

# A Conceptual Framework for Early Identification of Elementary School-Age Students at Risk for Language and Literacy Disorders: A Pilot Study

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## Abstract

*Purpose:* This study sought answers to the following questions: (1) How do teachers describe the effectiveness of the conceptual framework in the early identification of at-risk children? (2) What is the impact of narrative language interventions on language and reading comprehension?

*Method:* Using Narrative Language Measures (NLM) subtests, students (age ranges 5 – 7 years) were identified as at-risk for language and literacy disorders. Thirty kindergarten and first-grade students and their teachers participated in the study. The experimental group received narrative language interventions, following which both the experimental and control groups were re-screened using NLM subtests. Student modifiability ratings were completed at the end of the first and last intervention sessions to study changes in the experimental group's narrative language ability in response to direct language interventions. The teachers completed questionnaires to subjectively rate the experimental group's skill set pre-and post-intervention.

*Results:* The teacher-completed questionnaires indicated that the students' skillset post versus pre-intervention was not statistically significant. The teachers agreed that the conceptual framework was useful in the early identification of at-risk students. The experimental group had significantly higher scores post-intervention in NLM Listening than did the control group. There was no significant difference in NLM Reading scores between the experimental and control groups at baseline and post intervention; however, there was a significant increase in scores within the experimental group pre- and post-intervention.

*Conclusions:* Communication between teachers and speech language pathologists can be a useful tool in the early identification of children at-risk for language and literacy disorders. Narrative language interventions have a positive impact on language and reading comprehension.

**Keywords:** early identification, at-risk, language intervention, communication, dialogue

## 1. Introduction

During the 2019-2020 academic year, 14% of students (age range 3 – 21) in public schools received special education services under the Individuals with Disabilities Education Improvement Act (IDEA, 2004). Among the 14% of students who received special education services, 33% received services under the category of specific learning disability (which encompasses Dyslexia), and 19% received services under the category of speech or language impairment (National Centre for Education Statistics [NCES], 2021). Based on this data from the NCES annual report (2021), it is evident that the majority of students who receive special education services do so under the eligibility categories of specific learning disability (SLD) and speech or language impairment (SLI). Evidence from research shows that 51% of children with developmental language disorder (DLD) also have Dyslexia (Adlof & Hogan, 2018). Since SLD and SLI are co-morbid in some cases, early identification and intervention are vital for the child's overall academic success.

The IDEA 2004 (Public Law 108-446), mandates that Local Education Agencies (LEAs) emphasize early intervention and high-quality education based on scientific evidence. In addition to other amendments to the

original act, IDEA (2004) stipulates that school districts (i) may elect not to follow the discrepancy model in determining if a student has a learning disability; (ii) may use a response to intervention (RtI) framework instead; (iii) use RtI as part of the special-education evaluation and eligibility determination process; and (iv) base RtI interventions on evidence from research.

Universal screening is the first step within the RtI framework, and it includes assessments and progress-monitoring in the areas of reading (e.g., reading fluency and decoding) and mathematics (e.g., computations and applied problems). The purpose of these assessments is to identify students who are potentially at-risk for academic problems such as reading disorders. After identification, teachers then strategically place students identified as at-risk into specific skill-level groups depending on the frequency and intensity of interventions required for the students to succeed (Hughes & Dexter, n.d.).

The RtI framework consists of three tiers: (i) general education teachers provide tier 1 level of instruction to all students in the classroom, (ii) general education teachers and in some schools, interventionists or other specialists provide tier 2 evidence-based interventions to students identified as at-risk for academic difficulties, and (iii) educators provide tier 3 intensive interventions to students who did not respond positively to tier 1 and tier 2 interventions (Sanger et al., 2012). Within the RtI framework, educators (e.g., general education teachers and interventionists) use quantitative data to monitor students identified as at-risk at regular intervals to determine whether the students are responding positively to interventions and making academic growth (McMaster et al., 2012). Based on progress monitoring data, educators either continue or discontinue the intervention objectives.

Muti-tiered systems of support (MTSS) is *“a tiered education system that involves collaboration within teams of educators to make data-driven decisions and implement evidence-based practices to ensure students make adequate academic progress”* (Sylvan, 2021). The MTSS framework aims to identify students who present with challenges in academic growth and social emotional development. As such, this framework encompasses, but is not limited to, RtI (Sylvan, 2021). Within the MTSS framework, educators provide students with intensive interventions when needed or refer them to special education for additional assessments, depending on the students' response to interventions.

Language is embedded in all aspects of academic learning, including reading, mathematics, writing, oral expression, and also in social situations. Thus, direct assessment of language skills as part of a universal screening measure is crucial. This paves the way for the early identification of children who might be at-risk for language disorders such as DLD or literacy problems such as Dyslexia and other comorbid conditions. The early identification of children who are at-risk for language and literacy disorders is crucial so that appropriate interventions can be provided as early as possible (Loeb, 1997). A firm foundation of vocabulary development and language comprehension is an integral part of reading comprehension (Wise et al., 2007). There is also strong evidence in literature about the relationship between developmental language impairment and reading disabilities (Catts et al., 2002). For example, Catts et al. (2002) reported that children who present with language impairment in preschool and early elementary experience reading challenges during later elementary years.

Scarborough's Reading Rope Model (2001) visually represents two broad constructs, namely word recognition and language comprehension, including several underlying strands (e.g., background knowledge, vocabulary, language structures, verbal reasoning, literacy knowledge, phonological awareness, sight word recognition, and decoding) that weave together and become stronger over time through instruction and learning experiences in developing a skilled reader. As such, language comprehension and word decoding are variables that work together for skilled reading comprehension. Therefore, it is critical that at-risk children are identified early in order to receive language interventions alongside literacy-based interventions.

Most school districts do not have a policy that stipulates the scope of universal screening for the early identification of language impairment (Christopoulos & Kean, 2020). Additionally, large caseload sizes affect the Speech-Language Pathologist's (SLP) ability to provide services to students at-risk for language and literacy disorders who are not a part of their caseload. Christopoulos and Kean (2020) emphasized the need for further exploration to provide insights into the contribution of general education teachers in the identification of children with language impairment. As such, dialogue between general education teachers and SLPs is essential for early identification and prevention of language and literacy disorders. A gap in the current literature demonstrates the need for best practices to include interaction between general education teachers and SLPs in early identification within the RtI framework for data driven collaborative decision making.

