

The Influence of Prior Reading Instruction and IEP Goals on the  
Reading Skills of Children with Down Syndrome

Sara E. Germansky  
Dr. Joseph Wehby  
Peabody College at Vanderbilt University

**Abstract**

The purpose of this study is to determine whether there is a relationship between IEP goals and prior reading instruction for children with Down Syndrome, and whether both of those variables had an impact on the children's reading abilities and potential to learn. 24 children with Down Syndrome between the ages of 7 and 16 participated in a study conducted by Lemons and Fuchs (2010). The raw data was extracted to create kappa coefficients showing the agreement between IEP goals and prior reading instruction. Spearman Rank Correlation Coefficients were also created to determine the relations between IEP goals, reading instruction, reading abilities and gain scores on posttest scores. The results showed no significant agreement between IEP goals and reading instruction. There were also significant relations between reading instruction and pre-test scores but not gain scores. There was no relationship between IEP goals and either set of scores. Implications for practice and research are discussed.

### The Influence of Prior Reading Instruction and IEP Goals on the Reading Skills of Children with Down Syndrome

In 1990 The Individuals with Disabilities Act (IDEA) was passed, affording all children with disabilities a free education within the public school system (IDEA, 1990). Seven years later, reauthorization of the same act required children with special needs to be included in the accountability system for public schools. In 2001, President Bush signed the No Child Left Behind Act (NCLB), which made funding for public schools dependent on how well students performed on standardized tests (NCLB, 2001). Both laws furthered the initiative of researching how to properly teach children with special needs.

The most recent reauthorization of IDEA (2004) mandated that only five percent of children with disabilities were allowed to take alternative assessments (i.e. be given an oral exam instead of a written exam). Therefore, the vast majority of children with special needs are required to take the exact same test as their typically developing peers. Because of this requirement, teaching standard grade level material in a way that children with disabilities could learn and understand became all the more important.

The most important skill for these children to have in order to take the standardized tests is the ability to read. Reading is vital to comprehending assessment materials. Unless an accommodation is allowed, standardized tests across the country are in written form. Therefore, if children with disabilities are unable to read adequately and independently, it is unlikely for them to pass. General education teachers with the help of special education teachers need to learn how to effectively teach children with all sorts of disabilities to read.

Over the past 20 years, there has been a growing body of research regarding the reading development of typically developing children. The National Reading Panel (NRP), created in

1997, reported five main components to reading: phonics, phonemic awareness, fluency, vocabulary, and text comprehension (NRP, 2000). The NRP highlights two main approaches to teaching reading: phonics based approaches and sight-word approaches. Phonics based methods involve teaching phonemes (the smallest unit of spoken language) and how to blend those phonemes together to read words. Sight word approaches involve teaching children to recognize whole words both in isolation and in text. Phonics based approaches are more prevalent and are, in general, more effective for typically developing children (NRP, 2000).

Unfortunately, the development of reading skills for children with disabilities is less clear. This is especially true for children with intellectual disabilities (ID). Given the recent emphasis on increased academic accountability, there has been a rise in the number of studies on teaching reading to students with ID. This study focuses on the reading capabilities of a specific ID, Down Syndrome.

### **Research on Reading for Children with Down Syndrome**

Down Syndrome is a chromosomal disorder categorized by an extra copy of the 21<sup>st</sup> chromosome. There are various physical features and cognitive deficits accompanied with this abnormality. The physical features of this syndrome include low muscle tone, epicanthal folds in the eyes, smaller mouths (which cause protrusion of the tongue) and small ears (National Down Syndrome Society, 2011). Cognitive deficits include short-term memory (Laws, MacDonald, & Buckley, 1996) and language deficits (Kennedy & Flynn, 2002; Boudrea, 2002).

In regards to reading, it has been established that children with DS can learn to read (Boudrea, 2002; Houston & Torgesen, 2004; Lemons & Fuchs, 2010). However, because of their physical and cognitive differences, the development of reading ability does not come as naturally as for typically developing children. For the most part, children with DS will have to be

explicitly taught the various skills needed to learn to read. Even with explicit teaching, these children still lag significantly behind their typically developing peers (Boudrea, 2002; and Houston & Torgesen, 2004). This population tends to struggle more with phonology and morphosyntax (the structure of words and sentences) than vocabulary and the pragmatic use of language (Roch & Levorato, 2009). However, people with DS tend to have strengths in word recognition (Buckley, Bird, & Byrne, 1996)

Because of the relative weaknesses in phonological awareness and strengths in word recognition, the most popular method of reading instruction for this population has historically been this sight word approach. Cossu et al (1993) reported that children with DS performed extremely poorly on tests of phonological awareness but not as poorly on a test of sight words. Similar findings have been reported by other researchers. For example, Gombert (2002) and Boudrea (2002) assessed the phonological awareness in this population and reported that children with DS perform significantly lower on tasks involving phonological awareness compared with peers of the same cognitive age. The reason for their difficulty in phonological awareness is unknown; however a number of possible contributors have been noted. Three potential factors include below average IQ, difficulties with auditory processing, and memory deficits. Because of these issues, many researchers concluded that children with DS might learn to read without the extensive use of phonological awareness (Cossu et al, 1993).

