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Physical Education Teachers' Instructional Adaptations to Teach Motor Skills to Children with Language Disorders

Kristen Morgan

PHYSICAL EDUCATION TEACHERS' INSTRUCTIONAL ADAPTATIONS TO TEACH MOTOR SKILLS TO CHILDREN WITH LANGUAGE DISORDERS

by

Kristen N. Morgan

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Approved by:

Melissa Thompson, Committee Chair
Joann P. Judge
Stephanie McCoy
Nancy Speed

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ABSTRACT

Children with language disorders have a unique blend of impairments related to communication, memory (Gray et al., 2019; Montgomery et al., 2019), executive functioning (Kapa & Plante, 2015), motor skills (Hill, 2001), imitation, gestures (Wray et al., 2017), and reaching early motor milestones (Diepeveen et al., 2018). These deficits may negatively affect learning motor skills in physical education (PE). Instructional adaptations to overcome these learning impairments in PE has not been greatly explored in the literature. Nor has teachers' level of self-efficacy in providing adaptations to children with language disorders. The purpose of this study was to examine instructional adaptations PE teachers use to teach motor skills to children with language disorders and the impact of teacher self-efficacy on the selection of these adaptations.

Participants included current PE teachers (N = 105) across the United States. A mixed methods design was implemented for the purpose of this study. Quantitative data included the Scale for Instructional Adaptations in Physical Education– Language Disorders, the Physical Educators' Self-Efficacy Toward Including Students with Disabilities- Language Disorders, and educational experiences. Qualitative data included focus group discussions to understand perceptions of instructional adaptations. Data were analyzed using a descriptive analysis, isolation of themes, and merging the data to a single interpretation.

Four themes emerged from the interpretation:

1. Teachers expressed challenges when teaching children with language disorders, such as communicating information and the range of language disorders and multiple disorders.

2. Teachers used multisensory instruction such as visuals, adapted verbal instructions, and verbal expressions from the students.
3. Teachers progressed through instruction by allowing more process time and by breaking down instruction into a task analysis.
4. Teachers learned to adapt their instruction through a combination of trial-and-error, from other professionals in the school, and through professional development and conferences.

Regression analyses were completed to determine if self-efficacy and educational experiences predicted use of instructional adaptations. The model was statistically significant, $R^2 = .227$, $F(7, 87) = 3.655$, $p = .002$, with a medium effect size $f^2 = .293$. Self-efficacy positively predicted instructional adaptations, $r = .120$, $p < .001$, and years of teaching experience negatively predicted instructional adaptations, $r = -.013$, $p = .001$. There is a need to support self-efficacy in PE teachers for the vital role self-efficacy plays on instructional adaptations.

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Being a runner, I couldn't help but to compare the dissertation process to a marathon. Just like in a marathon, there are several key individuals that either make or break the process and I was blessed to have been surrounded by those who provided the utmost support!

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Run with perseverance the race that is set before us (Hebrews 12:1).

DEDICATION

To my Mom and family

A special thank you to my mom, Beverly, for instilling a sense of enthusiasm, perseverance, and creativity which have helped me every step of the way. Thank you to my loving sisters Belle, Hannah, and Erin, my brother Cyrus, and my father Charles for celebrating each accomplishment with me.

To my Husband

Thank you, Devon, for sticking by my side through all of my endeavors, for your patience, and continued support.

To my Teachers

Thank you to my teachers who believed in me. This led me to pursue my dreams.

The joy of the Lord is my strength (Nehemiah 8:10).

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LIST OF ABBREVIATIONS

ASD	Autism Spectrum Disorder
BOT	Bruininks Oseretsky Test of Motor Proficiency
DLD	Developmental Language Disorder
DSM-V	Diagnostic and Statistical Manual of Mental Disorders (5th ed.)
ESSA	Every Student Succeeds Act
FAPE	Free and Appropriate Public Education
FMS	Fundamental Motor Skills
IDEA	Individuals With Disabilities Education Act
LRE	Least Restrictive Environment
IMSLEC	International Multisensory Structured Language Education Council
MABC	Movement Assessment Battery for Children
PDH	Procedural Deficit Hypothesis
SHAPE	Society of Health and Physical Educators
SLI	Specific Language Impairment
TGMD-3	Test of Gross Motor Development, Third Edition
TD	Typically Developing
UDL	Universal Design for Learning

CHAPTER I – INTRODUCTION

There is significant literature examining teaching practices in physical education. However, there is little research on this process in special-needs populations such as children with language disorders. The purpose of this study was to explore instructional adaptations physical education teachers incorporate to teach motor skills to children with language disorders. The study also examined the impact of self-efficacy toward the inclusion of children with language disorders on the selection of these adaptations.

Background of the Problem

It is estimated that 8% of all children in the United States have a language disorder (Black et al., 2015). Researchers have found children with language disorders to have lower motor skills (Hill, 2001), working memory (Gray et al., 2019), cognitive function (Gallinat & Spaulding, 2014), and executive functioning (Kuusisto et al., 2017) compared to typically developing children. One explanation for these deficiencies is the procedural deficit hypothesis (PDH; Ullman & Pierpont, 2005). The PDH posits that children with language disorders have common deficiencies in learning both cognitive and psychomotor procedural tasks due to a disconnect in a neural circuit in the frontal cortex and basal ganglia. Thus, language disorders may negatively affect learning in physical education due to cognitive and psychomotor deficits (Rosenbaum & Simon, 2016).

Specialized instruction, such as multisensory instruction, has shown to be effective in teaching children with language disorders (Birsh & Carreker, 2018). Multisensory instruction integrates several learning pathways in the brain (e.g., visual,

auditory, kinesthetic) simultaneously to enhance memory and learning (IMSLEC, 2020). Multisensory instruction has been shown to support language development (Joshi et al., 2002; Magpuri-Lavell et al., 2014; Schlesinger & Gray, 2017), learning math (Rains et al., 2008; Taljaard, 2016; Thornton et al., 1983) and foreign language development (Sparks et al., 1991; Sparks & Miller, 2000) in children with language disorders. Multisensory instruction is also an evidence-based reading practice for children with language disorders (IMSLEC, 2020). A specific multisensory instructional method is The DuBard Association Method®. This method has supported language and confidence development in children (Martin et al., 2016). However, it is unclear if aspects of multisensory instruction have been implemented to teach other content, such as motor skills.

Motor skills are typically taught in physical education. Normalized or typical instruction in physical education has been categorized as verbal directions on how to perform a skill, a modeled demonstration, and then children are expected to perform the skill without instructional adaptations for children with disabilities (van Munster et al., 2019). Likewise, Rink (1994) observed instruction in physical education and found teachers generally provide verbal instruction, maybe a demonstration, and then students perform the skill. However, instruction should be adapted for children with language disorders due to the deficiencies related to having a language disorder (Ullman & Pierpont, 2005). Observational learning theory describes four stages to support learning through observing a teacher model a skill in physical education (Bandura, 1986). According to observation learning, the four subprocesses must take place (i.e., attention,

retention, production, motivation) for learning to occur. Bandura described instructional strategies that support the four subprocesses such as visuals, breaking a task down, and rehearsal. These instructional strategies support learning by enhancing the amount that the learner attends to the model, retains the information by the model, produces the modeled action, and is motivated to replicate the modeled action. These strategies could be used as adaptation to help children who may have a difficult time learning from typical instruction such as children with language disorders.

The Society of Health and Physical Educators (SHAPE) of America has outlined the essential components of physical education (SHAPE America, 2015). One essential component is delivering appropriate instruction and adapting content in a manner that is suitable for children with and without special needs. In addition, federal laws such as the Individuals With Disabilities Education Act (IDEA) and Every Student Succeeds Act (ESSA) mandate that instruction in physical education be adapted and modified to meet the needs of children with disabilities (Every Student Succeeds Act, 2015; Individuals With Disabilities Education Act, 2004). However, research is limited on instructional adaptations for children with language disorders in physical education.

Studies have found language-infused physical education to be beneficial in teaching children with language disorders (Connor-Kuntz & Dummer, 1996; Derri et al., 2010). Connor-Kuntz and Dummer (1996) found children at risk for language disorders benefited in their language development and motor skills following a physical education intervention that emphasized language (i.e., directions, shapes, colors). Motor skills have also improved through typical physical education without instructional adaptations (Adi-

Japha & Abu-Asba, 2014; Rintala & Linjala, 2003; Rintala et al., 1998). Rintala and Linjala found children with language disorders slightly improved in motor skills following a physical education intervention with no adaptations provided. However, little is known about instructional adaptations physical education teachers use to help teach motor skills to children with language disorders.

Instructional practices and adaptations may be influenced by self-efficacy. Self-efficacy is a task-specific form of self-confidence that arises from successful experiences and having the knowledge and skills for a situation (Bandura, 1977). Stephanou and Tsapakidou (2007) found teacher's self-efficacy to be related to physical education teachers' use of instructional practices. Similarly, Taliaferro (2010) found self-efficacy toward inclusion of children with disabilities to predict teaching behaviors and adaptations to children with disabilities. Additionally, teachers with more educational experiences, such as adapted physical education (APE) course training and years of teaching experience were found to have higher levels of self-efficacy toward the inclusion of children with disabilities. Stephanou and Tsapakidou (2007) and Taliaferro (2010) suggest that educational experiences support self-efficacy and self-efficacy supports adapting instruction for children with disabilities. However, little is known about physical educators' self-efficacy toward the inclusion of children with language disorders. Understanding physical education teachers' self-efficacy toward the inclusion of children with language disorders could help determine if this self-efficacy is associated with instructional adaptations. Theoretically, teachers with higher levels of self-efficacy toward the inclusion of children with language disorders should have

confidence in their teaching and would be more likely to adapt their instruction to teach children with language disorders.

Statement of the Problem

Children with language disorders typically have low motor skills, and there is a lack of understanding on instructional adaptations teachers are currently implementing to support learning in physical education. Likewise, there is little known regarding physical education teachers' sense of self-efficacy toward the inclusion of children with language disorders and how this might affect instructional adaptations. Multisensory instruction has been used to teach an array of subjects to children with language disorders, but little is known about the use of multisensory instruction to teach motor skills. Similarly, strategies that enhance the four subprocesses of observational learning have been used to teach motor skills to typically developing children. However, there is little known about physical education teachers' use of strategies that support observational learning for teaching children with language disorders. More research is needed that focuses on teaching children with language disorders in physical education. Specifically, research is needed that examines physical education teachers' instructional adaptations and self-efficacy toward the inclusions of children with language disorders.

Purpose and Research Questions

Considering the way multisensory instruction has supported learning, aspects of multisensory instruction may be incorporated by physical education teachers to teach children with language disorders. Likewise, observational learning strategies may also be implemented by physical education teachers to teach children with language disorders.

Further, physical education teachers' self-efficacy for inclusion of children with language disorders may be related to these instructional adaptations. However, these postulations are unknown.

The purpose of this study was to examine instructional adaptations physical education teachers incorporate to teach motor skills to children with language disorders and the impact of self-efficacy toward the inclusion of children with language disorders on the selection of these adaptations. The analysis focused on physical education teachers' self-reported instructional adaptations and self-efficacy. The overall goal of this study was to gain a better understanding of how physical education teachers teach children with language disorders and the effect of self-efficacy toward the inclusion of children with language disorders and educational experiences on their instructional adaptations. Physical education teachers' perceptions of integration of adaptations to support children with language disorders and self-efficacy were explored. Two research questions (RQ) guided this study:

RQ1: What current instructional adaptations are physical education teachers incorporating to teach motor skills to children with language disorders?

RQ2: Does physical education teachers' self-efficacy toward including children with language disorders, educational experiences in adapted physical education, years of teaching experience, and number of children taught with a language disorders predict types of instructional adaptations? *(Hypothesis: The above variables will predict instructional adaptations).*

Theoretical Framework

The theoretical framework is displayed in Figure 1. The theoretical framework behind the methods of this study begin with the paradigm of multisensory instruction and observational learning. This ontology premise began with real, external, and independent findings. From the paradigm, the theoretical lens was applied. The theories behind multisensory instruction explain language instruction specially designed for children with language disorders and key features of multisensory instruction (Birsh & Carreker, 2018). The theory of observational learning and the four subprocesses (Bandura, 1986) are the foundation to instructional practices within physical education. The lines connecting the two premises resemble the commonalities between the two. For example, visual are provided in multisensory instruction and Bandura (1986) proclaimed visuals can support the attentional process. The three dots in the middle are leading to the unknown instructional adaptations provided in physical education for children with language disorders.

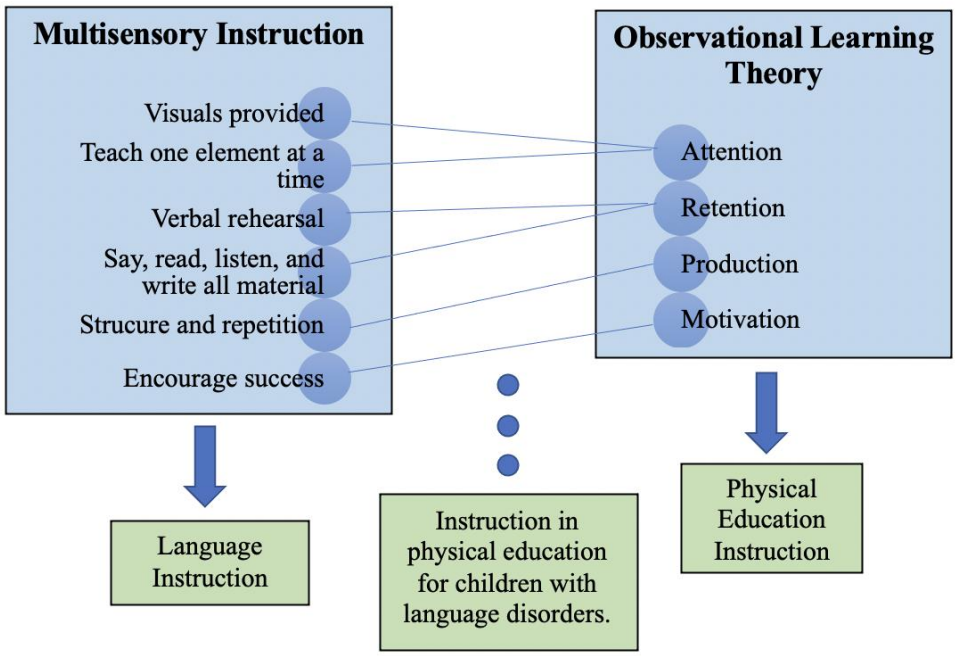

Figure 1. *Theoretical Framework*

Measures

A mixed methods approach was used to best answer RQ1. Qualitative measures for RQ1 included two focus group discussions to help gain an in-depth understanding of instructional adaptations implemented by a sub-sample of physical education teachers in the US. The focus groups inquired about educational experiences, challenges in teaching children with language disorders, adaptations implemented to teach children with language disorders, and how teachers learned to adapt instruction. Data were analyzed using descriptive analysis and isolation of themes (Fetters et al., 2013). Quantitative measures for RQ1 included the Scale of Instructional Adaptations in Physical Education - Language Disorders (SIAPE-L) to assess the use of instructional adaptations by a sample of physical education teachers in the United States (US).

A survey design was chosen to answer RQ2. Quantitative measures for RQ2 included the SIAPE-L, the Physical Educators' Self-Efficacy Toward Including Students with Disabilities- Language Disorders (PESEISD-L), and demographic information. The PESEISD-L, adapted from Taliaferro (2010), was used to assess self-efficacy toward the inclusion of children with language disorders. The demographic information was collected to assess educational experiences from the sample of physical education teachers. Measures were analyzed using a step-wise multiple regression to determine if self-efficacy and educational experiences predicted instructional adaptations. Independent variables included average self-efficacy, years of teaching experience, number of undergraduate APE, graduate APE, and special education courses, number of in-service workshops attended, and number of students with language disorders taught in the past five years. The dependent variable was the SIAPE-L average score.

Definition of Terms

Adapted Physical Education- "programs designed to develop physical and motor fitness; fundamental motor skills and patterns; and skills in aquatics, dance, and individual and group games and sports so that the individual with a disability can ultimately participate in community-based physical activity programs to enjoy an enhanced quality of life" (Adapted Physical Education National Standards [APENS], 2008, p. 180).

Communication Disorder- "an impairment in the ability to receive, send, process, and comprehend concepts or verbal, nonverbal and graphic symbol systems" (American Speech-Language-Hearing Association, 1993).

Differentiated Instruction- “teachers have clear learning goals that are rich in meaning and provide various avenues and support systems to maximize that chance of each student succeeding with those rich and important goals” (Tomlinson, 2005).

Expressive Language Disorder- “having problems sharing thoughts, ideas, and feelings” (American Speech-Language-Hearing Association, 1993).

Fundamental Motor Skills (FMS)- locomotor skills (i.e., skip, hop, leap, gallop, slide, run, jump) and manipulative skills (i.e., throw, kick, dribble, catch, strike, roll; (Haywood & Getchell, 2009).

Gross Motor Skill- “motor skills that involve the large, force-producing muscles of the trunk, arms, and legs” (Clark, 1994, p. 225).

Individuals With Disabilities Act (IDEA)- “a law that makes available a free appropriate public education to eligible children with disabilities throughout the nation and ensures special education and related services to those children” (Individuals With Disabilities Education Act, 2004).

Language Disorder- “impaired comprehension and/or use of spoken written and/or other symbol systems” (American Speech-Language-Hearing Association, 1993).

Language disorder (operational definition)- For this study language disorder is defined as a diagnosis of a speech-language or language disorder.

Motor Skill Development- “change in motor behavior over the lifespan and the process that underlie the change” (Clark, 1994, p. 225).

Multisensory Instruction- “engages the learner in visual, auditory, and kinesthetic responses and feedback with deliberate and intensive practices” (Birsh, 2011, p. 17).

Observational Learning- “when models exhibit novel patterns of thought or behaviors which observer did not already possess but which, following observation, they can produce in similar form” (Bandura, 1986).

Physical Education- “an academic subject that provides a planned, sequential, K-12 standards-based program of curricula and instruction designed to develop motor skills, knowledge and behaviors for healthy, active living, physical fitness, sportsmanship, self-efficacy and emotional intelligence” (SHAPE America, 2015).

Receptive Language Disorder- “having troubles understanding what other say” (American Speech-Language-Hearing Association, 1993).

Self-efficacy- ” beliefs in one’s capabilities to organize and execute the course of action required to produce given attainments” (Bandura, 1977, p. 3)

Speech Disorder- “an impairment of the articulation of speech sounds, fluency and/or voice” (American Speech-Language-Hearing Association, 1993).

Universal Design for Learning- “a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn” (CAST, 2018).

Delimitations

The population included in the study was comprised of only physical education teachers who self-reported that they had experience in teaching at least one child with a language disorder in the past five years. This limits the participants to only those who are aware of teaching children with language disorders in physical education.

Limitations

The limitations included the following: self-report data and validation of SIAPE-L instrument. Self-reported data were from participants' retrospective analysis of their own practices and beliefs. When relying on retrospective information, participants could have inflated their use of instructional adaptations or confidence in performing tasks. Additionally, the range of language disorders and incidence of comorbid conditions could have led participants to answer questions while identifying with students of different ability levels. This could have impeded the internal validity of the study.

Study Significance

The current study adds to the limited literature about teaching physical education to children with language disorders. There is limited knowledge on instructional adaptations and modifications implemented by physical education teachers for children with language disorders. There is also limited knowledge about physical education teachers' self-efficacy toward the inclusion of children with language disorders and how this impacts instruction.

The field of physical education and adapted physical education could benefit from understanding the types of instructional adaptations physical education teachers implemented to support children with language disorders and how teachers learned these adaptations. Potentially, future physical education teachers can learn about instructional adaptations to teach this population through professional development opportunities. This would not only help future teachers understand appropriate instructional adaptations, but it may help the children, too. The findings may help teachers understand the importance

of self-efficacy toward providing instructional adaptations for children with language disorders. This may affect physical education teachers' educational experiences, professional development, and feeling of success in teaching children with language disorders. In summary, the current study adds to the limited body of literature regarding teaching children with language disorders in physical education.

CHAPTER II – LITERATURE REVIEW

Section I: Children with Language Disorders

Language disorders include a broad range of speech and language developmental disorders that impair communication. According to the *Diagnostic and Statistical Manual of Mental Disorders* fifth ed. (DSM-V; American Psychiatric Association, 2013), language disorders are a form of a communication disorder, which can be defined as, "difficulties in language, speech, and communication." The diagnosis criteria for a language disorder include:

> A. Persistent difficulties in the acquisition and use of language across modalities (e.g., spoken, written, sign language, or other) due to deficits in comprehension or production that include the following: 1) reduced vocabulary. . ., 2) limited sentence structure. . . , 3) impairments in discourse. . .
>
> B. Language abilities are substantially and quantifiably below those expected for age resulting in functional limitations in effective communication, social participation, academic achievement, or occupational performance. . .
>
> C. Onset of symptoms is in the early developmental period.
>
> D. The difficulties are not attributed to hearing or other sensory impairment, motor dysfunction, or another medical or neurological condition and are not better explained by intellectual disability or global developmental delay.

Another definition according to the Individuals With Disabilities Education Act (2004, section 300.8), characterizes a speech or language impairment to be, "a communication

disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a child's educational performance."

The definitions and diagnosis criteria of a language disorders may be varied due to language being a multifaceted process that involves speaking, communicating, and comprehending oral and written information. Language disorders can manifest in speech, language, or in speech and language combined (Rosenbaum & Simon, 2016). Speech disorders are described as deficits in producing speech with the oral structures (i.e., lips, tongue, vocal cords). For example, a child with a speech disorder may have difficulties speaking in a way that flows (e.g., stuttering, stammering) or have difficulty forming specific words or sounds correctly (CDC, 2020).

Language disorders are described as having difficulties in communicating thoughts to others and/or understanding thoughts from others (CDC, 2020; Rosenbaum & Simon, 2016). Children with an expressive language disorder have difficulties expressing or sharing thoughts and emotions using language. For example, a child may not be able to communicate the lack of understanding in the class material or if they simply have a question. Children with a receptive language disorder have difficulties understanding what others say or receiving information (CDC, 2020; Rosenbaum & Simon, 2016). For example, a child may not understand the meaning of what the teacher is communicating to the class. Additionally, children with an expressive-receptive language disorder have difficulties in both generating and understanding language.

Speech and language disorders can also exist together. An example is a language delay, in which all facets of language production and comprehension develop more

slowly compared to a typically developing language system (CDC, 2020). Some of the common diagnostic terms for speech and language disorders include: aphasia, apraxia of speech, articulation disorder or phonological disorder, auditory processing disorder, dysarthria, developmental language disorder, development dysphasia, language delay, specific language impairment, expressive language disorder, and receptive language disorder (CDC, 2020).

According to the National Institute of Deafness and other Communication Disorders (NIDCD), the most common developmental disorder is specific language impairment (SLI). SLI has also been known as developmental language disorder (DLD), language delay, or development dysphasia (NIDCD, 2019). Diagnostic terms have been used interchangeably (Archibald, 2018; Sun & Wallach, 2014). Subsequently, literature reviews (Graham & Fisher, 2015; Kapa & Plante, 2015) and meta-analyses (Gallinat & Spaulding, 2014; Rudolph, 2017) combine diagnostic terms (e.g., SLI, DCD) into a common term for straightforwardness. For simplicity, the term language disorder will be used throughout the remainder of this paper to include varying diagnostic terms which include a speech-language diagnosis.

The prevalence of language disorders is pronounced in school-aged children. According to the 2012 National Health Interview Survey (NHIS), nearly 8% of 3-17-year-old children in the United States had a language disorder (Black et al., 2015). According to the NHIS, the prevalence of language disorders is higher in males (9.6%) compared to females (5.7%), blacks (9.6%) compared to white (7.8%) or Hispanic (6.9%), and in children age 3-6 years (11%), compared to 7-10 years (9.3%), and 11-17

years (4.9%). Data show children who are male, black, and in elementary school have a slightly higher incidence of language disorders compared to counterparts. Prevalence rates should be considered in the discussion of the causes and characteristics of children with language disorders.

Causes and Characteristics of Language Disorders

Just as there are numerous types of language disorders, there are many causes for language disorders. Several factors may contribute to a language disorder including genetic conditions and environmental exposures. Genetic factors include DNA and brain differences. Genome research has revealed differences in gene sequences in those with a language disorder and those without (Kornilov et al., 2016). Additionally, a review of literature by Graham and Fisher (2015) compiled thirty-two genes that could be associated with having a language disorder. Essentially, there is no single gene responsible for language disorders because genes play many roles in human function, genes do not regulate behaviors, and genes interact with one another in a network, not alone (Fisher, 2017). It was hypothesized that an interaction among many genes along with environmental factors contributes to having a language disorder (Graham & Fisher, 2015).

A genetic disorder is one caused by an abnormal DNA sequence (National Human Genome Research Institute, 2018). Genetic disorders that have been associated with language disorders are Turner syndrome, Down syndrome, fragile X syndrome, Klinefelter syndrome, neurofibromatosis type I, Williams syndrome, and tuberous sclerosis (Rosenbaum & Simon, 2016). Other genetic factors may include abnormal

facial and pharyngeal structures such as cleft palate. In fact, children with both overt and unrepaired submucous cleft palate are likely to have speech or language disorders (Boyce et al., 2018).

Brain differences or abnormalities have also been linked to language disorders (Jäncke et al., 2007; Pigdon et al., 2019; Rosenbaum & Simon, 2016; Vargha-Khadem et al., 2005). For example, magnetic resonance imaging (MRI) scans have revealed malformations such as hydrocephalus, agenesis of the corpus callosum, and abnormalities of cortical development such as cortical dysplasia (Rosenbaum & Simon, 2016). Voxel-based morphometry (VBM) has revealed lower levels of grey matter in areas (i.e., gyrus/Broca's area, temporal pole, head of the caudate nucleus, ventral cerebellum) and higher levels in other areas (i.e., gyrus and putamen; Vargha-Khadem et al., 2005). Similarly, Pigdon et al. (2019) found higher levels of grey matter in the right cerebellum and in the left inferior occipital lobe in children with language disorders compared to typically developing (TD) children. However, Jäncke et al. (2007) found children with language disorders had less white matter in both volume and density in the left hemisphere of the motor cortex compared to TD children through MRI and VBM techniques. Results suggest there are brain differences among children with language disorders.

Environmental factors may also contribute to language disorders. These include acquired hearing loss (i.e., medical illness, perinatal disorders, hypoxia, impaired blood flow, infections, drug exposures, pediatric tumors, malformations, eustachian tube dysfunction, trauma to the ear), toxic exposures (i.e., maternal alcohol, chemotherapy,

radiation), preexisting injuries or conditions (i.e., strokes, accidents, childhood abuse, tumors, cancer therapy), and poorly controlled epilepsy (Rosenbaum & Simon, 2016). Furthermore, language disorders can be inherited (Fisher, 2017). The risk of having a language disorder is greater in those with a family member who has a language disorder (Bishop, 2006; NIDCD, 2019). For example, the National Institute of Deafness and other Communication Disorders (NIDCD, 2019) proclaimed 50-70 percent of children with a language disorder have a family member who also has a language disorder. This family association may be due to the shared genetics and/or the shared environment (Bishop, 2006).

Rudolph (2017) identified genetic and environmental statistically significant ($p <$ .005) risk factors for language disorders. Factors included: mothers' education below a high school degree, male, very low 5-minute Apgar score, late birth order, prematurity, having a family history of language disorders, newborn condition (e.g., poor sucking/feeding, newborn trauma), pregnancy condition, maternal smoking, maternal alcohol, and a prenatal event. However, Lewis et al. (2006) found in a two-way factorial analysis that having a close family member with a language disorder and being male were the highest risk factors for language disorders. Results revealed both genetic and environmental factors contribute to language disorders.

Cognition and Memory

Just as the causes of language disorders are varied, deficiencies among children with language disorders are also varied. According to the American Speech-Language-Hearing Association (ASHA, 2019), early signs of language disorders include both

cognitive and motor deficits. Cognitive deficits include understanding, remembering, and reciting information. Motor deficits include holding, attending to, and turning pages in a book. These deficiencies may affect a child's ability to learn in physical education.

Children with language disorders were found to have deficiencies in nonverbal cognition (Gallinat & Spaulding, 2014). Gallinat and Spaulding completed a meta-analysis of 131 studies that examined nonverbal IQ. Results revealed children with language disorders performed statistically lower in IQ scores, $t(137) = -21.27$, $p < .001$, or -0.74 standard deviations lower, compared to TD children. Lower nonverbal IQ or cognition may impact the ability of children with language disorders to learn in physical education.

