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The Comparative Analysis of the Dyslexia Screening Instrument and the Dyslexia Screening Tool

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Abstract

STEEP is a universal screening instrument that provides effective and efficient identification of students at risk. It is hypothesized that by using the difference between the math STEEP score and the reading STEEP score that STEEP can be used to identify dyslexic children. The present research was conducted by selecting students that scored mastery/ instructional in math and frustrational in reading as the sample. The current study examines the correlation between the Dyslexia Screening Instrument and the Dyslexia Screening Tool by administering those instruments to the identified population. The results were analyzed by using the Pearson correlation coefficient (r) and the Kendall's Tau correlation coefficient (r). The results indicated a positive and significant correlation between the Dyslexia Screening Instrument and the Dyslexia Screening Tool. Recommendations were made for future research.

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The Comparative Analysis of the Dyslexia Screening Instrument and the Dyslexia Screening Tool

There is increased pressure for society to enhance education performance and establish more effective schools. With current legislation, educators and school districts are mandated to become more accountable for the success or failure of their students. As accountability increases and assessments become more crucial, early and efficient identification of educational difficulties of students is imperative to the academic success of students.

No Child Left Behind

With the reauthorization of the Elementary and Secondary Education Act (ESEA), the No Child Left Behind Act of 2001 has created an increased emphasis on both assessment and accountability. The United States Department of Education (USDE) explains that the No Child Left Behind Act of 2001 mandates every state to measure reading and math progress made by students in public schools (2002). The assessments are to be, "aligned with state academic content and achievement standards" (USDE, 2002). The assessment results are then compiled into student achievement data, used to modify instruction and curriculum and distributed to parents of public school students.

Under the No Child Left Behind legislation, if a school district continuously exhibits poor performance then the students are able to either transfer to higher performing schools or receive supplemental educational services in the community (USDE, 2002). The yearly assessments mandated by the No Child Left Behind Act of 2001 are the basis for sanctions or consequences for school districts that fail to make adequate yearly progress.

High Stakes Tests

Assessments known primarily for making critical decisions are deemed high stakes tests. School districts have been pressured to align their curriculum and instructional practices with the mandated high stakes test. Since performances on high stakes tests have such serious implications, educators are in search of frequent measures to monitor student progress prior to the annual high stakes test.

Frequent assessments based on the school's curriculum provide benchmark or data points to monitor student progress. In contrast to high stakes tests, frequent curriculum-based assessments enable educators to monitor the effectiveness of their teaching strategies. Curriculum-based measurements are beneficial in assisting educators in identifying specific students that need interventions to become successful. The curriculum-based measurements provide educators with data that determines which students are achieving adequate yearly progress.

Effective Reading Instruction

Literacy impacts nearly every aspect of life. Spoken language and written language are very different. Unlike spoken language, learning to read is not innate. In school age children reading is an imperative skill that is used not only for reading class but also for achievement in all academic subjects. The importance of literacy is crucial to success in school.

The National Reading Panel (NRP) was developed in 1997, in response to the Congressional request to, "assess the status of research-based knowledge about reading" (National Reading Panel, n.d., para.1). The National Reading Panel focused their research on effective instructional methods of teaching reading. Since the development

of the National Reading Panel current research on effective reading instruction has shifted to a more scientific basis. The National Reading Panel in conjunction with the United States Department of Education, the National Institute for Literacy, and the National Institute of Child Health and Human Development identified five areas essential to effective reading instruction (Armbruster, Lehr, & Osborn, 2001).

The five areas of effective reading instruction are phonemic awareness, phonetic instruction, fluency instruction, text comprehension instruction, and vocabulary instruction. Using a combination of the previously mentioned five areas of reading skills provides the best reading instruction for students. Various teaching strategies are beneficial for typical and atypical readers. Children that are not dyslexic still benefit from assistance with reading (Shaywitz, 2003). By implementing research based reading instruction, schools can promote reading skill development in all children.

Neurological Aspects of Reading

Past research on reading has placed emphasis on visual problems as a source of the reading disability. Current trends in reading instruction have modified their emphasis to focus on the brain and development. The brain is divided into two hemispheres, referred to as the right and left hemisphere. Each hemisphere is divided into four sections know as lobes. They are otherwise known as the frontal lobe, parietal lobe, occipital lobe, and temporal lobe.

