# Language Disorders Research on Bilingualism, School-Age, and Related Difficulties: A Scoping Review of Descriptive Studies

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# Language Disorders Research on Bilingualism, School-Age, and Related Difficulties: A Scoping Review of Descriptive Studies

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## Abstract

***Background:*** Developmental language disorder (DLD) often remains undetected until children shift from 'learning to read' to 'reading to learn,' around 9 years of age. Mono- and bilingual children with DLD frequently have co-occurring reading, attention, and related difficulties, compared to children with typical language development (TLD). Data for mono- and bilingual children with DLD and TLD would aid differentiation of language *differences* versus *disorders* in bilingual children.

***Objective:*** We conducted a scoping review of descriptive research on mono-and bilingual children < and >= 9 years old with DLD versus TLD, and related skills (auditory processing, attention, cognition, executive function, and reading).

***Data Sources:*** We searched PubMed for the terms "bilingual" and "language disorders" or "impairment" and "child[ren]" from August 1, 1979 through October 1, 2018.

***Charting Methods:*** Two abstracters charted all search results. Main exclusions were: secondary data/reviews, special populations, intervention studies, and case studies/series. Abstracted data included age, related skills measures', and four language groups of participants: monolingual DLD, monolingual TLD, bilingual DLD, and bilingual TLD.

***Results:*** Of 366 articles, 159 (43%) met inclusion criteria. Relatively few (14%, n = 22) included all 4 language groups, co-occurring difficulties other than nonverbal intelligence (n = 49, 31%) or reading (n = 51, 32%) or *any* 9−18 year-olds (31%, n = 48). Just 5 (3%) included *only* 9-18 year-olds. Among studies with *any* 9 to 18 year olds, just 4 (8%, 4/48) included 4 language groups.

***Conclusions:*** Future research should include mono- and bilingual children with both DLD and TLD, beyond 8 years of age, along with data about their related skills.

**Keywords:** child; language disorders; multilingualism/bilingualism; MeSH terms; review

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### What this Systematic Review Adds:

- Developmental language disorder (DLD) may go undetected until children start 'reading to learn'.
- DLD can be difficult to diagnose in bilingual speakers, especially absent comparative data on mono- and bilingual children with/without DLD.
- Research is needed on school-age comparator groups.

### How to Use this Systematic Review:

- For pediatricians in diverse settings: to guide clinical data collection in mono- and bilingual children and DLD.
- To guide analysis of secondary data in mono- and bilingual children and DLD.
- To advocate for increased DLD screening in school-aged mono- and bilingual children.

Speech and language disorders occur in approximately 7% of children ages 3 to 17 years in the United States [1] and represent the second most common disability (at 20%) among children receiving special education in the United States.[2] Developmental Language Disorders (DLD), previously called specific language impairment or SLI) refer to a long-standing condition, not associated with any other medical or causal conditions, where children have problems understanding and using spoken language.[3,4] Outside the field of communications science, DLD receives scant attention compared to other, less prevalent developmental disabilities, including autism, attention deficit/hyperactivity disorder (ADHD), learning, and intellectual disabilities.[5,6] DLD is most often diagnosed in childhood, but the co-morbid conditions associated with it continue to affect functioning throughout one's life. For example, DLD often leads to learning disabilities in school-aged children[7] and can continue to restrict a person's social and academic performance well beyond adolescence into adulthood.[8,9]

Differentiating a language disorder from normal language acquisition in bilingual speakers can be challenging for clinicians and educators. As bilingualism has become increasingly prevalent, the scope of this challenge is significant. In 2018, 23% of school-aged children nationwide spoke a language other than English at home.[10] English learners (ELs) comprised 10% of public school students in the 2017−2018 academic year, a 2% increase from 2000 to 2001. ELs may need 3 to 7 years to converge with native English-speaker norms.[11] Review of special education plans for school-aged ELs suggest an estimated 40% who were misclassified. For these children, authors write "*special education placement was the 'early intervention' when they entered elementary school*".[12]

Despite advances in language research on mono- and bilingual children, comparisons based on age, co-morbidities, and language ability (eg, DLD ± in mono- and bilinguals) may be limited. Regarding age, the first years of life remain critical for language development;[13] thus much research on mono-[14] and bilingual children covers the period prior to school entry,[15,16] or just after (ie, up to ≈8 years old).[17,18] Children with DLD often have co-occurring difficulties that impact both expression and severity of their clinical and learning needs. During the shift from 'learning to read' to 'reading to learn' that typically occurs around 9 years of age,[19] reading comprehension problems become more salient.[20] This often leads to a cascading effect of difficulties that arise with language disorders, such as behavioral and social emotional problems,[21,22] less social competence,[23] and attention problems.[24] Children with language difficulties report more concerns in the transition from elementary to middle school.[25] From a life course perspective, DLD at school entry is a risk factor for poorer literacy, mental health, and employment outcomes in adulthood.[26] Internationally, rates of compromised language (if not frank DLD) are higher among justice-involved youth vs. community samples, even controlling for socioeconomic status.[27,28]

