

Rowan University

Rowan Digital Works

Theses and Dissertations

7-16-2018

The effect of a multisensory approach to Spanish instruction on the foreign language proficiency of students with learning disabilities

Linda Chui
Rowan University

Follow this and additional works at: <https://rdw.rowan.edu/etd>



Part of the Bilingual, Multilingual, and Multicultural Education Commons, and the Special Education and Teaching Commons

Let us know how access to this document benefits you - share your thoughts on our feedback form.

Recommended Citation

Chui, Linda, "The effect of a multisensory approach to Spanish instruction on the foreign language proficiency of students with learning disabilities" (2018). *Theses and Dissertations*. 2592.
<https://rdw.rowan.edu/etd/2592>

This Thesis is brought to you for free and open access by Rowan Digital Works. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of Rowan Digital Works. For more information, please contact LibraryTheses@rowan.edu.

**THE EFFECT OF A MULTISENSORY APPROACH TO SPANISH
INSTRUCTION ON THE FOREIGN LANGUAGE PROFICIENCY OF
STUDENTS WITH LEARNING DISABILITIES**

by

Linda Chui

A Thesis

Submitted to the
Department of Interdisciplinary and Inclusive Education
College of Education

In partial fulfillment of the requirement

For the degree of
Master of Arts in Special Education

at

Rowan University

May 10, 2018

Thesis Chair: Amy Accardo, Ed.D.

© 2018 Linda Chui

Dedications

I would like to dedicate this thesis to my husband, Jack Chui and my daughter, Eleanora Jean Chui. To my husband, thank you for working together to make our careers and family a priority. To my daughter, thank you for being the inspiration to become more for my students and to move forward in my career. Most of your first year of life was spent on this journey with me and your smile made every minute worth it.

Acknowledgment

I would like to express my thanks for the guidance and encouragement provided by Dr. Amy Accardo. You made this process seem approachable. Without you, this dream would never have a chance.

Abstract

Linda Chui

THE EFFECT OF A MULTISENSORY APPROACH TO SPANISH INSTRUCTION ON THE FOREIGN LANGUAGE PROFICIENCY OF STUDENTS WITH LEARNING DISABILITIES

2017-2018

Amy Accardo, Ed.D.

Master of Arts in Special Education

The purpose of the study was to investigate the effect of a multisensory approach to Spanish instruction founded in Orton-Gillingham on the (1) foreign language writing, and (2) foreign language reading comprehension of students with learning disabilities in the middle school Spanish classroom. Additionally, the study inquired about the students' satisfaction with the Orton-Gillingham approach to learning to read in Spanish. Four middle school Spanish students with SLD, three male and one female, participated in the study. A single subject ABAB design was used. During the baseline phases, students received Spanish instruction in the traditional mainstream classroom. During the intervention, students received instruction through an alphabetic based multisensory program for teaching reading and spelling in the target language. Daily assessment scores were collected on reading comprehension and written expression across all phases. Results show all four participants improved their reading comprehension and writing scores from baseline data. The student satisfaction surveys suggest that students enjoyed the use of a multisensory approach to Spanish instruction. Further research is suggested investigating the effect of a multisensory approach on Spanish students with learning disabilities.

Table of Contents

Abstract	v
List of Figures	ix
List of Tables	x
Chapter 1: Introduction	1
Statement of Problem.....	2
Significance of the Study	3
Purpose of Study.....	4
Research Questions	5
Key Terms.....	5
Chapter 2: Review of the Literature.....	6
Foreign Language and Native Language Learning.....	7
Language Cross Transfer Between Spanish/English	7
Foreign Language and Native Language Problems	8
Linguistic Coding Deficit Hypothesis (LCDH).....	9
Multisensory Approach to Spanish Instruction.....	10
Conclusion	14
Chapter 3: Methodology	16
Setting	16
School	16
Classroom	16
Participants.....	17

Table of Contents (continued)

Participant 1	17
Participant 2	18
Participant 3	18
Participant 4	18
Research Design.....	19
Materials	20
Measurable Materials.....	20
Daily Assessments	20
Survey	20
Procedures.....	22
Measurement Procedures	22
Writing and Reading Comprehension.....	22
Data Analysis	22
Chapter 4: Results	24
Reading Comprehension.....	24
Written Expression.....	29
Survey Results	34
Chapter 5: Discussion	37
Findings.....	37
Reading Comprehension.....	37
Written Expression.....	39
Limitations	40

Table of Contents (Continued)

Implications and Recommendations41

Conclusions.....42

References.....44

List of Figures

Figure	Page
Figure 1. Student satisfaction survey	21
Figure 2. Reading comprehension scores student A.....	26
Figure 3. Reading comprehension scores student B	27
Figure 4. Reading comprehension scores student C	28
Figure 5. Reading comprehension scores student D.....	29
Figure 6. Written expression scores student A	31
Figure 7. Written expression scores student B.....	32
Figure 8. Written expression scores student C.....	33
Figure 9. Written expression scores student D	34

List of Tables

Table	Page
Table 1. General Information of Participating Students	17
Table 2. Mean and Standard Deviations for Reading Comprehension across Phases	25
Table 3. Mean and Standard Deviations for Written Expression across Phases	30
Table 4. Student Satisfaction Data Collection Table	35

Chapter 1

Introduction

Students with language learning disabilities face the ultimate challenge when learning a foreign language (DiFino & Lombardino, 2004). Sparks, Patton, Ganschow, Humbach, and Javorsky (2008) found that when learning to read in a second language (L2) students' pre-existing first language (L1) skills largely determine their potential success. Proficiency in first language reading and spelling often lead to proficiency in the second language (Sparks et al., 2008.) Hence, interventions and approaches for learning disabled children in English do benefit students in the foreign language classroom (Ford & Palacios 2015). Interventions must be mindfully adapted to the foreign language and implemented with consideration for the differences in language. However, the high level of Spanish and English cross language transfer can help in the development of reading programs in both languages (Manis, Lindsey, & Bailey, 2004).

Current teaching of foreign languages is based on a natural, whole language approach similar to language arts. This method exposes the learner to the language through large amounts of communicative input and expects immediate communicative output (Ganschow & Sparks 2000). However, for students with deficits in communication and processing language, this method makes acquisition of a second language particularly challenging and it has not been effective for learning-disabled students who need more direct and explicit methods of instruction (Sparks et al., 2008).

Supplemental, small group instruction has a favorable effect on student's sight word reading fluency and decoding fluency (Wanzek, Vaughn, Roberts, & Fletcher,

2011) At-risk learners in the foreign language classroom need specialized instruction in reading, writing and spelling. The Orton-Gillingham approach to teaching reading is one method which can transfer to foreign language instruction (Ganschow & Sparks 2000).

Statement of Problem

Klingner, Urbach, Golos, Brownell and Menon (2010) observed special education teachers teaching reading and found that teachers rarely used strategies to engage students in reading comprehension. Instead, teachers asked factual, right there in the text type of questions and seemed unsure of how to promote critical thinking. Reading instruction has barely progressed in the last 30 years in the special education classroom and in fact, there are classrooms which do not include any reading comprehension instruction at all (Klingner et al., 2010).

Sparks, Ganschow, Artzer and Patton (1997) proposed a Linguistic Coding Differences Hypothesis (LCDH) to explain students' difficulties with learning a foreign language. Every language is based in systems and patterns which either correlate or vary from their native language. Students' struggles lay primarily in the unknown phonological/orthographic system of the new language (Sparks et al., 1997). DiFino (2004) identified three main areas of second language acquisition that trouble learners; memorization, anxiety and lexical/grammar confusion. Students have difficulty with the grammar structure of the new language and the new vocabulary that must be established. DiFino (2004) suggested that foreign language teachers demonstrate grammar and vocabulary rather than simply present or explain either. Students with learning disabilities have problems with language-based learning because of their deficits in their oral communication, processing and production of the language (Sparks et al., 1991).

Phonological skills seem to be at the root of these communication issues (Wanzek et al., 2011). Phonological memory and phonological awareness support foreign language word learning and can severely impact success in the second language classroom (Hu, 2003).