The technique known as functional magnetic resonance imaging (fMRI) enables researchers to measure changes in neural activity in specific brain areas (Shaywitz & Shaywitz, 2004). The fMRI is a non-invasive procedure and can be used on children. The fMRI has allowed researchers to determine the areas that are active while a person is

reading. The areas involved in reading are located in the left hemisphere (Shaywitz & Shaywitz, 2004). The Broca's area, located in the front of the brain, is involved in articulation and word analysis (Shaywitz & Shaywitz, 2004). Two other areas situated in the posterior area of the brain are also involved in the neurology of reading. The two areas are the parieto-temporal region, involved in word analysis, and the occiptio-temporal region, involved in fluent reading (Shaywitz & Shaywitz, 2004).

Dyslexia is defined as the Dyslexic readers display under-stimulated parieto-temporal and occipito-temporal regions; as well as, over activated Broca's area (Shaywitz & Shaywitz, 2004). Dyslexia is explained as a specific learning disability that is characterized by the difficulties with decoding, poor spelling, and problems with word fluency and recognition (Shaywitz, 2003). Shaywitz (2003) also explains, more specifically, that brain activations in dyslexic people change with age. Dyslexic children show increased activation in the Broca's region and, as the children reach the period of adolescence, they appear to show an over-activation of the Broca's area (Shaywitz, 2003).

Early Identification of Reading Problems

Instead of maintaining the traditional wait-to-fail approach with learning disabilities, it is imperative to detect reading disabilities as early as possible. The National Center for Learning Disabilities (NCLD) conducted a national survey of parents and educators. The NCLD survey indicated that 54% of parents and 72 % of educators agreed that the current system for identifying students with learning disabilities takes too long to identify students and provide assistance (NCLD, 2003, para. 6).

It is crucial to assist children with reading disabilities at an early age. Children that possess reading difficulties at an early age do not tend to significantly improve their reading skills over time (Berg & Stegelman, 2003). Young children can utilize alternative methods to learn to read. At an earlier age, the human brain is still malleable and capable of developing alternative neural pathways. Research suggests that children who have not mastered phonemic awareness by ten years old may never develop the skill (Feifer & DeFina, 2000). After the period of brain plasticity subsides, it becomes extremely difficult for children to learn new ways of word identification and reading. Shaywitz (2003) explained that, "Once a child falls behind he must make up thousands of unread words to catch up to his peers who are continuing to move ahead" (p. 30). The cycle of continuously falling behind becomes more overwhelming as a student progresses through the school grades.

Reading difficulties can affect any person and are not restricted to a specific ethnicity, gender, or age. Unfortunately reading problems are under identified in children from lower socioeconomic status backgrounds. Shaywitz (2003) stated:

> Today… reading difficulties are often overlooked in children from disadvantaged circumstances. It is not that children from enriched backgrounds are "over-identified" as reading disabled but, rather, that far too few poor children with the same difficulties are ever noticed, much less treated, for their reading problems. (p. 23)

Screening To Enhance Equitable Placement (STEEP)

Screening to Enhance Equitable Placement (STEEP) is a program that includes curriculum-based assessments for both math and reading development (Witt, 2002).

STEEP provides students, grades one through five with an initial probe, entitled the classwide assessment. The data from the classwide assessment is then entered and graphed. Students' results then are graphed into the areas of mastery, instructional, and frustrational.

STEEP was developed to provide an effective curriculum-based measurement to decrease the referrals of special education students and more appropriately serve them in the classroom. STEEP reduces the reliance on teacher referral through universal screening. It provides an effective and efficient instrument for referral rather than waiting for students to fail. STEEP screens students for unsatisfactory instructional practices, motivational problems, and skill deficits. It is hypothesized that by using the difference between the math STEEP score and the reading STEEP score that STEEP can be used to identify dyslexic children. The result would be early identification of children at-risk and improved referral accuracy.