### *1.1 The Relationship Between Language Development and Literacy*

Language comprises five components that work together for effective communication to occur (language comprehension, oral, and written expression). They are: (i) *phonology—the speech-sound system of a particular language*; (ii) *morphology—the study of the smallest meaningful unit of language (e.g., free morphemes, bound morphemes, and derivational morphemes)*; (iii) *syntax – the rules by which words are combined to form phrases and sentences in a particular language (grammar)*; (iv) *semantics – understanding the meaning of words and sentences (vocabulary/comprehension)*; and (v) *pragmatics – knowledge of the rules associated with using language to achieve a purpose within a social context* (Gleason, 2016; ASHA, n.d.). A language disorder is an impairment in comprehension and/or use of a spoken, written, and/or other communication symbol system (e.g., American Sign Language). Catts et al. (2002) reported that about 50% of kindergarten children with language impairment demonstrate reading difficulties in the second and fourth grades. Additionally, children with persistent language problems in the second and fourth grades have poor reading outcomes; however, those who acquire higher language ability in the second and fourth grades have better reading outcomes (Catts et al., 2002).

Children with language deficits in association with reading difficulties have problems with other components of language in addition to the phonological component (e.g., phonological processing skills; Catts et al., 1999). About 57% of kindergarten children with reading-related problems had weak receptive language skills, and 50% of them presented with expressive language difficulties (Catts et al., 1999). When provided intervention in morphological awareness, children with language and literacy disorders show improvement in vocabulary development, reading comprehension (Gibson & Wolter, 2015), and spelling (Apel & Lawrence, 2011). Gillion and Dodd (1995) reported that remediation of children’s phonological, semantic, and syntactic processing skills improves both reading accuracy and reading comprehension. Children with strong semantic knowledge can understand the contextual information available to them so that words can be chosen correctly to impart meaning, particularly when spelling homophones in writing (Moxam, 2020). Children with adequate social-pragmatic skills can respond to questions, ask questions, and advocate for themselves within the classroom setting. Children with a solid foundation in phonology, morphology, semantics, and syntax can demonstrate their knowledge through narrative discourse. In addition to difficulties with reading comprehension (Catts et al., 2002), children with language impairment have shown increased levels of emotional problems across the stages of development (St. Clair et al., 2019), indicating a direct relationship between language ability and social emotional development. In summary, it is important for educators to be aware of red flags that pertain to language and literacy disorders.

### *1.2 Red Flags for Language and Literacy Disorders*

Red flags for Dyslexia include, but are not limited to, difficulty perceiving rhyming words, difficulty learning the letter names and sounds of the alphabet, persistence of letter reversals and transpositions beyond age seven, difficulty remembering the visual representation of irregular words during reading and spelling, spelling words the way they sound (phonetically) rather than the way they look, difficulty pronouncing certain multisyllabic words correctly, and delay in word decoding that affects overall reading fluency (Mather & Wendling, 2012). Children with underlying language impairment present difficulties in learning new words, comprehending directions, formulating complex sentences, word-retrieval problems, grammatical errors when speaking, reading problems, and sequencing events in a story in a logical order (National Institute on Deafness and Other Communication Disorders [NIH], 2019).

### *1.3 The SLP’s Role in the RtI Framework*

According to the ASHA’s position statement, the SLP’s roles and responsibilities within the school system include, but are not limited to, providing unique contributions to the curriculum, working across all grade levels, serving students with a range of communication and literacy-based needs, highlighting language and literacy, using evidence-based practices in prevention and assessment, providing interventions, and collaborating with other school professionals and families (Roles and Responsibilities of Speech-Language Pathologists in Schools, ASHA, n.d.). Therefore, SLPs are an integral part of a school’s literacy/MTSS team.

Being involved in the MTSS process, SLPs can achieve four major purposes: (i) collaborating with other educators to improve the overall quality of instructional practices of language and literacy, which could aid in the prevention of some students requiring more specialized services as they grow older; (ii) early identification of at-risk students for the purpose of early intervention; (iii) integration of speech-language services into the general education setting through collaboration with educators so that student needs can be met effectively; and (iv) to provide relevant data to the school literacy team for data-driven decision-making purposes and also to accurately identify students who are eligible for special education services (Sylvan, 2021).

#### 1.4 The Rationale for Dialogue Between General-Education Teachers and Speech-Language Pathologists

In 2019, the National Assessment of Educational Progress (NAEP) administered reading assessments to representative samples of fourth- and eighth-grade students across the nation, states, the District of Columbia, Department of Defense School System (DODSS), and 27 participating large urban school districts. The reading assessment included literary and informational texts to assess the students' reading comprehension skills (NAEP, n.d.). NAEP achievement levels are based on performance standards that specify what students should be capable of doing at a specific grade level. The results are reported as the percentages of students performing at or above three levels: NAEP Basic, NAEP Proficient, and NAEP Advanced (NAEP, n.d.).

In comparison to 2017, the 2019 NAEP assessment results indicated that students in the fourth and eighth grades achieved lower reading scores. The 2019 NAEP reading assessment results indicated that 9% of fourth-grade students performed at the NAEP advanced level, 35% of fourth-grade students performed at or above the NAEP Proficiency level, 66% of fourth-grade students performed at or above the NAEP basic level, 4% of eighth-grade students performed at or above the advanced level, 34% of eighth-grade students performed at or above the proficiency level, 73% of eighth-grade students performed at or above the basic level, 6% of twelfth-grade students performed at or above the advanced level, 37% of twelfth-grade students performed at or above the proficiency level, and 70% of twelfth-grade students performed at or above the basic level (NAEP, 2019). These results indicate that a fair number of elementary school children do not possess grade-level reading comprehension skills. Language deficits in themselves do not affect the acquisition of word-decoding skills in children with intact rapid-naming skills. Oral language skills are more important for reading comprehension than for decoding (Bishop et al., 2009).

Approximately 33% of students who receive special education services do so under the category of Specific Learning Disability (NCES 2021). The NCES (2021) defines specific learning disability as “*a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations*” (IDEA, 2004). Majority of the students who receive speech-language services in the schools also demonstrate significant reading and writing difficulties; therefore, the role of the SLP is essential in the selection of evidence-based strategies for intervention, analyzing student data to monitor the effectiveness of the interventions, and as such collaborating with other educators to improve support services for students, as needed (Otaiba et al., 2018).