Among monolingual children, systematic reviews and meta-analyses of co-occurring difficulties with DLD tend to focus on a specific co-morbidity, such as reading skills,[29] behavioral problems,[21] cognition,[30] or attention.[31] In bilingual children, these reviews have narrowly focused on executive function rather than other cognitive skills,[32,33] or comparison of language development in mono- and bilingual children with autism.[34] In addition, studies of bilingualism in older children[35] or those that focus on academic and social emotional development are scarce. In one, a population study of monolingual (DLD +/DLD-) and multilingual (DLD+/DLD-) children, language, literacy, and math performance at follow-up (8 −9 years old) tracked closely with DLD status at baseline (4−5 years old), with both mono- and multilingual children with DLD+ performing more poorly.[36]

We conducted a scoping review to identify gaps in descriptive (ie, non-interventional) research in school-aged mono- and bilingual children with/without language disorders, across putative comorbid difficulties. The goal was to broadly assess the adequacy of this research, with a focus on the medical literature, to guide future research. The research question guiding our review was: "To what extent does bilingualism research about children with language disorders include children aged 9 years or older, comparator groups by language status (mono- vs bilingual) and ability (with/without language disorder), and data on related difficulties (eg, behavioral)?".

## METHODS

### PROTOCOL AND ELIGIBILITY CRITERIA

In contrast to systematic reviews, which are designed to answer more precise questions, scoping reviews "examine the extent, range and nature of research activity" and identify gaps in the literature.[37,38] Additionally, scoping reviews provide a better alternative to systematic reviews in cases where researchers are examining *how* research in a specific content area is conducted − namely, what type of methodological study designs have been used − and can also serve as a precursor to future systematic reviews.[39] In accordance with recent scoping review guidelines, the protocol and eligibility criteria were established *a priori*[40] and followed Arksey and O'Malley's (2005) framework,[38] as later enhanced by Levac (2010).[41]

1. *Identify Research Question*. See above.
2. *Identifying Relevant Studies.* We applied the following search terms "bilingual" and "language disorders" or "language impairment" and "child[ren]." We conducted the search in PubMed with a date range of August 1, 1979 through October 1, 2018. This search yielded 366 studies, which were entered into a Microsoft Excel dataset. As the review was undertaken to guide a research project, a pragmatic decision was made to search only one database. We focused on PubMed because it indexes: a) American Speech-Hearing-Language Association journals that were of

interest, and; b) literature that would include the range of comorbidities of interest.

3. *Study Selection.* We excluded 5 categories of manuscripts for the following reasons:
   - *Abstract was not in English*: studies for which there was not an English translation of the abstract were excluded because the team did not have the linguistic capacity to review.
   - *Secondary data/review*: meta-analyses, literature and systematic reviews, viewpoints, etc., were deemed to lack sufficient detail to complete our charting instrument.
   - *Special populations*: Studies comprised solely of samples selected for specific conditions (eg, children with autism or ADHD) were excluded given a focus on the general population. However, we retained studies in general pediatric samples which, by definition, would include children with such conditions.
   - *Intervention*: Intervention studies tend to focus on a *narrow* group of eligible treatment subjects. Their inclusion would thus bias results towards *under-detecting* studies that include this review's multiple variables of interest, for example, age >= 9 years, measures of co-occurring difficulties). Exceptions include reports of previously conducted interventions with sufficient descriptive data, not otherwise excluded.
   - *Case study/case series*: articles with fewer than 5 participants were excluded, given their limited generalizability.
4. *Charting the Data*: Six authors (pediatrician, neuroscientist, social work researchers) developed the data-charting form to extract data from selected studies. Subsequently, with input from other authors, the team decided on the following data to be extracted, and data definitions:

Title of article, with hyper-link for review by abstracters

- Year−of publication.
- Authors−year and country of authors' affiliated institutions.
- Language(s)−of children in study.
- Study Groups−were classified based on the authors' description as: a) Monolingual + Typical Language, b) Monolingual + DLD, c) Bi-/Multilingual + Typical Language, and d) Bi-/Multilingual + DLD. Children (groups) were defined as monolingual, bilingual, or multilingual based on the authors' designation. Designation of children (groups) as bi/multilingual need not require a specific measure. Children (groups) defined as DLD include those described as having language delay, language disorder, and language impairment.
- Sample size−child participants only; excludes 18+.
- Ages−of children included.

