General Education Teachers' Contribution to the Identification of Children With Language Disorders

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Research Note

General Education Teachers' Contribution to the Identification of Children With Language Disorders

Tyler T. Christopulos[a] and Jacob Kean[b]

Purpose: The estimated prevalence of language disorders in early elementary school-age children is 7%–12%. Despite its prevalence, only 18% of children are identified and receive treatment. Children with language disorders who go unidentified and, consequently, untreated upon entry to kindergarten are at a cumulative risk for academic and social difficulties during their formative and later school years. Since there is no policy supporting universal screening for language impairment identification in public schools, vulnerabilities may exist in referral-based systems for language impairment identification. The primary purpose of this study was to examine the positive predictive value of general education teachers for language impairment identification.
Method: A record review of special education referrals across four elementary schools was conducted. A total of 177 referrals across all disabilities were examined. Forty-four of those language-based referrals became the focus of this study.
Results: Results showed, of the 44 referred for language impairment, general education teachers were the least correct of referral sources, with a positive predictive value of .35. Variables of teacher age, sex, years of teaching experience, and years of education did not predict general education teachers' ability to identify children with language impairment. The identification rate across the four schools was 1.38%.
Conclusions: General education teachers were responsible for nearly half of the referrals made to special education but demonstrated the most difficulty in correctly identifying children with language impairment. As a result, identification rates were considerably lower than prevalence expectations. This is of particular concern as teachers play a primary role in the identification of this population under a referral-based format.

Language disorders(s) are considered to be among the most common childhood disorders (Bishop, 2010). At its core, these impairments are characterized by problems in the ability to learn and use language across multiple domains (Conti-Ramsden et al., 2012). In academic research, children with language impairments have traditionally been described in two ways: (a) having language difficulty that is co-occurring with differentiating conditions such as intellectual, cognitive, or neurological deficits or (b) having language difficulty that has no known etiology.

Of the wide-ranging areas that are negatively impacted by language disorders, the development of morphology, syntax, and discourse skills is vitally important as they are foundational for academic success (Beitchman et al., 1986; Norbury et al., 2016; Tomblin et al., 1997). The estimated prevalence of language disorders in 5-year-olds ranges from approximately 7% to 12%, depending on the presence of comorbidities (Beitchman et al., 1986; Leonard, 2014; Norbury et al., 2016; Tomblin et al., 1997), making language disorders more common than Down syndrome, fluency disorders, traumatic brain injury and autism combined, or attention-deficit/hyperactive disorder and autism combined (Bishop, 2010). Despite its prevalence, research suggests that, on average, only 18% of children who suffer from language impairment are identified and receive treatment (Zhang & Tomblin, 2000). Children with language disorders who go unidentified and, consequently, untreated upon entry to kindergarten are at a cumulative risk for academic and social difficulties during their formative and later school years (Conti-Ramsden, 2008; Conti-Ramsden et al., 2018; Johnson et al., 1999; Tomblin & Nippold, 2014). Language disorders continue into adulthood, places high costs on societies, and are an enduring source of frustration and indignity to those affected (Conti-Ramsden et al., 2018).

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The identification and referral of students to special education services is commonly the responsibility of general education teachers. This onus is necessarily placed on the general education teacher as they spend the most time with students during a typical school day. For example, Lloyd et al. (1991) reported that nearly 80% of all referrals made to special education in their sample came from general education teachers, whereas only 10% came from specialists, 5% came from parents, and 5% came from administrators. Because teachers play such a central role under a referral-based format for disability identification, the understandable expectation from parents should be, at a minimum, that this group of valued professionals demonstrates high levels of effectiveness. Jessup et al. (2008), however, reported that teachers demonstrate high specificity (97%) but low sensitivity (15%) in the identification of language impairments in kindergarteners. The reported low sensitivity rate from their study is of particular interest. Diagnostic sensitivity represents the segment of a population that has been identified as potentially having a disorder and that ultimately is confirmed as having that disorder as identified by assessment measures. Diagnostic specificity, on the other hand, represents the segment of a population that has been identified as potentially having a disorder and that ultimately is confirmed as not having that disorder as identified by assessment measures. In other words, a low sensitivity value produced by general education teachers is problematic as it indicates they are prone to referring students for language disorder who do not ultimately get that diagnosis. Inaccuracy in this identification and referral process has been attributed to a lack of understanding of language structure and of students' language needs by general education teachers, regardless of the motivation to do so, or years of teaching experience (Antoniazzi et al., 2010; Girolamo et al., 2017; Moats, 1994). Research in the field of communication disorders supports this assertion, as primary phenotypes associated with language disorders, such as difficulties with morphosyntax and verbal working memory, are more difficult to identify by nonspecialized professionals such as general education teachers (Archibald & Joanissee, 2009; Rice et al., 2018). We were not able to find any studies that have, to date, examined the predictive nature of teacher variables, such as age, sex, years of teaching experience, and years of education, as it relates to language impairment identification accuracy.

