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Intervention Protocols for Narrative Skills and Oral Inferential Comprehension in Children with Developmental Language Disorder: A Scoping Review

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Review Article

Abstract

Introduction: Developmental language disorder (DLD) is characterized by persistent difficulties in language expression and/or comprehension. Storytelling and oral inferential comprehension (OIC) are complex linguistic skills that are frequently compromised in children with DLD. The present study aimed to identify the protocols and intervention programs used to improve oral storytelling and OIC in children with DLD.

Materials and Methods: This study was designed as a scoping review. A literature search was conducted across national and international databases, in accordance with predefined inclusion and exclusion criteria, covering the period from 2003 to December 2022. Ultimately, 11 studies were reviewed, and the results were categorized in a dedicated table.

Results: Most studies focused on storytelling and narrative organization. Explicit instruction in narrative structure, story retelling and generation, the use of modeling and visual-verbal supports, and the simultaneous targeting of macro- and micro-structure of narratives were the most frequently reported components, with improvements noted in story grammar, narrative organization, linguistic complexity, cohesion, and vocabulary. Fewer studies addressed OIC, employing strategies such as interactive reading, guided questioning, mental imagery, and direct inference training. The strongest evidence emerged from a randomized controlled trial (RCT), which demonstrated significant improvements in inferential comprehension, as well as the maintenance and generalization of intervention effects.

Conclusion: The available evidence supports the potential effectiveness of narrative-based interventions and direct instruction of OIC in children with DLD; however, heterogeneous interventions and few rigorously designed studies limit the establishment of a standardized protocol. An integrated, explicit, and structured approach that combines narrative instruction, visual-verbal support, and lexical, syntactic, and inferential goals tailored to the child's developmental level appears to be the most promising direction for future interventions. The absence of Persian-language studies highlights the need for further research within local populations.

Keywords: Developmental language disorder; Specific language impairment; Storytelling; Narrative; Inferential comprehension; Children

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Introduction

Developmental language disorder (DLD) refers to persistent difficulties in language development and use that may be associated with significant functional impairment in everyday life or academic progress and cannot be explained by a known biomedical condition (1). Population-based studies have shown that developmental language disorders are relatively common among children. However, prevalence estimates vary according to sample age, language and cultural context, diagnostic criteria, assessment instruments, and the thresholds applied. In Iran,

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available epidemiological studies have reported the prevalence of specific language impairment among preschool children to range from 2.7% to 3.44% (2, 3). Population-based studies in other countries have reported higher estimates, ranging from 7.4% to 7.58% (4–6). Despite these differences in prevalence estimates, the available evidence highlights the substantial burden of this disorder and the importance of early identification and intervention.

One important domain of language that may be affected in children with DLD is oral inferential comprehension (OIC). Language comprehension is not limited to receiving and recalling explicitly stated information; it also requires integrating presented information with prior knowledge and implicit semantic relationships. Oral inferential comprehension refers to a child's ability to derive information beyond what is directly stated in spoken discourse or a story. For example, a child must be able to infer the cause of an event, identify relationships between events, understand a character's mental or emotional state, or predict the likely outcome. By contrast, literal comprehension primarily involves retrieving information explicitly presented in written or spoken discourse. Inferential comprehension is therefore a complex process in which children must connect different pieces of information to construct a coherent representation of the content presented (7). This ability becomes increasingly sophisticated during the preschool years alongside the development of vocabulary, syntactic abilities, narrative knowledge, and cognitive skills (8). However, children with DLD experience greater difficulty comprehending narratives and constructing an integrated representation of information, particularly when a response requires going beyond explicitly stated information (7, 9). Poorer performance in both literal and inferential comprehension has been reported among 5-year-old children with DLD (8). Furthermore, narrative macrostructure and microstructure, literal comprehension, vocabulary, phonological memory, and theory of mind have been associated with inferential performance. In multivariable analyses, story-retelling macrostructure and theory of mind have made unique contributions to the explanation of inferential performance (9).

