*CORRESPONDENCE
Georgia Andreou
✉ andreou@uth.gr;
✉ galemoni@uth.gr

Narrative skills of children with developmental language disorder: retelling in macrostructure

Georgia Andreou ⓘ* and Garyfallia Lemoni

Department of Special Education, University of Thessaly, Volos, Greece

Introduction: Developmental Language Disorder is a common developmental disorder that affects 7% of both preschool and school-aged children. Children with DLD typically demonstrate simpler syntax, higher rates of grammatical errors and greater difficulty acquiring new vocabulary in comparison to typically developing (TD) children. Research has shown that children with DLD have significant language difficulties that result in poor narrative performance.

Methods: In this paper, the narrative skills of monolingual children with DLD and typically developing (TD) children are examined at the macrostructural level, using one of the most common methods of assessing narrative skills, picture retelling. The sample consists of 100 preschool and school-aged children (50 with DLD and 50 TD), aged 5 to 11 years, who were matched according to chronological age, socioeconomic status and language input received at home. The parameters measured are story structure, structural complexity and Internal State Terms (IST). The research hypotheses of the study were: (a) Children with DLD will present lower performance than TD children in the parameter of story structure, (b) Children with DLD are expected to present lower performance than TD children in the parameter of structural complexity, (c) Children with DLD will present lower performance than TD children in the parameter of expressing Internal State Terms and (d) There will be a significant dependence between the groups (children with DLD and TD children) and the subcategories of the story structure.

Results: The results confirmed all the above hypotheses except for the hypothesis that there is a significant dependence between the groups of children in the subcategories of the story structure.

Discussion: The findings of our study revealed that the narratives skills of children with DLD are more affected at the level of macrostructure than those of children with Typical Development (TD). However, a significant dependence between the groups (children with DLD and TD children) and the subcategories of the story structure was found only in five out of sixteen components in the three episodes of the story, a finding which is discussed on the basis of the limitations included in the present study.

KEYWORDS

developmental language disorder, narrative skills, macrostructure, retelling, typically developed children

1 Introduction

1.1 The development of narrative skills in children

The development of narrative skills in children starts from birth, when they begin to participate in interactions with older language users and develop gradually as they grow up. From infancy, children begin to acquire an understanding of the structure, use, and meaning of language and then they use one- or two-word phrases to communicate (Ralli and Sidiropoulou, 2012). Around the age of two, children begin to combine a group of ideas using words like "then" and "and" to connect sentences. After that, they are able to sequence story elements together without causal or time links. As children develop, they tell primitive stories with basic elements such as setting, main characters, and topic. After that stage, the stories of children begin to follow a predictable timeline. Finally, around the age of 5–7 years, children can tell stories with a true plot and well-developed storyline. At this age there is character development, sequencing of events, a problem, and a solution in children's narrations (Hutson-Nechkash, 2001).

Previous studies have shown that children's narrative abilities develop extensively during preschool and early school years (Pearson, 2002; Schneider et al., 2006). Narrative ability is an important skill for both children's school performance as well as their daily communication and constitutes a strong predictor for their later language skills. Thus, children with poor performance in narratives tend to show persistent language problems in lexical and syntactic skills (Botting et al., 2001; Mazlan et al., 2024). Narrative data may provide information about various aspects of children's language skills, such as their ability to structure complex discourse (Fiestas and Peña, 2004) or to narrate how story characters think and feel (Burris and Brown, 2014). For these reasons, studies of children's narratives have become increasingly popular in recent years, with both monolingual and bilingual children speaking a number of different languages being investigated on the development of their narrative ability (Lindgren, 2022).

1.2 Developmental language disorder (DLD)

Developmental Language Disorder (DLD) is a neurodevelopmental disorder characterized by persistent language difficulties in comprehension and/or production. It first emerges in early childhood in the absence of sensory, intellectual, or neurological problems and affects roughly 7% of the general population (Norbury et al., 2016). DLD was previously known as Specific Language Impairment until the year 2017, when the 2017 Delphi consensus took place and Developmental Language Disorder (DLD) was established instead, following Bishop et al. (2017).