Teaching students phonics helps struggling readers to grow more than non-phonics based approaches. Systematic phonics instruction makes a bigger contribution for young children but does have an effect on secondary aged children. (National Reading Panel, 2000). Since the late 1980s, teachers have been using an adapted Orton-Gillingham approach to teach novice Spanish-speakers (Sparks, Ganschow, Kenneweg, & Miller, 1991). This method has been shown to be effective in other languages (Singaporean, Korean, Spanish etc.) to significantly improve reading and spelling in the target language (Lim & Oei, 2015). Teachers report that students are successful because they receive multiple forms of input with immediate feedback. Both oral and visual feedback and kinesthetic input for letter sounds are incorporated into all Orton-Gillingham-based reading instructional programs (Ritchey & Goeke, 2006).

Significance of the Study

There is little to no research on methods of instruction for students with learning disabilities in the foreign language classroom (DiFino & Lombardino, 2004). Most foreign language teachers have little training in special education pedagogy and rarely implement specialized methods in their content area (Sparks et al., 1991). Students in New Jersey must meet the foreign language requirement of 5 credits in a second language in order to graduate from high school. The majority of learning disabled students are held to this requirement and foreign language teachers are struggling to accommodate their needs in the classroom (N.J.A.C. 6A:8-5).

The multisensory approach to teaching reading and writing in the foreign language classroom may be an appropriate alternative to the natural, whole language approach for learning disabled students at the middle school level (Ganschow & Sparks, 2000). Direct instruction methods work best in small groups when students respond orally, use hands-on activities, receive rapid feedback and are motivated (Ryder, Burton, & Silberg, 2006). Orton-Gillingham-based methods incorporate a multisensory approach with direct instruction, but many of the studies use small sample sizes with very few instructors trained in foreign language. All of the studies were completed in high school or college with no focus on novice level classes in the middle school (Ganschow & Sparks, 2000). Early intervention for students with special needs is best to prevent academic failure and anxiety related to the subject-matter (National Reading Panel, 2000). Most school districts begin foreign language instruction in the middle grades and foreign language teachers should be prepared to provide specialized interventions for the students in their classes at this level (N.J.A.C. 6A:8-5). There is, therefore, a need to examine the effectiveness of an Orton-Gillingham based approach to Spanish instruction for students with language disabilities in the middle school classroom (Hook, Macaruso, & Jones, 2001).

Purpose of Study

The purpose of the study was to investigate the effect of a multisensory approach based on Orton-Gillingham on the (1) foreign language writing, and (2) foreign language reading comprehension of students with learning disabilities in the middle school Spanish classroom. Additionally, the study inquired about the students' satisfaction with the Orton-Gillingham approach to learning to read in Spanish.

Research Questions

(1): Will a multisensory approach to Spanish instruction increase the foreign language writing ability of students with learning disabilities at the Middle School Level?

(2): Will a multisensory approach to Spanish instruction increase the foreign language reading comprehension of students with learning disabilities at the Middle School Level?

(3): Will students be satisfied with the use of a multisensory approach to Spanish language proficiency?

Key Terms

For purposes of this study, a multisensory approach will be defined as a combination approach including: kinesthetic methods (tracing letters), auditory-visual-kinesthetic (AVK) approach, songs, role-playing (writing dialogue-act it out), games, choral repetitions of vocabulary, phrases and verb conjugations, group and pair work (DiFino, 2004)

For purposes of this study, L1 shall be defined as a student's first language and L2 as a student's second nonnative language (Sparks et al., 2008)

For purposes of this study, *Orton-Gillingham approach* will be defined as an alphabetic based multisensory program for teaching reading and spelling. It was established in the 1930s. Several direct instruction reading programs are based on the tenets of this approach (e.g. Wilson, Esperanza etc.)

Chapter 2

Review of the Literature

The study of foreign language can be difficult for students of all abilities and poses an obstacle to academic success for students in both lower and higher education (DiFino & Lombardino, 2004). Students with language learning disabilities must overcome the hurdle of language learning again when tackling a foreign language (Sparks, Ganschow, Kenneweg, & Miller, 1991). Many theories have been offered as to the reason students struggle in the foreign language classroom include varying learning preferences, phonological memory, linguistic coding and language learning disabilities (Castro & Peck, 2005; DiFino & Lombardino, 2004; Hu, 2003; Ganschow & Sparks, 2000). Despite the needs of at-risk foreign language learners in the foreign language classroom, there is little research focused on the exceptional learner in this setting (DiFino & Lombardino, 2004). Yet, second language acquisition continues to be a goal for American students within our multilingual nation and as a part of a larger global economy (Ganschow, Sparks, & Javorsky, 1998).

Most public schools and liberal arts universities require foreign language coursework for graduation. Foreign language learning difficulties seem to be related to native language difficulties (Sparks, Ganschow, Artzer, & Patton, 1997). The underlying linguistic skills needed to learn a language seem to be universal, hence successful strategies in a student's first language should be successful in a student's second language (Ganschow et al., 1998; Sparks et al., 1997; Ganschow & Sparks, 2000; Sparks et al., 1991). Foreign language teachers are rarely trained in these supplemental strategies and find it difficult to help students in need (DiFino & Lombardino, 2004). A

multisensory alphabetic approach using direct instruction has been attempted by a handful of foreign language teachers trained in special education (Ganschow et al., 1998). The Orton-Gillingham approach, a multisensory, structured language learning adapted to Spanish instruction has shown some success when used with students with language learning disabilities (Sparks et al., 1997).

Foreign Language and Native Language Learning

Emphasis has not been placed on research in the study of foreign languages (DiFino & Lombardino 2004). Of the body of foreign language research, a very small percentage addresses the exceptional learner in the world language classroom (Ganschow & Sparks, 2000). Globalization is rapidly changing the school view of foreign languages, however, and researchers have begun to investigate first and second language acquisition (Sparks, Patton, Ganschow, Humbach, & Javorsky, 2008).

Language Cross Transfer Between Spanish/English

Decoding and comprehension are two fundamental skills of reading and exist in all languages. Sparks et al. (2008) examined students' skills in both areas over a period of ten years to determine if decoding and comprehension in a students' first language would predict second language skill levels. They followed 54 students from first through 10th grade. The students were assessed for first language proficiency in the areas of decoding, spelling, reading comprehension and phonological awareness. Upon completion of two years of foreign language study at the secondary level, those same students were assessed for second language proficiency in the areas of word decoding, spelling and reading comprehension. The results indicate long-term cross-linguistic transfer from early first language skills can predict reading and spelling ability in second

language study. These results suggest that diagnosis and possible prevention of reading and spelling problems in the second language can be attempted using data from first language acquisition (Sparks et al., 2008).

A study conducted by Manis, Lindsey and Bailey (2004) shows that Spanish and English share a modest amount of cross-language transfer. This investigation focused on the development of English- and Spanish-reading skills of 251 Spanish-speaking English-language learners from kindergarten through second grade. Manis et al. (2004) looked at the students' abilities in both languages in the areas of phonological awareness, rapid serial naming, sentence memory, letter knowledge, print awareness and expressive vocabulary. Data collected from their study showed significant correlations between assessment scores in English and Spanish. In particular, print knowledge was a significant predictor of the students' letter-word identification skills and their ability to comprehend passages in the second language (Manis et al., 2004).

Foreign Language and Native Language Problems

Early research looking at students with foreign language difficulties identified some key areas of weakness; reading, spelling, sound confusion and verbal memory (Ganschow & Sparks 2000). Students who experience difficulty with learning their first language encounter the same problems when learning their second language in the latter grades (Manis et al., 2004). The phonological and orthographic bases of language pose substantial difficulties for this body of students (Ganschow & Sparks, 2000). Weak phonological memory and phonological awareness make foreign language word learning difficult (Hu, 2003). Other researchers point to language learning disabilities, such as dyslexia, rote memory abilities, or a lack of grammatical skills as being the root cause of

foreign language learning difficulties (DiFino & Lombardino 2004). Researchers agree that foreign language difficulties are primarily language-based (DiFino & Lombardino, 2004; Sparks et al., 2008; Ganschow & Sparks, 2000).

In contrast to the research of Ganschow and Sparks (2000), Castro and Peck (2005) aimed to identify more than the simple linguistic deficits causing foreign language difficulties for students. To investigate alternative causes to students' challenges in second language acquisition, Castro and Peck (2005) administered the Kolb Learning Style Inventory to 43 students enrolled in regular and modified foreign language courses at a major U.S. university. While the data collected did not point to a specific learning style for foreign language success, there were a few take-aways to note. Students with a highly specialized learning style versus students who relied on varying learning style found the foreign language requirement more difficult to complete. Also, students with learning styles based in analytical thinking tended to fare better in the foreign language classroom (Castro & Peck, 2005). Students with learning disabilities perform significantly lower on Modern Language Aptitude Test (MLAT) than non-learning disabled students (Gajar, 1987). While no cognitive or foreign language aptitude deficits are exhibited by the learning disabled student, one study showed significant differences in spelling (Ganschow & Sparks, 2000).