Large caseload sizes affect the ability of the SLP to provide early intervention services within the MTSS framework. Katz et al. (2010) reported that 60% of the participants (SLPs) perceived their caseload as being of a size that is unmanageable. Sanger et al. (2012) surveyed SLPs regarding their opinions on RtI programs. Challenges reflected in their responses include: (a) the need for sufficient training, (b) SLPs already having heavy school caseloads, (c) concerns over students who may be “*stuck in the tiers of RtI instruction*” and the delay in timely referrals of students who need language services, and (d) having educational leaders that support RtI as well as the need for everyone to be “*on board*” (Sanger et al., 2012). Therefore, effective communication between general education teachers and SLPs during universal screening is of key importance in the early identification and treatment of children at-risk for language and literacy disorders.

#### 1.5 Language and Literacy Screening

Every Student Succeeds Act (ESSA), federal legislation passed in December 2015, governs education policies in the United States (U.S.) public schools. According to ESSA requirements, students are tested each year from third through eighth grade, and then once again in eleventh grade. These standardized tests determine each student's academic abilities and the capability of the specific U.S. state in effectively implementing educational programs for all students. ESSA also requires LEAs to prepare all students, regardless of race, income, disability, ethnicity, or English proficiency, for a successful college experience and a fulfilling career (ESSA, 2015).

Best practices for universal screening do not emphasize the need for speech or language screening; thus, school districts lack a consistent policy for such screenings (Christopoulos & Kean, 2020). The definitions for specific learning disability (SLD), speech and language impairment (SLI), dyslexia, and co-morbidities that exist among these conditions speak to the need for consistent standardized policies for language screenings within the public school system. Since general education teachers spend the greatest amount of time with students during the school day, it is the teacher who often initiates referrals for special education services (Christopoulos & Kean, 2020). Therefore, communication between general education teachers and SLPs is critical for data-driven informed decision-making and the early identification of children who are at-risk for language and literacy disorders.

### 1.6 Narrative Language Intervention

Narrative language intervention is based on storytelling, with an emphasis on specific language-based concepts such as vocabulary, story grammar, and sequencing events (Spencer & Petersen, 2020). Story narration can provide information on the student's receptive and expressive academic language ability (Petersen et al., 2020) in addition to more complex language use, such as making inferences and predictions. Based on the existing research evidence and clinical experiences, Spencer and Petersen (2020) suggest the following principle driven guidelines that can assist in providing narrative intervention: (i) *build story structure before vocabulary and complex language*; (ii) *use multiple exemplars to promote metalinguistics and generalization*; (iii) *promote active participation*; (iv) *contextualize, unpack, and reconstruct stories*; (v) *use visuals to make abstract concepts concrete*; (vi) *deliver immediate corrective feedback*; (vii) *use efficient and effective prompts*; (viii) *differentiate, individualize, and extend*; (ix) *arrange for generalization opportunities*; and (x) *make it fun* (p. 1085). Language-focused interventions improve children's reading comprehension through the mediation of vocabulary (LARRC, Jiang, & Logan, 2019). Spencer and Petersen (2018) reported positive written narrative outcomes in first graders who received narrative language intervention as a result of the cross-modality transfer of academic language skills.

### 1.7 Research Questions

In summary, compelling evidence from the literature suggests a need for consistency in policies that will promote effective communication between general education teachers and SLPs in the early identification of children who are at-risk for language and literacy disorders. Language-focused interventions improve reading comprehension in addition to improving language comprehension and written narratives, which is consistent with the knowledge that reading comprehension is the product of language comprehension and word decoding (Gough & Tunmer, 1986). Consistent with the extant literature, the purpose of this study is to reiterate the need for language screenings as part of universal screening measures within the public school system. As such, this study sought answers to the following questions:

- (1) How do general education teachers describe the effectiveness of the conceptual framework in the early identification of children at-risk for language and literacy disorders?
- (2) What is the impact of narrative language interventions on language comprehension and reading comprehension?

## 2. Method

### 2.1 Participants

The participants in this study included kindergarten and first-grade students and their teachers at a participating elementary school in Northern California, U.S. The participants included 11 kindergarteners and 19 first graders, for a total of 30 students (17 boys and 13 girls) age-ranges between five and seven years. There were six general education teacher participants. The six teachers were employed full-time at the elementary school; two teachers taught kindergarten, three taught first grade, and one taught a kindergarten-first-grade combination class. Table 1 includes the student participants' demographics.

Table 1. Student participants' characteristics by study group and educational level

Whole Group N = 30				
Descriptors	Kindergarten (n <sub>1</sub> =11)		First grade (n <sub>2</sub> = 19)	
	Experimental (n <sub>1</sub> = 4)	Control (n <sub>2</sub> = 7)	Experimental (n <sub>1</sub> = 10)	Control (n <sub>2</sub> = 9)
<b>Gender</b>				
Male	3	4	6	4
Female	1	3	4	5
<b>Language Proficiency</b>				
English	4	7	10	8
English Language Learner redesignated as	0	0	0	1

proficient in English				
<i>Ethnicity</i>				
Hispanic	1	2	4	4
Non-Hispanic	3	5	6	5
<i>Race</i>				
White	1	1	6	2
Filipino	2	2	3	4
Black/ African American	0	1	0	2
Asian	1	2	1	1
Other	0	1	0	0

The researcher recruited teacher participants through the following process: 1) the school principal informed the teachers of the research and informed them that the researcher would provide them an informed consent document, and 2) the researcher provided the informed consent document to the teacher participants. The researcher recruited student participants by: 1) sending an informational letter to the parents of kindergarten and first grade students, and 2) the School Principal sent an email to the parents informing them that the student would be bringing home the informational letter; the informational letter was also attached to the email. The informed consent process was completed by teachers at the school site. Parents of the student participants who were interested in volunteering their child to participate, contacted the researcher by phone.

The inclusion criteria for the student participants were as follows: 1) kindergarten and first grade students and 2) monolingual English speakers or English language learners who were reclassified as English-Proficient based on the school district's reclassification criteria. The teacher participants were kindergarten and first-grade teachers, whose students were also participants. Students who received special education services based on an IEP that identified them as having a reading disability/language disorder were excluded. None of the student participants became eligible for an IEP during the study. All methods and procedures were approved by the Institutional Review Board (IRB # 5210472).