Alongside inferential comprehension, storytelling and story retelling are important domains of language development during the preschool and early school years. Narrative development begins in early childhood, with improvements during this period in narrative length, coherence, event organization, linguistic complexity, and the expression of temporal and causal relationships. Narrative ability is typically described at two complementary levels: macrostructure and microstructure. Macrostructure concerns the overall organization of story content and elements such as characters, setting, the initiating event, the character's goal or response, actions, consequences, and the ending. Microstructure encompasses linguistic features at the word and sentence levels, including lexical diversity, sentence length and complexity, grammatical accuracy, reference, cohesive devices, and temporal and causal relationships (10, 11). The importance of storytelling extends beyond everyday oral communication because it requires children to present information coherently and relatively independently of the immediate context to a listener who may not have been present when the events occurred. From this perspective, narrative ability can serve as a bridge between oral and written language and may be associated with literacy skills and academic outcomes (12).

Children with DLD experience difficulties at both the macrostructural and microstructural levels of narrative, including producing shorter, simpler stories, making limited use of story-structure elements, and struggling to use complex vocabulary and grammatical structures. Longitudinal studies and reviews have also shown that some of these difficulties may persist into the early school years (13–15). Consequently, narrative-based interventions have become an increasingly prominent approach to treating children with language disorders. Available evidence supports the role of repeated story retelling, explicit instruction in macrostructural elements, and practice in narrative organization in improving certain macrostructural and microstructural measures. However, small sample sizes and heterogeneity in intervention methods limit definitive interpretation of this evidence (16, 17). In recent years, interventions directly targeting oral inferential comprehension have also attracted attention. For example, Dawes et al. (18) investigated a group intervention designed to improve oral inferential comprehension in children aged 5–6 years with DLD.

Despite the growing number of studies on narrative and inferential interventions, the protocols employed vary considerably in their treatment components, objectives, delivery methods, and outcome measures. Moreover, most of the available evidence comes from English and other European languages, with limited information on the application of these approaches in less-studied languages and cultural contexts, particularly Persian. Identifying and mapping the range of existing protocols may therefore help clarify

the common components of interventions, their differences, and existing research gaps. Accordingly, the present review addressed the following research question: What intervention protocols and programs are available to clinicians across different languages for improving oral storytelling and oral inferential comprehension in children with DLD, and what are their characteristics in terms of language, children's ages, intervention objectives, treatment content, and level of evidence?

Materials and Methods

Study Design: The present study was cross-sectional and descriptive- This scoping review aimed to identify, describe, and classify existing intervention programs and protocols for improving oral storytelling and oral inferential comprehension in children with DLD. The review process was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR), and the study selection process is presented in Figure 1.

Search Strategy: The literature search aimed to identify studies reporting a clearly specified intervention program, protocol, or approach designed to improve oral inferential comprehension, story comprehension, storytelling, or narrative production in children with language disorders. PubMed was searched, and the reference lists of relevant articles were manually screened. The search covered the period from 2003 to December 2022. To identify studies published before the term "developmental language disorder" became widely adopted, the terms "specific language impairment" (SLI) and "language impairment" were also used.

For storytelling and narrative interventions, terms related to DLD/SLI were combined with "narrative", "storytelling", "story retell", and "story grammar", as well as "intervention", "therapy", "treatment", "protocol", and "program". For inferential comprehension, the terms "inferential", "inferencing", "inferential comprehension", and "oral inferential comprehension" were combined with intervention-related terms.