**Revisiting Phonics.** Although students with a DS have typically been taught to read via a sight word approach, success of phonics-based reading with struggling readers without ID created a refocus on this approach for children with DS. Researchers have recently begun to see if a phonics-based approach will be effective with children with DS.

Cupples and Iacono (2002) conducted a study in which children with DS were either taught whole-word reading or phonics reading. Their phonics based method chunked phonemes in an attempt to bypass the smaller short-term memory capacity. Results of this study showed both groups made gains in reading explicitly trained words, however, only students in the phonics based group were able to generalize their skills to read new words (Cupples & Iacono, 2002). Other researchers (Byrne, Buckley, MacDonald and Bird, 1995, as cited by Fletcher & Buckley, 2002; Cossu, Rossini, and Marshall, 1993) have obtained similar results. These initial results demonstrate that a phonics-based approach, despite prior conclusions, might be more effective in teaching reading to this population than initially thought. A number of recent studies have supported these findings.

Lemons, Mrachko, Kostewicz, & Pattera (in press) looked at the effects of phonics reading interventions for children with DS. The study tested three evidenced based phonics programs on kids with DS. The first intervention taught sound-symbol correspondences, decoding skills, phonetically regular and high frequency words, reading orally, and spelling previously learned words. The next intervention followed the same principles but added another activity in which the students segmented words and moved objects with each phoneme. The last intervention aims to enhance phonological awareness by teaching the most common sounds and using a similar movement exercise. The first two interventions were effective at improving early reading skills and gains in sound symbol correspondences were visible as well (Lemons et al, in press).

A study conducted by Goetz et al (2008) demonstrated the effects of a short-term phonological reading intervention. Trained learning support assistants provided daily, forty minute, one to one sessions for sixteen weeks and eight weeks (for groups one and two

respectively). The intervention was a combination of two phonological interventions created in the United Kingdom: Jolly Phonics (an early literacy program) and Reading Intervention (an intervention used for students who are having trouble learning to read). The results showed that the group receiving the intervention immediately made much higher growths in early literacy skills, including early word recognition, letter knowledge, and word reading. What is even more promising is that these children maintained these skills as demonstrated on a follow up measure approximately five months later.

Al Otaiba and Hosp (2004) reported the findings from a study in which students with DS received approximately 18 hours of reading instruction in all five of the important reading areas (mentioned above). The researchers used an adapted version of Peer-Assisted Learning Strategies (PALS) and found that three of the four children made statistically significant growths in decoding. Another study, orchestrated by van Bysterveldt, Gillon, and Moran (2006) found similar results. Seven four-year-old children with DS were taught initial phoneme awareness, letter name and sound knowledge, and concepts of print over the course of a six-week program. Post-test results showed that all seven children made statistically significant growth on three of the four measures (with letter name knowledge approaching significance).

As mentioned earlier children with disabilities are supposed to be getting the most appropriate evidenced-based practices for their education (IDEA, 1997). Because initial research suggested that sight word approaches for teaching reading as more beneficial for students with DS, the students might have been missing out on some of the building blocks necessary for early literacy skills. From these more recent studies, it appears that just as it is for typically developing children, letter-sound knowledge and phonological awareness are critical skills for children with DS to learn how to read (Carroll & Snowling, 2004).

This surge of research shows that the necessary steps are being taken to try and discover the most effective method for teaching children with DS how to read. It is important that these research findings be translated into the classroom to try and maximize the reading potential of these students. IEP goals should reflect the research showing positive results for children with DS and reading instruction should mirror the IEPs. More specifically, if recent research suggest reading instruction with a phonics focus is desirable in terms of improving reading outcomes for student DS, it is important to see if this information is being applied to classroom instruction.

### **Purpose**

The purpose of this study is threefold. The three questions being asked are 1) what is the relationship between IEP goals and the reading instruction the children actually received in school, 2) what is the relationship between prior reading instruction, IEP goals, and the participants' reading abilities before the intervention, and 3) do children with more prior reading instruction respond better to intervention than those with less.

### **Methods**

#### **Participants**

The participants were 24 children with Down Syndrome from a study conducted by Lemons and Fuchs (2010). They ranged in age from 7 to 16. According to the study requirements the participants had to be able to sit and follow directions for 30 minutes a day, 5 days a week for 6 weeks. The participants were screened to determine their ability to see and hear well enough to benefit from typical classroom instruction, to speak clearly enough so a stranger could understand most of what they were saying, and to read at least one word correct or identify one letter sound (Lemons & Fuchs, 2010). The race, age, and gender of the participants can be found in Table 1.