DLD is a disorder with great heterogeneity and a wide range of communication difficulties that, although manifested in childhood, still occur in adulthood (Botting, 2010). Children diagnosed with DLD as preschoolers often present difficulties in their social–emotional development later on and they also demonstrate lower levels of school performance (Vissers and Koolen, 2016). Also, DLD is characterized by perceptual and expressive linguistic deficits which include extensive use of immature phonological processes (Aguilar-Mediavilla et al., 2002), slow word retrieval, naming errors (McGregor et al., 2002) and shorter mean length of utterance (Redmond, 2004) than typical development. Thus, the ability of children with DLD to compose and transmit oral narratives appropriate for their age is affected. It has also been found that poor expressive abilities of children with DLD in early childhood are the best predictor of reading problems and dyslexia in school-aged children (Lyytinen et al., 2015), thus placing DLD children at a further disadvantage compared to their peers (Tomas and Vissers, 2019).

1.3 Narrative skills in children with DLD

Oral narration is important to children, and the skill remains decisive across the lifespan. Narratives comprise several linguistic elements (e.g., syntax, morphology, semantics, pragmatics) and children with Developmental Language Disorder (DLD) are particularly vulnerable to experiencing difficulties with storytelling not only in language comprehension but in language production as well (Pauls and Archibald, 2021).

The narratives of children with DLD are shorter, show problems in complexity, grammaticality, coherence and fluency and contain a lower information or plot value compared to the narratives of typically developing (TD) peers (Christensen, 2019). Children with DLD demonstrate difficulty with many aspects of narration, such as making logical connections between story events, establishing a sense of continuity or describing characters' feelings or intentions (Reilly et al., 2004).

The narrative skills of children with DLD may develop slowly and their stories may not contain the most advanced elements that TD children include in their narratives such as the setting, the characters and the plot. Research has shown that compared to their peers, children with DLD produce fewer complex stories (Fey et al., 2004), more confused or deficient (Jones, 2015) and with more grammatical errors (Guo et al., 2008).

In particular, Fey et al. (2004), who studied the oral and written story skills of second and fourth grade children with DLD, found that in both grades children with DLD produced shorter and poorer stories and made more grammatical errors than typically developing children. Moreover, research data coming from a long-term study of storytelling skills in preschool children in Sweden have shown that children develop their storytelling skills over time, but not at the level of children of typical development at the age of ten (Reuterskiöld et al., 2011). In another study, Vandewalle et al. (2012) found that children with DLD at the age between 5–8 years, although they have good literacy development, they continue to show reduced narrative skills, with problems in vocabulary and morphology (Wellman et al., 2011).

Furthermore, it has been found that children with DLD seem to produce less complete and immature narratives in relation to size, lexical diversity, phrase complexity, and content (Gillam and Pearson, 2004). In addition, their narratives seem to contain less details that make the story more complete, such as links, fewer causal connections between events (Hayward et al., 2007) and fewer elements of story grammar (Leonard, 2014). In addition, Cleave et al. (2010) found reduced productivity, limited literary language, and several syntactic errors in children's with DLD storytelling at the age of four, while lexical-grammatical problems were identified in children of five and eight years old (Thomson, 2005).

Other studies reveal difficulties for DLD children in morphology, such as in the production of clitical objects and the use of pronouns (Leonard, 2014), in semantics of words (Befi-Lopes et al., 2008) and lexical deficits (Leonard and Deevy, 2004). According to Tribushinina et al. (2015) these children fail to incorporate effectively syntactic and semantic elements into word processing.

In Greece, a small number of studies have been conducted on the exploration of children's narrative skills at school and early school age. Research by Tsimpli et al. (2016) in monolingual and bilingual children with Specific Language Impairment (SLI) showed differences between typically development children and children with DLD in microstructure. Other studies by Theodorou and Grohmann (2010) and Theodorou et al. (2012) found that preschool and early school children with DLD who speak Cypriot-Greek presented a significantly lower performance in storytelling than their TD peers. In addition, the results of a research study conducted by Mpaka et al. (2012) in Greek students, showed that children with DLD compared to children of the corresponding linguistic but not chronological age, presented significantly lower performance in their narrations.