Research has also shown working memory to be impaired in some children with language disorders (Botting et al., 2013; Gray et al., 2019; Montgomery et al., 2019). Working memory holds temporary information and manages information for language, learning, and reasoning (Baddeley, 1983). For example, Montgomery et al. (2019) examined working memory in 7-to-11-year-old children with language disorders (n = 117) and TD peers (n = 117). Children with language disorders performed worse than TD children on working memory, $F(1, 231) = 70.16$, $p < .0001$, $d = -1.05$, verbal storage, $F(1, 231) = 25.55$, $p < .0001$, $d = -0.93$, sustained attention, $F(1, 231) = 60.14$, $p < .0001$, $d = -0.36$, and switching between auditory and sustained attention, $F(1, 231) = 25.34$, $p <$. 0001, $d = -0.54$. Results suggest that working memory, an aspect of executive functioning, may be hindered in children with language disorders.

Executive functioning is a process of the brain that controls higher-order thinking skills that control the ability to attend to and process information and exhibit motor actions. Children with language disorders may have low executive functioning (Kapa & Plante, 2015; Kuusisto et al., 2017). For example, Kuusisto et al. (2017) examined executive functioning in Finnish children with language disorders (n = 22) and TD children (n = 22). Executive functioning was assessed by the Behavior Rating Inventory of Executive Functions (BRIEF), which examined organization, working memory, monitoring, initiating, planning, flexibility/shifting, and emotional control. Results suggest executive functioning was significantly lower in children with language disorders compared to TD children before and after controlling for IQ.

Deficits in cognitive behaviors such as memory, executive functioning, and nonverbal IQ may hinder learning in physical education. In fact, children with language disorders are often delayed in reaching motor milestones (Diepeveen et al., 2018). More information about motor skills will be discussed following an explanation of the underlying theory for the common deficiencies of cognitive and motor behaviors within children with language disorders.

Procedural Deficit Hypothesis (PDH)

A popular explanation for the co-occurring cognitive and motor behaviors within language disorders is the Procedural Deficit Hypothesis (PDH) by Ullman and Pierpont (2005). The PDH suggests language deficits are due to neural abnormalities that control procedural learning and procedural memory. This impairs language, motor, and math skills since these rely on procedural memory (Evans & Ullman, 2016). Ullman and

Pierpont (2005) described the anatomical structures related to procedural learning. These include the frontal cortex (e.g., Broca's area) and the basal-ganglia (e.g., caudate nucleus) in the left hemisphere. Without going into great detail, these circuits are interconnected and work together. When there is an abnormality in the circuit, it leads to deficits in each one's function including: motor and cognitive skills, grammar, lexical retrieval, dynamic mental imagery, working memory, and rapid temporal processing. Therefore, the PDH suggest underlying brain abnormalities attribute to the comorbid relationship between motor and cognitive deficits.

Ullman and Pierpont (2005) suggested reasons prior hypotheses do not account for the relationship between motor and language deficiencies. For example, the processing-deficiency hypothesis stated the relationship is due to processing information more slowly and having a limited capacity of information. This hypothesis was too broad because not all children with language disorders process information slowly. Even though many children with language disorders have been found to process information more slowly than TD children (Marchman et al., 2016). Processing words slower can lead to a delayed response in producing motor skills for the time it would take to recognize the task, retrieve previous knowledge, and formulate and execute a motor plan. The PDH explained slower processing hinders kinesthetic and linguistic domains (Ullman & Pierpont, 2005).

Ullman and Pierpont (2005) also claimed the grammar-deficit hypothesis could not account for the relationship between language and motor abilities. The grammar-deficit hypothesis suggested the relationship was due to the mental capacity to translate

words into complex movements. The weakness of this hypothesis is that it does not address the range of challenges experienced by children with language disorders such as syntactic, morphological, and phonological deficits. Research has been conducted examining aspects of the PDH among children with language disorders and TD children. For example, Lum et al. (2014) found children with language disorders had worse sequential and blocked reaction times compared to age-matched peers. Many studies found children with language disorders exhibited difficulties in learning sequential tasks (Adi-Japha & Abu-Asba, 2014; Adi-Japha et al., 2011; Clark & Lum, 2017; Desmottes et al., 2017a; Hsu & Bishop, 2014; Lukács & Kemény, 2014). However, Desmottes et al. (2017b) found no difference in learning a sequential drawing task between children with language disorders and TD children. Results suggest language disorders are heterogenous. Some children with language disorders may have more profound difficulties in learning procedural skills, while others perform similar to TD children. An underlying neurodevelopmental impairment, as described by the PDH, may cause this association. However, research is still investigating the association between language and motor skill deficiencies.

Motor Skill in Children with Language Disorders

Over 50 years of research suggest children with language disorders have motor skill deficits (Hill, 2001; Rechetnikov & Maitra, 2009). Hill completed a literature review on motor skills within children and adults with language disorders. The review included twenty-six studies that determined motor impairments were evident in fine and gross motor, limb coordination, and imitation skills among individuals with language disorders.

Motor skills tests included in the literature review were the Movement Assessment Battery for Children (MABC), Bruininks-Oseretsky Test of Motor Proficiency (BOT; Bruininks, 1978), peg moving, finger tapping, bead threading, balancing, and speed and accuracy assessments. Results revealed 40 to 90% of children with language disorders demonstrated motor skill deficiencies.

More recently, Rechetnikov and Maitra (2009) documented the association between motor skills and language disorders through a meta-analysis that included 16 studies from the years 1960 to 2006 that analyzed motor abilities in children, age 2-21 years, with language disorders (n = 621) and who are TD (n = 446). The motor skills tests were coded as motor error (the number of errors), motor score (the score on the motor test), and motor time (the time taken to complete the motor test). Large effects were found in motor error for both fixed (d = 1.12, p < .001) and random effects (d = 1.23, p < .001). Medium effects were found in motor scores for both fixed (d = -0.50, p < .001) and random (d = -0.61, p < .001) effects and in motor time for both fixed and random effects (d = 0.47, p < .001). Results suggest children with language disorders perform lower in motor error, motor score, and motor time compared to their TD peers.

The literature review by Hill (2001) and the meta-analysis by Rechetnikov and Maitra (2009) cover research assessing motor skills in children with language disorders through 2006. Both analyses conclude children with language disorders have low motor skills. However, the studies included utilized an array of assessment items to measure motor skills. This could have led to inequivalent comparisons since tests of motor skills

measure different outcomes. Nevertheless, more recent research examining motor skills among children with language disorders is described below.

The MABC and the more updated Movement Assessment Battery for Children, Second edition (MABC-2) have been used to examine motor skills in children with language disorders (Finlay & McPhillips, 2013; Iuzzini-Seigel, 2019; Saletta et al., 2018; Visscher et al., 2007; Vuolo et al., 2017). The MABC-2 includes subtests for manual dexterity, aiming, catching, and balance, along with a total score. Visscher et al. (2007) examined motor profiles in children with language disorders with the MABC. Participants included 6-to-9-year-old children with speech disorders (n = 14), language disorders (n = 46), and both developmental speech and language disorders (DSLD; n = 65). Children with language disorders performed better in the overall test than children with speech disorders, z = -2.52, p < .01, and those with DSLD, z = -3.49, p < .001. Additionally, 51% of the children with DSLD had definite motor problems or borderline motor problems. Results suggest children with speech and language disorders combined have lower motor skills than children with a speech disorder or a language disorder alone.

Another assessment of motor skills using the MABC-2 was conducted by Finlay and McPhillips (2013). Participants included 9-to-10-year-old children, with a language disorder (n = 38), language and non-verbal IQ matched peers without a language disorder (n = 35), and TD children (n = 36). Language was assessed using the Clinical Evaluation of Language Fundamentals (CLEF-4). Results revealed children with a language disorder scored significantly lower than the language-matched peer, p < .001, and the TD, p < .001, groups in the motor skills total score. However, children in the language-matched

group were statistically equal, $p = 1.00$, to TD children. Findings suggest motor proficiency does not depend on language scores, but the underlying language disorder.

Vuolo et al. (2017) also revealed overall motor scores of children with language disorders to be lower than TD peers using the MABC-2. However, there were no differences in the aiming and catching subtest, $f(1, 45) = 0.003$, $p = 0.96$. While overall motor skills deficits were examined, individual differences in motor skills may have affected these results. Saletta et al. (2018) also found varying results with no differences in the motor scores of children with language disorders and TD children.

In a comparison across language disorders, Iuzzini-Seigel (2019) found differences in motor skills using the MABC-2. Motor skills were assessed in children ($n = 40$), age 3-6 years, with childhood apraxia of speech (CAS), speech sound disorders (SSD), TD children, and combined conditions. The CAS group scored lower in aiming and catching and in balance than children with SSD ($p = .004$ and $p = .001$) and TD children ($p < .001$) but no differences were found in manual dexterity. Additionally, language and speech abilities were both correlated with motor skills. While no differences were found in manual dexterity, others have found varying results (Finlay & McPhillips, 2013; Vuolo et al., 2017).

Obeid and Brooks (2018) studied manual dexterity across language abilities in a sample of children ($n = 63$), aged 6-10 years, with no known language disorders. Language ability and nonverbal cognition were tested using the CELF-4, receptive vocabulary and grammar tests, nonword repetition tasks, and the Test of Non-Verbal Intelligence. Manual dexterity was tested using The Grooved Pegboard, which requires

placing pegs in a board by rotating the board to match the shape of the peg. Regression analysis concluded that manual dexterity significantly predicted receptive vocabulary, $t(60) = -1.54$, $p = .01$, receptive grammar, $t(60) = -2.82$, $p = .007$, nonverbal intelligence, $t(58) = 4.06$, $p < .001$, and nonword repetition, $t(60) = 2.72$, $p = .008$. Findings suggested low language scores, even in children with no diagnosed language disorder, were associated with low manual dexterity.

Brumback and Goffman (2014) assessed motor skills and language in a sample of children, age 4-6 years, with language disorders ($n = 11$) compared to TD children ($n = 12$). Gross and fine motor skills were assessed using the standard protocol of the Peabody Developmental Motor Scale (PDMS) for the children under 6 years of age and the BOT (Bruininks, 1978) for the children over 6 years. Results indicated children with language disorders performed lower than TD children in language (i.e., comprehension, accuracy, production) and in motor skills, $f(1,18) = 11.98$, $p = .003$. However, only five of the eleven children with language disorders scored below 1 standard deviation of the scales. This revealed motor impairments may not be evident in all children with language disorders.

Similarly, Zelaznik and Goffman (2010) examined motor skills, using the BOT, and timing in children, age 6-8 years, with language disorders ($n = 14$) and in TD peers ($n = 14$). Results indicated children with language disorders scored lower than TD peers, $f(1,26) = 7.49$, $p = .01$, in the overall BOT motor score. The study suggested children with language disorders may not have understood or cognitively processed the directions since they were only provided verbally. Therefore, it is unknown whether children with

language disorders performed worse in the motor skills tests because of their motor abilities or because of verbal-linguistic deficiencies.

The Test of Gross Motor Development, second edition (TGMD-2) is another validated assessment of motor skills (Ulrich, 2000). The TGMD-2 includes 12 fundamental motor skills (FMS) including locomotor skills (run, gallop, hop, leap, jump, and slide) and object control skills (two-hand strike, stationary bounce, catch, kick, throw, and underhand roll). Visscher et al. (2010) examined FMS with the TGMD-2 in children, age 6-9 years, from the Netherlands with speech disorders (n = 16), language disorders (n = 41), both speech and language disorders (n = 48), and in TD peers (n = 105). TD children performed better in locomotor skills than children with speech, p < .001, r = .53, language, p < .001, r = .39, and both speech and language, p < .001, r = .55, disorders. TD children also performed better in object control than children with speech, p < .001; r = .45, language, p < .001, r = .37, and both speech and language, p < .001, r = .55) disorders. Results are similar to Sanjeevan and Mainela-Arnold (2019) who found children with language disorders performed significantly lower than TD children on the manual dexterity, $f(1,33) = 14.72$, $p < 0.001$, and balance, $f(1,33) = 8.95$, $p = 0.01$, sections of the TGMD-2.

Coordination and imitation of motor skills may also be hindered in children with language disorders. Vukovic et al. (2010) examined motor skills in Serbian children, age 4-7 years with language disorders (n = 30) and TD children (n = 30). The current study used the McCarthy Scales of Children's Abilities (MSCA; McCarthy, 1972) and the Test of Imitations of Movements (TIM; Berges & Lezine, 1972). Results showed children

with language disorders performed significantly lower than the TD children in the coordination of legs, $f(1) = 124.9$, $p < .01$, coordination of arms, $f(1) = 82.994$, $p < .01$, imitation of simple movements, $f(1) = 58.266$, $p < .01$, and imitation of complex movements, $f(1) = 90.878$, $p < .01$.

Gesture production may also be hindered in children with language disorders. Iverson and Braddock (2011) assessed gestures and motor skills in pre-school children, age 2-6 years, with language disorders ($n = 11$) and TD peers ($n = 16$). Gestures were assessed by retelling a gesture story in words and using gestures to describe a story. Fine and gross motor skills were assessed using the Battelle Developmental Screening Inventory (e.g., open doorknob, jumps 10 feet) and the Child Development Inventory (CDI), a parent-reported questionnaire assessing 60 gross and fine motor skills. Results showed children with language disorders used more gestures and scored lower on fine and gross motor skills compared to TD children.

Wray et al. (2016) also examined gestures and motor control in children, age 4-8 years, with language disorders ($n = 15$) and TD children ($n = 14$). Children with language disorders performed significantly lower in gesture production, $f(1, 25) = 20.33$, $p < .001$, $d = 1.23$, and in gesture comprehension, $f(1, 25) = 16.22$, $p < .001$, $d = 1.60$, compared to TD children. Similarly, Wray et al. (2017) found differences in motor control, gesture production, and gesture errors between children with language disorders and TD children. Studies (Iverson & Braddock, 2011; Wray et al., 2016, 2017) suggest children with language disorders produce more gestures to compensate for gesture errors and gesture production.

Motor deficits in children with language disorders may be evident as early as infancy. For example, Wang et al. (2014) examined motor skills using the CDI. Data were collected from 11,999 subjects at 17 weeks, 3 years, and 5 years by the Norwegian Institute of Public Health. Early motor skills predicted later communication and that these skills were fairly stable over time. In other words, infants with low motor skills were likely to exhibit low motor skills into childhood and were likely to have lower language skills.

Similarly, Libertus and Violi (2016) found sitting and reaching abilities by the age of three months to be associated with later receptive vocabulary in a sample of infants (n = 29). Authors suggest early motor milestones (e.g., the ability to reach, grab, balance) may reflect development of communication, fine and gross motor, adaptive, and social behaviors. Similarly, Diepeveen et al. (2018) analyzed previous data of motor milestones collected in a Dutch health care facility among children with language disorders (n = 253) and TD (n = 253) from birth to 4 years of age. Results showed that children with language disorders failed to reach motor milestones more frequently than TD children. Significant differences, $p < 0.05$, were found in walks alone, throws ball without falling down, rides tricycle, builds tower of 2 and 3 cubes, imitates a truck, and places 3 shapes in a shape box. The results indicated children with language disorders failed to reach many of the fine and gross motor milestones that were frequently met by TD children and early motor skills persisted into childhood.

Physical Activity and Children with Language Disorders

Many children with language disorders have deficits in motor skills. A lack of competence in motor skills may minimize participation in physical activity and sports (Clark & Metcalfe, 2002; Goodway et al., 2014; Stodden et al., 2008). Research suggests having competency in motor skills may increase participation in physical activity currently and for a lifetime (Bryant et al., 2014; Holfelder & Schott, 2014; Iivonen et al., 2013; Lai et al., 2014; McGrane et al., 2018; O' Brien et al., 2016; Stodden et al., 2009).

Participation in physical activity is encouraged for all children. In fact, the guidelines for physical activity proclaim children and adolescents, age 6-17 years, should engage in 60 minutes or more of moderate to vigorous physical activity a day and children should participate in a variety of enjoyable physical activities for 60 minutes at least 3 days a week (U.S. Department of Health & Human Services, 2018).

However, little is known regarding levels of physical activity in children with language disorders. Fujiki et al. (2001) suggested physical activity may be lower in children with language disorders based on their observation of recess during school hours. Observations were coded behaviors from video recordings and determined children with language disorders were more withdrawn while their TD peers engaged in more peer interaction.

A parent-reported questionnaire also suggested that children with language disorders engaged in low levels of physical activity (Croteau et al., 2015). The current study examined the life habits of children with language disorders, age 5-13 years, based on reports from parents (n = 26) and school professionals (n = 11). Parents reported

children had difficulties understanding oral instructions in larger groups such as on the playground, playing group games, and practicing physical activities and sports. School professionals reported similar difficulties. These results imply perceptions of children's engagement in physical activities to be low. Objectively measured levels of physical activity revealed contrary results.

Van der Niet et al. (2014) examined physical activity and physical fitness in children, age 8-11 years, with language disorders (n =26) and TD peers (n =27) in the Netherlands. Physical activity levels were measured by an accelerometer and physical fitness was assessed using the European physical fitness test battery (EUROFIT; e.g., standing broad jump, sit-ups, handgrip, 10x5m shuttle run, 20m shuttle run). Analysis revealed no differences in total time in physical activity, vigorous physical activity (MVPA), or sedentary time, $p > .05$. However, children with language disorders performed lower than TD children in fitness measures such as the standing broad jump, $p < .05$, sit-ups, $p < .001$, hand grip, $p < .05$, and in the 10x5m shuttle run, $p < .001$. Lower scores could have been due to differences in coordination. Therefore, children with language disorders may have lower physical fitness than TD peers while physical activity levels may be similar.

In summary, children with language disorders may have deficiencies related to both cognitive and motor skills. These include memory, IQ, executive functioning, motor skills, imitation of motor skills, gestures, physical activity, and physical fitness (Fujiki et al., 2001; Gallinat & Spaulding, 2014; Hill, 2001; Kapa & Plante, 2015; Van der Niet et al., 2014; Vukovic et al., 2010; Wray et al., 2017). These deficits may affect learning in

physical education. There is little known about how teachers overcome such deficiencies in teaching physical education. However, there is a substantial body of literature on specialized instruction for children with language disorders.

Section II: Multisensory Instruction for Children with Language Disorders

Children with language disorders need specialized instruction that supports the deficiencies related to having a language disorder (ASHA, 2019). Educational interventions using specialized instruction, therapy, and tutoring are considered as treatments for language disorders (CDC, 2020; NIDCD, 2019). Typically, language interventions are provided by speech-language pathologists (SLP), trained professionals who understand the needs and specialized services for children with language disorders (ASHA, 2019). Educational interventions are described in a student's Individualized Education Plan (IEP). Services can range from special education classes to traditional classes along with sessions in or out of school. Accordingly, speech and language services are mandated for children with disabilities under the Individuals With Disabilities Education Act (2004). Part B proclaims, "children and youth (3-21) receive special education and related services." Therefore, children with language disorders should receive specialized instruction as part of their educational plan.

Teaching Children with Language Disorders with Multisensory Instruction

A direct, specialized instruction and educational intervention that has helped children with language disorders is multisensory instruction (Birsh & Carreker, 2018). Multisensory instruction incorporates multiple sensory modalities to teach a skill or concept. Multisensory instruction can also be referred to as multimodal instruction

(Martin et al., 2016). Either way, multisensory means several sensory stimuli are engaged at the same time to support learning. This includes visual, verbal, and kinesthetic-tactile modalities to enhance memory and learning (Birsh & Carreker, 2018).

Introducing a skill or concept with multiple sensory modalities provides additional ways for children to learn compared to only verbal or visual information. Multisensory instruction aligns with Universal Design for Learning (UDL) since it allows different options and multiple means for students to learn (CAST, 2018; Morin, 2015). According to The Center for Applied Special Technology (CAST), UDL is, "a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn" (CAST, 2018). UDL states that multiple means of engagement, representation, and action and expression should be incorporated to support all types of learners. Therefore, multisensory instruction may be appropriate to teach all types of learners even though it was created especially for those with speech and language disorders.

Multisensory instruction was created to teach oral and written language to children and adults who had speech or language deficits. For example, a child with a language disorder might say, "Is this word was or saw?" or "is this tea or eat?" (Gillingham & Stillman, 1997, p. 24). Multisensory instruction was then created to help children who needed specialized instruction to learn language.

There are several forms of multisensory instruction created. One, is the Orton-Gillingham approach created by Dr. Samuel T. Orton and two research associates in 1936 (Gillingham & Stillman, 1997; Henry, 1998). Another form is the Association Method

created by Mildred Agatha McGinnis in the 1920s (McGinnis, 1939). Both systematically integrate what is seen, heard, and done in learning. However, the main differences between the two methods of multisensory instruction are the specific steps or linkages involved. In all, these two foundational multisensory instructional methods set the framework for the future in multisensory instruction for children with language disorders.

Literature Review on Multisensory Instruction

Multisensory instruction has been used to teach oral and written language skills to a variety of children. The majority of the literature regarding multisensory instruction includes children with dyslexia (Henry, 1998; Koifman, 2017; Lim & Oei, 2015; Oakland et al., 1998), which affects 10 to 15% of children and 80% of children with a disability (International Dyslexia Association, 2017). Multisensory instruction has also supported language development in populations such as children with autism spectrum disorder (ASD; Iarocci & McDonald, 2006), from low socio-economic households, and ethnic diversity (Joshi et al., 2002; Magpuri-Lavell et al., 2014), who learn English as a second language (Schneider & Kulmhofer, 2016; Sparks & Miller, 2000), and who struggle to read (Geiss et al., 2012; Marsh, 2018). Multisensory instruction has also improved oral and written language competency in both remedial and non-remedial classes (Jasmine & Connolly, 2015; Ritchey & Goeke, 2006; Rogers, 1999; Vickery et al., 1987). The results suggest multisensory instruction can help a variety of learners better comprehend oral and written language in a range of learning environments.

This may be due to the natural learning environment multisensory instruction creates (Shams & Seitz, 2008) and because of students' enjoyment (Jasmine & Connolly,

2015). It has also been analyzed that multisensory instruction increased sustained attention and focus within children with special needs such as ASD, learning disabilities, and multiple disabilities (Thompson, 2011). Additionally, receiving information through multiple stimuli at the same time causes an interaction between more areas of the brain than single stimuli, which causes a stronger impact (Koelewijn et al., 2010). Therefore, multisensory instruction creates an environment for learning by capturing attention, increasing focus, and stimulating the brain.

Research has examined the effectiveness of multisensory instruction to teach children with language disorders. Joshi et al. (2002) examined the effects of multisensory instruction to teach reading to first-grade children in inner-city schools. The study incorporated the Orton-Gillingham Approach in two experimental classes (n = 24) and included two control classes (n = 32). The experimental classes scored significantly higher than the control classes in phonological awareness, $F_{(1,53)} = 5.02$, $p < .03$, decoding, $F_{(1,55)} = 8.94$, $p < .004$, and comprehension, $F_{(1,52)} = 6.35$, $p < .02$. Results suggest multisensory instruction was more effective in teaching language skills to children in inner-city schools than traditional instruction.

Magpuri-Lavell et al. (2014) conducted a similar multisensory intervention. Participants were children, age 7-11 years (n = 39), with low language. The multisensory intervention led to significant growth in word identification, $p < .01$, spelling, $p < .05$, regular word sound-symbol relationships, $p < .01$, pseudo word sound-symbol relationships, $p < .001$, and in oral fluency, $p < .01$. Findings revealed multisensory

instructional intervention helped the children with low language scores improve in many areas of language.

Schlesinger and Gray (2017) studied the effects of multisensory instruction between children with dyslexia (n = 5) and TD children (n = 6). Multisensory instruction was compared to a traditional language instruction (one sensory modality). The children with dyslexia benefited more from the multisensory instruction compared to the traditional instruction and the TD children performed equally well regardless of the instruction. Results suggest multisensory instruction may be equivalent to traditional instruction for TD children but it may be more necessary for children with dyslexia.

Multisensory instruction has also been used to teach other domains of learning. Multisensory instruction has been effective in teaching math (Rains et al., 2008; Taljaard, 2016; Thornton et al., 1983) and foreign language to students with and without language disorders (Sparks et al., 1991; Sparks & Miller, 2000). For example, Spanish, French, Hebrew, and German have been taught as second languages using multisensory instruction (Sparks & Miller, 2000). Additionally, Newman (2019), a medical professor, advocated for using multisensory instruction to help teach medical students. This was founded on the basis that not all students learn the same way and the more opportunities for learning provided (multiple sensory modalities), the more likely an individual will learn. Results suggest multisensory instruction can support learning a variety of languages and subject areas, not just oral and written language.

According to the International Multisensory Structured Language Education Council (IMSLEC), multisensory instruction is an evidence-based practice in teaching

children with language disorders. IMSLEC (2020) provides accredited training programs for schools and educators of children with language disorders. IMSLEC recognizes six schools in the United States who are committed to supporting student growth through multisensory, structured, language education with accredited and trained teachers and administration. One of these schools is The DuBard School for Language Disorders.

The DuBard Association Method®

The DuBard School for Language Disorders has modified and expanded the Association Method into their own instructional method, The DuBard Association Method®. This method has distinctive features slightly different from the original Association Method (McGinnis, 1939). Distinctive features include not having a program to buy or sell; using Northampton symbols, cursive script, color differentiation, and a slower temporal rate; requiring precise articulation from the beginning; altering teaching progression; making individual student books as they progress throughout the method; and delaying instruction of phonetic rules (Martin, 2012).

The underlying principles of the Association Method are still evident within The DuBard Association Method®. There are ten underlying principles that drive daily instruction: (a) receptive follows expressive, (b) teach one concept at a time, (c) encourage success, (d) build on mastered concepts, (e) written form is completed for every concept, (f) slower rate of speech, (g) visual symbol provided for everything spoken, (h) verbal rehearsal for everything taught, (i) structure and repetition are vital, and (j) with all material, children say, read, listen, and write (Apraxia Kids, 2019; DuBard & Martin, 2000). These underlying principles are in effect within everything that

is taught. The underlying principles are evident within the specific steps to the Association Method (see Figure 2) as described by DuBard and Martin (2000). The steps progress from a simple sound-written association to fully comprehending verbal language.

Steps of the Association Method
1. Association of symbol with sound
2. Association of symbol with kinesthetic feedback from production of sound
3. Precise articulation for production of sound from written stimulus
4. Establishment of recall of written form
5. Association of written form with spoken sound
6. Copying written form correctly
7. Writing symbol following dictation of sound
8. Association of spoken form of linguistic content with its written form
9. Recognition of linguistic unit from auditory stimulus only

Figure 2. *Steps to the Association Method*

Few studies have examined the use of The DuBard Association Method®. Martin et al. (2016) examined the effects of a two-year intervention among children, age 3-10 years (n = 12), with childhood apraxia of speech (CAS), a neurodevelopmental speech disorder that affects motor production and is frequently comorbid with a further language disorder. In fact, 10 of the 12 participants had a language disorder secondary to their CAS. Significant increases were found in all measures of articulation skills, resilience measures in positive peer relations, self-efficacy/locus of control, and modeling/active social skills. Results suggests children with speech and language disorders can benefit in their language and resilience following multisensory instruction as provided by The DuBard Association Method®. Therefore, this multisensory instructional method may be

helpful to support other skills and behaviors in children with speech and language disorders.

Future research on multisensory instruction may help understand the implications of multisensory instruction for other domains of learning. Shams and Seitz (2008) proposed that future research to examine the generalizability of multisensory learning and if it could be beneficial for all learning or if it were restricted to certain tasks. They also suggested future research to examine the advantages of multisensory learning across modalities to determine if this were restricted to a certain set of sensory stimuli, or if this were generalizable to any set of sensory stimuli. The current study took into consideration these calls for future research by examining the use of multisensory instruction to teach motor skills in physical education.

Summary of Multisensory Instruction for Children with Language Disorders

Children with language disorders have a communication barrier that adversely affects academic performance. Therefore, it is necessary to use specialized instruction that is developmentally appropriate for children with language disorders, such as multisensory instruction. Multisensory instruction has helped teach language (Joshi et al., 2002), math (Rains et al., 2008), and foreign language (Sparks & Miller, 2000) to children with language disorders.

The DuBard Association Method® is a specific multisensory instruction. This method has supported language and confidence in children (Martin et al., 2016). However, it is unclear if aspects of this instructional method support learning in other domains, such as motor skills. It has been suggested that future research examine if

multisensory instruction could be beneficial for all learning (Shams & Seitz, 2008). Therefore, the current study examined the use of multisensory instruction in another academic subject, physical education.

Section III: Physical Education

Physical education is the academic subject in which children learn motor skills, knowledge, and behaviors to live a healthy, active lifestyle (SHAPE America, 2015). SHAPE America has defined four essential components of physical education: (a) policy and environment, (b) curriculum, (c) appropriate instruction, and (d) student assessment (SHAPE America, 2015). Policy and environment include the school districts' and schools' expectations of physical education and policies (e.g., waivers, exemptions, substitutions). The second component, curriculum, includes a clearly written plan of how content will be taught from kindergarten through high school. An appropriate curriculum aligns with the grade-level outcomes associated with each grade and is sequential and comprehensive.

