graders performed below the basic reading level for their grade, compared to 25% of non-Hispanic white students. These differences place English language learners at risk for school failure, as academic achievement is highly reliant on literacy skills (Padron, 1994).

Social class between African Americans, Hispanics, and Caucasians is an influential variable. Race is a persistent factor in employment statistics, educational attainment, and the acquisition of literacy skills, with significantly higher unemployment rates and lower educational attainment rates among African Americans and Hispanic Americans than among Caucasians (Corley, 2003). Research shows that education needs to be meaningful and responsive to students' needs, as well as linguistically and culturally appropriate (Tharp, Estrada, Dolton, Yamauchi, 2000).

The article, *The Role of Vocabulary in Building Comprehension* (2004), states that "children from all economic backgrounds—poverty, middle class, professional—have the same kinds of everyday language experiences; that is, they all hear talk about things, persons, relationships, feelings, actions, past and future events, etc." (p. 2). However, children in economically deprived families have fewer of these experiences. The limited opportunities to use language have an impact on the reading achievement of the children.

The following table (see Table 1) shows the differences researchers Hart and Risley (1995) found in early exposure to words among various social classes in the United States.
It is interesting to note that children from homes with professional parents hear 1538 more words per hour than children whose parents are on welfare, and 902 more words an hour than students from homes with working class parents. In addition, children from professional homes receive six times more positive affirmations per hour than children from welfare homes and almost three times more affirmations than children from working class parents.

Raising achievement of at-risk Hispanic, African American, and Caucasian students is indeed a great challenge. Educators must do everything in their power to support at-risk students and help each to experience success in school.

2. Methods

2.1 Research Question

After participating in a Direct Instruction reading program, is there a statistically significant difference in Hispanic students' reading vocabulary achievement, reading comprehension achievement, and total reading achievement when compared to African American and Caucasian students' reading vocabulary achievement as measured by the *Iowa Test of Basic Skills*?

3. Design

This study used the *Iowa Test of Basic Skills*, Form B test data of Hispanic, African American, and Caucasian students involved in a Direct Instruction reading program over a one-year period. The mean achievement gain scores were compared to determine differences in reading vocabulary, reading comprehension, and total reading achievement between Hispanic, African American, and Caucasian students in third, fourth, and fifth grades. The researcher chose a quasi-experimental, causal-comparative research design.

This design was chosen because the students mean achievement gain scores on the *ITBS* pretest and *ITBS* posttest were compared to determine relationships. The relationships between the gain scores were examined to determine whether Hispanic students when compared to Caucasian and African American students gain as much in reading vocabulary, reading comprehension, and total reading when participating in a DI reading program. These relationships were studied to identify possible causes.

3.1 Participants

Research was conducted in a small, rural school district in southeast Arkansas in the Mississippi River Delta consisting of only one lower elementary school (PreK-2), one upper elementary school (3-5), one middle school (6-8) and one high school (9-12). The district served approximately 1248 students during the study. Approximately, four percent of the school district's students were enrolled in an English as a second language program.

The third, fourth, and fifth grade African American, Caucasian, and Hispanic students from the upper elementary school were included in this study. The school was a Title I school with 85% of the students participating in the free and reduced lunch program. The racial population of the school was 7% Hispanics, 16% Caucasians, and 77% African Americans. The sample population used in this study consisted of 230 third, fourth, and fifth grade students who had participated in a DI reading program. Only the students who took both the *ITBS* pretest and *ITBS* posttest were included in the study. The total number of students enrolled in the school at this time was approximately 248. This sample represents about 93% of the overall population of third, fourth, and fifth grade students. There were 72 third graders, 72 fourth graders, and 86 fifth graders. There were 17 Hispanic students, 33 Caucasian students, and 180 African American students. The student population consisted of 115 males and 115 females. Table 2 summarizes the details of the descriptive analysis of participants included in this study.

4. Instrumentation

4.1 Direct Instruction Program

The *Reading Mastery Plus* reading program was used in third through fifth grades. Any student in third grade through fifth grade needing intensive reading intervention was placed in one of the *Corrective Reading* programs: *Decoding A*, *Decoding B1*, *Decoding B2*, or *Decoding C*. *Learning Through Literature* or *Novel Studies* was used when students completed the *Reading Mastery VI* program, regardless of the grade level.