Measures:

- *Language* included a broad range of expressive and receptive measures, as well as measures of phonology and narrative language. Not all measures were standardized. Only a few studies examined articulation, fluency, or voice (in addition to other language measures).
- *Attention* included explicit description of tests of visual and auditory attention, sustained/divided attention (eg, Continuous Performance Test), and behavioral survey measures such as those used to identify ADHD (eg, Conner's Comprehensive Behavioral Rating Scale).
- *Auditory Processing* included measures of listening difficulties in the absence of hearing loss. We relied on authors explicit use of this term to identify these measures (eg, dichotic digits, binaural integration).
- *Nonverbal Intelligence* included measures that assess the ability to think about and solve problems that do not require verbal language, for example, puzzles, pattern recognition (eg, Raven's Progressive Matrices). Note, we did not classify use of nonverbal intelligence measures to determine study eligibility or for stratification purposes as a study outcome.
- *Nonverbal Working Memory*: Refers to the ability to temporarily hold and manipulate visual, spatial, and auditory input, (eg, n-bask tasks; verbal memory span).
- *Executive Function* (EF): Iincluded measures denoted by the authors as tests of executive function (eg, Comprehensive Executive Function Inventory, Wisconsin Card Sorting Test). We are cognizant of the broad conceptualizations of EF, often described as an umbrella of neurocognitive skills (eg, planning, organization, inhibition, shifting, and self-regulation). Included among these are attention and (cognitive) nonverbal working memory, which we identified as separate categories, when they were not explicitly referred to by the authors as tests of EF.
- *Reading/Phonology*: Included specific mention of reading comprehension task or phonological assessment (in abstract, list of assessments, or title), including sentence/reading comprehension, and phonological repetition, nonword repetition or phonemic awareness tasks.

5. *Collating, Summarizing, and Reporting Results*: If authorship spanned multiple countries, the lead author's country was listed. Language was dichotomized as "English + Spanish" vs. others because we intended to apply findings to research in the United States, where Spanish is the most frequent second language (L2). Age was classified as including children: younger than 9 years, older than 9 years, or 0 to 18 years. The initial reviewer, who composed screening guidelines, screened all 366 publications and recorded results in Excel. Publications were then divided for secondary reviews to the five co-authors, who were masked to the evaluation of the initial reviewer. Four reviewers screened 73 articles

and one reviewer screened 74 articles. The initial reviewer cross-checked all secondary reviewer logs, and those with discrepancies were sent to a seventh reviewer to resolve conflict. Data charting forms for above measures were completed only for publications that met inclusion criteria. Frequencies are presented as number (%). For sample size we present the range, mean (standard deviation) and median (interquartile range). Data were exported to SPSS (IBM Statistics, Version 2.5, 2017) for cross-tabulation analysis by age. We completed the scoping review in October of 2018. Since this time, additional papers have been published. A cursory check of PubMed revealed an additional 57 papers up to June 2020. This value is consistent with the expanding number of relevant papers.

## RESULTS

Selection of Sources of Evidence. A schematic of our scoping review's 5-step methodological framework is shown in Figure 1.[41] Sources of evidence were selected by a PubMed search for the terms "bilingual", "children", and "language disorder" or "language impairment" between the years of 1979–2018. Of the 366 papers initially identified, 207 were excluded because they were: not written in English (n = 27), not primary sources of research (ie, literature reviews, meta-analyses) (n = 67), were primarily focused on interventions (n = 41) or special populations other than children with language disorders (n = 29), and case studies (n = 41). Two papers were excluded under the 'Other' category.

Characteristic of Sources of Evidence. The remining 159 papers included in the review are listed in the Appendix along with the countries where they were conducted, languages studied, and sample size. Just 4 were published prior to 2000, after which time the number of papers increased by approximately twofold every 5 years, with the last 5-year block showing 72 papers. (Fig. 2) Approximately half were conducted in the United States (n = 83, 52%); countries contributing <3% of studies are not