The third component, appropriate instruction, is to use deliberate practice to support student learning (SHAPE America, 2015). This includes differentiated instruction, modifications, inclusion, and to engage students in moderate to vigorous physical activity for at least half of the class time. Student assessment, the fourth component of physical education, provides evidence of student learning to determine student progress. Assessments should align with the national standards and reflect whether students meet the grade-level outcomes. According to SHAPE America, the four

essential components of physical education strengthen programs by ensuring quality educational practices.

Appropriate Instruction in Physical Education

SHAPE America (2015) explained appropriate instruction is for the teacher to provide a custom educational experience for students based on their unique needs and experiences. This is also known as differentiated instruction. Differentiated instruction is when a teacher "reaches out to a student or a small group to vary his or her teaching in order to create the best learning experience possible" (Tomlinson, 2000). For example, in physical education, a teacher would work with students individually or in small groups to help support their FMS acquisition.

Colquitt et al. (2017) and Tomlinson and Imbeau (2010) explained how to use differentiated instruction. First, physical education teachers should recognize students' readiness, interest, and learning profiles by continuously focusing on the students and their unique needs. For example, to deliver appropriate instruction for children with language disorders, teachers should understand their learning challenges and what learning adaptations can be provided. Secondly, the differentiated instruction content can be developed while providing multiple avenues for learning the content.

Providing multiple avenues for learning is in alliance with UDL framework. As previously mentioned, UDL guidelines address that multiple means of engagement, representation, and action and expression should be incorporated to support all types of learners. UDL has been effective in teaching FMS to children with disabilities (Altunsöz & Goodway, 2016; Brian et al., 2017; Brian & Taunton, 2018; Taunton et al., 2017).

Therefore, physical education teachers may utilize differentiated instruction by providing multiple avenues for learning to support FMS in students with language disorders.

Another characteristic of appropriate instruction is to make the necessary adaptations for students with special needs or disabilities (SHAPE America, 2015). Adaptations are modifications of physical education instructions and content to be appropriate for students with and without a disability (APENS, 2008). The necessary adaptations would depend on the individual learners' needs and abilities. For example, adaptations for children with language disorders in physical education should consider the underlying deficiencies previously stated such as working memory, IQ, executive functioning, motor skills, imitation of motor skills, gestures, physical activity, and fitness (Fujiki et al., 2001; Gallinat & Spaulding, 2014; Hill, 2001; Kapa & Plante, 2015; Van der Niet et al., 2014; Vukovic et al., 2010; Wray et al., 2017).

In order to determine the effectiveness of teacher instruction, student assessment could be used (SHAPE America, 2015). For example, when a student demonstrates skill mastery, they received and understood the teacher's instruction and the instruction was appropriate for the student. Conversely, when the teacher's instruction is ineffective, students may misunderstand and not have the opportunity to master the skill. This may be evident in physical education when a child with a language disorder performs a skill incorrectly because they did not understand the verbal instructions clearly. In all, instruction should be adapted for teaching children with language disorders in physical education and this may be evident through demonstration of skill mastery. Before

discussing specific strategies to adapt instruction, the underlying theory behind instruction in physical education must be explained.

Observational Learning

Instruction in physical education is theoretically founded on the basis that children learn from observing a modeled action (Bandura, 1986). Normalized or typical instruction follows a similar pattern of task presentation and student action without being differentiated or adapted for children with disabilities (Rink, 1994; van Munster et al., 2019) . However, it has been discussed that appropriate instruction should be differentiated and adapted for children with language disorders by providing multiple means of representation and expression. The theory of observational learning proclaims several strategies for representing and expressing a modeled action to support learning (Bandura, 1986).

The social cognitive theory of observational learning (Bandura, 1986) is founded upon the daily learning that occurs through observations of social interactions, behaviors, and experiences. Observational learning, termed by Albert Bandura, portrays humans acquire skills and behaviors by watching a modeled demonstration. In fact, “most human behavior is learned by observation through modeling” (Bandura, 1986, p. 47).

Observational learning requires two essential individuals, the model (e.g., teacher) and the observer (e.g., student). The model performs the modeled stimuli/action and the observer attends to the stimuli. After observing the model, the learner attempts to replicate the stimuli as similar as possible to the model. This can be described as a psychological matching process (Bandura, 1986). However, for observational learning to

occur, there are four subprocesses that must take place: attention, retention, production, and motivation.

Processes of Observational Learning

For observational learning to be effective, the information must be processed by the observer (Bandura, 1986). Information-processing occurs when learners attend, retain, and produce the stimuli and are motivated to do so. On the other hand, if there is a lack of attention, retention, production, and motivation, then it is less likely the observer will learn the modeled stimuli. Below, a more thorough description is provided of the four subprocesses of observational learning.

Attention. Attention is for the observer to attend to and recognize the relevant elements of the modeled skill which are the important characteristics of the movement or behavior they are observing (Bandura, 1986). Bandura stated, "people cannot learn much by observation unless they attend to, and accurately perceive the relevant aspects of modeled activities" (1986, p. 51). Attention can be enhanced when the modeled action is represented as less complex, unique, functional, subdivided, and accompanied by attention-directing aids, and pictures, videos, or animation. Bandura also claimed attention is heightened when the observer has greater cognitive skills, prior knowledge, a high value and attractiveness for the modeled skill, or when there is a reward or non-punishment for attentiveness.

Attention may be difficult for children with language disorders because of low executive functioning (Kapa & Plante, 2015; Kuusisto et al., 2017). Executive functioning is a process of the brain that controls the ability to attend to and process

information. Therefore, children with language disorders may have a more difficult time attending to and processing information in physical education due to the differences in executive functioning. Therefore, multiple means of representation (e.g., subdivided, picture, videos) may help children with language disorders attend to and process information.

Retention. The retention process is for the observer to remember the, "knowledge about activities that have been modeled at one time or another" (Bandura, 1986, p. 55). Therefore, an observer must be able to retain what they observed. Once the modeled behavior has been completed, the learner must maintain that information in memory in a symbolic form. Retention can be enhanced by creating symbolic codes, representational systems, and rehearsing (Bandura, 1986). Symbolic codes represent the key features of the modeled skill to help minimize the information. Rehearsal can be achieved by verbalization, physical reproduction of the skill, or silent mental rehearsal.

Retention may be difficult for children with language disorders due to low working memory (Botting et al., 2013; Gray et al., 2019; Montgomery et al., 2019). Additionally, research has shown that children with language disorders do not retain a learned motor skill over a period of time as well as TD children (Adi-Japha & Abu-Asba, 2014; Desmottes et al., 2017a). Multiple means of expression (e.g., mental and verbal rehearsal as well as physical practice) may help children with language disorders remember a modeled skill since those who mentally or physically rehearse are less likely to forget the modeled action than are those who do not rehearse (Bandura, 1986).

Production. The production process is for the learner to convert the symbols from memory into a motor action (Bandura, 1986). This requires "organizing responses spatially and temporally in accordance with the conception of the activity" to generate the modeled skill (p. 63). Production occurs best when the observer can process the incoming sensory feedback from the model, match it with their conception, and adjust the behavior by comparing information until the response is similar to the model. Production is supported when the observer utilizes feedback (i.e., intrinsic and extrinsic), engages in practice opportunities, visually monitors their actions, and has the foundational skills required to produce the skill. Characteristics such as body size, height, and age are also associated with enhanced production of a modeled skill.

Production may be difficult for children with language disorders because of low motor skills (Hill, 2001; Rechetnikov & Maitra, 2009) and coordination (Vukovic et al., 2010). Additionally, low ability to imitate motor movements (Wray et al., 2017) would hinder ability to reproduce an observed action. Strategies to support production as described by Bandura (1986), such as feedback from the teacher and visually monitoring actions, may help children with language disorders learn motor skills.

Motivation. The motivational process of observational learning is for the learner to want to perform or re-create the skill they observed. Bandura stated, "people are more likely to exhibit modeled behavior if it results in valued outcomes" (1986, p. 68). Motivation derives from direct, vicarious, and self-directed incentives (Bandura, 1986). Direct incentives include both positive (e.g., rewards) and negative (e.g., punishments) outcomes to motivate the observer. Vicarious incentives include everyday situations,

social interactions, and sensory stimulations from the modeled action (e.g., positive or negative) that either encourage or suppress the drive to produce the action. Self-directed incentives include personal standards such as self-satisfaction from the modeled action. When an observer is motivated to replicate a modeled skill, the learning is more likely to take place.

Literature Review on Observational Learning

Observational learning (Bandura, 1986) has been consistently supported in the literature regarding motor skill acquisition in a physical education setting (Weiss & Gill, 2005). Throughout the literature, observational learning has been used to teach a variety of motor skills and behaviors. Meta-analyses have found observational learning to be effective for teaching serial, continuous, and discrete motor skills for children and adults (Ashford et al., 2006; Derek Ashford et al., 2007).

Ste-Marie et al. (2012) reviewed the literature on observational learning and discussed how these supported learning. For example, the research has compared model types (e.g., self-model, peer-model, skilled model), instructional features of the task (e.g., complexity), and outcomes of the task (e.g., skill, performance) to determine the impact on learning. Other studies have examined how the model was observed (e.g., angle, frequency, live, video), where the model was observed (e.g., training competition, rehab), and when the model was observed (e.g., before, during, after). The literature review found variable results as to which attributes were more or less effective in supporting observational learning. The authors suggested future research to examine the learners' characteristics before teaching the motor skills. Understanding the learners' unique needs

to support observational learning is consistent with appropriate instruction in physical education (SHAPE America, 2015).

Other research has focused on implementing the instructional strategies that Bandura (1986) proclaimed would support the subprocesses (attention, retention, production, motivation) of observational learning to enhance overall learning. Research on the attention process has examined the effectiveness of attention-getting aids like pictures and videos. Children with mild intellectual disabilities have been supported in their motor skill acquisition when there was a visual, or picture of the motor skill provided (Fayza, 2017). Children with ASD have benefited from visual supports in an array of skills and behaviors (Breslin & Rudisill, 2011; Preissler, 2008; Rao & Gagie, 2006). Children for whom English as a second language have benefited from visual supports such as picture cards in learning motor skills in physical education (Nguyen & Watanabe, 2013). Additionally, using pictures and videos are supported by UDL framework and should be used to support motor skill acquisition (Lieberman et al., 2008). Results suggest pictures and visuals can help learners with and without special needs attend to a modeled skill and supports learning.

The theory of multimedia learning by Mayer (2003) described that using a picture along with the written description enhances learning. Learning is enhanced when a picture is provided along with words, simple without extraneous details, near the words, and presented in a form similar to a conversation. While the theory of multimedia learning was founded off book-based and computer-based learning, these same principles

have been recommended in a physical education environment (Morgan, 2019b; Waugh et al., 2007).

Much of the research on the retention subprocess involves strategies Bandura (1986) stated would support learning such as creating symbolic codes, representational systems, and rehearsing. Bandura et al. (1966) showed symbolic codes could help motor skill acquisition. Participants included boys (n = 36) and girls (n = 36), age 6-8 years, who were assigned to one of three symbolization conditions: (a) facilitative symbolization, in which participants simultaneously said the actions being performed in the instructional video; (b) passive observation; and (c) competing symbolization, in which participants counted while observing the video. Children in the verbal symbol condition performed better than the passive observation, $t = 2.18$, $p = .025$, and competing symbolization, $t = 5.12$, $p < .001$, groups. Results showed that learning was enhanced when the participants expressed verbal codes that aligned with the instruction.

Another study by Bandura and Jeffery (1973) found that coding and verbal rehearsal facilitated learning. Participants (n = 88) either coded or did not code a modeled stimulus, then either physically practiced, rehearsed the codes, or had no practice opportunities. Results found both immediate and delayed memory were highest after coding and immediately rehearsing codes. Interestingly, participants who only physically practiced, as commonly seen in physical education, did not retain the skill. This finding suggests that only physically practicing a skill after being introduced to it may not be the most effective instructional strategy to learn.

Soon after, Bandura et al. (1974) conducted a similar experiment regarding symbolic codes over time among male and female college students (n = 60). Participants coded the observed video modeled actions with either sentences, letters, or using dual codes. Half of the participants then rehearsed the code and the other half did not rehearse. Analysis suggested meaningful codes and rehearsal led to the highest accuracy and retention of the modeled actions. Results support using codes and verbal rehearsal to enhance memory for performing a modeled skill.

Other researchers have examined verbal rehearsal for teaching motor skills (Flavell et al., 1966; McCullagh et al., 1990; Weiss, 1983; Weiss et al., 1992; Weiss & Klint, 1987). For example, Flavell et al. (1966) examined spontaneous verbal rehearsal in children related to age and task difficulty. Results found older children, age 9-10 years, were more likely to rehearse when the task was more difficult compared to younger children, age 5-6 years, and when the task was simple. Weiss (1983) examined motor skill acquisition following verbal rehearsal and found children, age 7-8 years, performed better on a sequential motor task after verbally rehearsing compared to the younger children, age 4-5 years. However, Weiss et al. (1992) determined younger children, age 5-6 years, performed better in a six-part locomotor sequence with verbal rehearsal, while older children, age 8-9 years, performed equally well with or without verbal rehearsal. Likewise, McCullagh et al. (1990) found younger females, age 5-6 years, performed better than older females, age 7-9 years, when using verbal rehearsal to learn a dance sequence. Weiss and Klint (1987) also assessed motor skill performance in a six-part sequential course following different instructional strategies in 128 participants.

Participants who verbally rehearsed performed the best. Results suggest verbal rehearsal supports learning a variety of motor skills to children of different ages.

Following the previous studies, Kwak (2005) examined the acquisition of the overhand lacrosse throw among five learning conditions: (a) no task presentation, (b) an appropriate verbal explanation with a partial demonstration, (c) a full demonstration only, (d) an excessive verbal explanation with a partial demonstration, and (e) an appropriate verbal explanation with a full demonstration and verbal rehearsal by the learners. Results on the immediate and delayed skills test were significantly higher in the fifth learning condition. The results suggest learning can be enhanced by providing an appropriate amount of information, a full demonstration, and verbal rehearsal.

Verbal rehearsal may also be helpful to teach motor skills to children with learning disabilities (Kowalski & Sherrill, 1992). Kowalski and Sherril examined motor sequence acquisition in children (n = 80), age 7-8 years, following a videotaped model that was either silent or verbal. The participants engaged in verbal rehearsal or did not. Results showed boys with learning disabilities performed best when they verbally rehearsed the motor sequence compared to when there was no verbal rehearsal, $f(1, 65) = 8.33$, $p < .01$, and differences were not examined between the silent or verbal model. Results suggest verbal rehearsal and a visual model may be more important to learning than verbal instructions.

More recent literature on observational learning examined the use of mental imagery to learn motor skills. Kim et al. (2017) taught the golf putt to participants (n = 40, M_{age} = 25.20, SD = 4.12) in Germany who were randomly assigned into four groups:

(a) observation training group, who watched instructional videos while matching the golf posture and grip; (b) motor imagery group, who imagined the putting scene while making the posture and grip; (c) physical practice group, who performed the putt; and (d) control group, who did not practice. Groups participated in a 3-day training program where motor skills were assessed before, one day after, and three days after the training program. Additionally, participants ranked levels of difficulty for the mental representation on a questionnaire. Results showed the observational training and motor imagery groups performed the golf putt better compared to the physical practice and control groups. Results suggest both physical and cognitive learning was supported through observational learning, mental imagery, and physical practice.

Observational learning research on the production subprocess involves intrinsic and extrinsic feedback. Carroll and Bandura (1987) found participants performed better when they were able to receive visual feedback of their own actions. Being able to visually monitor one's actions is intrinsic feedback since it is coming from one's own sensory system, including tactile or proprioceptive feedback as well as visual. Intrinsic feedback can help a learner produce an observed skill if they are able to recognize what is correct or not correct about their action. Extrinsic feedback can inform a learner what is correct or not about their action. Extrinsic feedback comes from either someone else (e.g., coach, teacher, parent) or from one's own senses (e.g., seeing that a goal was made). Extrinsic feedback can be verbal (e.g., stating what was done correct or what could be done better) or visual (e.g., thumbs up, clapping, shaking head, thumbs down). Both intrinsic and extrinsic feedback can help boost the production of an observed skill.

Research on the motivation subprocess examines the key elements Bandura (1986) stated would support motivation such as direct (extrinsic motivation), vicarious (observation), and self-directed (self-satisfaction) incentives. Research on direct incentives has examined the use of rewards for performing an action. Bandura (1965) found children would reenact hurtful behaviors to a doll when they were told they would receive candy, while children who were not rewarded with candy did not. Alstot (2015) found children performed the overhand throw much better when they were rewarded a token for correct execution. However, when it comes to an expected reward, learning may be hindered (Bandura et al., 1966; Lepper & Greene, 1973). Studies (Bandura et al., 1966; Lepper & Greene, 1973) suggest extrinsic motivation can increase the likelihood of a child performing a behavior, but it may not help children learn a skill or be motivated to engage in the skill.

Motivational research has examined the effects of class climates and teacher behavior on student motivation. For example, Standage et al. (2003) examined secondary physical education students' (n = 328) motivation under several constructs as outlined by the self-determination theory (Deci & Ryan, 1985). Results found students' perception of autonomy, competence, and relatedness positively affected motivation. This means students were more motivated to learn when they felt they were in control of their own learning, performing well, and a part of the class. Subsequently, higher motivation led to higher quality learning. Results suggest motivating students in physical education by increasing their perception of autonomy, competence, and relatedness supports student learning.

Verbal communication from the physical education teacher may also support motivation. Webster (2010) proclaimed physical education teachers can enhance student motivation through rhetorical (being clear, using humor, communicating relevance) and relational (immediacy, presentation style, listening) strategies. Such strategies could be integrated into daily physical education to support student motivation. Verbal motivation and verbal encouragement may also support learning. For example, Drews et al. (2016) found children (n = 120) performed better in a motor task when the teacher provided verbal motivation stating the motor skill can be learned compared to those who were told their skill was inherited. Neto et al. (2015) found students were motivated to perform better in a physical task when the teacher provided verbal encouragement compared to when no encouragement was provided. Results suggest physical education teachers can support learning and performance in physical education by providing verbal motivation to the students. In summary, attention, retention, production, and motivation are essential for observational learning. Many studies have examined strategies that strengthen the subprocesses (e.g., visual aids, verbal rehearsal, mental imagery, motivation). However, there is little research on the use of the instructional strategies that support the four subprocesses in daily physical education.

Summary of Physical Education

Physical education is the academic course that teaches motor skills, knowledge, and behaviors to live a healthy lifestyle (SHAPE America, 2015). Appropriate instruction in physical education is to meet the unique needs of the learners so they are able to learn effectively. Several strategies to differentiate and adapt instruction are based on

observational learning (e.g., visual supports, rehearsal, building on mastered, feedback; Bandura, 1986). These strategies could be used in physical education as adaptations to help students learn motor skills who have limited experiences, such as children with language disorders. Little is known about the current use of the strategies that support observational learning in general physical education or in adaptation for children with language disorders. Research is warranted that examines the instructional adaptations physical education teachers incorporate to teach children with language disorders.

Section IV: Physical Education for Children with Language Disorders

Inclusion Laws in Physical Education

According to Individuals With Disabilities Education Act (2004) Section 300.108, physical education teachers must provide appropriate instruction for children with disabilities. The law proclaims, "physical education services, specially designed if necessary, must be made available to every child with a disability receiving free and appropriate public education." Additionally, the law makes physical education is a mandated service, not a related service. This means appropriate physical education instruction is required for all children receiving public education. Another U.S. law that supports physical education for all children is Every Student Succeeds Act (2015) that proclaimed physical education an essential for all children with and without disabilities.

Section 300.114 of the Individuals With Disabilities Education Act (2004) proclaimed students with disabilities should be educated in the least restrictive environment (LRE). The LRE is one where teachers include students into general education to be educated with TD children. Additionally, Section 504 of the

Rehabilitation Act of 1973 regulates that schools provide “free appropriate public education” (FAPE) to all children, even if they are not covered under IDEA. FAPE requires that individuals with and without disabilities are not excluded from participation in Federally funded activities. Appropriate instruction, according to Section 504, is for the instruction to be specially designed to meet the needs of students.

Individuals With Disabilities Education Act (2004) pertains to students aged 3-21 years who have a disability that adversely affects academic performance and need special education and related services. There are 13 disability categories covered by IDEA (e.g., specific learning disability, autism, speech or language impairment). The National Center for Education Statistics (2021) reported 7.3 million, or 14% of all public-school students, received services under IDEA in the 2019-2020 school year. The second-largest group of children receiving services was children with speech or language impairments at 19% of the 7 million. In fact, the number of children with language disorders who receive services under IDEA was almost double that of children with autism (11%) and nearly triple that of children with a developmental delay (7%) and an intellectual disability (6%).

Additionally, 88% of children with a language disorder spend 80% or more of their school day in a general education setting (National Center for Education Statistics, 2021). This coincides with children with language disorders being in their LRE. Therefore, general physical education teachers across the United States are faced with teaching children with language disorders. However, little is known about teaching physical education to children with language disorders.

Teaching Children With Language Disorders in Physical Education

There is little research on instructional adaptations used to teach children with language disorders in physical education. One strategy that has been examined in the literature is language-enriched physical education (Connor-Kuntz & Dummer, 1996; Derri et al., 2010). Connor-Kuntz and Dummer (1996) completed an eight-week study on language-enriched physical education for children, age 4-6 years, in special education (n = 26), Head Start (n = 35), and in TD class (n = 11). The experimental condition included language-enriched physical education with a verbal emphasis and labels used for directions, quantity, comparisons, colors, shapes, and numbers. The control condition received regular physical education with no emphasis on language. Motor and language skills were assessed in a pre-test, post-test, and for retention using the Peabody Developmental Motor Scales (Folio & Flewell, 1983) and the Bracken Basic Concepts Scale (Bracken, 1984). Groups significantly improved on motor and language skills with no differences between conditions, $p > .05$. However, a post-hoc analysis revealed differences in subscales of the language measures between conditions, $p < .01$. Additionally, the special education and Head Start participants benefited equally from language-enriched physical education compared to the TD class. Authors concluded the language-enriched physical education was especially helpful for students at-risk for language disorders. Adding language did not take away from instructional time, reduce physical activity, or present additional challenges in physical education. Results suggest emphasizing visual and verbal language into physical education helped children at risk for language disorders learn motor skills and language terms. However, it is unknown if today's physical education teachers are integrating such verbal and visual adaptations.

Derri et al. (2010) also examined physical education that highlighted language by using the words and expressions associated with the movement patterns. Participants included TD children, age 4-6 years, in Greece (n = 67) who participated in the experimental or control condition. Assessment items were created by the researchers to examine language skills associated with physical education (effort, spatial awareness, body awareness, relationship concepts, locomotor skills, and nonlocomotor skills). The language-infused physical education condition improved significantly more in language skills, $F_{(1, 64)} = 44.50$, $p < .001$, and in retention, $F_{(1, 64)} = 74.18$, $p < .00$, compared to the control condition. Sub measures of language (oral and speech) also improved significantly more in the language-infused physical education more than the traditional physical education. Studies suggest language-enriched physical education can support both language skills and motor skills within TD children and children at risk for language disorders (Connor-Kuntz & Dummer, 1996; Derri et al., 2010).

There is little known about other visual or verbal adaptations integrated into physical education specifically for children with language disorders. However, research has examined adaptations used by physical education teachers to teach children with communication impairments. For example, Kurková and Scheetz (2016) studied adaptations teachers and coaches used to support children who were deaf and hearing impaired. Findings revealed teachers used teacher and peer modeling, role-playing, pictures, visual aids, whiteboards, technology, videos, keeping it simple, and repetition until the motor skills have been learned. These adaptations are consistent with those that have been recommended to help children with language disorders in physical education (Morgan, 2019a; Murata, 2000, 2003; Waugh et al., 2007). Likewise, adaptations such as

providing visuals, keeping it simple, repeating, rehearsing, and slowing down have been recommended as helpful when teaching students with language and communication disorders in a general education classroom (Trump & Hange, 1996). However, empirical studies of instructional adaptations in physical education specially designed for children with language disorders are limited.

There is limited empirical research on FMS development or acquisition following physical education in children with language disorders. Rintala et al. (1998) examined the effects of physical education and physical therapy in Finnish children with language disorders (n = 54) and TD children (n = 39). Some participants received physical therapy (n = 16) which focused on gross motor skills, ball skills, and body awareness while providing one-on-one instruction to enhance task comprehension. Others received physical education (n = 54), which followed the school curriculum with no emphasis on improving specific skills and was sport-specific and competitive. Motor skills were assessed using TGMD-2 (Ulrich, 2000) and the MABC (Visscher et al., 2007). Tests revealed 71% of the children with language disorders exhibited motor skill deficiencies. After the 10-week intervention, both groups improved significantly on both test of motor skills, $f(5, 48) = 9.9$, $p < 0.001$, and there were no significant differences between the groups in their total motor scores. However, the physical therapy group improved more in their object control (MABC), $f(1, 52) = 4.8$, $p = 0.034$, and balls skills (TGMD), $f(1, 52) = 3.0$, $p = 0.09$. There were no significant differences between the groups in manual dexterity, static and dynamic balance, and locomotor skills.

Rintala et al. (1998) showed physical therapy could enhance some motor skills in children with language disorders than traditional physical education. However, equal

assistance was not provided to the two groups. The physical therapy group was given extra instruction in adaptation to ensure the participants understood the task, while the physical education group was not given this extra support. Therefore, the differences noted between the groups in object control and overall movement scores could have been due to the differentiated instruction and adaptations provided by the physical therapist to ensure the children with language disorders understood the task.

Rintala and Linjala (2003) examined gross motor skill development in Finnish children, age 7-12 years, with language disorders (n = 27) and TD children (n = 27). Participants engaged in 3, 45-minute physical education classes a week for eight weeks. The physical education classes were command-style, focusing on circuit training to improve gross motor skills led by the special education teacher and an aid who made sure the participants practiced the skills while providing no adaptations or modifications. According to the motor skill assessment (TGMD) children with language disorders ranked "poor" at the start and increased one rank to "below average" after the eight weeks while TD children ranked "average." Children with language disorders improved significantly in both their locomotor skills, t = 2.98, p = 0.01, and object control skills, t = 4.14, p = 0.001. Results suggest children with language disorders can improve in their FMS as a result of physical education even when there are no special adaptations provided. It is unknown how motor skills would have been affected if differentiated instruction and adaptations had been implemented.

As described in the PDH literature review, Adi-Japha and Abu-Asba (2014) tested acquisition and retention of complex motor skills in children with and without language disorders. The children with language disorders were slower, made more errors, and

experienced performance decrements after the 10-day retention period while TD children maintained. Adi-Japha and Abu-Asba (2014) explained it may be more difficult to teach children with language disorders motor skills due to motor performance decrements over a period without practice. Low retention of motor skills may be due to low working memory and motor skills (Ullman & Pierpont, 2005). Together, low memory and motor skills would make it difficult to teach children with language disorders physical education. Therefore, instructional adaptations should be incorporated.

Literature is limited in understanding instructional adaptations, differentiated instruction, or appropriate instruction in physical education for children with language disorders. Having a better understanding of how physical education teachers are adapting to meet the needs of children with language disorders would support the development of teachers who may not be aware of how to support this population. Likewise, providing new knowledge may support teachers' confidence in teaching children with language disorders.

Self-Efficacy in Teaching Physical Education

Self-efficacy in teaching children with language disorders is another central aspect that is under-studied in the physical education literature. Bandura (1977) described self-efficacy to be a task and situation specific form of self-confidence. Self-efficacy is, "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (Bandura, 1977, p. 3) that is specific to the task. Self-efficacy is having a sense of confidence in one's abilities to complete certain challenges. As previously described, it may be challenging to teach children with language disorders,

therefore, physical education teachers with a high sense of self-efficacy feel confident in their abilities to teach children with language disorders.

According to the self-efficacy theory, self-efficacy plays a central role in behavior and in predicting behavior (Bandura, 1977, 1994). Specifically, self-efficacy influences if a behavior will occur, the amount of effort exerted for the behavior, and how long a behavior will persist in the presence of challenges. This means those with high levels of self-efficacy are likely to engage in coping behaviors in reaction to a given situation. Oppositely, those with low self-efficacy may continue to engage in the same ritual without coping to change and adapting to fluctuating circumstances.

Self-efficacy is based on performance accomplishments, vicarious experiences, verbal persuasion, and physiological states (Bandura, 1977). The most influential source of self-efficacy is from performance accomplishments which arises from personal mastery within experiences and being successful in situations. Bandura (1994) stated, "successes build a robust belief in one's personal efficacy. Failures undermine it." Therefore, when a teacher experiences success, the teacher's self-efficacy will likely enhance. However, when a teacher fails to accomplish goals, self-efficacy lowers.