### 3. Instrumentation & Materials

#### 3.1 Narrative Language Measures (NLM)

The primary investigator used the Narrative Language Measures (NLM) Listening and NLM Reading respectively, which are part of the CUBED assessments (Petersen & Spencer, 2016) for screening purposes at the beginning and end of the study (pre- and post-intervention data). The CUBED assessments are designed to be used as norm-referenced or criterion-referenced universal screening and progress monitoring measures for decoding fluency, language comprehension, and reading comprehension. These assessments are designed for use with students in preschool through third grade. The NLM subtests use narratives (stories) to measure listening retellings, reading retellings, and reading decoding fluency. The measures are used to screen students' ability to use and understand oral and written academic language respectively. NLM protocols include instructions and scripts that the examiner must use during the administration. These protocols contain the story text at the top of the page and a scoring section at the bottom. The scoring section is divided into four sections: 1) Story Grammar (SG) of the narratives, 2) Language Complexity (LC) to measure different linguistic features, 3) Episode (E) includes formulas for awarding points for episodic complexity, and 4) the Other Targets section tracks specific targets unique to the student but is not included in the Retell Score (CUBED Examiner's Manual, p. 35). In addition to the Retell Score, the NLM Reading protocol measures Decoding Fluency by calculating the total number of correct words read in one minute (CUBED Examiner's Manual, p. 40). The administration time for NLM Listening and NLM Reading ranges between 5 and 15 min. An example of the examiner's prompts on the NLM Listening measures is, "I am going to tell you a story. Please listen carefully. When I am done, you are going to tell me the same story. Are you ready?". An example of the examiner's prompt on the NLM Reading measure is, "Thanks for reading. Now you tell me that story." The researcher audio recorded each participant's responses on both NLM measures using a Sony ICD-BX140 4GB Digital Voice Recorder for analysis and scoring purposes.

The NLM measures have specific cut-off scores, using which the examiner can categorize the students as “at benchmark” if they meet criteria, at “moderate risk” if their performance is moderately lower than expected, and at “high risk” if their performance is very low. Additionally, examiners can use raw scores to determine whether a student’s decoding fluency meets expectations according to a predefined criterion (CUBED Examiner’s Manual, p. 52).

### 3.2 Modifiability

Measure of modifiability is a dynamic approach to qualitatively and quantitatively study a child’s language learning potential in response to interventions (Gutierrez-Clellen et al., 1998). The *Modifiability Scale* (Pena, 2000) uses Likert-type ratings to observe behaviors such as the child’s overall responsivity to interventions, the intensity of effort required by the interventionist to induce change, and the child’s ability to transfer the new skill to a novel task. Modifiability scores can be used to measure and interpret a child’s responsivity to interventions, the examiner’s effort, and transfer skills (Gutierrez-Clellen et al., 2001). The scale used for this research was adapted from Dr. Elizabeth Pena’s (2000) original publication by the University of Oregon, 2016 as shown in Table 2.

Table 2. Modifiability Measure

Variables	Points			
Examiner Effort	<i>Extreme (1)</i>	<i>High-Moderate (2)</i>	<i>Moderate – Slight (3)</i>	<i>Slight – None (4)</i>
Student Responsivity	<i>None (1)</i>	<i>Slight (2)</i>	<i>Moderate (3)</i>	<i>High (4)</i>
Transfer	<i>None (1)</i>	<i>Low (2)</i>	<i>Moderate (3)</i>	<i>High (4)</i>
<b>Total Modifiability Score: (points)</b>				
<b>Scoring Criteria:</b>				
3 points: Observed Learning Patterns – Atypical & Severe				
4 – 6 points: Observed Learning Patterns – Atypical & Moderate				
7 – 9 points: Observed Learning Patterns – Atypical & Mild				
10 – 12 points: Observed Learning Patterns – Typical				
Pena, E. (2000). Measurement of Modifiability in Children from Culturally and Linguistically Diverse Backgrounds. <i>Communication Disorders Quarterly</i> , 21 (2), 87-97. <a href="https://doi.org/10.1177/15257401000210020">https://doi.org/10.1177/15257401000210020</a>				
University of Oregon, 2021. Dynamic assessment (Overview and Tools). <a href="https://coe.uoregon.edu/cds/files/2016/04/Dynamic-Assessment-Info-Protocol-and-Scoring-Criteria.pdf">https://coe.uoregon.edu/cds/files/2016/04/Dynamic-Assessment-Info-Protocol-and-Scoring-Criteria.pdf</a>				

### 3.3 Story Champs

*Story Champs* (Spencer & Petersen, 2016) is a multi-tiered language intervention curriculum that promotes the academic language of diverse students. The primary focus of the *Story Champs* is on the development of a strong oral language foundation through storytelling. It also promotes other aspects of academic language that are essential for education, through information retelling, vocabulary learning, and writing. This curriculum incorporates visual support such as colorful illustration cards, story grammar icons, passage icons, story starter cards, and champ checks (dry erase boards). Engaging activities, such as small group games, include Story Sticks, Bingo Cards, Story Dice, and other manipulatives within the intervention curriculum. *Story Champs* consists of lesson plans for delivery to large groups, small groups, or individually to a single student. It features a set of 24 stories constructed across 10 levels of difficulty and explicit teaching procedures that can be used to focus on multiple language targets, including story grammar, vocabulary, inferencing, syntax, informational retelling, and story generation.

## 4. Procedures

### 4.1 Pre-intervention

The primary researcher engaged in self-training sessions regarding the administration of NLM Listening and Reading measures, as well as the provision of language intervention using the *Story Champs* curriculum. Additionally, the CUBED assessments and *Story Champs* manuals were reviewed to ensure familiarity with the instruments. After receiving approval from the superintendent of schools and the school principal, the researcher

provided an informational session to the teacher participants explaining the rationale and purpose of the study, as well as an overview of the conceptual framework (Figure 1). Figure 1 illustrates the conceptual framework of dialogue between general education teachers and SLPs, which is the central tenet of the study. The researcher also explained the referral criteria to both teachers and parents of the student participants.