1.4 Narrative tasks: macro- and microstructure

The narratives children produce are generally analyzed at two different levels, namely macrostructure and microstructure. The term macrostructure refers to the overall content and organization of the story (Govindarajan and Paradis, 2022). The two most widely used models of macrostructure are story grammar and high point analysis. Such approaches focus on recognizing the key components of a story, the sequence of events, and the episodic structure of a story (Justice et al., 2006). According to the Story Grammar model, a story has (1) a *Setting* that introduces the time, place, and characters in the story, (2) an *Initiating Event* that sets up the problem or dilemma in the story, (3) an *Internal Response* or the character's response to the Initiating Event, (4) an *Attempt* of the character to solve the problem, (5) the *Outcome or the result* of the previous action, and (6) a *Response* or how a story character responds to the outcome (Govindarajan and Paradis, 2022).

On the other hand, the term microstructure refers to the language content of the discourse. It is an analysis of the linguistic structures used to produce stories. It includes measures of productivity and measures of complexity (Justice et al., 2006). Microstructure refers to the word- and sentence-level components of a story, such as the variety of vocabulary, clarity of cohesion or pronominal references or complexity of syntax and the use of referential, temporal and causal linking devices (Lindgren, 2022).

The types of narratives used in language acquisition research can be either fictional or personal (Fioretti et al., 2019). Personal narratives come from the narrator's life experiences and they are the first and most important type of narration that small children acquire. On the other hand, fictional narratives describe imaginary events, characters, and settings. Unlike personal narratives, which are based on real-life experiences, fictional narratives are created from the imagination and can include elements of fantasy, adventure and mystery. Fictional narratives often follow a specific structure, including components such as characters, settings, initiating events, internal responses, plans, actions, consequences, and conclusions (Gillam and Pearson, 2004).

Fictional narratives are usually evaluated through story retelling and through story telling. In the first case, children repeat a story they have just heard or through story generation tasks, in which children may produce a story while looking at a wordless picture book. In the story retelling children listen to stories told by the researcher and are asked to tell the stories back to the researcher whereas in story telling or generation task children tell a story while looking at a wordless picture book (Vandewalle et al., 2012).

1.5 Narrative macrostructure: DLD vs TD children

There are a lot of studies comparing the narrative skills of DLD children to those of children with TD. Yet, the results seem to be conflicting for narrative macrostructure. Some studies have found children with TD to obtain higher story grammar scores or include more narrative content, that is, more story grammar components, producing more coherent stories (Mäkinen et al., 2014; Norbury et al., 2016; Kunnari et al., 2016; Mazlan et al., 2024), whereas, other studies have not found macrostructure to differentiate TD from DLD groups (Tsimpli et al., 2016). The conflicting findings are attributed, in part, to methodological differences, and more specifically whether a story retell or a story generation task was used, with story generation being a more difficult task (Schneider et al., 2005).

Several studies found significantly higher scores of TD children compared to children with DLD at the macrostructure level in the retelling task or story telling task. More specifically, in a study with Croatian-speaking monolinguals it was found that children with TD outperformed those with DLD at the macrostructure level in both conditions of story retelling and storytelling (Kraljević et al., 2020). The stories produced by children with DLD were shorter and they were generally assessed as more modest in that they lacked important structural components, such as the problem of the story. The study by Sheng et al. (2020) in Mandarin- speaking children with TD and those at risk for DLD found a difference between the two groups on story structure in narratives elicited in the retelling mode, but greater difference between the groups in the story telling mode. Also, the grammaticality and productivity of DLD children were relatively preserved but story macrostructure, lexical diversity, and sentence complexity were vulnerable. Another study with Mandarin-speaking children (Torng and Sah, 2020) revealed that the narratives of children with DLD included significantly less story grammar components, less evaluative comments and were less coherent than those of TD controls. In addition, Xue et al. (2022) tried to capture the features of narratives for school-aged Mandarin-speaking children with SLI. The results revealed that across grades, for macrostructure, children with SLI lagged behind TD children in narrative pattern scores. Furthermore, Andreou and Lemoni (2020), in their systematic review on the narrative skills of monolingual and bilingual pre-school and primary school children with DLD, reported significant differences in the narrative performance between monolinguals with and without DLD and between bilinguals with and without DLD.

In addition, the studies by Otwinowska et al. (2020), and Wehmeier (2019) found significantly higher scores between TD and DLD children in retelling with pictures than in storytelling. In another study, Altman et al. (2024) examined the role of narrative microstructure (production of words and sentences) and narrative

macrostructure (organization of events) in the use of Internal State Terms (ISTs) in narratives of bilingual children with developmental language disorder (DLD) in their school language. The results revealed that at the macrostructure level children with DLD performed weaker in six out of the seven story grammar elements in their narratives than bilinguals with TD. For Internal State Terms (ISTs) and macrostructure, bilinguals with DLD produced fewer linguistic ISTs in the story structure component of Attempts than their peers with TD.

