EDUCATORS' UNDERSTANDING OF DYSLEXIA: A SURVEY EXPLORING THE NEED FOR PROFESSIONAL DEVELOPMENT IN THE AREAS OF PREVENTION AND INTERVENTION

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APPROVAL OF THE DISSERTATION

This dissertation, "Educators' Understanding of Dyslexia: A Survey Exploring the Need for Professional Development in the Areas of Prevention and Intervention," has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Education.

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This capstone project is dedicated to
my mother, Jean Floyd,
and my grandmother, Dot Moore.
This project is also dedicated to
the memory of my father, Henry Floyd,
and to my grandfather, Ralph Moore, Sr.
Without your love and support, this journey would not have been possible.

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ABSTRACT

Dyslexia currently affects up to 20% of the population and 80-90% of all students identified with a specific learning disability are dyslexic (American Academy of Pediatrics, 2009; Fletcher, Lyon, Fuchs, & Barnes, 2007; Hudson, High, & Al Otaiba, 2007; International Dyslexia Association, 2016 Vellutino, Fletcher, Snowling, & Scanlon, 2004). Due to the prevalence of dyslexia, educators must demonstrate an appropriate level of knowledge of this subject in order to identify and support the dyslexic readers in their schools and classrooms. Although the available research base is limited, recent studies indicate that many educators lack knowledge of the dyslexia construct (Wadlington & Wadlington, 2005; Washburn, Joshi, & Binks-Cantrell, 2011). Specifically, educators are unable to provide accurate definitions of dyslexia, do not recognize key characteristics of the dyslexia construct, and continue to embrace many common misconceptions about dyslexia that have been rejected by empirical studies, which appears to demonstrate a division between research and practice. This study explores the dyslexia knowledge of K-5 educators in one school district in Virginia through the lens of the ecological systems model. Elementary educators in the Spring Valley[1] division participated in a division-wide survey that evaluated their knowledge of dyslexia. The results from this study suggest that many educators in the district lack essential knowledge regarding dyslexia and endorse misconceptions about dyslexia that will affect their ability to identify and support dyslexic readers. The implications of this deficiency in knowledge are explored and suggestions for professional development are provided.

Keywords: dyslexia, educator knowledge, survey, ecological systems model, professional development

[1] Spring Valley is the pseudonym for the school district in this study.

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CHAPTER ONE

INTRODUCTION

Dyslexia is a specific learning disability that may affect up to 20% of the population, although specific numbers vary (International Dyslexia Association, 2016; Vellutino, Fletcher, Snowling, & Scanlon, 2004). Currently, between 80%-90% of students identified with a learning disability exhibit characteristics of dyslexia (American Academy of Pediatrics, 2009; Fletcher, Lyon, Fuchs, & Barnes, 2007; Hudson, High, & Al Otaiba, 2007; International Dyslexia Association, 2016). Defined as a language-based phonological processing disorder with a neurological source by the International Dyslexia Association (IDA) (2016), dyslexic readers demonstrate weak word recognition, decoding, and spelling skills as a result of the phonological deficits even when provided with appropriate classroom instruction.

Dyslexia has attracted a substantial amount of attention from physicians, educators, and parents during the last century. As a result, several theories regarding the sources of reading disabilities were generated during this period (Anderson & Meier-Hedde, 2001; Hudson et al., 2007; Orton, 1999; Pickle, 1998; Richardson, 1992). Although the evolution of those theories eventually resulted in the development of stronger, more accurate conceptualizations of dyslexia, misconceptions rooted in early theoretical positions still exist (Hudson et al., 2007). Therefore, it is necessary to consider whether educators are aware of these developments, as well as to determine if current knowledge is reflected in teachers' daily instructional practices.

Statement of the Problem

In order to provide dyslexic students with an appropriate level of support, educators must possess accurate knowledge about dyslexia. Educators need to recognize that dyslexia is a language-based disorder resulting in phonological processing deficits that affect word

recognition and spelling. Educators should also be familiar with the methods used to diagnose dyslexia and be aware of the limitations of commonly used methods for the identification of dyslexic readers. Furthermore, educators should not subscribe to common misconceptions about dyslexia, including assumptions that letter and word reversals are indicative of dyslexia or that dyslexic readers have visual perception deficits; the acceptance of such misconceptions has serious consequences for dyslexic readers (Hudson et al., 2007; Washburn, Joshi, & Binks-Cantrell, 2011). Recent findings, however, suggest that educators do not have adequate knowledge regarding dyslexia. Both pre-service and in-service teachers demonstrated inadequate knowledge about dyslexia, possessed inaccurate information, and embraced common misconceptions about dyslexia (Ness & Southall, 2010; Wadlington & Wadlington, 2005; Washburn et al., 2011).

Parents and legislators in one mid-Atlantic state have demonstrated an increased level of awareness regarding dyslexia in the past five years and have focused their attention on the ability of educators to identify and provide interventions for dyslexic readers. Based on the prevailing views promoted by both groups, there appears to be consensus that educators are not appropriately prepared to assist dyslexic readers. In truth, however, the assumptions that educators need additional support have not been validated. This study will evaluate the knowledge of a specific group of educators to determine what knowledge they currently possess about dyslexia, as well as to identify areas where additional support may be required. The methods used by educators to determine if a student is dyslexic and the techniques used to support students with dyslexia will be documented. This study will also determine how educators currently obtain information about dyslexia. Additionally, educators will be

encouraged to identify their specific needs for dyslexia-related professional development. Recommendations regarding professional development for these educators will then follow.

Increased Attention Focused On Dyslexia

An increasing amount of attention has been directed at the subject of dyslexia during the past five years. In particular, dyslexia attracted attention from parents, state legislators, and the Department of Education. Parent-oriented organizations such as Decoding Dyslexia and the state's Parent Teacher Organization (PTA) have both played a significant role in publicizing dyslexia. Not only have organizations like Decoding Dyslexia and the state PTA focused attention on the topic of dyslexia, but they have also encouraged parent advocacy, particularly for specific legislation. In addition, recent endeavors in the state legislature have featured dyslexia-focused legislation. The actions of the parent groups and state legislators represent a combination of efforts to recognize and promote dyslexia in the state.

Decoding Dyslexia

Decoding Dyslexia is a parent-centered organization that combines the promotion of dyslexia awareness with legislative advocacy. Active since 2013, the state affiliate includes is a self-described "grassroots movement of parents" (Decoding Dyslexia Virginia, 2016c) with approximately 800 members and provides an extensive website that includes a variety of resources. The organization provides a definition of dyslexia on its website that recognizes dyslexia as a specific learning disability and recognizes the neurobiological aspects of dyslexia. In addition, the definition endorsed by Decoding Dyslexia acknowledges that dyslexic readers demonstrate problems with word recognition, decoding, and spelling and is related to phonological deficits. This definition of dyslexia also includes recognition of the unexpected nature of the reading disability and notes that the disability is present even when appropriate

instruction has been provided. The definition explains that other reading difficulties, such as comprehension deficits, may result. Decoding Dyslexia cites the International Dyslexia Association (IDA) Board of Directors at the end of their definition and points out that the National Institute of Child Health and Human Development (NICHD) also employs the same definition of dyslexia.

The Decoding Dyslexia website provides links to talking points and advocacy packets are provided for parents who want to share the organization's message. In particular, these materials appear to be directed at engaging with legislators, although the group also recommends sharing the materials with educators and other parents. Legislative information is shared and initiatives supported by the organization are highlighted on the website. For example, initiatives endorsed by Decoding Dyslexia encourages screening for students, professional development for educators, increased availability to assistive technology (e.g., audiobooks), and the use of programs that represent the available research base. The group also sponsored a Dyslexia Advocacy Day in 2014 and 2015, during which supporters are encouraged to connect with legislators in the state legislature to encourage legislators to consider dyslexia-related legislation. Additionally, Decoding Dyslexia provides information for navigating the Child Study process and includes links to a variety of resources. Links include county-specific materials, a webinar led by Susan Barton, the developer of the *Barton Reading and Spelling System,* and a document addressing the importance of fidelity.

The Decoding Dyslexia organization conveys a consistent message that has attracted the attention of legislators who have sponsored several bills that reflect the goals of Decoding Dyslexia. For example, during the 2015 legislative session, members of Decoding Dyslexia

lobbied for passage of a bill to require professional development with an emphasis on increasing teachers' knowledge of dyslexia.

The Parent Teacher Association

One affiliate of the National Parent Teacher Association (PTA) located in this mid-Atlantic state passed a resolution at their 2015 conference that specifically addressed dyslexia. This resolution signifies the first time that this organization addressed the topic of dyslexia and represents a prominent part of the organization's agenda. Although the provenance of the definition of dyslexia used by the state affiliate when drafting the resolution was not provided, several statements contained elements of the International Dyslexia Association's (IDA) definition (International Dyslexia Association, 2002). For example, the PTA resolution acknowledged dyslexia as a type of specific learning disability and recognized the existence of deficits in the ability to process language, both of which are components of the IDA definition. The resolution presented by the PTA also acknowledged the neurological foundation of dyslexia, another key element of the IDA definition. Screening for dyslexia, dyslexia-specific professional development for educators, and the for dyslexic students were also endorsed by the PTA. These recommendations closely resemble the objectives promoted by Decoding Dyslexia.

The actions of these organizations reflect both an increased awareness of dyslexia and an expanded level of involvement by parents. The endeavors of Decoding Dyslexia and the PTA also indicate that parents have educated themselves about dyslexia and are willing to use that knowledge to precipitate change for their children. The advocacy of these parent groups is already having an effect on policy at the state level.

Dyslexia and the State Department of Education

In recent years, dyslexia has received increased recognition at the state level. The state Board of Education formally recognized dyslexia in the state's definition of a specific learning disability in July 2009, and provided a specific definition of dyslexia that was included in the state's Administrative Code (8VAC20-671-10). The Board of Education's definition of dyslexia not only acknowledged the presence of phonologically-based deficits in reading disabled students, but also recognized the neurobiological aspects of dyslexia. In addition, this definition affirmed that weak word recognition, decoding, and spelling are demonstrated by dyslexic readers and established that the deficits exhibited by dyslexic readers are not expected based on cognitive skills. Furthermore, the definition provided by the Board of Education suggested that comprehension can also be impacted as a result of dyslexia (8VAC20-81-10; 34 CFR 300.8 (c) [10]). The recognition of dyslexia as a specific learning disability was important because it represented the first time that dyslexia was directly recognized in the state. The inclusion of this definition of dyslexia was also significant because it reflected the International Dyslexia Association's definition of dyslexia (Lyon, Shaywitz, & Shaywitz, 2003). In addition, the definition recognized by the state Department of Education was shared with both educators and parents in a publication that identified the regulations and provided guidelines for supporting students with learning disabilities. As a result, educators and parents had access to the state's definition of dyslexia.

The state's Department of Education also developed a pilot program directed at the use of multi-sensory instruction to support dyslexic readers, which included professional development for teachers in the Orton-Gillingham approach, instructional materials, and a stipend for participants. Teachers in kindergarten through sixth grade were invited to apply to participate in

the program and the Department of Education anticipated selecting 80 teachers to participate in the program, projected for implementation during the 2015-2016 school year. This program represents an effort on the part of the state's Department of Education to prepare teachers to work with dyslexic students and reflects recommendations made by Decoding Dyslexia and the PTA regarding the use of programs such as Orton-Gillingham as an appropriate intervention for these students.

Dyslexia and the State Legislature

Efforts have been made to address the topic of dyslexia in the state legislature and as a result, the past five years have been characterized by increased legislative endeavors that emphasize dyslexia. In some cases, legislation has been introduced in the multiple times and some of this legislation reflected personal experiences with dyslexia. Support for legislation pertaining to dyslexia has not been the result of partisan views; both Republican and Democratic legislators have introduced and supported dyslexia legislation. Some of this legislation was stimulated by personal experiences. For example, one state senator cited her father's dyslexia as a factor that motivated her interest in developing legislation related to dyslexia (Fain, 2015).

In 2010, legislation was introduced that directed the state's Department of Education to evaluate the viability of statewide dyslexia screening for all kindergarten students and to identify appropriate tools for conducting such screenings (S. 87, 2010). Both the House of Delegates and the State Senate passed the bill, which became known as Senate Joint Resolution No. 87 (2010), with a unanimous vote. The text of the final resolution not only specified the requirements for the DOE study, but also included language that noted the need to provide intervention as early as possible (S. 87, 2010). The Superintendent of Public Instruction for the state presented results from the study mandated by this resolution to the governor in January

2011. The study's findings indicated that dyslexia screening was not viable since a valid, reliable tool did not exist and overall evidence did not support dyslexia screening. As a result, the committee did not recommend dyslexia screening in kindergarten. Instead, the committee cited use of the Phonological Awareness Literacy Screening-Kindergarten (PALS-K) tool in use as a component of the state's Early Intervention Reading Initiative and endorsed the continued use of PALS-K to identify at-risk students.

Although findings from the 2011 study rejected the viability of universal dyslexia screening in the state, legislative efforts continued to advocate implementation. Three years later, House Bill No. 961, another proposal requiring universal dyslexia screening, was introduced in the state legislature by Delegate Kory (Democrat, 38th District). However, Senate Joint Resolution No. 87 (2010) focused only on dyslexia screening for kindergarten students while Delegate Kory's bill called for the screening of students in kindergarten through sixth grade and would be guided by recommendations from the Department of Education. In addition, "related disorders" were also included in House Bill No. 961 (2014), which differed from Senate Joint Resolution No. 87 (2010) and were described as "disorders similar to dyslexia" and included "developmental auditory imperception, dysgraphia, specific developmental dyslexia, developmental dysgraphia, and developmental spelling disability" (H. 961, 2014). House Bill No. 961 (2014) also differed from the 2010 resolution because it provided a brief definition of dyslexia. Although the definition recognized that dyslexia impacted children's ability not only in reading, but also in writing and spelling, the phonological and neurological aspects of the disorder were not specifically acknowledged in the bill. Instead, House Bill 961 only stated that dyslexia was "a disorder of constitutional origin" (H. 961, 2014). Additionally, HB 961 (2014) endorsed use of the IQ-discrepancy model, a method used to identify dyslexic readers that

requires the presence of a discrepancy between scores on IQ and achievement tests. HB 961 (2014) indicated that dyslexia is "manifested through a discrepancy between ability and achievement in learning to read, write, or spell" (H. 961, 2014). However, the use of IQ-discrepancy models to diagnose dyslexia has been rejected by recent research. One of the primary issues with the IQ-discrepancy model is the assumption that disabled readers with discrepant scores differ significantly from disabled readers without a discrepancy in their scores, which has been disproven (Siegel, 1988; Vellutino et al., 1996; Vellutino et al., 2004). Instead, *response-to-intervention (RtI) models* that emphasize the identification of students through methods that consider the instruction provided and evaluate the child's response to appropriate interventions represent a superior alternative to the IQ-discrepancy model (Gresham & Vellutino, 2010; Stanovich & Siegel, 1994; Vellutino et al., 1996). See Table 1 for a further comparison of the IQ-discrepancy and response-to-intervention models.

Although House Bill 961 (2014) did not progress past the Education committee in the lower chamber of the state legislature, it represents another example of an attempt to promote legislation directed at establishing statewide policy pertaining to the identification and intervention of dyslexic students. The endorsement of the IQ-discrepancy model in HB 961 (2014) is of concern, though, because legislation should not reflect empirically invalidated practices.

Table 1

A Comparison of the Response to Intervention Framework and the IQ-Discrepancy Model

	Response to Intervention	IQ-Discrepancy Model
Characteristics	Requires identification of the child's response to intervention and differentiates between children who respond to intervention and those who do not	Requires discrepancy between IQ and achievement test scores for identification and services
	Considers child's educational history and recognizes that deficits can result from ineffective instruction and experiences	Does not account for previous educational experiences
	The child's lack of achievement achievement is unexpected	The child's lack of achievement is unexpected
	Provides a plan for intervention, which are provided in addition to regular classroom instruction	Does not prescribe interventions to be used to address deficits
	Can be implemented early (e.g., preschool, kindergarten)	Often a lengthy process
	Universal screening of all students	No universal screening
	Routine progress-monitoring	No routine progress monitoring
	Focuses on prevention	Does not predict achievement or response to intervention

Two bills were introduced in the state legislature in January 2015 that proposed to amend §22.1-298.1 with a requirement that teachers participate in professional development focused on dyslexia for initial licensure and re-certification. The state senator who introduced the legislation (S. 87, 2010) that resulted in the 2010 study of dyslexia screening by the Department of Education was the chief patron on the bill introduced in the State Senate on January 21, 2015, while the Republican Delegate of the 24th District in the House of Delegates introduced the second bill on January 23, 2015. Although both bills proposed professional development dedicated specifically to dyslexia, they differed slightly. For example, House Bill 2374 (2015) included a statement that required use of the definition of dyslexia provided by the Board of Education, but also noted that the professional development activities should reflect the available research base. The latter also included a statement regarding teacher preparation that directed the Department of Education and the State Council of Higher Education to work in cooperation to guarantee that teacher education programs adequately addressed dyslexia (H. 2374, 2015). The Senate's bill did specify that the professional development activities should include "the screening, intervention, accommodation, and use of technology for students with reading disabilities, including dyslexia," (S. 1386, 2015) but did not include a statement addressing the Board of Education's definition of dyslexia and did not require coordination between the Board of Education and the State Council of Higher Education to guarantee that teacher preparation programs include components that emphasize dyslexia.

During the 2015 session of the state legislature, neither Senate Bill. 1386 (2015) nor House Bill 2374 (2015) became law. However, at the beginning of the 2016 session, the same Delegate who the previous house bill introduced House Bill 842, which mirrored House Bill 2374 from the 2015 session. The bill had considerable support from the state's Decoding

Dyslexia organization, which encouraged parents to lobby their legislators for passage of this legislation. House Bill 842 passed with a 99-0 vote in the House of Delegates on February 16, 2016. The Senate passed the legislation (38-1), but included an amendment that was rejected by the House of Delegates. A committee consisting of members of both the House and Senate amended the bill, which was then passed by both houses. The governor signed the bill into law on April 1, 2016, and it will go into effect on July 1, 2017.

During the 2016 session of the state legislature, another State Senator (Republican, 13th District) also introduced legislation with a focus on dyslexia. Senate Bill 759 (2016) proposed an addition to § 22.1-253.13:2 mandating that "local school boards shall employ one full-time equivalent advisor on dyslexia and related disorders. Such advisor shall specialize in the identification of and the appropriate interventions, accommodations, and teaching techniques for students with dyslexia or a related disorder." Senate Bill 759 was referred to the Committee on Education and Health before assignment to the Public Education subcommittee in February 2016, before being consigned to the 2017 session.

The actions of parent groups and the state legislature reflect an increased interest in dyslexia. The call for increased screenings for dyslexia is a common theme that links the parent and legislative actions, as is the petition for increased professional development opportunities for educators. Based on the actions of the past five years, continued efforts to pass dyslexia-oriented legislation are anticipated.

Conceptual Framework

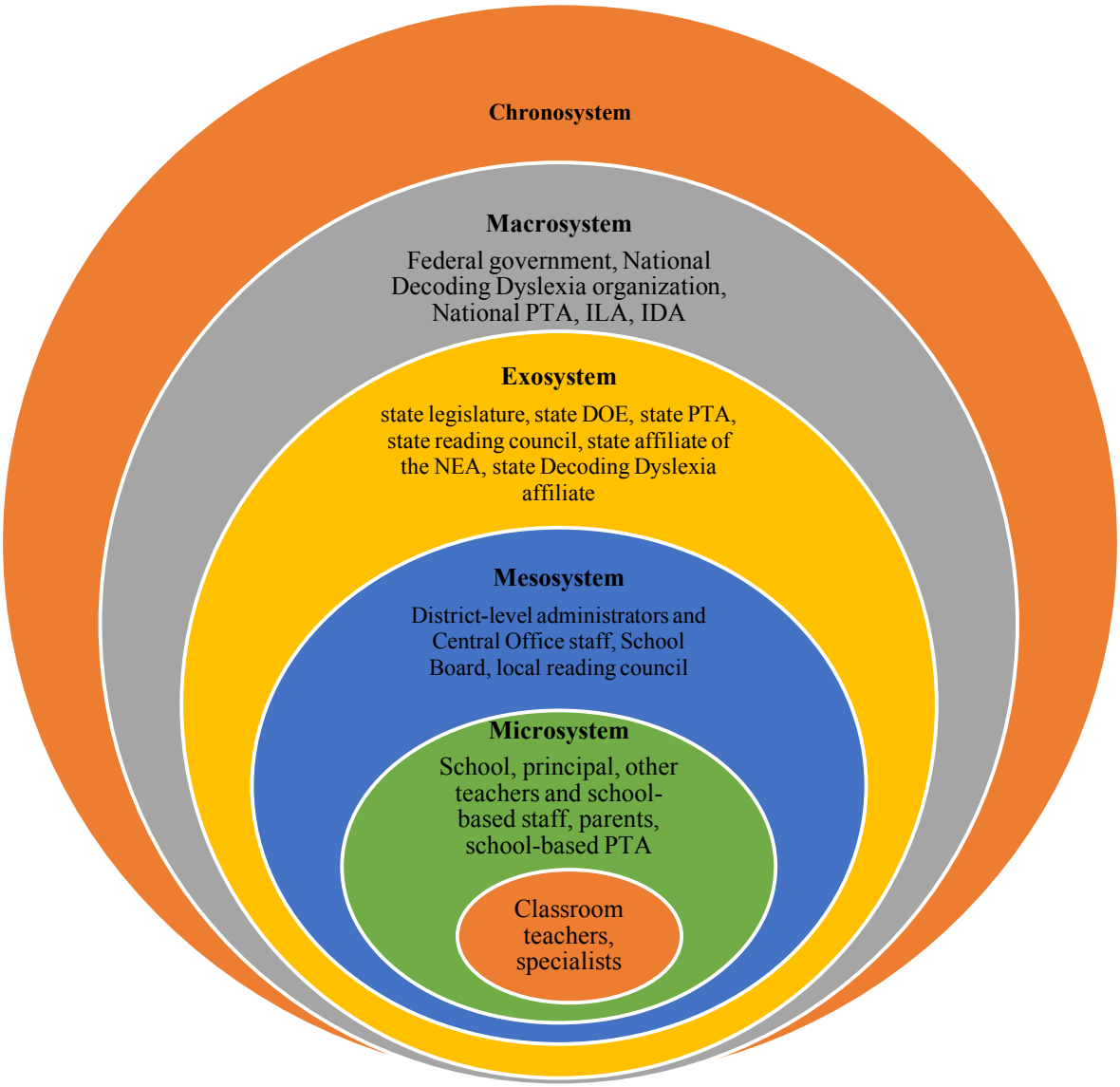
Since teacher knowledge and instructional practices (as related to dyslexia) are a focus of this study, it is necessary to consider and evaluate influential aspects of a teacher's environment. While teacher-specific factors will be targeted in this study, the influence of other elements

should also be explored. Additional elements that will be include administrative knowledge and leadership, support at the school and district levels, and policies and procedures implemented at both levels. Legislative actions at the state and national levels affect teachers and also need to be evaluated. In addition, as parent groups such as Decoding Dyslexia increase their advocacy for specific education policies, their influence and effect on teachers should also be explored.

The *ecological systems model* (Bronfenbrenner, 1976a, 1976b, 1977, 1979, 1989, 1994) was adapted as a conceptual framework for this study because it supports the exploration of the factors and environments that both directly and indirectly affect teachers. The ecological systems model is represented by a series of concentric circles with an individual located in the center (Bronfenbrenner 1976a, 1976b, 1977, 1979). Within the context of this study, classroom teachers, reading specialists, and special education teachers are represented in the center of the model. Each circle that radiates from the center includes an element of the environment and as the circles progressively move outward, a person becomes less directly involved in that environment. Even though the individual's direct involvement decreases, however, the influence of the environment remains substantial (Bronfenbrenner, 1976a, 1976b, 1977, 1979, 1989, 1994, 1998). Bronfenbrenner identified the individual circles as the *microsystem*, the *mesosystem*, the *exosystem*, the *macrosystem*, and the *chronosystem*. Figure 1 illustrates the influences on educator knowledge as indicated by the ecological systems model.

Figure 1

Influences on educator knowledge according to the ecological systems model.



The microsystem is the circle closest to the individual and includes direct interactions with the individual (Bronfenbrenner, 1976a, 1976b, 1977, 1979, 1989, 1994). For the purposes of this study, the microsystem is centered on the individual teacher's school and includes administrators at the school level, other teachers and staff (e.g., instructional assistants), students,

and parents. Interactions between the individual teacher and the microsystem can be considered within the context of this model.

District-level administrators and central office staff (e.g., curriculum specialists, director of special education), as well as the county school board, operate within the mesosystem, which is the next level of the ecological systems model. The mesosystem encompasses both the microsystem and the individual and emphasizes "the linkages and processes taking place between two or more settings containing the developing person" (e.g., the teacher) (Bronfenbrenner, 1994). For teachers who are members, the Meadowview Reading Council (MRC) and the Spring Valley Education Association (SVEA) represent two local professional organizations that operate within the context of the mesosystem. The Meadowview Reading Council is the local affiliate of the state reading association and the Spring Valley Education Association is the local chapter of the National Education Association. Teachers have the opportunity to directly interact with these organizations, which provide additional professional opportunities through networking and locally based "mini-conferences."

As the circles continue to move outward, the exosystem is the next level of this conceptual model and emphasizes fewer direct interactions with individual teachers. Although actions involving the exosystem affect teachers, teachers are usually not involved in the functions of this level. The state legislature and the state's Department of Education are two primary elements of the exosystem for this study because although they establish legislation and mandate curriculum, teachers at the individual level typically are not a part of these processes. State affiliates of parent organizations, such as Decoding Dyslexia and the Parent Teacher Association are also located within a teacher's exosystem. Although teachers are not usually involved in either of these organizations, the actions of both groups are becoming more

influential over time, particularly as they increase their lobbying efforts for specific education-focused legislation.

Professional organizations at the state level are also included in the exosystem. While teachers have the opportunity to participate in leadership roles at the state level, that involvement is usually limited to a specific set of positions that require either election or appointment (e.g., President, Vice President, committee chairpersons). As a result, most teachers who belong to these organizations participate indirectly through conference attendance and reading newsletters and journals published by the organizations. The professional organizations at the state level often appear to focus on the dissemination of information to members, providing professional development opportunities, and legislative advocacy. In Spring Valley, for example, only one teacher currently participates as a committee chairperson with the state reading association, although eight teachers from the district joined during the 2015-2016 school year. Similarly, only a few teachers are directly involved with the state affiliate of the National Education Association (Name withheld for confidentiality, personal communication, February 29, 2016).

The macrosystem represents the next component of the ecological systems model. According to Bronfenbrenner (1976a), "macrosystems are the overarching institutions of the culture or subculture, such as the economic, social, educational, legal, and political systems, of which local micro-, meso-, and exo-systems are the concrete manifestation" (p. 12a). He suggested that these institutions not only provide access to information, but also share and reinforce ideological concepts that influence both the individual and his environments. Bronfenbrenner (1976a, 1976b, 1977, 1979) also recognized that many ideological concepts were not always explicitly articulated within the macrosystem, but instead represented tacit assumptions that were a part of the overall culture.

Within the context of this study, the federal government, including the Department of Education, is a central part of the macrosystem. National organizations for educators, such as the International Literacy Association and the National Education Association, are also elements of the macrosystem. Other components of the macrosystem incorporate the national Decoding Dyslexia and Parent Teacher Associations. In addition, beliefs and attitudes regarding the education of children and assumptions about teacher knowledge and practice are identified as elements of the macrosystem. While the beliefs incorporated into a macrosystem can be unambiguous, "most macrosystems are informal and implicit---carried, often unwittingly, in the minds of the society's members as ideology made manifest through custom and practice in everyday life" (Bronfenbrenner, 1977, p. 515). Furthermore, current conceptualizations and misconceptions regarding the dyslexia construct will be considered as a part of the overall macrosystem since these ideas hold substantial influence over how teachers, administrators, parents, and legislators address the topic of dyslexia.

The final element of the ecological systems model, the chronosystem, was not initially included in the original conceptualization proposed by Bronfenbrenner in the 1970s, but was later added to address the element of time (Bronfenbrenner, 1994). The chronosystem in the model for this study includes the influence of time on individual teachers. Experiences over time can alter a teacher's instructional beliefs and approaches. For example, the process of obtaining a graduate degree can affect teachers, as this typically occurs over an extended period. Beginning teachers can also evolve over time as they accrue experiences in the classroom. Teachers are influenced by changes in employment; multiple years in the same school might affect teachers differently when compared to colleagues who have changed schools over the course of their careers. In addition, the passage of time often includes an evolution in the

decisions made by the government that directly affect teachers. For example, the increased emphasis on the subject of dyslexia by the state legislature and the Department of Education over the past five years represents another example of the influence of the chronosystem. Furthermore, since ideas and theories change over time, the inclusion of the chronosystem is essential in order to evaluate those changes. Over the past one hundred years, the chronosystem in this study reflects a significant theoretical evolution in the understanding of dyslexia. This study will determine if educators' knowledge of dyslexia reflects this theoretical evolution. Therefore, consideration of the role of the chronosystem in the ecological systems model will enhance our understanding of what educators know about dyslexia.

Bronfenbrenner's ecological systems model provides a framework in which the multiple levels of influence on educator knowledge can be considered and evaluated. This model not only recognizes that specific individuals and groups shape educators, but it also affirms the role of the environment as an essential part of the development of educators' pedagogical knowledge. In addition, the inclusion of time in Bronfenbrenner's model confirms that education research is not static, but constantly changing and evolving as theories are developed and evaluated.

Research Objectives

This study proposes an in-depth exploration of teacher knowledge of dyslexia with an emphasis on elementary school teachers in the Spring Valley school system. Spring Valley is a small, rural district in a mid-Atlantic state that has four elementary schools, one middle school, and one high school serving approximately three thousand students. Division-wide, 90% of students are Caucasian, three percent are African-American, and four percent are Hispanic. One percent of students in Spring Valley are Asian, three percent represent more than two races, and less than one percent of all students are identified as American Indians. Approximately 43% of

the students in Spring Valley are eligible for free or reduced lunch, which is often used as an indicator of economic disadvantage.

This topic needs to be examined given legislation currently under consideration in the state, actions made by the state's Department of Education, and the increased advocacy of parent groups such as Decoding Dyslexia. During the past five years, members of the state legislature introduced several bills that specifically addressed dyslexia. In particular, recent legislative efforts have focused on mandating that teachers participate in professional development activities directed at identifying and supporting dyslexic readers. The state Department of Education also formally recognized dyslexia as a specific learning disability and accepted the International Dyslexia Association's definition of dyslexia. In addition, recent actions, such as the creation of a pilot project to promote the use of the Orton-Gillingham program with dyslexic readers, further indicate that discussions about dyslexia are continue to evolve within the state's department of education. Furthermore, as parent groups expand their advocacy efforts, they've appealed for increased professional development for teachers. As attention is now being specifically focused on teacher knowledge and preparation to teach dyslexic readers, it is imperative that decisions are made based on accurate information. While studies of teacher knowledge of dyslexia have been conducted internationally, a systematic study has not been employed in this state. Although this study will focus on only one school division in the state, the results will provide evidence of teacher knowledge and some preliminary answers regarding areas of strength as well as areas of concern that can be addressed in dyslexia-oriented professional development for teachers. The questions addressed in this study will probe for Spring Valley educators' definitions of dyslexia, explore specific knowledge of dyslexia, and investigate the presence of misconceptions about dyslexia. The preparation of participants in this

study will also be appraised and questions will target not only participants' official coursework, but also the more informal learning opportunities that contribute to educators' knowledge. Finally, questions will explore the methods used to identify and support dyslexic readers in the Spring Valley school system. The results can be used to plan professional development opportunities for educators that address specific needs. For example, if a certain group (e.g., classroom teachers) demonstrates a lack of awareness of the characteristics of dyslexia, professional development sessions targeting classroom teachers can focus on that topic. The results of this survey can be used to tailor professional development experiences according to the identified needs in order for a better use of educators' time. Instead of requiring educators to participate in sessions that reflect concepts already known, this study will allow for tailored experiences to be provided to all educators, including administrators.

CHAPTER TWO

REVIEW OF THE LITERATURE

A Historical Perspective

The topic of reading disabilities has been a subject of interest for more than one hundred years, although the term dyslexia was not initially used to describe reading disabilities. A relationship between reading and the brain was first recognized in the seventeenth century when Johannes Schmidt observed a patient who was unable to read following a stroke (Anderson & Meier-Hedde, 2001; Campbell, 2011). Later, many physicians initially regarded reading disabilities as a form of *aphasia* (Anderson & Meier-Hedde, 2001; Campbell, 2011; Richardson, 1992;). While the literal meaning of aphasia is "the loss of speech," nineteenth century physicians frequently used the term to describe "all losses in the use of language, including reading and writing" (Richardson, 1992, p. 40).

A significant amount of brain research conducted throughout the nineteenth and early twentieth centuries provided additional knowledge about the areas of the brain and their specific functions (Pickle, 1998). During this period, several physicians (e.g., Kussmaul, Hinshelwood, and Morgan), many of whom were ophthalmologists, evaluated patients with both acquired and congenital reading disabilities and explored the causes of these deficits, providing attempts to explain why their patients couldn't read (Anderson & Meier-Hedde, 2001; Campbell, 2011; Pickle, 1998). The attention from the medical community in the late nineteenth and twentieth centuries provided a foundation upon which the study of reading disabilities was established (Anderson & Meier-Hedde, 2001; Campbell, 2011; Pickle, 1998; Richardson, 1992).

Word Blindness: Another Term for Reading Disabilities

Before dyslexia was used as a term to designate disabled readers, the phrase *word blindness* was employed to describe people who were unable to read. First attributed to Kussmaul in 1877, word blind readers could not recognize letters and words, although their vision was unimpaired (Anderson & Meier-Hedde, 2001; Hinshelwood, 1900). Initially, physicians in the late nineteenth century focused their attention on *acquired word blindness,* which occurred when the ability to read was lost suddenly and without warning (Anderson & Meier-Hedde, 2001; Richardson, 1992). Sometimes, acquired word blindness resulted from a brain injury (e.g., stroke), but specific causes were not always identified.

Later, the concept of word blindness was expanded to include *congenital word blindness,* which was characterized by a profound difficulty in literacy acquisition. Although people who demonstrated acquired word blindness were able to read at one time, those identified with congenital word blindness struggled to demonstrate basic literacy skills and their progress in reading was minimal. The use of the term "congenital" acknowledged that this form of word blindness was not acquired as a result of injury to the brain, but instead reflected a condition that reflected an abnormality in fetal brain development and existed from birth (Campbell, 2011; Hinshelwood, 1911; Morgan, 1896). Morgan (1896) published a case study of a fourteen-year-old patient, Percy, who characterized congenital word blindness. Morgan noted that Percy demonstrated significant weaknesses in reading even though he had adequate intelligence and many educational opportunities. Morgan suggested that Percy's difficulty in reading was the result of an inability for "preserving and storing up the visual impression produced by words" (p. 1378).

Hinshelwood (1900, 1904, 1911) provided additional examples of congenital word blindness and identified specific areas of the brain that he believed were related to the condition. He suggested that the left angular gyrus, an area of the brain associated with the processing of auditory and visual input and the comprehension of language, was abnormal in readers with congenital word blindness. As a result, Hinshelwood (1904) hypothesized that readers had to compensate for this abnormality by relying on the right angular gyrus to maintain words' visual memories. Since the right angular gyrus was not meant for this purpose, patients with congenital word blindness struggled to learn letters and words (Hinshelwood, 1904).

Hinshelwood (1911, 1912) also suggested that congenital word blindness was genetic. He cited cases in which several members of a family were struggling readers and noted that recognizing the genetic aspect of congenital word blindness was essential for identifying the origin of the disability (Hinshelwood, 1911). Hinshelwood also indicated the importance of differentiating between disabled readers with congenital word blindness and those with low intelligence and other cognitive deficits because children with congenital word blindness benefitted more from remediation opportunities (Hinshelwood, 1911). In addition, Hinshelwood (1911) emphasized the differentiation of disabled readers according to overall intelligence because he believed that only children with actual congenital word blindness would be able to respond to instruction and make progress in literacy. He indicated that children with low intelligence or neurological deficits would be unable to benefit from any additional training. More than one hundred years later, conversations about intelligence and achievement continue to be prominent in discussions of reading disabilities, despite research rejecting the theory that a discrepancy between intelligence and achievement test scores accurately identify disabled readers.

Most notably, the discussions about congenital word blindness emphasized the idea that reading disabilities were the result of difficulties with visual memory. However, in the past thirty years, deficits in visual memory have been disproven as a factor causing dyslexia (Vellutino, 1987; Vellutino et al., 2004). Instead, theories emphasizing the role of language-based phonological processing deficits have been recognized as the primary cause of dyslexia (Lyon et al., 2003; Siegel, 1998; Vellutino, 1987; Vellutino et al., 2004). However, even though phonological processing deficits have been recognized as the cause of reading disabilities, the idea that visual deficits for words are related to reading disabilities is still referenced more than one hundred years later and represents a common misconception about disabled readers (Snowling, 1996). This example illustrates the role of the chronosystem in the development of educators' knowledge as theories are evaluated, accepted, and sometimes rejected as a result of later research. In addition, this example also demonstrates that once ideas are accepted, they are often difficult to relinquish.

The Influence of Samuel Orton

Even though the word "dyslexia" entered the lexicon of reading disabilities in the late nineteenth century, the term "word blindness" continued to be used during the early twentieth century and influenced further lines of research into reading disabilities. One example of how the research related to word blindness influenced the development of hypotheses can be found in the work of Samuel Orton, a neurologist whose ideas about reading disabilities were dominant through much of the twentieth century.

Orton's interest in reading disabilities was stimulated by Hinshelwood's work on congenital word blindness. Although Orton disagreed with many of the central tenets promoted by Hinshelwood, Hinshelwood's work was a catalyst for Orton's work. For example, Orton

disagreed with Hinshelwood's premise that the label "congenital word blindness" should only be applied to the most severe cases of reading disability. Orton challenged Hinshelwood's assertion and suggested that reading disabilities existed on a continuum according to the severity of the disability "and it is only the occasional child in whom a fair facility in reading is not ultimately achieved and who would therefore fit into Hinshelwood's group" (Orton, 1937/1999, p. 150). Orton also believed that while genetic influences contributing to reading disabilities should be considered, those aspects should not be the only sources explored (Orton, 1937/1999; Schweizer, 1974). Orton (1937/1999) recommended that the consideration of both genetic and environmental factors were necessary in order to accurately diagnose reading disabilities. While Hinshelwood only emphasized the congenital elements inherent in reading disabilities, Orton recognized that the environment made important contributions that should not be overlooked. For example, Orton advised including an assessment of a child's educational history, as well as an analysis of any socio-economic factors that contributed to the presence of a reading disability.

Orton also disagreed with Hinshelwood's hypothesis about the neurological foundation of congenital word blindness, which centered on the cortex and its role in the preservation of the visual memory of words. Instead, Orton emphasized the role of *cerebral dominance* to explain the neurological aspect of reading disabilities (Anderson & Meier-Hedde, 2001; Orton, 1999; Schweizer, 1974). According to Orton (1937/1999), one hemisphere of the brain usually assumed dominance over language and reading with reading and writing skills derived from *engrams* maintained in the dominant hemisphere. Engrams are the memories recorded in the brain that are used by the dominant hemisphere and perform an essential role during the process of reading and writing. Orton proposed that although the non-dominant hemisphere also contained engrams, those engrams either remained dormant or were suppressed in favor of the

engrams in the dominant hemisphere, and resulted in normal reading ability. However, in the case of a child with a reading disability, a dominant hemisphere did not develop, which resulted in the availability of engrams from both hemispheres. According to Orton (1937/1999), both sets of engrams were mirror images of each other, which caused significant issues for reading development. Specifically, the lack of a dominant hemisphere meant that both hemispheres attempted to supply the memory traces required for word recognition, creating "errors and confusion in direction and orientation" (Orton, 1937/1999, p. 204). As a result, readers were unable to develop an effective link between the visual and oral aspects of words. Orton used the term *strephosymbolia,* which he defined as "twisted symbols," to describe this phenomenon (Anderson & Meier-Hedde, 2001; Henry, 1998; Orton, 1937/1999; Ritchey & Goeke, 2006). Orton explained that strephosymbolia was characterized by reversals of similar letters and words (e.g., *b* and *d*, *saw* and *was*) and in some cases, children with strephosymbolia also demonstrated mirrored reading and writing. Orton also indicated that although the children he saw struggled to read print traditionally (e.g., from left-to-right), when the mirror image of text was shown to strephosymbolic children, they were able to read this text more readily and with fewer errors (Orton, 1937/1999). Although strephosymbolia has since been rejected in favor of phonological processing deficits as a central cause of reading disabilities, the presence of reversals represents a common misconception about disabled readers. In addition, brain research has evolved considerably since Orton first promoted the concept of strephosymbolia in the early twentieth century. Specifically, developments in neuroimaging have also provided opportunities to observe the brain during literacy-related tasks (Hudson et al., 2007; Shaywitz et al., 2000). These advances illustrate the influence of time as represented by the chronosystem in the

ecological systems model. Over time, theories can either evolve or be rejected as new information emerges.