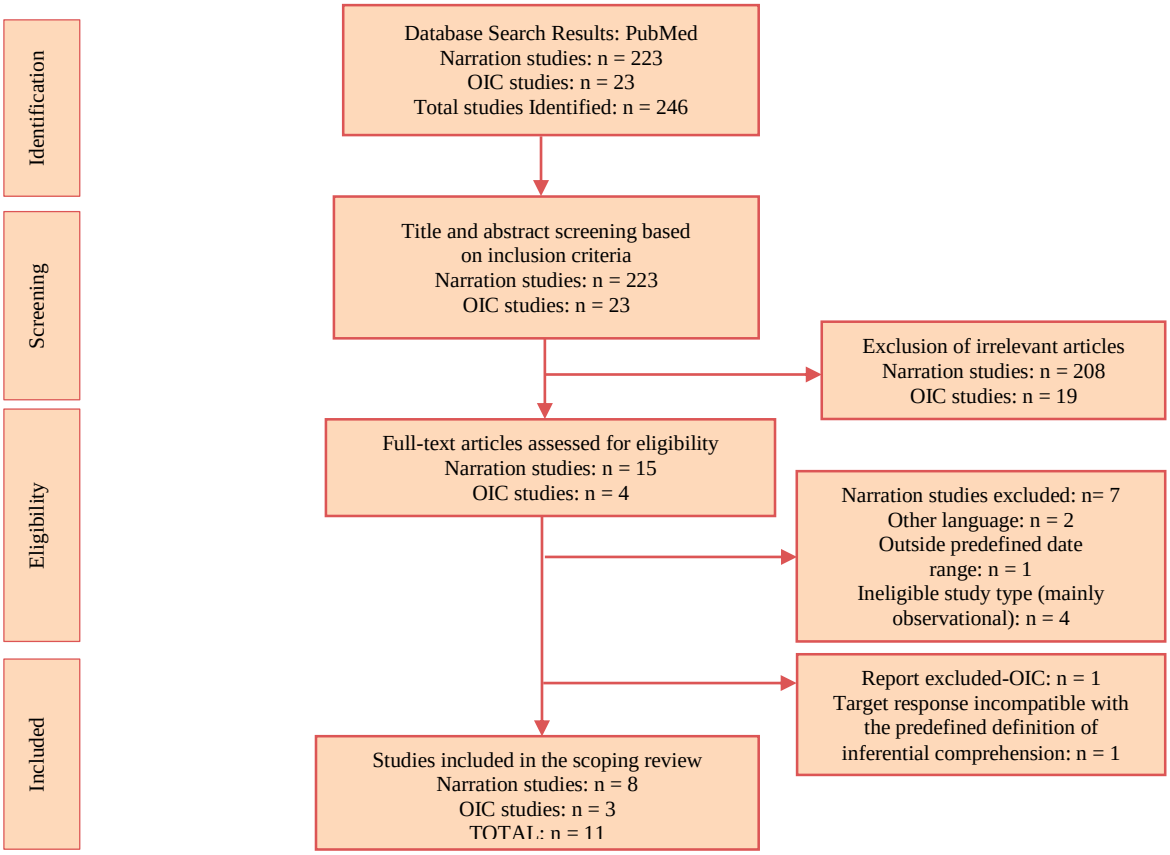


Figure 1. PRISMA-ScR flow diagram of the identification and screening of evidence on interventions targeting storytelling and oral inferential comprehension.

Persian-language searches were also conducted in IranDoc and the Scientific Information Database (SID), using Persian equivalents of "developmental language disorder", "specific language impairment", "language disorder", "reasoning", "inference", "inferential comprehension", "oral comprehension", "story comprehension", "storytelling", "narrative", "intervention", "treatment", "protocol", and "treatment program".

The final PubMed search strategy was as follows:

(("developmental language disorder"[Title/Abstract] OR "DLD"[Title/Abstract] OR "specific language impairment"[Title/Abstract] OR "SLI"[Title/Abstract] OR "language impairment"[Title/Abstract] OR "language disorder*"[Title/Abstract] OR "Language Disorders"[Mesh]) AND ("child*"[Title/Abstract] OR "pediatric*"[Title/Abstract] OR "paediatric*"[Title/Abstract] OR "preschool*"[Title/Abstract] OR "Child"[Mesh])) AND ("narrative*"[Title/Abstract] OR "storytelling"[Title/Abstract] OR "story telling"[Title/Abstract] OR "story retell*"[Title/Abstract] OR "story grammar"[Title/Abstract] OR "story comprehension"[Title/Abstract] OR "inferential"[Title/Abstract] OR "inferencing"[Title/Abstract] OR "inferential comprehension"[Title/Abstract] OR "oral inferential comprehension"[Title/Abstract] OR "inference*"[Title/Abstract]) AND ("intervention*"[Title/Abstract] OR "therapy"[Title/Abstract] OR "therapies"[Title/Abstract] OR "treatment*"[Title/Abstract] OR "protocol*"[Title/Abstract] OR "program*"[Title/Abstract] OR "training"[Title/Abstract]) AND ("2003/01/01"[Date - Publication] : "2022/12/31"[Date - Publication])

Inclusion and Exclusion Criteria: Studies were included if they focused on children with DLD, SLI, or equivalent diagnostic labels; presented an intervention program or approach that could be described and replicated; and targeted at least one of the following domains: oral inferential comprehension, story or narrative comprehension, oral storytelling, story retelling, or story/narrative structure. Articles were also required to provide extractable information on activity content, intervention delivery, objectives, or core program components. English- and Persian-language publications through December 31, 2022, were eligible, including intervention studies, experimental studies, quasi-experimental studies, single-case studies, and articles that provided detailed descriptions of a specific intervention program.

Studies that addressed only the assessment of language or narrative difficulties without providing an intervention were excluded.

Studies involving other disorders were also excluded when results for children with SLI/DLD could not be distinguished from those of other participants. Additional exclusions comprised studies involving adults, studies of acquired language disorders, studies concerned exclusively with diagnosis or assessment, studies without a clearly specified intervention program, publications in languages other than English or Persian, and studies published outside the specified timeframe.

Study Selection and Data Extraction: The search strategy identified a total of 246 articles. Two researchers independently screened the titles and abstracts, excluding 208 articles in the storytelling domain and 19 in the oral inferential comprehension domain. The full texts of the remaining studies were then examined, and reasons for exclusion at this stage were recorded. Seven articles on storytelling and one on oral inferential comprehension were excluded following full-text review.

From the final set of studies, comprising eight articles on storytelling and three on oral inferential comprehension, data were extracted on program title, authors and publication year, original language, number and age range of participants, group type, intervention objective(s), core program components, study design, and level of evidence. These data were organized in Table 1. Levels of evidence were assigned according to study design and the degree of experimental control, using the Oxford Center for Evidence-Based Medicine (OCEBM) classification system (19). Given the nature of a scoping review, formal assessment of methodological quality or risk of bias was not used as a condition for study inclusion. Nevertheless, the design and level of evidence of each study were recorded during data extraction to characterize the relative strength of the evidence available for different programs.

Results

No relevant studies were identified in the Persian-language databases within the specified timeframe. All included studies were therefore retrieved from PubMed. Examination of the 11 included studies showed that most interventions focused on improving storytelling and narrative organization (eight studies), whereas fewer directly targeted oral inferential comprehension (three studies).

Table 1. Studies included in the final synthesis of the scoping review of storytelling and oral inferential comprehension interventions