In their research Lin et al. (2024) tried to shed light in the relationship between Executive Functions in a daily life context and performance on two narrative tasks of Mandarin-speaking preschoolers with DLD and theirTD controls. The subjects completed a story generation and a story recall task. The results showed the TD group outperformed the DLD group on narrative macrostructure and microstructure. In another study Lin et al. (2024) the differences in narrative abilities of Malay-speaking school-age children with and without DLD are examined. TD children outperformed children with DLD in both narrative production and comprehension with TD ones constructing a higher combination of Goals, Attempts, and Outcomes components than children with DLD.

On the other hand, Tsimpli et al. (2016) in their research on narrative production in monolingual and bilingual children with Specific Language Impairment (SLI) found that bilingual children with SLI were found to attain similar levels of performance, and even to outperform monolingual children with SLI in macrostructure yet, there were differences between TD children and children with SLI in microstructure. Roch et al. (2016) found a significant, but relatively small difference in the story structure score, with higher scores in retelling. In another study, Soodla and Kikas (2010) found no consistent difference in marking all story structure components among 6- to 8-year-old children with typical and delayed language development.

Also, in another study Altman et al. (2016) investigated the macrostructure, microstructure, and Internal State Terms in the narratives of English–Hebrew bilingual preschool children with and without SLI. The macrostructure results showed similar performance in both languages for children with TLD and those diagnosed with SLI.

There were neither group nor language differences regarding Goals, Attempts, Outcomes (GAO) proportion and GAO per episode. Yet, an analysis of ISTs revealed more ISTs in children's L2, in particular, more mental verbs, especially early acquired perceptual and motivational verbs such as "see" and "want."

There is not a lot of research in the Greek language on the narrative skills of children with Developmental Language Disorder (DLD) since most research is in the English language, which is considered a language with limited morphological grammar (Haspelmath and Sims, 2010). Conducting this research in the Greek language is very important, as it is a highly declinable language with rich morphology, which comprises eleven parts of speech, out of which six are declinable. These come in a great variety of morphological forms, as the language distinguishes a large number of regular declension categories for nouns, adjectives, and verbs (Baldzis et al., 2005).

Based on the above, the aim of the present study is to study the narrative skills of children with Developmental Language Disorder (DLD) at the macrostructural level. It is expected that the narrative abilities of children with DLD will be more affected at the level of macrostructure than those of children with Typical Development (TD). More specifically, the research hypotheses of the study are the

following: (a) Children with DLD will present lower performance than TD children in the parameter of story structure, (b) children with DLD are expected to present lower performance than TD children in the parameter of structural complexity, (c) children with DLD will present lower performance than TD children in the parameter of expressing Internal State Terms (ISTs) and (d) there will be a significant dependence between the groups (children with DLD and TD children) and the subcategories of the story structure.

2 Materials and methods

2.1 Participants

A total of 100 pre-school and first school age children 5 to 11 years old participated in the study, who were matched on chronological age, socioeconomic status and language input received at home, according to the answers given in the questionnaire administered to the whole of the sample. For each DLD child a TD child was selected from the same school and area. The experimental group included 50 children with Developmental Language Disorder (DLD) while the control group included 50 participants with Typical Development (TD). All participants were monolingual Greek language speakers. Testing was conducted in the cities of Volos, Athens and Thessaloniki.

The children from the experimental group were chosen based on their diagnosis from KE. D. A. S. Y, which are support centers for the Diagnosis, Assessment, and Counseling for people with special educational needs under the supervision of the Ministry of Education. Another inclusion criterion was the speech and language pathologists' diagnostic reports from six institutions in which the participants underwent language therapy. The exclusion criteria for establishing this diagnosis were the presence of a cognitive disability and/or hearing impairment. Children with DLD, according to the details given in their official diagnoses, had deficits in one or more language domains namely expressive language (e.g., vocabulary, grammar), receptive language (e.g., understanding instructions) morphosyntax, semantics and discourse.