Although Orton's focus remained on the "confusion, because of reversals, in the memory images of symbols" (Orton, 1937/1999, p. 159), he noted that children with reading disabilities often demonstrated deficiencies in language skills (Orton, 1937/1999). This idea differed from previous theories of reading disabilities but presaged current definitions of dyslexia that characterize reading disabilities as language-based. In addition, Orton's ideas of the role of intelligence in determining the existence of a reading disability mirrored current research repudiating the IQ-discrepancy model as a method for the identification of reading disabilities. Orton (1937/1999) recognized that reading disabilities were "not related to feeble-mindedness and may occur at any intellectual level" (p. 173). With regards to the roles of language and intelligence, Orton was particularly insightful.

Orton (1937/1999) also developed definite ideas regarding how remediation should be provided for reading disabled students. He disagreed with whole word, or sight word, method for teaching reading common in the mid-20th century decades when his methods were developed; this approach minimized the role of phonics for the teaching of reading. Orton and his colleague Anna Gillingham encouraged the use of specific phonics instruction combined with multisensory techniques. Those procedures emphasized the use of visual methods, alongside auditory and kinesthetic techniques. For example, Orton encouraged teachers to have students trace letters as they made the sound of the letter (Orton, 1937/1999). He also endorsed instructional methods that included blending practice and the use of nonwords to build decoding skills. Additionally, Orton suggested the provision of intensive, individual remediation for struggling readers and recommended that remedial practices should supplant the regular classroom work, as he viewed

pursuing that work as unproductive. He indicated that anyone providing instruction needed to have an appropriate level of training.

Orton's conceptualization of remediation was developed into the Orton-Gillingham approach. Anna Gillingham, who worked with Orton, collaborated with Bessie Stillman, a teacher, to develop a practical manual that incorporated Orton's theories into an instructional manual. Orton provided the theoretical foundation while Gillingham and Stillman's contributions reflected the practical aspects of delivering the curriculum (Henry, 1998; Ritchey & Goeke, 2006). Orton required that the curriculum represent his theories with specific requirements for kinesthetic learning opportunities and instruction tailored specifically to student needs (Henry, 1998; Ritchey & Goeke, 2006). The first edition of the Orton-Gillingham manual was published in 1936 with the most recent iteration published in 1997 (Henry, 1998; Ritchey & Goeke, 2006). The manuals provided explicit details and materials in addition to detailed background information that explained the foundation upon which the lessons were designed. Gillingham and Stillman (1956) referenced Orton's theories on cerebral dominance and letter and word reversals as well as his theories regarding reading disabilities and "specific language disability" (Gillingham & Stillman, 1956, p. 16). Detailed instructions were provided for the amount of time required for implementation with lessons occurring on a daily basis and extending for at least two years (Gillingham & Stillman, 1956). Furthermore, Gillingham and Stillman (1956) suggested that no other reading or spelling instruction should happen outside of the remedial program. They proposed that remediation should be provided when the struggling reader's classmates were engaged in their regular literacy block of instruction to avoid any confusion that could develop as a result of participation in those lessons. In addition, Gillingham and Stillman (1956) recommended the early screening of students, particularly

during kindergarten. Such screenings were unusual at that time. Although many of Orton's theories (e.g., strephosymbolia) have been invalidated by more recent research, his influence on remediation practices continues to resonate in current conversations about interventions for dyslexic readers. The Orton-Gillingham approach continues to be used with dyslexic readers; parent groups such as Decoding Dyslexia currently advocate its use. Furthermore, during the 2015-2016 school year, the Department of Education established a pilot project focused on the implementation of the Orton-Gillingham approach with a second pilot program currently planned for the 2016-2017 school year. In addition, a number of programs based on the Orton-Gillingham approach have been developed and are used in a variety of settings. In one district, all first and second grade teachers will be trained in the Orton-Gillingham method.

Many of Orton's ideas about dyslexia continue to be prominent even in the twenty-first century. Even though several of Orton's ideas, including the role of cerebral dominance and the demonstration of letter and word reversals, have been rejected as issues for dyslexic readers, Orton's influence clearly has not diminished (Ritchey & Goeke, 2006; Vellutino, 1987). As a result, Orton's continued popularity illustrates the role of the chronosystem as an influential element in determining educators' knowledge of dyslexia.

Defining Dyslexia (1887-present)

First Use of Dyslexia To Describe Reading Disabilities

Dyslexia was not used to identify disabled readers until 1887 when Dr. Rudolf Berlin, an ophthalmologist in Germany, first employed the term (Anderson & Meier-Hedde, 2001; Campbell, 2011; Richardson, 1992; Wagner, 1973). Although Berlin acknowledged the existence of word blindness, he suggested that the term dyslexia represented a neurological aspect of reading disabilities that also indicated that patients did not demonstrate *alexia*, or a

complete inability to read (Anderson & Meier-Hedde, 2001; Wagner, 1973). Specifically, Berlin suggested that damage to the brain resulted in reading disabilities and he hypothesized that the damage was situated within the left hemisphere of the brain (Hinshelwood, 1900; Wagner, 1973). Although Berlin's patients represent acquired reading disabilities, his use of the term dyslexia to describe those disabilities in development represents a significant milestone not only because Berlin is the first to use the term, but also due to his emphasis on the neurological aspects of reading disabilities.

Defining Dyslexia Prior to 2002

Defining dyslexia has proved challenging. Definitions developed prior to 2002 typically emphasized the application of exclusionary criteria and required demonstration of a discrepancy between IQ and achievement test scores in order to identify the existence of a reading disability, a formula which has been since rejected by many cognitive researchers. Exclusionary criteria included in definitions of dyslexia focused on specifying what dyslexia was not. Exclusionary criteria often included socioeconomic status, intelligence, and cultural factors. Dyslexia was also frequently defined with imprecise terms that had little meaning and were often difficult to measure (Fletcher et al., 2007; Lyon, 1995). For example, the unexpected lack of achievement is frequently identified as a component of definitions of dyslexia although specific criteria were ambiguous. Prior to 2002, definitions of dyslexia also neglected to recognize key characteristics of dyslexia (e.g., phonological processing deficits, neurological origins) even though the relationship between weak phonological skills and dyslexia had already been identified and explained (Vellutino, 1987). Additionally, consideration of past educational experiences was also absent in most of the definitions of dyslexia provided earlier than 2002. As a result, the lack of strong, definitions allowed for many misconceptions about dyslexia to flourish.

Use of the IQ-discrepancy model to define dyslexia. Definitions developed prior to 2002 typically emphasized the application of exclusionary criteria and employed the *IQ-discrepancy model* to identify the existence of a reading disability (Lyon, 1995). This model required the demonstration of discrepant scores on IQ and achievement tests in order to diagnose a reading disability and presumed that discrepant readers identified as dyslexic differed significantly from their *garden-variety* counterparts who lacked discrepant scores due to low IQ scores and demonstrated weaknesses in both decoding and comprehension (Gough & Tunmer, 1986; Lyon, 1995). Application of the IQ-discrepancy model reflected the influence of studies conducted by Rutter and Yule during the 1970s (Fletcher et al., 1994; Gresham & Vellutino, 2010; Vellutino et al., 2000). Rutter and Yule (1975) identified two types of disabled readers: those with "*specific reading retardation (SRR)*" and those who demonstrated "*general reading backwardness (GRR)*" (Rutter & Yule, 1975, p. 181). The primary difference between the two types of readers centered on their performance on IQ and achievement tests. Children with specific reading retardation exhibited IQ scores that differed significantly from their achievement scores while children with general reading backwardness demonstrated both low IQ scores and low achievement scores. Rutter and Yule's descriptions provided the foundation upon which the IQ-discrepancy model was constructed, although later research recognized the weakness of that foundation (Fletcher et al., 1998; Gresham & Vellutino, 2010; Vellutino, et al., 2000).

Use of the IQ-discrepancy model to define dyslexia prevented the accurate identification of children because many reading disabled children did not achieve the required discrepancy between their IQ and achievement test scores (Siegel, 1989). As a result, the requirement of an IQ-achievement discrepancy created a difficult, prolonged process that often resulted in many children not being identified until the upper elementary grades, which created serious issues for

providing timely remediation that often is described as the "wait to fail" model (Fletcher et al., 1998; Fletcher & Lyon, 2008; Fletcher et al., 2007; Lyon et al, 2003; Stanovich, 1991; Vellutino et al., 1996; Vellutino, Fletcher, Snowling, & Scanlon, 2004). In addition, the application of the IQ-discrepancy model did not include any evaluation of children's educational background, which prevented the determination whether past experiences (e.g., poor or missing instruction) were potential sources of deficits (Vellutino et al., 1996; Vellutino, Scanlon, Small, & Fanuele, 2006).

Although the research base indicates that the use of the IQ-discrepancy model is not an appropriate method for identifying dyslexic readers, it continues to be used in many school districts. The Individuals with Disabilities Education Act (2004) continued to include the IQ-discrepancy model as an option for identification purposes, although a provision was made in the law that also allowed states to incorporate response-to-intervention models. The Virginia Department of Education allows school districts to use either the IQ-discrepancy model or the response-to-intervention model (Virginia Department of Education, 2010). Both models are currently used for identification purposes in Spring Valley.

Ambiguous definitions of dyslexia. In addition, previous definitions of dyslexia were often ambiguous and imprecise. Many definitions, particularly those used in state and federal legislation and medical reference materials, subsumed dyslexia under a broad category of specific learning disabilities without being explicitly defined (Lyon, 1995; Youman & Mather, 2013). Weak definitions made it not only difficult to identify disabled readers accurately, but also created challenges for researchers exploring dyslexia who needed to accurately identify potential subjects (Lyon, 1995; Lyon, Shaywitz, & Shaywitz, 2003).

Even medical references sometimes lacked precision when addressing dyslexia. The World Federation of Neurology developed two definitions of dyslexia in 1968, but both lacked substance and the reason for separate definitions is unclear (Critchley, 1968). One definition emphasized "specific developmental dyslexia" while a second definition was only labeled "dyslexia." This definition for "specific developmental dyslexia" noted that the disorder was often "of constitutional origin" but did not explicitly acknowledge neurological factors related to a diagnosis of dyslexia (Critchley, 1968). This definition also indicated that dyslexic children were unable to read even after receiving "conventional instruction," but a clear statement that indicated exactly what was meant by "conventional instruction" was not provided. Similarly, the second definition, which was simply labeled "dyslexia," included a reference to intelligence and educational experiences, but did not cite "constitutional origins" as a source of reading disabilities. Overall, neither definition provided adequate criteria upon which to make a diagnosis of dyslexia.

The *International Statistical Classification of Diseases and Related Health Problems Classification of Mental and Behavioural Disorders* (ICD-10) published by the World Health Organization (1993) is another example of a medical reference with a definition of dyslexia that was lacking in content. The definition included in the ICD-10 did not use the term "dyslexia" when referring to deficits in academic topics. Instead, the ICD-10 used the term "specific reading disorder," and included the IQ-discrepancy model as an acceptable method for identifying disabled readers. The IDC-10 indicated that students needed to achieve at least a 70 on an IQ test as scores lower than 70 would exclude students from consideration. The neurological aspect of reading disabilities was at least recognized in the IDC-10, as was the recognition of the importance of appropriate opportunities for learning. However, the definition

in the IDC-10 does not provide significant guidance when attempting to identify students with reading disabilities and also provides criteria (e.g., the IQ-discrepancy model) that have since been rejected by many researchers in the literacy field (Fletcher et al., 1998; Gresham & Vellutino, 2010; Lyon, 1995; Stanovich, 1991; Vellutino et al., 1996; Vellutino, et al., 2000).

Legislation concerning learning disabilities consistently included dyslexia within the context of the definition of specific learning disability but did not elaborate on exactly what dyslexia represented. The Education For All Handicapped Children Act of 1975, which later evolved into the Individual with Disabilities Education Act (IDEA), is an example of legislation that recognized dyslexia as a specific learning disability, but neglected to define it. This legislation, which has been amended and reauthorized several times in the past forty years, consistently included dyslexia in the definition of specific learning disability, but did not indicate what exactly constituted a diagnosis of dyslexia. Lyon, Shaywitz, and Shaywitz (2003) noted that defining dyslexia solely within the context of a specific learning disability creates a problem because the term specific learning disability can represent a variety of impairments not related to literacy (e.g., mathematics). Although a large percentage of students identified as learning disabled (LD) demonstrate problems with reading, including many different types of learning disabilities under one general label is problematic (Lyon, Shaywitz, & Shaywitz, 2003).

A definition developed in 1994 represented significant progress in presenting a more accurate conceptualization of dyslexia. Language deficits that resulted in phonological processing deficits were identified as causes of dyslexia. The effects of dyslexia on word recognition were recognized and the definition included a reference to the unexpected nature of the disability given "other cognitive and academic abilities" (Lyon et al., 2004).

Although the 1994 definition represented an improvement over earlier definitions, several weaknesses remained (Lyon et al., 2003). For example, the definition from 1994 did not include a statement recognizing the neurological foundation of dyslexia. Instead, this definition only indicated that dyslexia was "a specific language-based disorder of constitutional origin" (Lyon et al., 2003). A significant increase in knowledge of the neurological aspects of dyslexia had developed since 1994, which Lyon et al. (2003) insisted needed to be included in an updated definition. Specifically, Lyon et al. (2003) cited advances in brain imaging that provided an enhanced conceptualization of dyslexic brains, particularly when engaged in tasks involving literacy.

The 1994 definition also neglected to acknowledge the role of classroom instruction. Findings from several studies (Vellutino et al., 1996; Vellutino, Scanlon, & Lyon, 2000; Vellutino et al., 2004; Vellutino, Scanlon, Small, & Fanuele, 2006) indicated that many children are not actually disabled readers, but simply needed adequate instruction in order to be successful. Results from a longitudinal study conducted by Vellutino et al. (1996) concluded that intense intervention could significantly reduce the number of children identified as reading disabled. Vellutino et al. (1996) reported that "we found that the largest percentage (67.1%) of poor readers who received daily one-to-one tutoring scored within the average or above-average ranges on standardized tests of reading achievement after only one school semester of tutoring" (p. 629). In addition, only 1.5% of students initially identified as "poor readers" were unable to make a substantial amount of progress following one semester of intervention. Based on these findings, instruction clearly has an effect on determining whether or not students are truly disabled readers. Therefore, the absence of an evaluation of the quality of previous instructional opportunities in definitions of dyslexia prior to 2002 was a serious issue (Lyon et al., 2003).

A Current Definition of Dyslexia

A definition of dyslexia widely accepted in the research community and used by a number of organizations (e.g., International Dyslexia Association) since late 2002 addressed the problems inherent in past definitions and represents significant advances made in the identification of key elements of dyslexia. Developed by a committee of prominent literacy researchers and adopted by the International Dyslexia Association in November 2002, this definition refined the 1994 definition and reinforced certain concepts, such as the fundamental role of phonological processing skills (Lyon, Shaywitz, & Shaywitz, 2003). The neurobiological elements of dyslexia were explicitly identified in the 2002 definition, reflecting increased knowledge in this area. For the first time, the quality of instruction provided prior to the diagnosis of a reading disability was also emphasized in a definition of dyslexia. Previous definitions of dyslexia did not acknowledge that poor instructional practices could impede literacy development and thus cause children to appear as though they were reading disabled (Clay, 1987; Lyon et al., 2003; Fletcher et al., 2007; Fletcher & Lyon, 2008; Vellutino et al., 1996). The 2002 definition of dyslexia reflected the advances made during the past 30 years and demonstrated increased precision in describing the characteristics of this multidimensional construct (Lyon et al., 2003; Fletcher et al., 2007; Fletcher & Lyon, 2008).

Recent Policies That Reflect Current Definitions of Dyslexia

The International Literacy Association (ILA), previously known as the International Reading Association (IRA), published a Research Advisory in 2016 that addressed the topic of dyslexia. A panel of experts with extensive backgrounds in literacy research developed the document that not only recognized key factors related to dyslexia (e.g., phonological deficits), but also addressed and rejected the misconceptions that exist regarding the diagnosis and

remediation of dyslexic readers. For example, the document stated that dyslexia is not caused by visual deficits and cannot be characterized by children's reversals of both letters and words. In addition, assumptions that dyslexic children are more likely to demonstrate attention deficit disorders or have issues with their handedness were discounted in the Research Advisory. Requirements that the Orton-Gillingham approach be used for dyslexic readers were also rejected. In fact, the document states, "research does not support the common belief that Orton-Gillingham-based approaches are necessary for students classified as dyslexic (Ritchey & Goeke, 2007; Turner, 2008; Vaughn & Linan-Thompson, 2003)" (International Literacy Association, 2016, p. 3). This information is particularly important in an era when a number of stakeholders are advocating for the use of Orton-Gillingham-style programs with dyslexic readers.

The Dyslexia Research Advisory is available on the International Literacy Association's website (www.literacyworldwide.org) and is not limited only to members of the organization so any individual can access this information. Since the document provides not only the International Literacy Association's position on dyslexia and it is freely available, it reiterates the role of the International Literacy Association within the conceptual framework of this study. Information provided in the Dyslexia Research Advisory, represents an example of the potential for an element of the macrosystem, in this case a national professional organization, to influence the attitudes and beliefs of classroom teachers, special education teachers, reading specialists, and administrators.

The American Academy of Pediatrics (2009) also prepared a document that established the organization's position on dyslexia and affirmed key components of the definition of dyslexia endorsed by the International Dyslexia Association in 2002. This document recognized that dyslexic readers demonstrate language-based phonological processing deficits and

acknowledged the neurological foundation of those deficits. In addition, the document established that weak word recognition, decoding, and spelling skills characterize dyslexic readers. The American Academy of Pediatrics recognized that dyslexia exists on a continuum and is not always severe. Finally, the influential role of classroom experience was included as a factor for consideration when evaluating students for dyslexia.

The position paper developed by the American Academy of Pediatrics (2009) also addressed the identification of dyslexic readers and distinguished between the IQ-discrepancy and the response-to-intervention (RtI) models. Specifically, the amount of time required by the IQ-discrepancy model to determine students' eligibility for designation as reading disabled was recognized as detrimental because it promoted a situation in which students had to "wait to fail" before services could be provided (American Academy of Pediatrics, 2009, p. 840). The position paper noted that response-to-intervention (RtI) models that allow students to be identified earlier because interventions can be implemented as soon as a child begins to falter.

The American Academy of Pediatrics' position statement (2009) also indicated that dyslexia is not a visual disorder and rejected the long-held misconception that dyslexic readers reverse letters and words. They counseled against providing dyslexic readers with colored lenses or overlays and disregarded the use of eye exercises as a part of remediation plans. Throughout the position paper, recommendations emphasized evaluating the available research base to make informed decisions.

Common Misconceptions About Dyslexia

Lack of a clear definition of dyslexia allowed for a number of misconceptions to flourish. Common misconceptions include the legitimacy of the IQ-discrepancy model to identify dyslexic readers, the demonstration of letter and word reversals when reading and spelling due to

a disorder of visual perception, and the benefits of colored overlays for dyslexic readers (Hudson, High, & Al Otaiba, 2007; Vellutino, 1987; Vellutino et al., 2004). Many of these common misconceptions have become ingrained in professional practice even though they have been invalidated by research (Hudson et al., 2007; Vellutino, 1987).

IQ-discrepancy Model As a Method for the Identification of Dyslexic Readers

Evidence (e.g., Gresham & Vellutino, 2010; Stanovich & Siegel, 1994; Vellutino et al., 1996) presented in the past three decades challenged the use of the IQ-discrepancy model to differentiate between dyslexic and garden-variety poor readers. Findings from a variety of studies indicate that both dyslexic and garden-variety disabled readers demonstrate phonological processing deficits that are not related to IQ test scores, but are common to both groups of readers (Gresham & Vellutino, 2010; Siegel, 1998; Stanovich, 1988; Stanovich & Siegel, 1994; Vellutino et al., 1996). Furthermore, evidence indicated the IQ-discrepancy model did not differentiate between children who could be easily remediated versus those children who were more difficult to remediate (Gresham & Vellutino, 2010; Vellutino et al., 1996; Vellutino et al., 2000;Vellutino et al., 2006). Although the IQ-discrepancy model has not disappeared from the educational landscape and continues to be used in school environments, renunciation of this model by the research community demonstrated a significant change in perspective regarding the identification of children with reading disabilities and encouraged the development of improved methods for identification purposes. Currently, states have the option of using response-to-intervention models in lieu of the IQ-discrepancy model to determine if a child qualifies for special education services. In Virginia, both the IQ-discrepancy and response-to-intervention models are options available for the identification of dyslexic readers and the co-existence of both models could be a source of confusion for educators.

Visual Disorders

The presence of visual disorders is one of the most common misconceptions about dyslexic readers. Specifically, deficits in visual memory and visual processing are disorders frequently associated with dyslexic readers (Vellutino, 1987; Vellutino et al., 2004). As a result, dyslexia is often incorrectly characterized by the reversal of words and letters when reading and spelling. The popularity of this misconception can be attributed to Orton's influence and his assertion that dyslexic readers demonstrated mirror reading and writing that resulted from deficits in visual perception (Vellutino, 1987). However, Vellutino (1987) explained that letter reversals are common among all developing readers and suggested that reversals made by dyslexic readers reflect "a lack of correct practice in writing and spelling that actually results from a child's reading problems" (p. 39). Furthermore, reversals among dyslexic readers represent a weakness in the inability to encode, maintain, and access linguistic information (Vellutino, 1987). Vellutino (1987) cited studies that demonstrated that the visual memory of dyslexic readers did not significantly differ from the visual memory of non-dyslexic readers. Vellutino (1987) and Vellutino et al. (2004) both referenced a study in which dyslexic and non-dyslexic readers were provided with the printed version of Hebrew letters and words. After seeing the Hebrew words and letters, both groups were asked to recreate the letters and words, which required the activation and application of visual memory, but did not require the use of any language-based skills. Neither group of readers had a background in Hebrew, so they did not have any prior knowledge of the Hebrew symbols presented in the study. The performance of dyslexic students on this task was similar to the performance of the non-dyslexic group, demonstrating that visual memory was not the problem faced by dyslexic readers. Instead, results from the study indicated that the removal of linguistic elements of words enabled dyslexic

readers to perform comparably to their non-dyslexic counterparts (Vellutino, 1987; Vellutino et al., 2004).

Other visual conditions have also been attributed as factors contributing to dyslexia. For example, visual tracking disorders and deficits in the transient visual system continue to be cited as causes of dyslexia even though considerable evidence contradicts these assertions (Fletcher et al., 2007; Vellutino, 1987; Vellutino & Fletcher, 2005; Vellutino et al., 2004). Theories suggesting that visual tracking disorders affect eye movements during reading have been discredited by studies that determined that dyslexic readers do not perform any differently from non-dyslexic readers on tasks that evaluate their ability to track when presented with a variety of nonverbal stimuli (e.g., flashing lights) (Vellutino et al., 2004; Vellutino & Fletcher, 2005). Olson, Kliegl, & Davidson (1983) evaluated the visual tracking of dyslexic and non-dyslexic readers in an attempt to replicate an earlier study conducted by Pavlidis (1981) that suggested dyslexic readers' deficits are related to their eye movements. Olson et al. (1983) concluded that dyslexia did not result from visual deficits, but instead was probably reflective of verbal deficiencies. As a result, they concluded that they were unable to replicate Pavlidis's (1981) findings.

Hypotheses recognizing the role of deficits in the *transient visual system* represent additional attempts to explain the cause of dyslexia (Iovino, Fletcher, Breitmeyer, & Foorman, 1998; Vellutino & Fletcher, 2005; Vellutino et al., 2004). When presented with visual information, the transient visual system, also known as the magnocellular system, works in concert with the parvocellular system (Iovino et al., 1998; Vellutino et al., 2004). While the parvocellular system is focused on eye fixations, saccades are within the scope of the transient visual system. The transient visual system prevents extended visual traces to disrupt visual

perception. Theories that promote transient visual system deficits suggest that the visual trace is not successfully regulated "so that the letters and words appear superimposed and jumbled when reading across a page (Iovino et al., 1998, p. 791-792).

Although the role of deficits in the transient visual system as a cause of dyslexia has been discounted, proponents continue to support this theory. As a result, interventions often include methods directed at supporting the transient visual system. For example, dyslexic readers are often provided with colored overlays to support their visual processing of text. However, Iovino et al. (1998) determined that the use of colored overlays did not significantly improve the word recognition of dyslexic students. Iovino et al. (1998) indicated that "the reading difficulties attributed to transient system dysfunction occur when reading connected text, a deficit that can be explained in most disabled readers by their inability to decode single words" (p. 801). Iovino et al. (1998) concluded that colored overlays did not affect word recognition in isolation. Although theories of transient visual system deficits suggest that the disorder negatively affects word recognition in context, dyslexic readers do not only demonstrate weak contextual reading, but they also demonstrate weak word recognition in isolation. Therefore, contextual reading will be affected by isolated word recognition. Since the covered overlays do not positively affect individual word recognition, then the overlays will also be ineffective during contextual reading situations (Iovino et al., 1998; Vellutino et al., 2004).

Although research has recognized that language-based phonological processing deficits and not visual deficits result in dyslexia, that research has not been successfully transferred to practice as many practitioners continue to embrace the idea that students who reverse letters and words when reading and writing are dyslexic (Lyon & Weiser, 2013; Wadlington & Wadlington, Washburn et al., 2011).

Gender Differences

Another common misconception indicates that dyslexic readers are predominantly male because significantly more boys than girls are identified as dyslexic (Fletcher et al., 2007; Hudson et al., 2007). Shaywitz, Shaywitz, Fletcher, & Escobar (1990) reported that based on earlier studies, ratios of reading disabled males and females ranged between 2:1 to 5:1. Flynn and Rahbar (1993) reported that the ratio of males to females identified with learning disabilities is 4:1, while an estimate provided by Vogel (1990) suggested a ratio between 3:1 and 15:1. As a result, the misconception that more males are dyslexic has flourished over time.

A study by Shaywitz et al. (1990) contradicts the assumption that boys are more likely to be dyslexic. Shaywitz et al. (1990) studied a sample of children who participated in the Connecticut Longitudinal Study to determine if schools were more likely to identify male students as reading disabled. They compared students with reading disabilities who were organized into *research-identified* and *school-identified* groups. The research-identified students were identified using the IQ-discrepancy model while the criteria used to establish the school-identified group relied upon the existence of a school label designated by the school district and the provision of special education services. Although the IQ-discrepancy model has been rejected as an appropriate method for the identification of dyslexic readers, Shaywitz et al. (1990) employed this model to label students in the research-identified group, but acknowledged issues inherent in the use of the IQ-discrepancy model. The use of this model at the federal and state levels to define reading disabled students was also noted as a reason for employing the IQ-discrepancy model.

Shaywitz et al. (1990) anticipated that the school-identified group would include a larger number of males than the research-identified group and this hypothesis was confirmed. In fact,

the study's findings concluded that at the school level, a significantly larger number of males were labeled as reading disabled. However, an analysis of the test scores for both the research-identified and the school-identified groups revealed "no significant gender differences in overall ability" (Shaywitz et al., 1990). Shaywitz et al. (1990) concluded that the higher number of males identified as dyslexic reflected gender bias instead of a specific difference between males and females. Furthermore, behavior appeared to be a defining factor that determined whether or not a child was referred for an evaluation at the school level and males were more frequently recognized for demonstrating negative behaviors than were females. As a result, girls were less likely to be identified at the school-level, and when they were finally identified, their reading disabilities were exacerbated by the extended time required for diagnosis. Since the identification of dyslexic readers usually occurs within the context of the school, many female students could be affected by this bias. The implications of the gender bias have serious consequences for females with unidentified reading disabilities. Therefore, eradicating the misconception that males are more likely to be dyslexic is essential (Flynn & Rahbar, 1993). Suggestions for addressing this misconception involve improved teacher training with an emphasis on developing teachers' awareness that behavior should be separated from perceptions of reading ability (Flynn & Rahbar, 1993; Vogel, 1990)

Vogel (1990) also recognized the possibility that the identification of reading disabled students at the school or district level could be biased. Specifically, Vogel (1990) noted that the smaller number of females identified with reading disabilities can be attributed to factors that include the absence of attention and behavior issues, which reiterates findings from Shaywitz et al. (1990). Vogel (1990) cited a study by Mirkin (1982) in which teacher referrals resulted in a higher percentage of male students when compared to methods that were less subjective. Vogel

(1990) acknowledged that the Mirkin study also recognized that when teachers did refer female students, those students often displayed behavior issues.

Vogel (1990) recognized that when female students are identified, they often demonstrate IQ scores that are considerably lower than those of male students, which again is analogous to Shaywitz et al.'s (1990) findings. Vogel (1990) indicated that upon identification, females not only demonstrate more significant deficits, but also demonstrate a larger discrepancy between their scores on IQ and achievement tests, which can also be attributed to the increased amount of time required for a diagnosis (Vogel, 1990). Overall, teacher attitudes appear to be a significant factor in determining who is referred for evaluations as well as when those referrals are made (Vogel, 1990).

Flynn and Rahbar (1993) concurred with Shaywitz et al. (1990) and Vogel (1990) that the identification of reading disabled female students typically occurred later than that of male students and recognized the negative effects that delayed identification could have for female students. In addition, they agreed that results from standardized testing did not appear to indicate any significant differences between male and female students, which contradicted assumptions that males were more likely to be disabled readers. Flynn and Rahbar (1993) also recognized the influential role of behavior on teachers' assessments of students reading ability.

One group of researchers, however, criticized Shaywitz et al.'s (1990) findings. Rutter et al. (2004) rejected the assertions made by Shaywitz et al. (1990). Based on the evaluation of epidemiological studies that included nearly 10,000 children from New Zealand and the United Kingdom, Rutter et al. (2004) continued to advocate the position that reading disabilities are more prevalent among males. The studies analyzed by Rutter et al. (2004) all suggested that male students were more likely to be reading disabled when compared with female students,

although the actual ratios of disabled males and females differed across the studies included in the analysis by Rutter et al. (2004). Rutter et al. (2004) attributed these differences to the methods used for measurement purposes. However, the Rutter et al. (2004) study did not evaluate how students were identified by schools and therefore did not address the possible the under-identification of females at the school level, which was a key point established by Shaywitz et al. (1990). In addition, Rutter et al. (2004) cited the Isle of Wight studies (Rutter & Yule, 1975) from the 1970s as providing evidence of the difference between reading disabled males and female. Findings from the Isle of Wight studies resulted in an increased use of the IQ-discrepancy model to identify dyslexic readers, which significantly influenced many definitions of dyslexia, although this model has been rejected as a viable tool for determining the presence of reading disabilities. Concerns regarding the methodological approaches used in the Isle of Wight studies have also been acknowledged along with a lack of replication of the key findings. Acceptance of the Isle of Wight studies is of concern and should be considered when evaluating the conclusions made by Rutter et al. (2004).

Hawke, Wadsworth, and DeFries (2006) provided further evidence to repudiate the theory that dyslexic readers are predominantly male. Using a sample that included both identical and fraternal twins from the Colorado Reading Project and the Colorado Learning Disabilities Research Center, Hawke et al. (2006) determined that "results obtained from the present study provide little or no evidence for a differential genetic etiology of reading disability in males and females (p. 28)." These findings complement earlier studies (e.g., Shaywitz et al., 1990) that also rejected a link between gender and dyslexia.

Teacher Knowledge of Dyslexia

To date, only a small number of studies have investigated teacher knowledge of concepts related to dyslexia (Washburn, Binks-Cantrell, & Joshi, 2014), although these studies were conducted in a diverse group of countries that include the United States, the United Kingdom, Kuwait, and Portugal. Most of the studies evaluated in-service teachers' knowledge of dyslexia, although a few studies also addressed pre-service teacher knowledge. Administrators were typically not included in these studies, although they did comprise part of the sample identified by Wadlington & Wadlington (2005). One study (Paradice, 2001) included educational psychologists and special education coordinators, in addition to parents in an analysis of dyslexia knowledge. Bell, McPhillips, and Doveston (2011) surveyed instructional assistants in addition to classroom teachers and specialists. Most studies focused on educators at the elementary level (Kindergarten through the fifth grade), although Wadlington and Wadlington (2005) also included secondary-level teachers in their study.

Studies evaluating educator knowledge of dyslexia consistently conclude that educators do not possess acceptable levels of knowledge (Aladwani, & Al Shaye, 2012; Leite, 2012; Wadlington & Wadlington, 2005; Washburn et al., 2011). Furthermore, the lack of dyslexia knowledge is not specific to any group of educators (e.g., classroom teachers, specialists, administrators). When Wadlington and Wadlington (2005) administered their Dyslexia Belief Index (DBI) to a diverse of educators that included classroom teachers, specialists, and administrators, they noted that all of these educators lacked basic knowledge of dyslexia. Aladwani & Al Shaye (2012) also noted that the teachers in their study did not possess an appropriate level of knowledge regarding dyslexia. They reported that 14% of the participants in their study could be described as having sufficient knowledge of dyslexia.

Many of the studies that investigate teacher knowledge of dyslexia reported that participants needed further training and support in order to better help dyslexic readers in their classrooms. Teachers surveyed by Aladwani & Al Shaye (2012) indicated that they had received little or no dyslexia training. Wadlington and Wadlington (2005) reported similar findings; educators who completed the Dyslexia Belief Index disclosed that their coursework had not equipped them to address the needs of dyslexic students. When participants in the Washburn et al. (2011) study were questioned about teacher preparation, 87% asserted that teachers do not receive the necessary amount of training.

Studies have also evaluated the preparation of pre-service teachers. Some conclusions about the preparation of pre-service teachers suggest that these educators also need additional information about dyslexia (Ness & Southall, 2010; Washburn et al., 2014). Thirty-three percent of the pre-service teachers surveyed by Ness and Southall (2010) indicated a lack of the knowledge and preparation needed to work with dyslexic students. When asked about their coursework, less than 20% of respondents identified their classes as a source of dyslexia knowledge. Furthermore, only four percent of these teachers reported any experiences working with dyslexic readers (Ness & Southall, 2010). These pre-service teachers are not only lacking opportunities to develop their dyslexia knowledge through class content, but they have also not been provided with practical experiences in working with dyslexic readers.

Educators' Definitions of Dyslexia.

Studies of teachers' knowledge of dyslexia indicate that many educators are unable to provide accurate definitions of dyslexia. While many educators recognized that deficits in word recognition, decoding, and spelling characterize dyslexia, their definitions of dyslexia often appeared to be anchored in common misconceptions. In some instances, educators did not

recognize the role of phonological processing deficits or that dyslexia was a language-based disorder. Instead, visual deficits were identified as contributing factors for reading disabilities when educators attempted to define dyslexia (Paradice, 2001; Washburn et al., 2011). When Paradice (2001) provided educational psychologists and special education coordinators with a statement that characterized dyslexia as a linguistically-based disorder rather than a visually-based disorder, a large number of participants expressed their disagreement.

Although neurobiological factors have been recognized in definitions supplied by organizations such as the International Dyslexia Association, educators seldom mention these factors. Of the 57 English educators surveyed by Bell et al. (2011), only three noted that dyslexia had a biological component. Bell et al. (2011) also surveyed Irish teachers and found that only seven of 72 teachers mentioned the biological aspects of dyslexia.

The ability of pre-service teachers to define dyslexia was also investigated by Ness and Southall (2010) and Washburn et al. (2014). According to the result of Ness and Southall's (2010) survey, only two percent of teachers were able to define dyslexia as language-based. A higher percentage of American pre-service teachers (78%) surveyed in Washburn et al. (2014) attributed dyslexia to language-deficits, although a significantly lower (44%) of British pre-service teachers recognized the role of language deficits. Teachers in both studies incorporated misconceptions (e.g., letter and word reversals) into their definitions of dyslexia. However, teachers did recognize that dyslexic readers demonstrate deficits in word recognition, decoding, and spelling (Ness & Southall, 2010). These teachers also recognized that dyslexia could not be defined by intelligence (Washburn et al., 2014).

The Acceptance of Common Misconceptions About Dyslexia

Several studies that evaluated teachers' knowledge of dyslexia identified a number of common elements, including a lack of understanding of key characteristics of dyslexic readers, the acceptance of common misconceptions about dyslexia, and the need for information regarding strategies for supporting students in the classroom environment (Leite, 2012; Wadlington & Wadlington, 2005; Washburn et al., 2011).

Letter and word reversals. One common misconception accepted by educators involved the belief that letter and word reversals characterize dyslexic readers (Hudson et al., 2007; Wadlington & Wadlington, 2005; Washburn et al., 2011; Washburn et al., 2014). Wadlington & Wadlington (2005) determined that almost 70% of the participants surveyed indicated that "word reversal is the major criterion in the identification of dyslexia" (p. 27). Washburn et al. (2011) recognized that 91% of participants in their study accepted this misconception. A study of American pre-service teachers by Ness and Southall (2010) also found that 74% of respondents indicated that letter reversals characterized dyslexic readers and that evidence of these reversals facilitated the identification of dyslexic readers.

The misconception that reversals are indicative of dyslexia is not limited to American educators, but is also evident in the results of studies conducted outside of the United States. Bell et al. (2011) surveyed teachers and instructional assistants in Ireland and England and found that participants indicated that visual deficits were a primary issue for dyslexic students. Similarly, when Regan and Woods (2000) conducted focus group interviews with British teachers, visual impairments were identified as issues related to dyslexia. Paradice (2001) also reported that when educational psychologists and teachers in the United Kingdom were presented with a statement that dyslexia was attributed to language-based deficits instead of

visual disorders, both groups overwhelmingly disagreed with the statement. Therefore, the assumption that dyslexia represents visual deficits including letter and words reversals is prevalent among both pre-service and in-service educators.

The use of colored overlays. As a result of the acceptance that dyslexic readers demonstrated visual disorders that included letter and word reversals, a second misconception involves the use of colored overlays with dyslexic readers (Hudson et al., 2007; Iovino et al., 1998). Educators indicated that the use of colored lenses or overlays was beneficial for dyslexic readers (Washburn et al., 2011). Washburn et al. (2011) reported that nearly three-quarters of participants reported that colored overlays helped dyslexic readers Even pre-service teachers recommended the use of colored overlays. Washburn et al. (2014) noted that pre-service teachers in both the United States and the United Kingdom believed that colored overlays should be used with dyslexic readers. Specifically, 72% of the pre-service teachers in the United States who participated in the Washburn et al. (2014) study affirmed that colored overlays should be used with dyslexic readers. Similarly, 71% of British pre-service teachers surveyed by Washburn et al. (2014) also approved of the use of colored overlays. Not only do practicing teachers endorse colored overlays as an appropriate tool for dyslexic readers, but pre-service teachers also advocate this tool. Of concern is the high percentage of pre-service teachers who assume that colored overlays help dyslexic readers because these results suggest that coursework in literacy does not appear to adequately address common misconceptions regarding dyslexic readers as misconceptions continue to flourish (Ness and Southall, 2010). These pre-service teachers will eventually become practicing teachers and as a result, they may not provide the dyslexic readers who will populate their classrooms with effective and appropriate instructional opportunities.

IQ-discrepancy model. Another misconception that educators frequently endorsed represented the use of the IQ-discrepancy model to identify dyslexic readers. Educators appeared to assume that intelligence was a factor is discriminating between dyslexic readers and garden-variety readers (e.g., Stanovich, 1998) who demonstrated cognitive deficits in addition to their reading disabilities. Paradice (2001) reported that many special education coordinators and educational psychologists continued to accept the IQ-discrepancy model. Paradice (2001) theorized that these results suggest "either that these groups are not aware of the current debate about the discrepancy hypothesis, or that their own experience suggests to them that there is indeed an issue about dyslexia and intelligence" (p. 224). Paradice's (2001) suggestion that educators might be relying on their personal experiences promotes an interesting idea to consider: even if educators have been provided with accurate information, how do they interpret and apply that information to their instructional practices?