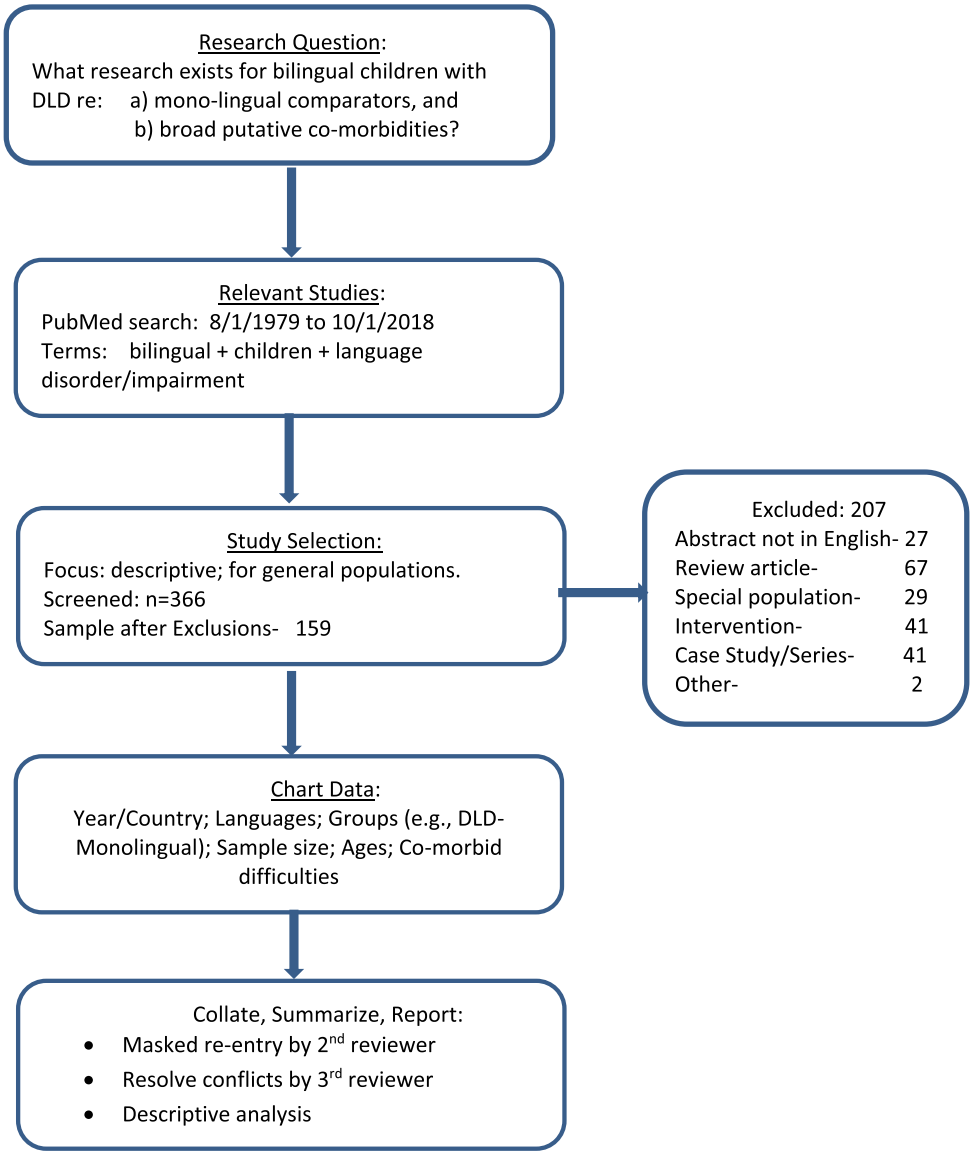


**Figure 1.** *Flow diagram.*

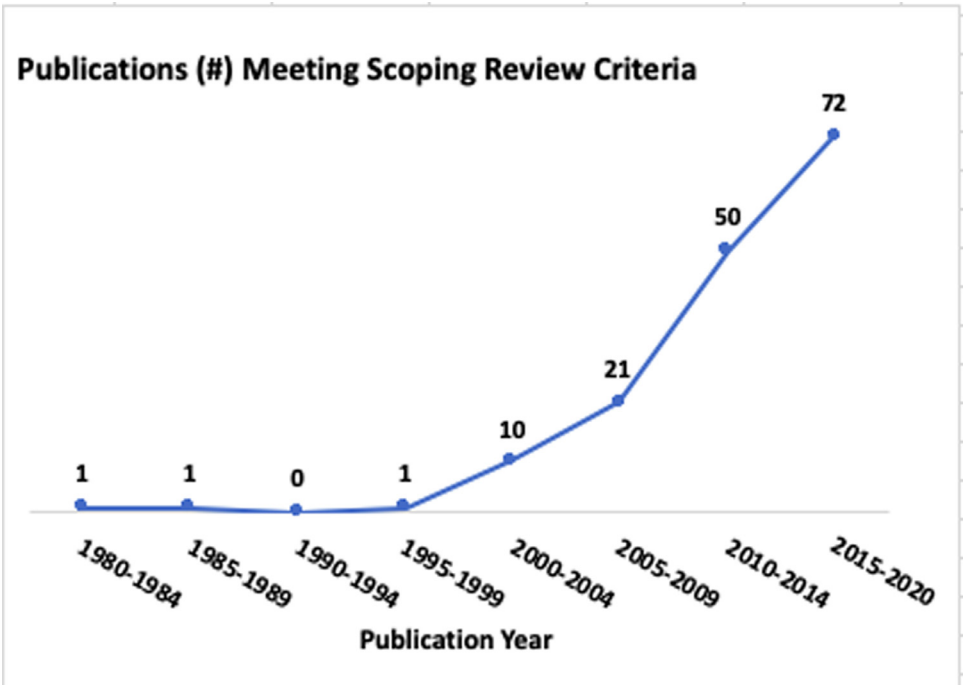


**Figure 2.** *Number of publications meeting scoping review criteria.*

shown. About half included bilingual English-Spanish speakers (n = 82, 52%), with the remainder including other language combinations. The studies' median sample size was 62 (IQR = 33−119), with the range spanning 9 to 1,108. (Table 1)