Linguistic Coding Deficit Hypothesis (LCDH)

Ganschow, Sparks and Javorksy (1998) proposed that problems in foreign language learning are primarily linguistic. In their Linguistic Coding Deficit Hypothesis (LCDH), the authors present evidence which supports the notion that language ability influences foreign language learning. Ganschow et al. (1998) assessed a group of college

students who petitioned their school for a foreign language waiver. The students were tested for first language phonology, word identification, spelling and grammar. Those scores were compared to students who did not request waivers and were successfully able to complete their foreign language requirement. The results of the study suggest that poor readers and writers in English, overall, had difficulty acquiring a second language due to a lack of understanding of the structural elements of that language (Ganschow et al., 1998).

Phonological, orthographical, syntactic and semantic components form a language and any preexisting problems with language skills will reemerge when progressing to a new language (Manis et al., 2004). A closer look at successful foreign language learners shows higher grades in the native language, stronger oral and written language skills and foreign language aptitude (Ganschow & Sparks, 2000). Students with learning disabilities reported a higher level of concern for their ability to learn a foreign language and feelings of anxiousness related to those classes (Javorsky, Sparks, & Ganschow, 1992). Students typically begin second language study in the United States at the secondary level where their early first language skills either help or hinder their progress (Ganschow & Sparks, 2000).

Multisensory Approach to Spanish Instruction

Specialized multisensory structured language instruction is likely to help at-risk learners to pass foreign language courses and ultimately to learn the second language (Ganschow & Sparks, 2000). While these programs help students with foreign language learning problems improve, the data shows that they will not perform similarly to their non-disabled peers (Sparks & Ganschow, 1993). Bilingual Spanish-English reading

programs, such as Esperanza, are based on classic Orton-Gillingham reading and spelling curriculum. The teacher uses a multisensory introduction to new sounds and oral language training in both languages (Manis et al., 2004). The teacher will usually follow with daily spelling practice in the target language and activities in writing and reading comprehension (Lindsey et al., 2003).

In a yearlong study of reading intervention for middle school students with learning disabilities, Wanzek et al. (2011) compared one group of students receiving reading intervention to a group that did not receive any assistance. The authors monitored an intervention which combined vocabulary and comprehension techniques with explicit phonics instruction in English. The results indicate that the treatment group did more favorably with sight word reading, phonemic decoding fluency and passage comprehension. Wanzek et al. (2011) reported that a single year of intervention was unlikely to result in long term results. Additional intervention services were suggested to continue after the initial phase to ensure student success and maintenance of learned skills.

A longitudinal study conducted by Hook, Macaruso and Jones (2001) on the reading skills of children with reading difficulties found that an Orton-Gillingham based intervention may have a greater impact than other reading interventions. The researchers compared an Orton-Gillingham approach to reading instruction with the Fast ForWord method. The findings suggest that the Orton-Gillingham based approach led to more growth in the areas of word attack skills and similar growth in phonemic awareness. It should be noted that both interventions were done on a one to one basis in addition to class time.

In contrast, Ryder, Burton and Silberg (2006) conducted a longitudinal study of direct instruction effects on reading and followed groups of 80 urban and non-urban students from first to third grade. The groups of students were assessed using standardized reading achievement tests at the beginning of first grade and again in both second and third grade. The researchers were also interested in teacher perceptions of direct instruction and its presentation in the classroom. This study found that both direct instruction and non-direct instruction methods improved students' achievement and proposed that the effectiveness of the teacher played a larger role in student gains in reading achievement. Also, interviews with teachers suggest that effective instruction does not conform to a set script but adapts to the students' needs (Ryder et al., 2006).

Joshi, Dahlgren and Boulware-Gooden (2002) found similar results in their empirical study of the effectiveness of an Orton-Gillingham based intervention using a multisensory teaching technique with 56 first graders. The researchers compared the treatment group with a control group taught only with the basal reader in four regular education classrooms. The groups were assessed for phonological awareness, word attack skills and reading comprehension at the beginning of the school year and taught literacy based lessons for 50 minutes each day using the agreed upon method. At the end of the year, the students were assessed a second time in all three areas of literacy. The data collected from both groups suggest that the multisensory Orton-Gillingham approach to literacy instruction may increase students' scores for phonological awareness, word attack and reading comprehension skills. The treatment group outperformed the control group in all three assessments.

Campbell, Helf and Cooke (2008) conducted a multiple baseline study looking at the effect of adding multisensory components to a pre-existing reading intervention for students who were not progressing. The multisensory components were based on the Orton-Gillingham approach which included finger tapping, letter formation and the use of magnetic letters. The study collected baseline data on six second-grade students who were identified as “treatment resisters” using the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) nonsense word fluency and oral reading fluency subtests. The students were given only ten additional minutes of daily instruction to their supplemental reading program. The ten minute sessions were conducted on a one to one basis outside of the classroom in a tutoring program. The DIBELS subtests were used to collect post test data. The results suggest that multisensory components in addition to reading intervention resulted in a higher rate of fluency of decoding nonsense words and oral reading fluency for treatment resisters. The study supports similar findings for an Orton-Gillingham approach for students with reading difficulties (Hook et al., 2001, Joshi et al., 2002, Sparks et al. 1991).

Lim and Oei (2015) examined the effectiveness of an Orton-Gillingham approach to remediation of dyslexia in Singapore. The researchers reported on the progress of 39 students over a period of one year of intervention using a pre-post test model. The students were assessed annually with the BAS-II reading and spelling subtests which served as the baseline data for the study. The post-test data showed reliable improvement in reading achievement and spelling. Lim and Oei (2015) stress the importance of early identification and intervention as the data showed the earlier the intervention began the greater the gains in students’ standard scores.

In the area of foreign language, Ganschow et al. (1998, 2000) and Sparks et al. (1991, 1997, 2008) have conducted a battery of studies related to the efficacy of a multisensory structured approach to foreign language instruction. In 1997, Sparks et al. looked at the foreign and native language gains of students taught using a multisensory approach for two years in the Spanish classroom. The study found that at risk learners in the foreign language classroom made significant gains in native language phonological/orthographic skills and all learners made gains in foreign language aptitude. These results suggest that learning disabled students in the foreign language classroom may be particularly supported by a multisensory approach to instruction and may even benefit in their first language classes (Sparks et al. 1997).

Conclusion

A multisensory structured approach to teaching reading is a scientifically supported method of remedial instruction for students' first and second languages (Campbell et al., 2008, Ganschow & Sparks, 2000, Sparks et al., 1991). In this modern world, globalization is bringing renewed focus to the study of foreign languages (Ganschow et al., 1998). Students who have difficulty learning a second language have weaknesses in oral and written native-language skills which involve phonological, syntactic, and semantic codes of language (Manis et al, 2004). The Linguistic Coding Deficit Hypothesis explains that the underlying difficulties for students are linguistic in nature. If a student has deficits in a language, those same deficits will likely reappear for any other language learning (Sparks et al., 2008). The connection between native and foreign language learning can be used as a tool for student success. Educators can utilize

interventions shown to be successful in the native language to remediate deficits in the foreign language (Sparks et al., 1997).

The Orton-Gillingham approach to teaching reading is a direct and explicit means of teaching language. It enables the student to access the language from varying points and modalities (Campbell et al., 2008). Because students with language learning disabilities have difficulties with both oral and written language, a multisensory, structured approach to language instruction is recommended in the foreign language (Ganschow & Sparks, 2000). Ganschow et al. (1998, 2000) and Sparks et al. (1991, 1997, 2008) have produced a compelling body of evidence related to learning disabled students in the foreign language classroom. However, the research is limited to their particular vision as very few studies have been conducted on students in the foreign language classroom. This study endeavors to build upon the findings of Sparks and Ganschow with regards to the effectiveness of a multisensory approach to foreign language instruction in improving students' writing and reading comprehension in the target language.

Chapter 3

Methodology

Setting

School. The study was conducted in a public middle school in a central New Jersey school district. The school district consists of one middle school servicing students from one town. Each grade is divided into four academic teams. The school operates on a seven period schedule lasting 56 minutes each.