Bell et al. (2011) and Regan and Woods (2000) also recognized that educators continued to acknowledge that dyslexic readers demonstrated a discrepancy between their IQ and achievement. Irish educators in the Bell et al. (2011) study cited discrepancies between achievement and ability as part of the identification process even though Ireland's education policy included a component that addressed response to intervention as a method for determining the existence of reading disabilities. Participants in Regan and Woods' (2000) focus groups appeared to endorse the IQ-discrepancy model when they referred to differences between dyslexic readers and garden-variety readers. Respondents indicated that they expected dyslexic readers to demonstrate discrepancies between ability and achievement because dyslexic readers appeared to be different from garden-variety readers.

A review of the literature indicates that although the research base regarding educator knowledge of the definitions and characteristics of dyslexia is limited, the evidence that is available suggests that educators lack fundamental knowledge of dyslexia. Many educators are not only unable to provide accurate definitions of dyslexia, but also are more likely to accept many common misconceptions about dyslexia (e.g., letter and word reversals, the use of colored overlays). Furthermore, educators recognize their need for professional development focused on dyslexia and appear to want access to current information. However, additional research is needed to better understand teacher knowledge of dyslexia and this study will make a contribution to the existing research base.

During the past decade, increased attention to the topic of dyslexia by the state legislature, the state Department of Education, and parent organizations (e.g., Decoding Dyslexia) has implications for educators across the state. A goal promoted by these groups is to mandate professional development focused on dyslexia for all teachers as a condition of licensure. Inherent in this goal for professional development is the perception that teachers lack an appropriate level of knowledge regarding both the characteristics of dyslexia and how to support dyslexic readers in the classroom. In order to provide professional development opportunities that meet educators' needs, a detailed assessment of current knowledge is necessary. However, an evaluation of the specific dyslexia-focused professional development needs of the teachers in this state has not been attempted. Although this study only targets educators in one school district, the information provided by this study can guide future studies that include a larger population of educators in the state. In addition, the results of this study will also provide guidance for the creation of professional development at the district level.

CHAPTER THREE

METHODOLOGY

The recent actions of legislators and parent groups indicate an increased level of concern about how dyslexic readers are identified and supported in the state's schools. Educator knowledge appears to be of particular concern and groups such as Decoding Dyslexia have emphasized the need for increased teacher training. Currently, legislation is under consideration in the to mandate professional development with a specific emphasis on dyslexia for both pre-service and in-service teachers as a condition for certification. The basic assumption of this legislation is that educators in the state do not have the necessary knowledge to support dyslexic readers and as a result require specific training. In addition, several studies have indicated that teachers often accept common misconceptions regarding the characteristics of dyslexia and lack essential knowledge of the dyslexia construct (Hudson et al, 2007; Wadlington & Wadlington, 2005; Washburn et al., 2011).

However, studies specifically directed at evaluating the knowledge of educators in this state have not been conducted. This study will attempt to address this gap in the research literature through exploration of the dyslexia knowledge of educators in the Spring Valley school system. Although this study will only emphasize a specific population of educators, it will provide an opportunity to explore the levels of dyslexia knowledge among a group of elementary educators in one school district. The results of this study will also provide valuable information that can be used to guide professional development opportunities at the district level.

Typically, administrators have not been included in previous studies of dyslexia and it is important to consider their knowledge of dyslexia, as well. Administrators are responsible for developing and implementing curriculum at the school and district levels. They are key

participants in the special education process and must have a certain level of knowledge of dyslexia if they are going to identify dyslexic students and assist teachers in developing appropriate plans for supporting those students in their schools. If administrators lack basic knowledge of dyslexia, then they will also need to engage in professional development activities to increase this knowledge. Therefore, opportunities for targeted professional development may need to be provided for administrators in addition to teachers at the district level. The results of this survey will be used to identify professional development needs at both the school and district levels for teachers and administrators.

This study will be conducted in the Spring Valley school system, a small, rural district located in a mid-Atlantic state. The district, which consists of four elementary schools, one middle school, and one high school, serves approximately 2,800 students from pre-kindergarten through the twelfth grade. Spring Valley did not meet the federal standards for accreditation for the 2015-2016 school year and one of its elementary schools, Pleasant Hill, was listed by the Department of Education as "Partially Accredited: Warned School-Pass Rate."

Research Questions

The following research questions will be addressed in this study.

1. How do educators in the Spring Valley Public School system define dyslexia?
    a. Do definitions of dyslexia vary according to educators' roles (classroom teacher, reading specialist, special education teacher, and administrator)?
    b. How do the definitions of dyslexia provided by Spring Valley educators compare with other definitions of dyslexia provided by the elements of the exosystem, the macrosystem, and the chronosystem?

2. What knowledge do educators in the Spring Valley Public School system currently possess regarding dyslexia?
    a. Does this knowledge vary based upon educators' amount of experience?
    b. Does this knowledge vary according to educators' roles within the school system?
    c. Does membership in a professional organization affect educator knowledge?
3. Do educators in the Spring Valley Public School system accept or reject common misconceptions about dyslexia?
    a. What misconceptions about dyslexia do educators accept?
    b. What misconceptions about dyslexia do educators reject?
    c. Do differences exist between misconceptions accepted (or rejected) by classroom teachers, reading specialists, special education teachers, and administrators?
4. To what extent have educators in the Spring Valley school system been prepared or trained to support dyslexic readers?
    a. Do educators in the Spring Valley school system receive training, information, and support about dyslexia and how to support dyslexic readers?
    b. How do educators in the Spring Valley school system obtain information about dyslexia?
    c. Have educators engaged in professional development opportunities specifically related to dyslexia in the past year? If so, what kind of professional development opportunities do educators report participating in during the past year?
    d. Do educators in the Spring Valley school system feel prepared to identify and support dyslexic readers in the classroom? What needs are identified by educators at all levels (classroom, reading specialists, special education, administration)?

5. How do educators in the Spring Valley school system currently identify and support students with dyslexia?
    a. What criteria do educators use to determine if a student is dyslexic?
    b. Do educators (e.g., classroom teachers, reading specialists, and special education teachers collaborate to identify and provide interventions for dyslexic readers?
    c. What interventions are endorsed and provided for dyslexic readers?
    d. Do the methods of identification and intervention employed by Spring Valley educators reflect evidence-based best practices?

Method

Research Design

The goal of this study is an examination of educators' knowledge and beliefs about dyslexia. To achieve these goals, a web-based, self-administered survey that includes questions focused on multiple aspects of the dyslexia construct (e.g., definitions of dyslexia, characteristics of dyslexic readers) will be administered to all K-5 classroom teachers, reading specialists, special education teachers, speech-language pathologists, and administrators in the Spring Valley school system. Qualtrics is the platform that will be used to create and deliver the survey. This platform provides options for customization that includes directing questions to specific participants based on previous answers and allowing participants to skip questions that are not applicable. For example, certain questions will be directed only to classroom teachers, while other questions will concentrate on administrators. Furthermore, Qualtrics allows answer choices to be provided in a variety of formats (e.g., multiple choice, checkboxes, and matrices).

Use of a web-based, self-administered survey may encourage participants to answer questions honestly and to the best of their ability because anonymity will be preserved.

Participants will only interact with me via e-mail communication and that communication will only involve informing participants about the purpose of the survey, providing a link to survey, and thanking them for or reminding them to complete the survey. The names of the participants will not be linked to the responses. Many of the questions included in this survey will ask teachers and administrators to report any insufficient knowledge. Therefore, participants may be more willing to do so in this environment. I will also be able to stipulate which questions participants will answer in a web-based survey.

Identification of the Target Population

First, a *target population* was identified for this study. The target population represents "the set of units being studied" (Groves, et al., 2009, p. 44). In this study, the target population includes elementary level (K-5) classroom teachers, reading specialists, special education teachers, and speech-language pathologists. School and district-level administrators in Spring Valley were also specifically included in this study because the inclusion of this group is lacking in other studies exploring educators' understanding of dyslexia. Previous studies have traditionally focused primarily on teachers' knowledge of dyslexia. While one goal of this study is to investigate teachers' knowledge of dyslexia, administrator knowledge is also important to consider because administrators must demonstrate adequate knowledge of the dyslexia construct in order to make informed decisions and recommendations regarding the education of dyslexic students. Administrators at both the school and district levels have many responsibilities, including the development and implementation of curriculum, overseeing assessment and providing professional development opportunities. For example, the Supervisor of Elementary Education is also the principal at Oak Grove Elementary School. The Director of Federal Programs, who oversees the Title I and preschool programs, also works with teachers at Pleasant

Hill Elementary School to support their school improvement process. Other administrators at the middle and high school levels also have Central Office responsibilities related to curriculum and instruction.

Classroom teachers comprise another group of educators targeted in this study because they supply core instruction for all students and are often the referring source in the Child Study process. They are the first educators to consider a child's reading ability and they are also the first educators who provide support for children who struggle with reading. In Spring Valley, classroom teachers are involved in providing intervention during specific times of the school day. Therefore, classroom teachers must be knowledgeable about the characteristics of dyslexic readers. They should not embrace common misconceptions about dyslexia but instead need to be familiar with current research and practice in order to support their students.

Since reading specialists assess, diagnose, and provide supplemental instructional opportunities for struggling readers, their knowledge of dyslexia will also be analyzed within the context of this study. Reading specialists must be aware of current research and practices in order to support their students and colleagues. Similarly, since special education teachers are significantly involved in supporting struggling readers, it is necessary to evaluate their knowledge of dyslexia to determine if outdated information or implement inappropriate methods are being implemented. Special education teachers prepare the Individualized Education Plans (IEPs) that establish specific goals for identified children, oversee accommodations and modifications to the curriculum for students, all while providing instructional support. In order to fulfill these roles successfully, knowledge of dyslexia is nonnegotiable. Since speech-language pathologists often work with dyslexic students and since dyslexia is a language-based disorder, their knowledge of dyslexia is also important to evaluate. Furthermore, in Spring

Valley, speech-language pathologists have addressed literacy during their district-wide professional development sessions during the 2015-2016 school year (name withheld for confidentiality, personal communication, April 5, 2016). However, since only four speech-language pathologists serve the elementary school population in Spring Valley, they will be combined with special education teachers for purposes of data analysis. This decision reflects the role of speech-language pathologists within the special education program in Spring Valley.

Development of the Sampling Frame

After the target population was identified, the next step was to create a *sampling frame*. The sampling frame in a study represents everyone in the target population who is eligible for selection. In this study, the sampling frame includes all K-5 classroom teachers, reading specialists, special education teachers, speech-language pathologists, and school and district-level administrators in Spring Valley. These educators represent all four elementary schools in the district, as well as the Central Office. E-mail lists available on both the district website and the district intranet (First Class) were used to create the sampling frame. Information identifying newly hired employees provided in the Spring Valley School Board minutes was also used during the construction of the sampling frame. The School Board minutes, which are published at least monthly on both the district's website and the district intranet, provide information about appointments and resignations approved by the School Board.

The sampling frame contains eight Central Office administrators, six school-level administrators (including one assistant principal and one administrative intern), 63 classroom teachers, nine reading specialists, 12 special education teachers, and four speech-language pathologists for a total of 102 educators. All of the educators identified in the sampling frame

will be invited to participate in the study, which will result in significantly reduced opportunities for undercoverage in this study.

The accuracy of the sampling frame was considered and evaluated in several ways. First, as the result of numerous budget cuts over the past few years, many administrators have multiple responsibilities across the district, which could lead to duplication issues. For example, the current principal at Oak Grove Elementary School also serves as the division-wide Supervisor for Elementary Instruction, so she has both school-level and district-level responsibilities. Therefore, instead of including the principal at Oak Grove twice in the sampling frame (once as a school-level administrator and once as a district-administrator), she was only listed in the sampling frame once. As an additional check to ensure the accuracy of the sampling frame, specific questions provided in the survey instrument allow for respondents to identify all of their roles within the school system without being required to participate in the survey on multiple occasions.

I also checked the sampling frame to ensure that educators were not duplicated across schools and confirmed that all teachers and administrators were only included once. In one instance, a reading specialist started the school year at one elementary school, but was transferred to a different elementary school in the middle of the year. The sampling frame was corrected to ensure that this teacher was not included twice. Another reading specialist was not hired until December 2015, so she needed to be included in the final sampling frame. One of the principals at the elementary level resigned in September to take a position in another district and was also removed from the sampling frame. In addition to my personal knowledge of the school system, the status of employees was further validated with the Spring Valley School Board minutes, which are published on First Class. The minutes include a section that lists

"Appointments" and "Resignations" and requests for leaves of absence. The information supplied in the minutes includes the employee's name, his/her role, and school placement.

Minimal coverage errors are anticipated because multiple sources of information were used to develop and validate the sampling frame. In addition, all K-5 educators in the Spring Valley will be invited to participate in this study so the sample will include the entire targeted population. In addition, the use of school-based e-mail addresses should also lessen the potential for coverage errors because every employee in the Spring Valley school system has an e-mail address linked to First Class. Employees are expected to access their e-mail accounts periodically to check the account for messages. For example, the principal at Northwood Elementary School asks teachers to check their school e-mail accounts at least twice daily and to use this e-mail account to communicate with parents (name withheld for confidentiality, August 2015, personal communication). Therefore, every person in the sampling frame can be directly contacted via e-mail.

This specific sampling frame was selected for several reasons. Although access to the sample is convenient, conducting this study within the Spring Valley school system is important for several reasons. First, Spring Valley teachers are required to participate in evening professional development sessions at the district level as a part of their contract hours. These sessions are organized and led by Central Office administrators and in past years, addressed writing across the curriculum, response to intervention, technology integration, and assessment. If the results from this study indicate that educators in Spring Valley lack knowledge of dyslexia or report the need for additional information and training related to dyslexia, then administrators may want to consider developing professional development sessions targeting this subject.

Another reason for selecting the Spring Valley school system involves the number of teachers who are new to the division. Approximately one-fifth of teachers at the elementary level have worked in Spring Valley for three years or less. While not all of these teachers are beginning teachers, they do represent a significant influx of educators new to the school system. Reading specialists and special education teachers represent approximately one-half of new teachers in Spring Valley for the 2015-2016 school year. At the conclusion of this study, administrators can use the results to provide support to these teachers as needed. If a considerable number of teachers who are new to the district demonstrate misconceptions or even a basic knowledge of dyslexia, professional development opportunities can be specifically directed at them.

In addition, one of the elementary schools in Spring Valley, Pleasant Hill Elementary School, was labeled as a "Focus School" by the Department of Education beginning with the 2014-2015 academic year. The Focus School designation indicates a lack of progress by students according to specific criteria established by the Department of Education and requires intensive school improvement procedures that include professional development. Although administrators and teachers at Pleasant Hill Elementary School participated in a variety of professional development opportunities during the past two years, they may not have received training specifically related to the identification and remediation of dyslexic students. In addition, Central Office administrators are exploring the option of requesting "Partially Accredited: Reconstituted School" status from the Department of Education. The change in status would prevent Pleasant Hill Elementary School from receiving a denial of accreditation should the school not achieve the criteria established by the Department of Education for the 2015-2016 school year.

Sample

Since all K-5 classroom teachers, reading specialists, special education teachers, and administrators in Spring Valley will be surveyed, the entire sampling frame will be selected to participate in the study. As a result, a random sample of the population will not be necessary at this time.

Development of the Survey Instrument

A survey instrument was developed specifically for use in this study, although instruments used in previous studies were consulted as references. For the purposes of this study, questions were presented in a closed format, which provided response options for the participant. Fowler (2014) recommended the use of the closed format for surveys in which the participant was responsible for administration of the instrument. Many of the questions in this survey were provided in a multiple-choice format and in some cases, the participants were able to select more than one answer.

Questions on the survey addressed demographic information (e.g., role, gender) which were presented in a multiple-choice format educators' roles within the school district, their number of years teaching in Spring Valley, and the total number of years in education. Participants were also asked about their membership in professional organizations, which is related to the conceptual framework for this study. Professional organization such as the Meadowview Reading Council, the state reading association, and the International Literacy Association represent the microsystem, exosystem, and macrosystem, respectively, and provide opportunities that develop and enhance educators' knowledge. However, not all educators, though, may be involved in professional organizations, which could impact their access to information about key education issues such as dyslexia. Other questions probed participants'

professional development experiences (e.g., courses taken, workshops attended), interest in future professional development opportunities, and the need for additional information on dyslexia. Participants were asked about how informed they felt on a variety of topics related to dyslexia, their knowledge of concepts, including the definition of dyslexia and the key characteristics displayed by dyslexic readers. Additional questions asked participants to agree or disagree with a variety of statements about dyslexia, some of which represent common misconceptions. Examples of these statements include "dyslexic readers reverse letters and words," "dyslexia is a neurological disorder," and "dyslexic readers have weak word recognition, decoding, and spelling skills." These questions were presented individually for two reasons. First, including all of the statements within one question could promote fatigue, which might affect the responses provided by participants. Presenting approximately ten statements to evaluate within one question could be overwhelming for participants and could lead to nonresponse. Second, separating each statement allowed participants to focus on one statement at a time and limited the effects of the other statements on their answers. The final survey instrument contained 58 questions. The first two questions provided a description of the survey, identified the rights of the participants, and included the consent for participation while the remaining 56 questions explored educators' knowledge of dyslexia. Participants were not required to answer all of the questions on the survey. The Display and Skip Logic features available through the Qualtrics software enabled questions to be tailored to each respondent's specific answers. For example, if a respondent indicated that he or she was a classroom teacher, only the questions that specifically targeted the classroom teacher's understanding of dyslexia were presented. Table 2 provides a breakdown of the questions by type and who responded to individual questions. The survey instrument is included in Appendix A.

Table 2
Questions Required For Participants

	Classroom teachers	Reading specialists	Special Education teachers	Speech-Language Pathologists	Administrators
Question 1*	X	X	X	X	X
Question 2*	X	X	X	X	X
Question 3	X	X	X	X	X
Question 4	X	X	X	X	X
Question 5**	X	X	X	X	X
Question 6	X	X	X	X	X
Question 7**	X	X	X	X	X
Question 8**	X				
Question 9**	X				
Question 10**	X				
Question 11**	X	X	X	X	
Question 12**	X				
Question 13**	X	X	X		

	Classroom teachers	Reading specialists	Special Education teachers	Speech-Language Pathologists	Administrators
Question 14**		X			
Question 15**	X	X	X	X	
Question 16**	X	X	X	X	
Question 17**	X	X	X	X	
Question 18**	X	X	X	X	
Question 19**	X	X	X	X	
Question 20**		X	X	X	
Question 21**		X			
Question 22**		X	X	X	
Question 23**					X
Question 24**					X
Question 25**					X
Question 26**					X

	Classroom teachers	Reading specialists	Special Education teachers	Speech-Language Pathologists	Administrators
Question 27**					X
Question 28**					X
Question 29					X
Question 30**	X	X	X	X	X
Question 31**	X	X	X	X	X
Question 32	X	X	X	X	X
Question 33	X	X	X	X	X
Question 34	X	X	X	X	X
Question 35	X	X	X	X	X
Question 36	X	X	X	X	X
Question 37	X	X	X	X	X
Question 38	X	X	X	X	X
Question 39	X	X	X	X	X
Question 40	X	X	X	X	X

	Classroom teachers	Reading specialists	Special Education teachers	Speech-Language Pathologists	Administrators
Question 41	X	X	X	X	X
Question 42	X	X	X	X	X
Question 43	X	X	X	X	X
Question 44	X	X	X	X	X
Question 45**	X	X	X	X	
Question 46**	X	X	X	X	
Question 47**					X
Question 48**					X
Question 49**	X	X	X	X	
Question 50**					X
Question 51	X	X	X	X	X
Question 52	X	X	X	X	X
Question 53	X	X	X	X	X
Question 54	X	X	X	X	X

	Classroom teachers	Reading specialists	Special Education teachers	Speech-Language Pathologists	Administrators
Question 55	X	X	X	X	X
Question 56	X	X	X	X	X
Question 57	X	X	X	X	X
Question 58**	X	X	X	X	X

Note. Questions identified with a single asterisk represent the survey description and consent and were not included in data analysis. Questions identified with a double asterisk are contingent upon an answer provided for a previous question.

Likert-scales were included in several questions. Specifically, Likert-scales were provided as response options to questions that required the evaluation of statements that included common misconceptions. Initially, the Likert-scales included "Strongly Agree," "Agree," "Strongly Disagree," and "Disagree" for questions evaluating participants' knowledge of not only the defining characteristics of dyslexia, but also to assess participants' awareness of common misconceptions. Based on the recommendations of Fowler (2014) and Groves et al. (2009), options that required participants to agree or disagree with the statements were rejected because of concerns regarding the reliability and validity of agree/disagree questions. I developed a simple true/false response format for for questions that reflect key concepts and misconceptions related to dyslexia. Participants were not provided with a "don't know" alternative to encourage them to consider each statement thoroughly before answering.

Several questions allowed participants to select an "Other" option. Participants who chose the "Other" option were able to input specific information into a text box. This option was provided to address any possible answers that might not have been included in the response options. In addition, providing participants with this option enhances the possibilities for data collection. For example, a participant could identify a resource or a professional development activity that will provide insight into the participant's experience. However, few respondents actually used this opportunity.

Procedure

The survey instrument was piloted with educators who were not currently employed by the Spring Valley school district. These educators represent classroom teachers, reading specialists, former special education teachers, retired educators, and college professors. Several Spring Valley educators who were not included in the target population but had backgrounds that

included coursework in literacy were also invited to participate in the pilot survey. These educators included one school librarian and two instructional assistants. One of the instructional assistants had a master's degree in education, while the second was working towards initial certification. Each person was contacted either by e-mail or face-to-face communication and invited to participate in the pilot survey. Participants in the pilot survey were asked to evaluate the survey to provide input regarding the overall format, wording of the questions, and use of terminology. However, limited feedback was provided from only three participants during this process, which may have been a result of the timing of the pilot process. One participant recommended including a "Don't Know" response for questions 32-43, which required respondents to indicate whether or not statements were true or false. I decided not to provide this option in order to avoid *satisficing*. Satisficing is a phenomenon that occurs when "respondents do the minimum they need to do to satisfy the demands of the questions" (Groves et al., 2009, p. 224). I wanted to encourage participants to consider the statements carefully and to answer each question to the best of their ability.

During the process of obtaining approval to conduct this study from the Institutional Review Board for Social and Behavioral Sciences at the University of Virginia (IRB), several changes required by the IRB were made to the pre-notification letter, cover letter, and follow-up letters, as well as to the directions and consent provided at the beginning of the survey instrument. For example, the directions for the survey were expanded to include a consent template that elaborated on the risks, benefits, confidentiality, rights, and contact information. The letters were revised to include an emphasis on confidentiality, as well as an increase in the amount of time needed to complete the study. Initially, the letters indicated that participants

would need approximately 10 minutes to complete the survey. Per IRB directions, the amount of time was changed to "under 20 minutes."

After the IRB approved the protocol for this study on May 9, pre-notification letters were sent to all K-5 teachers and administrators in Spring Valley informing them of the purpose of the study and inviting them to participate. On May 10, 2016, one day after the pre-notification letter was sent, the cover letter with the link to the survey was e-mailed to all participants. This letter also reminded participants of the purpose for the survey and emphasized the confidentiality of all responses. Individual codes for a $2.00 credit at amazon.com were provided in the cover letter to encourage participation. The pre-notification letter, cover letter, and follow-up letters are included in Appendix B.

On May 16, 2016, a follow-up e-mail was sent to all participants. This message thanked participants who had already completed the survey and reminded subjects who had not completed the survey that they could still participate. The link to the survey was also be included in the follow-up e-mail.

Data Analysis

Responses were examined to identify any missing data, which was minimal. Most questions had a response rate of 90% or more. Table 3 provides the response rates for individual questions. The only question with a response rate below 90% was Question 39, which asked participants to determine if evidence suggests that the Orton-Gillingham program is the best method for teaching dyslexic readers and had a response rate of 89%. Question 7, which addressed participation in professional development activities related to dyslexia over the course of a year, had an unexpected response rate. This question, which should only have been presented to participants who reported their participation in dyslexia-focused professional

development during the past year should only have had responses from four participants. However, seven different respondents provided answers even though the display logic employed for Question 7 should have prevented this from happening. The responses provided for Question 7 were reported in order to provide examples of the types of professional development identified by educators and were only used for descriptive purposes. Other technical difficulties prevented Question 56 from being presented to classroom teachers, reading specialists, special education teachers, and speech-language pathologists, so data was not collected on this variable.

Table 3
Response rates for individual survey questions.

Question 1	100%
Question 2	100%
Question 3	100%
Question 4	100%
Question 5	93%
Question 6	100%
Question 7*	-----
Question 8	95%
Question 9	95%
Question 10	95%
Question 11	97%
Question 12	95%
Question 13	100%
Question 14	100%
Question 15	97%
Question 16	97%
Question 17	97%
Question 18	97%
Question 19	97%
Question 20	97%
Question 21	97%
Question 22	100%
Question 23	100%
Question 24	100%
Question 25	100%
Question 26	100%
Question 27	100%
Question 28	100%
Question 29	97%

Question 30	98%
Question 31	100%
Question 32	96%
Question 33	96%
Question 34	96%
Question 35	96%
Question 36	96%
Question 37	96%
Question 38	96%
Question 39	89%
Question 40	96%
Question 41	96%
Question 42	96%
Question 43	96%
Question 44	96%
Question 45	95%
Question 46	92%
Question 47	100%
Question 48	100%
Question 49	95%
Question 50	100%
Question 51	96%
Question 52	94%
Question 53	96%
Question 54	92%
Question 55	92%
Question 56*	0%
Question 57	94%
Question 58	94%

Note. *An error in the number of responses provided were identified during data analysis.

Descriptive statistics were calculated for each survey question. Results were not only reported according to all participants' responses, but were also disaggregated by group (e.g., classroom teachers, reading specialists) Since many of the answer choices provided in the survey instrument included Likert-type scales that provide categorical data, common parametric tests (e.g., independent t-tests, analysis of variance) could not be used for analytical purposes. Instead, this study employed nonparametric tests to evaluate survey responses. Specifically, the chi-square test of association was used to determine the existence of relationships between categorical variables identified in this study in order to make inferences regarding the population of educators surveyed and to identify relationships between specific variables (Howell, 2013; Lomax & Hahs-Vaughn, 2012).

Upon completion of the data analysis, I was able to determine Spring Valley educators' level of knowledge regarding dyslexia. I explored educators' acceptance of common misconceptions (e.g., letter and word reversals as characteristics of dyslexia) and I identified weak areas of knowledge (e.g., lack of recognition that dyslexia is a language-based phonological processing disorder). This results of this survey were used to develop recommendations for district-level professional development.

CHAPTER FOUR

RESULTS

The purpose of this study is to explore educator knowledge of dyslexia in order to determine current levels of knowledge in one school district. Results from this study will ascertain the areas in which educators in the Spring Valley district require additional professional development opportunities to enhance their knowledge of dyslexia. Furthermore, this study will also consider the methods and techniques used by educators to support dyslexic readers in the district.

The research questions identified in this study include the following:

The following research questions will be addressed in this study.

6. How do educators in the Spring Valley Public School system define dyslexia?
    a. Do definitions of dyslexia vary according to educators' roles (classroom teacher, reading specialist, special education teacher, and administrator)?
    b. How do the definitions of dyslexia provided by Spring Valley educators compare with other definitions of dyslexia provided by the organizations making up elements of the exosystem, the macrosystem, and the chronosystem?
7. What knowledge do educators in the Spring Valley Public School system currently possess regarding dyslexia?
    a. Does this knowledge vary based upon educators' amount of experience?
    b. Does this knowledge vary according to educators' roles within the school system?
    c. Does membership in a professional organization affect educator knowledge?
8. Do educators in the Spring Valley Public School system accept or reject common misconceptions about dyslexia?

   a. What misconceptions about dyslexia do educators accept?
   b. What misconceptions about dyslexia do educators reject?
   c. Do differences exist between misconceptions accepted (or rejected) by classroom teachers, reading specialists, special education teachers, and administrators?

9. To what extent have educators in the Spring Valley school system been prepared or trained to support dyslexic readers?
   a. Do educators in the Spring Valley school system receive training, information, and support about dyslexia and how to support dyslexic readers?
   b. How do educators in the Spring Valley school system obtain information about dyslexia?
   c. Have educators engaged in professional development opportunities specifically related to dyslexia in the past year? If so, what kind of professional development opportunities do educators report participating in during the past year?
   d. Do educators in the Spring Valley school system feel prepared to identify and support dyslexic readers in the classroom? What needs are identified by educators at all levels (classroom, reading specialists, special education, administration)?
10. How do educators in the Spring Valley school system currently identify and support students with dyslexia?
   a. What criteria do educators use to determine if a student is dyslexic?
   b. Do educators (e.g., classroom teachers, reading specialists, and special education teachers collaborate to identify and provide interventions for dyslexic readers?
   c. What interventions are endorsed and provided for dyslexic readers?

d. Do the methods of identification and intervention employed by Spring Valley educators reflect evidence-based best practices?

To answer the research questions in this study, a link to web-based survey was provided to all classroom teachers, reading specialists, special education teachers, speech-language pathologists, and elementary administrators in Spring Valley. Central Office administrators with responsibilities at the elementary level were also invited to participate in the study. A total of 104 educators in the Spring Valley Public school system received surveys. The response rate was 68% and 94% of all respondents completed the entire survey. Eighty-four percent of respondents were female, 13% were male, and 3% indicated that they preferred not to answer. Participants averaged 18.74 years in education and 16 years as employees of the Spring Valley system. Figure 2 provides a summary of participants by their roles in the school division while Tables 4 and 5 describe participants' total number of years teaching and the length of time employed by the Spring Valley system.

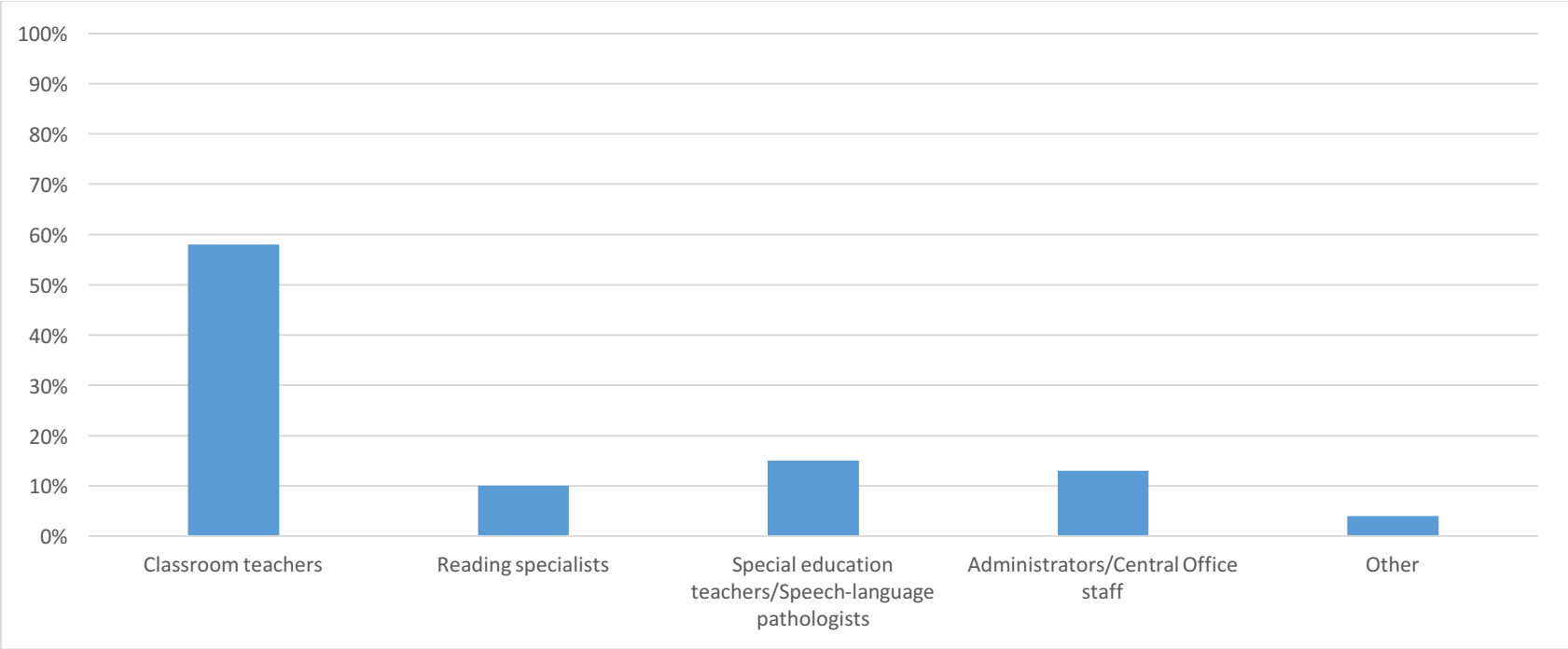


Figure 2. Survey Participants According to Role in the Spring Valley School System.

Table 4

Total years as an educator by participants' roles in the Spring Valley Public School System

	M	SD	Minimum	Maximum
Classroom teachers	17.44	7.86	1	35
Reading specialists	20	8.16	10	32
Special education/ Speech-language pathologists	15	8.97	5	29
Administrators/ Central Office staff	24.67	6.14	17	37
Other	26	8.30	17	33

Note. The "Other" category includes educators whose roles do not directly involve reading instruction in the Spring Valley school district although they have opportunities to interact with dyslexic readers.

Table 5

Total years as an educator in Spring Valley According To Participants' Roles

	M	SD	Minimum	Maximum
Classroom teachers	15.57	8.89	1	28
Reading specialists	16.29	9.14	1	27
Special education/ Speech-language pathologists	12	9.20	1	29
Administrators/ Central Office staff	19.33	5.94	13	30
Other	17.33	5.51	12	23

Defining Dyslexia in Spring Valley

The first research question addressed how educators in the Spring Valley school system defined dyslexia. Subsumed under the first research question were two additional questions that considered whether definitions of dyslexia varied according to educators' roles (e.g., classroom teacher, reading specialists) and how the Spring Valley educators' definitions of dyslexia compared to the definitions provided by the professional organizations in the exosystem, macrosystem, and chronosystem.

In order to determine how educators in the Spring Valley system defined dyslexia, one question on the survey asked participants to identify the strongest indicator of dyslexia. Other questions required participants to identify the veracity of statements, some of which included elements of widely-accepted definitions of dyslexia while other statements reflected common misconceptions about dyslexia. Based on the responses, conclusions were made regarding how the educators in this study defined dyslexia.

Definitions of Dyslexia Provided by Spring Valley Educators

Participants were asked to identify what they considered to be the strongest indicator that a student is dyslexic and Figure 3 provides a summary of those responses. Choices for selection included the following:

- The student reads and writes letters and words backwards.
- The student has poor phonological skills.
- The student has weak word recognition skills.
- The student demonstrates a discrepancy between scores on an IQ test and scores on an achievement test.
- The student has not responded to individualized interventions.

- The student reads below grade-level expectations.

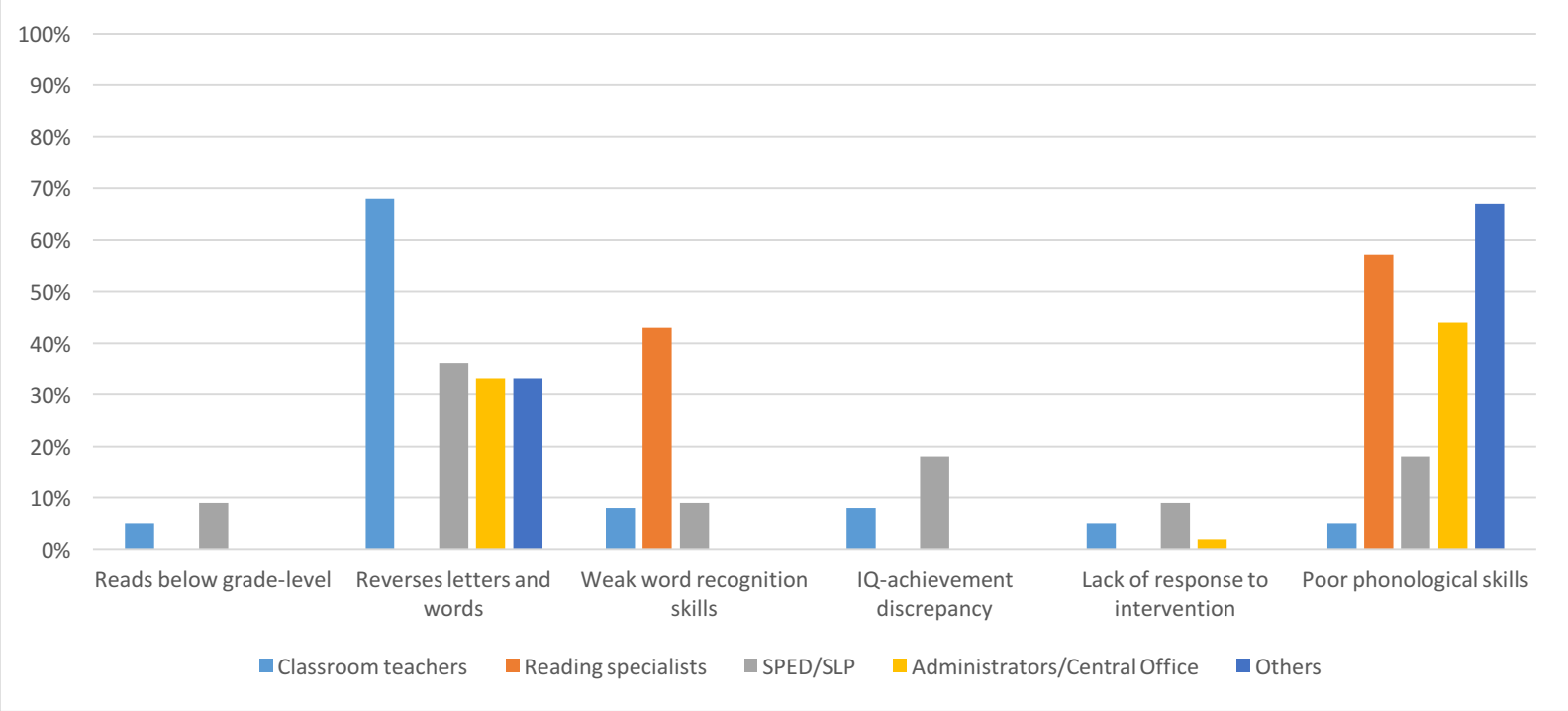


Figure 3. Identification of the strongest indicator of dyslexia according to participants' roles in the Spring Valley district.

Letter and word reversals represent a common misconception about dyslexia. Although research conducted over the past three decades rejected the theory that dyslexic readers reverse letters and words (Hudson et al., 2007; Vellutino, 1987), 50% percent of all respondents selected this choice as the strongest indicator of dyslexia. Of all the groups surveyed, classroom teachers were more likely to identify letter and word reversals as the strongest indicator of dyslexia.

Twenty-one percent of participants identified poor phonological skills as the strongest indicator of dyslexia although the presence of phonological deficits is explicitly stated in the current definition of dyslexia provided by the Virginia Department of Education that reflects the definition promoted by the International Dyslexia Association. More than half of the reading specialists surveyed selected poor phonological skills as the strongest indicator of dyslexia. Although participants who selected "Other" option to describe their roles in the school division are not directly involved in the delivery of reading instruction to dyslexic students, two-thirds of these respondents indicated that poor phonological skills are the strongest indicator of dyslexia.

Word recognition deficits are also included in current definitions of dyslexia provided by organizations such as the International Dyslexia Association, the International Literacy Association, and the state Department of Education. Among all participants surveyed, only ten percent identified weaknesses in word recognition as a strong indicator of dyslexia. Although this choice was not popular with all participants, 43% of the reading specialists surveyed selected this option. In fact, 100% of reading specialists chose either poor phonological skills or word recognition as the strongest indicator of dyslexia, two elements commonly recognized in definitions of dyslexia. None of the administrators or participants identified in the "Other" category selected weaknesses in word recognition and eight percent of classroom teachers preferred this option.