Purpose of the Study

The purpose of the study is to determine the correlation between the Dyslexia Screening Instrument and the Dyslexia Screening Tool. The purpose is to determine if the results of these two measures are interchangeable and therefore unnecessary to duplicate. The results of the study may promote educators to utilize the DSI or DST as a screener of children with reading disabilities.

Hypothesis

Once students are identified using the STEEP data, as mastery/instructional math and frustrational reading, it is hypothesized that a positive and significant correlation will exist between the results on the Dyslexia Screening Instrument and the Dyslexia

Screening Tool and that only one of these two instruments need to be used in the early identification of dyslexia.

Method

Participants

Students attended an elementary school located in a rural area of southeastern Ohio. Since the major professor did consulting for STEEP, one specific school was selected as the site of the study. Students were selected based on their performance on the STEEP reading and math probes. Students that scored frustrational in reading and mastery/instructional in math were selected as participants. The participants were currently in regular education and selected from the initial assessment data. The current research study was reviewed and approved by the Marshall University Institutional Review Board. Participants were then sent home with permission slips. Students that had parental/guardian permission and also gave permission to participate, were then screened with the Dyslexia Screening Tool and his/her teacher was also given a Dyslexia Screening Instrument protocol to complete.

Instruments

The Dyslexia Screening Tool (DST) and the Dyslexia Screening Instruments (DSI) were selected as the primary instruments in the study. The researcher and three other researchers were cross-trained on the Dyslexia Screening Instrument and the Dyslexia Screening Tool. A practicing school psychologist, experienced in the use of these two instruments, conducted the training on the DSI and DST.

Dyslexia Screening Instrument (DSI)

The Dyslexia Screening Instrument (DSI) is an individually administered instrument. The instrument is highly correlated with the identification of learning disabilities. The DSI is appropriate for students in grades one to twelve and between the ages six to twenty-one (Coon, Polk, & Waguespack, 1994). The Dyslexia Screening Instrument consists of 33 statements that are rated by the classroom teacher using a five-point scale. The rating scale provides one of six classifications. The possible classifications of the DSI are passed, failed, inconclusive, and cannot be scored (Coon et al., 1994). Administration of the DSI takes approximately 20 minutes (Coon et al., 1994).

The DSI was developed from a sample of 97 schools in a metropolitan area. Three hundred and eighty-six students between the ages of 5 years, 10 months and 21 years, 4 months were selected for the development population. The reliability of the DSI was determined through the examination of the inter-rater reliability and the internal consistency (Coon et al., 1994). The internal consistency statistics were broken into the elementary and secondary populations. The internal consistency reliability coefficient for the elementary population was.99 and the internal consistency reliability coefficient for the secondary population was .98 (Coon et al., 1994). The inter-rater reliability correlation was .86 (Coon et al., 1994). The validity was measured by using content validly and construct validity. The content validity was based on an extensive literature review. The construct validity proved to be 98.2% correct at the identification of students with dyslexia.

Dyslexia Screening Tool (DST)

The Dyslexia Screening Tool is a battery of eleven tests that assist in identifying students at risk for dyslexia. The DST is an individually administered instrument that is appropriate for children between the ages of six years, six months and sixteen years, six months. The screening tool is completed by an educational professional and then scored with a numerical at-risk quotient. Any numerical quotient higher than the number one is considered to be at-risk for dyslexia.

The reliability and validity were both examined for the DST. The reliability was examined through the use of test-retest reliability, inter-form reliability, and inter-rater agreement. The correlation coefficients range from .724 to .994 (Fawcett & Nicolson, 1996). The inter-form reliability encompassed a study in which both forms of one subtest was administered. The test-retest correlation was .959 (Fawcett & Nicolson, 1996). The inter-rater reliability coefficient was .94 (Fawcett & Nicolson, 1996). The validity of the DST was also assessed. The validity was examined by the use of construct validity. Seventeen children that had previously been identified with dyslexia were given the DST (Fawcett & Nicolson, 1996). Fifteen of those children had an at-risk quotient above 1.0 (Fawcett & Nicolson, 1996). The DST was also administered to 20 children that did not have dyslexia and none of the children had an at-risk quotient above 0.3 (Fawcett & Nicolson, 1996).