For the selection of the children consisting the TD group, the following criteria were taken into account: (a) no language difficulties reported by parents, teachers, or clinicians, (b) no history of speech-language therapy, no cognitive, neurological, or psychiatric disorders, (c) normal hearing, (d) age-appropriate performance both at school as well as in their daily communication and (e) their performance in the language tests administered, as they described below, which was within the average range, according to the cut off percentile score given for each test. More specifically, the scores obtained for each of the tests given were: (a) Raven's Progressive Matrices test (CPM): $\geq$ 25o percentile, (b) Raven's Vocabulary Scales- Crichton Vocabulary Scales (CVS): $\geq$ 10o percentile (c) the Greek version Test of expressive vocabulary: $\geq$ 25o percentile and (d) the Action Pictures: informational and grammatical proficiency test: $\geq$ 10o percentile.

2.2 Instruments

The tests administered for the selection of the TD group were: (a) Raven's Progressive Matrices test (CPM) (Raven, 2015; Sideridis et al., 2015), (b) Raven's Vocabulary Scales- Crichton Vocabulary Scales (CVS) (Sideridis et al., 2015), (c) the Greek version of the Word Finding

Vocabulary Test (Renfrew, 1995) "Test of expressive vocabulary" (Vogindroukas et al., 2009a) and (d) the "Action Pictures: informational and grammatical proficiency test" (Vogindroukas et al., 2009b).

Raven's Progressive Matrices (CPM) measure the individual's nonverbal ability to draw inferences in a visuospatial context. The Crichton Vocabulary Scales (CVS) assess the individual's verbal ability, which is related to the familiarity that a person has with specific concepts and verbal information. The combination of the results from the use of the two scales (CPM and CVS) is indicated for the most comprehensive assessment of general cognitive ability. The "Test of expressive vocabulary" is a reliable language assessment tool, which accurately measures the lexical abilities of children aged 4–8 whereas the "Action Pictures: informational and grammatical proficiency test" is a diagnostic tool which focuses on two areas of language, morphosyntax and pragmatics, during linguistic expression, offering specific information on the child's strengths and weaknesses in those language domains.

The main instrument of the study, which was used to assess both groups in story retelling with pictures, was Multilingual Assessment Instrument for Narratives (MAIN) (Gagarina et al., 2019). This tool can be used to assess *narrative comprehension and production* in children between 3 and 11 years of age. The parameters measured by the test, which measures retelling with pictures and storytelling with pictures are *story structure, structural complexity and Internal State Terms*. In our study we measured only the narrative production of the children and, based on the protocol in the production section, the highest score for the story structure parameter is 17 points, the highest score for the structural complexity is 15 points and one point is awarded for each Internal State Term (IST). The total number of IST in tokens is calculated. The list of suggested ISTs is long and is drawn from the following categories: Perceptual state terms, e.g., see, hear, feel, smell; Physiological state terms, e.g., thirsty, hungry, tired, sore, hurt(ing); Consciousness terms, e.g., alive, awake, asleep; Emotion terms, e.g., sad, happy, glad, angry, worried, disappointed; afraid, scared, proud, brave, (feel)safe, pleased, surprised; Mental verbs, e.g., want, think, know, forget, decide, believe, wonder, have/ make a plan; Linguistic verbs/ verbs of saying/ telling, e.g., say, call, shout, warn, ask.

The highest total points in all three categories indicate better performance. An experimental design was followed and the sample of children with DLD of preschool and early school age was compared with that of TD at the macrostructural level. The subcategories for story structure are the following: A1 setting, A2 IST initiating event, A3 Goal, A4 Attempt, A5 Outcome, A6 IST reaction, A7 IST initiating event, A8 Goal, A9 Attempt, A10 Outcome, A11 IST reaction, A12 IST initiating event, A13 Goal, A14 Attempt, A15 Outcome, A16 IST reaction. Each component is awarded 0 or 1 points except for setting that is awarded 0, 1 or 2 points.

The subcategories for structural complexity are the following: Number of attempt-outcome sequences (maximum 3 points), Number of single Goals-without Attempt or Outcome (maximum 3 points), Number of Goals- Attempts/Goals-Outcomes sequences (maximum 6 points), Number of Goals-Attempts-Outcomes sequences (maximum 3 points).

2.3 Procedure

Before the beginning of the research process, parents and teachers of the children of the two groups were informed on the content of the

research, the data collection tools and the method of recording the data. A statement signed by the parents of both TD and DLD children was obtained, in which it was stated clearly that participation in the research was not mandatory and that they could withdraw at any time they wished during the research process.