The DI lessons in the *Corrective Reading* programs *Decoding A, Decoding B1*, and *Decoding B2*, lasted 45 minutes a day. The DI lessons in *Reading Mastery Plus* Level 3 and *Corrective Reading* program *Decoding C* were 60 minutes a day. The DI lessons in *Reading Mastery Plus*, Levels 4-6, and *Learning Through Literature* or *Novel Studies* lasted 75 minutes a day.

All Direct Instruction reading classes were scheduled at a common time allowing students to move from class to class, teacher to teacher, and group to group. This allowed each student to progress at the fastest possible rate. Students who were working above grade level, on grade level, or below grade level were able to move in and out of a group as needed based on achievement. The goal of the Direct Instruction implementation was to accelerate learning so that students who had fallen behind could catch up with their peers. These groups were flexible and allowed children to be periodically reassigned to a faster group. Immediate assistance was given to children who were struggling.

Before implementing any Direct Instruction reading program, the students were pretested for placement using the DI placement test. The DI placement test informed the examiner of the reading instructional level and program assignment for the child. The students were placed in homogeneous reading groups to aid the teacher in accelerating mastery of skills for each student. After placement in the DI program, the students were given mastery tests and rate and accuracy tests to check attainment of skills after every five or ten lessons.

The students or groups of students that did not meet the program's benchmark for that lesson were remediated. Frequent assessments built into the program evaluated the students for mastery. These assessments detected students who needed extra help before falling too far behind and also identified students who needed regrouping for instruction.

4.2 Iowa Test of Basic Skills

The *Iowa Test of Basic Skills*® (*ITBS*), Form B, provided reading vocabulary, reading comprehension, and total reading achievement test scores for the students included in this study. In order for the students to have the same opportunities, the teachers received training in proper procedures when administering the standardized tests. The conditions and methods for administering the tests were identical for all the students so a comparison of the test results could be possible between the different racial groups. The *ITBS* was administered, as part of the Arkansas statewide testing to all students in third, fourth, and fifth grades. All students, regardless of language backgrounds and cultures, were administered the *ITBS* tests.

5. Results

An Analysis of Covariance (ANCOVA) was used to answer the research question. When a quasi-experimental research design is used, pretest means might differ considerably. To adjust for initial differences in pretest means, an ANCOVA was used. This statistical procedure permitted the researcher to attribute observed gains to the effect of the experimental treatment (e.g., DI reading) rather than to differences in initial scores (e.g., *ITBS* Pretest). By using an ANCOVA, the mean achievement gain scores of each of the three subgroups (e.g., Hispanics, African Americans, Caucasians) were compared as if they had earned the same mean achievement score on the pretest at the beginning of the study. The results of the ANCOVA allowed the researcher to compare the mean achievement gain scores between the Hispanics, African Americans, and Caucasians. The researcher was able to determine whether a statistically significant difference existed in reading achievement in Hispanic students when compared to African American and Caucasian students using a DI reading program taught in the English language only.

5.1 Analyses of ITBS Reading Data by Race

The mean vocabulary score for the Hispanic students on the *ITBS* reading pretest and the *ITBS* reading posttest were lower than both the Caucasian and African American students. However, after participating in the study, the Hispanic students had a higher mean gain score in vocabulary than the Caucasian or African American students. Table 3 presents the analysis of *ITBS* reading data by race.

The mean comprehension scores on both the *ITBS* pretest and the *ITBS* posttest showed African American students scoring lower than both the Hispanic and Caucasian students. In addition, after participating in this study, the Hispanic students had a higher mean gain score in comprehension than the Caucasian or African American students.

The mean total reading score for the Hispanic students on the *ITBS* reading pretest was lower than both the Caucasian and African American students. However, the mean total reading score for the Hispanic students on the *ITBS* reading posttest was higher than the African American students, but lower than the Caucasian students. Nonetheless, after participating in this study, the Hispanic students had a higher gain score in total reading than the Caucasian or African American students.

5.2 Analysis of ITBS Reading Data by Grade

The mean vocabulary scores on both the *ITBS* pretest and the *ITBS* posttest showed the fifth grade students with the highest vocabulary mean score. In addition, the fourth grade students had a higher mean vocabulary score than the third grade students. However, after participating in the study, the third grade students made more gains than the fourth grade or fifth grade students. In addition, the fourth grade students made higher gains than the fifth grade students.