In addition to the role that primary phenotypes of language disorder play as indicators under a referral-based format, other developmental clinical indicators have previously been examined by researchers as potentially germane in the identification of language disorders, such as articulation impairment and reading delay. For example, Zhang and Tomblin (2000) reported that kindergarten children with speech sound disorders were over 4 times more likely to receive intervention services when compared with kindergarten children with language disorders but otherwise typical speech. Research investigating the seeming overlap between dyslexia and language impairment has previously led some researchers to conclude that these are deviations of the same developmental disorder (e.g., Kamhi & Catts, 1986; Scarborough, 1990). For example, McArthur et al. (2000) reported that over half of the participants in their review with reading delay were classified as having a language disorder and vice versa (55% and 51%, respectively). Unfortunately, these frequently co-occurring conditions have proven to be unreliable as markers to identify students with language impairment for receipt of services in public schools. Rather, the frequent co-occurrence may be more attributable to the fact that articulation impairment and reading difficulties are more readily identified by teachers due to overt phenotypic characteristics. Recent findings from Weiler et al. (2018) support this assumption by emphasizing that children with language disorders cannot be accurately identified on the basis of articulation or emergent literacy screenings (see also Adlof, 2017; Adlof & Hogan, 2018; Catts et al., 2005). Consequently, this puts frontline professionals, such as general education teachers, who are tasked with accurately identifying children potentially at risk for language disorder at a gross disadvantage. As a result, these children miss out on the benefits that come from assessment, identification, and treatment available to all students as part of a free and appropriate public education.

Public schools represent a critical primary setting for the identification, evaluation, and treatment of all children with disabilities, regardless of the severity of their disabilities (i.e., Child Find mandate; Wright & Wright, 2007). Select studies, however, suggest vulnerabilities in current referral systems used in public schools (see Antoniazzi et al., 2010; Girolamo et al., 2017; Jessup et al., 2008). Consequently, most school districts have no policy mandating universal screening of language impairment. In order to address the need for major policy shifts in language impairment identification, such as the implementation of universal screening, further investigation is needed in order to provide a more comprehensive picture and a better understanding of the overall contributions of general education teachers with regard to language impairment identification in school-age children, such as referral accuracy and proportionality of referrals.

The current study involves a pilot project designated to identify and analyze data regarding the contribution of general education teachers in making appropriate referrals for children deemed at risk for language impairment. It is foundational for a larger hybrid implementation project that looks to assess the feasibility of a universal screening format compared to that of a referral-based format. Accordingly, for this preliminary analysis, we addressed the following research questions:

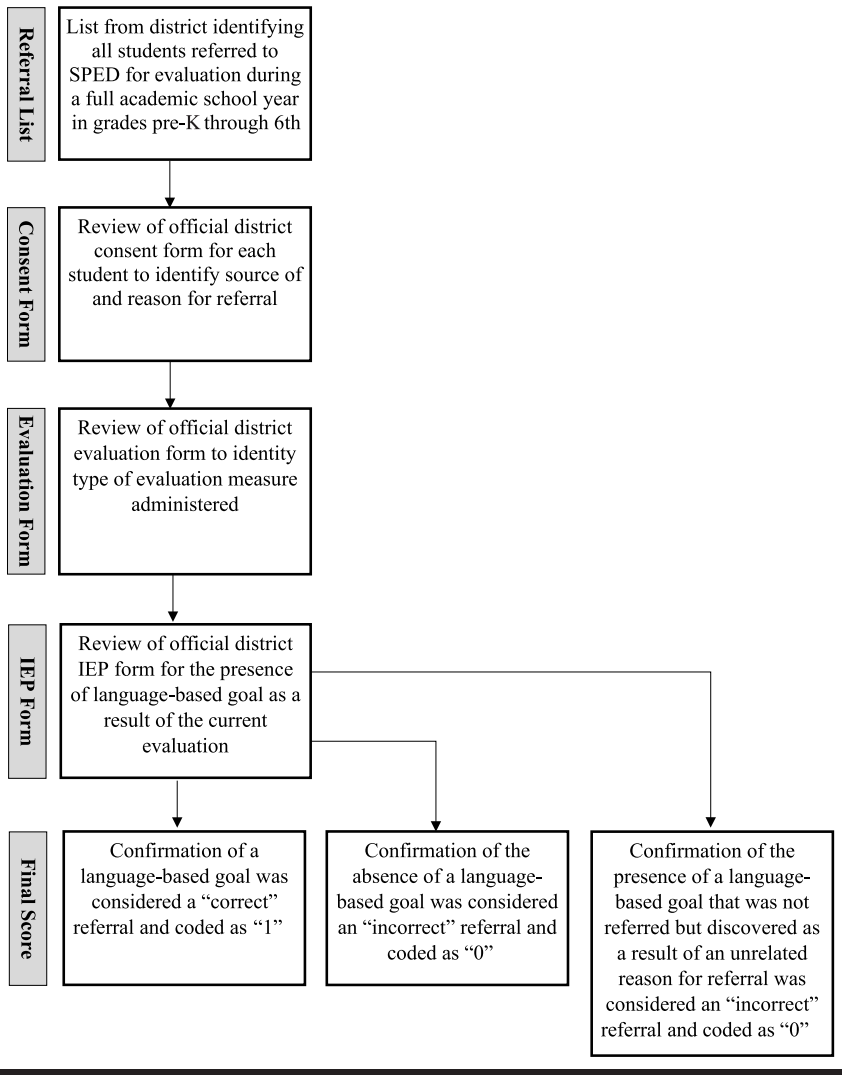
1. What is the positive predictive value (PPV) of general education teachers when identifying and referring students with language impairment to special education?
2. Do the variables of teacher age, sex, years of teaching experience, and years of education predict general education teachers' ability to identify children with language impairment?

Method

Student and teacher records across four randomly selected elementary school sites in Davis School District (DSD), located in Davis County, Utah, were included in this study. Across all disabilities, referrals made to special education were initially reviewed (e.g., academic, behavior, articulation, language, adaptive). Language-based referrals were then identified from the complete list of disability referrals and analyzed as outlined in this section. The first author conducted all of the record reviews and followed the steps as outlined in Figure 1 to determine the correctness/incorrectness of all referrals.

It is noted that there has been much debate regarding how to label types of language impairment appropriately (e.g., Bishop, 2017; Ebbels, 2014; Reilly et al., 2014). The CATALISE consortium project was a multinational and multidisciplinary Delphi consensus study aimed at providing researchers and clinicians better direction regarding diagnostic terminology in the field of speech-language pathology. In accordance with recent recommendations from the CATALISE project, this study used the term "language disorders" to describe the students who were positively identified as having language-based difficulties. Justification for this term, rather than the use of a more specific term such as developmental language disorder (DLD), lies in the fact that student files for this study were not reviewed for the identification of differentiation conditions based on intellectual, cognitive, or neurological deficits (e.g., attention-deficit/hyperactive disorder, autism, brain injury, intellectual disabilities), therefore making it impossible to determine etiology or comorbidity. This approach was purposeful as it was the intent of the file search to cast as wide a net as possible that would allow for the analysis

Figure 1. Correct/incorrect record identification flowchart showing the stages and forms used to assign dependent variable code. IEP = Individualized Education Program.



of language disorders across all disordered populations commonly seen in the public school system. The CATALISE consortium suggests the term "language disorder" can be used as a more general term that may or may not include the more specific characteristics of DLD, as this term denotes co-occurrence with the abovementioned conditions (Bishop et al., 2016, 2017).

