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The Effects of Using Colored Overlays
On the Reading Skills of Visually Dyslexic Children

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Abstract

Reading is a critical skill that all students must learn, but for the child with dyslexia it can be a very difficult task to overcome. A tool that may be used to accommodate a student with dyslexia is that of a colored overlay. The following is a study that examined the effects of colored overlays on the reading skills of one fifth-grade student and one sixth-grade student who are dyslexic. The Woodcock Reading Mastery Tests - Revised and an informal reading assessment were used as the measuring instruments. The results of those two tests were examined to find the relationship between errors without the use of overlays and errors with the use of overlays. The conclusions from this study showed there are positive effects with the use of colored overlays with some children with dyslexia.

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Table of Contents

List of Appendices	p. 5
List of Tables	p. 6
List of Figures	p. 7
Text of Thesis:	
Literature Review	p. 8
Research Studies	p. 16
Methods	p. 23
Subjects	p. 23
Instruments	p. 24
Experimental Design	p. 26
Procedure	p. 27
Analysis of Data	p. 29
Results	p. 29
Discussion	p. 32
References	p. 34
Appendices A-C	p. 38
Tables 1-7	p. 50
Figures 1-2	p. 66
Biography of Author	p. 70

List of Appendices

Appendix A Permission Forms
Appendix B Colored Overlay Questionnaire
Appendix C Informal Assessment Forms

Table 4 Scores - Informal Assessment (theta)
Table 5 Scores Comparison (theta and theta)
Table 6 Scores Correlation (theta)
Table 7 Scores Correlation (theta)

List of Tables

Table 1 Scores - Woodcock Reading Tests (Kelly)
Table 2 Scores - Woodcock Reading Tests (Bruce)
Table 3 Scores - Informal Assessment (Kelly)
Table 4 Scores - Informal Assessment (Bruce)
Table 5 Score Comparisons (Kelly and Bruce)
Table 6 Score Correlation (Kelly)
Table 7 Score Correlation (Bruce)

List of Figures

- Figure 1 Pretest vs. Posttest (Kelly)
Figure 2 Pretest vs. Posttest (Bruce)

The Effects of Using Colored Overlays On the Reading Skills of Visually Dyslexic Children

For almost 100 years physicians, psychologists, researchers, teachers, parents, and individuals have been attempting to define the term "dyslexia" (Levinson, 1980). The general public believes dyslexia is only a reading problem; however, dyslexia can affect all parts of a person's life (Griesbach, 1993). Some psychologists believe dyslexia originates from a low socioeconomic status or from educational disadvantages (Griesbach, 1993). Griesbach (1993) wrote that educators feel the term, "dyslexia," involves writing, reading, spelling, and/or speech. Dyslexia, as seen by persons in the medical field, involves physical, organic, and neurological aspects (Griesbach, 1993).

An Iowa doctor by the name of Samuel J. Orton was the first to produce a testable hypothesis regarding dyslexia (Griesbach, 1993). Dr. Orton discovered some children with normal intelligence could not be taught to read by standard methods (Griesbach, 1993). He referred to this condition as "word blindness" (Griesbach, 1993).

Another hypothesis concerning dyslexia involves the possibility of cerebral lateralization which means that dyslexics do not have a dominant hemisphere. All dyslexics do not share the same symptoms (Griesbach, 1993).

Many definitions of dyslexia exist, but they do involve many of the same variables. Hallahan and Kauffman (1991) indicated that the most commonly accepted definition of learning disabilities endorsed by the federal government is:

"Specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. (Federal Register, 1977, p. 65083)

Hynd and Cohen (1983) stated that dyslexic children have a severe reading disability which is not caused by secondary disabilities. Other factors exist

that may attribute to the incidence of dyslexia in the general population (Hynd & Cohen, 1983). These factors may include sex, heredity, and the psycholinguistic characteristics of the child's native language (Hynd & Cohen, 1983). The incidence rate in the United States is estimated to be between three and six percent of the population of school-age children (Hynd & Cohen, 1983).

As one may assume, the manner in which dyslexia is defined would appear to have a great impact on the treatment of the dyslexic (Hynd & Cohen, 1983). Two such treatments to be used with children who have reading difficulties are those of colored overlays and tinted lens filters. The overlays are placed on the page from which the child is reading. The filters are applied to lenses that are worn while reading. These color technologies were developed by Helen Irlen of the Irlen Institute for Perceptual and Learning Development (Rickelman & Hank, 1990). "Both of these technologies reportedly help combat an assumed visual perception problem known as Scotopic Sensitivity Syndrome" (Rickelman & Henk, 1990, p. 166). Scotopic Sensitivity Syndrome (SSS) has been "linked by Irlen and her associates with dyslexia" (Henk, 1992, p. 210). Marie Carbo (1983) suggests that research has led to the

conclusion that there is a relation between reading performance and perceptual abilities. The use of colored overlays could be a very simple solution to what is a very complex problem (Rickelman & Henk, 1990). "The overlays filter the light twice, before it hits the paper and then afterward as it heads toward the eye" (Henk, 1992, p. 213).

The researcher concentrated on visually dyslexic children who have severe reading problems (Goldberg, Shiffman, Bender, Kanner, 1983). Visual dyslexia refers to a person's inability to read and sometimes comprehend material. Auditory dyslexia refers to a person's inability to hear sounds appropriately. The term dyslexia and reading disabilities, as well as reading difficulties, will be used interchangeably. This study was designed to determine if visually dyslexic children benefit from the use of colored overlays in their reading abilities.

Literature Review

Reading is a skill that requires the ability to master a number of different factors. Children with learning disabilities, however, have a great deal of difficulty in acquiring all of these factors. Research on the use of overlays and filters has provided some

promising results in providing children with dyslexia a solution to some obstacles found in the ability to read (Rickelman & Henk, 1990). Saint-John and White (1988) reported that the use of tinted lenses is quite popular in Australia. "For example, officers of the South Australian Branch of the Specific Learning Difficulties Association (SPELD) have prescribed coloured lenses for approximately 75% of about 3,000 specific reading disabled children who have contacted them since 1985" (Saint-John & White, 1988, p. 403).