Regarding the administration of the MAIN, each participant was presented with one story to tell and one story to retell but in this article only the results of the story retelling are presented. The testing was conducted in quiet classrooms, or the library of the children's schools and participants were told that they had to choose among four different stories, although the stories were the same. In such a way a condition of an unshared context was created, in which the participant was convinced that the examiner does not know which story will be presented nor the content of the stories. During testing, the examiner was not allowed to give prompting questions that could affect the content and structure of the participants' performance in the story retelling process. Each participant produced two stories that were recorded and transcribed. Transcription and coding were carried out by the researcher and by a monolingual speaker of Greek who had undergone special training for coding.

Word-by-word transcription for each of the samples indicated at least 94% agreement with the corresponding original. *TurboScribe* was used which is an online tool that was used to convert audio files into accurate text in seconds. Also, *oTranscribe* was used, a free online tool that makes interview transcription easy. Transcripts were used for evaluating story structure. All stories produced by children were analyzed using the scoring protocol for analysis at a macrolevel, which was developed and provided with the test materials. The scoring sheet developed for use with MAIN contains a list of structural components for each episode, as well as examples of each component.

2.4 Data analysis

For the statistical analysis IBM SPSS Statistics 29.00.00 software was used. The normality of the distribution for the retelling with pictures variable was tested using the Kolmogorov–Smirnov test. This test showed that the variables related to story structure performance ($Z = 0.150$, $p < 0.001$), structural complexity performance ($Z = 0.185$, $p < 0.001$) and internal state terms ($Z = 0.217$, $p < 0.001$) deviate significantly from the normal distribution. Therefore, Mann–Whitney U test was used to compare the two groups (DLD vs. TD). It is a non-parametric alternative test to the independent sample t-test that compares two sample means from the same population and tests whether they are equal. Researchers usually use the Mann–Whitney U test when they have ordinal data or when they cannot meet the assumptions of the t-test (Nachar, 2008). Chi-square test of independence was used to examine if there is a significant dependence between the groups of children (DLD vs. TD) in the subcategories of the story structure. All comparisons were made at a significance level of 5%.

3 Results

The demographic characteristics of the children who participated in this study (50 children with TD and 50 children with DLD) are presented in Table 1. The majority of children in the DLD group were

boys (n = 31, 62%), whereas the TD group had an equal number of boys and girls (50% each). Both groups had comparable mean ages (7.7 years for the DLD group and 7.8 years for the TD group). Additionally, 80% (n = 20) of the participants in the DLD group were school-aged children, while 78% (n = 39) of those in the TD group were school-aged children. The majority of children with DLD 84% (n = 37) and those with typical development 78% (n = 39) resided in urban areas. Finally, 90% (n = 45) of the children in the DLD group had received some form of intervention (speech therapy), compared to only 22% (n = 11) in the TD group (Table 1).

The results of Mann–Whitney U test indicate that there is a significant difference between DLD and TD students in story structure performance (U = 537.0, p < 0.001). (Table 2). The findings show that TD children outperform those with DLD in story structure in the retelling with pictures task (DLD group: M = 9.3, Md = 9.0, SD = 1.6; TD group: M = 11.1, Md = 11.0, SD = 1.7) (Figures 1, 2).

Also, the results indicate that there is a significant difference between DLD and TD students in structural complexity performance (U = 834.5, p = 0.004). The findings show that TD students have a higher level of skills in structural complexity in the retelling with pictures task than those of students with DLD (DLD group: M = 4.0, Md = 3.0, SD = 2.6; TD group: M = 5.8, Md = 6.0, SD = 3.3) (Figure 3).

Moreover, the results of the Mann–Whitney U test indicate that there is a significant difference between DLD and TD students in Internal State Terms (U = 718.0, p = 0.001). The findings show that TD students presented a higher performance in Internal State Terms compared to that of DLD students (DLD group: M = 2.5, Md = 3.0, SD = 1.1; TD group: M = 3.5, Md = 3.0, SD = 1.2) (Figure 4).