The middle school consists of approximately 1600 students in grades sixth through eighth. Approximately 15% of these students have IEPs and receive special education services. The middle school has a diverse student population. According to the New Jersey Performance Report (New Jersey Department of Education, 2016), 57.5% of the students are Caucasian, 33.8% are Asian, 4.2% are Black, 3.7% are Hispanic and less than 1% are other races.

Classroom. The classroom is used by various teachers to teach world language, language arts and health. All of the classes taught in this room are mainstream classes. The classroom consists of two teacher desks, thirty student desks and three rectangular tables. There is one classroom desktop and ELMO camera that sync with the LED projector. There is also a DVD player and whiteboard.

The study was conducted in the mainstream Spanish classroom. The class is held daily during first period. There is a paraprofessional in the classroom to assist students with IEPs. No students have a one to one aid.

Participants

This study included four eighth grade students, three males and one female. All participants in this study have an IEP to meet their individualized needs. The participants in this study are classified for special education services for specific learning disabilities (SLD), other health impaired (OHI) and autism (AUT). Table 1 presents their general participant information.

Table 1
General Information of Participating Students

Participant	Age	Grade	Classification
A	13	8	SLD (RC)
B	13	8	SLD (BR/WE)
C	14	8	OHI
D	13	8	AUT

Participant 1. Student A is a 13-year-old Caucasian male. He is eligible for special education services under the classification SLD in reading comprehension. The Child Study team noted in their testing that the disability often presents when the student is engaged in independent silent reading comprehension with related responses. Teachers report that this student is courteous and polite. Academically he performs well, but lacks confidence in his skills. The student will often ask for clarification on tasks and reassurance before starting a task.

Participant 2. Student B is a 14-year-old Caucasian male. He is eligible for special education services under the classification SLD for basic reading and written expression. It should also be noted that a diagnosis for ADHD was also presented at the time of the writing of his IEP. This student is enrolled in the school's Wilson Reading program for students with reading difficulties. The teachers noted that attention and behavior in the classroom affects the student's learning. When the student is focused and engaged in his learning, performance dramatically increases. The student is often off task and is distracted by himself and others. Academically, this student has a history of failure in all academic subjects. He is in all in-class resource classes and pull out resource center for language arts.

Participant 3. Student C is a 13-year-old Caucasian female. She is eligible for special education services under the classification OHI for end stage renal disease. This student is often out of school and receives home instruction when needed. The student also participates in physical therapy during the school day. The student is courteous and polite. Academically, the student performs only up to her ability. The status of her health impacts the amount of work she is able to accomplish and that has a severe impact on her learning. In particular, any assignment which involves writing is of great difficulty for the student to complete. Her ability is far above where she performs in the classroom.

Participant 4. Student D is a 13-year-old Asian-American male. He is eligible for special education services under the classification AUT as high-functioning Asperger. The student is very quiet but polite. He does engage with peers with some guidance from the teacher. Academically, this student is motivated to do well and is able to maintain

good grades in his classes. His disability was noted to affect his oral language skills and silent reading comprehension.

Research Design

The research utilized a single-subject ABAB design. This study explored the effect of an independent variable, a multisensory approach to Spanish-instruction, on two dependent variables, writing and reading comprehension. Writing ability and reading comprehension were measured on daily assessments throughout the study. During Phase A, baseline data was collected from daily exit slips to evaluate the writing and reading comprehension ability of all students. Phase A was one-week long.

During Phase B, the multisensory approach to Spanish instruction intervention was used. Students were instructed using an Orton-Gillingham structured phonics based approach to Spanish. During class time, the teacher instructed students using sight, hearing, touch and movement to help students connect language with letters and words. Students' academic progress continued to be tracked through daily exit assessments after the initial introduction of the strategy. Phase B was three weeks long to account for the instruction of the alphabet.

During the second Phase A, the multisensory intervention was removed and students returned to baseline conditions for one week. During the second Phase B, the multisensory intervention was reintroduced for three weeks. Data was collected for each phase. Results were interpreted by reviewing writing and reading comprehension assessment scores. Daily exit assessments were graded on a scale from 0 to 10. A data collection table was used for each phase of data collection. Furthermore, at the end of the

second Phase B, students completed a Likert scale survey to report their satisfaction with the multisensory approach to Spanish instruction.

Materials

Two sets of materials were used during the course of this study. During phase A, the teacher used the traditional classroom materials such as guided notes sheets, vocabulary notecards etc. During phase B, the teacher presented the Spanish sound-symbol relationships using an Orton-Gillingham alphabet based approach. A chart of the sound symbol relationships was the basis of this presentation. Further instruction in the content of the class was presented using tactile strategies such as tapping and scooping. Diagrams for tapping and scooping were used with participants. Daily assessments were prepared in both writing and reading comprehension for both phases.

Measurable Materials

Daily assessments. Each day each student was given 5-10 minutes to complete a short assessment. The assessment was comprised of two multiple choice questions on a authentic text in the target language (Spanish) followed by a writing prompt related to the text. The students were asked one question answerable from the text and then to support that answer with the key word in the text which identified the response. The writing prompts were composed of a simple question which students were to write a high level sentence. During both phases the assessments were given as a warm-up activity.

Survey. At the conclusion of the study, students were asked to take a survey to indicate their level of satisfaction with the intervention strategy. Students took a Likert survey rating their responses to five questions on a 1-5 scale: 1 representing strongly disagree, 2 representing disagree, 3 representing neutral, 4 representing agree and 5

representing strongly agree. Participants were instructed not to put their names on the survey to remain anonymous to ensure honest responses. Figure 1 shows the survey students were asked to complete.

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
	5	4	3	2	1
1. I found the strategy of <i>multisensory instruction</i> easy to use.					
2. The strategy of <i>multisensory instruction</i> helped me to understand text in Spanish.					
3. The strategy of <i>multisensory instruction</i> helped me to write in Spanish.					
4. I enjoyed using the strategy of <i>multisensory instruction</i> in class.					
5. I would like to use the strategy of <i>multisensory instruction</i> again for Spanish in the future.					

Figure 1. Student satisfaction survey

Procedures

This study took place over eight weeks. Week one baseline data was collected on student's reading comprehension and writing ability using daily assessments. At the end of week 1, the teacher presented the Spanish sound-symbol relationships. Students were also instructed on how to decode Spanish words using tapping and scooping with guided worksheets. Weeks 3 and 4 were intervention weeks following instruction. Students continued to learn the content from class using the new strategy. Week 5 students returned to pre-intervention conditions. Week 6, the teacher instructed students on the sound symbol relationships in the target language. Weeks 7 and 8 returned to intervention conditions. At the end of week 8, students were asked to complete a voluntary survey regarding their satisfaction with the multisensory approach to Spanish instruction.

Measurement Procedures

Writing and reading comprehension. The daily assessments were given as warm-up activities during both phases. The students were asked to read a small sample of realia (authentic text) in the target language and to respond to two multiple choice questions. The students were then asked to write a one sentence response to a situational prompt. Each part of the daily assessment was graded separately on a scale of 0-10. The reading questions were simply graded based on accuracy. The sentence was graded based on the presence of a noun and correctly conjugated verb and the amount of detail or description related to the prompt.

Data Analysis

Survey results were compiled, recorded as a score from 1-10 and reported in a table. The data was then used to create line graphs to monitor the progress of the students.

Mean scores were used to compare the performance of the students during each phase of the study. The data points were used to identify changes in performance. Mean and standard deviations for reading comprehension and writing are reported in the tables. The data collection and comparisons helped to determine the effect of an Orton-Gillingham approach to foreign language instruction.

Chapter 4

Results

This single subject design study used ABAB phases to examine the effect of a multisensory approach to foreign language instruction on reading comprehension and writing in the target language. Four eighth grade students in a mainstream Spanish classroom participated in the study. Research questions investigated were as follows:

- (1) Will a multisensory approach to Spanish instruction increase the foreign language writing ability of middle school students with learning disabilities?
- (2) Will a multisensory approach to Spanish instruction increase the foreign language reading comprehension of middle school students with learning disabilities?
- (3) Will students be satisfied with the use of a multisensory approach to Spanish language proficiency?

Data was collected via daily assessments throughout all phases. At the conclusion of the study, students were asked to complete an anonymous Likert scale survey about their impression of the multisensory approach to instruction.

Reading Comprehension

Academic scores were collected through daily entrance tickets. The assessments were graded on a ten point scale using a holistic rubric. Means and standard deviations for students are reported in Table 2.