Table 1

*Description of Participants*

Participant	Age	Sex*	Race^	IQ
1	8.775	0	1	48
2	11.27	0	1	40
3	10.96	1	1	40
4	7.71	1	3	40
5	10.69	0	1	51
6	12.78	1	3	46
7	14.57	1	1	40
8	13.34	1	1	40
9	13.92	0	1	40
10	8.48	1	2	42
11	15.98	0	1	45
12	10.85	0	1	42
13	12.64	1	1	40
14	10.34	0	1	42
15	16.14	1	1	52
16	16.96	1	1	40
17	11.25	0	1	55
18	12.14	1	1	49
19	7.58	0	1	68
20	10.08	0	1	40
21	14.42	0	1	43
22	14.23	1	1	40
23	10.68	0	1	40
24	11.34	0	1	48

Note: \* 0 signifies a male, 1 signifies a female, ^1 signifies Caucasian, 2 signifies Hispanic, 3 signifies African American

The participants were split into two cohorts based on where and how they were located.

The first set of participants was recruited through community DS organizations and all attended a

day camp for children with DS over the summer. The children in the second group were recruited from two local school districts.

The purpose of the Lemons and Fuchs (2010) study was to “identify important child characteristics predictive of differential growth in targeted reading skills in response to an explicit, systematic reading intervention” (pg 45). The researchers implemented 30 hours of one to one instruction on various aspects of reading, but focused mostly on phonological awareness. Reading and cognitive measures were conducted to describe the sample of students as well as determine what factors could help predict the outcomes on posttest measures (Lemons & Fuchs, 2010).

### **Measures**

**Reading measures.** The reading measures tested both phonological awareness and sight word reading. The segmentation measure (created by Fuchs, Fuchs, Thompson, Al Oaiba, Yen, Yang et al, 2001) is a timed 1-minute measure and “assess a child’s ability to deconstruct words into component sounds (pg 257). The child was asked to break down as many 2-3 phoneme words as possible in that 1 minute. The blending exercise (also created by Fuchs, Fuchs, Thompson, Al Oaiba, Yen, Yang et al, 2001) measured a child’s ability to blend 3 phoneme sounds together into common words. In both cases if a child answers incorrectly four consecutive times the assessment ends even if time is not finished. The possible range for each of these tests is 0-22.

The sight word reading measure used in this study was the Word Identification Subtest of the Woodcock Johnson Reading Mastery Test-Revised (WRMT-R). Students read up to 100 single words but were stopped after six consecutive incorrect answers (Fuchs, Fuchs, Thompson, Al Oaiba, Yen, Yang et al, 2001). The Word Attack Subtest of the WRMT-R was also used. The

test is comprised of 45 nonsense words (ranked in order of difficulty). This test is also stopped after six incorrect answers. The range for the Word Identification and Word Attack subtests are 0-100 and 0-45, respectively. The pre-test scores for each of the four measures are reported in Table 2.

**Cognitive measures.** The cognitive measures used were the Kaufman Brief Intelligence Test, Second Edition (KBIT-2), the Wechsler Abbreviated Scale of Intelligence (WASI), and Wechsler Intelligence Scale for Children-Third Edition (WISC-III). The KBIT-2 is a test of both verbal and nonverbal intelligence and was given to the participants during the fourth week of the intervention (Lemons & Fuchs, 2010). IQ scores are reported in table 2.

Table 2

<i>Pre-test Scores</i>			
	Mean	SD	Range
IQ*	44.625	6.761	40-68
Blending	4.7916	6.01	0-17
Segmenting	13.75	16.38	0-52
Word Identification	21.833	18.19	0-49
Word Attack	1.125	1.75	0-5

\*Note. IQ results are from the KBIT-2

**Tutor and parent measures.** The SWAN rating scale (Swanson et al., 2004; as cited in Lemons & Fuchs, 2010) was administered to parents and teachers to obtain extra information about the participants. The behaviors on the scale were all related to inattentiveness and participation. The scale is rated from 1-7 with 1 being far below, 4 being average, and 7 being far above. Table 3 shows the responses to the SWAN Rating Scale.

Parents also provided the most recent copies of their children's IEP. Reading goals outlined on the IEPs were placed into seven categories: phonological awareness, letter sounds, sight words, decoding, fluency, vocabulary, and comprehension.

Table 3

*Tutor and Parent Responses from the SWAN Scale*

Swan Item	Mean (T)	SD (T)	Mean (P)	SD (P)
Pays Attention To Detail	3.08	1.38	2.54	0.09
Sustains Attention	3.17	1.61	3.25	1.07
Listens When Directly Spoken to	3.83	1.43	3.08	0.83
Finishes School Work/Chores	3.42	1.25	2.63	1.01
Organizes Tasks/Activities	3.13	1.12	2.33	1.13
Engages in Sustained Mental Effort	2.79	1.38	2.91	0.91
Keeps Track of Activity Elements	3.50	1.50	2.88	1.08
Ignores Extraneous Stimuli	2.46	1.32	2.67	0.87
Remembers Daily Activities	4.00	1.29	3.58	1.18
Sits Still	2.71	1.46	3.21	1.10
Remains Seated When Required	3.46	1.41	3.63	0.97
Inhibits Inappropriate Motor Activity	3.67	1.62	3.48	0.85
Plays Quietly When Required	3.83	1.27	3.83	0.87
Settles Down and Rests When Required	3.50	1.62	3.71	0.81
Controls Excess Talking	3.29	1.46	3.50	0.78
Controls Blurting Out Answers	2.79	1.22	2.71	0.91
Waits Turn	3.79	1.25	3.58	0.88
Enters Into Conversations/Games	3.29	1.43	2.75	0.99