In Table 3 the frequencies and % for story picture items in the two groups of children are presented. From the chi-square test of independence, a significant dependence was presented between the group of children (DLD vs. TD) and performance in the following categories: A4: Attempt [$\chi^2(1)$ = 8.306, p = 0.004], A6: IST as reaction [$\chi^2(1)$ = 4.762, p = 0.029], A9:attempt [$\chi^2(1)$ = 4.320, p = 0.038], A11: IST as reaction [$\chi^2(1)$ = 5.797, p = 0.016] and A15: outcome [$\chi^2(1)$ = 7.527, p = 0.006]. In these categoriesTD children achieved a score of 1 (correct response) at a significantly greater proportion compared to DLD ones.

The results of our study showed that TD children scored higher than DLD ones in all subcategories of the story structure, however, only in the components of A4: Attempt, A6: IST as reaction, A9: attempt, A11: IST as reaction and A15: outcome the results were statistically significant.

Specifically, in the category A4, 96% of TD students achieved a score of 1while the corresponding percentage for DLD children was 76%. Similarly, in the category A6, 24% of typically developing students achieved a score of 1, compared to 8% of DLD students. In the category A9, 84% of typically developing students achieved a score of 1, while the corresponding percentage for DLD children was 66%. In the category A11, 58% of typically developing students achieved a score of 1, whereas 34% of DLD students did. Finally, in the category A15, 100% of typically developing students achieved a score of 1, compared to 86% of DLD students.

4 Discussion

The present study compared the narrative performance of a group of children with DLD and children with TD and the aim of this study was to determine whether these two groups differ in their ability to structure a story in the condition of a story retelling task with pictures. It was expected that the narrative abilities of children with DLD would be more affected at the level of macrostructure than those of children with Typical Development (TD).

More specifically, our first hypothesis was that children with DLD will present lower performance than TD children in the parameter of story structure. According to the results of the study, children with DLD had a weaker performance than that of children with TD in the story structure components and therefore our hypothesis is confirmed. Our findings for Greek speaking children with DLD confirm those for children with DLD, who are speakers of different languages.

More specifically, the findings of the present study agree with Blom and Boerma (2016) who found that the Language Impaired group performed weaker than the TD group in all the stages of their assessment. In particular, the two groups were assessed at wave/stage 1 in story comprehension and production and one year later they were assessed at wave 2. At wave 1, the LI group performed weaker than the TD group in both tasks and at wave 2 the groups performed similarly on story comprehensionbut on story generation, the TD group still outperformed the LI group. Also, our study is consistent with Boerma et al. (2016) who found that Dutch-speaking children with LI produced fewer story structure elements and expressed a smaller number of Internal State Terms than children with TD. It is worth mentioning that the language impaired group scored lower than the TD group on all measures (grammar, grammatical complexity (mean length of utterance), verbal short-term and working memory, and sustained attention) except expressive vocabulary.

Also, our findings accord with those of Kraljević et al. (2020) with Croatian-speaking monolinguals, which showed that the stories produced by children with DLD were shorter and were generally assessed as more modest as they lacked important structural components, such as the problem of the story. Pham et al. (2019), in his study with Vietnamese-speaking monolinguals, also found weaker

TABLE 1 Sample demographics.

Individual -level variables		Group			
		DLD		TD	
		n	%	n	%
Gender	Boy	31	62%	25	50%
	Girl	19	38%	25	50%
Age (in years)	M (SD)	7.7 (2.0)		7.8 (2.0)	
	Range: Min-Max	5–11		4–11	
Level of education	Preschool	10	20%	11	22%
	School	40	80%	39	78%
Residential area	Urban	37	84%	39	78%
	Semi-urban	13	16%	11	22%
	Rural	0	0%	1	2%
Intervention	Yes	45	90%	11	22%
	No	5	10%	39	78%

TABLE 2 Mean scores for retelling with pictures in story structure, structural complexity and internal state terms of TD and DLD and children.

Macrostructure elements	DLD (n = 50)				TD (n = 50)				U	p
	M	SD	Md	IQR	M	SD	Md	IQR		
Story structure	9.3	1.6	9.0	3.0	11.1	1.7	11.0	2.0	537.0	0.001*
Structural complexity	4.0	2.6	3.0	4.0	5.8	3.3	6.0	4.0	834.5	0.004*
Internal state terms	2.5	1.1	3.0	1.0	3.5	1.2	3.0	1.0	718.0	0.001*

M, mean; SD, standard deviation; Md, median; IQR, interquartile Range.
*Statistically significant result.