- Results of Individual Sources of Evidence: N/A: only one source. See below for summary of results.
- Synthesis of results: While most studies included bilingual children with typical language (n = 138, 87%), just half included bilingual children with DLD (n = 86, 54%), and few included all 4 study groups (n = 22, 14%). Among studies with a Bilingual DLD group, the majority included a Bilingual TLD group (70/86, 81%). Similarly, among the studies with a Monolingual DLD group, most included a Monolingual TLD group (30/39; 77%) [not shown]. Just over one-quarter included *any* children aged 9 years or older. As expected, most included language measures (n = 145, 91%). Just under a third assessed reading/phonology (n = 51, 32%) or nonverbal intelligence (n = 49, 31%). The remaining measures were included in *fewer than* 10% of studies. (Table 1)

Data stratified by age < or >= 9 years of age are shown in Table 2. Age data were missing for 2 studies, thus the denominator used to calculate cell percentages is n = 157. Less than a third of studies included *any* children 9 to 18 years (n = 48, 31%); 5 studies (3%) included *only* children of this age. Among the 48 studies with *any* 9 to 18 year olds, just 4 (8%, 4/48) included all 4 language groups. Despite increased executive function and reading demands around 9 years of age, relatively few studies of older children include these measures.

## DISCUSSION

Most children with DLDs have difficulties that persist into later childhood; prolonged difficulties impact literacy development. Paradoxically, the scope of research on DLD and related skills in school-aged mono- and bilingual children remains unclear. This scoping review examined the extent to which bilingualism research about children with language disorders includes children aged 9 years or older, comparator groups by language status (mono- vs bilingual) and ability (with/without language disorder), and data on related difficulties. Of the 159 manuscripts that met inclusion criteria, just 31% included *any* 9 to 18 year-olds, and only 3% included *only* 9 to 18 year-olds. Just 14% included all four language groups, and apart from nonverbal intelligence (31% of studies) or reading (32% of studies), few included data for related difficulties.

Research on bilingual children with DLD was largely absent prior to 2000, but increased sharply between 2010 and 2018. Slightly over half the studies examined Spanish-English bilinguals − likely because many were from the United States, where Spanish is the most commonly spoken second language. Among the 60 million persons in the United States older than 5 years who speak a language other than English at home, more than half speak Spanish or Spanish Creole (37.5 million), followed by Chinese (2.9 million).[42] Worldwide, two-thirds of people speak one of 12 languages, the top 5 of which were: Chinese (all dialects, 1.4 billion), Hindu-Urdu (588 million), English (527 million), Arabic (467 million), and Spanish (389 million). English is spoken in the greatest number of countries (101).[43] Yet, few studies identified for our scoping review included speakers of Arabic or Hindu-Urdu.

**Table 1.** Overall Data Frequencies (n = 159 Studies)

| | | |
|---|---|---|
| Country | US Canada Netherlands Spain China Germany Sweden UK | 83 (52%) 11 (7%) 9 (6%) 6 (4%) 6 (4%) 5 (3%) 5 (3%) 6 (4%) |
| Languages | English + Spanish | 82 (52%) |
| Study groups | Monolingual-TLD | 66 (42%) |
| | Monolingual-DLD | 39 (25%) |
| | Bilingual-TLD | 138 (87%) |
| | Bilingual-DLD | 86 (54%) |
| | All four groups | 22 (14%) |
| Age* | 0–8 years span only | 109 (69%) |
| | 9–18 years span only | 5 (3%) |
| | 0–18 years span | 42 (26%) |
| | Missing | 2 (1%) |
| Measures | Language | 145 (91%) |
| | Attention | 5 (3%) |
| | Auditory processing | 10 (6%) |
| | Cognitive: Nonverbal working memory | 16 (10%) |
| | Cognitive: Nonverbal intelligence | 49 (31%) |
| | Cognitive: Verbal intelligence | 13 (8%) |
| | Executive function | 7 (4%) |
| | Reading/Phonology | 51 (32%) |
| Sample size | Mean (SD) | 114 (165) |
| | Median (IQR) | 62 (33–119) |

TLD indicates typical language development.
*Due to rounding, percentages add to 99%.

Thus, our research suggests that research on both DLD and typical language development be expanded to these languages.