A recent study by O'Connor, Sofo, Kendall, and Olsen (1990) shows that many of the children with reading difficulties have a disorder known as Scotopic Sensitivity Syndrome (SSS). SSS may involve the perceptual factor that is required in reading and understanding material (Rickelman & Henk, 1990). SSS may include such aspects as photophobia which is a sensitivity to glare and brightness (Rickelman & Henk, 1990). Rickelman and Henk (1990) further stated that photophobia may be attributed to light intensity, especially that of fluorescent lighting. The ability to accommodate the contrast of white pages with black print, known as background accommodation, is another component of SSS (Rickelman & Henk, 1990). Another

condition of SSS reported by Rickelman & Henk (1990) is that of span of focus which is the ability to perceive groups of words clearly at the same time. Being able to perform visual tasks for a long period of time, known as sustained focus, is also a part of SSS (Rickelman & Henk, 1990). Children with SSS may have all of these conditions or some of these conditions. The degree of these conditions may vary from child to child (Rickelman & Henk, 1990). The researchers, Rickelman and Henk (1990), stated the causes of SSS are not known nor are the reasons why the colored overlays and lens filters seem to help in remedying the problems that many dyslexic children have with reading. A high correlation exists between oculomotor problems and symptoms that are characteristic of SSS (Blaskey, Scheiman, Parisi, Ciner, Gallaway, Selznick, 1990).

In continuing the discussion of SSS, Beverly Butt (1991) stated that persons with reading disabilities don't realize that they see the page differently from other people. "Glare on a printed page can cause them so much eyestrain they cannot read comfortably for more than 10-15 minutes....letters may begin to move, disappear, or become blurry. Some see bright spots, dots, or colours on the page" (Butt, 1991, p. 38).

Butt (1991) continued by stating that some children with SSS see the whole page vibrating or swirling. She further stated that research has shown that symptoms of SSS may be eliminated by using special non-glare coloured overlays (Butt, 1991). The research shows that persons using the overlays may be able to see non-moving print. They may be able to read for longer periods of time without the usual eyestrain and the readers' comprehension may improve (Butt, 1991).

Educators and parents should be made aware of SSS as a condition that does exist. According to the literature, an estimated 48% of the learning disabled population and 8-15% of the general population have symptoms of SSS (Butt, 1990). Research showed that lower ability readers are more likely to have symptoms of SSS than are high ability readers (O'Connor et al., 1990).

Researchers investigating the effectiveness of tinted lenses or colored overlays should not assume that the subjects have had a previous eye examination (Blaskey et al., 1990). If possible, an eye examination should be included as part of the assessment (Blaskey et al., 1990). Hoyt (1990) stated that a study into the "effectiveness of Irlen lenses

will require an ophthalmologist or optometrist to be an integral part of the study so that all students may be carefully examined at the time of entry into the study" (p. 624).

A student would have to go through a number of screening processes to detect the possibility of various conditions of SSS. The initial screening procedure would be done through an independent, professional eye examination (Rickelman & Henk, 1990). Rickelman and Henk (1990) contend that when the condition is detected, several comparison trials with colored overlays are conducted to determine those offering the most relief. If the individual decides to wear lens filters, the next level of screening would allow the appropriate identification of lens filters (Rickelman & Henk, 1990). The authors further stated that this portion of the screening process can be lengthy and very intensive.

In comparing the use of colored overlays to the lens filters, the lens filters allow for more applications including reading from the chalkboard, colored paper, and monitor screens of computers (Rickelman & Henk, 1990). However, the screening process and purchase of the lens filters can be

somewhat expensive. Therefore, the colored overlays would be an inexpensive tool to use to improve the reading abilities of dyslexic children (Rickelman & Henk, 1990).

With the emphasis being placed on individualized instruction, colored overlays would provide a tool that could be easily used by each student (Carbo, 1984). Marie Carbo (1983) suggests that "correlational research comparing the learning styles of good and poor readers indicates that poor readers may, in part, have difficulty learning to read because instruction has not accommodated their individual learning styles" (p. 491). According to Marie Carbo (1984), a student's reading ability depends on his learning style preferences. One of these preferences could be the lighting in the room. The knowledge of Scotopic Sensitivity Syndrome and the use of colored overlays could provide some insight as to the difficulties in reading that some children experience.

Research Studies

Studies that have been done concerning the use of colored overlays and lens filters basically fall into three categories. Blaskey et al., (1990) described these three categories as: "those that found no

improvement in reading performance after using tinted lenses, studies that reported improvement, and those that reported mixed success" (p. 604). The authors suggested the placebo effect may have some influence on the results. Individuals who have problems reading are constantly searching for ways to improve. Research also shows that even if students' reading skills do not improve with the use of the lens filters or overlays, their self-esteem does (Blaskey et al., 1990).

Another issue to be considered is the color preference of the overlays or the lens filters. Would this have any effect on the improvement of the reading rate and accuracy of the learning disabled reader (Blaskey et al., 1990)? Even the question of the depth of the overlays has been studied. Hannell, Gole, Dibden, Rooney, and Pidgeon (1991) stated that the depth of a single colored overlay can be modified by overlapping it with another colored transparency. In this particular study, the researchers only covered half of the page with either a single or double sheet of each color. Therefore, the subjects were able to see half of the page with black print on a white background and the other half of the page through the colored overlays of various combinations (Hannell et

al., 1991). An interesting conclusion from this study is that the two subjects involved showed no syntactic errors when using the colored overlays while errors were made when not using the overlays (Hannell et al., 1991). The authors state "adequate visual-perceptual processing of print is, of course, a prerequisite for accurate reading" (Hannell et al. 1991, p. 69).

Blaskey et al., (1990) concluded from their study that subjects did report a change in some of the symptoms associated with Scotopic Sensitivity Syndrome while using the filters; however, the vision tests showed no change. Colored overlays and lens filters are not cures for vision problems, but may improve reading abilities. Conclusions from this study suggested that while no statistically significant changes in oral reading or reading comprehension occurred, an improvement in reading recognition did occur. This improvement was found only in three of the 11 subjects (Blaskey et al., 1990). "The data suggests that the immediate primary positive effect of Irlen filters is reduction in visual complaints" (Blaskey et al., 1990, p. 609). To summarize, individuals in this study were more comfortable while using the Irlen

filters, but only exhibited minor improvements in any of the reading areas examined.

In a study by Robinson and Miles (1987), subjects were divided into three groups according to the number of symptoms demonstrated in the Irlen Differential Perceptual Schedule (Robinson & Conway, 1990). These persons had been referred for help with reading problems. "These groups were tested on word matching, word recognition, letter recognition, and number recognition tasks developed for the study, under three conditions of use: (1.) a randomly selected plastic overlay, (2.) a clear plastic overlay, and (3.) a colored plastic overlay reported by each subject to reduce distortions..." (Robinson & Conway, p. 589, 1990). Because of the possibility of exaggerating the symptoms of Scotopic Sensitivity Syndrome by using white paper with black print all forms of the tests were controlled by being given on white paper with black print (Robinson & Conway, 1990). Solan (1990) suggested, however, that changing the colored paper on which the tests were standardized may invalidate the accuracy of the tests. The research done by Robinson and Miles (1987) did show that at the final testing, performance levels were much greater for accuracy,

rate, and comprehension than they had been at the initial testing (Robinson & Conway, 1990). The results of this study are synonymous to the study done by O'Connor and Sofo which also showed statistically significant improvements in comprehension, rate, and accuracy of reading when using colored overlays (Robinson & Conway, 1990). Dr. Irlen has also provided research that demonstrates an increase in word-matching and letter-recognition tasks when subjects use the colored overlays. Based on the information gathered from these studies, improvement in specific reading skills may be the result of colored overlays (Robinson & Conway, 1990). All research reviewed has not shown such positive effects.