Lastly, the parents answered a questionnaire designed by the researchers to ask about the child's prior reading instruction. The first section of the questionnaire asked about the amount of reading the child does at home. The questions asked were: do you or another family member read aloud to your child (if yes how many minutes per week), does your child read aloud to you

or another family member (if yes, how many minutes per week), and does your child read silently to him or herself (if yes, how many minutes per week). The responses to this questionnaire are shown in Table 4.

---

Table 4

*Reading At Home Minutes Per Week*

---

Category	Mean	SD	Range	# Yes	# No
Reading Aloud - Parent to Child	80.625	73.281	0-300	19	5
Reading Aloud - Child to Parent	31.43	53.07	0-225	14	10
Child Reading Silently to Self	23.85	32.92	0-120	11	13

---

**Calculations.** For the new analysis, raw data were extracted from Lemons and Fuchs (2010) to calculate descriptive statistics that were used to answer the proposed research questions. First, a total reading score for children who had prior reading instruction in seven reading areas (phonological awareness, letter sounds, sight words, decoding, fluency, vocabulary, and comprehension ) was calculated. Each student's individual percentage was calculated by adding up the number of reported components of reading instruction and dividing that number by seven. For example, if a student had three components in his reading instruction he had 42% of the components. In order to get an estimate of the type of reading instruction that should be occurring in school, the same calculations were made for the percentage of reading components in each child's IEP.

On the parent survey the researchers divided reading at home into three questions: the number of minutes per week family members read aloud to the child, the number of minutes per week the child read aloud to family members, and the number of minutes per week the child spent reading silently to himself. For the purposes of this study, the number of minutes the child

was read aloud to and the number of minutes the child read aloud were added together to represent the total number of minutes spent reading at home. Reading silently was not included in the total because it is too difficult to say whether the child was actually reading as opposed to simply looking at the book.

**Analysis Plan.** To answer the first research question contingency tables were created to determine the overlap and agreement between reported prior reading instruction and IEP goals. This data was then used to calculate a kappa coefficient [ $k = [\text{Pr}(a) - \text{Pr}(e)] / 1 - \text{Pr}(3)$ ] for each of the seven reading areas. These results showed the agreement between IEP goals and reports of prior reading instruction.

The Spearman Rank Correlation Coefficient (Siegel, 1956) was used to calculate correlations to answer questions two and three. To determine whether reading instruction and IEP goals had an effect on the participants' pre-intervention reading abilities the correlations were run between the percentage of IEP goal and prior reading components, the amount of time spent reading at home and at school, and pre-test scores. The pre-test scores were chosen because they would represent the children's current level of reading abilities before the intervention was implemented.

The Spearman Coefficient was also used to determine whether the IEP goals and reading instruction had an influence on the children's abilities to learn from instruction. The percentage of IEP goal and reading instruction components and the amount of time spent reading at home and at school were used again. However, gain scores (posttest scores – pre-test scores) were substituted for the pre-test scores. The results of these correlations would show if there is a relationship between the children's reading instruction and IEP goals would affect their ability to learn from the intervention.

## Results

### Relationship Between Prior Reading Instruction and IEP Goals

The first question answered was whether there is a relationship between reports of prior reading instruction and IEP goals. The percentage of students who reported having an IEP goal or prior reading instruction along with the kappa coefficients are reported in Table 5. The highest level of agreement was on fluency with  $k$  of .6611. The lowest agreement occurred within vocabulary with  $k$  of .0378. These results reveal that there is very little agreement between what appeared on the children's IEPs and the type of reading instruction reported by parents.

Table 5

#### *Parent Reports of Prior Reading Instruction and IEP Goals*

Reading Area	Prior Reading (%Yes)	IEP Goals (% Yes)	Kappa Coefficient
Phonological Awareness	62.5	12.5	0.318
Letter Sounds	83.3	20.83	0.143
Sight Words	87.5	62.5	0.081
Decoding	62.5	25	.610
Fluency	41.67	4.167	.661
Vocabulary	54.17	16.67	.038
Comprehension	62.5	62.5	.316

### Relation Between IEP Goals, Amount of Prior Reading Instruction, and Pre-test Scores

The second research question asked whether there was a relation between IEP goals, prior reading instruction, and pre-test scores. These results are shown in Table 6. The percentage of reported components and IEP goal components were used as the data for these calculations. The percentage of IEP components was not significantly correlated with any of the other measures

including the percentage of reading instruction components. The percentage of reading components was significantly correlated with almost all other variables. The amount of time spent reading at school also had significant correlations with all variables except percentage of IEP components and minutes reading at home.