The mean comprehension scores on both the *ITBS* pretest and the *ITBS* posttest showed the fifth grade students with the highest comprehension mean score. In addition, the fourth grade students had a higher mean comprehension score than the third grade students. However, after participating in the study, the fourth grade students made more gains in comprehension than the third grade or fifth grade students. In addition, the fifth grade students made higher gains than the third grade students.

The mean total reading scores on both the *ITBS* pretest and the *ITBS* posttest showed the fifth grade students with the highest total reading mean scores. In addition, the fourth grade students had a higher mean total reading score than the third grade students. However, after participating in the study, the fourth grade students made more gains than the third grade or fifth grade students. In addition, the third grade students made higher gains than the fifth grade students. Table 4 presents the analysis of *ITBS* reading data by grade.

5.3 Analysis of ITBS Reading Data by Gender

The mean vocabulary scores for the male students on the *ITBS* pretest and the *ITBS* posttest were lower than the mean vocabulary scores for the female students included in this study. However, after participating in this study, the male students had a higher gain score in vocabulary than the female students. Table 5 presents the analysis of *ITBS* reading data by gender.

The mean comprehension scores for the male students on the *ITBS* pretest and the *ITBS* posttest were lower than the mean vocabulary scores for the female students included in this study. On the other hand, after participating in this study, the female students had a higher gain score in comprehension than the male students.

The mean total reading scores for the male students on the *ITBS* pretest and the *ITBS* posttest were lower than the mean vocabulary scores for the female students included in this study. However, after participating in this study, the male students had a higher gain score in total reading than the female students.

6. Research Questions Analysis

The research question was analyzed using an Analysis of Covariance (ANCOVA) to determine statistical significance. The standard scores in reading vocabulary, reading comprehension, and total reading on the *ITBS* pretest and *ITBS* posttest were used to determine mean achievement gain scores for the different subgroups of students included in this study. The achievement gain scores of the Hispanic students were compared with the achievement gain scores of the Caucasian and African American students. Since DI was taught in the English language only, the researcher was seeking to find whether Hispanics made more, less, or the same gain in vocabulary achievement as the students of other races and whether this gain was significant.

To answer the question and to determine the significance of the findings, an Analysis of Covariance (ANCOVA) was used to analyze the mean achievement gain scores among the subgroups in relationship to vocabulary achievement, reading comprehension achievement, and total reading achievement. To adjust for individual differences at the beginning of the study, the *ITBS* pretest was the covariate and the *ITBS* posttest was the dependent variable. The independent variables were race (e.g., Hispanics, Caucasians, African Americans) and DI reading. By covarying and equalizing the *ITBS* pretest, the ANCOVA results computed adjusted mean scores. These adjusted mean scores were more dependable in reporting the results because participants started at the same point on the pretest. This ruled out the individual differences among participants at the beginning of the study.

6.1 Research Question

After participating in a Direct Instruction reading program, is there a statistically significant difference in Hispanic students' reading vocabulary achievement, reading comprehension achievement, and total reading achievement when compared to African American and Caucasian students' reading vocabulary achievement as measured by the *Iowa Test of Basic Skills*?

6.1.1 Reading Vocabulary Achievement

In this study, given this particular group of students, all the subgroups of participants had an increase in reading vocabulary achievement. The adjusted posttest means show that the students had a difference in reading vocabulary achievement using a DI reading program. The Hispanic students had higher mean achievement gains than the African American students in vocabulary, but less than the Caucasian students. The ANCOVA results indicated that the posttest differences between the three groups were statistically significant. The calculated value of F was significant ($F = 8.18$, $df = 2$, $p < .01$). It can be concluded that the adjusted posttest means were significantly different in the degree indicated, $p < .01$.

The ANCOVA assumed that the slopes of the regression lines for each of the groups considered separately did not significantly differ from the slope of the overall within group regression, which was 198.3. If they did significantly differ, then the Analysis of Covariance would have been invalid and any positive conclusion drawn from it would have been potentially false and misleading.

The assumption of homogeneity of regression was satisfied. Any value of *F* equal to or smaller than 1.0 will be non-significant. In this study, the F-ratio was non-significant ($F = 0.95$, $p = 0.39$). Table 6 reports the ANCOVA results for this research question.