An important factor that may play a role in the results of using colored overlays to improve reading skills is that of the subject's motivation. Most children who experience difficulties in reading have low self-esteem. If they are allowed the use of colored overlays, an increase in motivation may occur and the subjects will try much harder. The subjects may reread words or passages that they had not done before and they may correct reading errors more often than previously demonstrated (Robinson & Conway, 1990).

Henk (1992) believes that an individual's self-perception of treatment effectiveness, real or imagined, is an important motivator.

Literature exists, however, from the field of optometry that is not all positive in relationship to the improvement of reading due to the use of colored overlays (Henk, 1992). Optometrists may lean towards diagnosing more cases of Scotopic Sensitivity Syndrome to increase the growth of their clientele (Henk, 1992). Henk (1992) stated in his writing that much of the supportive research for the use of colored overlays and Irlen Filters has come from individuals connected with Irlen clinics. The sale of the Irlen products could have some influence on the perceived significance of the use of colored overlays.

Henk (1992) suggested that the causes of Scotopic Sensitivity Syndrome and the reasons behind the remedy of using colored overlays and filters are well understood. "The colored overlays and filters are thought to selectively reduce the input of specific troublesome wavelengths of light. In effect, frequencies that may cause perceptual distortion are eliminated before they reach the retina and the brain" (Henk, 1992, p. 214). Therefore, visual information

may be analyzed more effectively (Rickelman & Henk, 1990). Further research and studies are needed to provide more evidence of the positive effects of colored overlays.

As a result of the related research literature, it is hypothesized that the use of colored overlays will help to improve reading rate, reading accuracy, reading comprehension, and reading fluency for dyslexic students.

Kelly is a Caucasian female, age 13-4 who lives with her mother, father, and brother in a rural, farming area. Through the special education eligibility process, Kelly was diagnosed as being dyslexic. The dyslexia has interfered with her ability to process information, so paper and pencil

Method

Subjects

The names, Kelly and Bruce, were pseudonyms for the subjects participating in this study. These subjects' real names were not used in this research project or on any samples, tests, or other related materials. This procedure was done in accordance with the ensured confidentiality of both subjects.

The subjects, Kelly and Bruce, are enrolled in a special education program in conjunction with the local and state guidelines for learning disabilities. Kelly remains in the self-contained classroom for students with learning disabilities for all academic subjects and non-academic activities of the school day. Bruce comes into the classroom for students with learning disabilities for the subjects in the language arts area. Bruce has all other academic subjects and non-academic activities in the regular education classroom.

Kelly is a Caucasian female, age 12-4 who lives with her mother, father, and brother in a rural, farming area. Through the special education eligibility process, Kelly was diagnosed as being dyslexic. The dyslexia has interfered with Kelly's ability to process information, do paper and pencil

tasks, and read fluently. Based upon results from an achievement test administered in March of 1994, Kelly is reading at the 2.1 grade level. Her reading decoding score is at 2.1 and reading comprehension is at the 2.2 level. The standard scores for the above tests were: total test - 73, reading decoding - 73, reading comprehension - 75.

Bruce is a Caucasian male, age 11-1 who lives with his mother and step-father. The family makes their home in a rural, farming area. Through the special education eligibility process, Bruce was found to have developmental dyslexia. Dyslexia has interfered with Bruce's ability to be successful academically in the language arts area. The results of an achievement test given to Bruce in March of 1994 indicate his total reading ability at the 2.1 grade level. His reading decoding skills are at the 1.9 grade level. Reading comprehension is at the 2.3 level. The standard scores for the above tests were: total test - 72, reading decoding - 72, reading comprehension - 78.

Instrument

Two types of instruments were used to assess the progress of the subjects participating in this study.

One instrument was a formal measurement while the other was an informal measurement.

The formal instrument was the Woodcock Reading Mastery Tests - Revised. The purpose of this test was to assess the individual's reading ability (Sweetland & Keyser, 1991). There were two forms of this test - Form G and Form H. Form G consisted of six core subtests and one optional subtest. The subtests were visual-auditory learning, letter identification, word identification, word attack, word comprehension, and supplementary letter checklist (Sweetland & Keyser, 1991). Form H consisted of four subtests. These subtests were word identification, word attack, word comprehension, and passage comprehension (Sweetland & Keyser, 1991). The administration of this test was done on an individual basis and the approximate administration time was 10-30 minutes per cluster (Sweetland & Keyser, 1991).

For reliability purposes, internal consistency reliability coefficients were calculated by form for all Woodcock Reading Mastery Tests - Revised and clusters (Woodcock, 1987). The results showed the median coefficients to range from .84 to .99 (Woodcock, 1987).

Content validity was found to be acceptable in that the items contained in all subtests were designed to be comprehensive in both content and difficulty (Woodcock, 1987).

A second instrument used in this study was that of an informal reading assessment. A copy of this instrument is included in the appendices of this document. The subjects read unfamiliar reading passages that were selected from lower level, classics series textbooks. The passages consisted of 100-150 words. The researcher noted errors made by subjects during their reading and scored subjects according to their answers concerning the comprehension of the reading materials. Overlays were not used for the pretest, but were used during the treatment phase and during the posttest.

Experimental Design

The experimental design that was used for this study followed the pretest-treatment-posttest design. The subjects were pretested, exposed to the independent variable, and posttested (Gay, 1992). Posttest scores were then compared to the pretest scores. The scores measured the effectiveness of the treatment (Gay,

1992). The individuals' scores were compared to note any differences.

The independent variable was the same for both subjects and the form for this particular study was presence versus absence. In consideration of the short duration of this study, mortality was not an issue.

Internal validity was controlled because of the administration of a pretest and posttest (Gay, 1992).

Procedure

The initial step in this project was to obtain permission from the subjects' parents and from school officials for Kelly and Bruce to participate in this study.

The following steps were followed in the 4-week project.

The subjects who received the treatment went through an assessment process to determine the color of the overlay with which he was most comfortable. A teacher's guide to follow was supplied by Marie Carbo and a copy is included in the appendices.

A number of controls were addressed. This was done to ensure that the improvement of reading abilities was not due to chance. The subjects were told that they

were working on their reading skills, so they were not aware of the purposes of this study.

Another control factor was the time of day the treatment and testing were given. The subjects' rest or fatigue level was basically the same since the treatment and tests were administered at similar times each day.