Table 6

*Spearman Correlations Between IEP Goals, Amount of Prior Reading Instruction, and Pre-test Reading Scores*

	% Yes RI	% Yes IEP	Minutes Reading at School	Minutes Reading at Home	Pre Blend	Pre Seg	Pre WI	Pre WA
% Yes RI	-							
% Yes IEP	0.042	-						
Minutes Reading at School	.638**	0.012	-					
Minutes Reading at Home	0.169	0.224	0.169	-				
Pre Blend	.526**	0.149	.489**	.375*	-			
Pre Seg	.548**	0.102	.560**	.442*	.769*	-		
Pre WI	.519**	0.139	.421*	.449*	.608*	.617*	-	
Pre WA	.427*	0.007	0.314	0.311	.743**	.579**	.829**	-

\*. Correlation is significant at the .05 level (1-tailed). \*\*. Correlation is significant at the .01 level (1-tailed)

### **Relation Between IEP Goals, Amount of Prior Reading Instruction, and Gain Scores**

The final research question was whether the amount of prior reading instruction was associated with participants' response to instruction during the intervention. The results of the Spearman correlations are reported in Table 7. The results were far less significant for the gain scores than the pre test scores in relation to amount of time reading (both home and school) as



well as the percentage of IEP and prior reading components. The Word Identification gain scores were negatively correlated with all measures, including a significant negative correlation with gain score blending. On the other hand, Word Attack scores were significantly correlated with all but one (Word Identification) of the gain scores measures.

Table 7

*Spearman Correlations Between IEP Goals, Prior Reading Instruction, and Gain Scores*

	% Yes RI	% Yes IEP	Minutes Reading at School	Minutes Reading at Home	GS Blend	GS Seg	GS WID	GS WA
% Yes RI	-							
% Yes IEP	0.042	-						
Minutes Reading at School	.638**	0.012	-					
Minutes Reading at Home	0.169	0.224	0.169	-				
GS Blend	0.134	0.262	.425*	.575**	-			
GS Seg	0.197	-0.172	0.183	0.277	0.264	-		
GS WID	-0.101	-0.072	-0.324	-0.354*	-.410*	-.268	-	
GS WA	0.236	0.227	0.254	.460*	.478**	.344*	-.14	-

\*. Correlation is significant at the .05 level (1-tailed). \*\*. Correlation is significant at the .01 level (1-tailed)

### Discussion

The surge of research surrounding reading skills of with children with DS is due to the Individuals with Disabilities Act (1990). This law, along with its amendments, made public schools more accountable for the children with disabilities in their classrooms. Because of these changes, teachers needed to learn how best to teach these children. For children with DS, the best

approach to teaching reading has yet to be discovered. Both sight word approaches and phonics-based approaches have benefits and disadvantages.

IDEA (1990) also established specific protocol for how to best implement proper instruction. An IEP is written for each child who is eligible for services and that document outlines goals for the year based on the child's strengths and needs. As outlined in legislation, what is written on the IEP should guide classroom instruction for that child.

The first purpose of this study was to determine whether current emphasis on phonics based reading instruction for students with DS was reflected in the IEP goals of 24 students with this condition. The second was to discover whether those variables impacted the children's current (pre-intervention) reading skills. The last was to see if the amount of prior reading instruction influenced the children's ability to learn from the intervention in the Lemons and Fuchs (2010) study. To answer the first question kappa coefficients were calculated to find the agreement between IEP goals and prior reading instruction. For the second and third questions Spearman Rank Correlation Coefficients were used to determine the relations between IEP goals, amount and type of prior reading instruction, and pre-test scores.

### **Agreement Between IEP Goals and Prior Reading Instruction**

The kappa coefficients revealed a disconcerting result. The fact that there was so little agreement between the IEP goals and reports of prior reading instruction demonstrates that teachers are not providing the reading instruction outlined by the students' IEPs. As mentioned previously, the IEPs are written so that students may benefit from an education plan based on their strengths and needs. With the level of disagreement shown it is possible that these children were missing out on effective education.

One glaring finding in these analysis occurred between sight words and phonological awareness. Considering these are the two main approaches to reading, one would think the goals would appear on IEPs and instruction via those methods would be seen in classrooms. However, only 12.5% (3 out of 24) of students had goals in the area of phonological awareness. 15 participants had reports of prior reading instruction specifically in phonological awareness. Considering phonological awareness skills are vital for learning to read this is quite alarming. This disagreement is also troublesome because recent research in this area demonstrated that phonics based approaches for reading might actually be beneficial for children with DS. A similar discrepancy arose for sight words because almost all the participants (21 out of 24) had prior reading instruction in that area, however, a much smaller number (15) had goals written on their IEPs.

There was a pattern of more components being involved with reading instruction than on IEPs. The average percentage of components from reading instruction was 64% while the average number of components found on IEPs was 30%. This comparison is also somewhat disturbing. The IEP goals are chosen for very specific reasons. Children receiving a wider variety of reading instruction than the IEPs state may seem like a positive. However, these students may not be getting the necessary amount of time for the areas in which they truly need help.