Table 2
Mean and Standard Deviations for Reading Comprehension across Phases

	Baseline 1		Intervention 1		Baseline 2		Intervention 2	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Student A	4.0	2.2	4.6	2.3	5.0	2.8	4.4	2.5
Student B	5.0	1.2	7.2	0.8	4.6	3.1	5.8	3.3
Student C	3.8	0.4	5.4	1.5	6.8	1.0	4.6	2.6
Student D	6.4	1.1	8.0	2.0	7.6	1.5	7.6	1.5

Student A is a 13-year-old Caucasian male. He is eligible for special education services under the classification SLD in reading comprehension. During the first baseline, Student A's mean score in reading comprehension was 4.0. Student A's mean score increased during the first intervention phase to 4.6. When the intervention was removed, the student's mean score during the second baseline increased to 5.0 and decreased when the intervention was reintroduced to a 4.4. Student A's daily data is reported in Figure 2. As shown in Figure 2, Student A's scores are inconsistent. The daily assessments varied throughout both baseline and intervention phases. Scores decreased at the beginning of each phase and increased whether the intervention was in place or not.

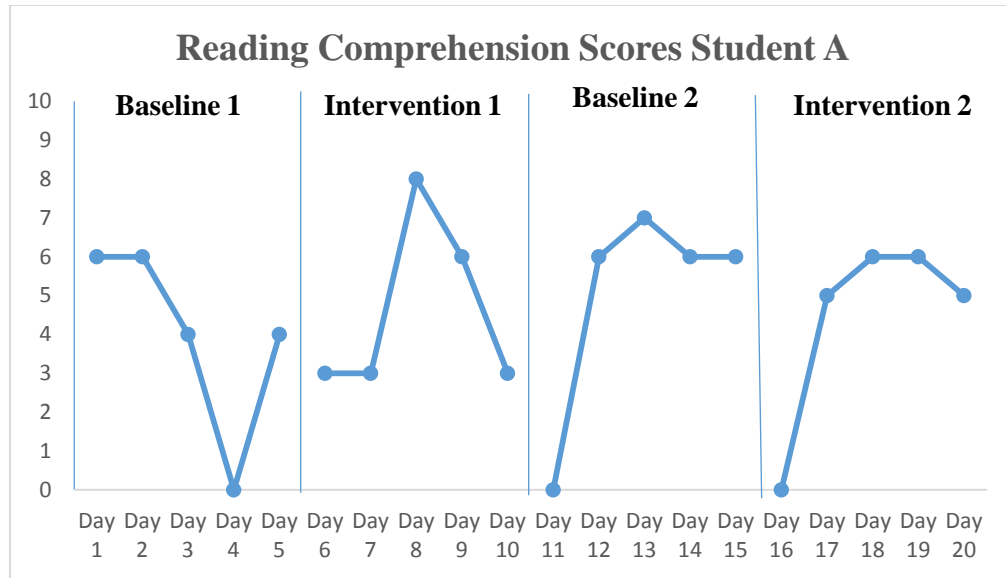


Figure 2. Reading comprehension scores student A

Student B is a 14-year-old Caucasian male. He is eligible for special education services under the classification SLD for basic reading and written expression. During the first baseline, Student B's mean score was 5.0. Student A's mean score increased during the first intervention phase to 7.2. When the intervention was removed, the student's mean score during the second baseline decreased to 4.6 and increased when the intervention was reintroduced to a 5.8. Student B's daily data is reported in Figure 3. As seen in Figure 3 Student B's scores decreased during both baseline phases. Student B's scores varied during the first intervention with some higher scores but overall student B increased during this phase. During the second intervention, Student B's scores also increased with one low score. Student B tended to have an overall increase during the intervention phases with one to two low scores.

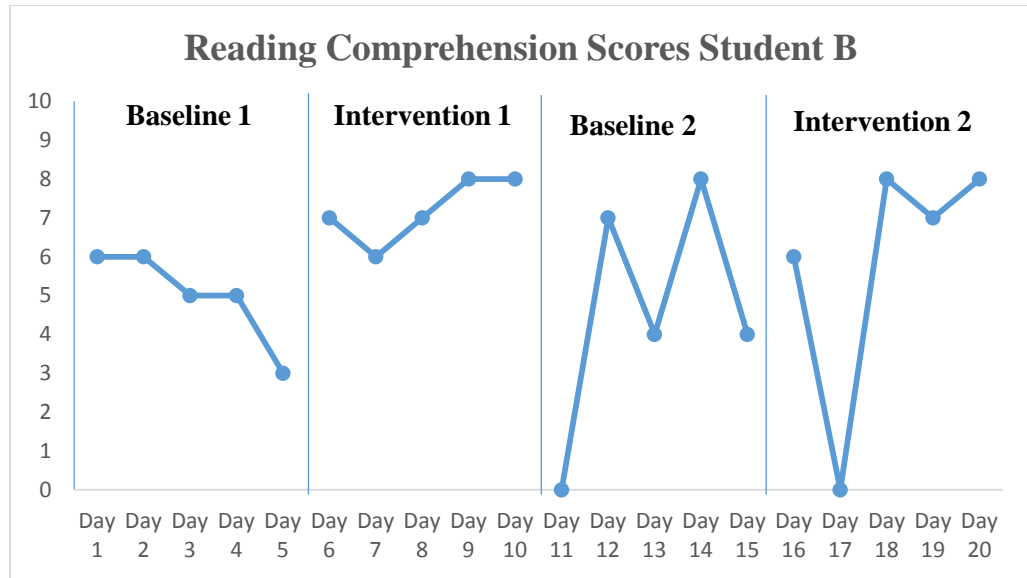


Figure 3. Reading comprehension scores student B

Student C is a 13-year-old Caucasian female. She is eligible for special education services under the classification OHI for end stage renal disease. This student is often out of school and receives home instruction when needed. During the first baseline, Student C's mean score in reading comprehension was 3.8. Student A's mean score increased during the first intervention phase to 5.4. When the intervention was removed, the student's mean score during the second baseline increased to 6.8 and decreased when the intervention was reintroduced to a 4.6. Student C's daily data is reported in Figure 4. As shown in Figure 4, Student C had inconsistent scores throughout baseline and intervention phases. Student C's first baseline scores were the lowest overall scores. During the first intervention Student C increased from the baseline but continued to increase when the intervention was removed with high scores during the second baseline. When the intervention was introduced again, Student C's scores again decreased.

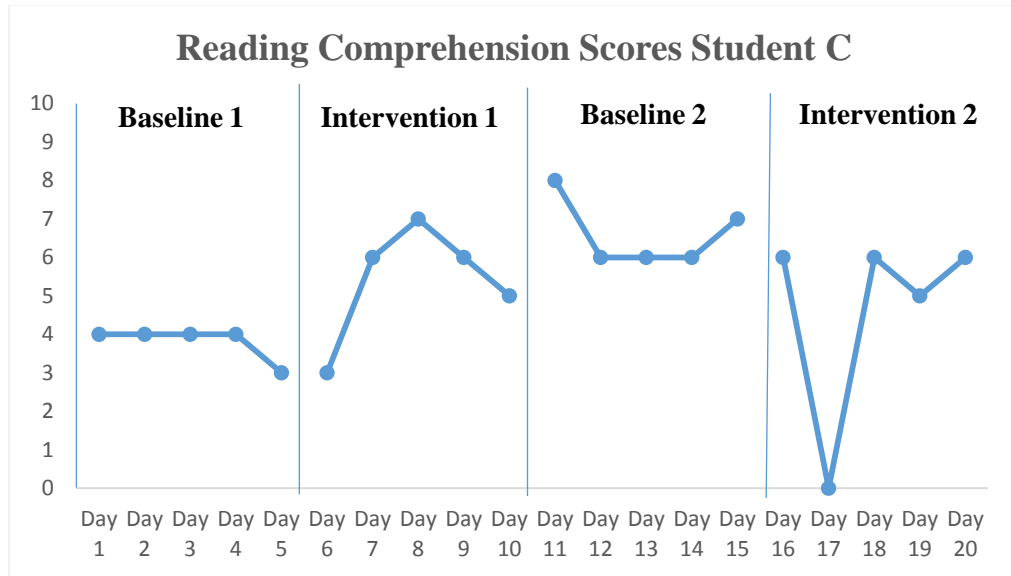


Figure 4. Reading comprehension scores student C

Student D is a 13-year-old Asian-American male. He is eligible for special education services under the classification AUT as high-functioning Asperger. During the first baseline, Student D's mean score in reading comprehension was 6.4. Student D's mean score increased during the first intervention phase to 8.0. When the intervention was removed, the student's mean score during the second baseline decreased to 7.6 and stayed the same when the intervention was reintroduced at a 7.6. Student D's daily assessment scores are reported in Figure 5. As shown in Figure 5, Student D had low scores in the first baseline. Student D increased during when the first intervention was introduced. After the first assessment, Student D decreased during the second intervention and steadily increased when the intervention was introduced again.