A factor that was quite important to control for in this study was that of lighting. Fluorescent lights were used with some amount of sunlight filtering through window blinds. This was the same for treatment and testing.

The maturation process of subjects was taken into consideration during the research study. Since the duration of this project was four weeks, this factor was held at a minimum level.

The subjects were carefully matched for their social background, their educational opportunities, age, and intelligence. Only the treatment under investigation was applied to the two subjects in the study (Evans & Drasdo, 1991).

To begin the study, a pretest was administered to the two subjects without either subject using a colored overlay. Form H of the Woodcock Reading Mastery Tests

- Revised was administered. Also, an informal assessment of reading, Informal Reading Assessment I, was done.

At this time, the subjects used their choice of the colored overlay over their materials in their reading textbooks for a four-week time period. At the end of the treatment phase, a posttest of Form G of the Woodcock Reading Mastery Tests - Revised was administered as well as another form of informal assessment, Informal Reading Assessment II. During the administrations of these two assessments, subjects used their choice of the colored overlay. All questions and comments made by the subjects during both the pretest and posttest were recorded.

Analysis of Data

A t -test was used to compare the group mean scores of both the pretest and posttest results from the Woodcock Reading Mastery Tests - Revised and the informal assessments.

A correlation coefficient was used to assess the relationship between the scores on the above mentioned instruments.

Results

With the use of the colored overlay questionnaire, developed by Marie Carbo, the subjects chose their preferred color of the overlay. Kelly chose the yellow overlay while Bruce chose the aqua overlay. These chosen overlays were used over the reading textbook for four weeks and were used during the posttest of both the formal and informal assessments.

The results of this study do demonstrate some positive effects of dyslexic children's use of colored overlays. Therefore, the original hypothesis (the use of colored overlays will help to improve reading comprehension, reading accuracy, and reading fluency) has been supported to a certain degree. Not all areas of the subtests showed improvements, but a number of them did. These scores are listed in Tables 1, 2, 3, and 4.

When the standard scores for Kelly were compared to those of Bruce there was noted a statistically significant difference between the reading abilities of the two subjects at the .05 level of significance. Originally, those two subjects were chosen to participate in this study because of their similarities in the classroom and on prior achievement test scores.

The average of the differences of their standard scores was 12.9. A t -test for the means showed that there was a significance between the scores of these two subjects at the .05 level of significance (Table 5).

The comparison of Kelly's pretest standard scores to her posttest standard scores showed that there was no statistically significant difference in Kelly's use or omission of the colored overlays in her reading abilities. The r coefficient was calculated at .422047. This number would have been larger if there had been some level of significant difference. These are listed in Table 6. Kelly did show improvements on some of the subtests of the Woodcock Reading Mastery Tests - Revised and on the informal reading assessment. There was an increase in the scores on word identification and word comprehension. The percentages of miscues in word recognition and the errors made in comprehension also showed improvements.

The information gathered when comparing Bruce's standard scores of the pretest to the standard scores of the posttest scores showed that Bruce did benefit from the use of colored overlays. The r coefficient was .687933 while the critical value was .666848. This

value was calculated at the .05 level of significance (Table 7).

Discussion

Kelly and Bruce were not aware of the fact that they were participating as subjects for a study. This factor was controlled for because the researcher did not want these children to feel an increase in anxiety because of the use of the overlays and its importance. Their parents were also encouraged not to tell the subjects why they would be using the overlays. All students in this self-contained classroom of children with learning disabilities used the colored overlays. Class participation seemed appropriate so as not to single out the subjects of this study.

During the time of the use of the overlays many comments were made by the participants. Some of these comments included "I can see better, the words are bigger, the words are brighter, the words don't go away, the words are not blurry, and my eyes don't hurt." When questioning the subjects about their choices of the overlays, Kelly stated that the darker overlays made the words appear darker. She also said that the words did not jump around on the pages when

she used the overlay. Kelly said that the white from the lights made the words harder to read and with the overlays she did not notice the whiteness from the lights.

Bruce stated that his eyes felt more comfortable with the overlays. He commented that sometimes his eyes would become "watery" when he tried to read without the use of the overlay. Both students were very cooperative with the use of the overlays. They both have stated that they would like to continue the use of the overlays.

The subject who showed a statistically significant difference with the use of the overlay in comparison to not using the overlay was the subject who, overall, had the lower standard scores. This study should be replicated in order to find if the use of colored overlays is more beneficial to lower achieving dyslexic students than higher achieving dyslexic students. A study could also be done to measure the effects of the "novelty" of using the overlays.

The use of colored overlays could be very beneficial for a teacher of students with dyslexia. The colored overlays are inexpensive and are easily implemented into the instructional program.

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Dear Parent,

I am currently in the process of developing a
reading program for my students. The project
will involve the use of colored overlays being placed
over the materials read during our reading period each
day for four weeks. Your child has been
selected because I feel that the use of the overlays
will improve his/her reading abilities. Literature
is known that these overlays have the potential of
being an effective reading tool. I would very much
like the opportunity to see if your child will benefit
from the use of overlays.

Appendix A

Permission Form for
Participation in Study

If you would like for your child to participate in
this project and will give your permission for his/her
to do so, please sign on the line below. If you do not
wish his/her to participate, please sign on the
appropriate line.

Please call me at school at 744-1484 or 344-1411
if you have any questions regarding this study.

Thank you,

Miss S. Keller

Yes, I do give my child's
permission to participate in this study as set forth by
Miss Keller.

No, I do not wish for my
child to participate in this study.

Date

Dear Parent,

I am currently in the process of completing my thesis project through Longwood College. The project will involve the use of colored overlays being placed over the materials read during our reading class each day for four weeks. Your son(daughter) has been selected because I feel that the use of the overlays could improve his(her) reading abilities. Literature has shown that these overlays have the potential of being an effective reading tool. I would very much like the opportunity to see if your child will benefit from the use of overlays.

I would like to assure you that strict confidentiality will be maintained throughout this study and in all results of this study. Participation in this study will be on a voluntary basis.

If you would like for your child to participate in this project and will give your permission for him(her) to do so, please sign on the line below. If you do not want him(her) to participate, please sign on the appropriate line.

Please call me at school at 349-3494 or 349-1011 if you have any questions concerning this study.

Thank you,

Mitzi D. Waller

_____ Yes, I do give my son(daughter)
permission to participate in the study to be done by
Mrs. Waller.

_____ No, I do not wish for my
son(daughter) to participate in this study.

Date

Dear Sir:

I am presently in the process of completing the requirements necessary for a master's degree as a curriculum specialist in the area of teaching students with learning disabilities. I am currently enrolled in the thesis program at Longwood College. As part of my project, I would like to ask your permission to have two of my students participate in this study. One is a self-contained student, while the other student is resourced into my room for his language arts subjects.