Identification, Scoring, and Analysis

Figure 1 outlines the process by which referrals were analyzed for correctness/incorrectness. As DSD did not have a predetermined process for this type of analysis, the first author and the personnel of DSD worked together to identify the necessary documents to review in order for this type of study to be conducted. In total, three documents were reviewed in order to assign a final score of correct or incorrect after the initial student referral list was provided by the district. The consent form provided information regarding the source of the referral (e.g., general education teacher, parents). This form was used to categorize the type of referrals made across disabilities. "Reason for referral" selection options on this form included the following: IQ/cognition, academic, language, articulation, motor, psychomotor, adaptive, social/behavioral, hearing, and vision. Information from this form allowed the first author to group the referrals made for language-based concerns. Only records that had "language" checked on this form were scored as having a language-based concern. The evaluation form provided information as to the type of testing done by school site personnel. This allowed the first author to decide if the type of evaluation completed was appropriate for the area of concern. In the case of language referrals, qualifying testing done by the referring school's speech-language pathologist (SLP; i.e., standardized measures) was reviewed to ensure face validity of the type of test(s) administered. School-based clinical evaluation experience and familiarity with routine tests used in DSD by the first author ensured accurate face validity. The Individualized Education Program (IEP) was used to confirm the presence or absence of a verbal expressive or receptive language-based goal as a direct result of consent-to-test and evaluation measure(s) used. It was at this stage that a language-based referral was scored as correct or incorrect. Because it was not the aim of this study to look at the classification type of language impairment (e.g., language disorder vs. DLD, expressive vs. receptive based), a language-based disorder was only looked at in terms of being present/not present based on the review of the documents. DSD does not utilize any tiered intervention programs, so all referrals made for language-based concerns were assessed by the referring school's SLP and either qualified or disqualified a student for treatment under an IEP goal. In other words, concerns with regard to a student's language ability were not treated by other professionals under consultation with the SLP (e.g., general education teachers).

The dependent variable of language-based referral correctness/incorrectness by teachers was scored binarily as 0 = *correct* and 1 = *incorrect* based on the following criteria: A language-based referral was scored correct if a language-based IEP goal was written that corresponded to the reason for a referral from any realized source (i.e., general education teacher, early intervention educator, or parent) and made after the date of referral. A language-based referral was scored incorrect for two reasons: (a) There was not a language-based goal on the IEP document after the date of the referral document for language concern, and (b) there was the presence of a language-based goal that was not referred but discovered as a result of an unrelated reason after the date of the referral document. For example, if a student was referred for concerns with articulation but, during the course of testing, the evaluating SLP was suspicious of a possible language difficulty and, as a result, completed an evaluation accordingly that yielded a positive result and need for a language-based goal.

Descriptive statistics were generated to determine the correctness/incorrectness of language disorder referrals. PPVs were calculated to assess the correctness of general education teachers' referrals. PPVs are useful for diagnostic accuracy in the public school setting because they report on the outcomes of only students who have been referred to special education for assessment. PPVs are defined as the proportion of participants with a positive screening result (i.e., fail the screener) who have the target disorder and are calculated using true and false positives (Dollaghan, 2007). In this study's case, a positive screening result was analogous to when a general education teacher accurately identified and referred a student with language disorder for evaluation. Binomial regression was used to determine the contribution of the teacher predictive variables of sex, years of teaching experience, and level of education.

Student Records

The records of 177 students enrolled in grades prekindergarten to sixth grade, who were referred to special education across all disabilities, were reviewed. Of the 177 student records reviewed, 44 were referred for possible verbal expressive or receptive language impairment (24.86%). Students demonstrating difficulty with written language were not considered for this study. Grade distribution of the students referred for possible language impairment favored preschool (26), followed by first grade (11), second grade (5), kindergarten (1), and third grade (1). Ethnic distribution of the students referred for possible language impairment was primarily Caucasian (77.27%), followed by Hispanic/Latino (11.36%) and American and Native Hawaiian/Pacific Islander (2.27%). One student was of mixed race (2.27%), and three were of unknown race (6.82%). Sex distribution favored boys (61%) over girls (39%). All students in this study spoke English as their primary language.

Teacher Records

Information about the referring general education teacher was collected regarding age, sex, years of teaching experience, and level of education. Table 1 provides descriptive

Table 1. Teacher descriptive data.

Teacher variable	Frequencies	Range
Sex	17/20 female (85%)	n/a
Age	40;3[a]	27;0–55;0[a]
Years of teaching	8;9[a]	1;0–20;0[a]
Level of education	1.53[b]	1–2[b]

[a]Mean (years;months). [b]Level of education: 1 = *bachelor's degree*, 2 = *master's degree*, and 3 = *PhD*.

data pertaining to the teachers who made language-based referrals. Of 105 total general education teachers across all four schools, a total of 20 made referrals for language-based concerns.