An individual's notion of self-efficacy has varying levels of strength. The stronger self-efficacy is, the more active efforts are and the steadier commitments are (Bandura, 1994). For example, a teacher with strong self-efficacy would give high effort to modify and adapt a situation to help children with language disorders learn. A weaker sense of self-efficacy would lead to less effort on the teacher's end to cope to the challenges of teaching children with language disorders in physical education.

Self-efficacy is related to how physical education teachers teach physical education, their behaviors, and their use of instructional strategies (Stephanou & Tsapakidou, 2007; Taliaferro, 2010). Stephanou and Tsapakidou (2007) examined physical education teachers' (n = 160) self-efficacy and self-reported use of Mosston's Spectrum of Teaching Styles (Mosston & Ashworth, 2008). These included eleven teaching styles that ranged from teacher-centered to student-centered (e.g., command, reciprocal, inclusion, guided discovery). Regression analysis found self-efficacy to predict integration of a variety of teaching styles. Results suggest that physical education teachers with higher levels of self-efficacy are more likely to integrate a variety of instructional practices instead of sticking to one traditional approach.

Teachers with higher self-efficacy have reported greater intentions to teach children with disabilities and more positive attitudes toward inclusion (Ammah & Hodge, 2005; Hutzler et al., 2019; Jovanovic et al., 2014; Martin & Kulinna, 2004). For example, Ammah and Hodge (2005) observed, interviewed, and assessed two high school physical education teachers on their beliefs and confidence in teaching students with disabilities. Descriptive analysis and thematic narratives revealed that self-efficacy toward teaching students with disabilities led to a sense of providing effective instruction. Hutzler et al. (2019) compiled 75 articles around self-efficacy in physical education teachers and described that teachers' self-efficacy, experience, education, and attitude affected behavior and inclusion of children with disabilities in physical education. Likewise, Martin and Kulinna (2004) found that positive attitudes predicted intention to teach in physical education.

Attitude towards inclusion may also impact the amount of practice opportunities children with disabilities receive in physical education. For example, Elliot (2008) found children with disabilities received significantly more practice attempts with more success when teachers had a more positive attitude. Therefore, it is important for physical education teachers to have a high level of self-efficacy and a positive attitude to teach children with disabilities for an equal opportunity to learn.

Self-efficacy can arise from educational experiences within a physical education program. Physical education teacher education (PETE) students have reported higher levels of self-efficacy after being exposed to an adapted physical education (APE) course or had the opportunity to work with children with disabilities (Block & Obrusnikova, 2007; Filho & Iaochite, 2018; Foley et al., 2020; Hutzler et al., 2005; Meegan & MacPhail, 2006; Taliaferro et al., 2015). For example, Filho and Iaochite (2018) interviewed PETE students and found APE courses, practicum experiences, and teacher guidance were significant sources of self-efficacy toward the inclusion of children with disabilities.

Foley et al. (2020) tested the effects on self-efficacy within PETE students following a summer camp experience for children with visual impairments. Self-efficacy scores significantly increased, $t(17) = 3.75$, $p = .002$, $d = .88$, following the summer camp toward inclusion of children with visual impairments. Interestingly, after the experience, self-efficacy also enhanced toward children with intellectual and physical disabilities. Findings revealed experiences in working with children with disabilities strengthens self-efficacy toward children with a variety of disabilities.

Research has also revealed that physical education teachers' years of experience teaching children with disabilities predicted self-efficacy (Taliaferro, 2010). Therefore, both college educational experiences and years of experience working with children with disabilities may affect self-efficacy. However, physical education teachers may not always feel prepared or confident in their educational training to teach children with disabilities (Hardin, 2005; Hersman & Hodge, 2010; Jerlinder et al., 2010; Sato & Hodge, 2009). Hersman and Hodge surveyed and interviewed physical education teachers, who expressed the need for more professional development and training to better teach children with disabilities. The feeling of being underprepared to teach children with disabilities may hinder self-efficacy and could be a barrier to inclusion. For example, Morley et al. (2005) found teachers' knowledge and training on how to teach children with disabilities to be the primary barrier to inclusion in general physical education. Results suggest it is vital to prepare and train physical education teachers to teach children with disabilities to support their self-efficacy.

Since self-efficacy is situation and context-specific (Bandura, 1977), it is commonly examined by disability classification. Self-efficacy has been examined in teaching children with visual impairments, physical disabilities, intellectual disabilities (Baloun et al., 2016; Block et al., 2013; Jovanovic et al., 2014), ASD (Selickaitė et al., 2018; Taliaferro et al., 2015), attention deficit disorder (Hutzler et al., 2005), cerebral palsy (Hutzler & Barak, 2017), and who are linguistically and culturally diverse (Krüger, 2019). However, little is known about self-efficacy in physical education teachers or pre-service teachers toward the inclusion of children with language disorders.

Research that examines physical education teachers' sense of self-efficacy, experiences, and instructional adaptations to teach children with language disorders is limited. Research is needed that examines the role of educational experiences in APE and experiences in teaching children with language disorders on self-efficacy. Subsequently, research should examine if these factors impact the use of instructional adaptations in teaching children with language disorders.

Summary of Physical Education for Children with Language Disorders

Children with language disorders should be taught physical education through specialized instruction. However, research on teaching children with language disorders in physical education is limited. Studies have found language-enriched physical education helped teach motor and language skills to children with and without language disorders (Connor-Kuntz & Dummer, 1996; Derri et al., 2010). Physical education has been found to improve motor skills even without adapted instruction (Adi-Japha & Abu-Asba, 2014; Rintala & Linjala, 2003; Rintala et al., 1998). However, the children with language disorders still exhibited motor delays, so it is unclear how motor skills would have been developed if adapted instruction were used.

Self-efficacy is an important component in understanding adapted instruction in physical education. Physical education teachers who feel successful in teaching children with language disorders will exhibit high levels of self-efficacy (Bandura, 1977). Subsequently, these physical education teachers would be more likely to cope with the challenges related to teaching children with language disorders and provide specialized instruction. Self-efficacy arises from having the necessary knowledge, preparation, and training to provide appropriate instruction. However, little is known about appropriate

instruction that has been adapted to teach physical education to children with language disorders. Likewise, little is known about teachers' perception of self-efficacy in teaching children with language disorders.

Section V: Summary of the Literature Review and Research Questions

The literature review began with describing children with language disorders and the PHD (Ullman & Pierpont, 2005). Children with language disorders have a unique blend of impairments in cognitive and psychomotor domains. Cognitively, children with language disorders have exhibited deficits related to their communication, memory (Gray et al., 2019; Montgomery et al., 2019), and executive functioning (Kapa & Plante, 2015). In the psychomotor domain, children with language disorders have exhibited deficits related to their gross and fine motor skills (Hill, 2001), imitation, gestures (Wray et al., 2017), and reaching early motor milestones (Diepeveen et al., 2018). The PDH (Ullman & Pierpont, 2005) explained children with language disorders have common deficits in learning procedural tasks in both cognitive and psychomotor domains because of underlying brain differences.

The deficits among children with language disorders may negatively affect learning, though, the use of adapted instructional practices may help children with language disorders learn. For example, IMSLEC (2020) stated multisensory instruction is an evidence-based practice in teaching reading and language to children with language disorders. Multisensory instruction helped children with language disorders master language skills better than traditional instruction (Joshi et al., 2002; Magpuri-Lavell et al., 2014; Schlesinger & Gray, 2017). Multisensory instruction has also supported math (Rains et al., 2008; Taljaard, 2016; Thornton et al., 1983) and foreign language (Sparks et

al., 1991; Sparks & Miller, 2000) comprehension more than traditional instruction. However, it is unknown if multisensory instruction is being implemented to teach children with language disorders in physical education.

The literature review then described appropriate instruction in physical education and learning in physical education through observational learning. Appropriate instruction is to use deliberate practice and adaptations to support student learning (SHAPE America, 2015). Observational learning occurs when the teacher models a targeted skill or behavior, then the student attempts to replicate the skill (Bandura, 1986). The four subprocesses of observational learning (attention, retention, production, motivation) must be present for learning to occur. There are many instructional adaptations that support the four subprocesses to enhance learning (e.g., visual aids, verbal rehearsal, mental imagery, motivation).

Appropriate instruction in physical education also adapts and modifies instruction to support special populations such as children with language disorders. This includes differentiated instruction and providing multiple opportunities for learning (e.g., UDL). Not only is appropriate instruction an essential component of physical education, it is the U.S. law to provide adaptations (Every Student Succeeds Act, 2015; Individuals With Disabilities Education Act, 2004; Section 504 of the Rehabilitation Act of 1973). For example, IDEA proclaimed physical education should be specially designed for children with disabilities.

It is necessary to provide instructional adaptations in physical education for children with language disorders. Children with language disorders may not learn from observational learning in the same way as TD children due to deficits in the cognitive and

motor domain (Gray et al., 2019; Hill, 2001; Kuusisto et al., 2017). Bandura understood that not all children learn in the same way and some children may need more or fewer supports for observational learning to occur. For example, when discussing how young children develop language, Bandura stated, "the more limited the knowledge and personal experiences, the more abstractions require concrete referents" (1986, p. 101). Therefore, children with limited motor skills, such as children with language disorders, may need more concrete aids and instructional adaptations to help them learn such skills.

There is little known about instructional adaptations that support the psychomotor domain in children with language disorders. Language-enriched physical education has been shown to help teach motor and language skills to children with language disorders (Connor-Kuntz & Dummer, 1996; Derri et al., 2010). Adaptations have been suggested such as using visual aids, using prompts, keeping it simple, slowing rate of speech, teacher and peer modeling, verbally rehearsing, role-playing, keeping in close proximity, and repetition (Morgan, 2019a; Murata, 2000; Murata & Maeda, 2007; Schmidt, 1985; Waugh et al., 2007). However, there is limited empirical research analyzing the use of these practices or any instructional adaptation for children with language disorders.

Physical education teachers with a high level of self-efficacy are likely to adapt or cope in response to a situation (Bandura, 1977). This suggests teachers may be more likely to adapt and provide instructional adaptations for children with language disorders when they have higher levels of self-efficacy. Additionally, physical education teachers with higher self-efficacy were more likely to use a variety of instructional practices in reaction to students' needs (Stephanou & Tsapakidou, 2007). Physical education teachers with lower self-efficacy reported using fewer types of instructional practices and stuck to

the same instructional practice regardless of the student population. Therefore, self-efficacy may affect instructional adaptations. However, little is known about the impact physical education teachers' self-efficacy has on instructional adaptations in teaching children with language disorders.

Self-efficacy toward children with disabilities has been found to improve as a result of successful teaching and from having educational course work in APE and experience in teaching children with disabilities (Foley et al., 2020; Taliaferro, 2010). Little is known about physical education teachers' sense of self-efficacy, educational training, and experience in teaching children with language disorders. Therefore, research is needed that examines these experiences and attributes in physical education teachers to determine if these factors impact instructional adaptations for children with language disorders.

How physical education teachers instruct children with language disorders has not been greatly explored in the literature. Nor has their level of self-efficacy in providing accommodations. Research is needed examining instructional adaptations physical education teachers use for children with language disorders. Furthermore, the impact of self-efficacy in providing instructional adaptations would add to the literature regarding specialized instruction in physical education to provide the best educational experience to children with language disorders.

The purpose of this study was to examine instructional adaptations physical education teachers incorporate to teach motor skills to children with language disorders and the impact of self-efficacy toward the inclusion of children with language disorders

and educational experiences on the selection of these adaptations. Within this purpose, two research questions (RQ) will specifically be addressed.

RQ1: What current instructional adaptations are physical education teachers incorporating to teach motor skills to children with language disorders?

RQ2: Does physical education teachers' self-efficacy toward including children with language disorders, educational experiences in adapted physical education, years of teaching experience, and number of children taught with language disorders predict types of instructional adaptations?

(Hypothesis: The above variables will predict instructional adaptations).

CHAPTER III - METHODOLOGY

Research Methods and Design

The methodology for the current study was two-fold. In order to answer RQ1, a mixed methods design was chosen. In order to answer RQ2, a survey design was chosen. Within the mixed methods, the quantitative data included an online survey and the qualitative data were gathered in focus groups. Both quantitative and qualitative data allowed for multiple perspectives and a more complete understanding of adaptations physical education teachers incorporated to teach children with language disorders. Including only the quantitative data would be insufficient to answer research question number one because key details would be left out that could not have been collected through the survey. Additionally, questions on the survey would not provide the opportunity for teachers to include open-ended responses, interact with one another in discussion, and for the researcher to ask follow-up questions regarding participants' responses. Data were enhanced by speaking with physical education teachers and understanding their perceptions of adaptations used to teach children with language disorders.

The research design for the mixed methods portion of the study was a convergent parallel design. In a convergent parallel design the research questions are the same for both the qualitative and quantitative data, there is equal priority to the data, and they are complementary to one another (Creswell, 2013). In the current study, both the survey data and focus group data were handled with equal priority on how the data sets agreed and disagreed (see Figure 3). Data were collected at the same time and analyzed separately. Products of the quantitative data included means, standard deviations, and

significances. Products of the qualitative data included the major and minor themes (Creswell, 2013). After independent data analyses, qualitative and quantitative results were merged and interpreted as combined data in the discussion (Creswell et al., 2016). A graphic display of the mixed methods research design presented in Figure 3 to help researchers and readers understand the sequence of data collection and analysis (Ivankova et al., 2006).

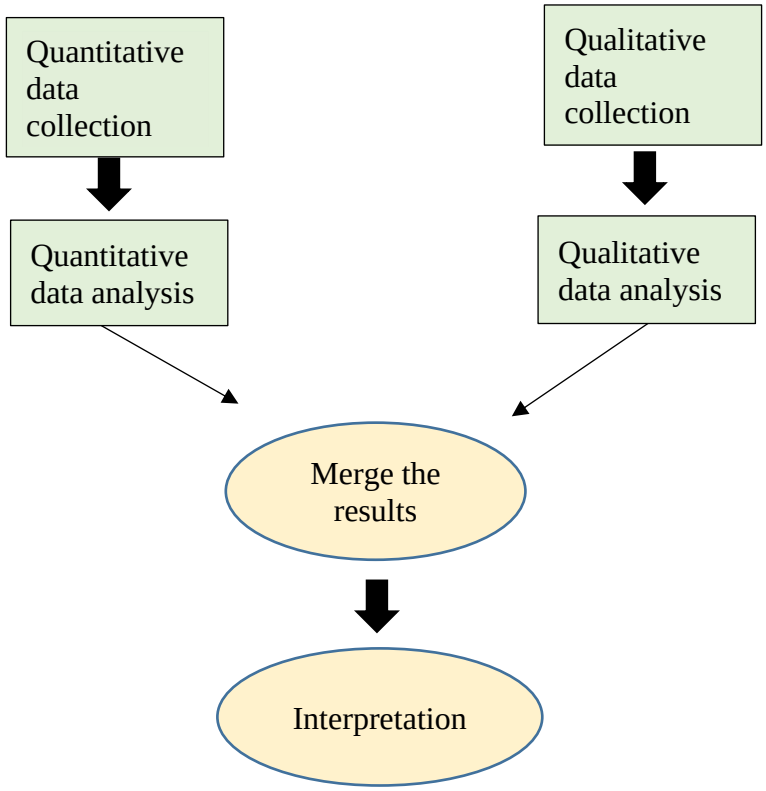

Figure 3. *Mixed Method Research Design*

Note. This figure was replicated from Wittink et al. (2006).

Participants

Participants were physical education teachers. Participants who met the inclusion criteria were eligible to participate in the study (see Table 1). The first question in the

online survey asked participants to confirm that they are currently teaching physical education. Only those who selected "yes" were able to continue. Those who selected "no" were directed to the end of the survey and thanked for taking the survey.

Table 1

Participant Inclusion and Exclusion

Inclusion criteria	Exclusion criteria
Signed informed consent 18 years of age Current physical education teacher English speaker	No recollection of teaching one child with a language disorders in the past five years

Participant Recruitment

Convenience sampling was used through contacting physical education teachers through email, in-person, and social media (i.e., Facebook, Twitter). The recruitment email (See Appendix A), flyer (see Appendix B), and social media posts (See Appendix C) briefly described the purpose of the study, a link, and a QR code to the survey. Recruitment materials were sent to SHAPE-affiliated physical education teachers through their state organizations as well as posted to an organizational listserv, Sport Psych.

Participants for the focus groups were recruited from the participants who fully completed the online survey. The last question of the survey allowed participants to provide their contact information if they were interested in a further discussion about their responses. Those who answered "no" were not contacted. Those who answered "yes" and included their email address were contacted via email regarding their participation in the focus group (See Appendix D). Following the initial email, two follow-up emails were sent to those who did not respond. From the forty-two participants who provided contact information, thirty did not respond, two rejected the invitation, and

one was not available during the scheduled time. Those who agreed to participate were further communicated with regarding availability.

Sample Size

Sample size was calculated using the sample size calculator (G*Power) using effect size = .15 (medium effect), 1 - β = .80, α= .05 (Cohen, 1992), and 7 predictors. Results revealed 103 participants were required. Therefore, the target sample of participants in the quantitative portion of this study was at least 103 participants. This size is in line with previous research examining self-efficacy in physical education teachers (Jovanovic et al., 2014; Mouton et al., 2013; Taliaferro, 2010).

It has been recommended to have 4 to 8 recruited participants with similar experiences for focus groups (Breen, 2006; Krueger & Casey, 2001; Millward, 2012; Morgan, 1997; Onwuegbuzie et al., 2009). Based on this information and the previous literature in physical education (Tindall et al., 2016), the target sample size in the qualitative portion of the study was eight participants.

Participant Consent

Informed consent was collected before participation in the study. The consent form (see Appendix E) was presented electronically before being directed to the online survey. Participants were directed to click “continue” if they agreed to participate in the study. Those who clicked “continue” agreed to voluntarily participate in the study and were directed to the survey. If participants did not wish to participate in the study, they clicked “exit” and were directed to a screen that thanked them for taking the survey. Participants were all over the age of 18 years and volunteered to participate.

Informed consent was collected again for participation in the focus groups. The consent form (see Appendix F) was emailed to participants who corresponded to the initial invitation to participate in the focus groups. All eight of the participants signed and returned the informed consent via email.

Instruments

To meet RQ1 (What current instructional adaptations are physical education teachers incorporating to teach children with language disorders?), a survey instrument was distributed and a focus group discussion was conducted. To meet RQ2 (Does physical education teachers' self-efficacy toward including children with language disorders and educational experiences in adapted physical education predict type of instructional adaptations?), a survey was distributed that consisted of three instruments. These included the Scale for Instructional Adaptations in Physical Education- Language Disorders (SIAPE-L), created by the researchers, and two that were modified from Taliaferro (2010).

Instructional Adaptations: Survey Design

To answer RQ1, a survey was created that examined instructional adaptations implemented by physical education teachers to support children with language disorders. The theoretical foundations for the survey content were derived from the social cognitive theory of observational learning (Bandura, 1986) and the principles of multisensory instruction. Principles of multisensory instruction were derived from the original textbook for teaching The DuBard Association Method® (DuBard & Martin, 2000) and from the revised and expanded version (Martin, 2012).

This instrument combined these instructional strategies to form the Scale of Instructional Adaptations in Physical Education - Language Disorders (SIAPE-L). The survey categorized instructional adaptations in four subscales: visual, auditory, kinesthetic, and progression. Scale categories and items in each category were based on those described in multisensory instruction (Martin, 2012) plus the progression scale to include adaptations related to advancing through instruction. The visual subscale included adaptations such as pictures and video. The auditory subscale included adaptations such as using a slower rate of speech. The kinesthetic subscale included adaptations such as verbal rehearsal and to write. The progression subscale included adaptations such as to teach one small element at a time. See Appendix G for the full survey.

Instructional Adaptations Survey Directions

Participants were asked to answer the questions in the survey in relation to a definition of language disorders. The definition of language disorders from the DSM-V (American Psychiatric Association, 2013) was presented to help participants understand the specific population referenced. The SIAPE-L was presented in two blocks. The first block instructed participants to answer the questions while reflecting on a typical physical education lesson. The second block instructed participants to answer the questions in regard to their instructional adaptations when teaching a new motor skill to children with language disorders. Participants were instructed to answer the questions in regard to their perceived level of integration of the instructional statement when teaching a new motor skill.

Instructional Adaptations Survey Scale.

In order to design the scale with consistency, each instructional adaptation was created into a statement and participants selected how often they implemented the adaptation. Participants responded on a Likert-type scale from Never to Always. The SIAPE-L survey included 17 questions (see Table 2 for sample questions). A scaled score was computed by turning ordinal variables into continuous items with a point value from 1 to 4 (i.e., 1 = *Never*, 2 = *Sometimes*, 3 = *Most of the time*, 4 = *Always*; Brown, 2000). An average score was calculated by summing total responses and dividing by the number of items. Additionally, subscales were calculated by summing responses by subscale (visual, auditory, kinesthetic, progression), then dividing by the number of items within the subscale. Scaled average scores ranged from 1 to 4.

Table 2

Sample Items from SIAPE-L

Subscale	Visual	Verbal	Kinesthetic	Progression
Sample item	Direct students with a language disorder to a video demonstration.	Use a delayed rate of speech/speak slower for students with a language disorder.	Request students with a language disorder to write the cues.	Allow students with a language disorder to progress at their own rate / self-paced learning.

Instructional Adaptations: Focus Group Design

A focus group interview guide was created to support RQ1 (see Appendix H). The questions included in the focus group interview guide were created to explore instructional adaptations physical education teachers use for children with language

disorders. The focus group interview guide included the introduction, a set of open-ended questions (see Table 3), and the closing statements.

Table 3

Questions Included in the Interview Guide

Please explain your name, years of experience, current physical education position, and about the children you teach with language disorders.
Can you describe your background in adapted physical education?
What are some challenges you have faced in teaching children with language disorders?
What general adaptations have you faced in teaching motor skills to children with language disorders?
Can you explain if you have any experience in providing visual adaptations for children with language disorders?
Can you explain if you have any experience in providing auditory adaptations for children with language disorders?
Can you explain if you have any experience in providing kinesthetic adaptations for children with language disorders?
Can you explain if you have any experience in adapting progression for children with language disorders?
How did you learn these instructional adaptations?

Focus Group Guidelines.

Guidelines were created to foster an appropriate environment for the focus group discussions (see Appendix I). These guidelines sought to allow participants to feel safe sharing their experiences (Krueger & Casey, 2001), not feel like the moderator was an expert in the topic (Sim, 1998), and feel like the purpose was to learn from them (Millward, 2012). These guidelines were set to help the conversation reveal experiences among the group instead of participants explaining what they know about instructional adaptations. Additionally, guidelines were set to foster group discussion since Krueger and Casey (2001) explained that a successful focus group is one where participants build

off one another to discuss the topics instead of only responding to the moderator's questions.

Self-Efficacy and Educational Experiences: Survey Design

To answer RQ2, surveys were modified to examine self-efficacy and educational experiences. The Physical Educators' Self-Efficacy Toward Including Students with Disabilities-Autism (PESEISD-A) was modified from Taliaferro (2010) to measure self-efficacy toward the inclusion of children language disorders (see Appendix G). The PESEISD-A (Taliaferro, 2010; Taliaferro et al., 2015) was found to have acceptable internal validity (α = .928) and reliability (r = .859) to assess self-efficacy in physical education teachers when working with children with autism. The PESEISD-A included 10 specific tasks related to including students with autism in general physical education founded on the self-efficacy theory (Bandura, 1977, 1994). The scale was consistent with Bandura's recommended response scale for self-efficacy (Bandura, 2006).

The PESEISD-A has been examined in the literature to determine self-efficacy in general physical education teachers toward including students with autism (Beamer & Yun, 2014; Li et al., 2018; Taliaferro & Harris, 2014; Taliaferro et al., 2015). However, little is known about adapting the instrument to determine physical education teachers' self-efficacy toward including students with other disability classifications, such as language disorders. Therefore, the main author requested permission to modify the PESEISD-A into the Physical Educators' Self-Efficacy Toward Including Students with Disabilities – Language Disorder (PESEISD-L; See Appendix J). The modification was to replace the term "autism" with "language disorder" within the directions and questions. For example, the original survey stated, 'modify equipment for students with

autism', and the modified version of the survey stated, 'modify equipment for students with language disorders'. This resulted in less than 10% of the survey being modified.

Directions and Scale.

Participants were instructed to answer the questions in regard to their perception of confidence in teaching children with language disorders in general physical education. The self-efficacy scale assessed teachers' confidence in including students with language disorders on an 11-point Likert scale (0 = *cannot do at all* to 10 = *highly certain can do*). The questions referred to the following situations in general physical education: 1) modify equipment, 2) modify activities, 3) create a safe environment, 4) promote social interactions, 5) manage behaviors, 6) modify instructions, 7) assess motor skills, 8) modify rules, 9) motivate students, and 10) collaborate effectively with other teachers/professionals. See Table 4 for sample items on the PESEISD-L.

Table 4

Sample Items from the PESEISD-L

Question
Modify activities for students with language disorders who are included in my general physical education classes.
Promote social interactions with peers for students with language disorders who are included in my general physical education classes.
Modify instructions for students with language disorders who are included in my general physical education classes.

Self-efficacy Scale Scoring.

The self-efficacy scale required participants to select a value between 0 and 10 for each of the 10 questions. The measure of self-efficacy was calculated by an average among the 10 questions. The scoring system was consistent with the PESEISD-A (Taliaferro, 2010).

Demographic Information.

To examine educational experiences, the demographic information connected to the PESEISD-A (Taliaferro, 2010) were modified (see Appendix G). The questions in the demographic section originally focused on participants' experiences in working with children with autism. For the purpose of this study, questions were modified from 'autism' to 'language disorders.' The demographic section of the survey included 12 items. Gender was presented as either male or female. Age was presented in a drop-down menu from 18 to 70. Years of teaching experience was presented in a drop-down menu that ranged in single increments from 1 to 50 or more. Location services through the online survey platform and searching IP addresses revealed locations of the participants. The number of undergraduate APE courses completed, number of graduate APE courses completed, and number of special education courses completed were presented in a drop-down menu that ranged in single increments from 0 to 10 or more. The number of in-service workshops attended was presented in a drop-down menu from 0 to 20 or more. Participants were to select all of the grade levels they were currently teaching in with the options of elementary, middle, and high. Participants selected either 'yes' or 'no' if there was an APE specialist in their school district. The number of students with a language disorder taught in the past five years was presented in a drop-down menu from 0 to 20 or more. Participants reported their perceived preparation to teach children with language disorders on a three-point scale (i.e., *not well, fairly well, very well*).

Survey Piloting

The online survey was piloted prior to recruiting study participants. The pilot survey included additional open-ended questions that requested feedback regarding the

item wording, instructions, formatting, and delivery of the survey. Physical education teachers, retired physical education teachers, and PETE students who completed their practicum experience at a specialized school for children with language disorders were recruited. Pilot recruitment took place through direct email communication. Quantitative questions were analyzed through a descriptive analysis and Cronbach's alpha test for internal reliability. Qualitative responses were reviewed for themes by reviewing the open-ended responses.

Six participants agreed to participate in the pilot. Due to incomplete surveys, the final sample size included two retired physical education teachers, one physical education teacher, and one PETE student. The participants (N = 4, n = 2 females) represented Mississippi (n = 1) and Louisiana (n = 3) and taught physical education in elementary (n = 2) and other (n = 2) settings. Measures of internal consistency revealed good reliability for the SIAPE-L for adapted instruction, α = .870, SIAPE-L for general instruction, α = .964, and for the PESEISD-L, α = .940 (Nunnally, 1978).

The results from the open-ended questions revealed the pilot directions, questions, and answer choices were clear, understandable, and representative. It was recommended to allow participants to select multiple levels of physical education taught since some teach simultaneously at elementary, middle, and high school levels. A participant also recommended to clearly explain the question regarding whether or not there was an APE specialist in their school district. Other responders believed the directions, questions, and answer choices were clear. The recommended changes were implemented. Upon the final revision of the online survey, participants were recruited and the official data collection began.

Procedures

The study was approved by the Institutional Review Board (IRB) at The University of Southern Mississippi (See Appendix K) prior to all data collection.

Quantitative Procedures

Physical education teachers who were interested in participating in the study were directed to click on the link or scan the QR code through recruitment materials which directed them to the online survey. The online survey was presented in an electronic format in an online website titled *Qualtrics* through the University of Southern Mississippi. The survey was presented in the following order: consent to participate in the study, definition of a language disorder, demographic questions, SIAPE-L for general instruction, SIAPE-L for adapting instruction for children with language disorders, PESEISD-L, and an optional space for participants to provide their contact information for recruitment for the focus group (See Appendix G). The survey took participants a median time of 6 minutes and 48 seconds to complete. Upon completion, participants were directed to screen which thanked them for taking the survey.