There was a dearth of studies in all 4 comparator groups. Few studies compared all 4 language groups (bilingual typical, monolingual typical, bilingual DLD and monolingual DLD). The (relatively) more limited research on mono- versus bilingual children with DLD may impede understanding of what DLD 'looks like' in mono- versus bilingual children. As well, we found limited assessment of related difficulties. This finding runs counter to the shift in terminology from SLI to 'DLD,' which better approximates DLD's co-occurrence with other neurodevelopmental disorders, [3] and its clinical presentation. For example, our multidisciplinary developmental disabilities center's school-age unit in the Bronx, New York evaluates children 6 years or older in 2019. Excluding those with autism and intellectual disability, n = 168 were diagnosed with DLD, including a third who were bilingual English-Spanish. Among these children with DLD, 91% had one or more academic, behavioral, or emotional difficulty including: reading (44%), math (38%), writing (34%), ADHD (53%), anxiety (27%), or depression (9%). These (unpublished) clinical data support the conceptualization of DLD as a spectrum disorder, as others have.[44] Our findings thus suggest that DLD

**Table 2.** Frequency Data by Age (n = 157)

| | 0–8 years | 9–18 years | 0–8 years |
|---|---|---|---|
| Country: US other | 54 (34%) 55 (35%) | 2 (1%) 3 (2%) | 28 (18%) 15 (10%) |
| LANGUAGE GROUP | | | |
| Monolingual typical | 49 (31%) | 3 (2%) | 12 (7%) |
| Monolingual DLD | 28 (18%) | 1 (<1%) | 10 (6%) |
| Bilingual typical | 98 (62%) | 5 (3%) | 33 (21%) |
| Bilingual DLD | 55 (35%) | 2 (1%) | 27 (17%) |
| All four groups | 18 (11%) | 1 (<1%) | 3 (2%) |
| MEASURES | | | |
| Language use | 103 (66%) | 3 (2%) | 37 (24%) |
| Attention ability | 2 (1%) | – | 1 (<1%) |
| Auditory processing | 3 (2%) | 1 (<1%) | 6 (4%) |
| Cognitive: Nonverbal working memory | 10 (6%) | 2 (1%) | 4 (3%) |
| Cognitive: Nonverbal intelligence | 27 (17%) | 5 (3%) | 15 (10%) |
| Cognitive: Verbal intelligence | 10 (6%) | 1 (<1%) | 1 (<1%) |
| Executive function | 4 (3%) | 2 (1%) | 1 (<1%) |
| Reading/Phonology | 35 (22%) | 3 (2%) | 11 (7%) |

DLD indicates developmental language disorder.
Typical = typical language.

research has not kept pace with the conceptualization and presentation of DLD.

The first US profile of middle childhood health and behavior found that more than 20% of 6 to 11 year-olds had a special health care need (including behavioral or developmental) and that speech-language disorders peaked at 7.7% at 8 to 9 years.[45] Yet, a majority of studies in our scoping review (70%) were in children younger than 9 years; just 5 studies (3%) included *only* these older children. With mounting cognitive, regulation and social demands in early preadolescence, persistent language deficits can lead to a child being newly diagnosed with a reading or learning disability. Late detection of reading disorders in particular occurs in ELs and children with lower socioeconomic means.[46] Additionally, Black, Hispanic, and linguistic minority children in the United States are less likely to be identified with a learning disability or speech-language impairment by the end of middle school than similarly situated white peers.[47] Our clinical experience echoes this finding: among children newly diagnosed with DLD at our center's school-aged unit (see above), 75% were 9 years or older. Our center is located in the Bronx, where nearly 60% of households speak a language other than English, and 27% of persons meet US Census criteria for poverty,[48] underscoring the disparities related to timely identification of DLD.

This scoping review possesses both strengths and limitations. To our knowledge, this is the first scoping (or systematic) review to concomitantly examine language differences (eg, mono- vs bilingual) and disorders, age and related difficulties. Other strengths include adherence to established scoping review protocols, masked secondary review of initial charting decisions, and a multidisciplinary reviewer team that included clinical, language disorders, and neuroscience expertise.

A primary limitation of this review is its reliance on PubMed alone, rather than additional education or psychology databases. The authors undertook this review to inform their development of a research project; in this context use of a single database was deemed practical and appropriate. We selected PubMed given our focus on identifying difficulties that often co-occur with DLD but that go beyond language as well as because PubMed indexes American Speech-Language-Hearing Association (ASHA) journals. To gauge the extent of this limitation, we conducted a cursory review of ERIC (EBSCO) (sponsored by the US Department of Education) using the same initial search terms and time period. This yielded n = 108 papers (vs n = 366 in our review), 55% of which were indexed in PubMed. Titles 'missed' from PubMed included those in linguistics and bilingualism journals which might have rendered our findings on comorbidities even more conservative. Conversely, the search in ERIC missed 62% of papers identified in PubMed, including those in International Journal of Speech-Language Pathology, American Journal of Speech-Language Pathology, Clinical Linguistics and Phonetics, and the Journal of Communication Disorders. At the same time, this cursory review identified a parallel increase in research on bilingualism in the past decade across both search engines. Findings reported here can serve as a precursor for a more comprehensive (using multiple search engines), systematic review of this topic. Additionally, omitting 'adolescent' as a search terms may have missed a small number of papers.