The study will deal with students who are visually dyslexic and will concentrate on the use of colored transparent overlays over their materials read during the reading subject of each school day. The project will last for four weeks. This should not interfere with any of their routine instruction of the day.

These students have extreme difficulty with their reading. Hopefully, with the use of the overlays their abilities in reading comprehension, reading accuracy, and word attack skills will show an improvement with the use of the colored overlays.

A pretest will be administered prior to the treatment. The treatment (using colored overlays) will continue for a four week duration and at the end of the four weeks a posttest will be given. The students' names used in this study will be pseudonyms and strict confidentiality will be applied.

I will request written permission from the parents of these students once I receive your response.

Thanking you in advance for your consideration regarding this matter.

Very truly yours,

Mitzi D. Waller

Reason(s) for Referral Underline those that apply.

Physical Problems: has headaches, red eyes, teary eyes, squints, rubs eyes, is clumsy, bumps into things, needs dim light

Reading: reverses or mixes up letters, words and/or numbers, reads haltingly, loses place easily on page, has problems tracking

Writing: has difficulty staying on the line, difficulty copying, spaces unevenly, reverses letters and/or words, forms letters poorly

Reading Style Inventory®: Scored "fair" or "poor" in visual perception

Examiner's Observations and Recommendations:

Recommendations on the Reading Style Inventory®

Strategies For Teaching to Perceptual Strengths _____

Most Highly Recommended Reading Methods _____

Most Highly Recommended Reading Materials _____

How to Use the Colored Overlays

1. In a relaxed manner, sit at a table next to the person being tested.
2. Place an open book on the table directly in front of the individual.
3. Place one of the eight colored overlays on a page of print, and ask the person to look at that page. Then ask this series of questions. Always allow time for responses and note the answer.
 - a) Does this color help you to see the page any better? Tell me what you see. (Pause and note the answer.) Tell me any changes that you see with the colored overlay.
 - b) Does the colored overlay make the print easier to read? (If yes, say) Tell me what you see. (Note the answer.)
 - c) Are the words any clearer or sharper? (If yes, say) Tell me what you see. (Note the answer.)
 - d) Do your eyes feel any more comfortable than without the overlay? (If yes, say). Tell me how your eyes feel. (Note the answer.)
4. Note the degree of improvement in visual perception on the "Results" chart using this code:
1 = Color substantially improves the visual image
2 = Color improves the visual image somewhat
ND = No difference
5. Follow the same procedure for each overlay and note the results on the "Results" chart.
6. If two overlays receive positive responses, then place the two overlays side by side, each over a page of print, and ask: Is either color better for you? (If yes, say) Tell me how this one is better. Continue pairing the most beneficial colors and asking the questions listed under number 3. Indicate the most beneficial color overlay(s) by circling the number 1s and 2s on the "Results" chart.

Results of Colored Overlay Assessment								
Date	Blue	Aqua	Turq	Peach	Rose	Pink	Gray	Yellow

Comments: _____

THEir MESSAGE

... fall. It was the first time they had
... night. Every year, the night of the
... evening. The people were very
... . He did not want to go to the
... to come to the fall. He
... they would not want. It was

Appendix C
Informal Reading Assessments
I and II

... Little John said he would be
... the John of the fall. He
... They he wanted to see the

1972

READING PASSAGE I

It was fall. It was the time of year for the 11
Nottingham Fair. Every year, the sheriff held 7
a shooting match. This year he wanted something 8
different. He did not want Robin Hood and his 9
band of men to come to the fair. He offered a 11
prize that they would not want. It was two, big 10
cows. 1
Little John told Robin he wanted to go to the fair 11
by himself. Robin did not want him to go. He was 11
afraid Little John would get caught by the sheriff's 9
men. Little John said he would be careful. 8
Little John dressed in red. He put a hood on his 11
head. Then he headed to the fair. 7

(Pyle, 1992)

- 3. What was the first thing the sheriff decided to do? (change the prize offer cows for the prize)
- 4. Why did the sheriff have the cows for prizes? (Robin and his men would not try for the prize)
- 5. Who had always won the prizes the year before? (Robin Hood and his men)
- 6. Who would try to catch Little John? (the sheriff, the sheriff's men)
- 7. Why did Little John do before he headed for the

INFORMAL READING ASSESSMENT I

Motivational statement: Read this story to find out where Little John is going.

Comprehension Questions:

- | | |
|--------------------------------|--|
| _____ Main Idea | 1. What would be a good title for this story? (John heads to the fair; John disobeys Robin) |
| _____ Detail | 2. How did Robin feel when John told him he wanted to go to the fair by himself? (Robin was worried; Robin thought John would be caught) |
| _____ Sequence | 3. What was the first thing the sheriff decided to do? (change the prize; offer cows for the prize) |
| _____ Cause & Effect Inference | 4. Why did the sheriff have the cows for prizes? (so Robin and his men would not try for the prize) |
| _____ Detail | 5. Who had always won the prizes the years before? (Robin Hood and his men) |
| _____ Detail | 6. Who would try to catch Little John? (the sheriff, the sheriff's men) |
| _____ Sequence | 7. What did Little John do before he headed for the |

he headed for the fair?
(dressed in red, pulled the
hood over his head)

_____ Inference

8. How do you think Little
John will act while he is
at the fair? (careful, like
he's having fun)

SCORING AID

Word Recognition

Comprehension

% Miscues

% Errors

99-1

100-0

95-3

87.5-1

90-6

75-2

85-9

62.5-3

50-4

37.5-5

25-6

12.5-7

0-8

(Wallace, Cohen, & Polloway, 1987)

READING PASSAGE II

Time passes. More men joined Robin Hood's band 8
One of them was Will Scarlet. This was the 9
name Robin gave him. It was because of the bright 10
red clothes he would wear. 5
One sunny morning Robin sat under a tree. On one 10
side of him sat Will Scarlet. On the other side 10
sat Little John. 3
"No one has had dinner with us for a long time," 11
said Robin to Little John. "We are running out 9
of money. Take some of my men and go to the inn. 12
Bring me back a man with a fat purse. Then we 11
will all feast together." 4

(Pyle, 1992)

INFORMAL READING ASSESSMENT II

Motivational Statement: Read this story to find out how Robin Hood got money to eat.