Qualitative Procedures

The qualitative data collection began once the targeted number of participants agreed to participate and completed the focus group consent form (See Appendix F). In order to accommodate participants' availability, two focus groups were completed. The focus groups occurred through recorded Google Meets virtual video conferences. The primary researcher moderated the focus group discussions. The moderator directed the focus group conversations by following the guide as closely as possible (see Appendix H). This began with an introduction which welcomed everyone, provided an overview,

and set the general ground rules (informing participants the moderator will contribute little to conversation, remain neutral). Questions were then asked one at a time which started general and progressed into specifics. The general protocol and transition of statements in the current study was based on a practical guide to focus group research created by Breen (2006). Probes were used to get more detail out of the responses (Krueger & Casey, 2001). For example, "How did you learn about this instructional adaptation?" Other probes simply asked for more detail such as an example or to further explain an adaptation mentioned.

The discussion was primarily between the group members instead of between the moderator and individual members. Transcripts provided evidence the focus groups were successful as several topics and ideas were bounced off one another and discussed among the focus group members. The focus groups lasted slightly under one hour each which has been recommended (Morgan, 1997).

Recording and Transcribing Focus Group Data

The focus groups were recorded for both video and audio. This has advantages such as allowing the moderator freedom to engage with the group instead of writing everything (Sim, 1998) and being able to examine nonverbal cues such as facial expressions and gestures. However, written field notes were taken (See Appendix L) to help in the event of technology failure and to add nonverbal details that may be linked to the verbal dialogue (Sim, 1998). Following the recorded focus group discussions, all dialogue was transcribed into a typed document. The transcription documents were 13 and 15 pages single-spaced. Transcriptions were then sent to individual participants for

an opportunity to clarify or add to their comments (See Appendix M). No participants opted to edit their responses.

Data Analysis

A summary is presented in Table 5.

Table 5

Data Analysis Summary

Research question (RQ)	Independent variable	Dependent variable	Analysis	Hypothesis
RQ1: What instructional adaptations are physical education teachers incorporating to teach motor skills to children with language disorders?	Quantitative: SIAPE-L items and sub-scales	Quantitative: SIAPE-L responses	Qualitative: Transcriptions and emergence of themes Quantitative: Mean and frequencies per SIAPE-L item	
RQ2: Does self-efficacy toward including children with language disorders and educational experiences in adapted physical education predict types of instructional adaptations?	Block 1: Self-efficacy. Block 2: Years of experience, undergrad APE courses, grad APE courses, special education courses, workshops attended, and number of children taught with language disorder in past 5 years.	SIAPE-L average score	Step-wise multiple regression Pearson correlation	HA: Self-efficacy and educational experiences will positively predict types of instructional adaptations. HO: There is no effect

RQ1: Instructional Adaptations: Mixed Methodology

Quantitative data analysis

The SIAPE-L survey data was entered into IBM SPSS Statistics for Windows (Version 25.0). Missing data for the SIAPE-L were replaced using intra-individual mean replacement. Descriptive statistics were completed to determine measures of central tendency (i.e., min, max, median, mode, *M*, *SD*) per item for adapted instruction for children with language disorders. Additionally, a frequency table was created to reveal the frequency of participants who selected each choice. Data show which instructional adaptations are more and less frequently implemented.

Qualitative data analysis

The qualitative data analysis followed an inductive design and analysis. Qualitative data was analyzed using a transcript-based analysis. This means a written report on all transcripts were analyzed along with the field notes (Krueger & Casey, 2001). This method is recommended since it has the highest rigor and lowest risk of error compared to memory, note, and tape-based analysis (Krueger & Casey, 2001; Onwuegbuzie et al., 2009).

The data (transcriptions) were analyzed using a data transformation merged analysis (Creswell & Plano Clark, 2011). This means the qualitative data were transformed into quantitative data and a new variable was created based on the presence of a theme and the number of times the themes appeared. Similar statements were identified, grouped, and counted for frequency (Morgan, 1998). This essentially turned qualitative data into quantitative data (Bian, 2015). Data were considered for similarities and discrepancies, then reported. This method of analysis fits with the purpose of the

study because the study seeked to examine the amount and types of instructional adaptations physical education teachers used to teach children with language disorders using both qualitative and quantitative data.

Integration of the quantitative and qualitative Data

Data were integrated by comparing the themes from the focus groups to the frequencies in the survey. Joining and equally representing the data is a more practical approach to true triangulation, since true triangulation is not always necessary (Morgan, 1998). This integration process is presented in the discussion section for a convergent design (Creswell et al., 2016). The discussion presents a narrative using the weaving approach which means the data were presented by theme discovered in both the qualitative and quantitative data (Fetters et al., 2013). Pseudonyms were used throughout to present the participants' voices and their level of interaction.

Validity, Reliability and Rigor of Qualitative Measures

In qualitative research, validity and reliability have been referred to as rigor (Smith & McGannon, 2018). The universal criteria, or "gold standard" for achieving rigor in qualitative research were set by Tracy (2010). The current study met the eight criteria for rigor as set out by Tracy (2010) including: a) worthy topic, b) rich rigor, c) sincerity, d) credibility, e) resonance, f) significant contribution, g) ethical, h) meaningful coherence (Tracy, 2010; Tracy & Hinrichs, 2017).

The current study started with a worthy topic; instructional adaptations are understudied in the adapted physical education literature and needed to understand instructional adaptations for children with language disorders. Rich rigor was achieved by using sufficient and complex theoretical constructs (e.g., observational learning), data,

time, and samples (e.g., two focus groups), contexts, and data collection and analysis. Sincerity was achieved by the researchers reflecting on values, bias, and inclinations and being transparent about the methods and challenges. Credibility was obtained by providing descriptive details and example quotes. Resonance was completed by describing a naturalistic generalization and some transferrable findings for daily physical education. Significant contribution was made in several areas including conceptually, practically, morally, and methodologically. The research was ethical by considering the procedural, situational and culturally specific ethics during the focus group discussions. Meaningful coherence was completed by achieving the purpose, using a data transformation analysis method that fit the purpose and research questions, and contributing to the literature by interconnecting the research questions, methods, and findings.

RQ2: Prediction of Instructional Adaptations

Preliminary analyses were completed before the major statistical tests. Data were checked for normality using the Kolmogorov-Smirnova and Shapiro-Wilk tests. In the case the data were not normally distributed, Wilcoxon tests were completed to determine if there were differences between general instruction and those provided in an adaption to teach children with language disorders according to the SIAPE-L. Instrument internal validity for the SIAPE-L (general and adapted instruction), SIAPE-L subscales for adapted instruction (i.e., visual, verbal, kinesthetic, progression), and PESEISD-L were examined through a Cronbach's alpha coefficient analysis (Gliem & Gliem, 2003). A reliability score of .7 is acceptable, a score of .8 is good, and a score of .9 is excellent (George & Mallery, 2003). The target reliability was .7 or higher (Nunnally, 1978).

Missing data were handled with consideration of data type. Due to the limited number of missing data for the SIAPE-L and the PESEISD-L, <.005%, missing values were replaced using intra-individual mean imputation (Little et al., 2013). This means a missing value was replaced with the mean score for that participant per the subscale (e.g., visual subscale) or for the scale (e.g., self-efficacy). Missing data in the demographic section were handled with an ad hoc pairwise deletion because the remaining cases were likely representative of the entire sample due to the small number of missing values, < .03% (Little & Rubin, 1989).

Assumptions for multiple regressions were met by having the following: continuous dependent variable, two or more independent variables that were ordinal or continuous, independence of observations (residuals), Durbin-Watson = 2.046, linear relationships between independent and dependent variables by visual inspection of partial regression plots, homoscedasticity by visual inspection of a plot of studentized residuals and unstandardized predicted values, and no multicollinearity by passing collinearity test with Tolerance values > .01. One case was removed from the regression analysis due to the standardized residual being 3 SD above the data set in the case wise diagnostics. A stepwise multiple regression analysis was completed to examine if factors predicted instructional adaptations according to the SIAPE-L. A stepwise regression, or analysis of covariance, is recommended when there are multiple factors (Royston & Altman, 199). Therefore, a step-wise multiple regression was completed. A Pearson correlation analysis was completed to determine the linear correlation between variables.

The dependent variable was the average score from the SIAPE-L from adapted instructions. The independent variable in step one was average self-efficacy. The

independent variables in step two were years of teaching experience, number of undergraduate APE, graduate APE, and special education courses completed, number of workshops or in-services attended, and number of students with language disorders taught in the past five years ("low" group = 0 to 5 students; "high" group = 6 or more students) which was consistent to previous literature (Beamer & Yun, 2014; Taliaferro, 2010). Years of teaching experience and average self-efficacy were scale values. The number of undergraduate APE, graduate APE, and special education courses, and workshops attended were recoded into multinominal values of 0, 1, 2, and more than 2. Recoded values were based off those expressed by Beamer and Yun (2014).

CHAPTER IV – RESULTS

Survey Participants

Two hundred and twenty-three participants agreed to participate in the online survey by signing the informed consent. However, 41 participants did not meet the inclusion criteria. Surveys that were terminated before finishing the final section (self-efficacy) were omitted from the final data set. This resulted in the final sample of 105 participants (*n* = 77 females), for a 56.8% completion rate. See the consort diagram in Figure 4.

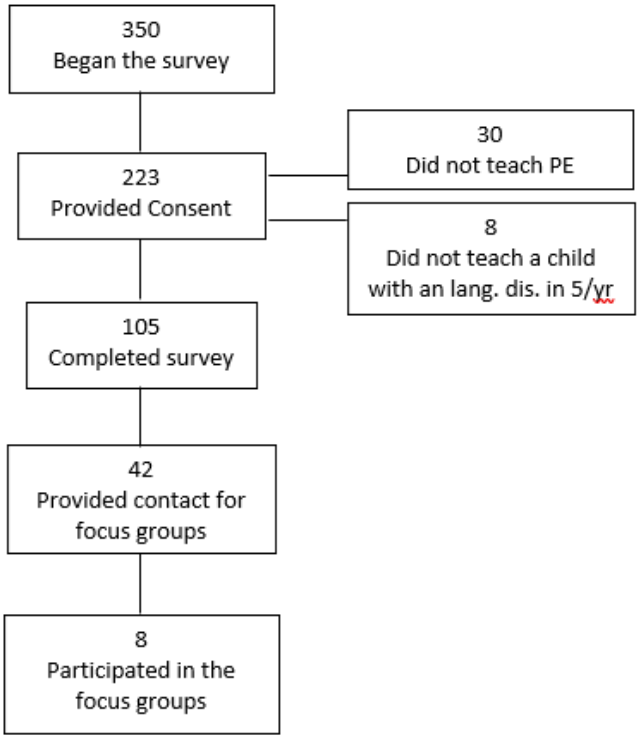

Figure 4. *Consort Diagram*

Participants ranged from 22 to 68 years of age (*M* = 41.92; *SD* = 11.05) with 1 to 45 years of teaching experience (*M* = 16.09; *SD* = 10.37). Participants taught physical

education in elementary (*n* = 46), middle (*n* = 16), high school (*n* = 17), and multiple levels (e.g., elementary and middle, middle and high (*n* = 25). Participants represented 32 states with the most representation from Louisiana (*n* = 20), Texas (*n* = 13), New York (*n* = 6), California (*n* = 6), Massachusetts (*n* = 5), Mississippi (*n* = 5), and Illinois (*n* = 5). The majority of the participants (61%) reported having experience teaching a high (6 or more) students with a language disorder in the past five years. Participants' educational coursework is displayed in Table 6.

Table 6

Participant Coursework and In-service Training

Course Type	None	One class	Two classes	More than two classes
Undergrad APE	14%	36%	17%	33%
Grad APE	62%	13%	3%	22%
SPED	32%	25%	8%	35%
Workshops	6%	6%	8%	80%

Focus Group Participants

Forty-two participants provided email addresses to be contacted for focus group recruitment. Nine participants signed and returned the informed consent to participate in the focus groups. One participant did not complete the poll for available times and did not join the focus group. The final sample size included eight participants (*N* = 8, *n* = 6 female), indicating a 19% participation rate.

Participants' years of teaching experience in physical education ranged from 2 to 40 years (*M* = 21.3, *SD* = 14.3). Participants represented six states including Louisiana (*n* = 2), New York (*n* = 2), North Carolina (*n* = 1), Texas (*n* = 1), Vermont (*n* = 1), and

Virginia (n = 1). Participants taught elementary (n = 6) and both elementary and middle school (n = 2) physical education.

Participants' educational experiences ranged from having an undergraduate degree in physical education (n = 4) to having a master's degree in APE (n = 2), educational technology (n = 1), and curriculum development (n = 1). Participants also completed additional educational work within APE. Two participants held their Certification in Adapted Physical Education (CAPE), one completed a minor in APE, and one was pursuing an APE add-on certification. Additionally, one participant was a founding member and past president of their state advisory board for APE.

Three participants described their experiences in teaching APE at specialized schools. For example, participants taught at a school for the deaf, a self-contained school, and a school for children with intellectual disabilities, autism, emotional, and behavioral disorders. Other unique experiences included being an APE consulting teacher, a paraprofessional for children with autism, working with the Special Olympics, and working with a Swim-n-Go program for children with disabilities. Participants within the focus groups described their experience teaching numerous children with language disorders in both general and adapted classes.

Preliminary Analyses

Preliminary data analyses were completed to determine if the data were normally distributed following parametric testing procedures (see Table 7). The SIAPE-L for adapted and general instruction passed the Kolmogorov-Smirnova and Shapiro-Wilk tests ($p > .05$). All of the SIAPE-L sub-scales failed both the Kolmogorov-Smirnov and

Shapiro-Wilk test, $p < .05$. Since data represented Likert-style responses and sub-scales failed normality testing, data were analyzed using non-parametric tests.

Table 7

Parametric Testing

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PESEISD-L	.135	104	.000	.915	104	.000
SIAPE-L Adapted	.081*	104	.088*	.979*	104	.107*
Visual	.133	104	.000	.971	104	.021
Verbal	.166	104	.000	.879	104	.000
Kinesthetic	.121	104	.001	.948	104	.000
Progression	.184	104	.000	.894	104	.000
SIAPE-L General	.073	104	.200*	.987	104	.423*

a. Lilliefors Significance Correction
*passes normality testing.

Reliability Testing

Internal reliability was analyzed through a Cronbach's index of internal consistency for all instruments (see Table 8). Internal consistency for the SIAPE-L for adapted instruction, α = .835, and for general instruction, α = .767 were both above the recommended value of .70 (Nunnally, 1978). Therefore, the SIAPE-L can be seen as a reliable tool within this sample. However, internal consistency for the SIAPE-L sub-scales for adapted instruction resulted in $\alpha = .679$ for visual, $\alpha = .753$ for verbal, $\alpha = .638$ for kinesthetic, and $\alpha = .737$ for progression. Only the verbal and progression sub-scales were above the recommended value. Therefore, only the results from the full SIAPE-L are presented. Internal consistency for the PESEISD-L resulted in an excellent reliability of $\alpha = .918$ (George & Mallery, 2003).

Table 8

Reliability Statistics

Scale	Cronbach's Alpha	Cronbach's Alpha based on standardized items	*N* of Items	*n*
SIAPE-L, Adaptation	.835	.845	17	104
Visual sub-scale	.679	.663	4	105
Verbal sub-scale	.753	.790	5	105
Kinesthetic sub-scale	.638	.615	5	105
Progression sub-scale	.737	.738	3	104
SIAPE-L, General	.767	.770	17	105
PESEISD-L	.918	.923	10	105

Results: Quantitative

RQ1 examined instructional adaptations provided for children with language disorders in physical education. The average score for the SIAPE-L was 2.94 (*SD* = .396) for adapted instruction and 2.91 (*SD* = .308) for general instruction Wilcoxon tests revealed no significant differences in the mean scores between general instruction and adapted instruction, z(104) = -1.172, *p* = .241, *d* = 0.0754 (see Table 9). This means there were little to no differences in the instruction participants reported using in general and those adapted to teach children with language disorders.

Table 9

General vs Adapted Instruction

	General		Adaptation		*z*	*n*	Sig.	Cohen's *d*
	M	*SD*	*M*	*SD*				
SIAPE-L[a]	2.91	.308	2.94	.396	-1.172[b]	104	.241	0.075

a= Wilcoxon signed ranks test; b = Based on negative ranks

RQ2 sought to determine the impact of self-efficacy and educational experiences on the selection of instructional adaptations participants reported using to teach children

with language disorders. The results from the step-wise multiple regression revealed the effect of self-efficacy and educational experiences on overall variance in instructional adaptations.

In the first model, self-efficacy significantly predicted instructional adaptations with a R^2 of .120, $F(1,93) = 12.687$, $p = .001$ indicating a small to medium effect size, $f^2 = .136$ (Cohen, 1992). The addition of years of teaching experience, APE coursework, special education, and children taught with a language disorder (model 2) led to an insignificant increase in R^2 of .107, $F(6, 87) = 2.011$, $p = .073$. The full model of self-efficacy, years of teaching experience, APE coursework, special education courses, workshops attended, and number of children taught with a language disorder to predict instructional adaptations (model 2) was statistically significant, $R^2 = .227$, $F(7, 87) = 3.655$, $p = .002$, adjusted $R^2 = .165$. The model resulted in a medium effect size $f^2 = .293$. See Table 10 for regression coefficients and standard errors for all variables in the model.

Pearson's correlations revealed self-efficacy was positively correlated to total adaptations, $r = .346$, $p < .001$, while years of teaching experience was negatively correlated with total adaptations, $r = -.279$, $p = .003$ (see Table 11). Pearson's correlations indicated effect sizes of $r = .346$ and $r = .279$, respectively which were medium and borderline medium ($r = .30$; Cohen, 1992).

Table 10

Regression

Variable	B	95% CI for B		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						.120	.120
Constant	2.004***	1.472	2.535	.268***			
Self-efficacy	.110**	.049	.172	.031**	.346**		
Step 2						.227	.107
Constant	2.087***	1.49	2.685	.301***			
Self-efficacy	.120***	.059	.181	.031**	.376***		
Years ex	-.013**	-.021	-.005	.004**	-.350**		
UAPE	-.007	-.084	.069	.038	-.019		
GAPE	-.018	-.084	.049	.033	-.055		
SPED	.040	-.030	.109	.035	.129		
Workshops	-.008	-.087	.104	.048	.018		
Stud LD	-.005	-.168	.159	.082	-.006		

Note. CL = confidence interval; LL = lower limit; UL = upper limit; Years ex = years of teaching physical education; UAPE = undergraduate APE coursework; GAPE = graduate APE coursework; SPED = special education coursework; Workshops = number of in-service workshops or trainings attended; Stud LD = number of students taught with a language disorder in the past 5 years.

*p < .05. **p < .01. ***p < .001.

Table 11

Correlations

Variable	1	2	3	4	5	6	7	8
1. SIAPE-L	-							
2. Self-efficacy	.346***	-						
3. Years ex	-.279**	.076	-					
4. UAPE	-.008	-.011	.010	-				
5. GAPE	.010	.094	.035	.156	-			
6. SPED	-.008	.033	.320**	.342***	.331**	-		
7. Workshops	-.067	-.046	.259**	.008	.201*	.276**	-	
8. Stud LD	-.014	.170	.231*	.163	.245**	.172*	.201*	-

*p < .05. **p < .01. ***p < .001.

Results: Qualitative

Focus group participants were asked to describe their instructional adaptations for children with language disorders. However, participants provided much broader commentary on their experiences. Four major themes were generated from the focus groups along with sub-themes for each major theme:

1) Challenges in teaching children with language disorders

2) Multisensory instruction

3) Progression

4) Learning to adapt

Pseudonyms are used when quoting participants.

Theme 1: Challenges in teaching children with language disorders

When asked about instructional adaptations for children with language disorders, participants frequently contextualized their responses by expressing the challenges associated with instructing students with language disorders. There were eleven incidences in which challenges were discussed by five of the participants. Within this major theme, two subthemes emerged: *communication* and *comorbid conditions*.

Sub-theme: Communication

Participants expressed that communicating the "how" and "what" of a motor skill was more challenging than students' execution of the motor skill. Once communication was clear, participants believed their students with language disorders executed motor skills easily. Luke commented twice about this challenge: "I feel like that once the communication part is down, once they understand what to do, the motor skill itself isn't

an issue," and "we feel like the motor skills themselves aren't necessarily the challenging portion as much as just expressing what it is that we want." Ann also noted "the hardest thing for me …is not the skill itself, but the comprehension of the skill."

Over time participants began to understand how to best communicate with children with language disorders. For example, Becky, "…had to learn that kind of patience and step back and then re-configure how that whole communication piece goes." In summary, communicating instructions was challenging, but participants reported that they were able to find strategies to overcome this challenge.

Sub-theme: Comorbid Conditions

Participants expressed their students with language disorders typically had several comorbid conditions. For example, Luke taught at "…a specialized school for intellectual disabilities, autism and emotional, behavioral disorders, so there was a lot of further speech and language disorders through that and a lot of other delays." Ann and Kristy expressed their students with language disorders also had other conditions such as, "…some verbal language issues, some auditory processing issues. . . and then children that have higher needs such as kids on the spectrum" and "…kids that are non-verbal, you know they have other issues too." Comorbid conditions on top of language disorders made it challenging for participants to understand the unique needs of each student. Steve mentioned, "The vast difference in language disorders can lead me not knowing what the child won't know, or what the misconception might be." Ann commented that comorbid conditions further add to the complexity of communication:

> The students that have verbal language on top of other challenges such as autism and things like that are definitely harder to take through the motor skills. I found in general, if it's just a language, or just a language processing, or a speech comprehension motor skills actually come pretty easily. It's the methods of getting to the motor skills that are harder.

Participants revealed language disorders were comorbid to many other conditions, adding to the challenges of choosing the best instructional adaptation.

Comorbid conditions were a challenge for participants because they did not always know the underlying reason why some children did not understand the instructions. For example, Becky stated "…explanations weren't clear enough and I don't always know if it is because English isn't their native language, or if they don't understand the directions, or it's a cognitive issue or they just weren't paying attention." While there are a variety of students under the umbrella of language disorders, Steve expressed the importance of seeking more information to help clarify a student's specific needs. Steve encouraged seeking information about comorbid conditions:

> Sometimes you might think it's a skill or a language issue and it could be something totally different that they're not responding to. So, not waiting for the answer to come to you but proactively seeking them out is the best advice I can give.

Therefore, the variety of language disorders and other conditions that could coincide with language disorders was a challenge for participants, but seeking out the student's individual prognosis was recommended.

Theme 2: Multisensory Instruction

To overcome the challenges noted in these focus groups, participants reported integrating several instructional adaptations to best instruct all students. There were 19 references to multisensory instruction. All eight participants made comments connected to this theme. Within this major theme, three subthemes emerged: *combination of sensory stimuli*, *visual supports*, and *verbal//auditory adaptations.*

Sub-theme: Combination of sensory stimuli

Participants explained that they are frequently integrating multiple sensory stimuli together to help children with language disorders learn. For example, Luke used "different modes of communication." Specific stimuli mentioned included visual, verbal, and auditory adaptations delivered together as multisensory teaching. Steve explained that integrating several adaptations was helpful due to the array of different language disorders and comorbid conditions:

> The more they can see and process in their brain because whether it's a language issue or processing delay or an actual language disorder, dyslexia, dysgraphia, or whatever the case may be. I don't know what each student is dealing with. So, the more different tips and tricks and tools that I can throw at them, the more I can hope that I can catch multiple kids with that net.

Other participants agreed that combining multiple means of instruction were helpful in teaching children with language disorders.

Hannah spoke to the integration of verbal instruction and a visual demonstration together. For example, "I'm usually doing two at the same time. I'll verbalize it, and then

I'll model it." Ann also integrated "…a visual demonstration along with a verbal explanation, guiding words, key words, very simple. . . some picture guides to break down the motor skill and video." Similarly, Luke expressed his daily instruction integrated visual and verbal stimuli:

> I'm going to say and I'm going to demonstrate. I'll have each step, one by one, written and then I'll have a task analysis under it. Whether it's like step, hop and just have each one pictured with the word, they can connect it. And giving them the time to read it.

Combining visuals (demonstration, pictures, written description) and verbal instructions were identified as superior to only providing one form of instruction. Steve firmly explained "If I'm only giving them [instructions] in one form or if I'm just giving it verbally and the student isn't receiving it, I'm not doing my job as a teacher." Participants agreed that using a visual representation and verbal directions together was helpful to teach children with language disorders.

Another multisensory strategy described in the focus groups was to request that students say the cue words and perform the skill at the same time (i.e., verbal rehearsal). Saying the cues while performing the skill was also used in conjunction with simple language and allowing time to process. Beverly recommended, "…combining that rhythm, steady beat, saying it while they're doing it, keeping the language clean and clear and then giving them that processing time." Participants agreed that having students say the cues and do the skill at the same time was an instructional strategy they used. Trish commented "the repetition with the movement with the words" supports memory. Steve

further explained how he believed verbal rehearsal enhances memory for children with language disorders:

> Tying a movement to a sound helps it to become more memorable. So, if you don't remember what the word was or what the word means or if aphasia is kicking in and you can't pull that word out of your brain, you can think back to the movement you used and hopefully be able to make those connections.

Therefore, combining sensory stimuli together like visual, verbal, and kinesthetic was reported to be an instructional strategy participants used to help teach children with language disorders.

Sub-theme: Visual supports

Participants described using visual supports to communicate how to perform motor skills. Participants used pictures along with words to help the children decipher the meaning. Ann remarked "Without the pictures, the words mean nothing to them. I think it just muddies it for them. If I can do a picture breakdown, that helps." Participants also posted pictures, posters, and task cards at stations to help students. For example, Becky stated she used "…task cards at the different stations, a lot of numbers, color coordinated things, number coordinated items, timers, or counters." Likewise, Beverly did "…a lot of station work so in our stations we always have task cards with a picture and then a description, trying to keep the language as simple as possible. And we use a lot of posters." According to these participants, the visual aids simplify the environment and integrate more visual information to help students with language disorders better understand the skill.

A key visual for teaching motor skills to children with language disorders was a visual demonstration of the motor skill. Beverly spoke to the demonstrations and suggested “pull out a small group of kids, kind of demonstrate what it is that we're explaining because we've got students themselves and kids who just have processing difficulties and they need to see it.” Participants also used peer modeling for a visual demonstration. Ann said, “That there's times where peer support can be really helpful. Can you try to follow this person? Can you copy what they're doing?” Likewise, Trish added “…having a buddy in class has been really great, someone that sits next to them that they feel comfortable with. They can help, ask questions, and look.” Peer models were integrated as an instructional strategy for teaching children with language disorders because of the help they provide for one another. Becky added to the peer-support discussion and stated, “It's sometimes amazing how students help each other. When you might have been at a loss and how they pull each other up and move each other forward. . . They go beyond language barriers.”

Participants in the focus groups also reported using videos. Hannah reported using, “…videos a lot of times if it's a relatable video” to model motor skills. Steve and Ann both reported integrating video self-modeling which is a feedback video of students performing the skill. For example, “…we have station work where we would use an iPad velcroed to a wall that was using a video delay app and the kids could perform their skill, then go over and watch themselves do it.” Ann described video feedback as helpful for children who were having a harder time learning motor skills: “I found that you know if kids are really, really struggling with the motor skills and they're really deficit, sometimes

video helps because I can video what they're doing and show it to them." In summary, participants expressed integrating visual supports such as pictures, posters, task cards, written descriptions, videos, and modeling. The modeling was expressed as helpful if it were completed by either the teacher or by a peer model.

Sub-theme: Verbal/ auditory adaptations

Alongside with the visual supports, participants reported to adapt their language to verbalize instruction to children with language disorders. As previously mentioned, participants kept their language short and simple to best communicate. Steve mentioned what he does in daily instruction:

> I try to have very short, very memorable cues, if I can keep it to three or four words or less that is just short and snappy that I can repeat, they almost get stuck in their brain. I think the more I talk, the more I risk losing you and that goes for kids with language disorders and ones who don't have a language disorder.

Along with using short, simple language, Ann also expressed being "…a big, big proponent, not just for kids with auditory problems, but using a microphone to amplify my voice" and recommended "…microphones if we know that there's a student with hearing challenges, so that it can be clearer."

One unique verbal adaptation expressed was using a bell ball. Luke explained that bell balls were helpful "…especially in teaching locomotor skills… when the verbal communication is more of a challenging issue." Bell balls were integrated by having students hit their knee to the bell ball when skipping for the auditory feedback of the bell. While none of the other members of the focus group reported using bell balls, they agreed

this was an example of a useful adaptation that could provide additional auditory feedback.

Participants described adapting expectations for student verbal expressions when verbal rehearsal was challenging for students. Ann initially asked students, "'What are the key words? What did I say?'. Well guess what, my auditory processors and my verbal language processors, they may not be able to tell me those words." Similarly, Luke "…wanted everybody to be able to express back, express back." However, the students were upset with him and had a hard time with verbal rehearsal. Luke learned to "…give them like communication cards instead of having them actually verbally communicate with me", and the students were more successful. The communication cards incorporated "thumbs up, thumbs down" or "green card, red card." Kristy "…would do the same thing; thumbs up, thumbs down." Therefore, adaptations in expressive language were implemented by participants because it was challenging to get students with language disorders to express back or verbally rehearse.