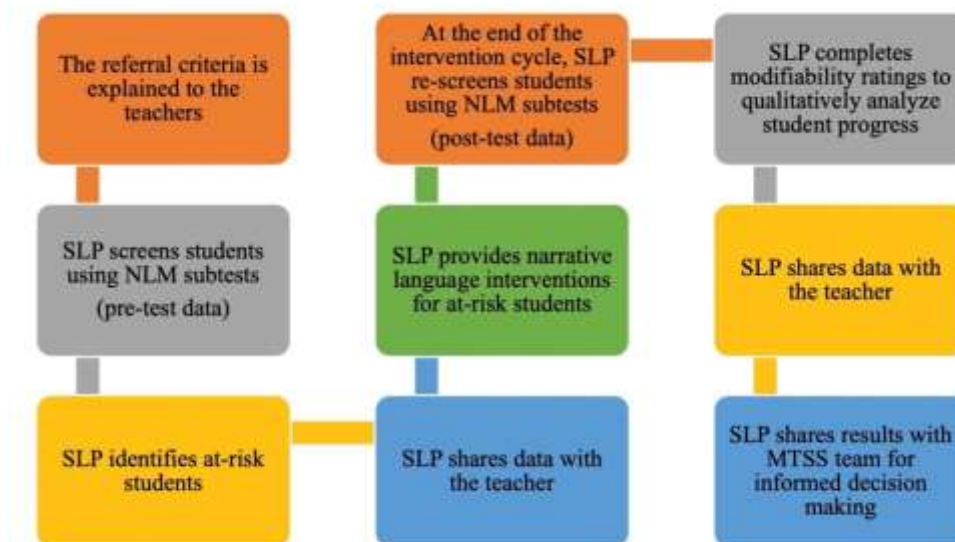


Figure 1. Conceptual Framework of Dialogue Between General-education Teachers and SLPs

Kindergarten and first-grade students who met the inclusion criteria (a total of 42 students) were screened using NLM measures. Screenings and interventions were conducted in a quiet room on the school campus with minimal auditory and visual distractions. One story from the NLM Listening measure (winter) was individually administered to all kindergarteners and first graders. During screening using the NLM Listening measure, the researcher read the story to the participant. If the student did not meet the benchmark cut-off score, then a second story was administered to determine if the student was at-risk for language disorder. The participant then retold the story. One story from the NLM Reading measure (winter) was administered individually to all first graders. During screening using the NLM Reading measure, the researcher instructed the participant to read the story aloud. The participant then retold the story. While the participant read the story, the researcher documented the total number of correct words read per minute to compute reading decoding fluency. The scoring criteria for both NLM measures incorporated responses in areas of story grammar, language complexity, and language comprehension. For kindergarteners, the CUBED assessments did not include the NLM Reading component; therefore, they were screened using the NLM Listening measure only. Each participant's responses to the NLM measures were audio recorded using a Sony ICD-BX140 4GB Digital Voice Recorder for analysis and scoring purposes. Each student's response on the two measures was scored in real time and re-checked using audio-recorded language samples.

Using criterion-referenced scoring system, students were classified as *advanced*, *at benchmark*, *at moderate risk*, and *at high risk* for language/ literacy disorders. Participants who scored at the *advanced* and *benchmark* levels were excluded from further participation in the study (12 students). Students who were identified as at-risk for language and literacy disorders were randomly assigned to the experimental and control groups (a total of 30 students; 14 in the experimental group and 16 in the control group).

Pre-intervention questionnaires were shared with teacher participants via Qualtrics. Teacher participants completed the questionnaire to subjectively rate the skill-set of students in the experimental group in the areas of reading comprehension, language comprehension, oral expression, and written expression. For kindergarteners in the experimental group, the teachers rated each student's skill-set pre-intervention in terms of language comprehension and oral expression. For first-graders in the experimental group, the teachers rated each student's skill-set pre-intervention in the areas of reading comprehension, language comprehension, oral expression, and written expression. See Table 3 for a sample of the pre-intervention questionnaire. Modifiability ratings were



completed at the end of the first intervention session to study the experimental group's level of modifiability in response to interventions (baseline data).

Table 3. Pre-intervention questionnaire

Please rate the student's current skill-level by completing this questionnaire.

Please enter the student's name in the box below:

1. How would you rate the student's language comprehension skills?

1 (Poor)

2 (Below-average)

3 (Average)

4 (Above-average)

2. How would you rate the student's oral expression skills?

1 (Poor)

2 (Below-average)

3 (Average)

4 (Above-average)

3. FOR FIRST-GRADE TEACHERS ONLY:

How would you rate the student's reading comprehension skills?

1 (Poor)

2 (Below-average)

3 (Average)

4 (Above-average)

4. FOR FIRST-GRADE TEACHERS ONLY:

How would you rate the student's written expression skills?

1 (Poor)

2 (Below-average)

3 (Average)

4 (Above-average)

#### 4.2 Intervention

The experimental group received interventions using the *Story Champs* multi-tiered language intervention curriculum. There were 10 sessions of narrative language intervention for a duration of 25 minutes each session in a small group (4 – 5 students). These intervention sessions were provided across a period of 12 weeks. See Table 4 for the lesson plan that was used during the intervention cycle. During each session, the researcher read the story aloud to students after which each student retold the story. Participants took turns being the first person to retell the story during the retelling task in consecutive sessions. During story retellings, story grammar and structure, language complexity, and vocabulary usage were the focus of interventions. The students in the control group continued to receive academic instruction and traditional methods of intervention from the general education teacher and other school staff, according to the school district's procedures.

Table 4. Lesson plan for intervention sessions (*STORY CHAMPS*)

Session (1 - 10)	Kindergarten	First grade
1	Classic Level A story # 1 Master lesson plan # 2 <i>Modifiability Scale (Dynamic assessment)</i>	Classic Level B story # 1 Master lesson plan # 2 <i>Modifiability Scale (Dynamic assessment)</i>
2	Classic Level A story # 2 Master lesson plan # 2	Classic Level B story # 2 Master lesson plan # 2
3	Classic Level A story # 3 Master lesson plan # 2	Classic Level B story # 3 Master lesson plan # 2
4	Classic Level A story # 4 Master lesson plan # 2 + Add on # 62	Classic Level B story # 4 Master lesson plan # 2 + Add on # 62
5	Classic Level A story # 5 Master lesson plan # 2 + Add on # 62	Classic Level B story # 5 Master lesson plan # 2 + Add on # 62
6	Blitz Level A story # 13 Master lesson plan # 3	Blitz Level B story # 13 Master lesson plan # 3
7	Blitz Level A story # 14 Master lesson plan # 3	Blitz Level B story # 14 Master lesson plan # 3
8	Blitz Level C story # 15 Master lesson plan # 4	Blitz Level C story # 15 Master lesson plan # 4
9	Blitz Level A story # 16 + Add on # 60 and # 62	Blitz Level B story # 16 + Add on # 60 and # 62
10	Blitz Level A story # 17 Master lesson plan # 2 <i>Modifiability Scale (Dynamic assessment)</i>	Blitz Level A story # 17 Master lesson plan # 2 <i>Modifiability Scale (Dynamic assessment)</i>