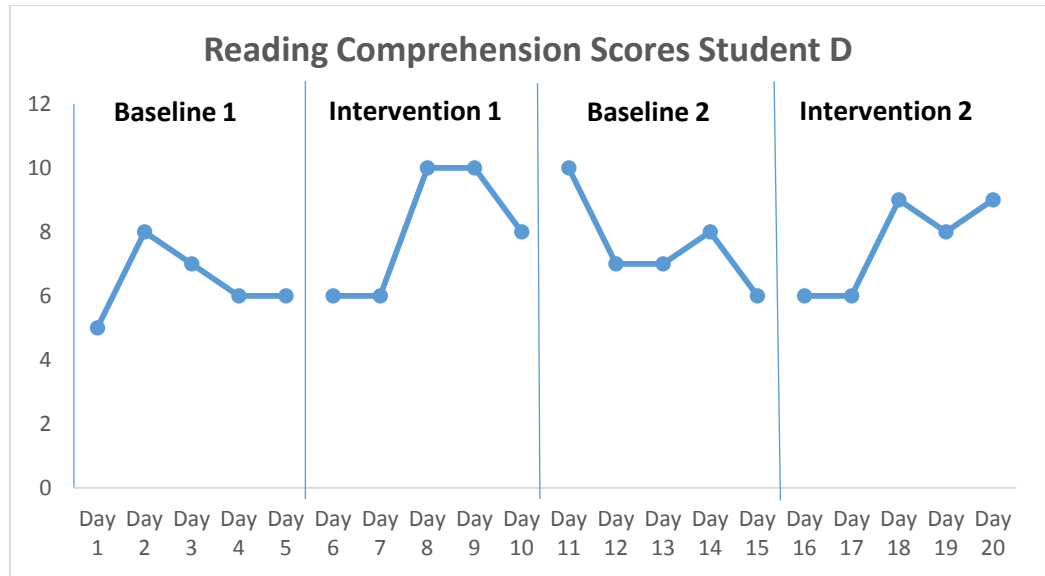


Figure 5. Reading comprehension scores student D

Written Expression

Academic scores were collected through daily entrance tickets. The assessments were graded on a ten point scale using a holistic rubric. Means and standard deviations for students are reported in Table 3.

Table 3
Mean and Standard Deviations for Written Expression across Phases

	Baseline 1		Intervention 1		Baseline 2		Intervention 2	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Student A	4.0	0.7	4.2	1.6	5.2	3.3	6.8	0.8
Student B	5.0	1.6	7.0	0.7	3.8	2.5	7.2	0.8
Student C	3.0	1.7	4.8	1.9	5.3	1.5	6.2	0.4
Student D	6.6	1.9	8.0	1.2	9.0	1.2	9.2	1.8

During the first baseline, Student A’s mean written expression score was 4.0. Student A’s mean score increased during the first intervention to 4.2. During the second baseline phase, Student A’s score continued to increase to a 5.2 and then increased again during the second intervention to 6.8. Student A’s daily assessment scores are reported in Figure 6. As seen in Figure 6, Student A started with low scores during the first baseline. During the first multisensory intervention phase, Student A’s scores were inconsistent with some high and low scores. During the second intervention phase Student A’s scores stayed consistently high.

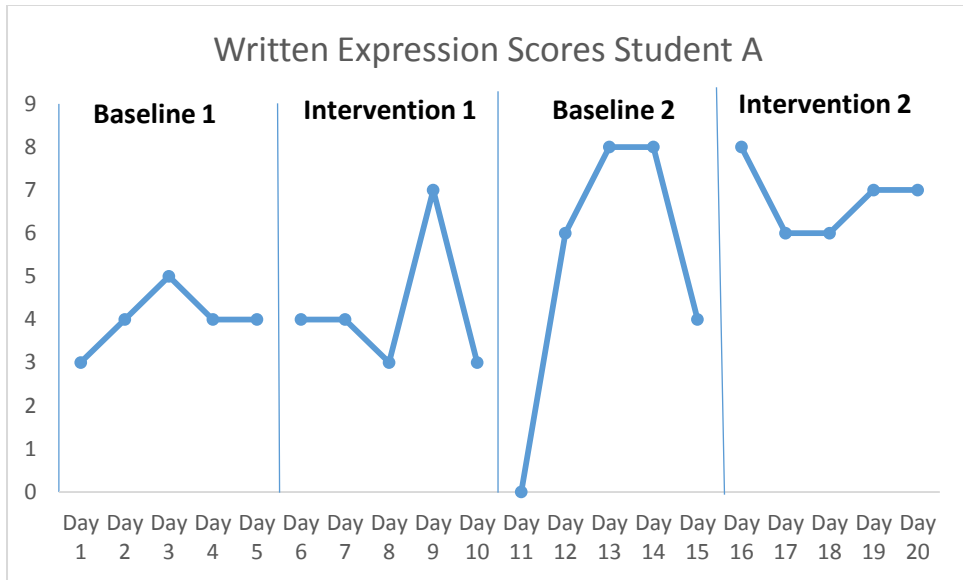


Figure 6. Written expression scores student A

During the first baseline, Student B's mean written expression score was 5.0. Student B's mean score increased during the first intervention to 7.0. During the second baseline phase, Student B's score decreased to a 3.8 and then increased again during the second intervention to 7.2. Student B's daily assessment scores are reported in Figure 7. As seen in Figure 7, Student B tended to decrease in both baseline phases. During both multisensory intervention phases, Student B's scores increased and remained consistently higher.

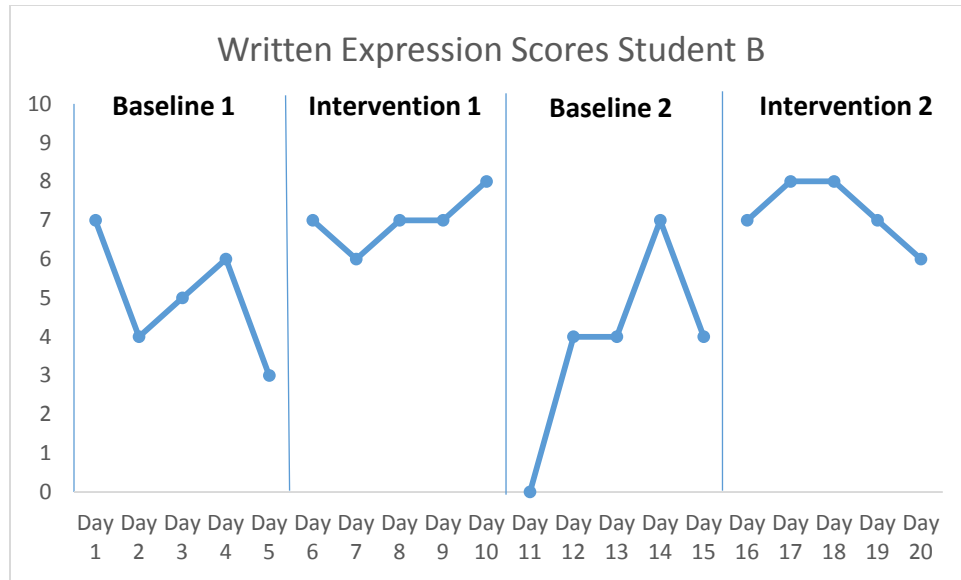


Figure 7. Written expression scores student B

During the first baseline, Student C's mean written expression score was 3.0. Student C's mean score increased during the first intervention to 4.8. During the second baseline phase, Student C's score continued to increase to a 5.3 and then increased again during the second intervention to 6.2. Student C's daily assessment scores are reported in Figure 8. As seen in Figure 8, Student C's first baseline scores were in the lower range. During the first intervention, Student C's scores increased but were inconsistent. When the intervention was removed Student C's scores dropped but steadily increased. When the intervention was reintroduced, Student C's scores remained consistently higher than the baseline phases.