Another verbal adaptation explained was student use of talking devices. Ann has used "… iPads with our students a lot, as talking devices. If the child is non-verbal they have a way to communicate." The student would "… push the button for the picture that they want, and it speaks the word for them." Another expressive verbal strategy Hannah integrated into daily instruction is to allow students to practice their speech by leading warm ups and teaching the class. This was helpful for students "…with language disabilities and stuff like that, like those that go to speech but they can clearly, they're

practicing, I mean you have to practice. I think giving them an opportunity [to practice] in my classes, is what I like to do."

The theme of multisensory instruction incorporated using a combination of sensory stimuli to teach children with language disorders. For example, participants provided visuals (pictures, words, demonstrations, video) along with verbal instruction. Another multisensory strategy explained was for students to verbally rehearse while performing the skill. Participants adapted in their verbal instructions by using short, simple phrases. Others adapted in auditory expressions from the students by integrating communication cards and talking devices.

Theme 3: Progression

Participants adapted in the way they progress through instruction for children with language disorders. There were 10 remarks by six of the participants in the focus groups around progression through instruction. In this main theme, two sub-themes emerged: *process time* and *task analysis*.

Sub-theme: Process Time

Participants recognized that children with language disorders need more time to process information when learning motor skills. For example, Trish stated, "I have to remind myself that those precious kids need a lot more in the areas of, like you said, the demonstration and the time to process what is going on in my class." This extra time to process information is key before progressing to new information. Luke explained other teachers may not be allowing the extra time before progressing which could hurt learning: "From watching their classroom, I feel like they're not giving them enough time

to fully process it, and that's another thing I think is really important." Becky and Kristy also expressed that they incorporate simple language and proximity to support this need. For example, "The cue words and the processing time I think are absolutely key in trying to get auditory information across" and "The extra time definitely and getting right next to them and sticking right with them and keeping it super, super simple." Therefore, participants agreed children with language disorders need extra time to fully process the information before progressing to new information.

Sub-theme: Task analysis

Participants explained breaking instruction down into a task analysis. A task analysis is to break a skill down into smaller, more manageable components. As described by Luke, instruction should "…start simple, give them some success, especially I feel like those students that struggle with language disorders, they're going to have that self -esteem where they especially need more successful attempts and successful trials to move forward." Integrating a task analysis was expressed as helpful for children with language disorders. Becky recommended, "…break it down, take one piece and then another layer, and with the modeling."

Participants explained that a task analysis should also use the same clear and simple language as previously described. For example, Luke suggested "…providing really direct, really discreet task analysis through it and using those same prompting techniques." The task analysis was preferred over teaching a whole motor skill or a whole activity. Steve explained how he delivers instruction to children with language disorders: "Instead of introducing a whole activity or a whole skill, breaking it down into smaller

digestible chunks where you can tie together the term, or the name of the skill or what your desired outcome is with the movement." In the progression theme, participants proclaimed to break down instruction into a task analysis and allowed students with language disorders the appropriate time to process the information. These progression adaptations were implemented to accommodate the learning deficiencies in children with language disorders.

Theme 4: Learning to Adapt

Participants learned these instructional adaptations and how to adapt through several means. There were 15 comments by all eight of the participants on how they learned to adapt their instruction in physical education. Within the main theme, three sub-themes emerged: *trial and error, reaching out to other professionals in the school,* and *professional development.*

Sub-theme: Trial and error

The most frequently occurring statement around learning to adapt was "trial and error". Steve claimed "One of the perks to having taught to many different grade levels, is that I've been able to kind of experiment with different strategies for my little ones." In this, trying different instructional adaptations helped determine which worked best. Participants learned to adapt through trying different techniques, reflecting on its success, and then adapting if appropriate. For example, Ann stated "Trial and error. . . I try something, it doesn't work, back to the drawing board, make accommodations." Beverly agreed that when a strategy did not work, she had to adapt, "A lot of trial and error. A lot

of stumbling, you know, just try it and ‘wow that didn't work’. ‘Why did that not work?’ Think about it. ‘What can I do to make it better?’” In addition, Steve stated:

> I didn't know how to get over that hurdle early in my career. It’s like ‘but I'm telling them what to do, they're not getting it.’ I had to learn to adjust, adapt, come up with visual cues, lots of charts that I can point to on the wall so after I give my verbal direction, they can see it and show it in a demonstration and give them a chance to explore it.

Moreover, participants described learning how to adapt their instructions for children with language disorders through trial and error along with reflecting and adapting on previous experiences.

Sub-theme: Other professionals in the school

Many participants voiced the importance they placed on proactively seeking out advice from special education teachers, classroom teachers, physical therapists, and other professionals in the school. For example, Hannah has learned how to adapt instruction through “…communication with the other people that work with them [the student], the aides, the physical therapists that come, and the OTs who deal with the more physical part of it.” Luke explained why the classroom teachers were especially helpful, “When you're sitting with the same kids for six hours, you're going to learn a lot more than me in 45 minutes.” In other words, the classroom teachers may have learned some tips and tricks that were helpful for certain students. Additionally, speech-language practitioners (SLPs) have helped participants learn adaptations. For example, Ann tries to “…work with our speech and language practitioners, physical therapists and get some guidance

from them" because " …our SLPs spend a tremendous amount of time providing us input as to what would best help our students." Quotes revealed that teachers learned how to adapt and modify instruction for children with language disorders from other professionals.

While some of the teachers referred to these sub-themes independently, other participants described a combination of trial and error and reaching out for help from other professionals in the school. Kristy spoke to the interplay between the ways she learned to adapt instruction:

> I've been teaching 25 years so a lot of it is trial and error. But I also like to lean on their teachers a little bit, their regular sped teachers, like, 'How did they react to this? What do you think about that?' I'll bounce an idea off of them and see what they think.

Participants explained both trial and error and advise from other professionals were beneficial to learning instructional adaptations.

Sub-theme: Professional development

Professional development and continued education opportunities were ways participants learned innovative instructional adaptations. Ann stated, "A lot of the things that I've done, I've come up with or seen, I've also seen at professional conferences, workshops, and through professional networking and social media." Trish admitted "asking for help…[and] always getting that professional development for myself" in order to "get those students help." Participants felt it was important to seek out information and instructional adaptations before they were needed. Steve voiced:

> Going to conferences and attending as many sessions as I can before I need to learn the information. Not going 'oh my God I have a student in my class I don't know how to help.' I need to go to a conference session like trying to get those out of the way ahead of time so I had that background knowledge.

While participants learned adaptations at professional conferences, the implementation in daily instruction may have been the most beneficial. Becky explained:

> I've learned a lot with just watching and observing other people teach. You know when you go to conventions you pick up things and ideas and the latest and the greatest, or maybe some piece of technology, or whatever. But just being in the trenches, at work, being there with the teachers, figuring things out and stuff.

This comment by Becky revealed being at work and overcoming daily challenges were powerful means toward adapting instruction even after attending professional conferences and observing other teachers. Other participants, like Beverly, learned to adapt through a combination of "Trial and error, reflection, professional development, trainings." Trish also learned from a variety such as "…trial and error, reaching out to their actual classroom teachers and finding out what's working in their classroom, and staff developments. . . reach out to the PE peeps, finding out what's going on."

Luke also gave credit to his educational institution for his knowledge about adapting instruction: "I was very, very fortunate through UVA's master's program with Martin Block, to be able to learn a lot of modifications and really dig down deep." In all, participants learned to adapt their instruction for children with language disorders in several ways. In most cases it was a combination of trial and error, seeking advice from

other professionals, and attending professional conferences. See Table 12 for a summary and example quotes for each theme and subtheme (see Appendix N).

Table 12

Themes and sub-themes

Theme	Sub-theme	Example quote
1. Challenges		
	Communication	Participants feel as if communication was the biggest challenge, "…the motor skills themselves aren't necessarily the challenging portion as much as just expressing what it is that we want".
	Multiple disorders	Participants expressed the range of language disorders can be challenging, "The vast difference in language disorders can lead me not knowing what the child won't know, or what the misconception might be."
2. Multisensory teaching		
	Combination of sensory stimuli	Participants explained using a combination of sensory stimuli to teach, "The more different tips and tricks, and tools that I can throw at them, the more I can hope that can catch multiple kids with that with that net."
	Visual supports	Participants used many visual supports like, "…task cards with a picture, and then a description, trying to keep the language as simple as possible and we use a lot of posters."
	Verbal/ auditory	Participants adapt in their verbal language, "…very short, very memorable cues, if I can keep it to three or four words or less that is just short snappy."
3. Progression		
	Process time	Participants recommended to allow time to process information; "cue words and the processing time I think are absolutely key in trying to get auditory information across."
	Task analysis	Participants use a task analysis to break down motor skills," break it down, take one piece and then another layer," to progress.

Table 12 (continued)

4. Learning to adapt		
	Trial- and-error	Participants learned to adapt by, “trial and error. . . I try something, it doesn't work, back to the drawing board, make accommodations”.
	Professional help	Participants reach out to other professionals for help, “…work with our speech and language practitioners, physical therapist, PTs, and get some guidance from them” to learn adaptations.
	Professional development	Participants learn adaptations through …” professional conferences and workshops and through professional networking and social media”.

CHAPTER V – ADAPTING MOTOR SKILL INSTRUCTION IN PHYSICAL EDUCATION FOR CHILDREN WITH LANGUAGE DISORDERS

Abstract:

It has been documented that children with language disorders have lower motor skills (Sanjeevan & Mainela-Arnold, 2019), executive functioning (Kuusisto et al., 2017), and memory (Gray et al., 2019) compared to typically developing children. Therefore, it is essential that motor skill instruction is adapted to help children with language disorders learn. The purpose of this study was to examine instructional adaptations provided by physical education (PE) teachers for children with language disorders and the impact of teacher self-efficacy and educational experiences on those adaptations. PE teachers (N = 105) completed a survey examining instructional adaptations, self-efficacy, and educational experiences. Focus groups were also conducted for a more in-depth exploration of how teachers (n = 8) adapt instruction. Data were analyzed and four themes were identified: challenges to instructing children with language disorders, multisensory instruction, progression adaptations, and learning to adapt. Analyses revealed PE teachers with higher levels of self-efficacy provide more instructional adaptations for children with language disorders. There is a need to support self-efficacy in PE teachers for the vital role self-efficacy plays in inclusive instruction.

Keywords: (5) inclusion, adapted physical education, communication disorders, focus group, interviews

Introduction

Roughly 8% of children have a language disorder (Black et al., 2015). This population has been referred to as having an invisible disability because children with language disorders might not appear to be different from their typically developing (TD) peers (Beyer et al., 2009). However, these children have demonstrated brain abnormalities that affect procedural learning (Ullman & Pierpont, 2005). These manifest into cognitive (e.g., understanding, remembering) and motor deficits (e.g., holding, attending, manipulating objects; ASHA, 2019). Cognitive and motor deficiencies affect a child's ability to learn in physical education (PE).

Cognitively, children with language disorders have been found to have lower IQ scores (Gallinat & Spaulding, 2014), working memory (Botting et al., 2013; Gray et al., 2019; Montgomery et al., 2019), and executive functioning (Kapa & Plante, 2015; Kuusisto et al., 2017) compared to TD children. Deficiencies may negatively affect learning in PE because motor skill learning requires both working memory and executive functioning. For example, Adi-Japha and Abu-Asba (2014) found children with language disorders exhibited motor skill decrements over a period of time without practice when the TD children maintained. Performance losses may have been due to the ability to attend to and understand instructions, remember the task, and follow directions correctly.

Children with language disorders have exhibited lower motor skills (Brumback & Goffman, 2014; Finlay & McPhillips, 2013; Hill, 2001; Rechetnikov & Maitra, 2009; Sanjeevan & Mainela-Arnold, 2019; Visscher et al., 2010; Vuolo et al., 2017) and imitation of skills (Wray et al., 2017) compared to TD peers. For example, Sanjeevan and

Mainela-Arnold examined children, age 8-12 years, with language disorders (n = 13) and TD children (n = 14). Results showed children with language disorders performed significantly lower than TD children in manual dexterity, $f(1,33) = 14.72$, $p < 0.001$, and balance, $f(1,33) = 8.95$, $p = 0.01$. Results suggest motor skills are impeded for children with language disorders. There is a need to help these children learn motor skills in order to live healthy lifestyle (Stodden et al., 2008). Cognitive and motor deficiencies reveal adapted instruction may be necessary. However, there is little known about instructional adaptations used in PE to help teach children with language disorders.

Instructional adaptations in language education

An instructional adaptation designed to teach oral and written language to children with language disorders is multisensory instruction which integrates visual, auditory, and kinesthetic stimuli (Birsh & Carreker, 2018). Some features of multisensory instruction include to teach one concept at a time; build on mastered concepts; use a slower rate of speech; provide visuals; require verbal rehearsal; and with all material, children say, read, listen, and write (Apraxia Kids, 2019; DuBard & Martin, 2000; Martin, 2012). These features are incorporated in daily instruction to support comprehension and memory in children with language disorders. Multisensory instruction has supported language (Joshi et al., 2002; Magpuri-Lavell et al., 2014; Schlesinger & Gray, 2017), math (Rains et al., 2008; Taljaard, 2016; Thornton et al., 1983), and foreign language (Sparks et al., 1991; Sparks & Miller, 2000) comprehension more than traditional instruction. Furthermore, multisensory instruction is an evidence-based reading practice for children with language disorders (IMSLEC, 2020). Likewise,

features of multisensory instruction such as visuals and verbal rehearsal have been effective in teaching motor skills to students with disabilities (Nguyen & Watanabe, 2013; Valentini et al., 2017). However, it is unknown if features of multisensory instruction are being implemented as adaptations to help teach children with language disorders in PE.

Instructional adaptations in physical education

Instructional adaptations in PE are provided to meet the unique needs of the learners so they can effectively learn (SHAPE America, 2015). Additionally, in the United States, federal law requires instruction to be adapted (Every Student Succeeds Act, 2015; Individuals With Disabilities Education Act, 2004) in PE for diverse learners. Several strategies to differentiate and adapt instruction are described by observational learning (Bandura, 1986). Bandura proclaimed children with limited experiences can learn more by supporting the four subprocesses of observational learning (attention, retention, production, motivation). Attention can be enhanced when the action is broken down and accompanied by pictures and videos. Retention can be enhanced when the learner creates codes such as mental imagery and verbal rehearsal. Production is supported with feedback, practicing the skill, and by having the foundational skills required to produce the skill. Motivation can be enhanced from successful experiences and from teacher encouragement. Since children with language disorders may have limited experiences in motor skills (Sanjeevan & Mainela-Arnold, 2019), such strategies should be incorporated as adaptations to help them learn in PE.

Research is limited in examining adaptations PE teachers use to support children with language disorders. Adaptations have been recommended such as to integrate visual aids, prompts, teacher and peer modeling, simple language, slow teachers' rate of speech, role-playing, close proximity, repetition, and to require students to verbally rehearse (Morgan, 2019a; Murata, 2000, 2003; Trump & Hange, 1996; Waugh et al., 2007). Instructional strategies recommended could be used as adaptations to help children with language disorders learn motor skills. However, there is limited empirical research analyzing the use of these adaptations in PE.

Self-efficacy and educational experiences

Research has examined teacher characteristics such as self-efficacy and the impact this has on instructional adaptations. Self-efficacy plays a central role in behavior and in predicting if a behavior will occur, the amount of effort, and how long a behavior will endure in the presence of challenges (Bandura, 1977, 1994). Self-efficacy toward the inclusion of children with disabilities has been related to PE teachers' behaviors and their use of instructional strategies (Stephanou & Tsapakidou, 2007; Taliaferro, 2010). Stephanou and Tsapakidou (2007) found PE teachers (N = 160) with higher levels of self-efficacy integrated more of a variety of Mosston's Spectrum of Teaching Styles (Mosston & Ashworth, 2008) in adaptation to student needs. Additionally, teachers with higher self-efficacy have reported greater intentions to teach children with disabilities and a more positive attitude toward inclusion (Ammah & Hodge, 2005; Hutzler et al., 2019; Jovanovic et al., 2014; Martin & Kulinna, 2004). In all, self-efficacy is a key variable related to adapting instruction to teach PE to children with disabilities.

Self-efficacy may arise from educational experiences within PE. For example, physical education teacher education (PETE) students exhibited higher levels of self-efficacy after completing an Adapted Physical Education (APE) course or working with children with disabilities (Block & Obrusnikova, 2007; Filho & Iaochite, 2018; Foley et al., 2020; Hutzler et al., 2005; Meegan & MacPhail, 2006; Taliaferro et al., 2015). Results suggests educational experiences may affect teachers' level of self-efficacy.

Self-efficacy has been examined in PE teachers toward the inclusion of children with visual impairments, physical disabilities, intellectual disabilities (ID) (Baloun et al., 2016; Block et al., 2013; Jovanovic et al., 2014), autism spectrum disorder (ASD; (Selickaitė et al., 2018; Taliaferro et al., 2015), and who are linguistically and culturally diverse (Krüger, 2019). However, little is known about PE teachers' level of self-efficacy toward the inclusion of children with language disorders. Additionally, there is little known on how self-efficacy affects the instructional adaptations provided for this population. Therefore, purpose of this study was to examine instructional adaptations provided in PE for children with language disorders and the impact of self-efficacy and educational experiences on the selection of these instructional adaptations.

Method

A mixed methods approach was implemented for this study. Quantitative data included a survey examining instructional adaptations, self-efficacy, and educational experiences. Qualitative data were collected through two focus group discussions to better understand instructional adaptations implemented by a sub-sample of PE teachers.

Before participant recruitment, the study was approved by the university's Institutional Review Board (IRB) (See Appendix K).

Participants

The survey participants included a convenience sample of 105 PE teachers (N = 105, n = 27 males). Participants represented 32 states with the most representation from LA (n = 20), TX (n = 13), NY (n = 6), and CA (n = 6). Participants ranged from 22 to 68 years of age (M = 41.92; SD = 11.05) with 1 to 45 years of teaching experience (M = 16.09; SD = 10.37). Participants taught PE in elementary (n = 46), middle (n = 16), high school (n = 17), and combination (n = 25) settings. Participants' educational experiences are presented in Table 6.

The focus group participants included eight PE teachers (n = 2 males) who had participated in the survey. Participants taught PE in LA, NY, NC, TX, VT, and VI. Participants taught PE in elementary (n = 6) and both elementary and middle school (n = 2) with 2 to 40 years of teaching experience (M = 21.3, SD = 14.3). Participants' educational experiences included having a Bachelors (n = 4), Master's (n = 4), Certification in Adapted Physical Education (CAPE; n = 2), minor in APE (n = 1), and pursuing an APE add-on certification (n = 1). Three expressed unique experiences teaching APE at specialized schools for students who are deaf, have intellectual disabilities, ASD, emotional, and behavioral disorders, and at a self-contained school.

Instruments

An online survey was developed to examine current instructional adaptations physical education teachers are using to teach children with language disorders, self-

efficacy toward the inclusion of children with language disorders, and educational experiences (See Appendix G). Instructional adaptations were examined using the Scale of Instructional Adaptations in Physical Education - Language Disorders (SIAPE-L), created by the authors. The SIAPE-L was developed on the basis of the strategies that support the four subprocesses of observational learning (Bandura, 1986) and features of multisensory instruction (DuBard & Martin, 2000; Martin, 2012). The SIAPE-L was comprised of 17 items including use of visual (e.g., pictures, video), verbal/ auditory (e.g., slower rate of speech, clear/ direct language), kinesthetic (e.g., verbal rehearsal, write, read), and progression (e.g., skill break down, building) adaptations. Responses were provided on a Likert-type scale (*never, sometimes, most of the time, always*). The SIAPE-L was completed twice, once for general instruction and once for adapted instruction for children with language disorders. Average scores were computed for the scale resulting in a value between 1 (*Never*) and 4 (*Always*). Sample items included in the SIAPE-L are displayed in Table 2.

Self-efficacy was examined using the Physical Educators' Self-Efficacy Toward Including Students with Disabilities- Language Disorders (PESEISD-L) modified from Taliaferro (2010). The PESEISD-L examined how confident teachers were to include students with language disorders under 10 situations (e.g., modify instructions, modify rules, manage behaviors). Responses were on a Likert-type scale from 0 (*cannot do at all*) to 10 (*highly certain can do*). Educational experiences were examined through questions modified from those included in the Taliaferro (2010) study.

A focus group guide was developed to guide the conversations around the perceptions of PE teachers on how they adapt instruction for children with language disorders. The focus group questions covered educational experiences, challenges, adaptations, and how teachers learned to adapt instruction for children with language disorders (see Table 3).

Data collection procedures

Upon providing consent to participate in the study, participants were directed to the online survey. The survey was presented in the following order: definition of a language disorder (American Psychiatric Association, 2013), demographic questions, SIAPE-L for general instruction, SIAPE-L for adapted instruction, PESEISD-L, and an optional space to provide contact information for focus group recruitment. Once eight participants agreed to partake in the focus groups, the date and times were set. The focus groups were completed through a recorded virtual video conference. The moderator followed the guide as closely as possible (See Appendix H). This began with an introduction, an overview, and then questions were asked one at a time which started general and progressed into specifics (Breen, 2006). The moderator followed recommended focus group guidelines (Krueger & Casey, 2001; Millward, 2012; Sim, 1998). The focus groups lasted between 45 and 50 minutes each. Focus group recordings were transcribed and sent to the participants for an opportunity to add or clarify responses. Upon acceptance, pseudonyms were used to protect participants' confidentiality.

Data Analysis

Data were analyzed using SPSS Version 25 (IBM, Armonk, NY). Descriptive statistics (*M, SD*) for the SIAPE-L scale and sub-scales, PESEISD-L, and educational experiences were completed. Wilcoxon tests were completed to examine differences between general instruction and those adapted for children with language disorders according to the SIAPE-L. Internal validity testing was completed for scales and sub-scales through Cronbach's alpha. The qualitative data (transcriptions) were analyzed using a data transformation merged analysis (Creswell & Plano Clark, 2011). Data were analyzed by identifying similar statements, grouping them into themes, and counting frequency (Morgan, 1998). Influence of self-efficacy and educational experiences were examined through a step-wise multiple regression. The dependent variable was the SIAPE-L for adapted instruction average score. Independent variables included self-efficacy (step 1), years of experience, undergraduate and graduate APE courses, special education courses, in-service workshops attended, and students taught with a language disorder in the past five years ("low" = 0 to 5 students; "high" = 6 or more students; step 2). In addition, Pearson's correlations were calculated.

Results

Quantitative Results

Internal consistency for the SIAPE-L for adapted instruction, α = .835, and for general instruction, α = .767 were both above the recommended value of .70 (Nunnally, 1978). Internal consistency for the SIAPE-L adapted instruction sub-scales were $\alpha =$ .679 for visual, $\alpha =$ .753 for verbal, $\alpha =$ .638 for kinesthetic, and $\alpha =$ .737 for

progression. Internal consistency for the PESEISD-L resulted in an excellent reliability of $\alpha = .918$ (George & Mallery, 2003).

The average score for the SIAPE-L was 2.94 (*SD* = .396) for adapted instruction and 2.91 (*SD* = .308) for general instruction. Wilcoxon tests revealed no significant differences between general instruction and adapted instruction, $z(104) = -1.172$, $p = .241$, $d = 0.0754$ (see Table 9). Participants had an average self-efficacy toward the inclusion of children with language disorders of 8.54 (*SD* = 1.24).

In the first model, self-efficacy significantly predicted instructional adaptations with a R^2 of .120, $F(1,93) = 12.687$, $p = .001$ indicating a small to medium effect size, $f^2 = .136$ (Cohen, 1992). The addition of years of teaching experience, APE coursework, special education, and children taught with a language disorder (model 2) led to an insignificant increase in R^2 of .107, $F(6, 87) = 2.011$, $p = .073$. The full model of self-efficacy, years of teaching experience, APE coursework, special education courses, workshops attended, and number of children taught with a language disorder to predict instructional adaptations (model 2) was statistically significant, $R^2 = .227$, $F(7, 87) = 3.655$, $p = .002$, adjusted $R^2 = .165$, indicating a medium effect size $f^2 = .293$. See Table 10 for regression coefficients and standard errors for all variables in the model. Pearson's correlations revealed self-efficacy was positively correlated to instructional adaptations, $r = .346$, $p < .001$, while years of teaching experience was negatively correlated with instructional adaptations, $r = -.279$, $p = .003$ (see Table 11).

Qualitative Results

Focus group participants were asked to describe their instructional adaptations for children with language disorders. However, participants provided a much broader commentary on their experiences. Results include four major themes: 1) challenges in teaching children with language disorders, 2) multisensory instruction, 3) progression, and 4) learning to adapt. Alongside the major themes, sub-themes discovered for each major theme are presented.

Theme 1: Challenges in teaching children with language disorders

There were eleven incidences in which challenges were discussed in the focus groups by five of the participants. Within this major theme, two subthemes emerged: *communication* and *comorbid conditions*.

Sub-theme: Communication

Participants in the focus groups expressed that communicating the "how" and "what" of a motor skill was more challenging than students' execution of the motor skill. Once communication was clear, participants believed their students with language disorders executed motor skills easily. Luke commented twice about this challenge: "I feel like that once the communication part is down, once they understand what to do, the motor skill itself isn't an issue," and "we feel like the motor skills themselves aren't necessarily the challenging portion as much as just expressing what it is that we want." Ann also noted "the hardest thing for me …is not the skill itself, but the comprehension of the skill." Over time participants began to understand how to best communicate with children with language disorders. For example, Becky, "…had to learn that kind of

patience and step back and then re-configure how that whole communication piece goes." In summary, communicating instructions was challenging, but developing this skill is important because once students understand the instructions, they can perform the skills.

Sub-theme: Comorbid Conditions

Participants noted their students with language disorders typically had several comorbid conditions. For example, Luke taught at "…a specialized school for intellectual disabilities, autism and emotional, behavioral disorders, so there was a lot of further speech and language disorders." Ann and Kristy also said their students with language disorders had other conditions such as, "…some verbal language issues, some auditory processing issues. . . and then children that have higher needs such as kids on the spectrum" and "…kids that are non-verbal, you know they have other issues too." Comorbid conditions on top of language disorders were challenging for participants to understand students' unique needs. Steve mentioned, "The vast difference in language disorders can lead me not knowing what the child won't know, or what the misconception might be." Ann added that comorbid conditions further add to the complexity of communication:

> The students that have verbal language on top of other challenges such as autism and things like that definitely are harder to take through the motor skills. I found in general, if it's just a language, or just a language processing, or a speech comprehension motor skills actually come pretty easily. It's the methods of getting to the motor skills that are harder.

Comorbid conditions were a challenge for participants because they did not always know the underlying reason why some children did not understand the instructions. For example, Becky stated "…explanations weren't clear enough and I don't always know if it is because English isn't their native language, or if they don't understand the directions, or it's a cognitive issue or they just weren't paying attention." While there are a variety of students under the umbrella of language disorders, Steve expressed the importance of seeking more information to help clarify a student's specific needs. Steve encouraged seeking information about comorbid conditions:

> Sometimes you might think it's a skill or a language issue and it could be something totally different that they're not responding to. So, not waiting for the answer to come to you but proactively seeking them out is the best advice I can give.

Therefore, the variety of language disorders and other conditions that coincide with language disorders was a challenge for participants, but seeking out the student's individual prognosis was recommended.

Theme 2: Multisensory Instruction

To overcome such challenges, participants have integrated several instructional adaptations to best instruct all students. There were 19 references to multisensory instruction collectively and all eight of the participants. Within this major theme, three subthemes emerged: *combination of sensory stimuli*, *visual supports*, and *verbal/auditory adaptations.*

Sub-theme: Combination of sensory stimuli

Participants explained that they are frequently integrating multiple sensory stimuli together to help children with language disorders learn. For example, Luke used "different modes of communication." Specific stimuli mentioned included visual, verbal, and auditory adaptations delivered together. Steve explained:

> The more they can see and process in their brain because whether it's a language issue or processing delay or an actual language disorder, dyslexia, dysgraphia, or whatever the case may be. I don't know what each student is dealing with. So, the more different tips and tricks and tools that I can throw at them, the more I can hope that I can catch multiple kids with that net.

Other participants agreed that combining multiple means of instruction were helpful in teaching children with language disorders.

Hannah spoke to the integration of verbal and visual together; "I'm usually doing two at the same time. I'll verbalize it, and then I'll model it." Ann also integrated "…a visual demonstration along with a verbal explanation, guiding words, key words, very simple. . . some picture guides to break down the motor skill and video." Similarly, Luke expressed his daily instruction integrated visual and verbal stimuli:

> I'm going to say and I'm going to demonstrate. I'll have each step, one by one, written and then I'll have a task analysis under it. Whether it's like step, hop and just have each one pictured with the word, they can connect it. And giving them the time to read it.