The question then becomes, why does such a large discrepancy exist? There are a few possible reasons for this finding. The first is that general education teachers (assuming the children are in inclusion classrooms) are not equipped to teach these students. It is possible that the teachers simply cannot manage implementing both regular classroom instruction and the individualized instruction for these children. Special education teachers get specific training in these areas and are therefore more knowledgeable and experienced teaching children with

disabilities. However, general education teachers do not receive that training and as a result may not be prepared to teach reading to struggling readers, specifically those with intellectual disabilities.

Another possible reason is these teachers might not feel as though it is their job to educate these children in the first place. Many general education teachers feel special education and general education are separate entities and therefore general education teachers do not have to teach students with disabilities. However, this is not the case. When students with disabilities are included in the general education classroom they become the responsibility of the general education teachers. If those teachers are not providing the appropriate education it then becomes the job of the administrators to see why this is not happening.

### **Correlations Between IEP Goals, Reading Instruction, and Pre-test Scores**

The correlations calculated yielded interesting results. The number of components appearing on the IEPs was not significantly correlated with any other variables. This, along with the kappa coefficients, demonstrates that the IEP goals were essentially arbitrary for these 24 students. On the other hand, percentage of prior reading components and minutes spent reading at school were both significantly correlated with the all four of the pre-test measures (except for reading minutes at school, which was not significantly correlated with Word Attack). This finding makes sense because these measures reflect the components of reading instruction. For example, if the students had more prior instruction in sight words than phonological awareness it seems logical the students would perform better on the pre-test measures in sight words because they had more instruction, and therefore higher level abilities, in sight word reading.

Another interesting pattern was amount of time spent reading at home was significantly correlated with three of the four pre-test measures (word attack was not significantly correlated).

This outcome potentially demonstrates the importance of parents reading aloud to their children and encouraging their children to read aloud as well. Reinforcing what children learn at school in the home environment is an important aspect of learning. These results show, for this population, the more often children read at home the better they performed on pre-test measures. Because the pre-test scores represent the children's level of reading at the beginning of the study it can be stated that the children who had more exposure to reading at home had higher early reading capabilities.

It was curious that Word Attack was not significantly correlated with the amount of time spent reading at home or in school. Word Attack is a decoding measure, which depends on phonemic awareness abilities. Therefore, if a child struggles with phonological awareness their decoding skills will most likely be lower. Because this score did not have a significant relationship with either amount of time, it could mean that decoding skills must be explicitly taught. In this case, it would be the type of instruction that matters the most and not the amount of time spent reading. Looking at the raw data, only 6 participants had IEP goals in decoding and approximately half had reports of prior reading instruction. However, no information is known about the amount of time spent on these specific skills. It is quite possible that very little instruction was spent on decoding.

Lastly, the pre-test scores were all significantly correlated with each other. It could be that each of these students had received prior reading instruction that would have translated to the tasks required on the pre-test screening measures. Therefore, if these students had exposure to various elements of reading instruction they would perform higher across all test scores. It could also mean that exposure to one area of reading instruction helps with performance across other reading abilities.

### **Correlations Between IEP Goals, Prior Reading Instruction, and Gain Scores**

The gain scores for blending were significantly correlated with both minutes spent reading at home and minutes spent reading at school but not with either percentage of components. This result might suggest that blending is a skill that depends on time as opposed to the type of instruction. Blending would fall under the phonological awareness category of reading instruction, however, it is unknown whether it was specifically taught. Similarly, the significant correlation with the amount of time spent at home could mean that simply reading aloud is good practice for blending. Gain scores in blending were also significantly correlated with gain scores in Word Identification and Word Attack, however, the correlation with Word Identification was negative. This result is slightly puzzling because both tests involve reading words. Therefore, if a child has higher blending capabilities he should perform better on assessments that involve reading words, which occurred with Word Attack but not with Word Identification.

It is possible that the method of scoring the Word Identification assessment influenced these results. Word Identification is a measure of how well someone can read a word fluently. Therefore, it may be that children were attempting to blend words together and were not doing so as fluently as needed to get credit for reading the word correctly. Therefore, the students might actually have been reading the words but not getting credit because of the level of fluency..

Gain scores in Word Attack were significantly correlated with all pre and gain scores except gain scores for Word Identification. As mentioned before, decoding might be a skill that has to be explicitly taught. It may also be that decoding comes from learning other phonological awareness skills. Therefore, as segmenting and blending skills increase so do decoding abilities.

Lastly, it is interesting that gain scores were not significantly correlated with the percentage of components on both IEPs and prior reading as well as the amount of time spent reading both at home and school. The only exception to this was gain scores for blending, which were significantly correlated with both amounts of time. This means that those participants who had received prior reading instruction, no matter the amount of components or time, did not perform better than those who had not received prior instruction. This finding suggests that the children from this sample who had no prior reading experience benefitted from the intervention just as much as those who had prior reading knowledge.