## CONCLUSIONS

Our scoping review identified substantial gaps in research on bilingualism in children in terms of related difficulties, comparator groups, and age. In the United States, where speech-language pathologists must adhere to both ASHA and Individuals with Disabilities Education Act requirements, there has been progress in evaluating language proficiency in bilingual speakers.[49] However, the relatively more limited research on both mono- and bilingual children with DLD presents limitations to this progress. Worldwide, there is some misalignment between languages studied compared with the number of speakers of major language groups. Future research that captures the breadth of DLD as a spectrum disorder, across childhood, is warranted.

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## SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.acap.2021.12.002.

## REFERENCES

1. Black LIVA, Hoffman HJ. Communication disorders and use of intervention services among children aged 3–17 years: United States, 2012. *National Center For Health Statistics*. Hyattsville, Md: NCHS Data Brief, no. 205; 2015.
2. US Department of Education, National Center for Education Statistics. The Condition of Education: Children and Youth with Disabilities. In: US Department of Education, ed. Available at: https://nces.ed.gov/programs/coe/indicator/cgg. Accessed January 7, 2022.
3. Bishop DVM, Snowling MJ, Thompson PA, et al. Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: terminology. *J Child Psychol Psychiatry*. 2017;58:1068–1080.
4. McGregor KK, Goffman L, Van Horne AO, et al. Developmental language disorder: applications for advocacy, research, and clinical service. *Perspect ASHA Special Interest Groups*. 2020;5:38–46.
5. Bishop DV. Which neurodevelopmental disorders get researched and why? *PLoS One*. 2010;5:e15112.
6. Garcia S, Hall-Lande J, Nye-Lengerman K. Factors influencing low prevalence of neurodevelopmental disabilities among US Hispanic/Latino children. *J Racial Ethn Health Disparities*. 2019;6:1107–1121.
7. Pennington BF, Bishop DV. Relations among speech, language, and reading disorders. *Annu Rev Psychol*. 2009;60:283–306.