Combining visual and verbal instructions were expressed to be superior to only providing one form of instruction. Steve firmly explained "If I'm only giving them [instructions] in

one form or if I'm just giving it verbally and the student isn't receiving it, I'm not doing my job as a teacher." Subsequently, participants agreed that using a visual representation and verbal directions together was helpful to teach children with language disorders.

Another multisensory adaptation explained was to request students to say the cue words and perform the skill at the same time (verbal rehearsal). Beverly recommended, "…combining that rhythm, steady beat, saying it while they're doing it, keeping the language clean and clear and then giving them that processing time." Participants agreed verbal rehearsal was a helpful adaptation. Trish commented "the repetition with the movement with the words" supports memory. Steve further explained how he believed verbal rehearsal enhances memory for children with language disorders:

> Tying a movement to a sound helps it to become more memorable. So, if you don't remember what the word was or what the word means or if aphasia is kicking in and you can't pull that word out of your brain, you can think back to the movement you used and hopefully be able to make those connections.

Therefore, combining sensory stimuli together like visual, verbal, and kinesthetic were an instructional adaptation used to help teach children with language disorders.

Sub-theme: Visual supports

Within the multisensory lens, participants described using visuals such as pictures along with words to help the children decipher the meaning. Ann remarked "Without the pictures, the words mean nothing to them. I think it just muddies it for them. If I can do a picture breakdown, that helps." Participants also used pictures, posters, and task cards at stations. For example, Becky stated she used "…task cards at the different stations, a lot

of numbers, color coordinated things, number coordinated items, timers, or counters." Likewise, Beverly did "…a lot of station work, so in our stations we always have task cards with a picture and then a description, trying to keep the language as simple as possible. And we use a lot of posters." According to these participants, the visual aids simplify the environment and integrate more visual information to help students with language disorders better understand the skill.

A key visual for teaching motor skills to children with language disorders was a visual demonstration. Beverly suggested to "pull out a small group of kids, kind of demonstrate what it is that we're explaining because we've got students themselves and kids who just have processing difficulties and they need to see it." Participants also used peer modeling for a visual demonstration. Ann believed, "That there's times where peer support can be really helpful. Can you try to follow this person? Can you copy what they're doing?" Likewise, Trish noted "…having a buddy in class has been really great, someone that sits next to them that they feel comfortable with. They can help, ask questions, and look." Peer models were described as helpful for teaching children with language disorders because of the support they provide for one another. Becky added, "It's sometimes amazing how students help each other. When you might have been at a loss and how they pull each other up and move each other forward. . . They go beyond language barriers."

Participants also used videos. Hannah reported using, "…videos a lot of times if it's a relatable video." Steve and Ann both reported integrating video self-modeling which is a feedback video of students performing the skill. For example, "…we have station

work where we would use an iPad velcroed to a wall that was using a video delay app and the kids could perform their skill, then go over and watch themselves do it." Ann also reported using video feedback: "I found that you know if kids are really, really struggling with the motor skills and they're really deficit, sometimes video helps because I can video what they're doing and show it to them." In summary, participants expressed integrating visual supports such as pictures, posters, task cards, written descriptions, videos, and modeling. The modeling was expressed as helpful if it were completed by either the teacher or by a peer model.

Sub-theme: Verbal/ auditory adaptations

In addition to visual supports, participants reported adapting their language to verbalize instruction to children with language disorders by keeping their language short and simple. Steve mentioned what he does in daily instruction:

> I try to have very short, very memorable cues, if I can keep it to three or four words or less that is just short and snappy that I can repeat, they almost get stuck in their brain. I think the more I talk, the more I risk losing you and that goes for kids with language disorders and ones who don't have a language disorder.

One unique auditory adaptation expressed was using a bell ball. Luke explained that bell balls were helpful "…especially in teaching locomotor skills… when the verbal communication is more of a challenging issue." Bell balls were integrated by having students hit their knee to the bell ball when skipping for the auditory feedback of the bell. While none of the other members of the focus group had used bell balls, they agreed this was an example of a useful adaptation that could provide additional auditory feedback.

Participants adapted in the way students where to express back when verbal rehearsal was challenging for students. Ann initially wanted students to respond to "'What are the key words? What did I say?' Well guess what, my auditory processors and my verbal language processors, they may not be able to tell me those words." Similarly, Luke "…wanted everybody to be able to express back, express back." However, the students had a hard time with verbal rehearsal. Luke learned to "…give them like communication cards instead of having them actually verbally communicate with me," and the students were more successful. The communication cards incorporated "thumbs up, thumbs down" or "green card, red card." Kristy "…would do the same thing; thumbs up, thumbs down." Instead of communication cards, Ann used "…iPads with our students a lot, as talking devices. If the child is non-verbal they have a way to communicate." Therefore, adaptations in expressive language were implemented by participants because it was challenging to get students with language disorders to express back or verbally rehearse.

Another expressive verbal strategy Hannah integrated into daily instruction is to allow students to practice their speech by leading warm ups and teaching the class. This was helpful for students "…with language disabilities and stuff like that, like those that go to speech but they can clearly, they're practicing, I mean you have to practice. I think giving them an opportunity [to practice] in my classes, is what I like to do."

The theme of multisensory instruction incorporated a combination of sensory stimuli to teach children with language disorders. For example, participants provided visuals along with verbal instruction and have students verbally rehearse while

performing the skill. Participants adapted their verbal instructions by using short, simple phrases. Others adapted auditory expressions from the students by integrating communication cards and talking devices.

Theme 3: Progression

Participants adapted in the way they progress through instruction for children with language disorders. There were 10 remarks collectively around progression by six of the participants. In this main theme, two sub-themes emerged: *process time* and *task analysis*.

Sub-theme: Process Time

Participants recognized that children with language disorders need more time to process information when learning motor skills. For example, Trish stated, “Those precious kids need a lot more in the areas of, like you said, the demonstration and the time to process what is going on in my class.” This extra time to process information is key before progressing to new information. Luke explained other teachers may not be allowing the extra time before progressing which could hurt learning: “From watching their classroom, I feel like they're not giving them enough time to fully process it, and that's another thing I think is really important.” Becky and Kristy also expressed that they incorporate simple language and proximity. For example, “The cue words and the processing time I think are absolutely key in trying to get auditory information across” and “The extra time definitely and getting right next to them and sticking right with them and keeping it super, super simple.” Therefore, participants agreed children with

language disorders need extra time to fully process the information before progressing to new learning in PE.

Sub-theme: Task analysis

Participants explained breaking instruction down through task analysis. A task analysis is to break a skill down into smaller, more manageable components. As described by Luke, instruction should "…start simple, give them some success, especially I feel like those students that struggle with language disorders, they're going to have that self-esteem where they especially need more successful attempts and successful trials to move forward.". Becky recommended, "…break it down, take one piece and then another layer, and with the modeling." Participants explained that a task analysis should use the same clear and simple language. Luke suggested "…providing really direct, really discreet task analysis through it and using those same prompting techniques." The task analysis was preferred over teaching a whole motor skill or a whole activity. Steve explained: "Instead of introducing a whole activity or a whole skill, breaking it down into smaller digestible chunks where you can tie together the term, or the name of the skill or what your desired outcome is with the movement." In the progression theme, participants recommended breaking down instruction into a task analysis and allowed students with language disorders the appropriate time to process the information. These progression adaptations were implemented to accommodate the learning deficiencies in children with language disorders.

Theme 4: Learning to Adapt

Participants learned how to adapt through several means. There were 15 comments by all eight participants about how they learned to adapt their instruction in physical education. Within the main theme, three sub-themes emerged: *trial and error, reaching out to other professionals in the school,* and *professional development.*

Sub-theme: Trial and error

The most frequently occurring statement about learning to adapt was "trial and error." Steve claimed "One of the perks to having taught to many different grade levels, is that I've been able to kind of experiment with different strategies." Participants' learned to adapt through trying different techniques, reflecting on outcomes, and then adapting if appropriate. Ann stated "Trial and error. . . I try something, it doesn't work, back to the drawing board, make accommodations." Beverly agreed that when a strategy did not work, she had to adapt; "A lot of trial and error. A lot of stumbling, you know, just try it and 'wow that didn't work.' 'Why did that not work?' Think about it. 'What can I do to make it better?" In addition, Steve stated:

> I didn't know how to get over that hurdle early in my career. It's like 'but I'm telling them what to do, they're not getting it'. I had to learn to adjust, adapt, come up with visual cues, lots of charts that I can point to on the wall so after I give my verbal direction, they can see it and show it in a demonstration and give them a chance to explore it.

Moreover, participants expressed learning how to adapt their instructions for children with language disorders through trial and error along with reflecting and adapting on previous experiences.

Sub-theme: Other professionals in the school

Many participants voiced the importance they placed on proactively seeking advice from other professionals in the school. For example, Hannah has learned to adapt instruction through "…communication with the other people that work with them [the student], the aides, the physical therapists that come, and the OTs who deal with the more physical part of it." Luke explained why the classroom teachers were especially helpful, "When you're sitting with the same kids for six hours, you're going to learn a lot more than me in 45 minutes." In other words, the classroom teachers may have learned some tips and tricks that were beneficial for certain students. Additionally, speech-language practitioners (SLPs) have taught participants adaptations. For example, Ann tries to "…work with our speech and language practitioners, physical therapists and get some guidance from them."

While some of the teachers referred to these sub-themes independently, other participants learned to adapt from a combination. Kristy spoke to the interplay between the ways she learned to adapt instruction:

> I've been teaching 25 years so a lot of it is trial and error. But I also like to lean on their teachers a little bit, their regular sped teachers, like, 'How did they react to this? What do you think about that?' I'll bounce an idea off of them and see what they think.

Participants explained both trial and error and advice from other professionals were beneficial to learning instructional adaptations.

Sub-theme: Professional development

Professional development and continued education opportunities were also ways in which participants learned innovative instructional adaptations. Ann stated, “A lot of the things that I've done, I've come up with or seen, I've also seen at professional conferences, workshops, and through professional networking and social media.” Trish acknowledged “asking for help…[and] always getting that professional development for myself” in order to “get those students help.” Participants felt it was important to seek out information and instructional adaptations before they were needed. Steve voiced:

> Going to conferences and attending as many sessions as I can before I need to learn the information. Not going ‘oh my God I have a student in my class I don't know how to help.’ I need to go to a conference session like trying to get those out of the way ahead of time so I had that background knowledge.

While participants learned adaptations at professional conferences, the implementation in daily instruction may have been the most beneficial. Becky explained:

> I've learned a lot with just watching and observing other people teach. You know when you go to conventions you pick up things and ideas and the latest and the greatest, or maybe some piece of technology, or whatever. But just being in the trenches, at work, being there with the teachers, figuring things out and stuff.

The comment by Becky revealed being at work and overcoming daily challenges were powerful means toward adapting instruction even after attending professional conferences and observing other teachers. Other participants, like Beverly, learned to adapt through a combination of “Trial and error, reflection, professional development, trainings.” Trish also learned from “…trial and error, reaching out to their actual

classroom teachers and finding out what's working in their classroom, and staff developments. . . reach out to the PE peeps, finding out what's going on."

Luke also gave credit to his educational institution for his knowledge about adapting instruction: "I was very, very fortunate through UVA's master's program with Martin Block, to be able to learn a lot of modifications and really dig down deep." In all, participants learned to adapt their instruction for children with language disorders through trial and error, seeking advice from other professionals, and attending professional conferences.

Discussion

The purpose of this study was to examine instructional adaptations PE teachers incorporate when teaching motor skills to children with language disorders and the impact of teacher self-efficacy and educational experiences on the selection of these adaptations. The current study found the range of different language disorders and frequent comorbid conditions to be challenging. The survey revealed the majority of the participants had experience teaching a high load of children with language disorders. Specific diagnoses were not collected; however, the definition of language disorders embraces a variety of communication impairments. Participants explained the variability in diagnoses was challenging when teaching general PE. Results are similar to Daniel and McLeod (2017) who interviewed classroom teachers and revealed challenges in teaching children with language disorders. Challenges included the teachers' awareness of students' needs and how to use this to adapt language-based instruction. Teachers in the

current study also described this challenge is not only understanding the specific student needs but also determining the most appropriate adaptation.

Language disorders are commonly comorbid with attention deficit hyperactivity disorder (ADHD; Mueller & Tomblin, 2012), ID (Marrus & Hall, 2017), fetal alcohol spectrum disorder (Popova et al., 2016), ASD, and emotional/ behavioral disorders (Pinborough-Zimmerman et al., 2007). Comorbid conditions among children with language disorders makes it more challenging for them to learn (CDC, 2020). The occurrence of comorbid conditions and the related challenges in PE parallels the findings in the current study. Results support the need for teachers to search for student-specific diagnoses to be informed and prepared to adapt instruction in PE.

Teachers in the current study revealed they are also challenged with communicating with children with language disorders. Deficiencies in communication may affect learning in PE. Zebron et al. (2015) claimed learning will not be effective unless proper communication is used when teaching children with language disorders. To combat this challenge, Reichle et al. (2019) identified ways to tailor communication to support learning among students with complex communication needs. These included to match communication modes to the learner, identify opportunities, use visual representations, select appropriate vocabulary, and the dose of communication. Such strategies to tailor communication are comparable to the instructional adaptations revealed in the current study such as the use of visuals, simple language, and repetition.

The current study examined integration of the strategies Bandura (1986) proclaimed would support the four subprocesses of observational learning. Both survey

and focus group participants reported the integration of attention strategies such as pictures, video, and breaking skills down into a task analysis. Some participants had students engage in verbal rehearsal to support their retention of the motor skill. Participants reported to support production by having students physically practice the skill and build on previously mastered skills. Survey data shows participants support students with language disorders' motivation by verbal encouragement.

The current study's survey responses revealed no differences in the instruction provided in adaptation for children with language disorders and those provided in general PE instruction. This finding is important for two reasons. First, it's possible that teachers are constantly adapting instruction in PE that it becomes what they consider their general instruction. Second, the nature of the survey format did not allow for teachers to describe the reliance on multisensory adaptation. Meaning, the survey did not consider the use of several instructional strategies together as an adaptation. Focus groups helped reveal the use of several instructional adaptations together for all children, not only those with a language disorder. These included the use of visuals (pictures, demonstrations) along with verbal/ auditory adaptations (expressions to and from the students), breaking down instruction into a task analysis, and allowing the appropriate time to process the information.

Multisensory instruction as an adaptation to teach motor skills

Verbal/ auditory adaptations were integrated among participants in the current study. For instance, use of clear, simple, and direct language was one of the highest reported adaptations within the survey and there were numerous responses in the focus

groups about simple, short language. Results are consistent with strategies that support communication with children with language disorders (Reichle et al., 2019). A verbal adaptation that was less frequently used was use of delayed rate of speech. Only a third of the participants always used a delayed rate of speech and there were few remarks about slow speech in the focus groups. Using a delayed rate of speech has been beneficial for TD children (Haake et al., 2013) and even more so for children with language disorders (Montgomery, 2005). This may be due to children with language disorders having a slower reaction time for recognizing words. Subsequently, using a delayed rate of speech allows them time to process verbal information (Montgomery, 2005). Practitioner-based articles have also recommended teachers to always provide these adaptations such as to keep directions short, clear, and simple and provide extra time (Cooley, 2007; Murata, 2000, 2003). Results suggest PE teachers should delay their rate of speech when teaching children with language disorders even more so than the participants did in the current study.

Another verbal/ auditory adaptation that was seldomly reported in the current study's survey was verbal rehearsal. Participants in the focus groups revealed verbal rehearsal was challenging for students with language disorders. Valentini et al. (2017) examined the effects of interventions on motor skills and verbal rehearsal among TD children (n = 46) and children with disabilities (n = 18). Result showed a similar improvement in verbal rehearsal and motor skills for all participants. However, there was a less significant improvement in verbal rehearsal for the children with disabilities (p = .002) compared to the TD children (p < .0001). Results are similar to Hastie et al. (2018)

who found a significant ($p < .05$) relationship between children with disabilities' ability to verbally rehearse cues and performance in all locomotor skills and five object control skills. Results from the studies suggest verbal rehearsal is worthy to incorporate in PE even though it is challenging for children with language disorders. Additionally, promoting verbal utterances has been recommended for teaching children with language disorders by asking them questions, having them speak in front of the class, promoting language concepts, and getting them to engage in verbal rehearsal (Cooley, 2007; Morgan, 2019a; Murata, 2003).

Pictures and demonstrations were the most frequently reported visual adaptations in the current study according to both the survey and focus groups. When teaching children with language and other disorders, it has been promoted as beneficial to provide a demonstration and visual aids along with verbal explanations (Beyer et al., 2009). Studies have found children with ASD (Breslin & Rudisill, 2011; Preissler, 2008), ID (Fayza, 2017), and language barriers (Nguyen & Watanabe, 2013) learned motor skills better when there was a visual, or picture of the motor skill provided. However, there was a slight misalignment between the results in the current study. All of the participants in the focus groups claimed to always use a demonstration and almost everyone addressed the use of pictures. Only a little over half of the survey participants reported always using a demonstration and even fewer used pictures. Therefore, PE teachers may not be incorporating enough demonstrations and visual pictures to help children with language disorders learn motor skills.

Another form of a visual demonstration noted in the current study was use of peers for a model and for support. While the survey did not inquire about peer models, participants in the focus groups stated peers were helpful for teaching children with language disorders. Peer modeling and tutoring gives children with disabilities individual attention in a PE setting (Cervantes et al., 2013). Kurková and Scheetz (2016) found PE teachers and coaches (n = 32) used peer modeling and several of the previously mentioned adaptations (e.g., pictures, simple language) to support children with communication and hearing impairments. Peer modeling is also an evidence-based practice for teaching children with ASD (Wong et al., 2014). TD peers could offer children with language disorders the opportunity to look and learn motor skills and could be an adaptation to explore in a PE setting.

The limited use of video demonstrations was also discovered in the current study. The survey revealed video demonstrations were one of the lowest reported averages. Likewise, participants in the focus groups barley mentioned video demonstrations. Using video demonstrations or a "film-mediated model" to learn motor skill is supported by observational learning as a means to enhance attention (Bandura, 1986). Video demonstrations have been used to help children with hearing and communication impairments (Kurková & Scheetz, 2016) and have been effective in teaching motor skills to children with ASD (Wong et al., 2014). Another form of video demonstration is video self-modeling for feedback. Video feedback has been an effective strategy to teach PE to students who are TD (Fukkink et al., 2011; Kretschmann, 2017; Potdevin et al., 2018) and with ASD (Kurnaz & Yanardag, 2018) but little is known about its effectiveness with

children with language disorders. The current study's survey did not seek out use of video self-modeling, but two participants in the focus groups reported using video feedback. Nevertheless, PE teachers may not be fully utilizing videos to model motor skills and video feedback as an adaptation to teach children with language disorders.

Along with the previously mentioned adaptations, some participants adapted in the manner they visualized how to progress through instruction. Participants integrated a task analysis which is a visual break down of motor skills. The survey revealed about half of the participants always teach one element of a motor skill at a time and even more participants build on previously mastered skills. These adaptations replicate a task analysis which was mentioned numerous times within the focus groups. Results are consistent with recommendations to use a task analysis when teaching children with language disorders (Beyer et al., 2009). Additionally, using a task analysis has been effective in teaching general PE (Metzler, 2017, p. 67) and complex motor skills to children with disabilities (Snodgrass et al., 2017).

Some of the least reported adaptations in the current study were use of a written description and reading in PE. Within the survey, only 5% of participants reported always using a written description and to request students to read the cues. Likewise, written descriptions and reading were briefly mentioned in the focus groups. Results are inconsistent with recommendations to integrate language (written descriptions, reading) when teaching PE to children with language disorders (Morgan, 2019a, 2019b; Murata, 2003). Studies suggest integrating language concepts into PE can support motor skills

and literacy in young children at risk for language disorders and TD children (Connor-Kuntz & Dummer, 1996; Derri et al., 2010).

Connor-Kuntz and Dummer (1996) completed an 8-week intervention comparing language-enriched PE and general PE in children, age 4-6 years, in special education with language and/or cognitive delays (n = 26), Head Start (n = 35), and in a general class (n = 11). Language-enriched PE emphasized verbal and written concepts (e.g., directions, colors). Groups equally improved on motor and language skills, $p > .05$. The children at risk for language disorders benefited equally from language-enriched PE compared to the general class. However, the children at risk for language disorders in the language-enriched PE group improved more in their direction/position scores compared to the control group, $p < .05$, and improved their school-readiness composite scores at the same rate as the TD children. Results suggest children with language and/or cognitive delays benefited from integrating language concepts in PE by cognitive improvements similar to TD children. Even though motor skills improved equally across conditions, cognitive development may be supported by integrating language concepts into PE without compromising instructional time in PE (Connor-Kuntz & Dummer, 1996). PE teachers may consider integrating more language concepts (e.g., written instructions/ labels, reading) to support children with language disorders.

Impact of self-efficacy and educational experiences on instructional adaptations

The current study found participants were more likely to adapt instruction when they had higher levels of self-efficacy toward the inclusion of children with language disorders. Similarly, Block et al. (2013) found a cross-factorial relationship between

specific adaptations and self-efficacy toward children with disabilities. Results are comparable to Beamer and Yun (2014) who found PE teachers' self-efficacy was significantly correlated to inclusion behaviors, attitudes, and intentions to teach children with ASD. However, regression analysis did not find self-efficacy to significantly predict inclusion behaviors unlike the current study. The different findings may be due to the different instruments used to measure instructional adaptations and inclusion practices. Beamer and Yun used a modified version of the Teacher's Beliefs and Intentions Toward Teaching Students with Disabilities (TBITSD; Jeong & Block, 2011) which included eight instructional modifications (e.g., peer tutor, adapt equipment) on a scale from "*not at all*" to "*always.*" The current study used the SIAPE-L and focus groups to assess instructional adaptations.

The current study found an insignificant impact of educational experiences in APE on instructional adaptations. Also, within the focus groups, only one participant mentioned that APE coursework supported instructional adaptations. Similarly, Beamer and Yun (2014) found an insignificant impact of undergraduate APE courses and in-service workshops on inclusion behaviors. However, graduate APE coursework and years of experience significantly predicted inclusion behaviors which was inconsistent to the current study. Conflicting results may be due to the quality and meaningfulness of one's educational experiences. Positive and enriched experiences are affirming and enhance self-efficacy and one's efforts to adapt to help children with language disorders (Bandura, 1977). Subsequently, instructional adaptations for children with language disorders may

not be supported by APE coursework due to limited experiences and knowledge related to teaching PE to children with language disorders.

Another factor related to instructional adaptations in the current study was years of teaching experience. Survey participants in this study were less likely to adapt instruction for children with language disorders when they had more years of teaching experience. Rizzo (1984) and Özer et al. (2013) found similar results- that younger teachers and teachers with less experience had a more positive attitude toward children with disabilities. Hutzler et al. (2019) suggested this may be due to advances in educational policies and novice professionals may be more responsive to inclusion. Implications would lead tenured teachers to stick to traditional approaches and fail to adapt for children with language disorders. However, this may not have been the case in this study.

Focus group participants portrayed years of teaching experiences supported them in adapting instruction for students with language disorders through trial and error, professional development, and advice from colleagues. While this finding is inconsistent with the survey, results also suggested participants do not do anything different when teaching students with language disorders versus general PE. This may be better explained by teachers incorporating multiple instructional strategies into general PE classes to capture all students. This concept aligns with Universal Design for Learning (UDL) which states that multiple means of engagement, representation, and action and expression should be incorporated to support all types of learners (CAST, 2018; Morin, 2015). Since students with language disorders are typically placed into general education

(National Center for Education Statistics, 2021), the least restrictive environment, instructional adaptations are necessary in general PE. We conclude that, over time, teachers learn to adapt instruction for all students, not just children with language disorders. This instruction bleeds into general PE so there may not be a difference between general PE and adapted PE as teachers gain years of teaching experience. Nevertheless, PE teachers incorporate a modest amount of the strategies expressed by Bandura (1986) and those related to multisensory instruction to adapt for children with language disorders (Martin, 2012). Enhancing the quantity and quality of instructional adaptations is recommended to help children with language disorders learn motor skills.

Limitations and future research

Limitations included a small sample size and validity of the SIAPE-L. Additionally, self-report survey responses were retrospective beliefs of one's instruction which could have led to an inflation of the use of instructional adaptations. Self-report may have led participants to answer the survey items in different contexts. For example, the natural variability in language disorders could have led participants to identify with students with less or more severe needs while answering the questions. Also, focus group participants volunteered and were not randomized which could have led to a sample of participants with specialized experiences and knowledge compared to the general PE teacher population.

Literature is limited examining the effects of instructional adaptations on motor skill acquisition in children with language disorders. Rintala et al. (1998) and Rintala and Linjala (2003) found PE can support motor skills in children with language disorders

even when there are no adaptations provided. It is unknown how motor skills can be affected if adapted instruction is implemented. Future research should consider objectively measured use and effectiveness of instructional adaptations PE teachers are using to teach children with language disorders. Motor skill interventions should determine the effectiveness of adapted instruction in a PE environment for discrete and serial tasks. The impact of comorbid conditions should also be considered in future research due to the vast differences in language disorders and high incidence rate of comorbid conditions.

Appendix A – Survey Recruitment Email

Questionnaire Recruitment Email

Greetings fellow physical education teacher,

I am a Doctoral Candidate completing my dissertation on instructional adaptations for children with language disorders in physical education and I need your help!

Will you please consider taking part in my online survey?

The purpose of this online survey is to understand instructional adaptions physical education teachers are using to help teach motor skills to children with language disorders. The online survey should only take 10 minutes to complete.

YOU are being asked to participate because you are a current physical education teacher. Your participation will help the community and future physical education teachers be aware of instructional adaptions to support children with language disorders. We honor your opinions and experiences in teaching physical education.

In order to complete the online survey, Click Here.

Also, please **forward this email to fellow physical education teachers** who you think may be interested in completing the survey as well.

Thank you so much and have a great day,

Kristen Morgan, PhD. Candidate
The University of Southern Mississippi
School of Kinesiology & Nutrition
Email: Kristen.connor@usm.edu
Cell #: (662) 418-8091

Appendix B – Study Recruitment Flyer

Appendix C - Sample Twitter Post

Kristen Morgan @kristenconna · Oct 21, 2020

usmep.co1.qualtrics.com/jfe/form/SV_9L...

Please share #PhysEd with PE teachers 👍⚽🏀🏒🎤 I need 30 more physical education teachers to complete my research survey linked above. @OPENPhysEd @bdevore7 @lfpalabama @camkerst @Camthesailorman @JodysAPE @MrsHolland_APE @Beach_APE

1 6 2

Kristen Morgan @kristenconna · Oct 21, 2020

usmep.co1.qualtrics.com/jfe/form/SV_9L...

I am still looking for about 30 physical education teachers to complete this research survey (linked). Please Share and Tag PE teachers! 😀 #PhysEd @NorthAmericaAPA @SHAPE_Florida @ShapeMontana @SHAPEAmericaSD @KY_SHAPE @MAHPERD1 @SCAHPERD

1 2

You Retweeted

Kristen Morgan @kristenconna · Sep 10, 2020

Participants Needed for Research in Physical Education #PhysEd #adaptedPE #kinesiology #physicaleducation #SHAPEHealthEd #inclusion #ape

CTAHPERD and 8 others

3 2 3

Appendix D – Focus Group Recruitment Email

Focus Group Recruitment Email

Greetings _____,

First of all, I want to thank you for participating in the online survey and providing your contact information.

The next step of the study is to complete a virtual group discussion to further understand responses from the survey. The purpose of this discussion is to get a few physical education teachers together to talk about instructional adaptions used to help teach motor skills to children with language disorders. The discussion will take place virtually, through Google Meets video conference and should last about 1 hour.

The information will support completion of my Doctoral dissertation. The information collected will be typed out and analyzed to detect common themes.

YOU are being asked to participate because you are a physical education teacher who has taught at least one child with a language disorder in the past five years. Your participation will help the community and future physical education teachers. We honor your opinions and experiences in teaching physical education.

If you accept, please respond back to this email and I will get in touch with you regarding specific details.

Also, if you have any questions, comments, or concerns, please email or call me using the contact information provided.

Thank you so much and have a great day,

Kristen Morgan, PhD Candidate
The University of Southern Mississippi
School of Kinesiology & Nutrition
Email: Kristen.connor@usm.edu
Cell #: (662) 418-8091

Appendix E – Survey Informed Consent

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (ONLINE) INFORMED CONSENT

STANDARD (ONLINE) INFORMED CONSENT PROCEDURES

The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval. Use what is given in the research description and consent sections below when constructing research instrument online.