### **Limitations**

There are a handful of important limitations to this study. The first major limitation is the sample size. There were only 24 participants in this study. With such a small sample it is difficult to generalize the conclusions and results to the broader population of students with Down Syndrome. However, the results obtained do propose interesting questions surrounding the relationship between IEP goals, prior reading instruction, and the reading skills of children with DS.

The other major limitations come from the reports of reading instruction. Because it was the parents who reported the reading information it is possible that not all the information is accurate. Obtaining reports from teachers or whoever works with the student on reading skills would be more reliable.

Similarly, while the types of reading instruction were provided along with the total amount of time spent on reading per week. However, the specific amount of time spent on each type of instruction is unknown. It is therefore possible that some children spent 200 of the 300 minutes learning sight words and the other 100 minutes were divided between the other six

categories. There are an infinite number of possible combinations for the breakdown of reading instruction. These various amounts of time most likely have some impact on the children's reading abilities.

There is also no detailed information about the actual reading instruction. The only information given are the reading areas covered. It would be helpful to know what types of reading instruction each child was being taught with. There are certain practices that have more evidence supporting their effectiveness. Children who are receiving these methods might perform better on measures than those who do not.

### **Conclusions**

It is somewhat disheartening to learn the participants in this study were not receiving the instruction outlined by their IEPs. If this trend is continuing throughout the United States it is a major point of concern. The entire purpose of using IEPs is to help children with disabilities get the best instruction possible based on their strengths and needs. By teachers ignoring the goals they are supposed to help these children achieve, the only people being hurt are the students.

The results demonstrated that only prior reading instruction affected the reading abilities of the participants. It is impossible to say that if the reading instruction was based on the IEPs the children would have performed better on the pre-test measures. However, because of the nature of IEPs and the fact that prior reading instruction influences reading abilities, it would not be an unreasonable hypothesis to make.

Making sure children with disabilities are getting their individualized and appropriate instruction must be a priority for teachers and administrators. There are specific reasons why each of those goals are written. Not providing instruction that works towards those goals can hinder a child's learning. It is also in opposition to what all legislation requires.



The research on effective reading interventions for children with DS is growing. It is important that findings from this research be implemented into public school systems once effective approaches have been identified. Children with disabilities have the right to benefit from instruction as much as any other student and making sure they get the opportunity to maximize their potential is incredibly important.

### References

- Al Otaiba, S., & Hosp, M.K. (2004). Providing effective literacy instruction to students with Down syndrome, *Teaching Exceptional Children*, 36(4), 28–35.
- Berry, K., & Mielke, P. (1998) A Generalization of Cohen's kappa agreement measure to interval measurement and multiple raters, *Educational and Psychological Measurement*, 48(4), 921-933
- Boudrea, D. (2002) Literacy skills in children and adolescents with Down syndrome, *Reading and Writing: an Interdisciplinary Journal*, 15, 497-525
- Buckley, S. J., Bird, G., & Byrne, A. (1996). Reading acquisition by young children with Down syndrome. In B. Stratford & P. Gunn (Eds.), *New Approaches to Down syndrome* (pp. 268-279). London: Cassell.
- Carroll, J. M., & Snowling, M. J. (2004). Language and phonological skills in children at high risk of reading difficulties. *Journal of Child Psychology and Psychiatry*, 45, 631–640
- Cupples, L., & Iacono, T. (2002). The efficacy of 'whole word' versus 'analytic' reading instruction for children with Down syndrome. *Reading and Writing: An Interdisciplinary Journal*, 15(5–6), 549–574
- Cossu, G., Rossini, F. & Marshall, J. C. (1993). When reading is acquired but phonemic awareness is not: A study of literacy in Down Syndrome. *Cognition*, 46, 129-138.
- Fuchs, D., Fuchs, L.S., Thompson, A., Otaiba, S., Yen, L., Yang, N., Braun, M., & O'Connor, R.E. (2001) Is reading important in reading-readiness programs? A randomized field trial with teachers as program implementers, *Journal of Educational Psychology*, 93(2), 251-267

- Goetz, K., Hulme, C., Brigstocke, S., Carroll, J., Nasir, L., & Snowling, M. (2008) Training reading and phoneme awareness skills in children with Down syndrome, *Reading and Writing: An Interdisciplinary Journal*, 21(4), 395-412
- Houston, D. & Torgesen, J. (2004) Teaching students with moderate disabilities to read: Insights from research, Bureau of Instructional Support and Community Services, Florida Department of Education
- Individuals with Disabilities Education Act of 1990 Pub. L. No. 101-476 20 U.S.C. § 1432(1) 104 Stats. 1142 (1990)
- Individuals with Disabilities Education Act Amendments of 1997, Pub. L. No. 105-17, § 1-619, 111 Stats. 3-1047. (1997)
- Individuals with Disabilities Education Improvement Act (IDEA) of 2004, Pub. L. No. 108-446, 1-306, 118 Stats. 2647-2808. (2004).
- Kennedy, E. J., & Flynn, M. C. (2003). Training phonological awareness skills in children with Down syndrome. *Research in Developmental Disabilities*, 24, 44-57. doi: 10.1016/s0891-4222(02)00168-3
- Laws, G., Macdonald, J. & Buckley, S. (1996) The effects of a short training in the use of a rehearsal strategy on memory for words and pictures in children with Down syndrome, *Down Syndrome Research and Practice*, 4(2), 70-78
- Lemons, C., Mrachko, A.A, Kostewicz, D.E., Paterra, M.F. (in press). Effectiveness of decoding and phonological awareness interventions for children with Down syndrome: Three single-subject studies
- National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific

research literature on reading and its implications for reading instruction (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, 1-1076, 115 Stat. 1425-2094. (2001)