6.1.2 Reading Comprehension Achievement

In this study, given this particular group of students, all the subgroups of participants had an increase in reading comprehension achievement. The adjusted posttest means show that the students did have a difference in reading comprehension achievement using a DI reading program. The Hispanic students had higher mean achievement gains than both the Caucasian and African American students in comprehension.

The ANCOVA results indicated that the posttest differences between the three groups were not statistically significant. The calculated value of *F* was not significant ($F = 1.03$, $df = 2$). It was concluded that the adjusted posttest means between the three races were not significantly different. Table 7 reports the ANCOVA results for this research question.

The ANCOVA assumed that the slopes of the regression lines for each of the groups considered separately did not significantly differ from the slope of the overall within group regression, which was 223.87. If they did significantly differ, then the Analysis of Covariance would have been invalid and any positive conclusion drawn from it would have been potentially false and misleading. The assumption of homogeneity of regression was satisfied. The F-ratio was non-significant ($F = 1.4$, $p = 0.25$).

6.1.3 Total Reading Achievement

In this study, given this particular group of students, all the subgroups of participants had an increase in total reading achievement. The adjusted posttest means show that the students had a difference in total reading achievement using a DI reading program. The Hispanic students had higher mean achievement gains than the African American students in total reading, but less than the Caucasian students. The ANCOVA results indicated that the posttest differences between the three groups were statistically significant. The calculated value of *F* was significant ($F = 4.25$, $df = 2$, $p < .05$). It can be concluded that the adjusted posttest means were significantly different in the degree indicated, $p < .05$. Table 8 reports the ANCOVA results for this research question.

The ANCOVA assumed that the slopes of the regression lines for each of the groups
considered separately did not significantly differ from the slope of the overall within group regression, which was 120.89. If they did significantly differ, then the Analysis of Covariance would have been invalid and any positive conclusion drawn from it would have been potentially false and misleading. The assumption of homogeneity of regression was satisfied. Any value of *F* equal to or smaller than 1.0 will be non-significant. In this study, the F-ratio was non-significant ($F = 0.77$, $p = 0.46$).

Many educational differences exist between Hispanics, African Americans, and Caucasians. The background cultures of the children influence achievement in school with disparity in achievement existing among students with different language barriers and different racial backgrounds. These findings were consistent with current research studies (e.g., Padron, et al., 2002; Goldenberg, 2006) pointing to an achievement gap between Hispanics and other races.

7. Discussion

The *No Child Left Behind* legislation has increased accountability for all students regardless of the students' language backgrounds or cultures. The Hispanic population has been growing continually each year creating an issue for schools. Every student must take state mandated tests regardless of background languages or cultures. There is so much pressure on schools to have each student scoring at state mandated levels that the researcher of this study was seeking to discover whether the Hispanic students at the upper elementary school in southeast Arkansas made more, less, or the same achievement gains in reading vocabulary, reading comprehension, and total reading achievement as the Caucasian and African American students.

The third, fourth, and fifth grade students in this study on average made gains in reading vocabulary, reading comprehension, and total reading achievement. According to the ANCOVA results, the Hispanic students made a higher mean achievement gain score than the African American students in reading vocabulary, reading comprehension, and total reading achievement. The Caucasian students made a higher mean achievement gain score than the Hispanics and African Americans in reading vocabulary and total reading achievement.

The Hispanics made a higher mean achievement gain score in reading comprehension than the Caucasian or African American students. Even though the Hispanics did not attain the same level of achievement with the Caucasians or African Americans in every area, the Hispanics did close the achievement gap somewhat between the different racial groups. The ANCOVA results reported the Hispanic students exceeding the African American students in all three areas: reading vocabulary, reading comprehension and total reading achievement. These results help to support the findings of previous studies (e.g., Becker & Gersten, 1982; Gersten, 1985; Bessellieu, et al., 2001, DiChiara, 2001; J/P Associates, 2006a) involving Direct Instruction reading.