Author/Protocol name	Language	Age	Sample size	Intervention type	Target domain	Macrostructure	Microstructure	Study design	Level of evidence
Swanson et al. (20 Narrative-Based Language Intervention[1] (NBLI)	English	6;11–8;09 years; mean: 7;10	10	NBLI: story retelling, story generation, and sentence formulation	Storytelling	Story content/quality and narrative structure	Vocabulary and sentence structure	Quasi-experimental, single-group pretest–posttest design	III
Joffe, Cain, & Marić (21) Mental imagery training	English	Mean age: SLI group, 9;06 years; typically developing group, 9;10 years	9 children with SLI and 16 typically developing children	Training in generating mental images for sentences and stories	Both storytelling and inferential comprehension, with a primary focus on inferential comprehension	Understanding story relationships and information to answer questions	Sentence comprehension and construction of mental representations	Quasi-experimental pretest–posttest design with an age-matched control group	III
Acosta, Moreno, Axpe, & Lorenzo (22) Narrative intervention integrated into formal education[2]	Spanish	Preschool age; approximately 4 years	3	Collaborative intervention delivered by a speech-language therapist and a teacher; narrative scaffolding	Storytelling	Basic narrative elements and event sequencing	Cohesion, pronoun use, fluency, and linguistic structures	Multiple-case series	IV
Green & Klecan-Aker (23) Story grammar and relational expression intervention[3]	English	6;03–9;06 years	24	Explicit instruction in story grammar and story organization	Storytelling	Story grammar	Sentence units and accompanying narrative language features	Quasi-experimental, single-group pretest–posttest design	III
Desmarais et al. (24) Inferential comprehension intervention	French	4–6 years	16	Dialogic reading and inferential reasoning in response to predetermined questions	Inferential comprehension	Understanding story structure and relationships between events	Verbal responses to questions and language comprehension	Pretest–posttest clinical trial	III
Dawes et al. (25) Oral inferential comprehension intervention	English	5–6 years	37: intervention group, 19; control group, 18	Shared book reading, story mapping, story retelling, and inferential discussion	Oral inferential comprehension	Story mapping and retelling guided by story structure	Vocabulary, literal comprehension, and theory of mind	Randomized controlled trial	II
Janssen et al. (26) Learning to Tell the Plot	Dutch	8–10 years	12: intervention group, 6; control group, 6	Group-based narrative intervention involving story retelling and story generation	Storytelling	Story grammar elements	Mean length of utterance, percentage of grammatical utterances, fluency, and complexity	Controlled group intervention study	III

Table 1. Studies included in the final synthesis of the scoping review of storytelling and oral inferential comprehension interventions (continue)

Author/Protocol name	Language	Age	Sample size	Intervention type	Target domain	Macrostructure	Microstructure	Study design	Level of evidence
Hessling & Schuele (27) Story Champs	English	8–9 years	4	Individual narrative intervention involving story retelling and personal narrative generation	Storytelling	Core story grammar elements	Linguistic complexity, targeted implicitly	Single-case experimental study with a multiple-baseline design	IV
Pauls & Archibald (28) NBLI	English	8–11 years	10	NBLI involving story retelling and story generation	Storytelling	Story grammar and overall story organization	Cohesion, vocabulary, syntactic complexity, and grammatical structure	Single-case study	IV
Iuliu & Martínez (29) Remote oral narrative intervention[4]	Spanish	9 years, 2 months	1	Remotely delivered practice, explicit instruction in story structure, and story retelling	Storytelling	Setting, episodes, and events	Mean length of utterance, type–token ratio, vocabulary, and discourse markers	Case study	IV
Acosta-Rodríguez et al. (30) Language comprehension intervention	Spanish	5 years	99: DLD control group, 25; typically developing control group, 25; DLD intervention group, 25; typically developing intervention group, 24	Lexical–semantic, morphosyntactic, narrative, and working-memory intervention	Both storytelling and inferential comprehension, with a primary focus on storytelling	Story retelling and generation, cohesion and coherence, and story structure	Vocabulary, grammatical morphology and syntax, semantics, and fluency	Quasi-experimental, four-group controlled design	III

DLD: Developmental language disorder; SLI: Specific language impairment; NBLI: Narrative-based language intervention

Discussion

In narrative-based interventions, recurring components included story retelling, story generation, explicit instruction in story grammar, event organization, and the use of narrative structure elements. At the macrostructural level, most interventions focused on identifying and organizing story elements, sequencing events, and establishing relationships between them. At the microstructural level, targets included vocabulary, mean length of utterance, sentence structure, coherence, syntactic complexity, grammatical accuracy, and discourse markers. Studies addressing oral inferential comprehension employed strategies such as interactive reading, story mapping, guided questioning, retelling, inferential discussion, and mental imagery.