The file review was restricted to students enrolled in the participating school sites over the period of an entire academic school year. A review of multiple academic school years was determined to be beyond the scope of the project, given available resources. Data were extracted for all types of referrals made to special education, but language-based referrals were analyzed exclusively for this report. Student and teacher lists were obtained by the principal investigator with the University of Utah Institutional Review Board (IRB) and DSD approval. As per IRB and district guidelines, no informed parental consent was required in order to review individual student records due to the retrospective nature of file review projects. All teacher information was provided by DSD as de-identified to the first author and therefore did not require informed teacher consent as per IRB and district guidelines. Student information was provided exclusively to the first author, as identified. All identified student information was stored on an encrypted hard drive that could be accessed only by the first author. This, along with policies and procedures put in place by DSD to protect the personal information of students and teachers, made a breach of privacy risk unlikely. The information gathered was performed primarily through electronic record review. For information not available on a small percentage of students, physical files were reviewed at the respective school sites. The file review focused on the following information: grade, age, sex, source of referral, the reason for referral, and placement status (i.e., eligible/not eligible for services) for the students and age, sex, years of teaching experience, and level of education for the teachers.

Results

Research Question 1

This study's primary aim was to assess the referral accuracy of general education teachers in the referral process of children with language disorders (see Table 2). In addition to their contribution, results identified two other sources as contributors to student referrals as well: parents and early intervention educators. While the focus of this study was to assess the identification performance of general education teachers, the inclusion of other referral sources (i.e., early intervention educators and parents) in this data set is important to report for completeness and comparison purposes. All early education educators were district employees working in the early education department of DSD. General education teachers had the highest proportion of referrals (n = 20, 45.45%), followed by parents (n = 14, 31.83%) and early intervention educators (n = 10, 22.72%). PPVs for the referral sources showed early intervention educators as the most accurate of the three sources at 90%, followed by parents at 78.75%. General education teachers were the least correct, only correctly identifying 35% (i.e., true positives). It is noted these data do not account for those students with language impairment who were not identified by these three sources (i.e., false/true negatives). The total identification rate of language impairment across all four school sites was 1.38, indicating underidentification compared to expected prevalence rates (see Beitchman et al.,1986; Norbury et al., 2016; Tomblin et al.,1997). The identification rate was calculated by dividing the total number of language disorder referrals (44) by the total school enrollment of the four schools (3,177).

Research Question 2

Binomial regression showed the model of general education teachers' sex, age, years of teaching experience, and level of education as predictor variables only accounted for approximately 12% of the model variance (R^2 = .119). Individual predictor variables did not reach statistical significance of $p < .05$: sex (p = .630), age (p = .375), years of teaching experience (p = .788), and level of education (p = .820). A test assessing multicollinearity of the model revealed moderate levels of correlation between age and years of teaching experience. Therefore, age was removed from the model, but still, no statistical significance was observed.

Discussion

Findings from this preliminary study support the contention that reliance on a referral system, whereby general education teachers are a primary source of referral of children with language impairment to special education for assessment, may be error prone. The referral accuracy of early intervention educators was the most correct. This is not surprising as specialists involved at the early intervention level have had more formal training in language development and disorders when compared to general education teachers and parents. Parents were approximately 2 times more likely to correctly identify concerns regarding language development as compared to general education teachers. This finding could be interpreted in different ways. First, it may be surprising that general education teachers were least correct in the identification of children with language impairment as most are exposed to language development curriculum as part of their formal education. However, several studies have highlighted that teachers often feel ill-equipped to identify key markers of language deviance or.

Table 2. Proportion of referrals across sources, true positives, false positives, and positive predictive values.

Referral source	Proportion of referrals[a]	True positives	False positives	Positive predictive values
General education teacher	45.45%	7	13	.35
Early intervention educators	22.72%	9	1	.90
Parent	31.83%	11	3	.79
Combined	100%	27	17	.61

[a]Total number of referrals for language impairment: 44 (24.86%).

delay due to little or no training, with knowledge needing to be attained primarily through personal experience and outside reading (Marshall et al., 2002; Sadler, 2005). Second, findings support a broad range of research identifying parents as a reliable source for identification of developmental delay (Fenson et al., 2007; Law & Roy, 2008). For example, parent report measures take advantage of the vast knowledge possessed by caregivers regarding their child's behaviors across a variety of settings. As a result, caregivers can shed more light on a child's skill set as compared to naturalistic assessments or forced-choice standardized measures. It was interesting that years of teaching experience was not a statistically significant predictor in language referral ability for general education teachers, as there is some research that has shown this particular factor to be influential in teachers' referral abilities (Podell & Soodak, 1993; Schwartz et al., 1997).