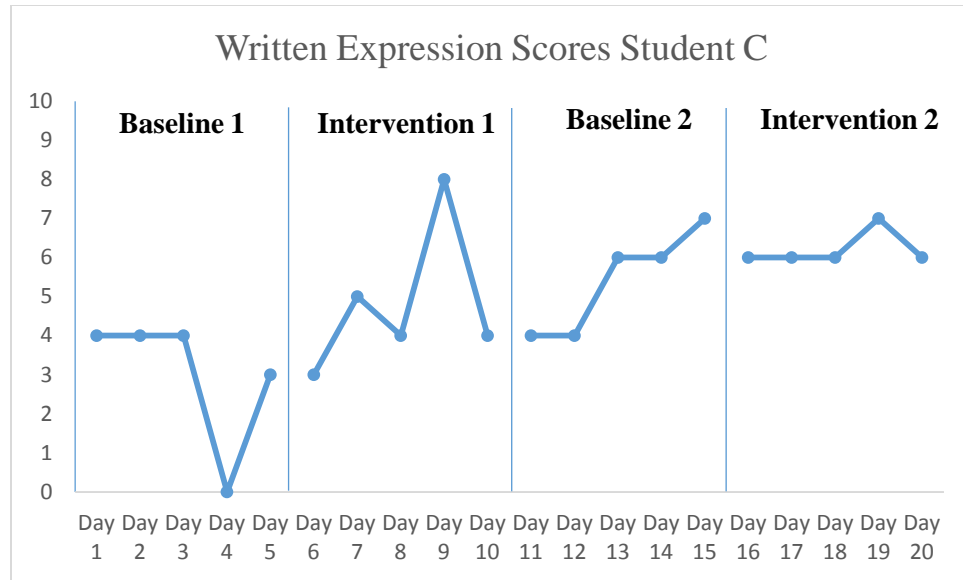


Figure 8. Written expression scores student C

During the first baseline, Student D's mean written expression score was 6.6. Student D's mean score increased during the first intervention to 8.0. During the second baseline phase, Student D's score continued to increase to a 9.0 and then increased again during the second intervention to 9.2. Student D's daily assessment scores are reported in Figure 6. As seen in Figure 9, Student D began in the lower range during the first baseline. When the intervention was introduced, Student D's scores stayed on the higher end with one exception. When the intervention was taken away, Student D maintained his high written expression scores and continued with those scores for the second intervention.

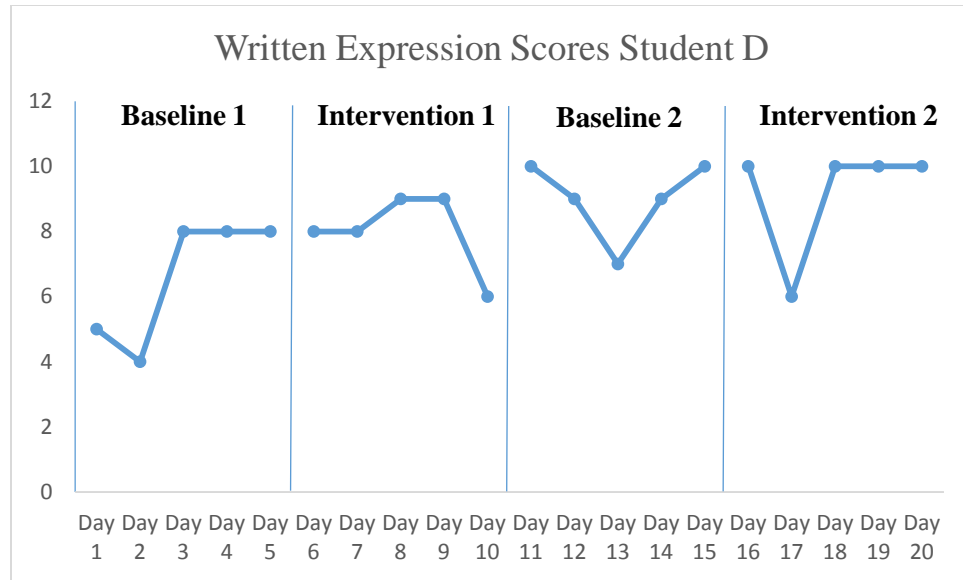


Figure 9. Written expression scores student D

Survey Results

All students voluntarily complete a Likert scale survey for satisfaction with the multisensory approach to foreign language instruction. The surveys were completed after the second intervention was finished and the students' responses were kept anonymous. Results were recorded and converted into percentages. The student response percentages are reported in Table 4.

Table 4
Student Satisfaction Data Collection Table

Statement	5 Strongly Agree (%)	4 Agree (%)	3 Undecided (%)	2 Disagree (%)	1 Strongly Disagree (%)
I found the strategy of multisensory instruction easy to use.	0	75	25	0	0
The strategy of multisensory instruction helped me to understand text in Spanish.	25	75	0	0	0
The strategy of multisensory instruction helped me to write in Spanish.	0	0	100	0	0
I enjoyed using the strategy of multisensory instruction in class.	0	25	50	25	0
I would like to use the strategy of multisensory instruction again for Spanish in the future.	75	25	0	0	0

As seen in Table 4, a rating of 4 or 5 indicated that the students agreed to some degree with the statement. A rating of 3 indicated the student was undecided with the statement. A rating of 2 or 1, indicated the students disagreed to some degree with the statement. Table 4 shows that all of the students found the multisensory strategy easy to use or were undecided. Table 4 shows that all of the students agreed to some degree that the multisensory strategy helped them improve their understanding of the text in Spanish. On the other hand, all of the students were undecided whether the strategy helped them to write in Spanish. Half of the students were undecided whether they enjoyed the strategy while one agreed and another disagreed that they enjoyed using the strategy. All of the students agreed that they wanted to continue to use the strategy for future Spanish instruction.

Chapter 5

Discussion

The purpose of this study was to determine the effect of a multisensory approach to Spanish instruction on foreign language proficiency of students with learning disabilities. Foreign language proficiency was defined as reading comprehension and writing. At the end of the study, participants were asked to complete a voluntary anonymous survey to assess their overall impressions of the multisensory approach to Spanish instruction.

Findings

Specialized multisensory structured language instruction is likely to help at-risk learners to pass foreign language courses and ultimately to learn the second language (Ganschow & Sparks, 2000). The current findings support the research of Ganschow & Sparks (2000) in that all four participants improved their reading comprehension and writing scores from baseline data. In addition, survey results indicated that all four participants were satisfied to a certain degree with the multisensory approach to Spanish instruction.

Reading comprehension. Campbell, Helf and Cooke (2008) conducted a multiple baseline study looking at the effect of adding multisensory components to a pre-existing reading intervention for students who were not progressing. The results align with the current study and suggest that multisensory components in addition to reading intervention resulted in a higher rate of fluency of decoding nonsense words and oral reading fluency for treatment resisters. In the present study, Student B increased from a mean of 5.0 to 7.2 during the first intervention and from a mean of 4.6 to 5.8 for the

second intervention. Student D increased from baseline to first intervention from a mean score of 6.4 to 8.0 but scores remained the same during the second intervention at a mean score of 7.6.

In contradiction to most studies, Student A and C's scores increased from baseline to first intervention but scores decreased during the second intervention. Student A's mean score went from 4.0 to 4.6 in the first phase but in the second phase Student A's mean score went from 5.0 to 4.4. Student C's mean score went from 3.8 to 5.4 during the first intervention but in the second phase his score dropped from 6.8 to 4.6. The post-test data in a study conducted by Lim and Oei (2015) showed reliable improvement in reading achievement and spelling however the authors of the study stressed the importance of early identification and intervention as the data showed the earlier the intervention began the greater the gains in students' standard scores. It is believed that Students A and C fall into this category. Both students have experienced a history of academic failure in the area of reading and often required extensive prompting to even attempt the reading tasks. Constant supervision and redirecting to stay on task was required for completion of reading tasks.

The current study results may support the findings of Wanzek et al. (2011) whose results indicated that a single year of intervention was unlikely to result in long term results. The mean scores for Student B and Student D seem to support these findings as both students second intervention scores resulted in lower mean scores for reading comprehension when the intervention was reintroduced. Student B increased from 5.0 to 7.2 during the first intervention and from 4.6 to 5.8 for the second intervention. Student B's mean score during the first intervention was a 7.2 yet the second intervention score

was only 5.8. Student D increased from baseline to first intervention from a mean score of 6.4 to 8.0 but scores remained the same during the second intervention at a mean score of 7.6. Student D's mean score during first intervention was 8.0 and during the second intervention student D's mean score during the second intervention was a 7.6.