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Table 1

Actual Differences in Quantity of Words Heard

In a typical hour, the average child would hear:	
Professional	2153 words
Working Class	1251 words
Welfare	615 words

Actual Differences in Quality of Words Heard

In a typical hour, the average child would hear:	
Professional	32 affirmations
Working Class	12 affirmations
Welfare	5 affirmations

Source: Hart & Risley, (1995)

Table 2

Descriptive Analysis of Participants at the Upper Elementary School

	Grade 3		Grade 4		Grade 5	
	Males	Females	Males	Females	Males	Females
Hispanics	2	2	3	4	5	1
Caucasians	3	7	9	5	4	5
African Americans	32	26	26	25	31	40

Table 3

Analysis of *ITBS* Reading Data by Race

	Hispanics	Caucasians	African Americans
	M	*M*	*M*
Vocabulary Pretest	168.47	192.94	173.36
Vocabulary Posttest	184.71	208.70	184.98
Vocabulary Gain	16.24	15.76	11.62
Comprehension Pretest	176.0	196.52	175.15
Comprehension Posttest	191.06	208.09	186.53
Comprehension Gain	15.06	11.57	11.38
Total Reading Pretest	172.18	194.45	174.16
Total Reading Posttest	187.82	208.82	185.86
Total Reading Gain	15.64	14.37	11.70

Table 4

Analysis of *ITBS* Reading Data by Grade

	Third Grade	Fourth Grade	Fifth Grade
	M	*M*	*M*
Vocabulary Pretest	159.85	174.88	189.94
Vocabulary Posttest	176.03	189.99	197.34
Vocabulary Gain	16.18	15.11	7.40
Comprehension Pretest	166.67	178.92	187.47
Comprehension Posttest	176.57	193.49	198.21
Comprehension Gain	9.90	14.57	10.74
Total Reading Pretest	163.21	176.89	188.43
Total Reading Posttest	176.50	191.65	198.03
Total Reading Gain	13.29	14.76	9.60

Table 5

Analysis of *ITBS* Reading Data by Gender

	Males	Females
	M	*M*
Vocabulary Pretest	173.60	178.00
Vocabulary Posttest	186.80	189.92
Vocabulary Gain	13.20	11.92
Comprehension Pretest	174.57	181.98
Comprehension Posttest	185.78	194.13
Comprehension Gain	11.21	12.15
Total Reading Pretest	173.90	179.95
Total Reading Posttest	186.37	192.23
Total Reading Gain	12.47	12.28

Table 6

ANCOVA Results for Reading Vocabulary

Race	N	Observed Means	Adjusted Means
Hispanics	17	184.71	189.37
Caucasians	33	208.70	197.82
African Americans	180	184.98	186.54

Source	SS	*df*	MS	*F*	*P*
Adjusted Means [Between Groups Effect]	3243.11	2	1621.55	8.18	0.000372**
Adjusted Error [Within Groups]	44797.95	226	198.22		
Adjusted Total	48041.06	228			

Note: The observed means are the posttest means one would have expected if the groups in the study had a variety of pretest means. The adjusted means are the posttest means one would have expected if all the groups in the study had the same pretest means. **Significant at the .01 alpha level.

Table 7

ANCOVA Results for Reading Comprehension

Race	N	Observed Means	Adjusted Means
Hispanics	17	191.06	192.99
Caucasians	33	208.10	192.63
African Americans	180	186.53	189.18

Source	SS	*df*	MS	*F*	*P*
Adjusted Means [Between Groups Effect]	463.80	2	231.90	1.03	0.358677
Adjusted Error [Within Groups]	50774.25	226	224.66		
Adjusted Total	51238.05	228			

Note: The observed means are the posttest means one would have expected if the groups in the study had a variety of pretest means. The adjusted means are the posttest means one would have expected if all the groups in the study had the same pretest means.

Table 8
ANCOVA Results for Total Reading

Race	N	Observed Means	Adjusted Means
Hispanics	17	187.82	191.78
Caucasians	33	208.82	194.22
African Americans	180	185.86	188.16

Source	SS	*df*	MS	*F*	*P*
Adjusted Means [Between Groups Effect]	1025.24	2	512.62	4.25	0.015421*
Adjusted Error [Within Groups]	27265.59	226	120.64		
Adjusted Total	28290.83	228			

Note: The observed means are the posttest means one would have expected if the groups in the study had a variety of pretest means. The adjusted means are the posttest means one would have expected if all the groups in the study had the same pretest means. *Significant at the .05 alpha level.