8. Botting N. Language, literacy and cognitive skills of young adults with developmental language disorder (DLD). *Int J Lang Commun Disord*. 2020;55:255–265.
9. Clegg J, Hollis C, Mawhood L, et al. Developmental language disorders a follow-up in later adult life. Cognitive, language and psychosocial outcomes. *J Child Psychol Psychiatry*. 2005;46:128–149.
10. Annie E. Casey Foundation. Kids count data center: children who speak a language other than English at home. 2018. Available at: https://datacenter.kidscount.org/data/tables/81-children-who-speak-a-language-other-than-english-at-home#detailed/1/any/false/1729,37,871,870,573,869,36,868,867,133/any/396,397. Accessed January 7, 2022.
11. Paradis J. The development of English as a second language with and without specific language impairment: clinical implications. *J Speech Lang Hear Res*. 2016;59:171–182.
12. Ortiz AARP, Wilkinson CY, Liu Y-J, et al. The role of bilingual education teachers in preventing inappropriate referrals of ELLs to special education: implications for response to intervention. *Bilingual Res J*. 2011;34:316–333.
13. Berkman ND, Wallace I, Watson L, et al. U.S. Preventive Services Task Force evidence syntheses, formerly systematic evidence reviews. *Screening for Speech and Language Delays and Disorders in Children Age 5 Years or Younger: A Systematic Review for the U. S. Preventive Services Task Force*. Rockville, Md: Agency for Healthcare Research and Quality (US); 2015.
14. Rudolph JM. Case history risk factors for specific language impairment: a systematic review and meta-analysis. *Am J Speech Lang Pathol*. 2017;26:991–1010.
15. Hoff E, Core C. Input and language development in bilingually developing children. *Semin Speech Lang*. 2013;34:215–226.
16. Pua EPK, Lee MLC, Rickard Liow SJ. Screening bilingual preschoolers for language difficulties: utility of teacher and parent reports. *J Speech Lang Hear Res*. 2017;60:950–968.
17. Kapantzoglou M, Restrepo MA, Gray S, et al. Language ability groups in bilingual children: a latent profile analysis. *J Speech Lang Hear Res*. 2015;58:1549–1562.
18. Orellana CI, Wada R, Gillam RB. The use of dynamic assessment for the diagnosis of language disorders in bilingual children: a meta-analysis. *Am J Speech Lang Pathol*. 2019;28:1298–1317.
19. Chall J. *Stages of Reading Development*. New York, NY: McGraw Hill Book Company; 1983.
20. Bailey R, Jones SM. An integrated model of regulation for applied settings. *Clin Child Fam Psychol Rev*. 2019;22:2–23.
21. Curtis PR, Frey JR, Watson CD, et al. Language disorders and problem behaviors: a meta-analysis. *Pediatrics*. 2018;142: e20173551. https://doi.org/10.1542/peds.2017-3551.
22. Tervo RC. Language proficiency, development, and behavioral difficulties in toddlers. *Clin Pediatr (Phila)*. 2007;46:530–539.
23. Horwitz SM, Irwin JR, Briggs-Gowan MJ, et al. Language delay in a community cohort of young children. *J Am Acad Child Adolesc Psychiatry*. 2003;42:932–940.
24. Zadeh ZY, Im-Bolter N, Cohen NJ. Social cognition and externalizing psychopathology: an investigation of the mediating role of language. *J Abnorm Child Psychol*. 2007;35:141–152.
25. Gough Kenyon SM, Lucas RM, Palikara O. Expectations of the transition to secondary school in children with developmental language disorder and low language ability. *Br J Educ Psychol*. 2020;90:249–265.
26. Law J, Rush R, Schoon I, et al. Modeling developmental language difficulties from school entry into adulthood: literacy, mental health, and employment outcomes. *J Speech Lang Hear Res*. 2009;52:1401–1416.
27. Snow PC. Speech-language pathology and the youth offender: epidemiological overview and roadmap for future speech-language pathology research and scope of practice. *Lang Speech Hear Serv Sch*. 2019;50:324–339.
28. Seroczynski AD, Jobst AD. Latino youth and the school-to-prison pipeline: addressing issues and achieving solutions. *Hispanic J Behav Sci*. 2016;38:423–445.
29. Kudo MF, Lussier CM, Swanson HL. Reading disabilities in children: a selective meta-analysis of the cognitive literature. *Res Dev Disabil*. 2015;40:51–62.
30. Gallinat E, Spaulding TJ. Differences in the performance of children with specific language impairment and their typically developing peers on nonverbal cognitive tests: a meta-analysis. *J Speech Lang Hear Res*. 2014;57:1363–1382.
31. Ebert KD, Kohnert K. Sustained attention in children with primary language impairment: a meta-analysis. *J Speech Lang Hear Res*. 2011;54:1372–1384.
32. Arizmendi GD, Alt M, Gray S, et al. Do bilingual children have an executive function advantage? Results from inhibition, shifting, and updating tasks. *Lang Speech Hear Serv Sch*. 2018;49:356–378.
33. Dick AS, Garcia NL, Pruden SM, et al. No evidence for a bilingual executive function advantage in the nationally representative ABCD study. *Nat Hum Behav*. 2019;3:692–701.
34. Wang M, Jegathesan T, Young E, et al. Raising children with Autism spectrum disorders in monolingual vs bilingual homes: a scoping review. *J Dev Behav Pediatr*. 2018;39:434–446.
35. Adesope OOLT, Thompson T, Ungerleider C. A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Rev Educ Res*. 2010;80:207–245.
36. McLeod SHL, Whiteford C, Walker S. Multilingualism and speech-language competence in early childhood: impact on academic and social-emotional outcomes at school. *Early Child Res Q*. 2015;34:53–56.
37. Pham MT, Rajic A, Greig JD. A scoping review of scoping reviews: advancing the approach and enhancing the consistency. *Res Synth Methods*. 2014;5:371–385.
38. Arksey HOML. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8:19–32.
39. Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol*. 2018;18:143.
40. Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann InternMed*. 2018;169:467–473.
41. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Science*. 2010;5:69.
42. US Census Bureau. Detailed languages spoken at home and ability to speak English for the population 5 years and over: 2009-2013. 2015. Available at: https://www.census.gov/data/tables/2013/demo/2009-2013-lang-tables.html. Accessed April 15, 2021.
43. Noack R. The world's languages, in 7 maps and charts. The Washington Post. 2015. Available at: https://www.washingtonpost.com/news/worldviews/wp/2015/04/23/the-worlds-languages-in-7-maps-and-charts/. Accessed April 15, 2021.
44. Lancaster HS, Camarata S. Reconceptualizing developmental language disorder as a spectrum disorder: issues and evidence. *Int J Lang Commun Disord*. 2019;54:79–94.
45. Parasuraman SR, Ghandour RM, Kogan MD. Epidemiological profile of health and behaviors in middle childhood. *Pediatrics*. 2020;145: e20192244. https://doi.org/10.1542/peds.2019-2244.
46. Kieffer MJ. Socioeconomic status, English proficiency, and late-emerging reading difficulties. *Educ Res*. 2010;39:484–486.
47. Morgan PL, Farkas G, Hillemeier MM, et al. Minorities are disproportionately underrepresented in special education: longitudinal evidence across five disability conditions. *Educ Res*. 2015;44:278–292.
48. US Census Bureau. Quick facts: Bronx borough (Bronx County), New York. *Population Estimates*, 2019. In: Washington, DC: US Department of Commerce; 2019.
49. Arias G, Friberg J. Bilingual language assessment: contemporary versus recommended practice in American schools. *Lang Speech Hear Serv Sch*. 2017;48:1–15.