Consideration of the identification rate across the four schools is important as it further supports the position that referral-based formats are prone to underidentification of children with language disorders in public schools. The identification rate across all four school sites was considerably lower than the estimated prevalence rates of language disorders at 12% as suggested by Beitchman et al. (1986) and at 7% as suggested by Norbury et al. (2016) and Tomblin et al. (1997). As a result, a sizable portion of the student population with language disorders in these schools will have to navigate their academic and social experiences without the necessary support systems that are available to them as part of a free and appropriate public education.

Limitations, Future Direction, and Clinical Implications

Critical appraisal of any particular diagnostic method ideally should include a full diagnostic accuracy workup that includes not only PPVs but also negative predictive values, sensitivity/specificity values, and true/false predictive ratios (see Dollaghan, 2007). The data presented as part of this file review are limited to examination of only true/false positives, thus preventing a full diagnostic accuracy report. School districts do not routinely conduct any type of confirmatory testing (i.e., standardized testing) on students considered not to be in need of assessment by school SLPs under either referral- or screening-based programs. Consequently, it makes it impossible to calculate negative predictive values, sensitivity/specificity values, and true/false predictive ratios. As a result, this provides a potentially incomplete picture of a referral-based system's impact on language impairment identification. Additionally, this study only examined data from four schools from a large school district in one geographic location, thus making generalization of our findings limited. Finally, the initial intent of this study was to look at the contribution of general education teachers as it relates to language disorder identification. Interesting data with regard to the role parents and early intervention professionals play in language disorder identification, as presented in the Results section, were realized post hoc. Accordingly, predictive variable data pertaining to the second research question were not collected on these two important groups and, as a result, could not be compared to the similar data collected on general education teachers.

We recognize that, although universal screening may seem a logical alternative to explore, public school resources that are required to carry out a program of this nature are substantial and involve extensive planning before implementation. In addition, currently, there exists a variety of service delivery and decision-making models that are used across schools, districts, and states, as well as nationally. Future directions regarding this line of research should also address how to better utilize these current models, such as the need for more shared interprofessional trainings and stronger teams, as highlighted in the 2018 American Speech-Language-Hearing Association survey of speech-language pathologists (American Speech-Language-Hearing Association, 2018). Specifically, questions such as how to improve overall teacher accuracy under referral-based formats and what role SLPs play are germane in understanding the broader picture of how educating professionals can better identify and treat children with language difficulties.

The field of speech-language pathology stands to benefit from research that investigates whether a more effective way to identify students with language impairment can be developed. The outcomes of untreated language impairment, specifically as it relates to academic achievement, social skill development, and access to financially sufficient gainful employment, have been well documented and indicate severe implications if children with language impairment receive no services or delayed services. Specifically, because language disorders present a substantial obstacle for school-age individuals, engagement in further education and training beyond secondary school can be difficult. For example, Johnson et al. (2010) found that only 27% of young adults with language disorders went on to complete undergraduate-level education.

Data from this study highlight the need for speech-language pathology services and for SLP support of classroom teachers in the identification of language disorders (e.g., difficulty with morphosyntax and verbal working memory) until the referral-based system utilized by most public school districts is supplanted. Support could take the form of (a) education regarding the short- and long-term impact of underidentification, which include poorer academic achievement, social skill development, and access to financially adequate employment; (b) brief "check-ins" initiated by the SLP during the classroom teacher's preparatory time, over lunch, or in passing to ask about kids who are having challenges that could be explained by language disorders and that may warrant screening; (c) review of school records to identify patterns of testing and school performance that could be explained by language disorders and that may warrant screening. Greater accuracy in referrals could increase speech-language pathology caseloads, which may be challenging to manage. However, the increase in caseloads could be offset by time savings downstream, as considerable resources are needed for these unidentified children as they progress through later elementary and secondary grade levels. These resources include, but are not limited to, modification of general education teachers' classroom structure, multitiered systems of support programs (e.g., response to intervention), and special education services. Both speech-language pathology and classroom teachers can be proactive in the education of school and district leadership to manage potential changes or in staffing or reallocation of finances necessary to accommodate larger caseloads and, hopefully, reduced need for services downstream.

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