#### 4.3 Post-intervention

Modifiability ratings were completed during the last intervention session to study the experimental group's level of modifiability in response to interventions. Students in both the experimental and control groups were re-screened using the NLM measures. One story from the NLM Listening measure (spring) was administered individually to all kindergarteners and first-graders. During screening using the NLM Listening measure, the researcher read the story to the participant. The participant then retold the story. If the student did not meet the benchmark cutoff score for the first story, then a second story was administered to determine whether the student continued to be at-risk for language disorder. One story from the NLM Reading measure (spring) was administered individually to all first graders. During re-screening using the NLM Reading measure, the researcher instructed the participant to read the story aloud. The participant then retold the story. While the participant read the story, the total number of correct words read per minute was documented to compute reading decoding fluency. Each participant's responses on the NLM measures were audio-recorded for analysis and scoring. Each participant's responses to the two screening measures were scored in real time and re-checked using audio-recorded language samples. Using a criterion-referenced scoring system, students were re-classified as *advanced*, *benchmark*, *moderate risk*, and *high risk* for language/literacy disorders.

Post-intervention questionnaires were shared with teacher participants via Qualtrics to receive feedback regarding the effectiveness of the conceptual framework. The questionnaire was also used to subjectively rate the skill-set of the students in the experimental group post narrative language intervention. Teacher participants completed the questionnaire to subjectively rate the skill-set of students in the experimental group in the areas of reading

comprehension, language comprehension, oral expression, and written expression. For kindergarteners in the experimental group, the teachers rated each student's skill-set post-intervention in terms of language comprehension and oral expression. For first-graders in the experimental group, the teachers rated each student's skill-set post-intervention in the areas of reading comprehension, language comprehension, oral expression, and written expression. See Table 5 for a sample of the post-intervention questionnaire.

Table 5. Post-intervention questionnaire

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Please rate the effectiveness of the conceptual framework in early identification by completing this questionnaire.

Please enter the student's name in the box below:

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1. The conceptual framework is helpful in early identification of at-risk students. Do you agree or disagree?
    - Agree
    - Disagree
  
  2. How would you rate the student's language comprehension skills at this time?
    - 1 (Poor)
    - 2 (Below-average)
    - 3 (Average)
    - 4 (Above-average)
  
  3. How would you rate the student's oral expression skills at this time?
    - 1 (Poor)
    - 2 (Below-average)
    - 3 (Average)
    - 4 (Above-average)
  
  4. FOR FIRST-GRADE TEACHERS ONLY:  
How would you rate the student's reading comprehension skills at this time?
    - 1 (Poor)
    - 2 (Below-average)
    - 3 (Average)
    - 4 (Above-average)
  
  5. FOR FIRST-GRADE TEACHERS ONLY:  
How would you rate the student's written expression skills at this time?
    - 1 (Poor)
    - 2 (Below-average)
    - 3 (Average)
    - 4 (Above-average)
- 

NLM Listening and Reading screening results were shared with the teacher participants as well as the multi-tiered systems of support team (MTSS team) at the elementary school. The intention was to provide student data that could be useful for informed decision-making regarding continuation of tier 2/ tier 3 interventions or for referring the student to special education for further assessments.

## 5. Data Analysis

Data were analyzed using SPSS version 28.0. (SPSS Inc, Chicago, IL, USA). Data were summarized using frequency (%) for categorical variables, mean  $\pm$  standard deviation (SD) for quantitative variables, and median (min, max) for ordinal variables or when the distribution of the variables was not approximately normal. The normality of the quantitative variables was assessed using the Shapiro-Wilk test and box plots. For the experimental group, the Wilcoxon signed-rank test was used to analyze the teachers' perceptions pre-versus post intervention. The same test was used to compare pre- and post-test scores for NLM Reading, NLM Reading Decoding Fluency, and modifiability ratings within each group. The median (minimum, maximum) of these scores pre- and post-intervention were compared between the experimental and control groups using the Mann-Whitney U test. The Independent t-test was used to compare the mean NLM Listening scores between the experimental and control groups pre- and post-intervention for all participants. For kindergarten and first-grade students, changes in mean NLM Listening scores pre versus post intervention were examined using the paired t-test. The level of significance was set at  $p \leq 0.05$ .

## 6. Results

### 6.1 Effectiveness of the Conceptual Framework

Analysis of data from teacher completed questionnaires indicated that the median (minimum, maximum) ratings of students' skill-set post versus pre-intervention were not statistically significant in listening comprehension (3 (1,4) versus 3 (1,4);  $Z = -0.28$ ,  $p = 0.783$ ), oral expression (3 (2,4) versus 3 (1,4);  $Z = -1.41$ ,  $p = 0.157$ ), reading comprehension (3 (1,4) versus 2.5 (1,4);  $Z = -1.00$ ,  $p = 0.317$ ), and written expression (2.5 (1,3) versus 2.5 (1,3);  $Z = 0.00$ ,  $p = 1.000$ ). All teachers agreed that the conceptual framework was useful in the early identification of children at-risk for language and literacy disorders.

### 6.2 Impact of Narrative Language Intervention on Language and Reading Comprehension

There were no significant differences in mean  $\pm$ SD NLM Listening scores at baseline in kindergarten, first grade, and all students between the experimental and control groups ( $p > 0.05$ , Table 6). Post-intervention, there was no significant difference in NLM Listening scores between the experimental and control groups ( $12.5 \pm 3.1$  versus  $9.0 \pm 4.5$ ,  $p = 0.219$ ). However, among first grade students and the whole group, the experimental group had significantly higher scores post-intervention than the control group ( $18.0 \pm 1.7$  versus  $11.9 \pm 4.6$ ,  $p = 0.004$ ; and  $16.4 \pm 3.3$  versus  $10.6 \pm 4.7$ ,  $p < 0.001$  respectively).

For within group (post versus pre) comparisons, there was a significant increase in NLM Listening score in the experimental group in kindergarten, first grade, and whole group ( $12.5 \pm 3.1$  versus  $4.5 \pm 4.2$ ,  $p = 0.045$ ;  $18.0 \pm 1.7$  versus  $13.2 \pm 3.8$ ,  $p = 0.001$ ; and  $16.4 \pm 3.3$  versus  $10.7 \pm 5.5$ ,  $p < 0.001$ , respectively). In the control group, however, there was no significant change in mean NLM scores (pre versus post) in kindergarten, first grade, or the whole group ( $p > 0.05$ , Table 6).