Procedures

Permission was initially given by the principal in order to review the student's STEEP data. The principal of the elementary school also provided permission to use the school facilities and send home permission slips to parents and legal guardians. The

students selected for the study were provided with permission slips to be signed by their parent/legal guardian. Once permission slips were returned, students were then screened with the Dyslexia Screening Tool. Reading teachers were then given a Dyslexia Screening Instrument form to complete. The Dyslexia Screening Tool protocols and Dyslexia Screening Instrument Protocols were scored and charted. The statistical program SPSS version 11.0 was then used to compute and analyze the correlation between the data sets.

Results

The current study examines the correlation between the Dyslexia Screening Instrument and the Dyslexia Screening Tool. The protocols were then analyzed using the Comprehensive Statistical Software Program (SPSS) version 11.0. Descriptive Statistics were then run on the data (see Figure 1). An Analysis of Variance was then completed on the data to determine if the regression was significant and to determine the level of variance the study accounted for (see Figure 2). After the regression was deemed significant, then the Pearson Corrleation (see Figure 4) and the Kendall's Tau Correlation (See Figure 5) were completed on the data. The results for both the Pearson ($r = .421$, $p = .032$) and Kendall's Tau Correlation Instrument ($r = .387$, $p = .019$) indicate that there is a significant and positive correlation between the Dyslexia Screening Tool and the Dyslexia Screening.

Discussion

The research study investigated the relationship between the Dyslexia Screening Instrument (DSI) and the Dyslexia Screening Tool (DST). The hypothesis stated that it is anticipated that a positive and significant correlation exists between the results of the DSI

and the DST. The hypothesis proposed that the DSI and the DST are interchangeable measures of dyslexia. The implications of the study are that students may be screened for dyslexia with either instrument in less than 45 minutes.

The results of the study indicate that the Pearson Correlation ($r = .421$, $p = .032$) proves there is a significant correlation between the DSI and the DST. The regression is significant ($p = .032$) and the model accounts for 17% of the variance. The information reviewed in the current study indicates that there is a relationship between the Dyslexia Screening Instrument and the Dyslexia Screening Tool.

Recommendations

Several variables were not considered in the current research that may have implications on the results. The study was conducted at an elementary school located in southeastern Ohio. Due to constraints of the study, the ethnicities and socioeconomic statuses were unable to be included in the data. A control group of students not selected from the STEEP assessment data should have been screened and served as a control group. Students were selected from the initial STEEP screening assessments but it would have been better to compare the students selected from mid to late year assessments.

Although the current research did not examine the variables mentioned previously, the research study still provides data that the Dyslexia Screening Instrument and the Dyslexia Screening Tool demonstrate a significant relationship between each other. The Dyslexia Screening Instrument and the Dyslexia Screening Tool provide useful data in determining the need for a more comprehensive dyslexic evaluation. In future research, the current research indicates that to determine the need for referral for

special education eligibility, it is only necessary to use one of the two instruments, either the Dyslexia Screening Instrument or the Dyslexia Screening Tool.

Figure 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
DST	28	.0	1.2	.393	.3310
dsi_n	26	1	3	1.69	.788
Valid N (listwise)	26				

Figure 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.421[a]	.177	.143	.3158

a. Predictors: (Constant), dsi_n

Figure 3

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.516	1	.516	5.170	.032[a]
	Residual	2.394	24	.100		
	Total	2.910	25			

a. Predictors: (Constant), dsi_n

b. Dependent Variable: DST

Figure 4

Correlations

		DST	dsi_n
DST	Pearson Correlation	1	.421*
	Sig. (2-tailed)	.	.032
	N	28	26
dsi_n	Pearson Correlation	.421*	1
	Sig. (2-tailed)	.032	.
	N	26	26

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 5

Correlations

			DST	dsi_n
Kendall's tau_b	DST	Correlation Coefficient	1.000	.387*
		Sig. (2-tailed)	.	.019
		N	28	26
	dsi_n	Correlation Coefficient	.387*	1.000
		Sig. (2-tailed)	.019	.
		N	26	26

*. Correlation is significant at the .05 level (2-tailed).

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