Comprehension questions:

- | | |
|----------------------|---|
| _____ Main Idea | 1. What would be a good title for this story? ("Money to Eat"; "The Man who Wore Red") |
| _____ Detail | 2. How did Will Scarlet get his name? (Robin gave it to him; because he wore red all the time) |
| _____ Sequence | 3. What was the first thing Robin, Little John, and Will Scarlet did? (sat under the tree) |
| _____ Cause & Effect | 4. Why had the men not had anyone to eat dinner with them? (because they were running out of money) |
| _____ Detail | 5. Who did Robin speak to about the money? (Little John) |
| _____ Detail | 6. Who would go to the inn? (Little John and Will Scarlet; Little John and the men) |
| _____ Sequence | 7. What were the men to |

bring back to Robin?
(money; a man with a fat
purse)

_____ Inference

8. How do you think Robin
and his men will act when
they get this money?
(have a party; have a
feast)

SCORING AID

Word Recognition

% Miscues

99-1

95-3

90-6

85-9

80-12

75-15

70-18

65-21

Comprehension

% Errors

100-0

87.5-1

75-2

62.5-3

50-4

37.5-5

25-6

12.5-7

0-8

(Wallace, Cohen, and Polloway, 1987)

Table 1
Scores Calculated from the Woodcock Reading Mastery Tests

Subject: Kelly

Subtests	Raw Score	Percentile Rank
Word Identification	59	50
Word Equivalents	7-10	7-11
Sound Equivalents	2.7	2.8
Standard Score	70	51
Percentile Rank	50	50
Word Comprehension	51	41
Word Equivalents	7-9	7-9
Sound Equivalents	2.7	2.7
Standard Score	61	41
Percentile Rank	41	41
Word Comprehension	58	57
Word Equivalents	7-11	7-10
Sound Equivalents	2.6	2.6
Standard Score	64	56
Percentile Rank	57	56
Word Skills Cluster	52	47
Word Equivalents	7-9	7-9
Sound Equivalents	2.7	2.7
Standard Score	62	47
Percentile Rank	47	47

Table 1

Scores Calculated from the
Woodcock Reading Mastery Tests - Revised
Kelly

Table 1

Scores Calculated from the Woodcock Reading MasteryTests - Revised

Subject: Kelly

<u>Subtests</u>	<u>Pretest</u>	<u>Posttest</u>
Word Identification		
Raw Score	49	50
Age Equivalent	7-10	7-11
Grade Equivalent	2.7	2.8
Standard Score	60	61
Percentile Rank	.4	.5
Word Attack		
Raw Score	11	6
Age Equivalent	6-11	6-6
Grade Equivalent	1.7	1.3
Standard Score	67	57
Percentile Rank	1	.2
Word Comprehension		
Age Equivalent	7-9	8-4
Grade Equivalent	2.4	3.0
Standard Score	61	71
Percentile Rank	.5	3
Passage Comprehension		
Raw Score	28	27
Age Equivalent	7-11	7-10
Grade Equivalent	2.6	2.6
Standard Score	69	66
Percentile Rank	2	1
Basic Skills Cluster		
Age Equivalent	7-6	7-5
Grade Equivalent	2.3	2.1
Standard Score	62	57
Percentile Rank	1	.2

Reading Comprehension Cluster		
Age Equivalent	7-10	8-0
Grade Equivalent	2.6	2.7
Standard Score	66	68
Percentile Rank	1	2
Total Reading Cluster		
Age Equivalent	7-9	7-9
Grade Equivalent	2.5	2.5
Standard Score	61	59
Percentile Rank	1	.3

Table 2

Score Calculated from the

Woodcock Reading Mastery Tests - Revised

Group

Calculated from the Woodcock Reading Mastery Tests

Grade	Estimated	Estimated
1st Grade	50	50
2nd Grade	54	54
3rd Grade	58	58
4th Grade	62	62
5th Grade	66	66
6th Grade	70	70
7th Grade	74	74
8th Grade	78	78
9th Grade	82	82
10th Grade	86	86
11th Grade	90	90
12th Grade	94	94

Table 2
Scores Calculated from the
Woodcock Reading Mastery Tests - Revised
Bruce

1st Grade	50	50
2nd Grade	54	54
3rd Grade	58	58
4th Grade	62	62
5th Grade	66	66
6th Grade	70	70
7th Grade	74	74
8th Grade	78	78
9th Grade	82	82
10th Grade	86	86
11th Grade	90	90
12th Grade	94	94

Table 2

Scores Calculated from the Woodcock Reading MasteryTests - Revised

Subject: Bruce

<u>Subtests</u>	<u>Pretest</u>	<u>Posttest</u>
Word Identification		
Raw Score	37	38
Age Equivalent	7-3	7-4
Grade Equivalent	2.0	2.0
Standard Score	54	54
Percentile Rank	.1	.1
Word Attack		
Raw Score	7	5
Age Equivalent	6-3	6-5
Grade Equivalent	1.1	1.2
Standard Score	50	53
Percentile Rank	.1	.1
Word Comprehension		
Age Equivalent	7-3	7-6
Grade Equivalent	1.9	2.1
Standard Score	52	59
Percentile Rank	.1	.3
Passage Comprehension		
Raw Score	18	23
Age Equivalent	7-2	7-7
Grade Equivalent	1.8	2.2
Standard Score	57	66
Percentile Rank	.2	1
Basic Skills Cluster		
Age Equivalent	6-11	7-0
Grade Equivalent	1.7	1.8
Standard Score	50	52
Percentile Rank	.1	.1

Reading Comprehension Cluster

Age Equivalent	7-2	7-7
Grade Equivalent	1.9	2.5
Standard Score	51	59
Percentile Rank	.1	.3

Total Reading Cluster

Age Equivalent	7-0	7-3
Grade Equivalent	1.8	2.0
Standard Score	41	52
Percentile Rank	.1	.1

Table 3
Scores Calculated from Informal
Reading Assessments I and II
Kelly

	Informal	Formal
Word Recognition - 4 Blended	85	85
Comprehension - 4 Items	85	85

Table 3

Scores Calculated from Informal Reading Assessments I
and II

Subject: Kelly

	<u>Pretest</u>	<u>Posttest</u>
Word Recognition - % Miscues	75	89
Comprehension - % Errors	37.5	62.5

Table 4
Scores Calculated from Informal Reading Assessments I
and II
Subject: Bruce

	Assessment I	Assessment II
Word Recognition - % Misses	14	20
Comprehension - % Errors	42.5	48.5

Table 4
Scores Calculated from Informal
Reading Assessments I and II
Bruce

Table 4

Scores Calculated from Informal Reading Assessments I
and II

Subject: Bruce

	<u>Pretest</u>	<u>Posttest</u>
Word Recognition - % Miscues	75	65
Comprehension - % Errors	62.5	62.5

Table 5
Score Comparisons of the Two Subjects
Kelly and Bruce

Table 5

Score Comparisons of the Two Subjects - Kelly and Bruce

Mean of Differences	=	12.9
Standard Deviation of Differences	=	16.4634
Degrees of Freedom (df)	=	19
Confidence Interval Levels	=	5.19244, 20.6076
Test Statistic	t =	3.50417
Critical Value	t =	-2.09369, 2.09369
P-value	=	.00237
Significance Level	=	.05