For NLM Reading scores, there was no significant difference in the median (minimum, maximum) scores between the experimental and control groups at baseline and post-intervention ( $p = 0.604$  and  $p = 0.968$ ). For within group comparisons (post versus pre), there was a significant increase in the median NLM Reading score for the experimental group (10 (0, 19) versus 4 (0, 16),  $p = 0.028$ ; Table 6). However, no significant changes were observed in the control group ( $p = 0.326$ ).

In terms of NLM Reading Decoding Fluency, there was no significant difference between the experimental and control groups at baseline and post-intervention ( $p = 0.400$  and  $p = 0.315$ , respectively). In addition, there was no significant difference (post versus pre) between the experimental and control groups ( $p = 0.779$  and  $p = 0.635$ , respectively; Table 6). In the experimental group, there was a significant increase in mean  $\pm$  SD post- versus pre-modifiability scores in kindergarten, first grade and the whole group ( $10.0 \pm 2.2$  versus  $5.3 \pm 1.0$ ,  $p = 0.033$ ;  $9.8 \pm 1.5$  versus  $5.5 \pm 1.0$ ,  $p = 0.003$ ; and  $9.9 \pm 1.7$  versus  $5.4 \pm 0.9$ ,  $p = 0.001$ ; respectively, Table 6).

Table 6. Changes in mean ± SD of learning outcomes overtime (pre versus post) and by group in kindergarten and first grade students (N = 30)

Variable	Kindergarten (N <sub>1</sub> = 11)			First Grade (N <sub>2</sub> = 19)			Whole Group (N = 30)		
	Experimental (n <sub>1</sub> = 4)	Control (n <sub>2</sub> = 7)	P-value (d)	Experimental (n <sub>1</sub> = 10)	Control (n <sub>2</sub> = 9)	P-value (d/r)	Experimental (n <sub>1</sub> = 14)	Control (n <sub>2</sub> = 16)	P-value (d)
Pre-test NLM Listening	4.5±4.2	7.9±3.0	0.156 (0.4)	13.2±3.8	12.7±4.5	0.780(d=0.1)	10.7±5.5	10.6±4.5	0.934 (0.0)
Post-test NLM Listening	12.5±3.1	9.0±4.5	0.219(0.3)	18.0±1.7	11.9±4.6	<b>0.004(d=1.0)</b>	16.4±3.3	10.6±4.7	<b>&lt;0.001(1.4)</b>
<b>P-value (d)</b>	<b>0.045 (1.2)</b>	0.400 (0.3)		<b>0.001 (1.4)</b>	0.597 (0.2)		<b>&lt;0.001 (1.3)</b>	0.949 (0.0)	
Pre-test NLM Reading*				4 (0, 16)	4 (0, 16)	0.604 (r=0.1)			
Post-test NLM Reading*				10 (0, 19)	10 (0, 16)	0.968 (r=0.0)			
<b>P-value (r)</b>				<b>0.028 (0.7)</b>	0.326 (0.3)				
Pre-test NLM Reading Decoding Fluency*				17 (0, 100)	33 (12, 86)	0.400 (r=0.2)			
Post-test NLM Reading Decoding Fluency*				28.5 (0, 95)	38 (15, 78)	0.315 (r=0.2)			
<b>P-value (r)</b>				0.779 (0.1)	0.635 (0.16)				
Pre- Modifiability Scale	5.3±1.0			5.5±1.0			5.4±0.9		
Post- Modifiability Scale	10.0±2.2			9.8±1.5			9.9±1.7		
<b>P-value (r)</b>	<b>0.033 (0.9)</b>			<b>0.003 (0.9)</b>			<b>0.001 (0.9)</b>		

Findings using a criterion-referenced scoring system (CUBED assessments) indicated that 50% of kindergarteners in the experimental group met benchmark scores post-intervention, compared to zero students who met the benchmark pre-intervention (Table 7). Additionally, 30% of first graders in the experimental group scored at benchmark post-intervention, compared to 20% at benchmark pre-intervention. Most importantly, only 14% of the students in the experimental group remained in the high-risk category compared to 57% pre-intervention. The distribution of student participants by skill level and group at baseline and post intervention using the CUBED assessments' criterion-referenced scoring system is displayed in Table 7.

Table 7. Number of participants by skill level ranking and group at baseline and post intervention

<b>Whole Group N = 30</b>				
<b>Variables</b>	<b>Kindergarten (n<sub>1</sub>=11)</b>		<b>First grade (n<sub>2</sub> = 19)</b>	
	Experimental (n <sub>1</sub> = 4)	Control (n <sub>2</sub> = 7)	Experimental (n <sub>1</sub> = 10)	Control (n <sub>2</sub> = 9)
<b>Pre-test NLM Listening</b>				
Advanced	0	0	0	0
Benchmark	0	0	2	2
Moderate risk	1	2	3	0
High risk	3	5	5	7
<b>Post-test NLM Listening</b>				
Advanced	0	0	0	0
Benchmark	2	1	3	1
Moderate risk	1	3	6	1
High risk	1	3	1	7
Pre-test NLM	n/a	n/a		
<b>Reading</b>				
Advanced			0	0
Benchmark			0	0
Moderate risk			1	3
High risk			9	6
Post-test NLM	n/a	n/a		
<b>Reading</b>				
Advanced			0	0
Benchmark			1	0
Moderate risk			1	1
High risk			8	8
Pre-test Reading	n/a	n/a		
<b>Decoding Fluency</b>				
Advanced			2	2
Benchmark			1	1
Moderate risk			2	3
High risk			5	3
Post-test Reading	n/a	n/a		
<b>Decoding Fluency</b>				
Advanced			2	0
Benchmark			0	2
Moderate risk			4	6
High risk			4	1

The experimental group showed a significant change in modifiability (e.g., examiner effort, student responsivity, and transfer skills) between the first and last sessions. Additionally, analysis of modifiability ratings indicated that 78% of students in the experimental group (11 out of 14 students) scored in the typical range for their narrative language ability at the end of the 10-session intervention cycle (Table 8).