Seven percent of all participants suggested that a discrepancy between scores on an IQ test and scores on achievement tests signified that a student was dyslexic. The IQ-discrepancy model, although discredited (see Gresham & Vellutino, 2010; Stanovich & Siegel, 1994; Vellutino et al., 1996), remains in use in many school divisions, including the Spring Valley school system, when determining eligibility for special education services, particularly for students with specific learning disabilities such as dyslexia.

The lack of a student's response to intervention was chosen by 7% of all participants, even though response to intervention can be used to determine a student's eligibility for a specific learning disability designation in many districts, including Spring Valley. Of all participants in the survey, administrators were more likely to characterize response to intervention as the strongest indictor of dyslexia. Nine percent of special education teachers and speech-language pathologists considered response to intervention to be a strong indicator of dyslexia.

Few participants considered the strongest indicator of dyslexia to be reading below-grade level expectations. Five percent of classroom teachers and 9% of special education teachers/speech-language pathologists selected this option.

Although participants varied in their responses regarding the strongest indicator of dyslexia, a large percentage of educators identified letter and word reversals as the strongest indicator of dyslexia. A chi-square analysis of the responses indicated a statistically significant relationship between participants' roles and the strongest indicator of dyslexia (X^2 (20) = 38.644, p = .007. Cramer's V = .377, which suggests a moderate effect size. Reading specialists recognized phonological processing deficits and word recognition deficits as the strongest indicators of dyslexia, which are two components of commonly accepted definitions of dyslexia.

Special education teachers and speech-language pathologists appeared to focus more on the presence of letter and word reversals, although they did endorse use of the IQ-discrepancy model more than any other group of educators. Classroom teachers also frequently reported that dyslexic students reversed letters and words when reading and writing.

Educator Recognition of Key Elements of Definitions of Dyslexia

Participants were presented with statements that included key elements of the widely-accepted definition of dyslexia used by the International Dyslexia Association, the International Literacy Association, and the state Department of Education. Statements included the role of phonological processing skills, word recognition, decoding, and spelling skills as well as the language and neurological aspects of dyslexia. Participants were asked to ascertain the veracity of these statements and the responses were used to determine how they defined dyslexia.

Dyslexic readers demonstrate phonological processing deficits. Participants were also asked to determine if dyslexic readers demonstrate weak phonological processing skills, which is a fundamental element of definitions of dyslexia. Sixty-eight percent of respondents acknowledged that this statement is true. Fifty-three percent of classroom teachers recognized the role of phonological processing deficits, although 100% of the reading specialists surveyed indicated that phonological processing deficits affect dyslexic readers. Most special education teachers and speech-language pathologists (91%) also recognized that dyslexic readers are affected by weak phonological processing skills. Seventy-eight percent of administrators specified that dyslexic readers demonstrate phonological processing deficits. A chi-square analysis suggests that there is a statistically significant difference in responses according to respondents' roles in the school division (X^2 (4) = 10.406, p = .034). In addition, Cramer's V (.391) suggests a modest effect size. Figure 4 illustrates the respondents who indicated that

dyslexic readers demonstrate phonological processing deficits according to respondents' specific roles in the Spring Valley school system.

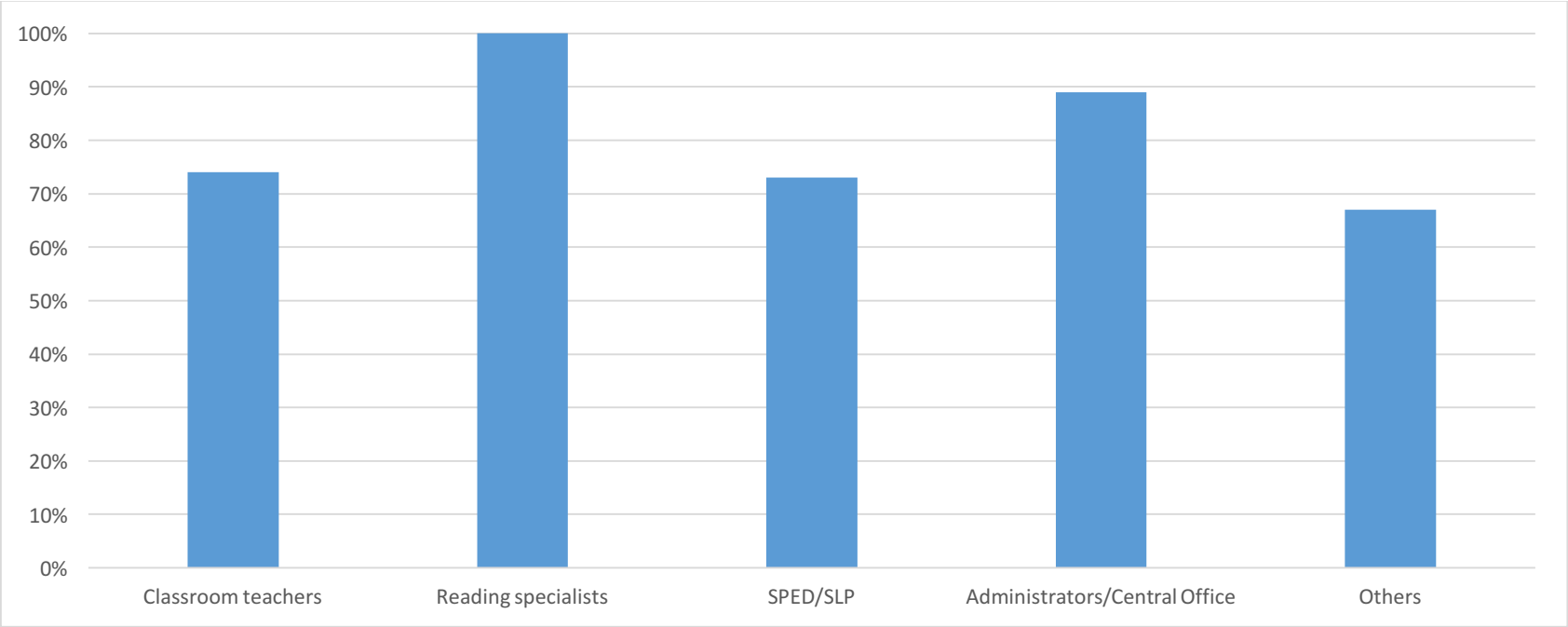


Figure 4. Percentage of Respondents Who Indicated that Dyslexic Readers Demonstrate Phonological Processing Deficits.

Dyslexic readers demonstrate word recognition, decoding and spelling deficits.

Widely-accepted definitions of dyslexia acknowledge the effects of deficits in word recognition, decoding, and spelling. Recognition of the role of these word-level skills is essential if educators are to provide appropriate interventions for dyslexic readers. A commonly accepted misconception, however, suggests that dyslexia results from visual deficits that affect the perception of letters and words, resulting in reversals that negatively affect the ability to read. Furthermore, this misconception neglects to acknowledge the role of decoding. Consequently, educators may not realize the importance of word-level skills.

Nearly three-quarters of all respondents indicated that dyslexic readers demonstrate weak word recognition, decoding, and spelling skills. A majority of reading specialists, administrators, and Central Office staff demonstrated an awareness of the role of these word-level skills, as shown in Figure 5. Results from a chi-square analysis indicates that the relationship between educators' roles and their recognition that dyslexia involves deficits at the word level were not statistically significant (X^2 (4) = 4.857, $p > .05$).

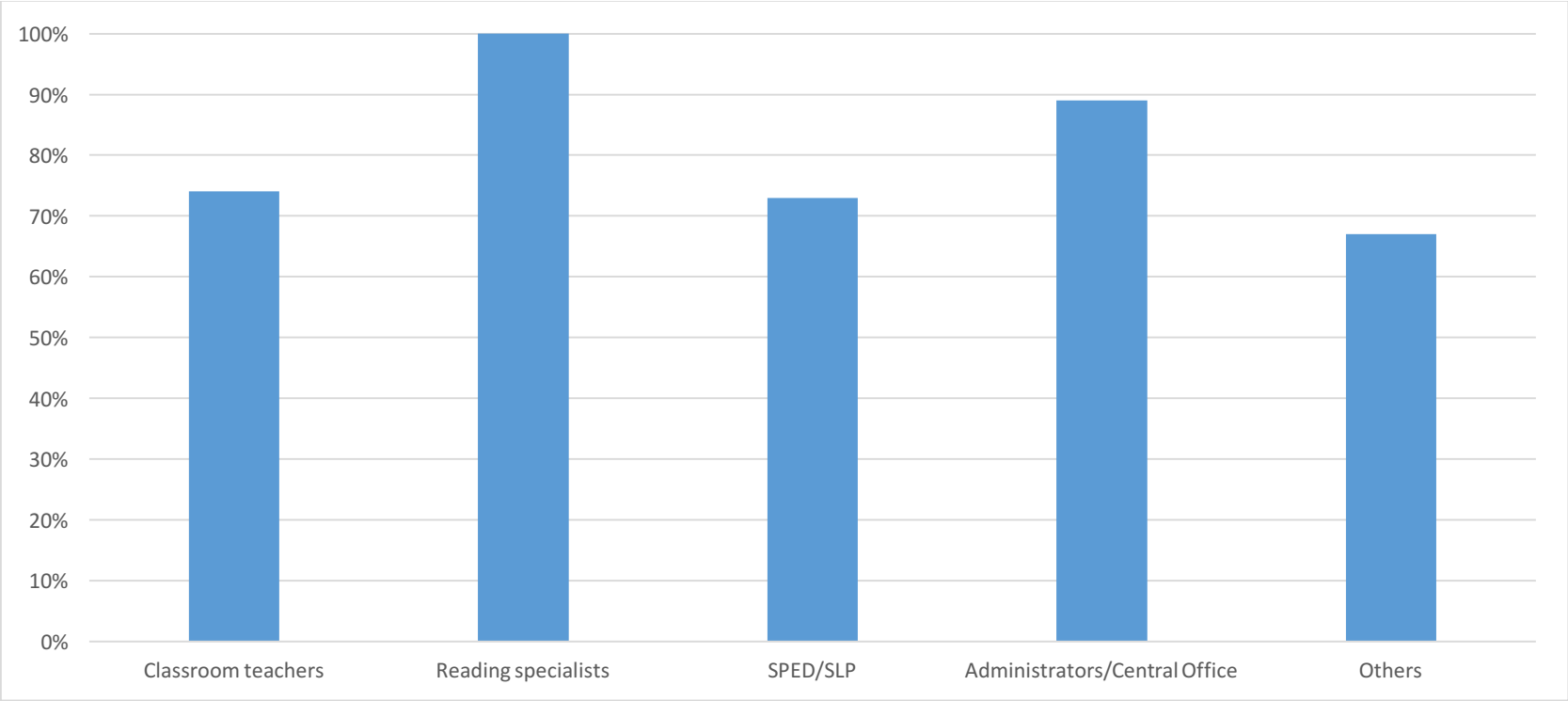


Figure 5. Percentage of Respondents Who Acknowledged that Dyslexic Readers Demonstrate Word Recognition, Decoding, and Spelling Deficits.

Dyslexia is a language-based disorder. Another question on the survey required respondents to consider whether or not dyslexia is a language-based disorder. The definition of dyslexia provided by the International Dyslexia Association and cited by the International Literacy Association and the state Department of Education recognizes that dyslexia is a language-based disorder. In addition, the form used to determine if a student is eligible for special education services in the Spring Valley school system includes a definition of dyslexia that references the role of language deficits. Twenty-eight percent of all respondents indicated that dyslexia is a language-based disorder. Special education teachers and speech-language pathologists represented the largest group of participants who did not define dyslexia as a language-based disorder as shown in Figure 6. Specifically, 82% of the special education teachers and speech-language pathologists who were surveyed did not believe that dyslexia involved a deficit in language, despite the fact that both groups are directly involved in the eligibility process. A chi-square test evaluating the relationship between educators' roles and their recognition of dyslexia as a language-based disorder was not statistically significant (X^2 (4) = 5.641, p > .05).

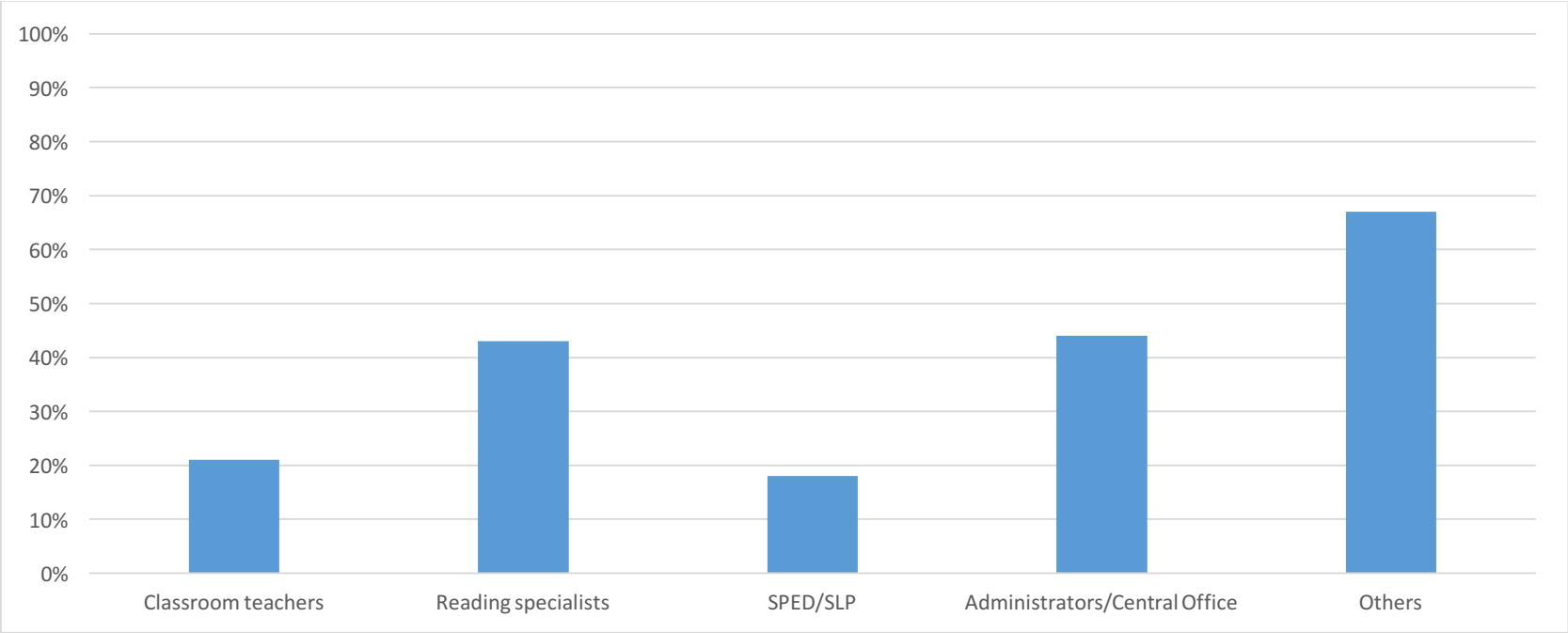


Figure 6. Percentage of Respondents Who Recognized that Dyslexia is a Language-based Disorder.

Dyslexia is a neurological disorder. Eighty-two percent of the educators in the Spring Valley school system recognized that dyslexia is a neurological disorder, which is another key element of the definition of dyslexia. However, educators differed in their responses to this question based on their roles in the division. For example, 43% of reading specialists stated that dyslexia is a neurological disorder although 100% of administrators and 82% of special education teachers and speech-language pathologists acknowledged the neurological basis of dyslexia. A chi-square analysis suggests a statistically significant relationship between responses between educators' roles and their responses to the question about the neurological aspect of dyslexia (X^2 (4) = 10.177, p = .038. Cramer's V (.387) suggests a moderate effect size. Figure 7 illustrates the percentages of respondents who indicated that dyslexia is a neurologically-based disorder.

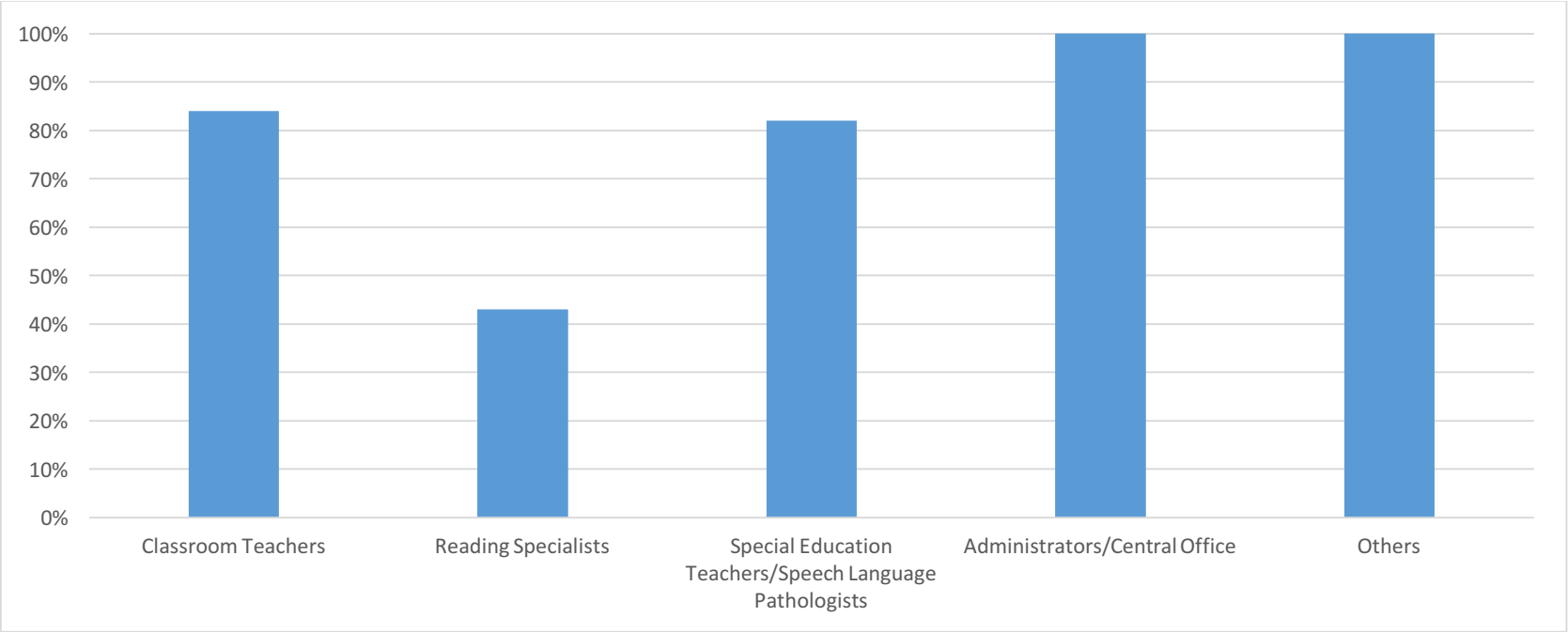


Figure 7. Percentage of Respondents Who Recognized Dyslexia as a Neurological Disorder.

Educator Knowledge of Dyslexia

The second research question provides an extension of the first question regarding educators' ability to define the strongest indicator of dyslexia by assessing overall knowledge of the dyslexia construct. If educators lack essential knowledge about dyslexia, then their ability to serve the dyslexic readers in their classrooms, schools, and districts will be affected. Educators will not only be unable to accurately identify dyslexic readers, but they will be unable to provide appropriate interventions. Students will not be adequately served, which will result in a lack of progress for the readers who are struggling.

Results from this study suggest that educators in the Spring Valley school district demonstrate inconsistencies in their knowledge of dyslexia. Even though theories that visual deficits are the source of dyslexia have been repeatedly discredited, educators continue to accept and promote the idea that dyslexic readers see letters and words backwards because of visual deficits. Half of the respondents endorsed the idea that dyslexia is characterized by visual deficits that cause readers to see letters and words backwards even though this theory has been repeatedly discredited. However, 68% of respondents also acknowledged that dyslexic readers demonstrate phonological processing deficits.

The contradictions in educators' knowledge appear to exist across participants' roles in the school division and are not limited by amount of experience. A chi-square analysis was conducted to determine the existence of a relationship between the number of years as an educator and responses to the question on the survey that required respondents to indicate if dyslexia is caused by visual deficits that result in letter and word reversals. Results were not statistically significant when total number of years in education were considered (X^2 (4) = 5.531,

$p > .05$), as well as when years specifically in the Spring Valley school system were examined (X^2 (4) = 4.196, $p > .05$).

Membership in professional organizations also did not appear to be related to educators' understanding of dyslexia. Chi-square analyses indicated that relationships between professional organization membership and educators' knowledge of key concepts of dyslexia were not statistically significant ($p > .05$) and suggest that professional organizations embedded in the mesosystem, exosystem, and macrosystem may not have influenced educators' knowledge of dyslexia.

Misconceptions About Dyslexia

To address the third research question, educators in the Spring Valley school system were presented with a series of questions designed to assess their acceptance or rejection of common misconceptions about dyslexia. For example, one commonly accepted misconception suggests that colored overlays or lenses help dyslexic readers. Other common misconceptions include the following: that the IQ-discrepancy model can identify dyslexic readers, more males than females are dyslexic, dyslexia is limited to the English-speaking population, and the Orton-Gillingham program is the best method to use with dyslexic readers. Evaluating educators' acceptance and rejection of common misconceptions about dyslexia will provide insights how educators will approach dyslexic readers at both the division and school levels. If educators continue to accept theories of dyslexia that have been disproven, then they may be more likely to identify and implement outdated instructional methods, which can have negative effects for dyslexic students.

Misconceptions that Dyslexia Is Caused By Visual Deficits

One question provided on the survey required participants to determine if dyslexia is characterized by visual deficits that cause readers to see letters and words backwards. This statement was included because it is a common misconception that dyslexia results from visual deficits (Hudson et al., 2007; Vellutino, 1987). Seventy-five percent of all respondents indicated that this statement was true. A chi-square analysis indicated that there was not a statistically significant difference in responses according to educators' roles in the division and their acceptance of visual deficits as a cause of dyslexia (X^2 (4) = 4.913, $p > .05$). Figure 8 provides a comparison of responses according to educators' roles.

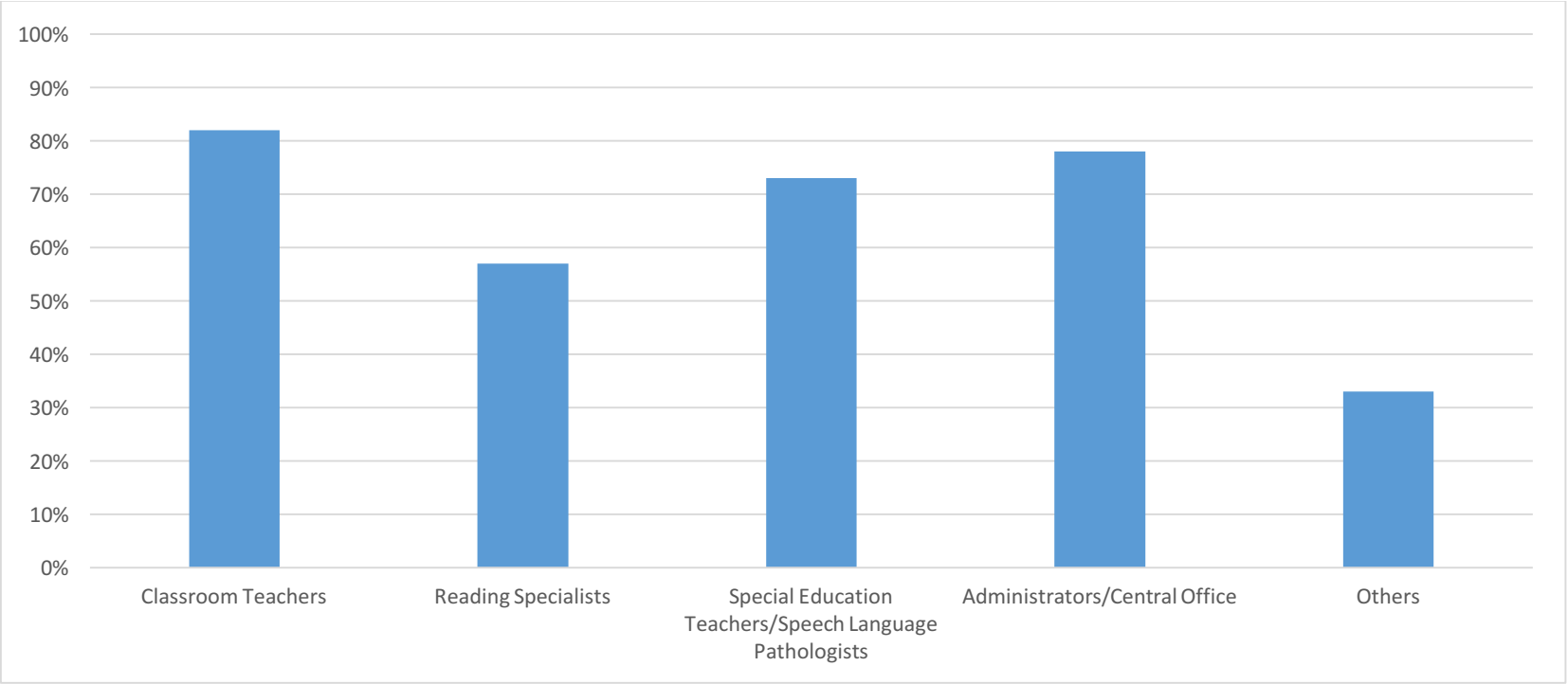


Figure 8. Percentage of Respondents By Role Who Indicated that Dyslexia is Characterized by Visual Deficits.

Sixty-eight percent of all participants recognized that dyslexic readers are characterized by phonological processing deficits while 75% of those participants also endorsed the presence of visual deficits in dyslexic readers. A chi-square analysis indicated that the relationship between participant responses regarding phonological processing and visual deficits was not statistically significant (X^2 (1) = .806, p > .05).

Misconceptions That Every Struggling Reader Is Dyslexic

Participants were also asked to determine if all struggling readers are dyslexic. This distinction is important because not all struggling readers demonstrate the issues exhibited by dyslexic readers. Some struggling readers may not present with word recognition deficits, but instead might have trouble with the comprehension of text. Other struggling readers might have accurate word recognition, but display slow oral reading fluency. One hundred percent of the respondents rejected the idea that struggling readers are automatically dyslexic.

Misconceptions About the Use of Colored Overlays or Lenses

Colored overlays or lenses are often provided for dyslexic readers by opticians, so one question on the survey asked participants whether these tools were beneficial. Sixty percent of respondents indicated that colored overlays or lenses help dyslexic readers. Reading specialists were the least likely to endorse the use of colored overlays as shown in Figure 9. Classroom teachers were most likely to agree with the statement that colored lenses were beneficial with nearly three-fourths of respondents accepting this misconception. Almost two-thirds of special education teachers and speech-language pathologists supported the use of colored lenses. A chi-square analysis that evaluated the relationship between educators' roles and their response to the question regarding the use of colored overlays was statistically significant (X^2 (4) = 10.942, p = .027). Cramer's V = .401, which suggests a strong relationship between the two variables.

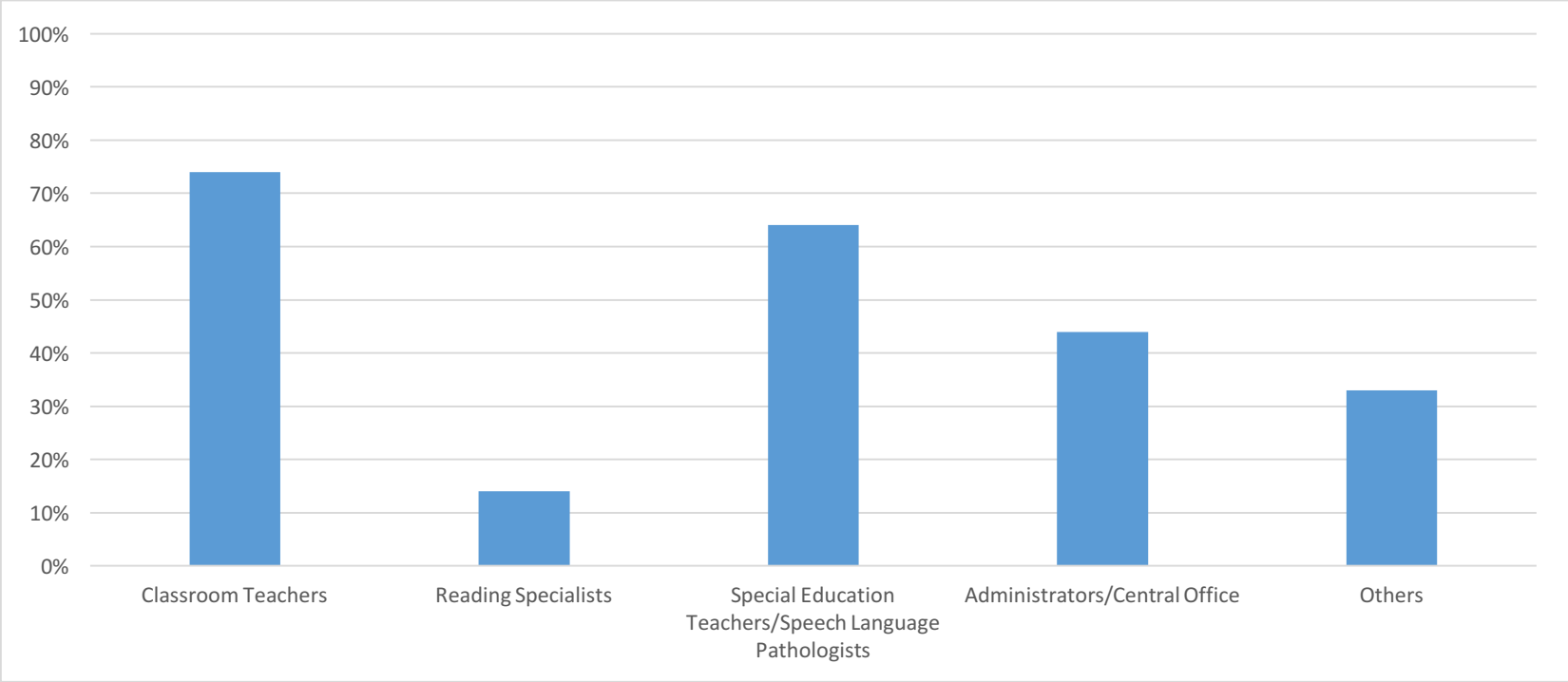


Figure 9. Percentage of Participants Who Endorse the Use of Colored Overlays for Dyslexic Readers.

Misconceptions Regarding Use of the IQ-discrepancy Model to Identify Dyslexic Readers

Many school districts, Spring Valley included, continue to use the IQ-discrepancy model when evaluating students for specific learning disabilities, although this model has been repeatedly rejected as a method for the identification of dyslexic readers (Fletcher et al., 1998; Gresham & Vellutino, 2010; Siegel, 1989) and state and federal legislation also allow districts to use the response-to-intervention model. Forty-four percent of all respondents indicated that dyslexic readers can be identified through use of the IQ-discrepancy model, although only 14 percent of reading specialists agreed with the use of this approach as shown in Figure 10. Results of a chi-square evaluating the responses of participants according to educators' roles in the school division were not statistically significant (X^2 (4) = 4.218, $p > .05$).

While IQ-achievement test results continue to be used in meetings to determine students' eligibility for special education services, one-third of administrators and Central Office staff endorsed the use of this method to identify dyslexic readers.

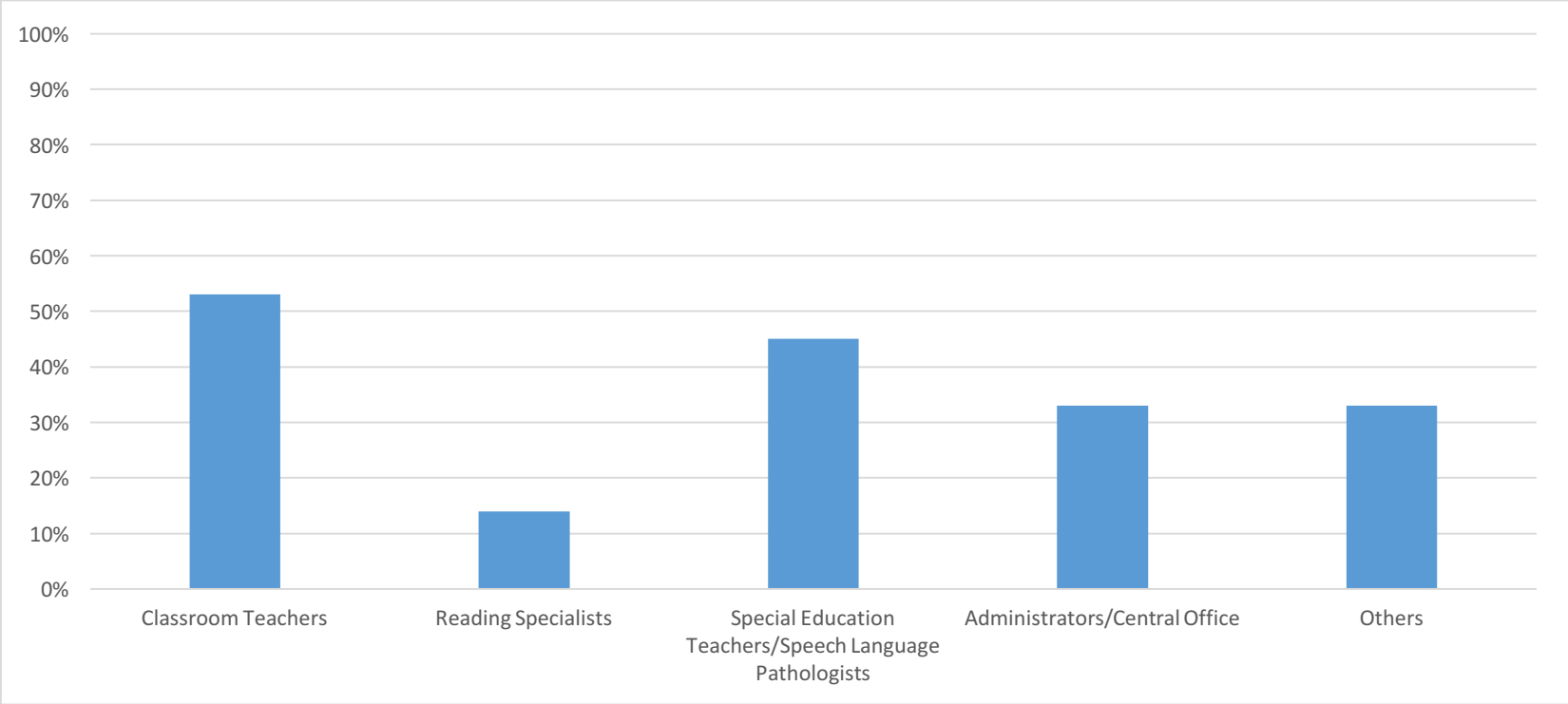


Figure 10. Percentage of Participants in the Spring Valley District Who Endorse Use of the IQ-Discrepancy Model.

Misconceptions Regarding the Gender of Dyslexic Readers

Another common misconception regarding dyslexia involves gender. Although studies (e.g., Hawke et al., 2006; Wadsworth et al., 2000) have rejected the premise that more males are diagnosed with dyslexia, this misconception continues to be endorsed by many educators and the respondents from the Spring Valley school system were no different as indicated in Figure 11. Among the participants in this study, 81% indicated that more males than females are dyslexic. The differences between the different groups of educators was not statistically significant according to the results from a chi-square analysis (X^2 (4) = 4.044, $p > .05$).

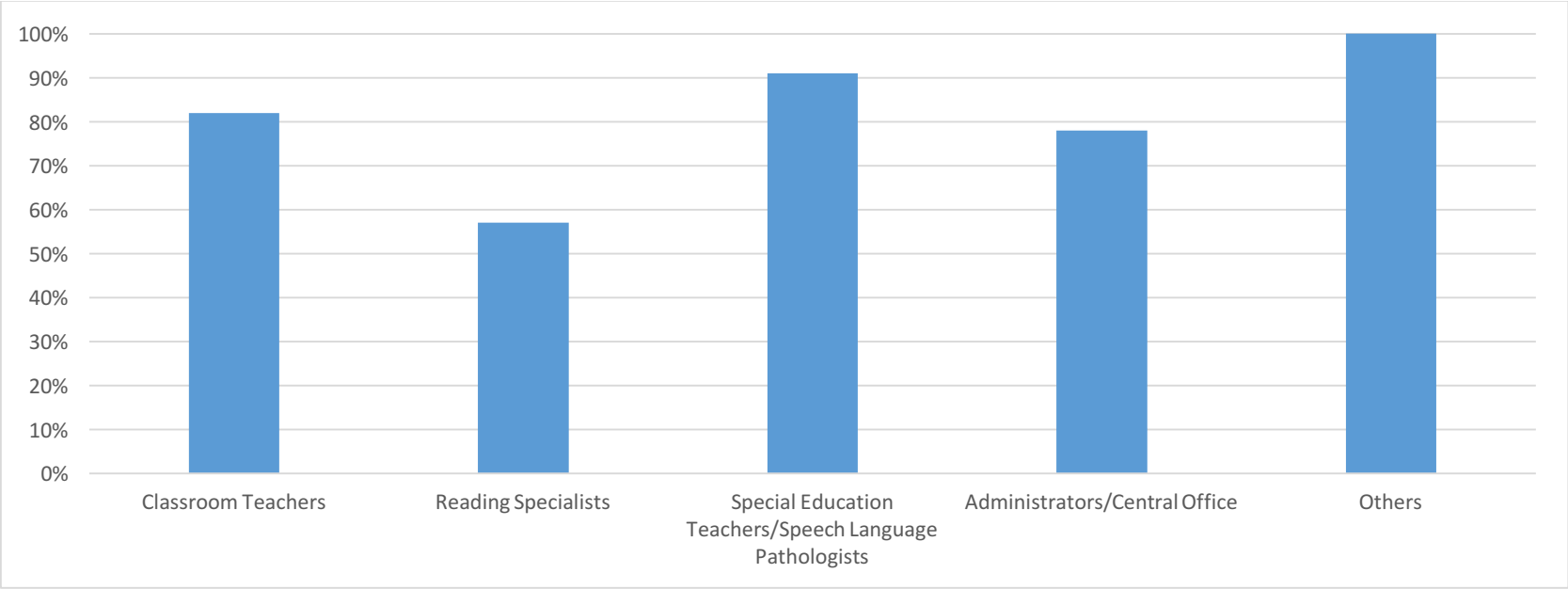


Figure 11. Percentage of Participants Who Agree with the Misconception that Males are More Likely to be Diagnosed with Dyslexia.

Misconceptions of Dyslexia as Specific to English-speaking Populations

Dyslexia has been erroneously characterized as limited to the English language. However, Hudson et al. (2007) noted that dyslexia is found in many languages, including those languages that are not based upon an alphabetic orthography (e.g., Chinese). Ninety-six percent of all survey respondents rejected the statement that dyslexia is limited to the English-speaking population. A chi-square analysis indicated no statistically significant differences between the responses of educators according to their different roles (X^2 (4) = 3.508, $p > .05$).

Misconceptions Regarding the Orton-Gillingham Program

The Orton-Gillingham program is often viewed as the best approach to use with dyslexic readers, although empirical evidence supporting such an assertion is lacking (Ritchey & Goeke, 2006). Specifically, Ritchey and Goeke (2006) noted that "despite widespread use by teachers in a variety of settings for more than 5 decades, OG instruction has yet to be comprehensively studied and reported in peer-reviewed journals" (p. 182). Of the educators surveyed for this study, 44% indicated that the Orton-Gillingham program was the best method for dyslexic readers. More than half of the administrators and Central Office staff surveyed indicated support for the Orton-Gillingham program. The highest percentages of respondents who indicated support for the Orton-Gillingham program included participants who identified with the "Other" category. These educators typically were not responsible for direct literacy instruction, although they may have interactions with dyslexic readers. Results from a chi-square analysis that included educator roles and responses to the question about the Orton-Gillingham program were not statistically significant (X^2 (4) = 1.403, $p > .05$), Figure 12 shows the percentage of respondents from each group who reported that the Orton-Gillingham method was the best program for dyslexic readers.