Correlation of Pretest and Posttest Scores
Kelly

Level of significance = .05
Two-tailed test
Critical value = 0.95

Table 6
Correlation of Pretest and Posttest Scores
Kelly

table 6

Correlation of Pretest and Posttest Scores

subject: Kelly

Level of significance = .05

Test statistic $r = .422047$

Critical value $r = .666848$

Correlation of Pretest and Posttest Scores

Bruce

Level of significance = .05

Test statistic $r = .887933$

Critical value $r = .68947$

Table 7

Correlation of Pretest and Posttest Scores

Bruce

Table 7

Correlation of Pretest and Posttest Scores

Subject: Bruce

Level of significance = .05
Test statistic $r = .687933$
Critical value $r = .666848$

Figure 1
Pretest vs. Posttest
Standard Scores
Kelly

Pretest vs. Posttest - Standard Scores

Kelly

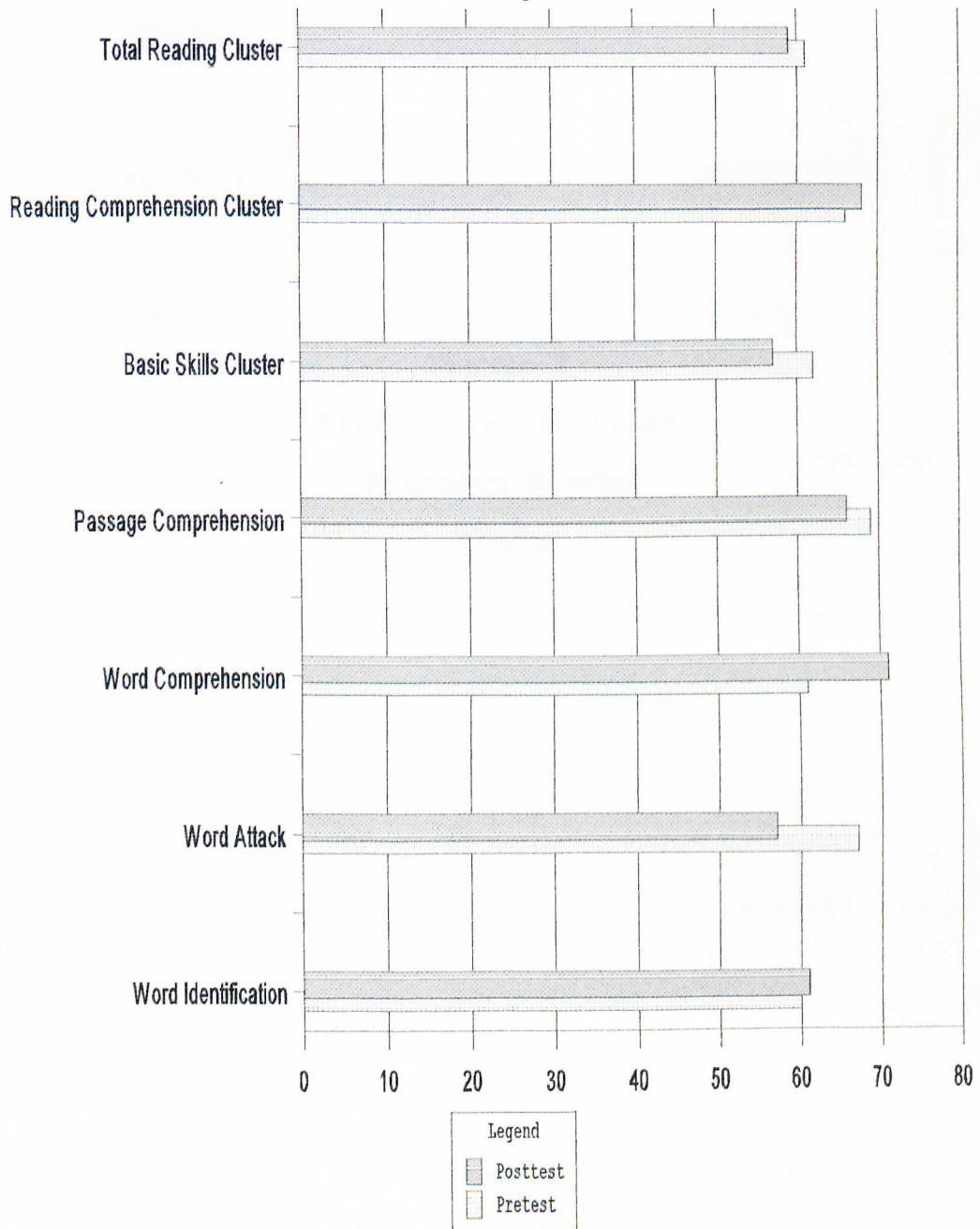
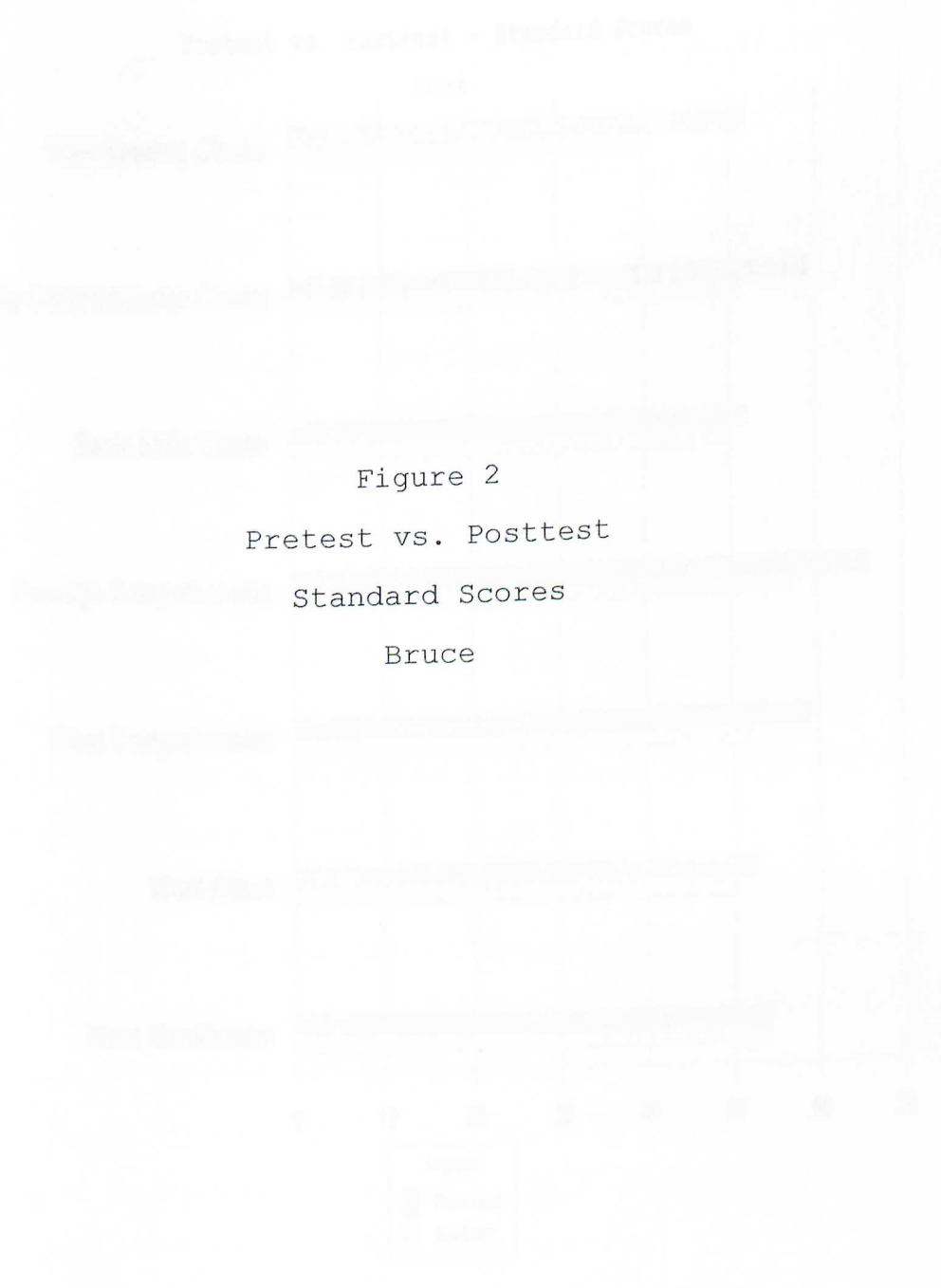
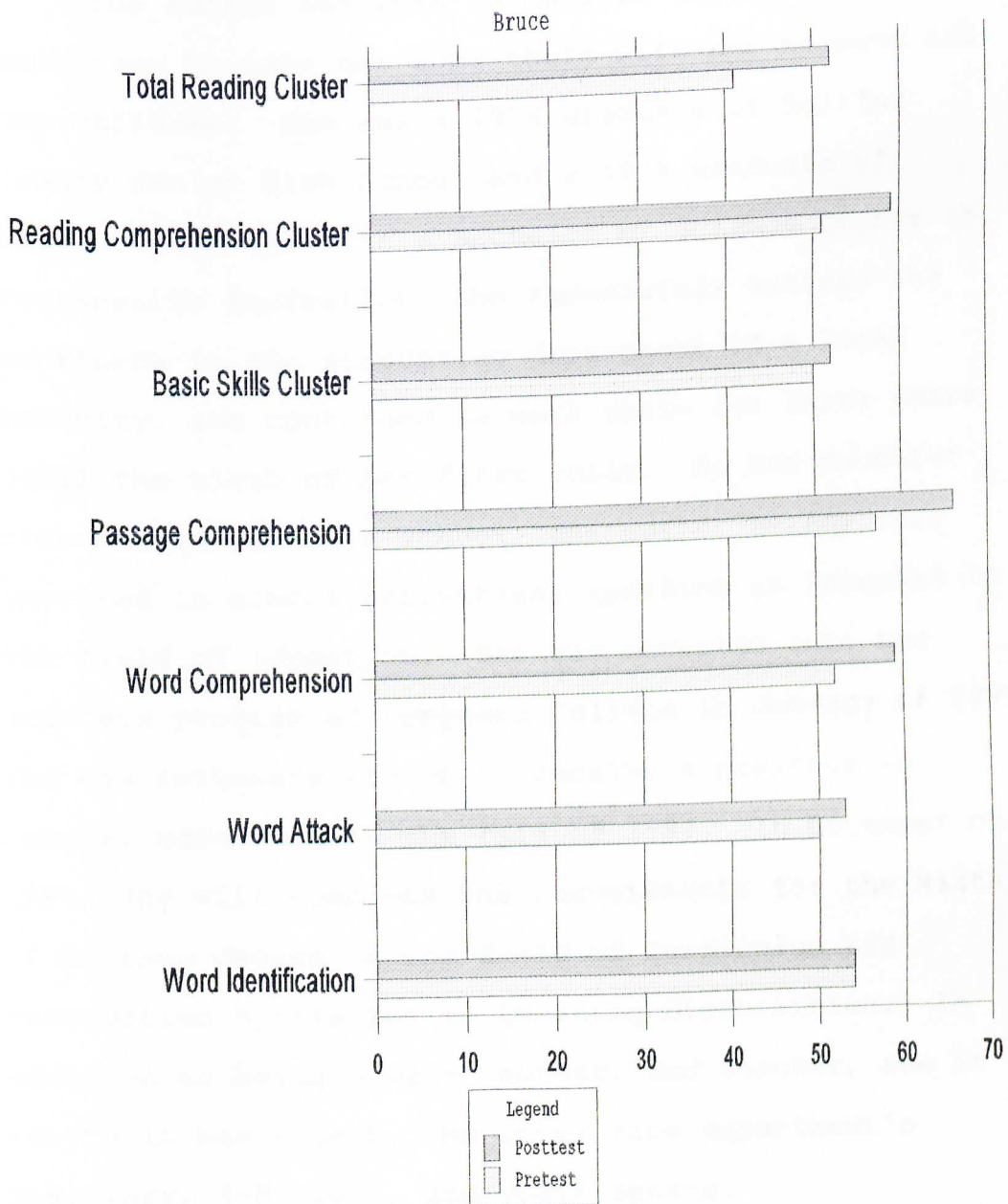


Figure 2
Pretest vs. Posttest
Standard Scores
Bruce



Pretest vs. Posttest - Standard Scores



Biography of Author

The author was born in Halifax County and continues to make her home there with her husband and two children. She was a 1974 graduate of Halifax County Senior High School and a 1979 graduate of Longwood College with a Bachelor of Science Degree in Therapeutic Recreation. She immediately entered the workforce in the accounting department of a local industry, and continued to work there for three years until the birth of her first child. As her daughter grew and enrolled in school, the author became very involved in school activities, sparking an interest in the field of education. She was accepted into the graduate program at Longwood College in January of 1991 and was fortunate enough to receive a position in special education in the fall of 1991. In December of 1994, she will complete the requirements for the Master of Science degree in the field of Curriculum and Instruction Specialist in Learning Disabilities. In addition to being a wife, mother, and teacher, she is active in her church, the local fire department's auxiliary, 4-H clubs, and youth sports.