Table 8. Distribution of participants in the experimental group by skill level based on modifiability ratings

<b>Experimental group</b>		
<b>Modifiability scale ratings</b>	<b>Kindergarten (n1=4)</b>	<b>First grade (n2 = 10)</b>
<b>First session (baseline)</b>		
Atypical & Severe	0	0
Atypical & Moderate	4	8
Atypical & Mild	0	2
Typical	0	0
<b>Last session (post-intervention)</b>		
Atypical & Severe	0	0
Atypical & Moderate	0	0
Atypical & Mild	1	2
Typical	3	8

## 7. Discussion

Analysis of pre- and post-intervention questionnaires completed by the teachers indicated that they found the conceptual framework effective in the early identification of at-risk children, although the students did not generalize the skills into the classroom setting. After receiving ten sessions of research-based narrative language interventions in small groups, the students in the experimental group showed improvement in listening as well as reading comprehension, as evidenced by the statistical analysis of pre- and post-intervention data using NLM measures. Consistent with the extant literature, the findings indicated that narrative language intervention positively impacted both language and reading comprehension as a result of cross-modality transfer of academic skills (Spencer & Petersen, 2018).

Conducting language screenings for all students may not be a practical solution for school districts, particularly for those with limited resources and personnel. Additionally, large caseloads impact the SLP's ability to be fully involved in the response to intervention process (RtI) (Katz, 2010). Therefore, data-driven dialogue between general education teachers and SLPs can be essential in the early identification and prevention of language and literacy disorders in young school-aged children. Teacher participants in this study found that the conceptual framework was effective in the early identification of children at-risk for language and literacy disorders, although statistical analysis of pre-and post-intervention questionnaires did not show a significant change in the experimental group's skill set (e.g., listening comprehension, oral expression, reading comprehension, written expression) within the classroom setting. This could be possibly due to the fact that the students in the experimental group received short-term narrative language interventions and did not begin to generalize their skills to other contexts such as the classroom setting. Although the results were not statistically significant, it is important to note that there was a quantitative change in teacher perceptions of students' skill-set pre- and post-narrative language intervention. For example, as per qualitative analysis of teacher completed questionnaires, we found that one kindergartener demonstrated average skills in language comprehension post-intervention compared to below-average skills pre-intervention. The teacher rated the same student as having below-average skills in oral expression post-intervention compared to having poor skills pre-intervention. Another kindergarten student received a teacher rating of average skills in language comprehension post-intervention compared to poor skills pre-intervention. One first-grade student received a teacher rating of above-average skills in language comprehension and oral expression post-intervention compared to average skills pre-intervention. Another first-grade student received a teacher rating of average skills in reading comprehension post-intervention in comparison to below-average skills pre-intervention. Although there were no

statistically significant differences in comparing pre-and post-intervention questionnaires completed by the teachers, there were clinically significant results.

Analysis of the pre- and post-narrative language intervention data indicated that the experimental group showed significant changes in language and reading comprehension (Table 6). Additionally, modifiability ratings reflected clinically significant changes in the experimental group's narrative language skills at the end of the last session in comparison to the first session (Table 8). These findings are consistent with evidence from previous studies showing that when language-based interventions are provided, children with language and literacy disorders show improved vocabulary and reading comprehension (Gibson & Wolter, 2015). All students (kindergarten and first grade) in the experimental group showed clinically significant change in listening comprehension skills pre- and post narrative language intervention (Table 6).

The experimental group showed a significant change within the NLM Reading scores post versus pre-intervention; however, there was no significant difference post versus pre-intervention between the control and experimental groups (Table 6). When using the criterion-referenced scoring system (CUBED assessments), we found that 10% of first graders in the experimental group scored at benchmark post-intervention compared to zero at benchmark pre-intervention (Table 7). The first graders in the control group showed regression in their skills. That is, 89% of students in the control group scored in the high-risk range in NLM Reading in the post-test compared to 67% in the high-risk range pre-test. This may suggest that criterion-referenced cutoff points that are a part of the CUBED assessments are better indicators of progress in comparison to statistical analysis using raw scores. Although first graders in the experimental group showed a clinically significant change in reading comprehension post-versus pre-intervention, neither the participants nor the control group showed a clinically significant change in reading fluency (NLM Reading Decoding Fluency). However, the narrative language intervention that was used in this study did not target decoding, reading fluency, or reading comprehension.

Limitations of the study include the small sample size and the referral criteria that was used (inclusion/exclusion). A small sample size (experimental group = 14 students; teacher participants = 6) possibly affected the quantitative positive outcomes in the statistical analysis. Since a consistent referral system for language screening is not part of the universal screening process, as an exploratory method, parents volunteered to have their children participate in this study. Therefore, the primary investigator set the inclusion and exclusion criteria. The results support the need for school districts to mandate a consistent referral system that includes language screening as part of universal screenings within the MTSS framework.

According to ASHA's position statement, the Speech Language Pathologist's (SLP) roles and responsibilities within the school system include, but are not limited to, providing unique contributions to the curriculum, working across all grade levels, serving children with a range of different disorders, highlighting language and literacy, using evidence-based practices in prevention and assessment, providing interventions, and collaboration with other professionals (ASHA, n.d.). Data-driven dialogue between general education teachers and SLPs is effective in the early identification of children who are at-risk for language and literacy disorders; however, further investigation is needed to explore the contribution of general education teachers in the referral process for early identification of children with language impairment (Christopoulos & Kean, 2020).

In accordance with the Individuals with Disabilities Education Act (IDEA, 2004) mandate, local education agencies (LEAs) must emphasize early intervention and high-quality education based on scientific evidence. Considering factors such as ASHA's position statement on the roles and responsibilities of school-based SLPs, the caseload size, IDEA's (2004) mandate, and the need for educational leaders who support RtI, this study serves as a call to action for educators within the public school system to create a consistent referral process for language screenings as well as language interventions within the multi-tiered systems of supports (MTSS) framework.

Future research should focus on providing insights for educators to create a consistent referral system for language screenings and multi-tiered systems of language interventions (MTSLS) within the MTSS framework. Additionally, LEAs should acknowledge prevention, early intervention, and collaboration with other educators as part of the SLP's scope of practice within the MTSS framework. This may require LEAs to consider reducing the SLP's caseload size (i.e., the number of students with IEPs) and shift to a workload approach to encourage the SLP's participation and contribution towards prevention, early identification, and intervention within the MTSS framework. Both the IDEA (2004) and Every Student Succeeds Act (ESSA, 2015) encourage support for students who are not yet identified as needing special education services but who might still be at-risk. LEAs can consider using Title I and IDEA funds to pave the way towards a workload approach that would allow SLPs' involvement in the MTSS framework to support students who need additional academic and behavioral support within the general education setting (Sylvan, 2021).



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### Data availability statement

These data are available by contacting the corresponding author.

### Conflict of interest statement

The authors have declared that no conflict of interests exist. The authors declare that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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### Approval to conduct study

All methods and procedures were approved by the Institutional Review Board (IRB # 5210472).

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