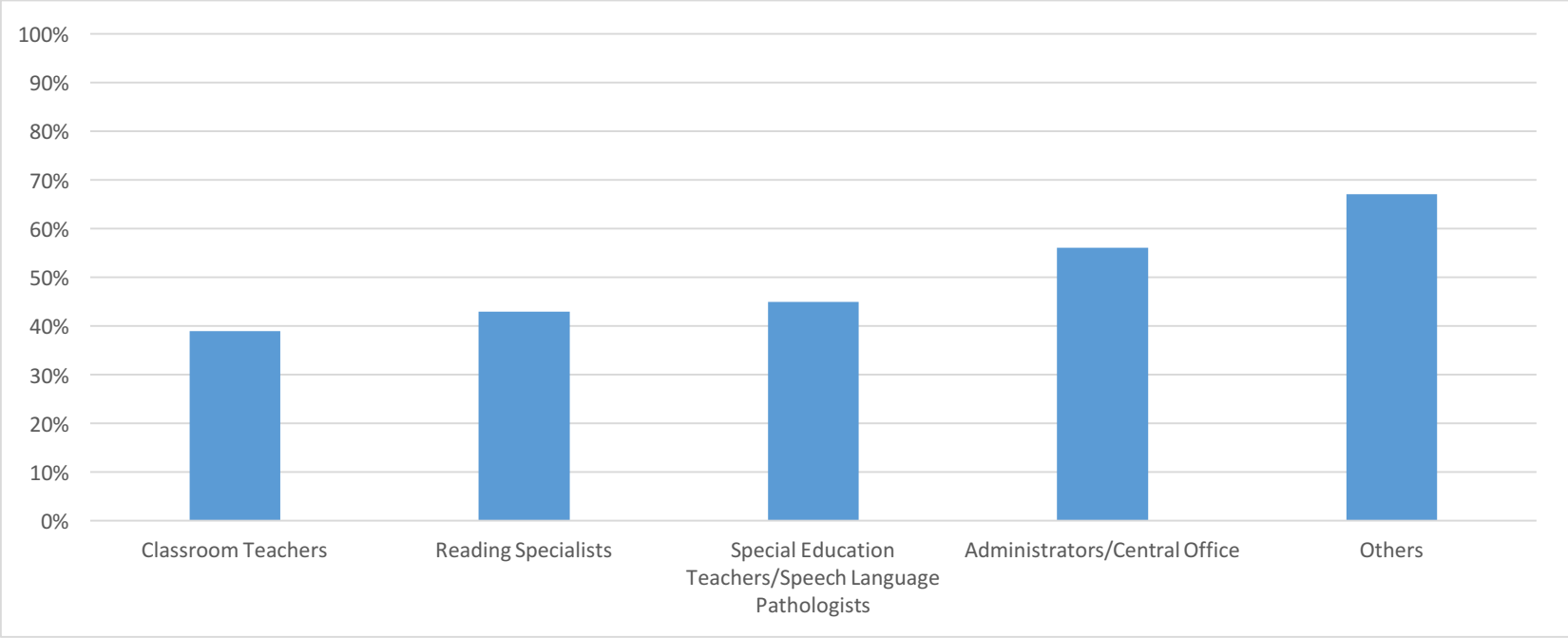


Figure 12. Percentage of Educators Who Indicated that the Orton-Gillingham Program is the Best Approach for Dyslexic Readers.

Summary of Results

Overall, results suggest that although Spring Valley educators reject some misconceptions about dyslexia (e.g., dyslexia is limited to the English-speaking population), they continue to accept misconceptions that can affect how dyslexic readers are supported at both the school and division levels. For example, many educators endorsed the theory that dyslexia is caused by visual deficits that cause the reversal of letters and words when reading and spelling. Educators also indicated that colored overlays or lenses were beneficial for dyslexic readers and reported that dyslexia is more likely to affect males than females. These theories have been repeatedly discredited in the past three decades, which suggests a division between research and practice.

Some, although not all educators, continue to support the misconception that use of the IQ-discrepancy model can accurately identify dyslexic readers, although research has confirmed that the existence of a discrepancy between IQ scores and achievement test scores does not necessarily signify that a child is dyslexic. However, the IQ-discrepancy model is often used during the special education process in the Spring Valley school system, so even though educators appear to be aware that the IQ-discrepancy model is not a viable method for identifying dyslexic readers, that knowledge does not yet translate to practice.

Most of the educators who participated in this study recognized that not all struggling readers are dyslexic. In addition, they also acknowledged that dyslexia is not limited to English-speaking populations. Educators in the Spring Valley school system were also aware that dyslexic students do not always have strong comprehension. This knowledge is important as educators work to meet the needs of dyslexic readers in their schools and districts and provides a

starting point for Spring Valley educators as they continue to increase their knowledge about dyslexia.

Spring Valley Educators' Preparation to Support Dyslexic Readers

The fourth research question posed for this study focused on the extent to which educators in the Spring Valley school system had been prepared or trained to support dyslexic readers. Specifically, participants were asked about their training and how they obtain information about dyslexia. In addition, questions addressed participants' engagement in professional development activities as well as their need for further training.

Participation in Professional Development

Educators in the Spring Valley school district were asked to report their participation in professional development activities related to literacy in general as well as opportunities specifically focused on dyslexia. One set of questions addressed professional development that occurred during the nine-week period preceding the survey while other questions targeted activities over the course of a year. Participants were also invited to identify their specific professional development activities. The results provided insights into not only the amount of professional development, but also the types of activities engaged in by Spring Valley educators.

Participation in activities addressing literacy during a nine-week period. Participants were asked about their professional development activities focused on literacy during the course of the nine weeks prior to the administration of the survey. Answer choices included zero times in nine weeks, one to three times, four or five times, and more than five times in the nine-week period. Only a third of all respondents indicated that they had participated in literacy-oriented professional development activities between one and three times during that period and 64% reported that they had not participated in any professional

development activities related to literacy during the past nine weeks. As indicated in Figure 13, administrators and Central Office staff members were more likely than any of the other groups of educators to report participation in professional development opportunities related to literacy. However, more than half of classroom teachers reported that they had not participated in any professional development activities involving literacy in a nine-week period and less than half of the reading specialists surveyed reported participation in between one and three activities during that time. A chi-square analysis indicated that the relationship between educators' roles in the school district and participation in literacy-focused professional development was not statistically significant (X^2 [4] = 4.667, $p > .05$).

These results suggest that Spring Valley educators did not take advantage of opportunities for professional development provided by organizations in the mesosystem and exosystem. Specifically, the nine-week period preceding the survey included the state reading association's annual conference and the Meadowview Reading Council's spring mini-conference.

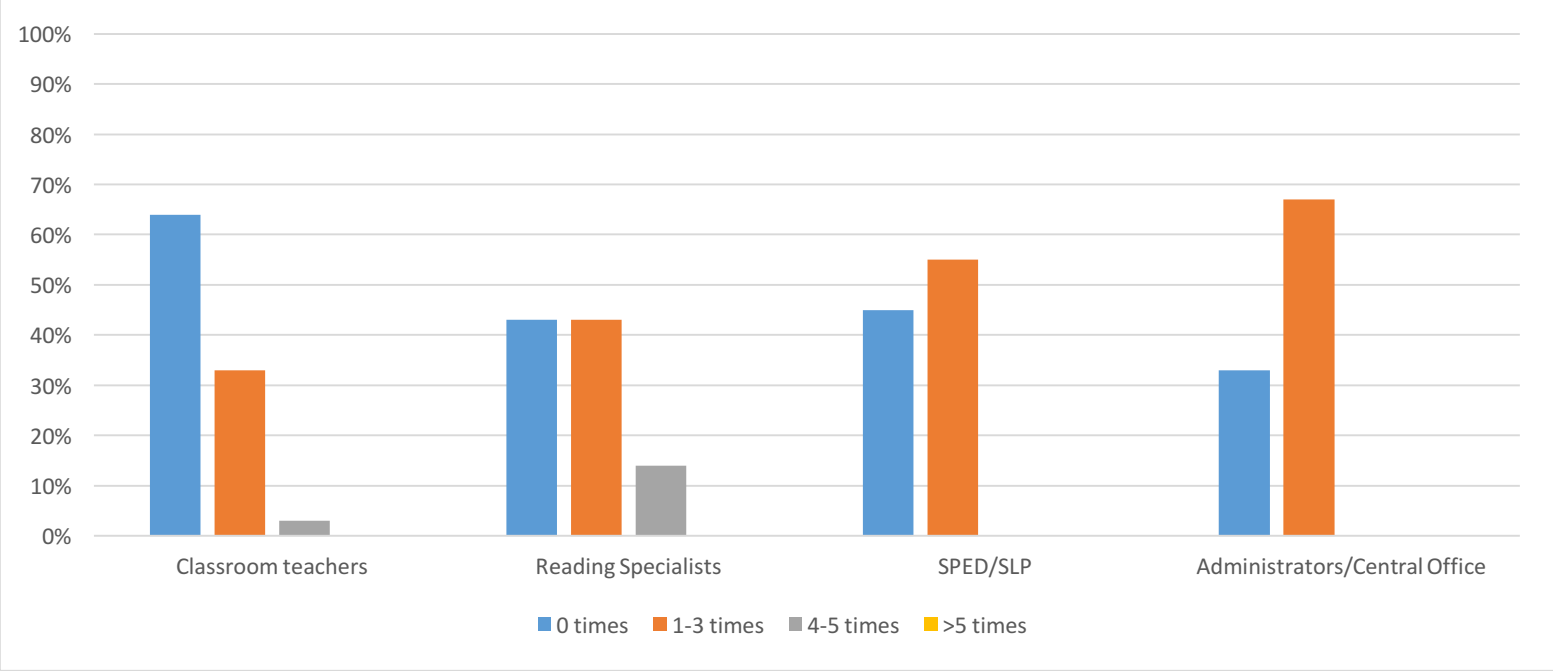


Figure 13. Participation in Literacy-Focused Professional Development Opportunities During a Nine-week Period.

Participation in activities addressing dyslexia during a nine-week period.

Participants were also asked to consider how often they had participated in professional development activities that specifically addressed the topic of dyslexia during the nine-week period prior to administration of the survey. Again, participants were able to select answer choices that ranged from zero opportunities to more than five. As shown in Figure 14, only small percentages of classroom teachers and administrators and Central Office staff reported any professional development on the topic of dyslexia. Results from a chi-square analysis indicated that the relationship between participants' roles in the Spring Valley school district and participation in dyslexia-focused professional development were not statistically significant (X^2 [2] = .470, $p > .05$).

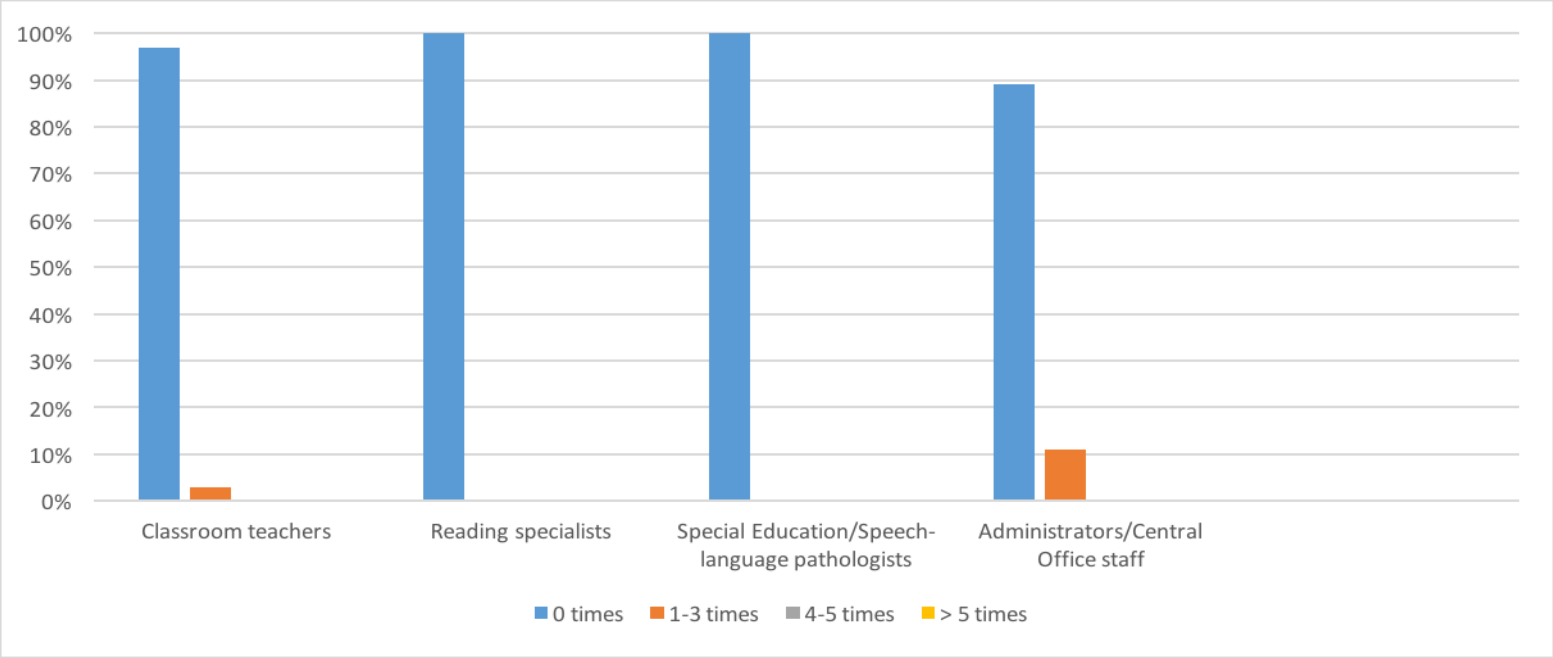


Figure 14. Participation in Dyslexia-Focused Professional Development Activities During a Nine-week Period.

Participation in activities addressing literacy during the past year. Participants were not only questioned about their participation in professional development activities related to literacy during a nine-week period, but they were also asked to report on their activities over the course of an entire year. This question was included to evaluate the influence of timing on professional development in order to determine if differences existed between different periods of time because educators may be more likely to participate in professional development activities during the summer and at earlier times during the school year. Therefore, a question focusing only on a nine-week period near the end of the school year might not capture an accurate assessment of respondents' participation in professional development activities.

Although only one-third of all participants reported literacy-focused professional development during the nine weeks before the survey was administered, 72% indicated that they had participated in professional development with an emphasis on literacy over the course of the past year. Reading specialists represented the group with the highest percentage with 86% of those surveyed indicating that they had participated in literacy-oriented professional development. Nearly three-quarters of special education teachers and speech-language pathologists indicated their involvement in activities that emphasized literacy. Figure 15 illustrates the percentages of participants who reported participation in literacy-based professional development activities during the past year.

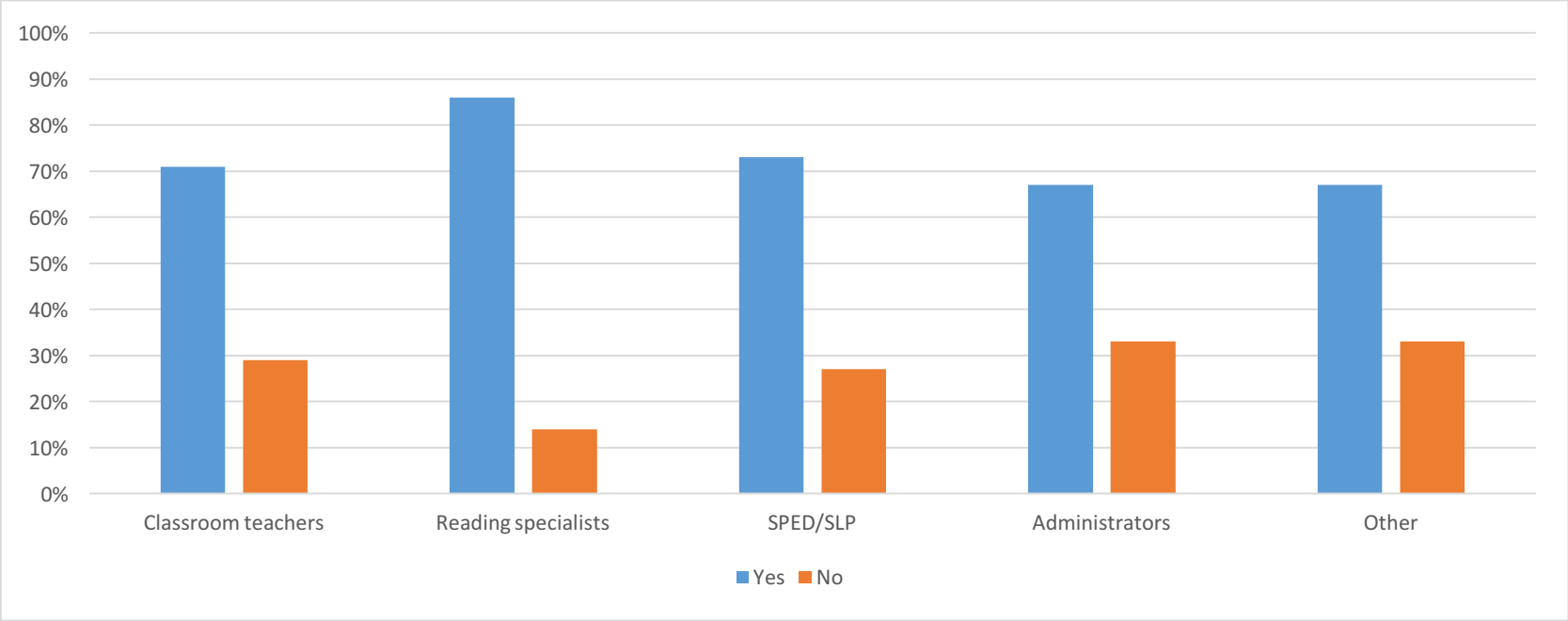


Figure 15. Participation in Literacy-based Professional Development During the Past Year.

Respondents also indicated the types of professional development activities in which they engaged during the past year. The professional development opportunities that were most often selected by Spring Valley educators represent components of the macrosystem, mesosystem, and exosystem in the ecological systems model and reinforce the influential roles of each of these elements. For example, school-based and district-sponsored professional development activities were among the most frequently selected choices as shown in Table 6. In addition, conferences sponsored by organizations such as the state reading association were a source of literacy-based professional development for 83% of reading specialists in the Spring Valley school system.

Table 6

Types of Literacy-Focused Professional Development Among Spring Valley Educators

	Classroom Teachers	Reading Specialists	Special Education/ Speech-Language Pathologists	Administrators/ Central Office staff	Others
School based PD	74%	67%	73%	63%	50%
District-sponsored PD	59%	17%	45%	38%	50%
T-TAC[a] workshops	36%	50%	9%	63%	50%
One-day workshops and conferences	15%	33%	27%	38%	100%
Conferences sponsored by professional organizations	8%	83%	18%	0%	50%
Professional book studies	13%	17%	9%	38%	50%

	Classroom Teachers	Reading Specialists	Special Education/ Speech-Language Pathologists	Administrators/ Central Office staff	Others
PALS webinars	13%	33%	0%	38%	0%
State DOE webinars	8%	0%	0%	38%	0%
Other[b]	3%	0%	0%	13%	0%

Note. [a]T-TAC stands for Training and Technical Assistance Center and provides in-service opportunities for educators.
[b]Responses provided for the "Other" category included webinars and participation in a doctoral program at Virginia Polytechnic Institute and State University.

Participation in activities addressing dyslexia during the past year. Only two percent of all educators surveyed participated in dyslexia-specific professional development activities during the nine weeks prior to the survey's administration. However, when the time frame was extended to include the course of a year, the percentage of respondents who reported participating in professional development that addressed dyslexia remained small. Specifically, six percent of all educators indicated professional development experiences related to dyslexia during the course of the year. None of the reading specialists who participated in the study reported dyslexia-specific professional development and only nine percent of special education teachers and speech-language pathologists documented any professional development experiences that included dyslexia. Although 100 percent of respondents who selected the "Other" designation to describe their role in the school division reported that they had not participated in dyslexia professional development during the past year, the majority of these "other" respondents were not responsible for literacy instruction. Figure 16 reports the participation by Spring Valley educators in dyslexia-focused professional development over the past year.

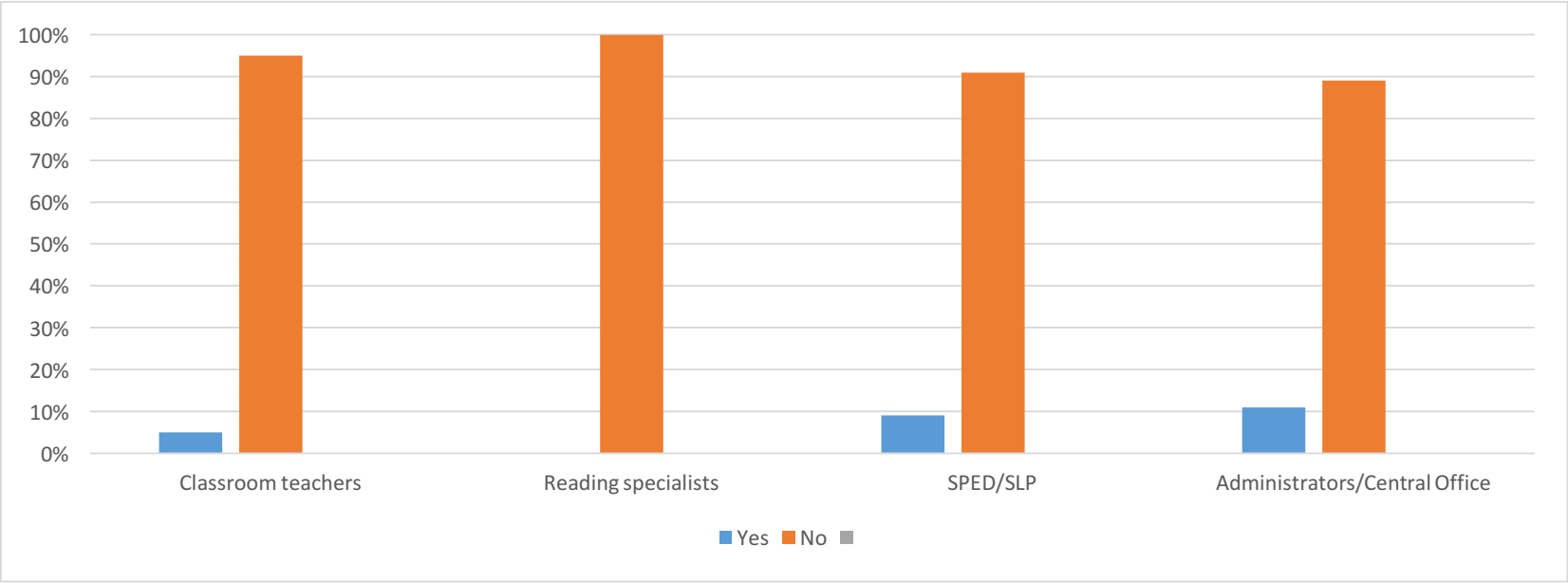


Figure 16. Participation in Dyslexia-based Professional Development During the Past Year.

Educators' Perceptions of Their Preparation to Work With Dyslexic Readers

In order to determine Spring Valley educators' perceptions of their preparation to work with dyslexic readers, they were asked to indicate if they agreed or disagreed with the following statement: *I am prepared to work with dyslexic readers*. Based on the responses to this statement, many educators do not appear to consider themselves as prepared to provide the support that dyslexic readers require. Among all participants, two-thirds of the respondents either disagreed or strongly disagreed with the statement that they were prepared to support dyslexic readers. Only one-quarter of all respondents reported that they felt an appropriate level of preparation. As shown in Figure 17, educators in a variety of roles in the Spring Valley school system appeared not to feel adequately prepared to provide support for dyslexic readers.

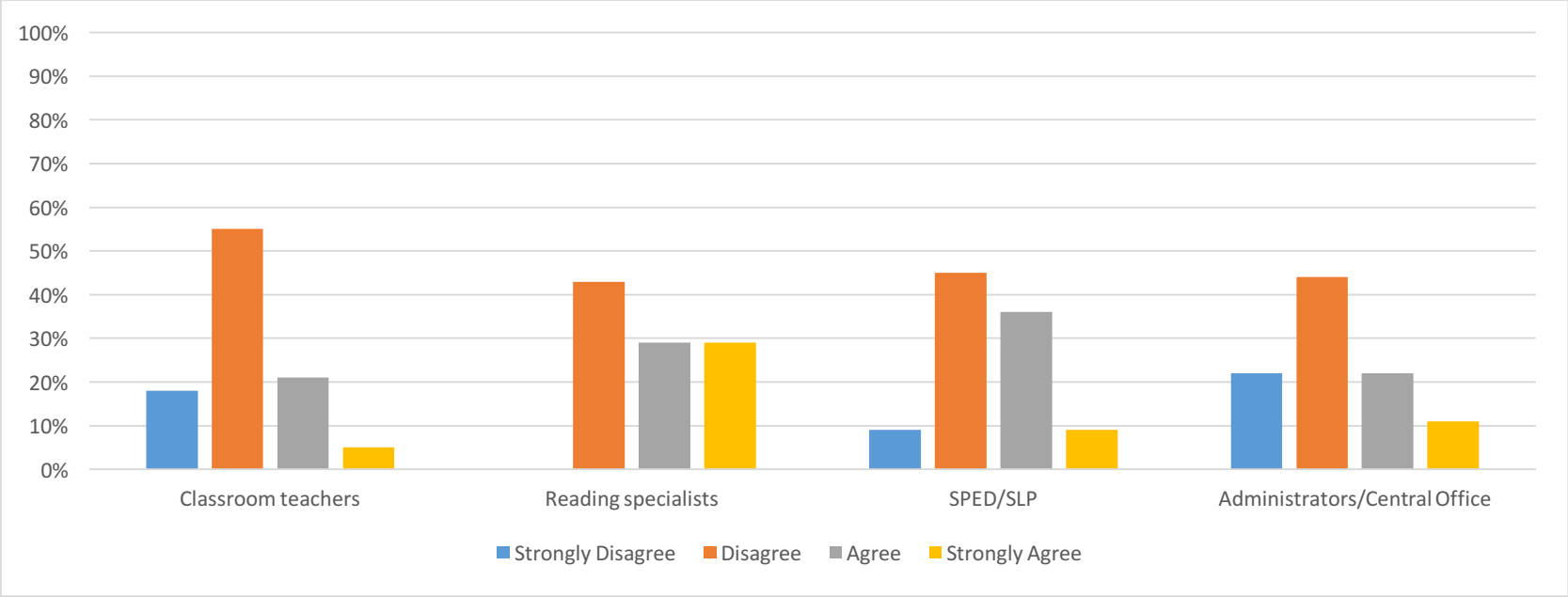


Figure 17. Educators' Response to the Statement, "I am prepared to work with dyslexic readers."

Educators' Perceptions of Their Need for Professional Development

Participants were asked if they needed professional development targeting strategies and methods for supporting dyslexic readers. While earlier questions probed at participants' knowledge of dyslexia, the responses to this question provided educators with an opportunity to consider their personal need for dyslexia-focused professional development. The responses to this question also determined if educators recognized deficits in their knowledge of dyslexia.

Nearly 50% of all participants agreed that they would benefit from additional professional development and an additional 40% responded that they strongly agreed with this statement. Almost 90% of classroom teachers either agreed or strongly agreed that they needed dyslexia-focused professional development. Similarly, nearly 90% of administrators and Central Office staff indicated the need for professional development that addressed strategies and methods for dyslexic readers. More than 90% of special education teachers and speech language pathologists also indicated a need for professional development. Among reading specialists, 100% either agreed or strongly agreed that professional development in dyslexia would be beneficial. Based on these results, it appears as though educators division-wide are willing to participate in dyslexia-oriented professional development and that they recognize that they have deficits in their knowledge of dyslexia. Figure 18 reports participants' responses to the question regarding the need for professional development.

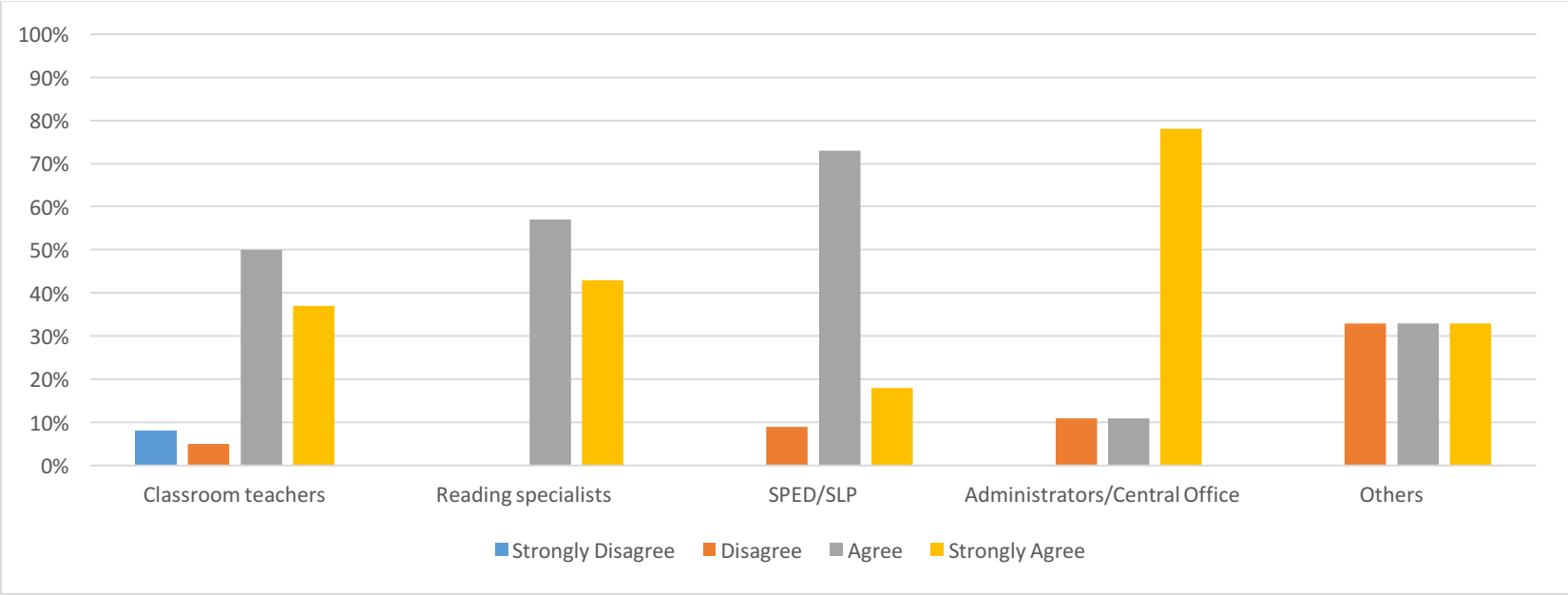


Figure 18. Responses Indicating Participants' Need for Dyslexia-related Professional Development.

Educators' Perceptions of Their Need for Information on Topics Related to Dyslexia

The educators who participated in this survey were asked to indicate how informed they felt on a variety of topics related to the dyslexia construct. For example, participants were asked if they needed more information or if they possessed sufficient information on topics that ranged from the definition of dyslexia to the identification of dyslexic readers and strategies. Responses to these questions can be used to identify specific topics to address in professional development sessions.

The definition of dyslexia. The definition of dyslexia was first topic that participants were asked to consider. Sixty-nine percent of all respondents reported that they would like more information on the definition of dyslexia while 31% of all respondents noted that they already possessed a sufficient amount information on that topic. Eighty-six percent of reading specialists recognized that they needed additional information about the definition of dyslexia. Administrators and Central Office staff also noted that they needed information about the definition of dyslexia, with 78% requesting information on this topic. However, 55% of special education teachers and speech-language pathologists reported the need for information about the definition of dyslexia. Figure 19 illustrates participants' need for information about the definition of dyslexia.

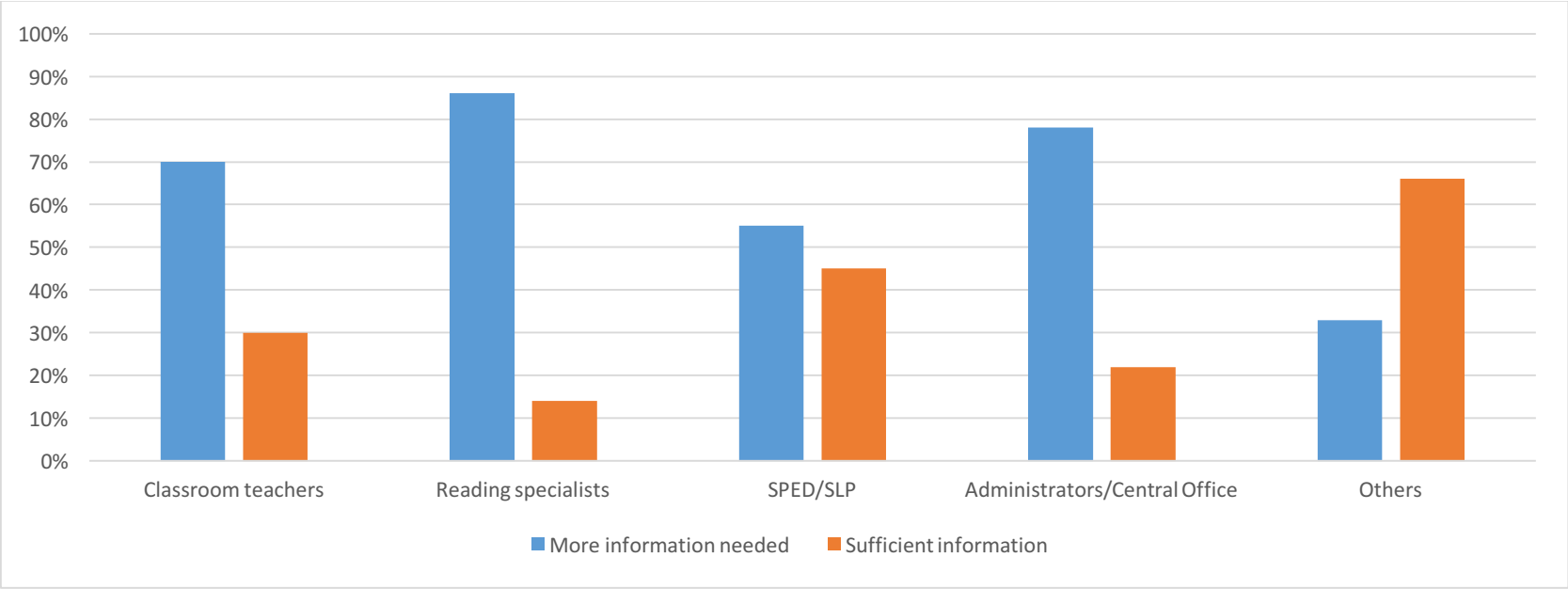


Figure 19. Participants' Reported Need for Information Regarding the Definition of Dyslexia.

Identifying dyslexic readers. Participants were also asked if they needed information about how to identify dyslexic readers. Ninety percent of all respondents indicated that they would like information on this topic. Since the IQ-discrepancy model continues to be both cited and used as a method for identifying dyslexic readers, the recognition by the educators in this study that they need further information on this topic is promising. While special education teachers and speech-language pathologists did not appear to want information about the definition of dyslexia, more than 80% of respondents expressed interest in obtaining additional information regarding the identification of dyslexic readers. Although two-thirds of the respondents who identified themselves in the "Other" category indicated that they had sufficient information about how to identify dyslexic readers, the majority of these "Other" respondents were not responsible for literacy instruction and they may not anticipate needing to identify dyslexic readers as a part of their instructional role. Figure 20 presents the responses to the question about the need for information for the identification of dyslexic readers.

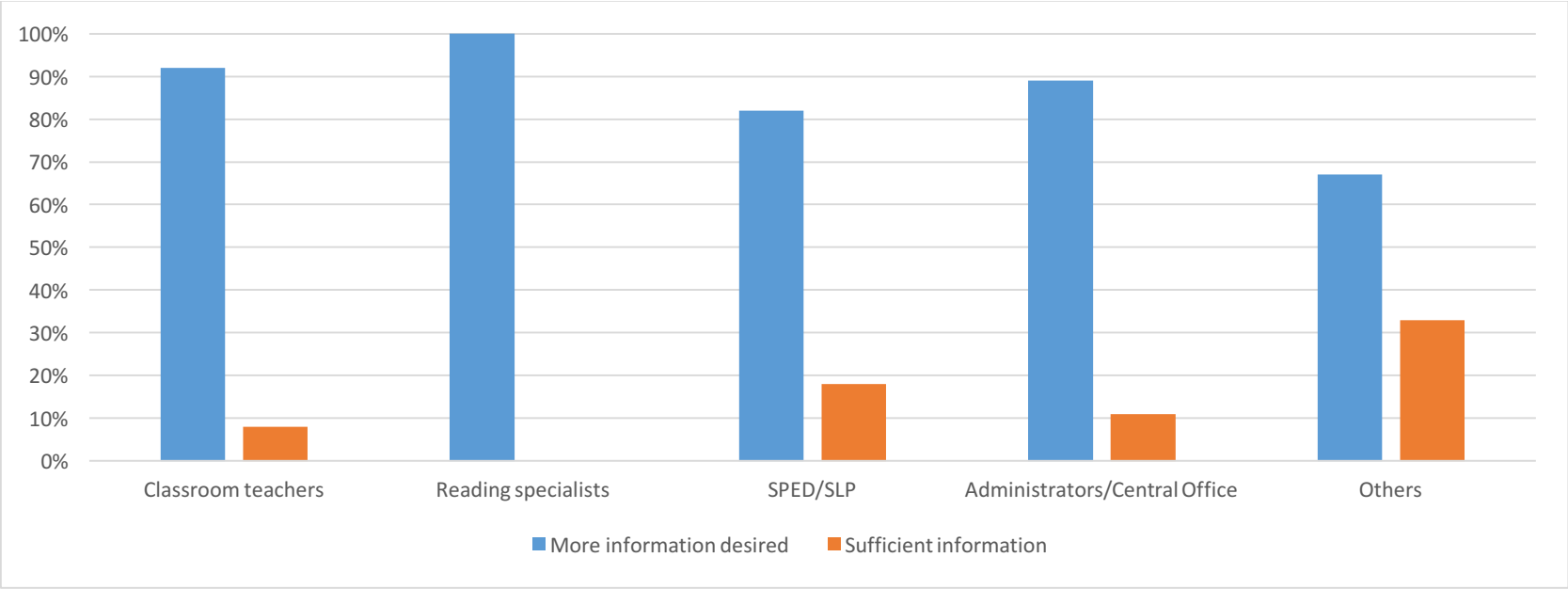


Figure 20. Participants' Reported Need for Information Regarding the Identification of Dyslexic Readers.

Strategies and techniques for supporting dyslexic readers. Participants were asked to indicate their need for more information about strategies and techniques for supporting dyslexic readers. Ninety-four percent of all respondents reported that they would like more information on this topic. These results suggest that respondents across a variety of roles are interested in learning more about the methods that will benefit dyslexic readers. One hundred percent of administrators and Central Office staff noted that they would like information about strategies for dyslexic readers.

Programs used with dyslexic readers. When asked about their need for information regarding programs used with dyslexic readers, 93% of all participants indicated their interest in obtaining information on this topic. One hundred percent of reading specialists, special education teachers, and speech-language pathologists noted that they would like this information. The large percentage of educators who want more information about programs that are used with dyslexic readers implies that these educators believe that programs are necessary for use with dyslexic readers.

Materials used with dyslexic readers. Participants were also asked to consider how informed they felt regarding the materials that are used with dyslexic readers. Again, respondents overwhelmingly expressed the need for further information with 91% of all participants in agreement. All of the reading specialists, 92% of classroom teachers, and 91% of special educations teachers and speech-language pathologists surveyed for this study reported that they wanted to find out more about the materials they should use with dyslexic readers in their classrooms. Similarly, 89% of administrators and Central Office staff indicated interest in information about materials used with dyslexic students.