The use of visual and verbal supports was another shared feature across several programs (20, 21, 25, 29). Pictures, story maps, cues for story elements, modeling, and guided questions can help children retain and organize relationships among events more effectively. An important consideration in this regard is the gradual fading of support. Although initial support is essential to help children access the target structure, the ultimate goal of intervention should be to increase their independence in producing narratives or answering inferential questions. Accordingly, an approach in which clinicians first explicitly introduce the structure and strategy, then provide repeated opportunities for practice, and finally reduce prompting is more consistent with the findings of the studies included in this review (20, 24, 25, 28).

Although limited, the findings concerning oral inferential comprehension were particularly noteworthy. In the study by Joffe et al. (21), mental imagery training for children with SLI improved performance only on literal comprehension questions. Constructing a mental representation of story content may be one of the processes underlying narrative comprehension; however, the evidence from this study alone is insufficient to establish mental imagery as an effective intervention for inferential comprehension. By contrast, Desmarais et al. (24) targeted inferencing more directly through interactive reading, predetermined questions, and cues. Post-intervention improvements indicate the potential of explicit inferencing instruction. Nevertheless, measurement limitations preclude firm conclusions regarding the magnitude or generalizability of its effects. This distinction is important because correctly answering an inferential question within the same story or instructional activity does not necessarily indicate that a child can apply inferencing skills in novel contexts (24).

The strongest evidence for direct intervention in oral inferential comprehension among the included studies came from the randomized controlled trial (RCT) conducted by Dawes et al. (25). Benefits were observed for oral inferential comprehension but not for literal comprehension, and extended beyond the intervention period into follow-up and generalization assessments. The findings demonstrated a significant improvement in inferential comprehension that was maintained at follow-up (25). This finding is important because it supports the feasibility of explicitly teaching inferencing and suggests that improvements in this ability need not arise solely as a secondary consequence of broader gains in language skills. Nevertheless, the presence of only one RCT among the 11 included studies is insufficient to establish a standardized protocol applicable to all children with DLD.

Nor can a uniform approach be recommended across all developmental stages. The included studies involved children aged approximately 4–11 years, and considerable variation was observed in intervention delivery. For younger children, greater emphasis was placed on interactive reading, questioning, vocabulary instruction, attention to relationships between events, and collaborative activities with teachers or clinicians. For school-aged children, interventions more frequently emphasized instruction in story structure, retelling, and independent story generation, as well as more specific targeting of macrostructural and microstructural measures. These differences suggest that children's linguistic and cognitive developmental levels should be considered when selecting and adapting interventions. In practice, expectations regarding a preschool child's ability to independently produce a structurally complex narrative cannot be the same as those for an older child.

Despite these promising findings, caution is warranted when interpreting the strength of the evidence. Only one of the 11 included studies employed an RCT design. Although some studies used nonrandomized controlled or quasi-experimental designs, a substantial proportion of the evidence was derived from single-group studies, case series, single-case studies, and case reports. Under the OCEBM framework, many of these studies fall within lower evidence levels and cannot be considered equivalent to an RCT in their capacity to support causal inference. Furthermore, several studies had small samples, and participant characteristics, diagnostic criteria, languages, intervention types, treatment intensity, and duration varied across studies. Consequently, any claim that one protocol is superior to another should be made cautiously.

Linguistic heterogeneity is another important limitation of this evidence base. The studies were conducted in English, Spanish, French, and Dutch, and the structural characteristics of each language may influence linguistic targets and narrative organization. This issue is particularly relevant to Persian. Persian syntactic structure, referential systems, discourse marker use, and patterns of narrative organization are not necessarily equivalent to those of the languages examined in the available studies. Therefore, directly translating a protocol developed in another language into Persian for Persian-speaking children without assessing its linguistic and cultural appropriateness may reduce its expected effectiveness. In this regard, one of the most important findings of this review was the absence of systematic intervention evidence in Persian: searches of Persian-language sources in IranDoc and SID identified no relevant studies within the specified timeframe.