Roch, M. & Levorato, M.C., (2009) Simple view of reading in Down's syndrome: The Role of listening comprehension and reading skills, *International Journal of Language and Communication Disorders*, 44(2) 206-223

Siegel, S. (1956) *Nonparametric Statistics for the Behavioral Sciences*, New York: McGraw-Hill

van Bysterveldt, A., Gillon, G., & Moran, C. (2006) Enhancing phonological awareness and letter knowledge in preschool children with Down Syndrome, *International Journal of Disability Development and Education*, 53(3), 301-329

## Appendix A

*IEP Goals and Reports of Prior Reading Instruction by Student*

Std. id	PR p.a.	G p.a.	PR l.s.	G l.s.	PR s.w.	G s.w.	PR dec	G dec	PR flu	G flu	PR voc	G voc	PR com	G com
1	yes	yes	yes	no	yes	yes	no	no	no	no	yes	no	no	yes
104	yes	no	yes	no	yes	yes	no	no	no	no	yes	no	yes	no
114	n.s.	no	n.s.	no	yes	yes	n.s.	no	no	no	no	no	no	no
107	n.s.	yes	n.s.	yes	n.s.	yes	n.s.	no	n.s.	no	n.s.	no	n.s.	no
111	n.s.	no	yes	no	yes	no	n.s.	no	n.s.	no	n.s.	yes	n.s.	yes
12	no	no	yes	no	yes	no	no	no	yes	no	yes	no	yes	yes
11	yes	no	yes	yes	yes	yes	n.s.	no	no	no	n.s.	no	yes	no
120	no	no	yes	no	yes	yes	no	no	no	no	n.s.	no	n.s.	yes
101	no	no	no	no	no	yes	no	no	no	no	no	yes	no	yes
18	no	no	no	no	no	no	no	no	no	no	no	no	no	no
119	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
7	yes	no	yes	no	yes	yes	yes	yes	yes	no	no	no	yes	yes
110	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
9	yes	no	yes	no	yes	yes	yes	yes	n.s.	no	yes	no	yes	yes
6	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
117	n.s.	no	yes	no	yes	no	yes	no	n.s.	no	no	no	yes	yes
3	yes	no	yes	no	yes	no	yes	no	n.s.	no	n.s.	no	yes	yes
102	yes	no	yes	no	yes	no	yes	yes	yes	no	n.s.	yes	yes	yes
8	yes	no	yes	yes	yes	yes	yes	yes	n.s.	no	yes	no	n.s.	yes
108	yes	yes	yes	yes	yes	yes	yes	no	n.s.	no	n.s.	no	n.s.	no
10	n.s.	no	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes
113	yes	no	yes	no	yes	yes	yes	no	yes	no	yes	no	yes	no
105	yes	no	yes	no	yes	yes	yes	no	yes	no	yes	no	yes	yes
112	yes	no	yes	yes	yes	no	yes	no	yes	no	yes	no	yes	yes

Note. PR = prior reading, G = goal, n.s. = not sure

## Appendix B

*IQ, Pre-test and Posttest Raw Scores*

std_id	IQ	Pre blend	Post blend	Pre seg	Post seg	Pre wid	Post wid	Pre_ wa	Post wa
1	48	0	10	0	0	3	5	0	0
104	40	0	0	0	13	2	5	0	0
114	40	0	0	1	1	1	1	0	0
107	40	0	0	0	3	0	2	0	0
111	51	7	17	32	47	48	48	5	8
12	46	0	7	1	23	15	23	0	1
11	40	0	0	0	0	1	1	0	0
120	40	4	9	4	24	11	12	0	0
101	40	0	1	0	21	14	27	0	1
18	42	0	0	0	14	0	1	0	0
119	45	12	17	12	49	37	34	1	2
7	42	17	18	13	35	34	32	5	7
110	40	14	18	31	48	14	12	1	0
9	42	2	8	4	32	24	19	0	0
6	52	17	20	45	51	42	49	1	2
117	40	3	5	3	28	39	40	1	1
3	55	6	17	26	51	49	44	5	11
102	49	6	17	52	51	47	45	4	7
8	68	7	17	38	51	9	6	0	0
108	40	0	0	1	0	1	1	0	0
10	43	3	8	0	46	47	43	2	4
113	40	1	1	24	36	40	43	1	0
105	40	0	3	18	30	28	32	0	1
112	48	16	16	25	47	18	25	1	3