Professional development focused on dyslexia. Participants were asked to determine how informed they felt about professional development opportunities focused specifically on dyslexia. Ninety-four percent of respondents revealed that they would like more information about the availability of these opportunities. All of the reading specialists, as well as the administrators and Central Office staff who were surveyed expressed interest in this topic. The overall response to this question provides evidence that educators in the Spring Valley school system are interested in opportunities to expand on their knowledge of dyslexia. Furthermore, as indicated by educators' responses to other questions on the survey, most of the educators surveyed have not participated in professional development with an emphasis on dyslexia.

Educators' Consultation of Resources About Dyslexia

Even though educators in the Spring Valley school system may not have participated in professional development activities related to dyslexia, they could still enhance their understanding of the topic by consulting resources for additional information. Participants were asked if they consulted resources that addressed dyslexia and dyslexic readers and 39% of all respondents indicated that they accessed resources related to dyslexia. Figure 21 provides the percentages of responses to this question according to educators' roles. As shown in this table, more than half of the respondents in each category indicated that they had not consulted any resources on the topic of dyslexia.

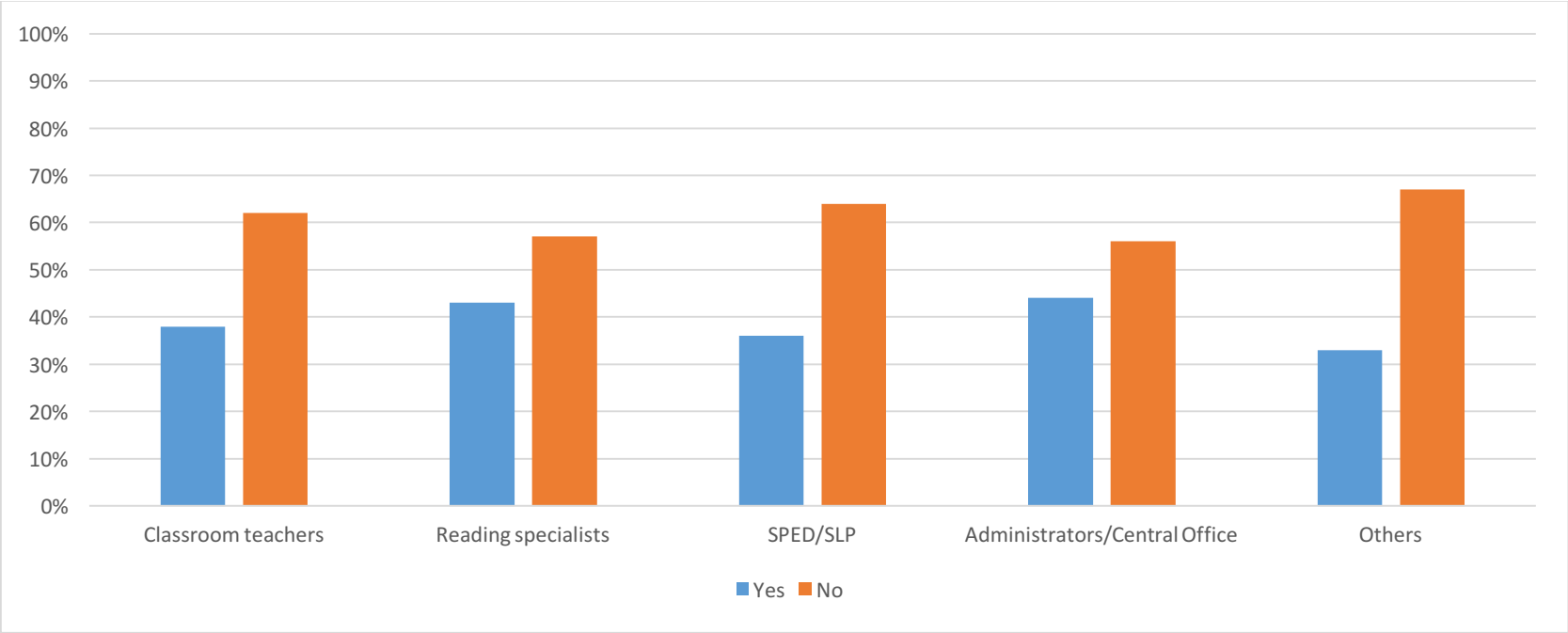


Figure 21. Participants' consultation of resources related to dyslexia.

Of those participants who indicated that they consulted resources regarding dyslexia and dyslexic readers, professional colleagues and professional books represented the most popular choices selected by respondents as shown in Figure 22. Rarely were materials from college and university courses or professional journals cited by the survey's respondents, who were more likely to rely on Google's search engine instead. The influence of professional conferences on educators in the Spring Valley school system also appears to be minimal as only two percent of respondents selected this choice. Although professional organizations at the levels of the mesosystem, exosystem, and macrosystem often present conferences on a variety of topics related to literacy, their lack of influence could be attributed to an absence of conference sessions that address the topic of dyslexia.

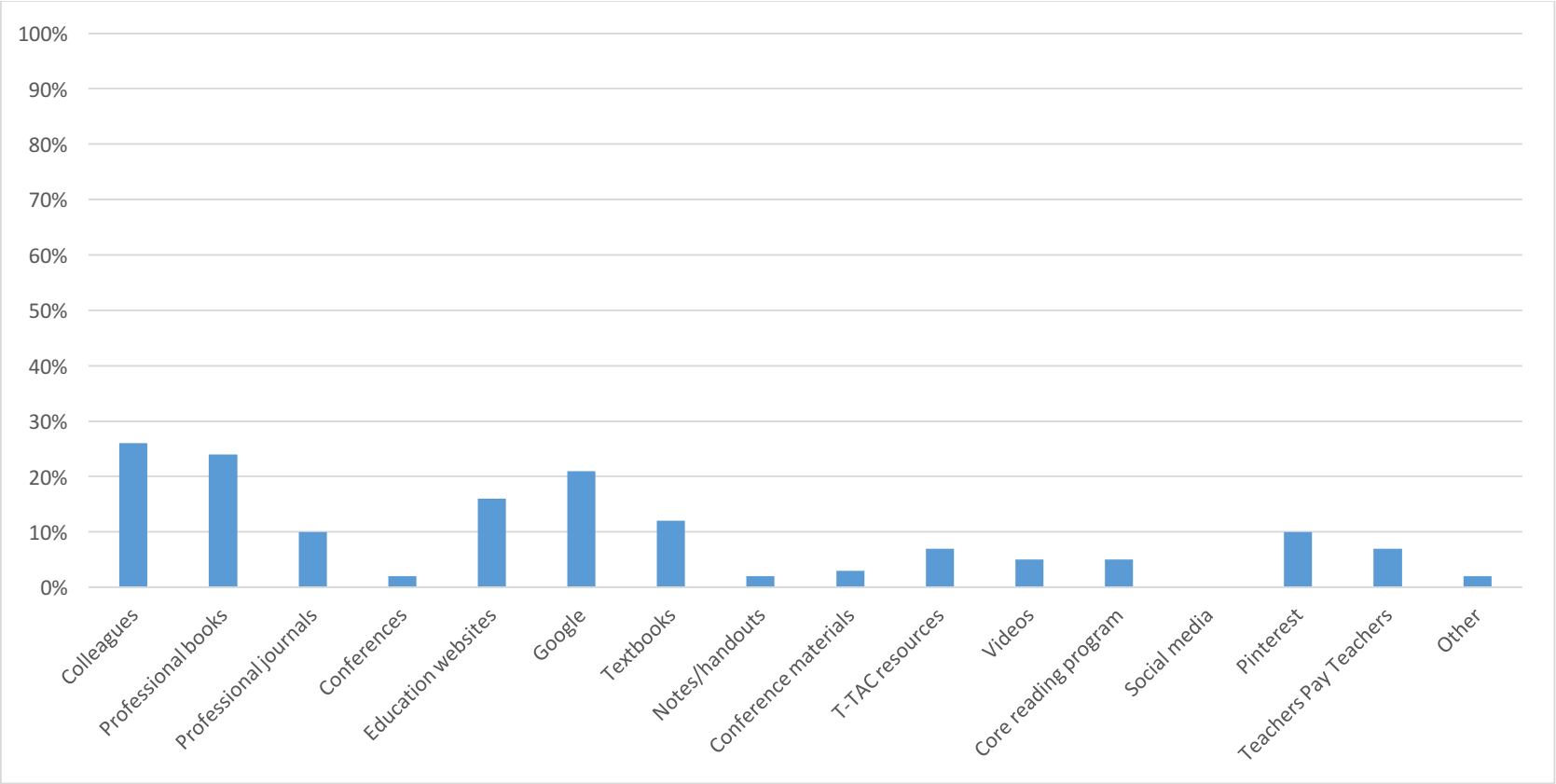


Figure 22. Resources Consulted by Participants in the Spring Valley School System.

Participants who indicated that they consulted professional colleagues regarding dyslexia and dyslexic readers often reported seeking advice from the reading specialists or special education teachers at their schools as illustrated by the results provided in Figure 23. However, many of the reading specialists and special education teachers who participated in the survey reported that they did not feel prepared to work with dyslexic readers and that they needed professional development opportunities related to dyslexia. In addition, common misconceptions (e.g., dyslexia is the result of visual deficits, dyslexic readers see letters and words backwards) continue to be accepted by both reading specialists and special education teachers, which can result in the continued promotion of inaccurate information.

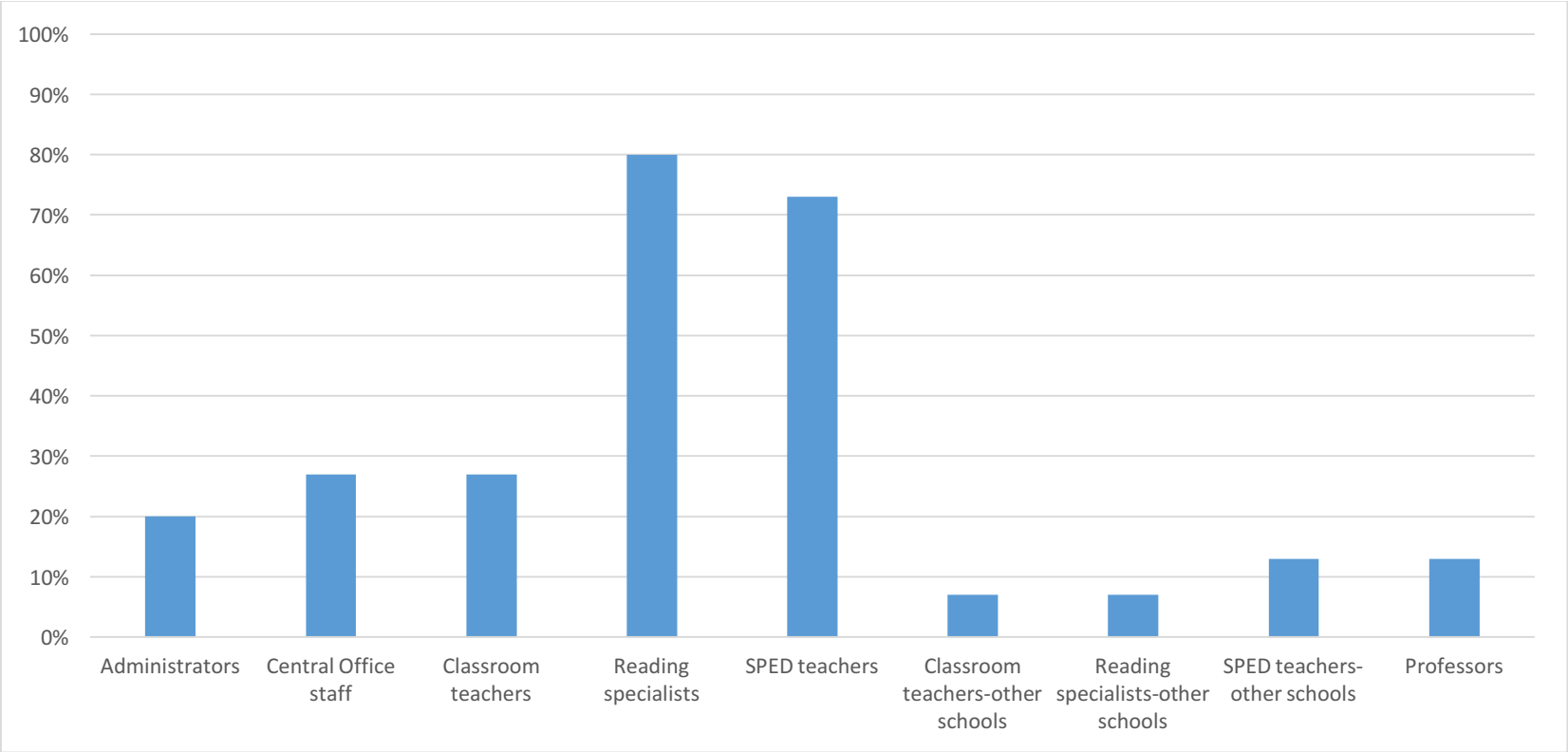


Figure 23. Resources Consulted by Participants in the Spring Valley School System.

School administrators and Central Office staff appeared to be infrequently consulted on issues related to dyslexia. Educators in the Spring Valley school system also did not often report conferring with educators at other schools when they had questions and concerns involving dyslexia. Professors at the college and university level were also rarely asked about issues concerning dyslexia and dyslexic readers.

Many educators in the Spring Valley school system do not currently report consulting resources regarding dyslexia and dyslexic readers. Of the educators who indicated that they do consult these resources, almost one-third of respondents indicated that they asked professional colleagues for support. Furthermore, the different levels of the ecological systems (e.g., mesosystem, exosystem, and macrosystem) model did not appear to have a substantial influence on educators in the Spring Valley school system.

Summary of Results

Overall, results indicate that most educators in the Spring Valley school system do not feel prepared or trained to work with dyslexic readers, although they often recognize their need for opportunities to increase their knowledge of dyslexia. Many educators also acknowledge their need for additional information on several significant topics (e.g., the identification of dyslexic readers, strategies for supporting dyslexic readers). However, educators also reported that they have neither participated in dyslexia-focused professional development, nor have they consulted any resources about dyslexia. These results may explain why many educators continue to endorse common misconceptions about dyslexia and why their definitions of dyslexia are often outdated or incomplete.

Identifying and Supporting Dyslexic Readers in the Spring Valley School System

The final research question in this study addressed how educators identify and support dyslexic readers in the Spring Valley school system. Participants were first asked if they had dyslexic readers in their classrooms and schools. Then they were asked about the criteria they used to determine if a student is dyslexic and the interventions they provided for dyslexic readers. Responses provided by participants were evaluated against evidence-based best practices.

The Identification of Dyslexic Readers

Participants were asked if they currently worked with dyslexic readers. Sixteen percent of all respondents indicated that they worked with dyslexic readers, while 36% indicated that they did not. An additional 48% selected the "Maybe" option as they were unsure if any of their students were dyslexic. One respondent noted that "I am not sure that a student has ever been identified as dyslexic as long as I have been teaching." As shown in Figure 24, special education teachers and speech-language pathologists were more likely to report working with dyslexic readers, while classroom teachers were the least likely to indicate that they worked with students who were dyslexic. Although only 14% of reading specialists indicated that they worked with dyslexic readers, 86% recognized the possibility that they might have dyslexic readers in their classrooms. Only a small percentage of administrators acknowledged the presence of dyslexic readers.

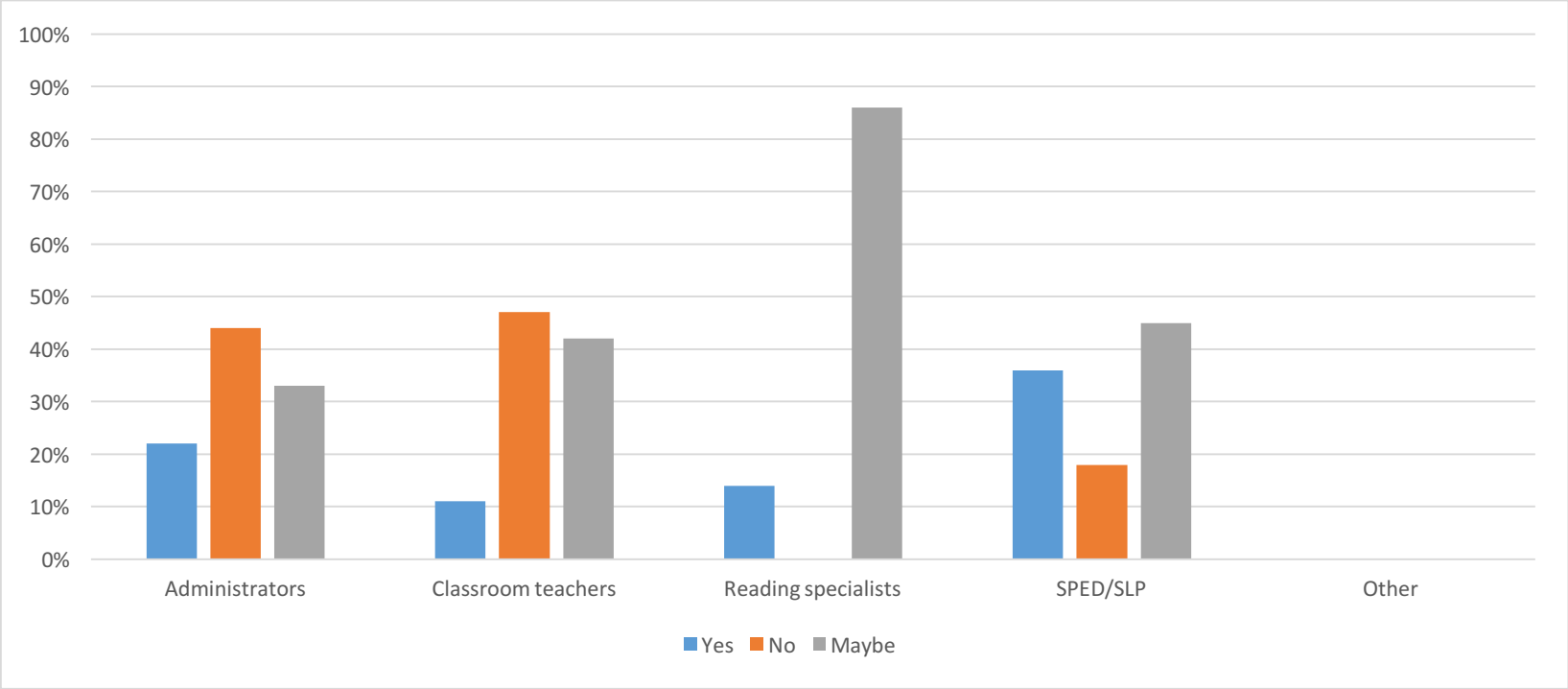


Figure 24. Participant Recognition of the Presence of Dyslexic Readers in Their Classrooms and Schools.

Some educators' reticence in recognizing dyslexic readers could be the result of their school culture. For example, a classroom teacher at one of the elementary schools in the division replied to the initial contact regarding participation in the survey and noted that "We don't recognize dyslexia at Pleasant Hill. A reading disability is a reading disability is what we are told (name withheld for confidentiality, personal communication, May 9, 2016)." A parent employed by the Spring Valley school system also recognized that the term "dyslexia" was discouraged at this particular school. When this parent mentioned the possibility of dyslexia during a meeting involving her son, who has a learning disability, she reported being told that the school did not endorse use of the term dyslexia (name withheld for confidentiality, personal communication, June 10, 2016).

Identifying Dyslexic Readers During The Child Study and IEP process

The Child Study and IEP processes both provide opportunities to recognize dyslexic readers. During the Child Study process, educators determine if a child should be evaluated to determine the presence of a learning disability. They also consider the instruction that has been provided for the child, as well as his or her response to intervention and is a time when educators can have conversations about dyslexia. Similarly, IEP meetings provide opportunities when the topic of dyslexia can be addressed. As a result, Spring Valley educators were asked about their participation in Child Study and IEP meeting that focused on students with dyslexia during a nine-week period. As illustrated in Figure 25, most participants reported that they had not participated in any Child Study meetings that were focused on students with dyslexia. This lack of participation in Child Study meetings that involve dyslexic readers could be a consequence of how dyslexia is viewed at the school level. If a school (e.g., Pleasant Hill) doesn't formally recognize dyslexia, then educators at that particular school may not report participation in Child

Study meetings for dyslexic students and these educators may assume that they cannot even speculate on a dyslexia diagnosis.

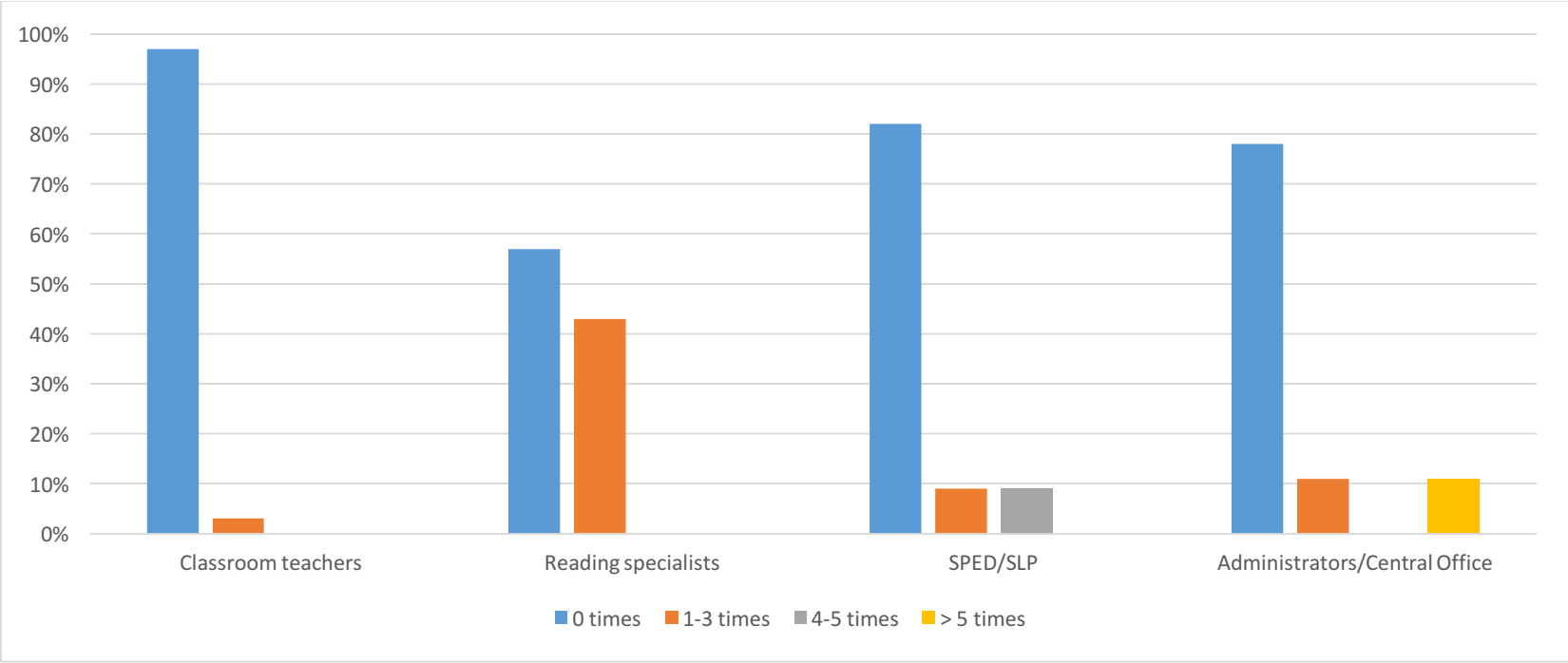


Figure 25. Participation in Child Study Meetings Focused on Students With Dyslexia.

Reading specialists, however, reported a higher level of participation in Child Study meetings that focused on students with dyslexia. Forty-three percent of reading specialists indicated that they had participated in Child Study meetings between one and three times over the course of the nine weeks. These results could be related to their definitions of dyslexia and the criteria that they used to determine if a child was dyslexic. However, reading specialists were less likely to report that they had participated in IEP meetings that focused on dyslexic readers, as illustrated by Figure 26. This difference could result from specific procedures at the individual school level. At some of the schools in the Spring Valley school system, reading specialists do not automatically continue to work with students after they become eligible for special education services and as a result, they may not always be included in the IEP process. Administrators and Central Office staff, Special Education teachers, and Speech-language pathologists, though, reported slightly more participation in IEP meetings that focused on students with dyslexia than Child Study meetings. This difference could be attributed to the fact that a majority of IEP meetings occur in the spring, which is when this survey was administered, and administrators and Special Education teachers are required to be present at those meetings. Survey responses from different times throughout the year may have provided different results.

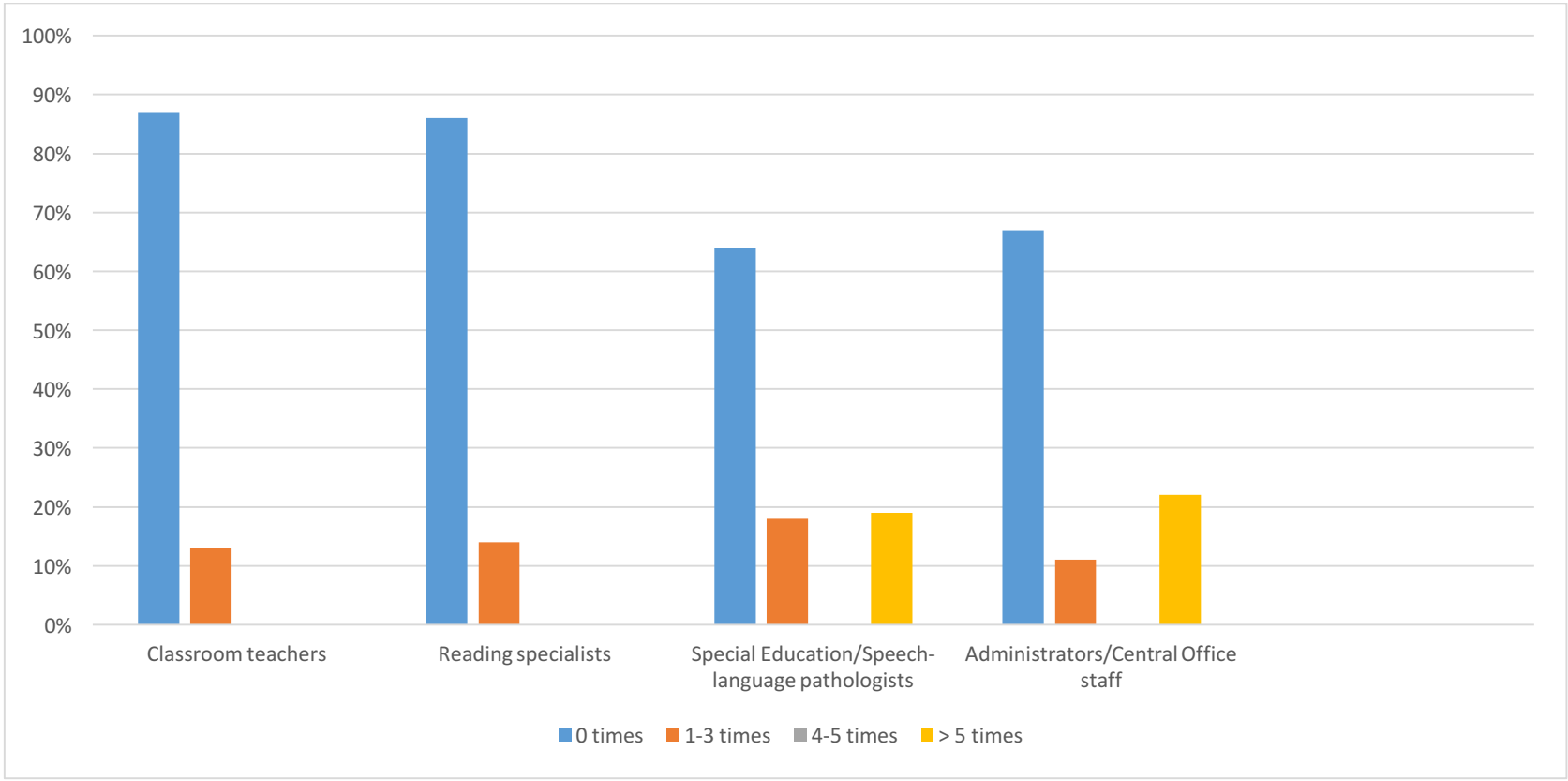


Figure 26. Participation in IEP Meetings Focused on Students with Dyslexia.

Intervention Support Provided For Dyslexic Readers

Educators in the Spring Valley school system were asked to identify interventions that they used for dyslexic readers. Participants were provided with a list of interventions, some of which represented evidence-based best practices, while other choices included interventions that reflected common misconceptions about dyslexic readers (e.g., the use of colored overlays or lenses). Participants were not limited to the selection of only one intervention and were also provided with an "Other" option that allowed them to input any interventions that were not already included in the answer choices. Several choices, such as "Encourage teachers to use a specific program" and "Encourage teachers to use instructional-level materials" were only available to administrators and Central Office staff since they provide instructional leadership at the school and division levels and recommend or mandate specific practices.

Responses from all teachers were analyzed first and the most popular intervention involved reading aloud material (e.g., assignments, tests, and quizzes) to dyslexic. Slightly more than half of these participants also reported modifying grade-level assignments (e.g., shorten assignments, modified spelling lists). Less than 50 percent of teachers noted that they use instructional materials for reading and spelling, even though these materials are essential for dyslexic readers. Additionally, while the benefits of colored overlays or lenses has been discredited (American Academy of Pediatrics, 2009; Hudson, High, & Al Otaiba, 2007), 30 percent of participants furnished students with these tools. Four participants provided responses with the "Other" option that allowed them to input responses not already provided as answer choices, although only one educator actually provided an example of an intervention. This teacher reported the use of "visuals" with dyslexic readers, but did not elaborate further on this statement to explain how visuals were used to support students. A classroom teacher with 18

years of experience selected the "Other" option and noted that "I am not sure that a student has ever been identified as long as I've been teaching" and a reading specialist stated that "I do not work with students identified with dyslexia."

Responses were also analyzed by participants' roles in the school division and are presented in Figures 27 and 28. Fifty-six percent of the administrators and Central Office staff who participated in the survey reported that they supported dyslexic readers through the purchase of specific programs (e.g., the Orton-Gillingham program, the Barton program). However, only 22% of administrators and Central Office staff members required the use of a program for dyslexic readers. Classroom teachers, special education teachers, and speech-language pathologists were more likely than reading specialists to make modifications to grade-level materials. While more than one-third of classroom teachers, special education teachers, and speech-language pathologists favored the use of colored overlays or lenses, none of the reading specialists surveyed acknowledge use of these materials with dyslexic readers. Administrators and Central Office staff also did not report purchasing colored overlays for teachers to give dyslexic readers. One administrator/Central Office staff member responded that the question was "Not Applicable."

Despite their training, only one third of reading specialists reported the use of instructional-level materials for reading and spelling, although nearly two-thirds of special education teachers and speech-language pathologists endorsed their use. Since many reading specialists already use instructional-level materials for all of their struggling readers, they may not have recognized this method of intervention as specific to dyslexic readers, but as one that is beneficial to all readers.

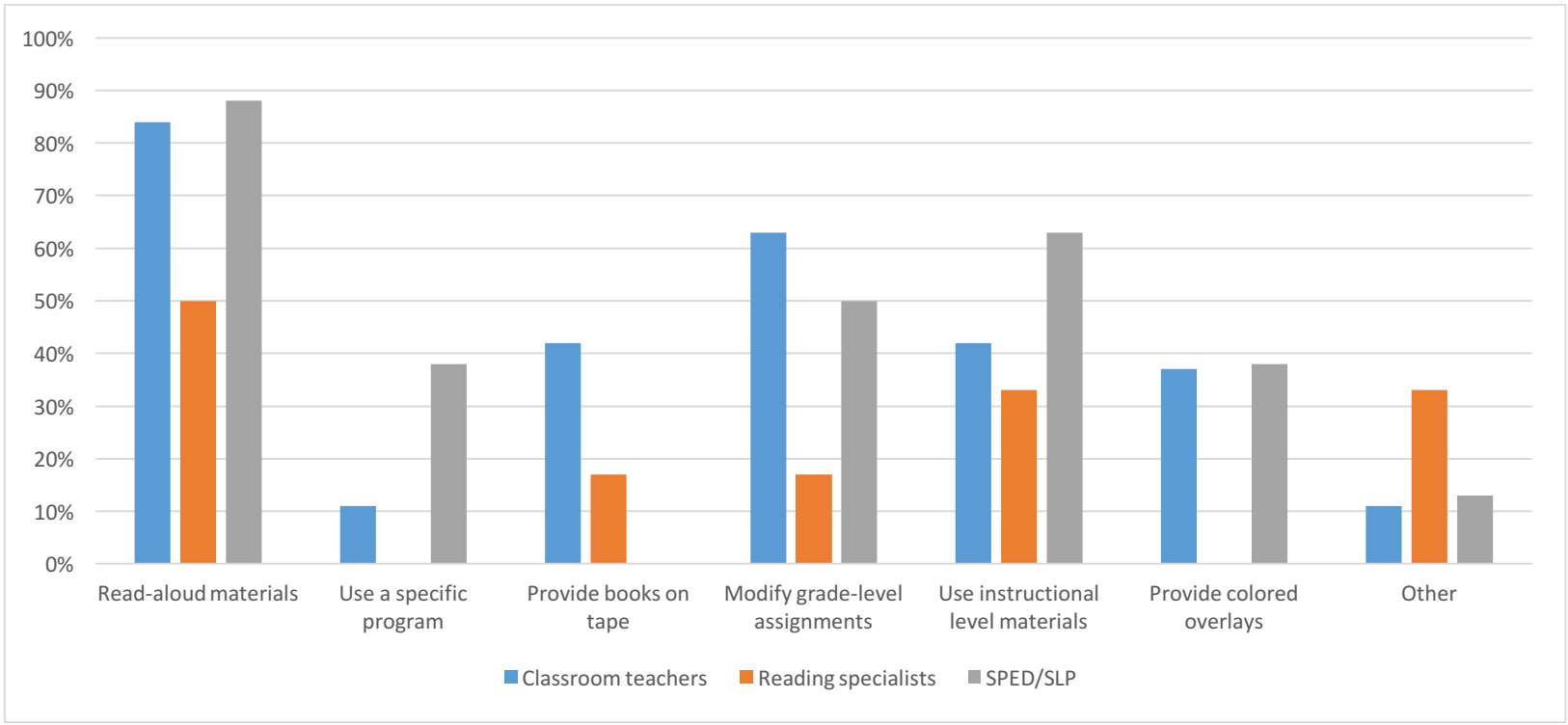


Figure 27. Interventions Employed by Classroom Teachers, Reading Specialists, Special Education Teachers, and Speech-language Pathologists in the Spring Valley School District.

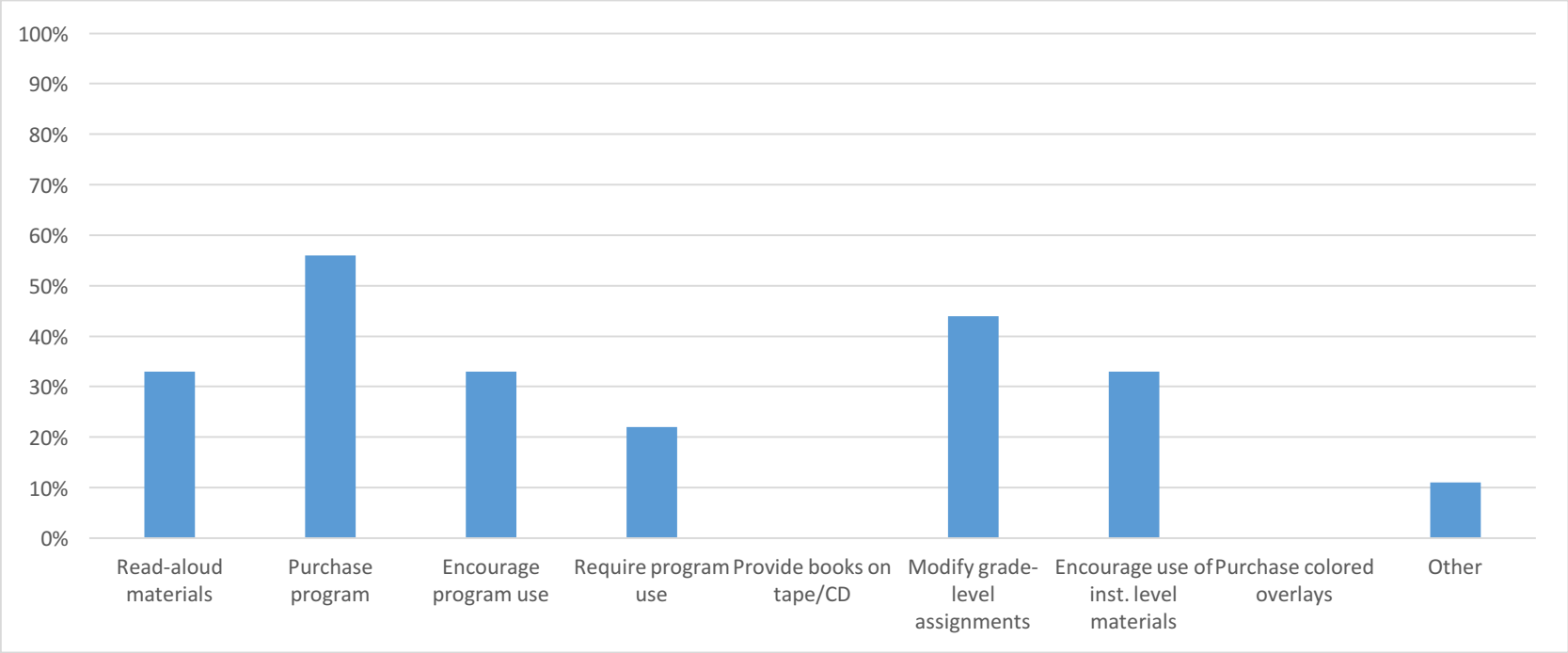


Figure 28. Interventions for Dyslexic Readers Endorsed by Administrators and Central Office Staff in the Spring Valley School District.

Summary of Results

Overall, although some interventions identified by participants represent common misconceptions about dyslexia, participants did report the use of interventions that are known to be beneficial for dyslexic readers. However, while educators in the Spring Valley school system documented the use of suitable interventions, results suggest that those participants represent a minority of respondents. Furthermore, inconsistencies exist between participants' endorsement of common misconceptions about dyslexia and their reported use of interventions that represent those misconceptions. For example, when asked about the use of the Orton-Gillingham program with dyslexic readers, 55% of all participants indicated that evidence suggests that this method is the best for dyslexic readers. However, only 15% of all respondents reported that they used a program like Orton-Gillingham with students. While this disparity could result from a lack of access to the materials for these programs, educators may not have felt comfortable reporting their use of a program with students even with the provision of confidentiality. In addition, educators may have assumed that even though they did not use a program with dyslexic readers, evidence was available that affirmed the value of the Orton-Gillingham programs. Furthermore, the differences in responses could result from educators' assumptions about the presence of dyslexic readers in their schools and classrooms. Thirty-five percent of educators reported that they did not work with dyslexic readers and another 48% reported that they might have dyslexic readers in their classrooms. If educators either did not recognize the presence of dyslexic readers or were unsure if any of their students were dyslexic, then they would not be likely to report the use of interventions with those students.

A discrepancy between responses was also identified between participants who accepted the misconception that colored overlays or lenses are beneficial for dyslexic readers and those

participants who reported their use with students. Sixty percent of all participants indicated support for the common misconception that colored overlays or lenses help dyslexic readers. However, only 30% actually reported using those tools. Again, this difference might reflect participants' recognition of the presence of dyslexic readers in their classrooms. Participants might believe that colored overlays or lenses are beneficial, but they may not have reported using them if they either do not consider any of their students to be dyslexic readers or they unsure if they work with students who are dyslexic.

CHAPTER FIVE

DISCUSSION

The topic of dyslexia has received considerable attention in this state during the past five years. The actions of parent groups, the state legislature, and the state's Department of Education have all contributed to the increased emphasis on dyslexia across the state. In particular, teacher knowledge regarding dyslexia has been targeted by parent groups and state legislators. While the research base regarding teacher knowledge is limited, the results of several studies (Aladwani & Al Shaye, 2012; Bell et al., 2011; Leite, 2012; Paradice, 2001; Regan & Woods, 2000; Wadlington & Wadlington, 2005; Washburn et al., 2011) indicate that teachers not only lack basic knowledge of the dyslexia construct, but they also continue to embrace common misconceptions about dyslexia that have been rejected by research conducted in the past three decades. However, further studies of teachers' knowledge of dyslexia is necessary, particularly since a substantial amount of attention continues to be directed on the topic.