This research gap reflects more than the absence of a few intervention studies; it highlights the need to develop locally grounded knowledge of narrative and inferencing abilities in Persian-speaking children with DLD. Before a protocol developed in another language is simply translated and implemented in clinical practice, it is necessary to establish how story elements, linguistic structures, referential relationships, temporal and causal markers, and different types of inferential questions are realized in Persian. Rather than merely transferring an existing protocol, this approach could inform the development of an intervention designed from the outset to align with the linguistic and cultural characteristics of Persian-speaking children.

Limitations

The international literature search was largely restricted to PubMed. Other bibliographic databases, such as Scopus, Web of Science, and PsycINFO, as well as gray literature sources, including theses and conference abstracts, were not searched. This increases the possibility that relevant studies were missed and that the review was affected by publication bias.

Recommendations

Future research should employ larger samples and controlled, preferably randomized, designs. Storytelling and inferential comprehension outcomes should also be measured separately using standardized instruments to determine precisely which abilities each intervention affects. Detailed reporting is needed on the number of sessions, session duration, types of narrative stimuli, amount and type of prompting, progression criteria, and measures of skill maintenance and generalization. In particular, outcome assessments should examine the generalization of inferencing skills to unfamiliar stories and novel situations. The purpose of intervention is not merely to improve performance on instructional tasks, but to enable children to apply these skills in everyday communication and learning activities.

Intervention research in Persian is also an important priority. In addition to examining the effectiveness of existing interventions, such studies could help identify narrative and inferential components appropriate to Persian linguistic structure and the cultural context of Iranian children. Future studies could also compare integrated interventions with single-domain approaches to determine whether combining narrative, vocabulary, syntax, and inferencing instruction yields greater benefits than targeting a single component.

Conclusion

This scoping review found that the available evidence supports the potential of story- and narrative-based interventions, as well as direct interventions targeting oral inferential comprehension, to improve certain language and narrative skills in children with DLD. In storytelling interventions, recurring components included instruction in story structure, story retelling and generation, and the simultaneous targeting of macrostructural and microstructural features. In oral inferential comprehension interventions, explicit inferencing practice, guided questioning, interactive discussion, and mental imagery showed promising findings, although few studies directly addressed this domain.

Given the heterogeneity of the studies and the limited number of rigorous experimental designs, no single protocol can currently be regarded as the gold standard for treating difficulties with storytelling or oral inferential comprehension in children with DLD. The available evidence instead favors an integrated, explicit, structured, and developmentally appropriate approach in which stories provide a context for organizing content, strengthening narrative structure, and targeting lexical, syntactic, and inferential skills. Translating these shared principles into a broadly applicable clinical protocol will require larger sample sizes, more rigorous experimental designs, detailed reporting of intervention dosage and components, assessment of the maintenance and generalization of effects, and, in particular, research grounded in Persian language and culture.

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Authors' Contribution

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Funding Acquisition: Yalda Kazemi
Administrative, Technical, and Material Support: Yalda Kazemi, Negar-Sadat Asadi, Fatemeh-Sadat Jaberifard
Provision of Study Samples: Yalda Kazemi, Negar-Sadat Asadi, Fatemeh-Sadat Jaberifard
Data Collection: Yalda Kazemi, Negar-Sadat Asadi, Fatemeh-Sadat Jaberifard
Analysis and Interpretation of Results: Yalda Kazemi, Negar-Sadat Asadi
Manuscript Preparation: Yalda Kazemi, Negar-Sadat Asadi, Fatemeh-Sadat Jaberifard
Critical Review of the Manuscript for Scientific Content: Yalda Kazemi, Negar-Sadat Asadi, Fatemeh-Sadat Jaberifard
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Conflict of Interest

The authors did not have a conflict of interest.

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