Written expression. Sparks et al. (1997) found that at risk learners in the foreign language classroom made significant gains in native language phonological/orthographic skills and all learners made gains in foreign language aptitude. The current study supports these results in the area of writing proficiency for all four students. In particular Student B increased his mean score during both intervention phases and his scores tended to decrease when the intervention was removed. Student A's mean written expression scores increased from baseline to first intervention from 5.0 to 7.0 with an increase of 2.0. During the second baseline, the student mean written expression scores dropped to a 3.8 and increased to a final mean score of 7.2, an increase of 3.4.

In contradiction to the current findings, Ryder, Burton and Silberg (2006) found that both direct and non-direct instruction methods had the same effect student reading achievement. The authors suggested the effectiveness of the teacher was more important than the instructional method. The current findings show that direct instruction methods (multisensory approach) resulted in higher reading achievement scores. The findings for Students A, C and D support these findings as their scores continually increased through both intervention and baseline phases. Student A mean written expression scores remained relatively the same from first baseline to first intervention with only a .2 increase from 4.0 to 4.2. Student A continued to improve in written expression with mean score of 5.2 during second baseline. Making a more significant increase when the

intervention was removed. Student A's final mean written expression score during the second intervention was a 6.8. Student C steadily increased her mean scores in the area of written expression throughout the process from 3.0 to 4.8 and continued to progress from 5.3 to 6.2. Student D similarly increased his mean scores through both phases from 6.6 to 8.0 then from 9.0 to 9.2. Students A, C and D increased their mean written expression scores with and without the intervention in place. The effectiveness of the teacher and not the strategy seemed to play a more important role in written expression scores.

Limitations

This study had a few possible limitations. One limitation may have been the health concerns of two of the participants. Student B and C were often absent and received inconsistent instruction and intervention strategies. The daily assessments had to be made up on days when the students were in class and some of the instruction had to be presented by a paraprofessional so as not to disrupt full class Spanish instruction. The students expressed concerns over the amount of instruction missed and the impact on assessment scores.

Another limitation was the excessive instructional time required to teach the foundation for the multisensory approach to Spanish instruction. The Orton-Gillingham based method required the teaching of the initial Spanish sounds taught each day. There were 31 Spanish sounds which required 31 days of instruction prior to data collection. This type of instruction time impacted all students and curriculum instruction.

Lastly, the single-subject research design included a small sample size. This study was conducted with four participants. The data may be different if replicated with a larger population size.

Implications and Recommendations

This study adds to the existing research on the effect of a multisensory approach to Spanish instruction on foreign language proficiency of students with learning disabilities in which daily assessments of reading comprehension and written expression were investigated individually. The results of this study may lead educators to consider using a multisensory approach to foreign language instruction to improve foreign language proficiency in the areas of reading comprehension and written expression. However, the intervention may not be effective for all students with learning disabilities. Also, the intervention may not be effective if implemented after a history of academic failure has been established.

While the study does have its limitations, the data suggests that for most students a multisensory approach to Spanish instruction may improve reading comprehension and written expression scores. Prior research by Sparks et al. (1997) has resulted in stronger reading and written expression scores for large sample-sizes over a longer period of time when a multisensory approach to foreign language instruction is utilized. There continues to be a need for further research on the effect of a multisensory approach to foreign language instruction. The research is limited as very few studies have been conducted on students in the foreign language classroom. Also, all of the studies (Ganschow et al. 1998, 2000; Sparks et al. 1991, 1997, 2008) that have been conducted in the foreign language classroom, all were conducted in a high school or college classroom. The current study was conducted in the middle school classroom, but there continues to be a demand for further research on the effect of a multisensory approach to foreign language instruction on students with learning disabilities.

In this study, all four participants increased their scores in reading comprehension and written expression during the multisensory approach to Spanish instruction intervention from initial baseline scores. Research should be conducted with a larger sample size over the course of at least one year of Spanish instruction to determine if the results generalize to all special needs learners.

The multisensory approach to Spanish instruction is a highly specialized intervention strategy requiring training and teacher preparation. Once trained in the strategy, the approach requires instructional time over the course of 31 days for the base teaching of the Spanish sounds. Some teacher may find the amount of training of procedural teaching too demanding and not worth the inconsistent results. Training can cost districts and teachers money and time which may not be available. Educators may reconsider trying this strategy as it will impact the amount of curricular content which can be covered in the classroom.

From survey results, it seems that students enjoyed the multisensory approach to Spanish instruction intervention in Spanish I. More research should be conducted to determine if the strategy is effective for elementary and middle school students with learning disabilities.

Conclusions

This study supports prior research that a multisensory approach to Spanish instruction improves students' scores in reading comprehension and written expression for students with learning disabilities. Also, students with LD enjoyed using the multisensory instruction and felt that it helped improve their ability to understand text in Spanish. Further research is needed at the middle school level with a larger sample size

over a longer period of time. While the study attempted to show increased score in reading and writing for exceptional learners, more research is needed to generalize the results to middle school aged students in foreign language classrooms.

References

- Campbell, M.L., Helf, S., Cooke, N.L. (2008). Effects of adding multisensory components to a supplemental reading program on the decoding skills of treatment resisters. *Education and Treatment of Children*, 31 (3), 267-295. DOI 10.1853/etc.0.0003
- Castro, O., Peck, V. (2005). Learning styles and foreign language difficulties. *Foreign Language Annals*, 38 (3), 401-409.
- DiFino, S.M., & Lambardino, L.J. (2004). Language learning disabilities: The ultimate foreign language challenge. *Foreign Language Annals*, 37, 390-400.
- Ford, K., Palacios, R. (2015) Early literacy instruction in Spanish: Teaching the beginning reader. *Colorín Colorado: A bilingual site for educators and families of English language learners*.
- Ganschow, L., Sparks, R.L. (2000). Reflections on foreign language study for students with language learning problems: Research, Issues and Challenges. *Dyslexia*, 6, 87-100.
- Hook, P.E., Macaruso, P., Jones, S. (2001) Efficacy of Fast ForWord training on facilitating acquisition of reading skills by children with reading difficulties- a longitudinal study. *Annals of Dyslexia*. 51, 75-96.
- Joshi, R.M., Dahlgren, M., Boulware-Gooden, R. (2002). Teaching reading in an inner city school through a multisensory teaching approach. *Annals of Dyslexia*, 52 (1), 229-242.
- Lim, L., Oei, A.C. (2015) Reading and spelling gains following one year of Orton-Gillingham intervention in Singaporean students with dyslexia. *British Journal of Special Education*, 42(4), 376-388. D.O.I 10.1111/1467-8578.12104
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington, DC: National Institute of Child Health and Human Development
- New Jersey Department of Education (2008). New Jersey high school graduation requirements (N.J.A.C. 6A:8-5) Retrieved from <http://www.nj.gov/education/archive/aps/info/grad.htm>
- Manis, F.R., Lindsey, K.A., Bailey, C.E. (2004). Development of reading in grades K-2 in Spanish-speaking English-language learners. *Learning Disabilities Research & Practice*, 19(4), 214-224.

- Ritchev, K.D., Goeke, J.L. (2006). Orton-Gillingham and Orton-Gillingham-Based reading instruction: A review of the literature. *The Journal of Special Education*, 40 (3), 171-183.
- Ryder, R.J., Burton, J.L., Silberg, A. (2006). Longitudinal study of direct instruction effects from first through third grades. *The Journal of Educational Research*, 99(3), 179-191.
- Sparks, R.L., Patton, J., Ganschow, L., Humbach, N., and Javorsky, J. (2008). Early first-language reading and spelling skills predict later second-language reading and spelling skills. *Journal of Educational Psychology*, 100, 162-174. Doi:10.1037-0022-0663.100.1.162
- Sparks, R.L., Ganschow, L., Artzer, M., and Patton, J. (1997) Foreign language proficiency of at-risk and not-at-risk learners over 2 years of foreign language instruction: A follow-up study. *Journal of Learning Disabilities*, 30 (1), 92-98.
- Sparks, R.L., Ganschow, L., Kenneweg, S., and Miller, K. (1991) Using Orton Gillingham approach to teach foreign language to dyslexic/learning disabled students: Explicit teaching of phonology in a second language. *Annals of Dyslexia*, 41, 96-118.
- Wanzek, J., Vaughn, S., Roberts, G., Fletcher, J.M. (2011). Efficacy of a reading intervention for middle school students with learning disabilities. *Council for Exceptional Children*, 78 (1), 73-87.