This study responds to the need for additional research regarding educators' dyslexia knowledge by exploring the following research questions:

1. How do educators in the Spring Valley Public School system define dyslexia?
    a. Do definitions of dyslexia vary according to educators' roles (classroom teacher, reading specialist, special education teacher, and administrator)?
    b. How do the definitions of dyslexia provided by Spring Valley educators compare with other definitions of dyslexia provided by the organizations making up elements of the exosystem, the macrosystem, and the chronosystem?
2. What knowledge do educators in the Spring Valley Public School system currently possess regarding dyslexia?

   a. Does this knowledge vary based upon educators' amount of experience?
   b. Does this knowledge vary according to educators' roles within the school system?
   c. Does membership in a professional organization affect educator knowledge?

3. Do educators in the Spring Valley Public School system accept or reject common misconceptions about dyslexia?
   a. What misconceptions about dyslexia do educators accept?
   b. What misconceptions about dyslexia do educators reject?
   c. Do differences exist between misconceptions accepted (or rejected) by classroom teachers, reading specialists, special education teachers, and administrators?
4. To what extent have educators in the Spring Valley school system been prepared or trained to support dyslexic readers?
   a. Do educators in the Spring Valley school system receive training, information, and support about dyslexia and how to support dyslexic readers?
   b. How do educators in the Spring Valley school system obtain information about dyslexia?
   c. Have educators engaged in professional development opportunities specifically related to dyslexia in the past year? If so, what kind of professional development opportunities do educators report participating in during the past year?
   d. Do educators in the Spring Valley school system feel prepared to identify and support dyslexic readers in the classroom? What needs are identified by educators at all levels (classroom, reading specialists, special education, administration)?
5. How do educators in the Spring Valley school system currently identify and support students with dyslexia?

a. What criteria do educators use to determine if a student is dyslexic?
b. Do educators (e.g., classroom teachers, reading specialists, and special education teachers collaborate to identify and provide interventions for dyslexic readers?
c. What interventions are endorsed and provided for dyslexic readers?
d. Do the methods of identification and intervention employed by Spring Valley educators reflect evidence-based best practices?

While this study focuses on the Spring Valley school district, the results parallel many of the findings from previous studies and enhance the current research base. In addition, the results from this study provide school and district-level leaders with information that can be used to plan professional development opportunities for educators at the school and district levels. These findings also can be used by leaders of professional organizations (e.g., the state reading association) to promote members' knowledge of the dyslexia construct.

Conclusions About Spring Valley Educators' Definitions of Dyslexia

The first research question in this study focused on examining definitions of dyslexia provided by Spring Valley educators. Participants were asked to identify what they believed to be the strongest indicator of dyslexia. They were also asked to evaluate a series of statements, some of which represented accurate statements about dyslexia while other statements exemplified common misconceptions about dyslexia. Results suggest the existence of a clear divide between research and practice when the definitions of dyslexia provided by Spring Valley educators are compared with the widely-accepted definition provided by organizations such as the International Dyslexia Association, the International Literacy Association, and the state Department of Education. As a result, educators in the Spring Valley school district would benefit from participation in professional development activities that address definitions of

dyslexia in the context of current theoretical understandings. In addition, since organizations such as the International Dyslexia Association, the International Literacy Association, and the state Department of Education represent components of the exosystem and the macrosystem, they have opportunities to influence educator knowledge of dyslexia. Since results from this study suggest that educators in the Spring Valley school district appear to lack essential knowledge regarding the definition of dyslexia, the leaders of these organizations may need to consider how they disseminate and promote this information because their methods of communication may not be reaching the intended audience. Many professional organizations provide materials and information (e.g., professional journals) as a benefit. However, only 54% of Spring Valley educators reported membership in a professional organization, which puts them at a disadvantage for benefitting from interactions with the mesosystem, exosystem, and macrosystem.

Spring Valley Educators' Definitions of Dyslexia

Letter and word reversals. One of the survey questions asked participants to identify the strongest indicator of dyslexia. Responses to this question were then used to determine how educators in the Spring Valley school district defined dyslexia. Although participants varied in their responses, the large percentage of educators who identified letter and word reversals is concerning because half of all respondents selected this choice despite the rejection of this theory as a result of research conducted during the past three decades (Fletcher et al., 2007; Vellutino, 1987; Vellutino et al., 2004; Vellutino & Fletcher, 2007). These results suggest the existence of a considerable divide between research and practice that must be remediated through professional development opportunities in order to address this issue. If educators continue to embrace theories that have been discredited by research, then their effectiveness in serving dyslexic

readers in the district will be severely compromised. Educators in Spring Valley should be provided with current information that eliminates the assumption that the presence of letter and word reversals indicate that a student is dyslexic.

Classroom teachers were more likely than any other group of respondents to accept the presence of reversals as indicative of dyslexia. These findings are discouraging because classroom teachers are often the first educators who encounter struggling readers who may be dyslexic. As a result, this belief could negatively affect the ability of classroom teachers not only to identify dyslexic readers, but also to provide appropriate interventions for those students. Since classroom teachers in the Spring Valley school district are directly involved in supporting students during dedicated intervention times, their acceptance of the role of letter and word reversals could have significant implications for dyslexic readers. For example, the inclusion of materials that have been discredited by research (e.g., colored lenses or overlays) as a part of intervention plans represents one potential implication. In addition, since many classroom teachers are the referring source for Child Study evaluations, their belief that dyslexic readers demonstrate letter and word reversals could result in misguided referrals. As Vellutino (1987) noted, "some degree of mirror writing can be observed in normally developing readers as in poor ones. The tendency is quite likely a vestige of an earlier stage of development, which some poor readers take more time to transcend" (p. 39). Educators in Spring Valley would benefit from professional development that recognizes reversals in writing as a part of the developmental progression.

None of the reading specialists indicated that letter and word reversals are the strongest indicator of dyslexia. These findings are promising because reading specialists not only provide interventions for dyslexic readers, but they also are a source of information for classroom

teachers. Ninety percent of classroom teachers who reported that they consult professional colleagues indicated that they confer with the reading specialists at their schools when they have questions about dyslexia. As a result, reading specialists should use these opportunities to provide classroom teachers with accurate information regarding the role of letter and word reversals.

Phonological processing deficits. Less than one-quarter of all Spring Valley educators reported that poor phonological skills are the strongest indicator of dyslexia. These results are concerning because organizations included in both the exosystem (e.g., the state Department of Education) and the macrosystem (e.g., the International Dyslexia Association, the International Literacy Association) provide educators with access to current definitions that specifically mention phonological processing deficits. Additionally, a current definition of dyslexia that includes principal components (e.g., language-based phonological disorder, word recognition, decoding, and spelling deficits) is provided on the form used in the Spring Valley school system to determine a student's eligibility for a specific learning disability label. Revised in November 2011, the definition on this form mirrors the definition provided by the state Department of Education and the International Dyslexia Association. These results suggest that across the ecological systems model, there appears to be a disconnection between the information that is available to educators and the accessibility of that information. Therefore, organizations and groups represented in the ecological systems model should consider how information regarding the role of phonological processing deficits is made available to educators.

Although more than half of the reading specialists reported that phonological processing deficits were the strongest indicator of dyslexia, the responses from other groups (e.g., classroom teachers, special education and speech-language pathologists, administrators and Central Office

staff) suggest that many educators do not recognize phonological processing deficits as a strong indicator of dyslexia. Educators' ability to identify dyslexic readers could be negatively affected if they are not aware of the consequences of phonological processing deficits. Similarly, a lack of knowledge regarding the role of phonological processing deficits could have serious repercussions related to the selection of interventions for dyslexic readers. Educators in Spring Valley need professional development opportunities that emphasize the role of phonological processing deficits.

Word recognition deficits. Although word recognition deficits are identified in current definitions of dyslexia provided by organizations included in the exosystem (e.g., the state Department of Education) and macrosystem (e.g., the International Dyslexia Association, the International Literacy Association), few respondents selected this choice as the strongest indicator of dyslexia. These results suggest that educators in the Spring Valley school district have not benefitted from interactions with these organizations. In addition, since a substantial percentage of educators reported that letter and word reversals represent the strongest indicator of dyslexia, it is not surprising that only a limited number recognized weaknesses in word recognition. If educators believe that dyslexic readers reverse letters and words, then they may not recognize the importance of word recognition deficits in identifying dyslexic readers. Therefore, dyslexic readers who need interventions targeting weaknesses in word recognition may not receive the support that their disability requires. Again, as with many of the other components of widely-accepted definitions of dyslexia, organizations that are included in the mesosystem, exosystem, and macrosystem reference the role of word recognition deficits in definitions of dyslexia, but educators in the Spring Valley school district do not seem to have accessed this information.

IQ-discrepancy model. The small percentage of educators in Spring Valley who noted that a discrepancy between IQ and achievement scores indicates that a student is dyslexic represents an encouraging finding from this study because it suggests that many educators recognize the inadequacy of this method for identification purposes. However, analysis of responses by role appears to indicate that special education teachers and speech-language pathologists were more likely to identify the presence of a discrepancy in IQ-achievement test scores as indicative of dyslexia. These results are troubling for several reasons. First, over the course of the past three decades, support for the IQ-discrepancy model has eroded as research has discredited this method of identification (Gresham & Vellutino, 2010; Stanovich & Siegel, 1994; Vellutino et al., 1996). In addition, special education teachers and speech-language pathologists are directly involved in the eligibility process, so their lack of understanding of the limitations of the IQ-discrepancy model may potentially impact students' eligibility for services.

Since many school districts, including Spring Valley, continue to employ the IQ-discrepancy model as a part of the process for special education eligibility, these findings suggest a division between research and practice. Therefore, professional development opportunities need to address this disconnection between what educators believe and what they actually practice.

Response-to-intervention. Although Spring Valley implemented a response-to-intervention (RtI) framework as a part of the special education process several years ago, only a small percentage of respondents reported that this framework could be used to identify students who might be dyslexic. Specifically, nine percent of special education teachers and speech-language pathologists indicated that the RtI model could be used for the identification of dyslexic readers even though this framework has been accepted as an alternative to the IQ-discrepancy

model to determine if a student is eligible for special education services. Since these educators are directly involved in the special education process and typically serve as case managers, their lack of recognition of the role of the RtI framework is surprising. In addition, only five percent of classroom teachers recognized that a student's response to RtI can indicate the presence of a reading disability even though 40% reported that they evaluated their students' response to intervention between one and three times over the course of a nine-week period. An additional 26% indicated that they reviewed students' response to intervention either four or five times in nine weeks. Therefore, although two-thirds of classroom teachers are involved in assessing students' response to intervention, they do not seem to realize that the information that they are assessing could be used to determine if a student is dyslexic. However, these results may reflect use of the RtI framework in the Spring Valley school district where response to intervention is not only monitored for literacy, but also for math achievement. As a result, educators in Spring Valley may not recognize the relationship between the response to intervention framework and dyslexia. Based on these findings, educators in Spring Valley would benefit from professional development opportunities that emphasize not only the role of an RtI framework in determining if a student is a disabled reader, but also the rationale behind its use.

The Identification of Key Elements of Definitions of Dyslexia

Educators in the Spring Valley school district were also presented with a series of statements that included elements of widely-accepted definitions of dyslexia. Based on participants' responses, inferences were made regarding the ability of educators in the Spring Valley district to define dyslexia.

Dyslexia is characterized by phonological processing deficits. Few respondents recognized that dyslexia is characterized by phonological processing deficits. Of particular

concern is the percentage of classroom teachers who indicated that dyslexic readers demonstrate phonological processing deficits. Only 53% of classroom teachers responded that phonological processing deficits characterize dyslexic readers, so a significant percentage of classroom teachers do not appear to recognize that this is a key element of definitions of dyslexia. These findings may be reflective of the substantial number of classroom teachers who indicated that dyslexic readers are affected by visual deficits that cause them to reverse letters and words. If classroom teachers are more likely to endorse theories that promote the role of visual deficits, then they may be less likely to recognize that dyslexic readers demonstrate phonological processing deficits.

Other groups of educators appeared to recognize the role of phonological processing deficits. All of the reading specialists and 91% of special education teachers and speech-language pathologists noted that dyslexic readers demonstrate phonological processing deficits. These results are encouraging because both reading specialists and special education teachers are involved in identifying dyslexic readers and their increased awareness should allow them to respond appropriately when they observe students who display phonological processing deficits. In addition, many classroom teachers report that reading specialists and special education teachers are the professional colleagues that they confer with when they have questions about dyslexia and dyslexic readers. Therefore, reading specialists and special education teachers have the opportunity to share their knowledge with classroom teachers to enhance their understanding of dyslexia.

In addition, more than three-quarters of all administrators and Central Office staff also acknowledged the effects of phonological processing disorders, which is encouraging since many of these educators are directly involved in the process for students' eligibility for special

education services and the subsequent meetings that develop individualized education programs for students. As a result, they may be more likely to consider both the role of phonological processing deficits on dyslexic readers as well as the implications of those deficits for instruction.

These results, however, illustrate some inconsistencies with participants' responses to the question about the strongest indicator of dyslexia. While educators were limited to providing only one response to that question, phonological processing deficits was not the most popular answer. Actually, only 21% of all participants cited phonological processing deficits as the strongest indicator of dyslexia. Instead, the majority of respondents selected the choice for letter and word reversals.

Dyslexia is characterized by word recognition, decoding, and spelling deficits. Definitions of dyslexia that have been widely accepted by organizations such as the International Dyslexia Association, the International Literacy Association, and the Virginia Department of Education include statements that recognize the influence of word recognition, decoding, and spelling deficits. Approximately three-fourths of all educators in the Spring Valley school district acknowledged that dyslexic readers demonstrate weaknesses in word recognition, decoding, and spelling.

Only two-thirds of classroom teachers reported that dyslexic readers struggle with word-level skills, which is concerning since classroom teachers are the first educators who usually encounter struggling readers. If classroom teachers do not realize that word recognition, decoding, and spelling are deficient in dyslexic readers, then their ability to identify and support dyslexic readers in their classrooms may be negatively affected. As a result, students may not receive the support that they need. Similarly, the percentage of special education teachers and

speech-language pathologists who responded that dyslexic readers demonstrate deficits in their word recognition, decoding, and spelling is also troubling. Only 73% of these participants recognized that word-level deficits characterize students with dyslexia. Since special education teachers are directly involved in diagnosing dyslexic readers, developing IEP plans, and providing intervention support, it is particularly important that they are aware of these factors.

Most of the reading specialists and administrators and Central Office staff members who participated in this study, however, appeared to be aware that dyslexic readers are deficient in word-level skills. These results are encouraging because as these educators participate in Child Study, special education eligibility meetings, and IEP meetings, they will be able to use this knowledge to guide their decisions and recommendations.

Dyslexia is defined as a language-based disorder. Although the language-basis of dyslexia is an essential part of any definition, only 28% educators in the Spring Valley school district acknowledged this component of the definition of dyslexia. For example, 79% of classroom teachers did not recognize that dyslexia is a language-based disorder, which is concerning. However, these results are not surprising since 81% of these educators assumed that dyslexia is characterized by visual deficits that cause readers to reverse letters and words. If classroom teachers do not know that language deficits affect dyslexic readers, then they may not be able to make the appropriate referrals for these students.

Furthermore, eighty-two percent of special education teachers and speech-language pathologists did not recognize that dyslexia is a language-based disorder. This is troubling since both groups are involved in the special education eligibility process and speech-language pathologists are directly responsible for working with students with language disorders. If these educators are not aware that dyslexia is a language-based disorder, then this lack of knowledge

will not only affect their ability to diagnose students accurately, but may also affect their ability to provide students with appropriate interventions. These results are also concerning because one of the documents used during the special education eligibility process provides a definition of dyslexia that specifically mentions the role of language. This document, which contains the criteria used to determine if a student demonstrates a specific learning disability, is available to all Spring Valley educators via First Class and is used consistently in eligibility meetings.

Clearly, these results indicate that Spring Valley educators need professional development opportunities to enhance their understanding of the language aspects of dyslexia. Furthermore, educators' attention also needs to be directed to the documents in use by the school system that provide information about dyslexia and how it is defined.

Dyslexia is a neurological disorder. Despite the fact that few Spring Valley educators recognize that dyslexia language-based disorder, eighty-two percent of them recognized that dyslexia is a neurological disorder, although these results varied according to participants' roles in the school district. Less than half of the reading specialists demonstrated awareness that dyslexia has a neurological basis, but all of the administrators and Central Office staff and more than 80% of special education teachers and speech-language pathologists recognized this component of commonly accepted definitions of dyslexia.

Significant advances in knowledge about the neurological aspects of dyslexia have characterized the past three decades (Fletcher et al., 2007; Hudson et al., 2007; Vellutino et al., 2004). Therefore, it is surprising that such a small percentage of reading specialists were familiar with this information. However, the percentage of administrators, Central Office staff, special education teachers, and speech-language pathologists who noted that dyslexia is a neurological disorder is encouraging and could serve as a foundation upon which to build on

their knowledge in other areas (e.g., the language-basis of dyslexia, the presence of phonological processing deficits).

The increased use of brain imaging (e.g., functional magnetic resonance imaging) along with postmortem brain research have provided valuable insights indicating that the brains of dyslexic readers differ from the brains of non-impaired readers. In particular, these differences involve areas of the brain related to language. For example, the left hemisphere, which is responsible for language, is usually larger than the right hemisphere in non-dyslexic readers' brains. However, the left and right hemispheres in dyslexic readers' brains are often symmetrical, which may explain the deficits in language that result in the difficulties experienced by dyslexic readers (Fletcher et al., 2007; Hudson et al., 2007; Vellutino et al., 2004). In addition, studies using brain imaging during interventions with a phonological emphasis demonstrated significant changes in the activity in the left hemisphere of the brain related to word recognition (Fletcher et al., 2007; Vellutino et al., 2004). This information may be useful to share with educators who are aware of the neurological aspects of dyslexia, but lack knowledge regarding the roles of language and phonological processing deficits by emphasizing the connection between all three elements.

Conclusions About Spring Valley Educators' Dyslexia Knowledge

The second research question evaluated Spring Valley educators' overall knowledge of dyslexia and identified some areas of concern. Results from this study revealed that educators in the Spring Valley school district exhibit inconsistent knowledge of the dyslexia construct. Although more than two-thirds of all educators recognized that dyslexic readers demonstrate weak phonological processing skills, participants simultaneously accepted the disputed theory that dyslexia is the result of visual deficits. These theories are not compatible and cannot be

reconciled in any way. Therefore, when Spring Valley educators indicate that dyslexia reflects both visual and phonological disorders, they demonstrate the need for professional development that will enhance their basic foundational knowledge of dyslexia.

Since the contradictions in educators' knowledge was not limited to one specific group of educators in Spring Valley, district-wide professional development that addresses these inconsistencies would be beneficial for everyone. In particular, professional development activities should emphasize phonological processing deficits while also referencing the research that disproves visual deficit theories. Educators must demonstrate knowledge that reflects current conceptualizations of dyslexia if they are to identify dyslexic readers and to provide appropriate interventions for those students.

Surprisingly, results from this study suggested that educators' dyslexia knowledge did not appear to be related to their membership in professional organizations. These findings could indicate that organizations embedded within the mesosystem, exosystem, and macrosystem have not effectively communicated information about dyslexia to their members. The professional organizations at each of these levels may need to consider addressing this topic more in depth. These organizations could also include information about dyslexia in their publications (e.g., journals, newsletters), on their websites, and as a part of their conference programming. However, only 54% of all educators in Spring Valley reported membership in at least one professional organization. If educators do not join these organizations, then they will be unable to benefit from any opportunities for learning provided through membership.

Conclusions About Educators' Misconceptions Regarding Dyslexia

The third research question considered the extent to which educators in the Spring Valley school district endorsed common misconceptions about dyslexia (e.g., dyslexic readers see letters

and words backwards, more males than females are dyslexic). If educators accept misconceptions that have been discredited by research, then their ability to identify and support dyslexic readers will be severely compromised because not only will they be unable to recognize students who demonstrate characteristics of dyslexia, but they also will not be able to provide those students with appropriate interventions. Results from this study indicate that many Spring Valley educators accept several misconceptions that are particularly concerning. For example, many educators who participated in this study indicated that dyslexia is caused by visual deficits that cause readers to reverse letters and words when reading. A large percentage of educators also accepted the misconception that males were more likely than females to be diagnosed as dyslexic. These findings have implications for dyslexic readers in the Spring Valley school district because they indicate that the special education referral process has the potential to reflect bias towards the identification of males. As a result, some students may not be identified or provided with evidence-based interventions that meet their specific needs. Therefore, the results of this study suggest that many educators continue to support misconceptions that have been discredited by research, which suggests the existence of a research-practice divide in Spring Valley that needs to be addressed through the provision of targeted professional development opportunities to address and resolve these misconceptions about dyslexia.

Although educators in Spring Valley endorsed several common misconceptions about dyslexia, they did not endorse all of the misconceptions identified in this study. They overwhelmingly rejected misconception that dyslexia is limited to only the English-speaking population and they also disagreed with the misconception that all struggling readers are dyslexic. These results are encouraging because this knowledge will provide a foundation for future learning opportunities that address dyslexia.

Misconceptions Regarding the Role of Visual Deficits. According to Vellutino et al. (2004), "theories implicating deficiencies in the visual system have been the most ubiquitous and most influential theories of dyslexia" (p. 8). Since visual deficit theories continue to be embraced by many educators, Spring Valley educators were asked to respond to a question on the survey that addressed this subject. Three-quarters of all participants agreed with a statement that indicated dyslexia results from visual deficits. These results are concerning because the assumption that dyslexia results from visual deficits has been consistently rejected over the past three decades (American Academy of Pediatrics, 2009; Fletcher et al., 2007; Iovino et al., 1998; Olson et al., 1983; Vellutino, 1987; Vellutino et al., 2004; Vellutino & Fletcher, 2005). For example, theories that dyslexia resulted from eye tracking disorders or deficits in the transient visual system have been repudiated while other studies demonstrated that the performance of dyslexic readers on visual memory tasks was comparable to non-dyslexic readers as long as language-based elements were not included (Iovino et al., 1998; Olson et al., 1983; Vellutino, 1987, Vellutino et al., 2004). Consequently, educators who accept theories involving visual deficits may select interventions that are not appropriate (e.g., using colored overlays to improve visual perception), which has serious implications for dyslexic readers who need interventions that target word recognition, decoding, and spelling. In addition, these results are troubling because many of these educators also reported that dyslexic readers also demonstrate weak phonological processing skills. These educators endorsed two theories that are considerably different because they reflect different conceptualizations of the source of dyslexia. Therefore, such conflicting beliefs may negatively affect the ability to provide appropriate evidence-based interventions for dyslexic readers in Spring Valley.

Since visual deficits theories appear to widely accepted among all groups of participants in Spring Valley, educators would benefit from professional development activities at the division level that address this misconception. In particular, any professional development activities should emphasize not only the differences between the visual deficit theory and phonological deficit theory, but these opportunities should also provide participants with access to current research that directly addresses the issues inherent in the visual deficit theory. Considerable evidence rejects the premise that dyslexic readers demonstrate visual memory disorders, which could guide discussions about this topic. Olson et al. (1983) refuted the idea that eye tracking disorders were the source of dyslexia while Vellutino (1987) provided compelling evidence from a study that indicated the visual memory of dyslexic readers is comparable to that of non-dyslexic readers on tasks when language-based skills are not required. In addition, Iovino et al. (1998) rejected the assumption that colored overlays are beneficial for dyslexic readers. Resources including Hudson et al. (2007), Vellutino (1987), and the statement released by the American Academy of Pediatrics (2009) that addressed dyslexia and vision would be excellent resources to share with educators in the Spring Valley district during professional development activities.

Since organizations that comprise the mesosystem, exosystem, and macrosystem (e.g., the Meadowview Reading Council, the state reading association, and the International Literacy Association) also provide professional development opportunities for educators, they could share evidence that refutes visual deficit theories. Information could be made accessible on these organizations' websites, as well as in publications (e.g., professional journals). In addition, conference programming could include sessions that address these theoretical issues.

Misconceptions Identifying All Struggling Readers as Dyslexic. Not all struggling readers are dyslexic and some can demonstrate areas of difficulty not limited to deficits at the word level. According to Gough and Tunmer (1986), "there must be three types of reading disability, resulting from an inability to decode, an inability to comprehend, or both. It is argued that the first is dyslexia, the second hyperlexia, and the third common, or garden-variety, reading disability" (p. 6). All of the participants in this study recognized that struggling readers should not automatically be labeled as "dyslexic." These results suggest that educators in the Spring Valley school district do not view all struggling readers as the same, which is essential when selecting appropriate interventions for students.

Misconceptions Regarding the Use of Colored Overlays or Lenses. One common misconception that continues to be accepted by educators involves the use of colored overlays or lenses as an intervention for dyslexic readers (Hudson et al., 2007; Washburn et al., 2011). This misconception developed in response to the theory that dyslexia resulted from visual deficits (Washburn et al., 2011). However, studies conducted during the past three decades determined that dyslexic readers did not benefit from the use of colored overlays or lenses (e.g., Iovino et al., 1998). For example, the performance of dyslexic readers on word recognition tasks did not improve with the use of colored overlays (Iovino et al., 1998). In addition, much of the evidence that advocates the use of colored overlays or lenses appears to be flawed (American Academy of Pediatrics, 2009). Methodological issues were also identified in many studies that promoted colored lenses as an intervention for dyslexic readers and "the method used to select the lens or filter color has been highly variable (American Academy of Pediatrics, 2009, p. 843). These findings provide further support that rejects colored overlays as an appropriate intervention for students with dyslexia.

Even though the use of colored overlays and lenses has been rejected as an appropriate intervention for dyslexic readers, 60% of all educators in the Spring Valley district, however, endorsed their use. These findings are not surprising because nearly three-fourths of all participants also indicated that dyslexia was caused by visual deficits that result in the reversal of letters and words. Of particular concern is the percentage of special education teachers, speech-language pathologists and classroom teachers who indicated support for the use of colored overlays. These results are troubling because of the influence that these educators have on the interventions that are provided for students in the Spring Valley school district. For example, special education teachers are directly involved in providing support for dyslexic readers once they have been identified to receive special education services. They usually develop the IEPs for students, which includes a list of modifications and accommodations that enable students' access to the regular curriculum. Based on the results from this study, many of these educators may choose to incorporate colored overlays or lenses into IEPs for dyslexic readers when those students would benefit more from targeted instruction to address deficits in word recognition, decoding, and spelling.

Classroom teachers in Spring Valley are also directly involved in providing intervention for struggling readers as a part of the response to intervention framework employed by the district. As a result, they are responsible for selecting interventions to use with students during a specific intervention time during each school day. If a substantial percentage of classroom teachers believe that colored overlays are beneficial, then it is likely that those materials will be used as an intervention strategy. In addition, 70% of classroom teachers indicated that they approached the special education teachers at their school when they had questions about dyslexia. Since a large percentage of special education teachers approved of the use of colored

overlays, it seems likely that they might also encourage classroom teachers to incorporate these materials as an intervention for dyslexic readers.

Misconceptions Regarding the Use of the IQ-discrepancy Model to Identify Dyslexic Readers. The validity and effectiveness of the IQ-discrepancy model to identify dyslexic readers represents a common misconception, although research conducted during the past thirty years rejected this model in favor of response-to-intervention frameworks (Fletcher et al., 1998; Gresham & Vellutino, 2010; Siegel, 1989; Stanovich & Siegel, 1994; Vellutino et al., 1996; Vellutino et al., 2004). The goal of the IQ-discrepancy model was to differentiate between dyslexic readers whose reading disability reflected word-level deficits and their garden-variety counterparts who demonstrated weaknesses in both decoding and comprehension. However, evidence indicated that dyslexic and garden-variety readers both display phonological processing deficits that are unrelated to their scores on IQ tests (Gresham & Vellutino, 2010; Siegel, 1998; Stanovich, 1988; Stanovich & Siegel, 1994; Vellutino et al., 1996). In addition, the IQ-discrepancy model does not allow for the differentiation of children who were easily remediated from those children who did not respond to intervention (Gresham & Vellutino, 2010; Vellutino et al., 1996; Vellutino et al., 2000; Vellutino et al., 2006).

Although the legitimacy of the IQ-discrepancy model has been rejected, state and federal legislation provides school districts with the option of using response-to-intervention (RtI) frameworks to identify students for special education services. Spring Valley currently employs both the IQ-discrepancy model and a response-to-intervention framework during the eligibility process for special education services and the Child Study committee decides which format to use on an individual case-by-case basis. This lack of consistency could have implications for the accurate identification of dyslexic readers in Spring Valley because identification could depend

on the method used that could vary according to the approach used on any given day. Students not found eligible through the application of the IQ-discrepancy model might instead demonstrate a lack of response to intervention that would have identified them for services.

Although the IQ-discrepancy model continues to be used in Spring Valley, results from this study indicate that a majority of participants reported that the IQ-discrepancy model is not an appropriate method for the identification of dyslexic readers. In fact, two-thirds of administrators and Central Office staff rejected the use of the IQ-discrepancy model. Since many of these educators are directly involved in special education eligibility meetings, they have the authority to determine which format is used to determine if a student qualifies for services. If administrators and Central Office staff do not believe that the IQ-discrepancy model should be used, they could choose to discontinue the use of the IQ-discrepancy model. Results indicate that many educators in Spring Valley already assess their students' response to intervention. During a nine-week period, 97% of all respondents indicated that they evaluated students at least once to evaluate if interventions were effective. Therefore, a transition to the exclusive use of a response-to-intervention framework appears to be a reasonable endeavor.

Educators, however, may not be fully aware of how and when to implement the response-to-intervention framework, particularly once they have identified students who demonstrate a lack of measurable growth. This uncertainty regarding implementation could explain why the IQ-discrepancy model continues to be used in Spring Valley. School and district leaders should consider an evaluation of the current use of the response-to-intervention framework in Spring Valley. Protocols for implementation may need to be developed or revised in order to transition away from the reliance on the IQ-discrepancy model. The criteria used to evaluate students with a response-to-intervention framework may need to be evaluated, as well. Professional

development addressing use of the response-to-intervention (RtI) framework would also be beneficial for educators in the Spring Valley school district, particularly as new administrators and teachers are hired. District leaders might want to consider partnering with a local university to offer coursework that addresses the response-to-intervention framework.

Misconceptions Regarding the Gender of Dyslexic Readers. Even though studies conducted in the past twenty-five years have rejected the assumption that more males than females are dyslexic (Hawke et al., 2006; Shaywitz et al., 1990; Wadsworth et al., 2000), this misconception was accepted by 81% of the educators in the Spring Valley school district. Special education teachers and speech-language pathologists represented the largest group of educators who endorsed this misconception, with 91% of these respondents indicating that more males than females were dyslexic. These results are particularly concerning since special education teachers are often directly involved in the identification of dyslexic readers. If they assume that females are less likely to be dyslexic, then they may overlook a significant number of students, preventing timely identification (Shaywitz et al., 1990). According to Shaywitz et al. (1990), the result of such delays is that female students "are more often severely impaired in reading before they are identified for services" (p. 1001).

A large percentage of classroom teachers also reported that male students were more likely to be diagnosed with dyslexia. These findings are troubling because classroom teachers are often the referring source during the Child Study process. If they are influenced by behavior, then they may be more likely to over-identify male students since behavioral factors are often the reason why more boys than girls are likely to be identified as dyslexic (Shaywitz et al., 1990), educators in the Spring Valley school district should consider the criteria that is used by teachers when the refer students. District and school leaders may need to develop a system of checks and

balances within the referral process to ensure that a student's behavior does not provide undue influence during the Child Study process. Teachers also may need training with an emphasis on differentiating between behavioral and educational issues.

Misconceptions Characterizing Dyslexia as Specific to the English Language. Another common misconception suggests that dyslexia is specific to the English language (Caravolas, 2005; Hudson et al., 2007). Since a majority of dyslexia research has historically emphasized the English language, the existence of this misconception is not entirely unexpected (Caravolas, 2005). In addition, this misconception is based upon comparisons between the orthographic differences that exist between English and other languages (e.g., Spanish) (Caravolas, 2005; Hudson et al., 2007).

Ninety-six percent of all educators in the Spring Valley school district rejected the misconception that dyslexia is limited to the English-speaking population. These findings are encouraging because educators will not be as likely to discount the possibility that English language learners are dyslexic, which will enable those students not only to be identified, but also to receive interventions. Although Spring Valley currently has only a small population of English language learners, they appear to be aware that dyslexia can affect those students. In addition, these results suggest that the over-identification of English language learners is not a concern in Spring Valley.

Misconceptions Regarding Use of the Orton-Gillingham Program. A common misconception suggests that the Orton-Gillingham program is the best program for dyslexic readers. Empirical evidence, however, does not currently support this assertion (Ritchey & Goeke, 2006). Although many practitioners have embraced use of the Orton-Gillingham program, little research is available to support the comprehensive implementation of this

approach (Ritchey & Goeke, 2006). Only 44% of all educators in Spring Valley reported that the Orton-Gillingham program was the best method for dyslexic readers. Among individual groups of educators, more than half of administrators and Central Office staff members reported the support for the Orton-Gillingham approach. Since these educators are typically responsible for selecting and purchasing programs, it seems likely that administrators and Central Office staff would choose to acquire Orton-Gillingham materials for dyslexic readers at the school and division levels.

The group with the highest percentage of support for the use of the Orton-Gillingham program with dyslexic readers included those respondents who selected "Other" as their role in the Spring Valley school district. These educators do not provide direct literacy instruction for students, which may explain why they were more likely to endorse this program. Therefore, they may assume that such a program would be the best option for dyslexic readers because it represents a specific example of an intervention.

Classroom teachers were the least likely of all respondents to indicate that the Orton-Gillingham program was the best method to use with dyslexic readers. These results were surprising for several reasons. First, only five percent of the classroom teachers who responded to this survey reported that they had participated in dyslexia-focused professional development within the past year. Since most of these teachers had not received professional development that addressed appropriate interventions for use with dyslexic readers, it seemed feasible that they might endorse the use of a program like Orton-Gillingham, particularly as this program is so well-known and highly publicized.

The results also demonstrate a difference in the beliefs of classroom teachers and administrators regarding the Orton-Gillingham program. Fewer classroom teachers indicated

that evidence suggests that Orton-Gillingham represents the best approach for use with dyslexic readers However, a larger percentage of administrators and Central Office staff members not only endorsed the theory that the Orton-Gillingham program represented the best intervention for dyslexic readers, but a majority also indicated that they supported dyslexic readers at the school and district levels through the purchase of specific programs that included Orton-Gillingham. These results suggest that classroom teachers are less likely than administrators and Central Office staff to assume that the best way to support dyslexic readers is through the use of particular programs.

Professional development activities at the school and district level should recognize the lack of evidence regarding the benefit of using the Orton-Gillingham program. In addition, these activities could include training on use of the Interactive Strategies approach as an intervention for students (Scanlon & Anderson, 2010; Vellutino & Scanlon, 2002).

Conclusions About Spring Valley Educators' Preparation to Support Dyslexic Readers

The purpose of the fourth research question was to evaluate educators' preparation and training to work with dyslexic readers. Educators in the Spring Valley reported their participation in professional development activities, perceptions regarding the adequacy of their preparation to work with dyslexic readers, their need for dyslexia-focused professional development, and the need for additional information on the topic of dyslexia. Participants were also asked to identify resources consulted when they had questions about dyslexia. Results suggest that few educators in the Spring Valley school district have engaged in professional development opportunities with an emphasis on dyslexia. In addition, many educators indicated that they were not prepared to work with dyslexic readers and that they needed dyslexia-focused professional development because they lacked sufficient information on the topic. Based on the

issues identified regarding Spring Valley educators' lack of knowledge on key elements of the definition of dyslexia, as well as their acceptance of common misconceptions, these results are not surprising.

Spring Valley Educators' Participation in Professional Development Activities

Educators in Spring Valley were asked about their participation in professional development activities. Survey questions differentiated between professional development that was addressed literacy in general and activities that were dyslexia-specific. Questions also evaluated participation over a nine-week period as well as over the course of an entire year. Respondents were also asked to indicate specific professional development activities in which they had participated during these periods. Responses provided insights into both the amount of professional development, as well as the types of activities in which Spring Valley educators participated.

Participation in literacy-focused professional development during a nine-week period. Results indicated that in the nine-week period prior to the survey's administration, only one-third of participants engaged in professional development activities with a focus on literacy between one and three times during this period. Sixty-four percent of classroom teachers reported that they did not participate in any professional development activities with an emphasis on literacy during this time. Forty-three percent of reading specialists indicated that they also had not participated in literacy-oriented professional development. However, during the nine-week period identified in this study, the state reading association held its annual conference in and the Meadowview Reading Council hosted a spring mini-conference. These results suggest that Spring Valley educators did not take advantage of opportunities for professional development offered by organizations in the mesosystem and exosystem. Since the state reading

association conference was held less than two months prior to the administration of standardized testing and was scheduled during two weekdays, teachers may have chosen not to participate in conference activities in order to avoid being absent from the classroom when they were preparing students for testing.

Participation in dyslexia-focused professional development during a nine-week period. Few educators in the Spring Valley school district reported participating in professional development activities related to dyslexia during the nine weeks prior to the administration of this survey. Only 11% of administrators and Central Office staff and three percent of classroom teachers indicated that they had participated in dyslexia-focused professional development. The small percentage of participants who did not engage in professional development related to dyslexia could be attributed to a lack of opportunities directed at this topic. In addition, the nine-week period identified in the survey represented a point in time directly before the start of statewide standardized testing. Even if opportunities with a focus on dyslexia were available, many educators may not have wanted to leave their classrooms in order to attend these professional development sessions.

Participation in literacy-focused professional development during the past year. Participants were also asked to report on their participation in literacy-focused professional development over the course of an entire year. Seventy-two percent of all participants indicated that they had participated in professional development activities with an emphasis on literacy during the past year. These results indicate that although only a small percentage of Spring Valley educators had participated in professional development at the time of the survey, they were involved in professional development at other times throughout the year.

Although more participants reported engagement in literacy-focused professional development activities when the time frame included an entire year, 28% of all educators in the Spring Valley district still did not report any professional development that addressed literacy, which is concerning because these findings suggest that they have not been exposed to new information and ideas related to literacy instruction. If educators do not expand on their knowledge of current literacy practices, then their ability to support students at the school and district levels will be compromised.

Participation in dyslexia-focused professional development during the past year. Even when the time frame was extended to include an entire year's worth of professional development, only a small percentage of Spring Valley educators reported their participation in activities that addressed the topic of dyslexia. None of the reading specialists and only nine percent of special education teachers and speech-language pathologists participated in dyslexia-specific professional development. These results are particularly concerning as reading specialists, special education teachers, and speech-language pathologists are usually directly involved in providing intervention support for dyslexic readers. If these educators have not participated in professional development activities to enhance their understanding of dyslexia, then they will be unable to fully support the dyslexic readers in their classrooms.

Suggestions for future professional development opportunities. Participation in school and district-based professional development activities were most often reported by educators in the Spring Valley school district. Therefore, incorporating information about dyslexia into these sessions may be the best way to enhance educators' knowledge. Sessions could extend over several months, with each session building on the previous one. In addition, multiple professional development sessions would allow educators to study and respond to

common texts. For example, Shaywitz (2003) and Hudson et al. (2007) could serve as entry points for educators in Spring Valley. Elliott and Grigorenko (2014) could also stimulate conversations about use of the term "dyslexia." Educators could read and discuss these materials as a component of each session. Technology can also be used facilitate online discussions of materials, as well, with educators connecting via social media (e.g., Facebook and Twitter) to share their responses and insights.

Since a large percentage of reading specialists indicated that conferences sponsored by organizations that included the state reading association were a source of literacy-focused professional development, the inclusion of topics addressing dyslexia at these conferences would also be valuable. Conference planners need to evaluate their programming and explore options that would enable them to provide sessions with an emphasis on dyslexia.