Last Edited May 13th, 2019

Today's date:		
PROJECT INFORMATION		
Project Title: Physical education teachers' instructional adaptations to teach motor skills to children with language disorders		
Principal Investigator: Kristen Morgan	Phone:	Email: kristen.connor@usm.edu
College: The University of Southern Mississippi	School and Program: School of Kinesiology & Nutrition	

RESEARCH DESCRIPTION

1. **Purpose**:

The purpose of this study is to examine instructional adaptations implemented by physical education teachers to teach motor skills to children with language disorders and to examine their self-efficacy in providing instructional adaptations. Findings will help better understand inclusion practices for children with language disorders in physical education.

2. **Description of Study:**

Participants will complete an online survey that will be in three sections. The first section will gather demographic information such as years of experience and educational experiences. The second section will gather instructional adaptations used to teach motor skills to children with language disorders. The third section will gather information about self-efficacy towards inclusion of children with language disorders. The online survey should take 10 minutes to complete. We hope to have about 200 participants complete the survey.

3. **Benefits:**

Benefits may include recognizing an instructional adaptation that may be helpful in teaching children with language disorders and having the opportunity to reflect on past teaching practices.

4. **Risks:**

Risks may include feeling uncomfortable completing an online survey which may take longer than 10 minutes to complete depending on depth of reflection.

5. **Confidentiality:**

All data and responses will be non-identifyable towards individual participants. Names and contact information will not be required, however, such information may be disclosed if participants choose to do so. Disclosure of personal information may be used for a follow-up study.

6. **Alternative Procedures:**

At any time during the online survey, participants may chose to end the survey by clicking the "end" button. Incomplete surveys will not be used for data collection and information gathred will be discarded.

7. **Participant's Assurance:**

This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5125, Hattiesburg, MS 39406-0001, 601-266-5997.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

CONSENT TO PARTICIPATE IN RESEARCH

I understand that participation in this project is completely voluntary, and I may withdraw at any time without penalty, prejudice, or loss of benefits. Unless described above, all personal information will be kept strictly confidential, including my name and other identifying information. All procedures to be followed and their purposes were explained to me. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected. Any new information that develops during the project will be provided to me if that information may affect my willingness to continue participation in the project.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

CONSENT TO PARTICIPATE IN RESEARCH

By clicking the box below, I give my consent to participate in this research project.

☐ Check this box if you consent to this study, and then click "Continue." (Clicking "Continue" will not allow you to advance to the study, unless you have checked the box indicating your consent.)

If you do not wish to consent to this study, please close your browser window at this time.

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (ONLINE) INFORMED CONSENT

STANDARD (ONLINE) INFORMED CONSENT PROCEDURES

The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval. Use what is given in the research description and consent sections below when constructing research instrument online.

Last Edited May 13th, 2019

Today's date:

PROJECT INFORMATION

Project Title: Physical education teachers' instructional adaptations to teach motor skills to children with language disorders

Principal Investigator: Kristen Morgan	Phone:	Email: kristen.connor@usm.edu
College: The University of Southern Mississippi	School and Program: School of Kinesiology & Nutrition	

RESEARCH DESCRIPTION

1. **Purpose**:

The purpose of this study is to understand instructional adaptations implemented by physical education teachers to teach motor skills to children with language disorders. Findings will help better understand inclusion for children with language disorders in physical education.

2. **Description of Study:**

I will join an online focus group discussion with the principal investigator and three to five other physical education teachers. The topic of the focus group will be on instructional adaptations used to teach motor skills to children with language disorders and the thought process behind these adaptions. Specifically, the principal investigator will ask a series of questions about general adaptations, difficulties in providing instructional adaptations, visual adaptations, verbal adaptations, kinesthetic adaptations, and progression adaptations that I have provided in teaching students with a language disorder. The online focus group discussion should take about one hour to complete. The principal investigator hopes to have 4 to 6 physical education teachers participate in the focus group.

3. **Benefits:**

My benefits may include recognizing an instructional strategies that may be helpful in teaching children with language disorders and learning from the other members in the group.

4. **Risks:**

My risks may include feeling uncomfortable sharing my experiences to the other physical education teachers. Also, I may be uncomfortable completing the entire online focus group discussion because it may take longer than one hour to complete.

5. **Confidentiality:**

All data and responses will be non-identifyable towards individual participants. Quote may be disclosed, but they will not be attached or identifiable to any participant.

6. **Alternative Procedures:**

At any time during the online focus group, participants may chose to leave the discussion by exiting the meeting.

7. **Participant's Assurance:**

This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5125, Hattiesburg, MS 39406-0001, 601-266-5997.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

CONSENT TO PARTICIPATE IN RESEARCH

I understand that participation in this project is completely voluntary, and I may withdraw at any time without penalty, prejudice, or loss of benefits. Unless described above, all personal information will be kept strictly confidential, including my name and other identifying information. All procedures to be followed and their purposes were explained to me. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected. Any new information that develops during the project will be provided to me if that information may affect my willingness to continue participation in the project.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

CONSENT TO PARTICIPATE IN RESEARCH

By clicking the box below, I give my consent to participate in this research project.

☐ Check this box if you consent to this study, and then click "Continue." (Clicking "Continue" will not allow you to advance to the study, unless you have checked the box indicating your consent.)

If you do not wish to consent to this study, please close your browser window at this time.

Appendix G – Survey

What is a Language Disorder?
According to the *Diagnostic and Statistical Manual of Mental Disorders* fifth ed. (American Psychiatric Association, 2013), language disorders are:
A. "Persistent difficulties in the acquisition and use of language across modalities (i.e., spoken, written, sign language, or other) due to deficits in comprehension or production that include the following: 1) reduced vocabulary. . ., 2) limited sentence structure. . . ,3) impairments in discourse. . ."
B. "Language abilities are substantially and quantifiably below those expected for age resulting in functional limitations in effective communication, social participation, academic achievement, or occupational performance. . .
C. "Onset of symptoms is in the early developmental period."
D. "The difficulties are not attributed to hearing or other sensory impairment, motor dysfunction, or another medial or neurological condition and are not better explained by intellectual disability or global developmental delay."
[Diagnostic criteria 315.32 (F80.2)]
Please select the most appropriate answer about **your current physical education position and experiences** within the following questions:

Question	Response format
Gender	Male Female
Age	18 to 65
Years of teaching experience	0 to
Number of undergraduate adapted physical education courses completed	0 to 10+
Number of graduate adapted physical education courses completed	0 to 10+
Number of special education courses completed	0 to 10+
Number of in-service or workshops attended	0 to 20+
Number of students with a language disorder taught in past 5 years?	0 to 20+
Grade level taught (select all)	Elementary Middle High
State currently teaching in (please type out)	_____
Adapted physical education specialist in school district	Yes No
How well do you feel your undergraduate PE program prepared you to teach children with language disorders in general PE	Not at all Fairly well Very well

n responding to the questions in this block, think back to a typical lesson and the instruction you provide when teaching a new motor skill to a general physical education

class.
Please rate how often that you do the task listed below by selecting the appropriate response after the statement.

Question	Response format	
Direct students to a live demonstration.	Always Most of the time	Sometimes Never
Direct students to a picture or poster.	Always Most of the time	Sometimes Never
Direct students to a written description.	Always Most of the time	Sometimes Never
Direct students to a video demonstration.	Always Most of the time	Sometimes Never
Provide verbal directions.	Always Most of the time	Sometimes Never
Provide verbal feedback.	Always Most of the time	Sometimes Never
Provide verbal motivation.	Always Most of the time	Sometimes Never
Use a delayed rate of speech or speak slower.	Always Most of the time	Sometimes Never
Use clear, simple, and direct language.	Always Most of the time	Sometimes Never
Request students to physically practice.	Always Most of the time	Sometime Never
Request students to verbally rehearse or state the cues.	Always Most of the time	Sometimes Never
Request students to read the cues.	Always Most of the time	Sometimes Never
Request students to write the cues.	Always Most of the time	Sometimes Never
Request students to mentally rehearse or use mental imagery.	Always Most of the time	Sometimes Never
Teach one small element of a motor skill at a time.	Always Most of the time	Sometimes Never
Build on previously mastered motor skills.	Always Most of the time	Sometimes Never
Allow students to progress at their own rate/ self-paced learning.	Always Most of the time	Sometimes Never

In responding to the questions in this block, think back to a typical lesson and the instructional adaptations you provide **when teaching a new motor skill to students with a language disorder.**
Please rate how often that you do the task listed below by selecting the appropriate response after the statement.

Question	Response format	
Direct students with a language disorder to a live demonstration.	Always Most of the time	Sometimes Never
Direct students with a language disorder to a picture or poster.	Always Most of the time	Sometimes Never
Direct students with a language disorder to a written description.	Always Most of the time	Sometimes Never
Direct students with a language disorder to a video demonstration.	Always Most of the time	Sometimes Never
Provide verbal directions for students with a language disorder.	Always Most of the time	Sometimes Never
Provide verbal feedback for students with a language disorder.	Always Most of the time	Sometimes Never
Provide verbal motivation for students with a language disorder.	Always Most of the time	Sometimes Never
Use a delayed rate of speech or speak slower for students with a language disorder.	Always Most of the time	Sometimes Never
Use clear, simple, and direct language for students with a language disorder.	Always Most of the time	Sometimes Never
Request students with a language disorder to physically practice.	Always Most of the time	Sometime Never
Request students with a language disorder to verbally rehearse or state the cues.	Always Most of the time	Sometimes Never
Request students with a language disorder to read the cues.	Always Most of the time	Sometimes Never
Request students with a language disorder to write the cues.	Always Most of the time	Sometimes Never
Request students with a language disorder to mentally rehearse or use mental imagery.	Always Most of the time	Sometimes Never
Teach one small element of a motor skill at a time to students with a language disorder.	Always Most of the time	Sometimes Never
Build on previously mastered motor skills for students with a language disorder.	Always Most of the time	Sometimes Never
Allow students with a language disorder to progress at their own rate/ self-paced learning.	Always Most of the time	Sometimes Never

This set of questions was designed to help us gain a better understanding of the things that create difficulties for teachers in including children with language disorders in general physical education.
Please rate **how certain you are that you can do the task listed below** by selecting the appropriate number after the statement.

Please rate your degree of confidence by recording a number from 0 to 10 using the scale provided.

Question	Response format
Modify equipment for students with language disorders who are included in my general physical education classes.	0 to 10
Modify activities for students with language disorders who are included in my general physical education classes.	0 to 10
Create a safe environment for students with language disorders who are included in my general physical education classes.	0 to 10
Promote social interactions with peers for students with language disorders who are included in my general physical education classes.	0 to 10
Manage behaviors of students with language disorders who are included in my general physical education classes.	0 to 10
Modify instructions for students with language disorders who are included in my general physical education classes.	0 to 10
Assess the motor skills of students with language disorders who are included in my general physical education classes.	0 to 10
Modify rules to games for students with language disorders who are included in my general physical education classes.	0 to 10
Collaborate effectively with other teachers/ professionals regarding students with language disorders who are included in my general physical education classes.	0 to 10
Motivate students with language disorders who are included in my general physical education classes.	0 to 10

Please select if you are willing to be contacted for a further inquiry about instructional adaptations you provide when teaching motor skills to children with language disorders. If you select "yes" please type your **name** and the **best email address** to get in contact with you. Note: selecting 'yes' and providing contact information does not mean you are required to participate, nor does it mean you will be contacted.

Yes, I may be interested in participating in the next segment of the study. My name and email address are below.

No, I am not interest in participating in the next segment of the study.

Appendix H - Focus Group Guide

Welcome and thank you for agreeing to participate in this discussion about instructional adaptations for teaching motor skills to children with language disorders. My name is Kristen Morgan and I am a Doctoral candidate in the School of Kinesiology & Nutrition at The University of Southern Mississippi. My dissertation is about how physical education teachers adapt instruction to help teach motor skills to children with language disorders.

The purpose of this discussion is to understand more **about your** experiences and practices in adapting all aspects of instruction in daily physical education for students who have a language disorder.

I am recording the discussion, so **please speak loud and clear** and remember that the audio-tape will not pick up on gestures such as a head node, so please vocalize your state of agreement or non-agreement. Likewise, please speak one at a time so when it comes time to decipher the audio-tape, it is understandable.

Let's take a moment and introduce ourselves. Please share your name, years of experience, current physical education position, and a little about your students with language disorders. 5 min

Can you describe your background in adapted physical education? 5 min

What are some challenges you have faced in teaching motor skills to children with language disorders? 5 min

What general adaptations have you provided for children with language disorders when teaching a new motor skill? 15 min

Can you explain any experience you have providing visual adaptations for children with language disorders? 5 min

Can you explain any experience you have providing auditory adaptations for children with language disorders? 5 min

Can you explain any experience you have providing kinesthetic adaptations for children with language disorders? 5 min

Can you explain any experience you have providing progression in instruction adaptations for children with language disorders? 5 min

I cannot explain how thankful I am that each one of you took your time to discuss your adaptations with me. This information is going to be super helpful in completing my dissertation and for the community of children with language disorders. Thank you again for your time. Have a great day.

- **How did you come to this idea?**
- **In which of your courses did you learn this instructional adaptation?**
- **What do you like about using this instructional adaptation?**
- **How did you discover that this adaptation was appropriate?**
- **What was your thought process behind that idea?**
- **Can you provide me with a specific example on how this may have been either effective or ineffective?**
- **Is this instructional adaptation connected to any specific resources either available or not?**

Appendix I – Focus Groups Guidelines

Moderator Rules

- Create an environment that allows participants to **feel safe sharing their experiences**.
- **Not appear to be an expert** in providing instructional adaptations to children with language disorders.
- Signify the purpose of the focus group is to **learn from the participants**.
- Help **reveal experiences among the group** instead of participants explaining what they know about instructional adaptations.
- The **discussion should primarily between the group members** instead of between the moderator and individual members.
- Help **participants build off one another** to discuss the topics instead of only responding to the moderator's questions.
- Minimize leading body gestures and verbal responses to the participants' responses to **maintain a neutral stance.**

Appendix J – Request for Permission to Modify Instrument

Dear Andrea Taliaferro,

I am requesting permission to modify the instrument in your Doctoral Dissertation titled; Validation of an Instrument to Explore Physical Educators' Beliefs Toward Inclusion: Application of Self-Efficacy Theory (2010). The instrument I am requesting to modify is titled:

> **Physical Educators' Self-Efficacy Towards Including Students with Disabilities- Autism (PESEISD-A)**

The modification I would like to make to the PESEISD-A is to replace the term "Autism" with the term "Language Disorder" in order to fit the purpose of my study. The modified instrument would have the following title:

> **Physical Educators' Self-Efficacy Towards Including Students with Disabilities – Language Disorder (PESEISD-L).**

A copy of the modified instrument that I would like to use to attached to this email.

If you agree to allow me to use and modify the PESEISD-A, please sign and return this letter to me. I would be very grateful for your permission. If you have any questions, please feel free to contact me.

Sincerely,

Kristen Morgan

Kristen Morgan

I ____Andrea Taliaferro_____, grant permission for Kristen Morgan to use the instrument according to the modifications above.

Signature____ Andrea Taliaferro Date_____7/7/2020_____

Appendix K – IRB Approval Letter

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

118 COLLEGE DRIVE #5125 • HATTIESBURG, MS | 601.266.6576 | USM.EDU/ORI

NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.
- FACE-TO-FACE DATA COLLECTION WILL NOT COMMENCE UNTIL USM'S IRB MODIFIES THE DIRECTIVE TO HALT NON-ESSENTIAL (NO DIRECT BENEFIT TO PARTICIPANTS) RESEARCH.

PROTOCOL NUMBER: IRB-20-286
PROJECT TITLE: Physical Education Teachers' Instructional Adaptations to Teach Motor Skills to Children with Language Disorders
SCHOOL/PROGRAM: Kinesiology, School of HPRO
RESEARCHER(S): Kristen Morgan, Melissa Thompson

IRB COMMITTEE ACTION: Exempt
CATEGORY: Exempt
Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

APPROVED STARTING: July 28, 2020

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

Appendix L - Field Notes from Focus Groups

Focus Group Notes

Thursday November 12th 2020

Moderator: Kristen Morgan

2:00- 3:00pm CT

Participant name and state	Comments and Notes
Virginia	3 yrs, special school ADD, public now.. BA in PE James Mad CAPE cer ABD Adaptive PE. task analysis, prompts. short cues, written, pics, video - bell balls, (KIW) - express book, com. cards - • trial + error • UVA master credit Block • Resources - ipad.
Louisiana	NCLA, special needs mix, K-12, BA, APE Add on pre-8th, few non-verbal, ESL, ASD, Spanish BA - multiple issues. (Non-verbal) - time, simple, pic, demo peer - close, make sure they are listening - sam + build off success. - Age appropriate • trial + error • SPED teachers • copy what others have done • Resources school
Vermont	K-2, 29 year, aud. proc. ESL, ASD, selective mutism. BA K-12, No adapted, inclusive MA education, learning tech - Multiple issues - communication / Rules, bell balls - video + show to them, - Demo, slow, simple, pic, video, peer support, stories? • Resources - they have IPad. workshop media 1. professional network 2. trial + error conference SHAPE • Accommodate
	- microphone, 1 on 1 work. - work w/ SLP + OP + a - Ipad - " " " " team. - same + build

- too dif. of a word
- hard = peer evaluation.

Emails: '

5:00- 6:00pm CT

Participant name and state	Comments and Notes
North Carolina	40 yrs, APE (17), - NCAA conferences in APE - Netherlands, (Masters) grad in APE, CAPE, Board certified. - struggle = clearness, do they understand? ✓ some visual, #'s, colors, timers, video, breakdown step, A- cue, processing time. K- cross, spin, imagery.
New York	1990, general, Lexington School for deaf, ASD 7 years - ASD training 15+, Queens, PE (Master) - No APE teachers. - too much = struggle need demo. K- layer activities, action based, spinning, sensory ✓ task cards, pic, words, posters, little tech, demo, speak + pair A- Agree, Rhythm, say words, repetitive, clean, clear lang, process time, (wait)
New York	- 11 yr, general. BA in PE, APE classes, minor in APE - Quiz + concise. - Not only verbal. hands on unique experiences - Adjust + adapt ✓ technology, Loop play video, -steps, self- video A- short cues, K- break down into pieces, frame the sound) P- bite size direction + see what they know
Texas Michaela	Pre-6, USM, Coaching + Volleyball 22 years, ESL, time to process. demo, translating, put down own guard + ally. ✓ slides, translation, word walls, + videos, buddy, other teacher A- say in own lang. Ens-span. K- sign, repe, words,

Emails:

- teachers
- Classroom
- trial + error

LA	2 yr, 1 course + - words, fluent, verbose ✓ videos, mod, Spanish + ens words A- visualize it, vocalize the words + teach others P- natural +

- professional organ
- trainings
- PT, OT, teacher

Appendix M – Transcription Checking with Participants

Opportunity to Add or Clarify from Focus Group Discussion

Kristen Morgan <kristen.connor@usm.edu>
Mon 11/30/2020 3:50 PM
To:

1 attachments (41 KB)
2pm focus group transcription.docx;

Greetings,

I hope this email finds you well. This is a follow-up email regarding our virtual group discussion on November 12th.

I would like to offer you the opportunity to add any additional comments or to clarify anything to the transcriptions attached.

You may review your comments by color and your initials. If you would like to make any edits, please use Track-Changes in Word. If possible, please return by Sunday, December 13. This is completely optional and thank you again for your participation!

Have a happy holiday season,
Kristen Morgan

Appendix N – Quotes by Theme Within the Focus Groups

Major Theme	Minor Theme	Example Quote
Challenges		
	Communication	"I feel like that once the communication part is down, once they understand what to do, the motor skill itself isn't an issue" "We feel like the motor skills themselves aren't necessarily the challenging portion as much as just expressing what it is that we want" "I think the hardest thing for me would be auditory in verbal is not the skill itself but the comprehension of the skill" "I had to learn that kind of patience and stepping back and then re-configuring how that whole communication piece goes" "The students that have verbal language on top of other challenges such as autism and things like that are definitely are harder to take through the motor skills. I found in general, if it's just a language or just a language processing, or a speech comprehension, motor skills, actually come pretty easily. It's the methods of getting to the motor skills that are harder"
	Multiple Disorders, Range of language disorders	"My first years out of college were at a specialized school for intellectual disabilities, autism and emotional, behavioral disorders, so there was a lot of further speech and language disorders through that and a lot of other delays" "Explanations that weren't clear enough, and I don't always know if it is because English isn't their native language, or if they understand the directions, or it's a cognitive issue or they just weren't paying attention or so they're you know there are a lot of underlying reasons why you have to repeat yourself"

	"The vast difference in language disorders can lead me not knowing what the child won't know, or what the misconception might be" "Some verbal language issues, some auditory processing issues. . . and then children that have higher needs such as kids on the spectrum and things like that" "I know with some of our kids that are non-verbal, you know they have other issues too" "Sometimes you might think it's a skill or a language issue and it could be something totally different that they're not responding to. So, not waiting for the answer to come to you but proactively seeking them out is the best advice I give."
Multisensory Instruction	
Combination of sensory stimuli	"The more they can see and process in their brain because whether it's a language issue or processing delay or an actual language disorder of dyslexia, dysgraphia whatever the case may be. I don't know what each student is dealing with. So, the more different tips and tricks, and tools that I can throw at them, the more I can hope that can catch multiple kids with that with that net" **Verbal and visual** "Always a visual demonstration along with a verbal explanation, guiding words key words, very simple. . . some picture guides to break down the motor skill and video" "I'm going to say and I'm going to demonstrate I'll have each step one by one, written, and then I'll have a task analysis under it, whether it's like step, hop, and just have each one picture with the word they can connect it and giving them the time to read it" "I'm only giving them in one form or if I'm just giving it verbally, and the student isn't receiving it. I'm not doing my job as a teacher I didn't know how to get over that hurdle. Early in my career is like 'but I'm telling them what to do that, they're not getting it'. I had to learn to adjust, adapt come up with visual cues, lots of charts that can point back to on the wall so after I gave my verbal

	direction, they can see it and show it in a demonstration give them a chance to explore it” “That’s what's unique to PE is that we do naturally we just model, a lot of the time so I get away with a lot of times if I have those students that have language disorders, and they have some barriers to go through that just watching me do it, they can get the same information if I'm verbalizing it. Because I'm usually doing two at the same time. I'll verbalize it, and then I'll model it” **Say and do** “Combining that rhythm, steady beat, saying it while they're doing it, keeping the language clean and clear. And then giving them that process in time” “Tying a movement to a sound helps it to become more memorable. So, if you don't remember what the word was or what the word means or you know if aphasia is kicking in and you can pull that word out of your brain, you can think back to the movement you use, and hopefully be able to make those connections” “The repetition with the movement with the words”
Visual supports	“Task cards at the different stations. I use a lot of numbers, color coordinated things, number coordinated items, timers, or counters” “Without the pictures, the words mean nothing to them. I think just muddies it for them. If I can do a picture breakdown, that helps” “We do a lot of station work so our stations, we always have task cards with a picture, and then a description. Trying to keep the language as simple as possible. And we use a lot of posters” “I’ll suggest to pull out a small group of kids, kind of demonstrate what it is that we're explaining, because we've got students themselves and kids who just have, you know, processing difficulties and they need to see it” “Being right there near the child getting close to them. I also will pull them when I can, if necessary, for one on one work”

	Peer modeling "I also think that there's times where peer support can be really helpful. Can you try to follow this person? Can you copy what they're doing?" "Having a buddy in class has been really great, someone that sits next to them that they feel comfortable with. They can help, ask questions, and look" "It's sometimes amazing how students help each other. When you might have been at a loss and how they pull each other up and move each other forward. . . They go beyond language barriers" "Another thing that I discovered can be extremely helpful but it also can be really detrimental to students with language issues is peer evaluation. If they're supposed to be watching you know, let's say you're watching your partner, skip, can you tell them what you don't see? . . . Kids with the verbal language skills that are stretched have a real difficult challenge with that" **Video** "I'll sometimes use videos on a lot of times if it's a relatable video" **Video for feedback** "We have station work where we would use an iPad velcro to a wall that was using a video delay app and the kids could perform their skill, then go over and watch themselves do it, and we can get actually hit pause and isolate certain areas of it" "I found that you know if kids are really, really struggling with the motor skills and they're really deficit. Sometimes video helps because I can video what they're doing and show it to them"
Verbal/ Auditory	**Receptive Language** "I have become a big, big proponent, not just for kids with auditory problems, but using a microphone amplifies amplify my voice"

"we have assisted devices such as microphones if we know that there's a student with hearing challenges, so that it can be clearer"

"One that I've used before, again it kind of goes into the physical prompting the using bell balls… Especially in teaching locomotor skills I've used is with the skip for having that knee up. Where my knee comes up, hitting my knee with a bell ball and then when they're doing and I can say okay I can hit the bell ball and it gets pretty clear distinction of where they're at. That's one that I've used a lot when the verbal communication is more of a challenging issue"

"I try to have very short, very memorable cues, if I can keep it to three or four words or less that is just short snappy that I can repeat. They almost get stuck in their brain. I think the more I talk, the more I risk losing you. And that goes for kids with language disorders and ones who don't have language disorder"

Expressive Language

"iPads with our students a lot, as talking devices. If the child is non-verbal they have a way of communicate, pushing buttons on their iPad "bathroom, or drink" and "they push the button for the picture that they want, and it speaks the word for them"

"I want everyone to verbalize everything that I say; 'what are the key words? What did I say?'. Well guess what, my auditory processors and my verbal language processors, they may not be able to tell me those words. It still gives them the skill but if I'm going to assess them on the cognitive knowledge piece for their ability to recite those key words, it may not happen"

"I wanted everybody to be able to express back, express back . . . I would give them like communication cards instead of having them actually verbally communicate with me"

"It could be a 'thumbs up, thumbs down' it could be a 'green card, red card' if they're good to go or if they need a break. So, it would vary student to student"

		"I would do the same thing the thumbs up thumbs down" "With languages disabilities and stuff like that, like those that go to speech but they can clearly, they're practicing, I mean you have to practice. I think giving them an opportunity in my classes, is what I like to do"
Progression		
	Processing Speed	"I have to remind myself that those precious kids need a lot more in the areas of, like you said, the demonstration and the time to process what is going on in my class" "The cue words and the processing time I think are absolutely key in trying to get auditory information across" "The extra time definitely and getting right next to them and sticking right with them and keeping it super, super simple like he said just keywords, super simple" "From watching their classroom, I feel like they're not giving them enough time to fully process it, and that's another thing I think is really important"
	Task analysis	"Break it down, take one piece and then another layer. And with the modeling. That seems to really help the students so much more" "Instead of introducing a whole activity or a whole skill, breaking it down into smaller digestible chunks where you can tie together the term, or the, the name of the skill or what your desired outcome is with the movement" "Providing really direct, really discreet task analysis through it and using those same prompting techniques" "Keeping it simple, task analysis" "Start simple, give them some success, especially I feel like those students that struggle with language disorders, they're going to have that self -esteem where they especially need more successful attempts and successful trials to move forward" "Figure out how to adapt those into my generic classes, to see how to really break down cues and what directions work best, how to best communicate information in the shortest period of time"
Learning to adapt		

	Trial and error	"trial and error. . . I try something, it doesn't work, back to the drawing board, make accommodations" "Trial an error, reflection, professional development, trainings" "A lot of trial and error. A lot of stumbling, you know, just try it and wow that didn't work, why did that not work, think about it, what can I do to make it better" "One of the perks to have to having taught to many different grade levels, is that I've been able to kind of experiment with different strategies for my little ones" "Trial and error and reaching out to their actual classroom teachers and finding out what's working in their classroom. And staff developments, all that kind of stuff, reached out to you guys. Reach out to the PE peeps, finding out what's going on!"
	Other professionals in the school	"A lot of it is trial and error, I have been teaching 25 years so a lot of it is trial and error. But I also like to lean on their teachers a little bit, their regular sped teachers, like, 'how did how did they react to this? what do you think about that?'. I'll bounce an idea off of them and see what they think" "One of the things that I work really hard to do is to work with our speech and language practitioners, physical therapist, PTs, and get some guidance from them" "When you're sitting with the same kids for six hours, you're going to learn a lot more than me in 45 minutes" "Our SLPs spend a tremendous amount of time providing us input as to what would best help our students as well" "Communication with the other people that work with them, the aids, the physical therapists that come, and the OT's who deal with the more physical part of it"
	Continued professional development	"I've learned a lot with just watching and observing other people teach. You know when you go to conventions you pick up things and ideas and the latest and the greatest or maybe some piece of technology or whatever. But just

	being in the trenches, at work, being there with the teachers, figuring things out and stuff"
	"I was very, very fortunate through UVA's master's program with Martin Block, to be able to learn a lot of modifications and really dig down deep"
	"A lot of the things that I've done, I've come up with or seen, I've also seen at professional conferences and workshops and through professional networking and social media"
	"Going to conferences and attending as many sessions as I can before I need to learn the information. Not going 'oh my god I have a student in my class I don't know how to help'. I need to go to a conference session like trying to get those out of the way ahead of time so I had that background knowledge has been tremendously helpful as well"
	"Always getting that professional development for myself"

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