Educators' Perception of Their Preparation to Work With Dyslexic Readers

The lack of participation in dyslexia-focused professional development translated to educators' perceptions of their preparation to work with dyslexic readers as two-thirds of all participants reported an inadequate level of preparation. These results were not surprising and provide further evidence that supports the need for professional development. The deficiency in preparation was not limited to teachers, though, as two-thirds of administrators and Central Office staff members reported that they were not prepared to support dyslexic readers. However, the silver lining in these findings is that educators in Spring Valley seem to be aware that they are not prepared to support dyslexic readers in their classrooms and schools. As a result, this knowledge may prompt educators to explore opportunities that will allow them to increase their preparation for working with dyslexic students.

Educators' Perceptions of Their Need for Professional Development

Eighty-nine percent of all participants either agreed or strongly agreed with a statement indicating that they would benefit from professional development that addressed strategies and methods for supporting dyslexic readers. Based on these results, educators in Spring Valley appear to recognize that their knowledge needs to be strengthened in order to better serve their students. The results from this study also indicate that the need for professional development is not limited to educators in one particular role, but is acknowledged by all groups division-wide. Therefore, professional development activities should not be directed at only specific groups of educators, but should include all educators in the Spring Valley system.

Educators' Perceptions of Their Need for Information

Educators in the Spring Valley school district were asked to determine their need for information on several topics, including the definition of dyslexia, the identification of dyslexic readers, strategies and techniques to use with these students, programs and materials, and professional development opportunities. With the exception of the definition of dyslexia, more than 90% of respondents acknowledged their need for information on these topics.

The definition of dyslexia. Although many educators demonstrated weaknesses in the ability to define dyslexia, only sixty-nine percent of educators noted that they needed additional information on the definition of dyslexia. While a large percentage of reading specialists (86%), administrators, and Central Office staff members (78%) reported that they needed this information, only 55% of special education teachers and speech-language pathologists indicated that they needed additional information about the definition of dyslexia. Considering that 82% of special education teachers and speech-language pathologists did not recognize that dyslexia is a language-based disorder and that almost three-quarters of those same respondents indicated

that dyslexia is characterized by visual deficits that cause readers to reverse letters and words when reading, it appears that this group of educators may have overestimated their knowledge of the definition of dyslexia.

Identifying dyslexic readers. A large percentage of educators in the Spring Valley school district acknowledged the need for additional information regarding the identification of dyslexic readers. Since the IQ-discrepancy model continues to be both cited and used as a method for identifying dyslexic readers, the recognition by the educators in this study that they need further information on this topic is promising. Professional development activities that address the identification of dyslexic readers at the school and division levels would be beneficial and should focus specifically on use of the response-to-intervention model. In addition, although many special education teachers and speech-language pathologists reported that they had sufficient information concerning the definition of dyslexia, more than 80% of these respondents wanted information pertaining to methods for diagnosing students with dyslexia. These results are also encouraging because special education teachers usually act as case managers for students during the Child Study and eligibility process and therefore need to be well versed in the methods for identifying dyslexic readers.

Strategies and techniques for supporting dyslexic readers. Many educators in the Spring Valley school district indicated that they needed information about strategies and techniques to use in instructing dyslexic readers. For example, *all* of the administrators and Central Office staff members who participated in this study indicated that they needed additional information about strategies and techniques. These findings are encouraging since these educators are usually involved in the special education process at the school and division levels, which includes the Child Study and eligibility processes, as well as meetings to develop

students' individualized education programs. As a result, administrators and Central Office staff members need to be knowledgeable regarding evidence-based strategies for dyslexic readers in order to provide appropriate suggestions during these meetings. Similarly, the percentage of special education teachers and speech-language pathologists who expressed interest in learning about strategies and techniques for dyslexic readers is encouraging because these educators need to be aware of practices that are appropriate for dyslexic readers, particularly when they develop and implement individualized education programs for identified students.

Only two-thirds of educators who selected the "Other" option when describing their role in the Spring Valley district reported that they wanted information regarding strategies and techniques for dyslexic readers. However, these results were not particularly surprising since this group of educators is not usually responsible for providing students with direct literacy instruction, so they may not believe that this information would be beneficial.

Programs used with dyslexic readers. Educators not only requested information about strategies and programs for dyslexic readers, but 93% indicated that they were also interested in obtaining information about programs (e.g., Orton-Gillingham) that could be used to support students with dyslexia. These results were surprising since 56% of all participants reported that the Orton-Gillingham program was the best method to use with dyslexic readers in a previous question. Educators' responses to this particular question may also reflect their interest in learning about programs in general without placing emphasis on a specific program.

All of the reading specialists, special education teachers, and speech-language pathologists who participated in this study indicated that they would like access to additional information on this topic. Since these educators typically provide intervention support for dyslexic readers, their interest in learning about programs for supporting dyslexic readers is not

unexpected. However, instead of looking to a program to support these students, providing these educators with professional development activities that emphasizes the use of evidence-based practices to support students with dyslexia may be more beneficial.

Materials used with dyslexic readers. Ninety-one percent of educators in Spring Valley also indicated that they needed information regarding materials to use with dyslexic readers. These results are encouraging, particularly since educators representing all roles in the school division recognized their need for information on this topic. Classroom teachers, reading specialists, special education teachers, and speech-language pathologists all have opportunities to work with dyslexic readers, so their expression of interest suggests the willingness to explore the options that are available. Similarly, the percentage of administrators and Central Office staff members who were interested in obtaining information about materials for dyslexic readers is promising since they often select instructional materials that are used at the school and district levels. Targeted professional development activities can provide information on an evidence-based intervention, such as the Interactive Strategies approach (Scanlon & Anderson, 2010; Vellutino & Scanlon, 2002).

Professional development focused on dyslexia. Participants also recognized that they need information about dyslexia-focused professional development opportunities. These results suggest that organizations represented in the mesosystem, exosystem, and macrosystem not only may need to sponsor activities that emphasize dyslexia, but they also may need to promote those activities to ensure that educators are aware of their availability. In addition, leaders in the Spring Valley school system may need to sponsor incorporate dyslexia into school and district-wide professional development offerings that incorporate dyslexia. These sessions would be

accessible to educators in Spring Valley and could address needs specific to participants (e.g., the identification of dyslexic readers).

Conclusions Regarding Educators' Consultation of Resources About Dyslexia

Even in the absence of professional development opportunities, educators can use a variety of resources to enhance their knowledge of dyslexia. Educators can consult professional colleagues, professional publications, textbooks, and education websites (e.g., Reading Rockets). However, only 39% of educators in the Spring Valley school district reported that they consulted resources when they had questions about dyslexia. These findings were not specific to any particular group of educators, but were consistent across instructional roles. These results are concerning because they indicate that educators in Spring Valley not only demonstrate a lack of participation in professional development activities that address dyslexia, but that many of them also refrain from accessing resources to enhance their knowledge. The creation of a curated list of appropriate resources related to dyslexia might be beneficial for Spring Valley educators because they may not know which resources to consult. This list could be made available to educators via First Class and frequent updates would ensure that relevant information was provided.

Professional colleagues and professional books were the most popular choices cited by participants. In particular, respondents indicated that they consulted the reading specialists or special education teachers at their schools. However, since many of those educators often reported a lack of preparation to work with dyslexic readers, they might not always possess the expertise necessary to serve as resources for their colleagues. Surprisingly, school administrators and Central Office staff members were rarely consulted regarding dyslexia and dyslexic readers.

These educators provide instructional leadership at the school and district levels, so these results are unexpected.

Materials from college and university courses were rarely referenced by participants, which could be the result of participation in courses that did not address dyslexia. In addition, professional journals were rarely identified as a source of information. These results are not particularly surprising since only 54% of educators in Spring Valley reported membership in a professional organization and professional journals are often included as a benefit. If educators are not members of these organizations, then it is unlikely that many journals would be readily available to them. To address this issue, district leaders may want to consider purchasing subscriptions to reputable journals (e.g., *The Reading Teacher*) for each school, as well as the Central Office, to increase educators' access to resources.

The influence of professional conferences also appears to be minimal. As a result, few educators in Spring Valley reported consulting materials from these events. However, if conferences do not address the topic of dyslexia, then educators will not have information to access when they have questions or need information. Therefore, conferences sponsored by organizations included in the ecological system model at the levels of the mesosystem, exosystem, and macrosystem do not appear to influence educators at this time. In order to influence educators' knowledge of dyslexia, conference planners should evaluate the sessions offered and identify opportunities for addressing the topic of dyslexia in their programs.

Conclusions About the Identification and Intervention of Dyslexic Readers

The last research question in this study evaluated how educators identified and supported dyslexic readers in the Spring Valley school system. Participants were asked about the presence of dyslexic readers in their classrooms and schools. They were also questioned about the criteria

used to identify dyslexic readers, as well as interventions provided for these students. The findings from this study indicate that many educators do not currently identify dyslexic readers in their classrooms and schools. In addition, dyslexic readers were rarely the topic of Child Study and IEP meetings. Interventions by teachers often emphasized reading aloud material to dyslexic students or modifying grade-level assignments while administrators and Central Office staff members were more likely to purchase a specific program (e.g., the Orton-Gillingham program, the Barton program). Based on these results, it is not surprising that many educators reported the need for additional information regarding strategies, techniques, and materials for supporting dyslexic readers. Therefore, educators in Spring Valley might benefit from professional development opportunities that addresses both the identification of dyslexic readers and methods for supporting those students in the classroom.

The Identification of Dyslexic Readers

Results from this study suggest that many educators in Spring Valley are hesitant to identify students as "dyslexic." Only 16% of participants reported that they worked with dyslexic readers, although an additional 48% selected the "Maybe" option when presented with this question. Few classroom teachers indicated that they worked with dyslexic readers, but these results were not surprising because 92% of these educators also noted that they would like additional information on the identification of dyslexic readers. If classroom teachers do not feel informed on this topic, they may be reluctant to identify students as dyslexic. The small percentage of reading specialists who recognized that they may serve dyslexic readers, however, is troubling. While reading specialists were more likely to report that they might work with dyslexic readers, their uncertainty suggests that they might also benefit from participation in professional development activities with an emphasis on the identification of dyslexic readers.

Special education teachers and speech-language pathologists are likely to encounter students with dyslexia and although they represented the group with the largest percentage of respondents who acknowledged that they worked with dyslexic readers, only 36% of them responded that they do. These findings continue to indicate that educators in Spring Valley do not appear to be comfortable with the identification of dyslexic readers.

The small percentage of administrators who reported the possible existence of dyslexic readers in their schools is concerning because these results suggest that administrators may also require additional support regarding the identification of students with dyslexia. Therefore, professional development opportunities should not be limited to teachers, but also include administrators in the Spring Valley district.

Findings from this study also indicate that dyslexic readers are rarely identified during the Child Study and IEP processes in the Spring Valley school district. In a nine-week period, only 11% of all respondents reported their participation in Child Study meetings focused on students with dyslexia between one and three times. While these results might be an effect of the timing of the survey and could differ at other times during the year, the lack of participation in Child Study meetings could either reflect the reluctance of educators to identify dyslexic readers or represent their insecurity regarding use of the term "dyslexia" to describe students. Similarly, few respondents participated in IEP meetings that involved dyslexic readers. Since a majority of IEP meetings are held in the spring, these findings were surprising.

The hesitation of many educators to explicitly identify students with dyslexia may reflect an issue of school culture. At one school in Spring Valley, educators are discouraged from using the term "dyslexic" to describe students (name withheld for confidentiality, personal communication, June 10, 2016). Although some scholars (e.g., Elliott & Grigorenko, 2014)

question the value of the term "dyslexia," it is legally recognized in Virginia as a specific learning disability. If educators are prevented from using this term, then they will probably be reluctant to identify any of their students as dyslexic readers. Educators may not be aware that dyslexia is formally recognized as an example of a specific learning disability in the state's Administrative Code and this information is available on the state's Department of Education's website. Professional development sessions at the school and district levels should provide this information to all educators in the Spring Valley district along with information regarding widely-accepted definitions of dyslexia (e.g., the definition provided by the International Dyslexia Association). In addition, the Department of Education may want to consider how to make this information more accessible to educators. While dyslexia is identified as a specific learning disability on the Department of Education's website, some searching is required to locate this information. Educators may be unaware of exactly what to look for on the site, or not even realize that the information is available. As a member of the exosystem, the state Department of Education directly influences educators across the state, which provides opportunities for the promotion of all aspects of the dyslexia construct.

Intervention Support Provided for Dyslexic Readers

Several issues were identified regarding the interventions provided for dyslexic readers in the Spring Valley school system. First, many educators appear to be confused about the difference between modifications to the regular curriculum and interventions. Dyslexic readers are often provided with modifications to the curriculum in lieu of actual interventions. While the modifications reported by the participants in this study may be beneficial to dyslexic readers' survival, they are not interventions that will directly improve their literacy skills. Modifications provide accessibility to the grade-level curriculum, while interventions specifically target and

develop the areas in which students are weak. In addition, many educators did not report providing dyslexic readers with instructional level materials for reading and spelling, which is essential for literacy development since these materials reflect and support students' individual needs. Students who may not be successful with grade level texts are able to navigate materials on their instructional level because they have fewer issues with automatic word recognition or decoding. As a result, oral reading skills can be developed. Furthermore, interventions that reflect common misconceptions about dyslexia (e.g., the use of colored overlays or lenses) appear to be used by some educators in the district. Therefore, the results of this study suggest that educators in the Spring Valley school district would benefit from professional development opportunities that identify appropriate interventions for dyslexic readers.

Modifications to the Curriculum. When educators in Spring Valley were asked to identify interventions used to support dyslexic readers, more than three-quarters of all participants reported that they read aloud material (e.g., assignments, tests, and quizzes) to students with dyslexia. In particular, large percentages of classroom teachers, special education teachers, and speech-language pathologists cited these practices. Although reading aloud to dyslexic students is a worthwhile practice to increase background knowledge and vocabulary, this action does not really involve an actual *reading* intervention; it is a modification of the existing curriculum. Similarly, more than half of the educators surveyed indicated that they modified grade-level assignments (e.g., shortened assignments) for students with dyslexia. Again, many classroom teachers, special education teachers, and speech-language pathologists reported making these modifications for dyslexic readers. While these practices may provide students with some access to the regular curriculum, they do not represent interventions that will develop and improve their literacy.

Instructional level materials. Interventions that emphasize the use of instructional level materials for reading and spelling do not appear to be widely used by Spring Valley educators as less than half of all participants reported that they provided this support for dyslexic readers. These results are concerning because they suggest that dyslexic readers are not being provided with the materials that are necessary for their literacy development. Instead of furnishing dyslexic readers with instructional level materials, many educators appear to believe that reading materials aloud to dyslexic students and providing them with modified assignments are sufficient interventions.

The small percentage of administrators and Central Office staff members who reported that they encouraged teachers to use instructional level materials with dyslexic readers might offer another explanation for these results. If school and district leaders do not suggest the use of instructional level materials, they may send an implicit message to teachers indicating that these resources are not valuable. Conversely, administrators may assume that teachers already recognize that dyslexic readers need instructional level materials and do not need to be told to provide this intervention.

Surprisingly, only 33% of reading specialists indicated that they used instructional level materials with dyslexic readers. While these results are unexpected, they may reflect an assumption that all struggling readers benefit from access to instructional level materials. Therefore, reading specialists in Spring Valley may not recognize this intervention practice as necessary for all students.

Colored overlays and lenses. Although the use of colored overlays and lenses have been rejected as an appropriate intervention for dyslexic readers (American Academy of Pediatrics, 2009; Hudson, High, & Al Otaiba, 2007; Iovino et al., 1998), 30% of Spring Valley

educators reported providing students with these materials. While the results from this study suggest that only a small group of educators endorse the use of an intervention that has been discredited, they were unexpected because 60% of respondents indicated that they believed that colored overlays or lenses help dyslexic readers. In addition, 75% of the educators surveyed also endorsed the misconception that dyslexia is characterized by visual deficits. Based on those results, the expectation was that a greater percentage of educators would report the use of colored overlays or lenses. These findings may be related to the small percentage of educators who indicated that they worked with dyslexic readers. If more educators had identified the presence of dyslexic students in their classrooms, then the percentage of educators who reported providing colored overlays or lenses might have been elevated.

The use of specific programs. Few teachers in the Spring Valley school district reported using a specific program (e.g., Orton-Gillingham, Barton) to support dyslexic readers. These results are encouraging because little evidence is available to support the effectiveness of these programs (Ritchey & Goeke, 2006). In fact, according to Ritchey and Goeke (2006), the Orton-Gillingham program "has yet to be comprehensively studied and reported in peer-refereed journals (p. 182). Surprisingly, though, slightly more than half of administrators and Central Office staff members who responded to this survey noted that they support dyslexic readers at the school and district levels through the purchase of specific programs. However, results indicate that these educators rarely mandate the use of programs for dyslexic readers, which is reassuring given the absence of concrete evidence regarding the benefits of prominent approaches such as the Orton-Gillingham program.

Other responses. Participants were provided with a response option that allowed them to identify other interventions that they used with dyslexic readers but were not supplied as direct

answer choices in this survey. This opportunity allowed participants to share specific methods that they employed to support dyslexic readers at both the school and district levels. Unfortunately, few respondents took advantage of this option. Of the four participants who selected the "Other" option, only one identified an intervention. This participant included a response regarding the use of "visuals" was reported, although an explanation of this intervention was not provided, so it is not clear how these visuals were used to support dyslexic readers. An administrator/Central Office staff member provided the response "Not Applicable." Two other teachers used the opportunity to make statements indicating that they either did not work with dyslexic readers or their uncertainty regarding the identification of dyslexic readers. These results may indicate that educators assumed that only the choices provided were appropriate and as a result were hesitant to include any other interventions. Participants also may not have felt comfortable sharing interventions, even though the confidentiality of all responses was assured.

Implications of This Study

The topic of dyslexia has received an increased amount of recognition in this state during the past five years from legislators, parent groups, and the state's Department of Education. In particular, considerable attention has been directed to the subject of educator knowledge. However, the current research base regarding educators' knowledge of dyslexia is somewhat limited. This study not only enhances current understandings regarding educators' knowledge of dyslexia, but it also provides insights about the educators in one particular school district. School and district-level leaders in Spring Valley can use the results from this study to implement professional development opportunities for educators that reflect the specific needs identified by this study, which will benefit dyslexic readers in the division.

If educators do not have accurate knowledge of dyslexia, then they will be unable to identify and support dyslexic readers in their classrooms and schools. Based on the results of this study, many educators in the Spring Valley school district demonstrate an inability to provide an accurate definition of dyslexia and lack essential knowledge about the source of dyslexia. In addition, many educators appear to be confused about the difference between modifications and interventions, which compromises their ability to provide effective interventions. Furthermore, several misconceptions about dyslexia (e.g., colored overlays and lenses are beneficial for dyslexic readers) continue to be endorsed by educators throughout the school district. Instruction that continues to reflect these misconceptions will prevent dyslexic readers from making significant progress. As a result, these deficits in educators' knowledge have serious implications for dyslexic readers in the Spring Valley school system. Therefore, educators should be provided with professional development opportunities that address basic knowledge of dyslexia, as well as evidence-based methods for the identification and intervention of students with dyslexia.

The results of this study also have implications for professional organizations represented in the mesosystem, exosystem, and macrosystem. Findings suggest that these organizations have had a minimal impact on the dyslexia knowledge of many educators in Spring Valley. However, while this study only represents one group of educators in a particular geographic area, this lack of influence may not only be specific to Spring Valley but could instead reflect a more comprehensive issue that is not limited to a specific geographic area but includes educators in other places as well. Therefore, leaders of these professional organizations should evaluate how information about dyslexia is communicated, as well as to identify methods that will allow them to provide educators with opportunities to acquire current, evidence-based knowledge. For

example, these organizations can promote dyslexia during conferences and through their publications. They can also develop and share resources that reflect best practices. Many professional organizations have established an online presence through their websites and social media pages, so disseminating these resources will not be difficult.

Limitations of This Study

Although the results of this study provide significant insights regarding educators' knowledge of dyslexia, several limitations identified in this study need to be considered. These limitations include the restriction of data collection to one small geographic area, the small population of educators who were surveyed, the inclusion of educators only at the elementary level, and the timing of the survey's administration. Future studies should address these limitations in order to make stronger generalizations about educators' knowledge of dyslexia.

First, since this study was conducted in one small school district, opportunities for the generalization of these results will be limited to this particular school system. In addition, rural districts are considerably different from their urban counterparts. Therefore, future studies should encompass a larger geographic area with both rural and urban settings represented.

A second limitation involves the total number of participants in this study and the representation of their roles within the school district. One hundred and four educators in the Spring Valley school district were invited to participate in this study. Although reading specialists, special education teachers, speech-language pathologists, and administrators were included in this study, a majority of respondents were classroom teachers. Subsequent studies should expand the sampling frame in order to increase the numbers of participants who are not classroom teachers. Furthermore, middle and high school educators should also be included in later studies because evaluating their knowledge of dyslexia is also important.

An additional limitation identified in this study involves the timing of the survey's administration, which was less than one month before the end of the school year. This time of the year is a particularly busy time for educators because many of them are involved in end-of-the-year assessments, report writing, and many other activities that characterize the months of May and June in the public school setting. In addition, educators received the link to the online survey during the state's standardized testing window, which may have affected some participants' accessibility to the web-based survey instrument because access to the Internet is often restricted during testing. The timing of the survey may also have affected the process of piloting the instrument. Many of the educators who indicated at an earlier time that they would be able to pilot the survey were unable to do so. As a result, only a few individuals provided feedback regarding the survey instrument. This study would have benefitted from a piloting process that was considerably more rigorous.

Conclusions

The results of this capstone project suggest that many educators in the Spring Valley school district demonstrate deficient knowledge of the dyslexia construct that often includes a lack of basic, foundational concepts. Additionally, many educators embrace common misconceptions that have been rejected by empirical studies conducted during the past three decades. However, a substantial percentage of Spring Valley educators also have not received the preparation necessary to work with dyslexic readers, so their insufficient knowledge may be attributed to an inadequate amount of preparation. As a result, educators in Spring Valley would benefit from targeted professional development activities that address the areas of concern identified in this study. Many educators who participated in this study recognized their need for professional development and expressed interest in increasing their knowledge of dyslexia,

which is encouraging. School and district-level leaders can use the results of this study to design and implement opportunities that will enhance all educators' understanding of this important topic.

In addition, findings from this study suggest that the professional organizations located in the mesosystem, exosystem, and macrosystem could do a better job of promoting and sharing information related to dyslexia. Unfortunately, these organizations do not appear to be sources of information for educators at this time, although they have the potential to fulfill this important role. Hopefully, the leaders of professional organizations devoted to literacy will use the results of this study to address these needs.

As an element of the exosystem, the influence of the state Department of Education on educators is extensive. Over the past five years, the state Department of Education has expanded its efforts to promote dyslexia. The results of this study, however, suggest that these efforts have not always translated into increased knowledge for educators in Spring Valley. In addition, initiatives sponsored by the state Department of Education have not consistently reflected the available research base, which negatively affects the quality of the information shared with school districts. Therefore, the state Department of Education may want to evaluate how information is shared with educators and consider additional methods to address the needs identified in this study in order to ensure the dissemination of evidence-based practices.

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Appendix A

Q1 Please read this consent agreement carefully before you decide to participate in this study.
Purpose of the research study: The purpose of the study is to explore educators' knowledge of dyslexia.
What you will do in the study: You will complete a questionnaire.
Time required: The time required for the questionnaire is under 20 minutes.
Risks: The data in this study are anonymous; thus, there are no anticipated risks in this study.
Benefits: There are no benefits to you for completing this survey. However, this study may help the researcher understand current teacher knowledge of dyslexia, which can be used to guide professional development opportunities.
Confidentiality: The information that you give in the study is anonymous. You will not be asked to identify yourself or the school at which you work. Based on your answers, it may be possible to determine your identity, but I will not do so and I will report data in such a way that you cannot be identified.
Voluntary participation: Your participation in this study is completely voluntary. You may elect not to participate without any penalty or loss of benefits to which you would otherwise be entitled. If you participate at first, but later discontinue participation, you will not be subject to any penalty or loss of benefits. You are free not to answer certain questions without penalty.
Right to withdraw from the study: If you want to withdraw from the study, you may do so by closing your internet browser. Because the data are anonymous, you cannot withdraw your data after submission.
Payment: You received a code to redeem a $2.00 Amazon credit in the letter that included the link to this survey.
If you have questions about the study, contact:
Jennifer Floyd, M.Ed.
Telephone: 540-570-0077
Email address: jaf9d@virginia.edu
If you have questions about your rights in the study, contact:
Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Drive Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Q2 I agree to participate in the research study described above.
- ❍ Yes
- ❍ No

Q3 Some of the questions presented will depend on your role in the school division. What is your current role in the Spring Valley school system?

- ❍ Classroom teacher
- ❍ Reading specialist
- ❍ Special education teacher or speech-language pathologist
- ❍ Administrator or Central Office staff
- ❍ Other _____

Q4 In the past year, have you participated in professional development activities that specifically addressed literacy?

- ❍ Yes
- ❍ No

If Yes is selected, then skip to Question 5.

Q5 Which of the following professional development activities have you participated in during the past year that specifically addressed literacy? Please select all that apply.

- ❑ School-based professional development meetings
- ❑ District-sponsored professional development meetings
- ❑ Webinars provided by the Virginia Department of Education
- ❑ One-day workshops/conferences sponsored by outside organizations (e.g., Staff Development for Educators)
- ❑ PALS webinars
- ❑ Conferences sponsored by professional organizations (e.g., VSRA, VAASCD)
- ❑ T-TAC workshop(s)
- ❑ Professional book studies/book groups
- ❑ Other _____

Q6 Within the past year, have you participated in professional development activities that were related to dyslexia?

- ❍ Yes
- ❍ No

Answer if Yes Was Selected for Question 6.

Q7 Within the past year, in which of the following professional development activities related to dyslexia have you participated. Please select all that apply.

- ❑ Professional conference session(s)
- ❑ Webinar(s)
- ❑ T-TAC workshop(s)
- ❑ College or university-level course(s)
- ❑ Video(s)
- ❑ Division-level professional development
- ❑ Professional book study
- ❑ Other _____

Answer if Classroom teacher was selected in Question 3.

Q8 Please consider the past nine weeks. How many times did you collaborate with the reading specialist to identify dyslexic readers.

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher was selected in Question 3.

Q9 Please consider the past nine weeks. How many times did you collaborate with the special education teacher to identify dyslexic readers.

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher was selected in Question 3.

Q10 Please consider the past nine weeks. How many times did you ask the reading specialist at your school for assistance, ideas, strategies, and/or materials to support dyslexic readers in your classroom?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist were selected in Question 3.

Q11 Please consider the past nine weeks. How many times did you read professional journal articles and books to learn more about dyslexic readers?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher was selected in Question 3.

Q12 Please consider the past nine weeks. How many times did you ask the special education teacher at your school for assistance, ideas, strategies, and materials to support dyslexic readers in your classroom?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Reading specialist, Special education teacher or speech-language pathologist was selected in Question 3.

Q13 Please consider the past nine weeks. How many times did you collaborate with classroom teachers at your school to identify dyslexic readers?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Reading specialist was selected in Question 3.

Q14 Please consider the past nine weeks. How often did you collaborate with the special education teacher(s) at your school to identify dyslexic readers?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q15 Please consider the past nine weeks. How many times did you administer assessments to evaluate students' progress in reading?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q16 Please consider the past nine weeks. How many times did you evaluate your students' response to intervention?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q17 Please consider the past nine weeks. How many times did you participate in Child Study meetings that focused on students with dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q18 Please consider the past nine weeks. How many times did you participate in IEP meetings that focused on students with dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q19 Please consider the past nine weeks. How many times did you participate in professional development activities related to literacy?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Answer If Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q20 Please consider the past nine weeks. How many times did you participate in professional development activities related to dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Answer If Classroom teacher, Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q21 Please consider the past nine weeks. How many times did you make instructional recommendations for dyslexic students?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Reading specialist, Special education teacher, or speech-language pathologist was selected in Question 3.

Q22 Please consider the past nine weeks. How many times did the classroom teachers at your school ask you for assistance, ideas, strategies, and/or materials to support dyslexic readers in their classrooms?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q23 Please consider the past nine weeks. How many times did you evaluate students' response to intervention?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q24 Please consider the past nine weeks. How many times did you participate in Child Study meetings that focused on students with dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q25 Please consider the past nine weeks. How many times did you participate in IEP meetings that focused on students with dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q26 Please consider the past nine weeks. How many times did you make recommendations for dyslexic students?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q27 Please consider the past nine weeks. How many times did you participate in literacy-focused professional development activities?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Answer if Administrator or Central Office staff was selected in Question 3.

Q28 Please consider the past nine weeks. How many times did you participate in professional development activities that focused on dyslexia?

- ❍ 0 times
- ❍ 1-3 times
- ❍ 4-5 times
- ❍ More than 5 times

Q29 Do you consult resources regarding dyslexia and dyslexic readers?

- ❍ Yes
- ❍ No

If Yes was selected, then skip to: Which of the following resources have you consulted in the last six months specifically regarding dyslexia?

Q30 Which of the following resources have you consulted in the last nine weeks specifically regarding dyslexia? Please select all that apply.

- ❑ Professional colleague(s)
- ❑ Professional books
- ❑ Professional journals (e.g., The Reading Teacher, Language Arts)
- ❑ Pinterest
- ❑ Education websites (e.g, Reading Rockets)
- ❑ Social media (e.g., Facebook, Twitter)
- ❑ Google
- ❑ Core reading program materials
- ❑ Textbooks from college/university courses
- ❑ Notes and handouts from college/university courses
- ❑ Professional conference(s)
- ❑ Conference handouts/materials
- ❑ Materials from the Virginia Training and Technical Assistance Centers (T-TAC)
- ❑ Videos (online or previously recorded)
- ❑ Teachers Pay Teachers
- ❑ I have not accessed any of these materials in the past nine weeks.
- ❑ Other materials not listed above _____

Answer if Professional colleague(s) was selected in Question 30.

Q31 Who do you consult when you have questions about dyslexia and dyslexic students? Please select all that apply.

- ❑ Administrator at my school
- ❑ Central Office staff
- ❑ Classroom teacher(s) at my school
- ❑ Reading specialist(s) at my school
- ❑ Special education teacher(s) at my school
- ❑ Classroom teacher(s) at another school
- ❑ Reading specialist(s) at another school
- ❑ Special education teacher(s) at another school
- ❑ Professor
- ❑ I do not consult other educators
- ❑ Other colleague(s) _____

Q32 Please indicate if you believe that the following statement is true or false: Every struggling reader is dyslexic.

- ❍ True
- ❍ False

Q33 Please indicate if you believe that the following statement is true or false: Dyslexic readers have weak word recognition, decoding, and spelling skills.

- ❍ True
- ❍ False

Q34 Please indicate if you believe that the following statement is true or false: Dyslexia is characterized by visual deficits that cause readers to see letters and words backwards.

- ❍ True
- ❍ False

Q35 Please indicate if you believe that the following statement is true or false: Dyslexic readers are identified with a discrepancy between their scores on an IQ test and their performance on an achievement test.

- ❍ True
- ❍ False

Q36 Please indicate if you believe that the following statement is true or false: Dyslexia is a neurological disorder.

- ❍ True
- ❍ False

Q37 Please indicate if you believe that the following statement is true or false: Dyslexic readers demonstrate weak phonological processing skills.

- ❍ True
- ❍ False

Q38 Please indicate if you believe that the following statement is true or false: Dyslexic readers always demonstrate strong oral comprehension.

- ❍ True
- ❍ False

Q39 Please indicate if you believe that the following statement is true or false: There is evidence that the Orton-Gillingham program is the best method for dyslexic readers.

- ❍ True
- ❍ False

Q40 Please indicate if you believe that the following statement is true or false: Dyslexia is limited to the English-speaking population.

- ❍ True
- ❍ False

Q41 Please indicate if you believe that the following statement is true or false: More boys than girls are diagnosed with dyslexia.

- ❍ True
- ❍ False

Q42 Please indicate if you believe that the following statement is true or false: Colored overlays or lenses help dyslexic readers.

- ❍ True
- ❍ False

Q43 Please indicate if you believe that the following statement is true or false: Dyslexia is a language based-disorder.

- ❍ True
- ❍ False

Q44 Which of the following do you consider to be the strongest indicator that a student is dyslexic? Please select only one answer.

- ❍ The student reads below grade-level expectations.
- ❍ The student reads and writes letters and words backwards.
- ❍ The student has weak word recognition skills.
- ❍ The student demonstrates a discrepancy between scores on an IQ test and scores on an achievement test.
- ❍ The student has not responded to individualized interventions.
- ❍ The student has poor phonological skills.

Answer if Classroom teacher, Reading specialist, Special education teacher or speech-language pathologist was selected in Question 3.

Q45 Do you currently work with students with dyslexia?

- ❍ Yes
- ❍ No
- ❍ Maybe

Answer if Yes or Maybe was selected in Question 45.

Q46 How do you support dyslexic readers in your classroom? Please select all that apply.

- ☐ Read aloud materials (e.g., assignments, tests, quizzes)
- ☐ Use a specific program (e.g., Orton-Gillingham, Barton)
- ☐ Provide books on tape or CD
- ☐ Modify grade level assignments (e.g., shorten assignments, modified spelling list)
- ☐ Use instructional materials for reading and spelling
- ☐ Provide colored overlays or colored lenses for reading assignments
- ☐ Other _____

Answer if Administrator or Central Office staff was selected in Question 3.

Q47 Do you currently have dyslexic readers identified in your school?

- ❍ Yes
- ❍ No
- ❍ Maybe

Answer if Administrator or Central Office staff was selected in Question 3.

Q48 How do you support dyslexic readers in your school (if you are an administrator) or district-wide (if you are a member of the Central Office staff)? Please select all that apply.

- ❑ Direct teachers to read aloud materials (e.g., assignments, tests, quizzes) to dyslexic readers.
- ❑ Purchase a specific program (e.g., Orton-Gillingham, Barton)
- ❑ Encourage teachers to use a specific program (e.g., Orton-Gillingham, Barton)
- ❑ Require the use of a specific program (e.g., Orton-Gillingham, Barton)
- ❑ Provide books on tape or CD
- ❑ Modify grade level assignments (e.g., shorten assignments, modified spelling tests)
- ❑ Encourage teachers to use instructional level materials for reading and spelling
- ❑ Purchase colored overlays or colored lenses for teachers to give students
- ❑ Other _____

Answer if Classroom teacher, Reading specialist, Special education teacher or speech-language pathologist was selected in Question 3.

Q49 Please indicate if you agree or disagree with the following statement. I am prepared to work with dyslexic readers.

- ❍ Strongly disagree
- ❍ Disagree
- ❍ Agree
- ❍ Strongly agree

Answer if Administrator or Central Office staff was selected in Question 3.

Q50 Please indicate if you agree or disagree with the following statement. I am prepared to support dyslexic readers.

- ❍ Strongly disagree
- ❍ Disagree
- ❍ Agree
- ❍ Strongly agree

Q51 Please indicate if you agree or disagree with the following statement. I need professional development targeting strategies and methods for supporting dyslexic readers.

- ❍ Strongly disagree
- ❍ Disagree
- ❍ Agree
- ❍ Strongly agree

Q52 Please indicate how informed you feel on the following topics.

	I would like more information.	I have sufficient information.
The definition of dyslexia	❍	❍
Identifying dyslexic readers	❍	❍
Strategies and techniques for supporting dyslexic readers	❍	❍
Programs used with dyslexic readers	❍	❍
Materials used with dyslexic readers	❍	❍
Professional development opportunities focused on dyslexia	❍	❍

Q53 What is your gender?
- ❍ Male
- ❍ Female
- ❍ I prefer not to answer.

Q54 How many total years have you been an educator?

Q55 How many total years have you been employed by the Spring Valley school system?

Answer if Classroom teacher, Reading specialist, Special education teacher or speech-language pathologist was selected in Question 3.

Q56 What grade(s) do you teach? Please check all that apply.
- ❑ Kindergarten
- ❑ First Grade
- ❑ Second Grade
- ❑ Third Grade
- ❑ Fourth Grade
- ❑ Fifth Grade
- ❑ Other

Q57 Do you currently belong to any professional organizations?
- ❍ Yes
- ❍ No

Answer if Yes was selected in Question 59.

Q58 To which of the following professional organizations do you currently belong? Please select all that apply.

- ❑ National Education Association/Virginia Education Association/Spring Valley Education Association
- ❑ International Literacy Association (ILA)
- ❑ Virginia State Reading Association/Meadowview Reading Council (VSRA/MRC)
- ❑ National Council of Teachers of English (NCTE)
- ❑ Virginia Association of Teachers of English (VATE)
- ❑ Association for Supervision and Curriculum Development (ASCD)
- ❑ Virginia Association for Supervision and Curriculum Development (VAASCD)
- ❑ Virginia Association of Elementary School Principals (VAESP)
- ❑ Other _____

Appendix B1
Pre-notification Letter

Hello,

I am contacting you about participating in an online survey regarding dyslexia knowledge that is a part of my dissertation research at the University of Virginia. This survey measures educators' knowledge of dyslexia to determine professional development needs. Your specific responses are anonymous and will not be shared with anyone. In addition, all responses will be destroyed following the conclusion of this study.

In the next day or two, I will send you a link to the survey. You should be able to complete the survey in under 20 minutes. Your input is valuable and will contribute to developing and understanding educators' dyslexia knowledge and professional development needs.

Thank you in advance for your time and assistance with this project.

Sincerely,

Jennifer Floyd, M.Ed.
Doctoral Candidate-Reading Education
Curry School of Education

University of Virginia

*The link to the survey will be embedded in an e-mail from noreply@qemailserver.com and will not come from my school address.

Appendix B2

Cover Letter

Dear _____,

There are many students in our school division who struggle with reading. Some of them may be dyslexic. Therefore, it is important to understand how to identify and support those children.

You have been selected to participate in a study exploring educators' knowledge of dyslexia. The results of this study will be used to identify professional development needs. This survey will take under twenty minutes. Your responses in this survey are anonymous.

As a token of my appreciation, please accept this $2 gift card from Amazon. To redeem your gift card, visit amazon.com, click on "Gift Cards" and then "Redeem Gift Cards" and enter the following code in the appropriate box.

Amazon Gift Card Code:

If you have questions about this study, please contact me at jaf9d@virginia.edu or at jennifer_floyd@rockbridge.k12.va.us. Thank you for your time and assistance with this project.

Sincerely,
Jennifer Floyd, M.Ed.
Doctoral Candidate-Reading Education
Curry School of Education
University of Virginia.
Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}
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Appendix B3
Follow-up Letter

Hello,

Last week, I sent you an e-mail requesting your participation in a survey about dyslexia. If you have already completed the survey, I thank you for your time and participation. If you haven't completed the survey, it is not too late to participate. You can still access the survey at (insert link here). The survey will take under 20 minutes to complete and will be available through June 6, 2016.

Thank you for your time and contributions,
Jennifer Floyd, M.Ed.
Doctoral Student-Reading Education
Curry School of Education
University of Virginia

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UNIVERSITY of VIRGINIA

OFFICE OF THE VICE PRESIDENT FOR RESEARCH
INSTITUTIONAL REVIEW BOARD FOR THE SOCIAL AND BEHAVIORAL SCIENCES

In reply, please refer to: Project # 2016-0176-00

May 9, 2016

Jennifer Floyd and Marcia Invernizzi
CISE (Curriculum, Instruction & Special Ed)
20 Straub Lane
Lexington, VA 24450

Dear Jennifer Floyd and Marcia Invernizzi:

Thank you for submitting your project entitled: "Educators' Understanding of Dyslexia: A Survey Exploring the Need for Professional Development in the Areas of Prevention and Intervention" for review by the Institutional Review Board for the Social & Behavioral Sciences. The Board reviewed your Protocol on May 6, 2016.

The first action that the Board takes with a new project is to decide whether the project is exempt from a more detailed review by the Board because the project may fall into one of the categories of research described as "exempt" in the Code of Federal Regulations. Since the Board, and not individual researchers, is authorized to classify a project as exempt, we requested that you submit the materials describing your project so that we could make this initial decision.

As a result of this request, we have reviewed your project and classified it as exempt from further review by the Board for a period of four years under 45 CFR Â§46.101 (b)(2), research involving the use of anonymous survey procedures. This means that you may conduct the study as planned and you are not required to submit requests for continuation until the end of the fourth year.

This project # 2016-0176-00 has been exempted for the period May 6, 2016 to May 5, 2020. If the study continues beyond the approval period, you will need to submit a continuation request to the Board. If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences

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