FIGURE 1
DLD and TD performance in the subcategories of story structure, structural complexity and ISTs parameters.
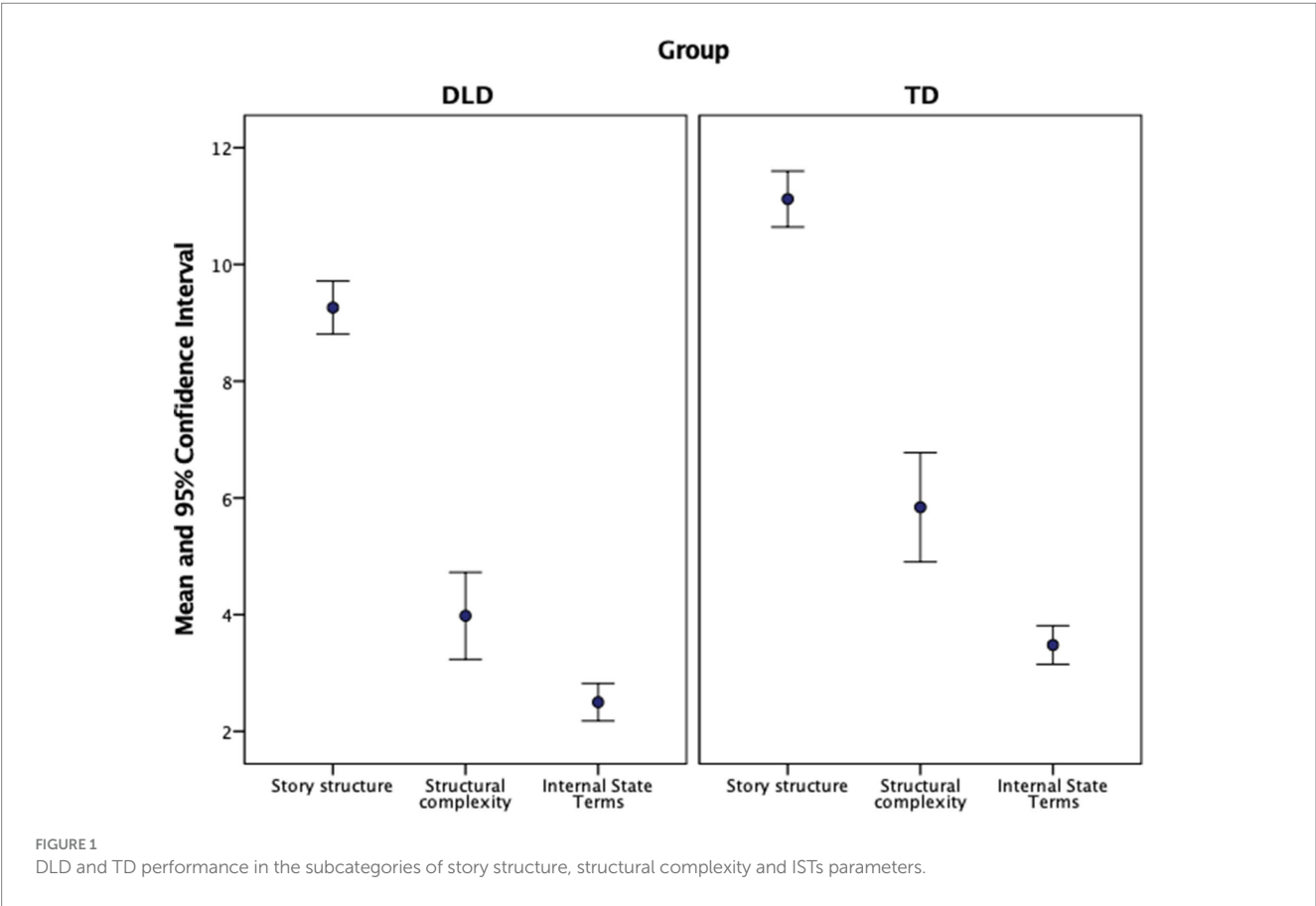
performance on the part of DLD children in narrative macrostructure as compared to DLD ones.

Andreou and Lemoni (2020), in their systematic review on the narrative skills of monolingual and bilingual pre-school and primary school children with DLD, reported significant differences in the narrative performance between monolinguals with and without DLD and between bilinguals with and without DLD. Also, our findings agree with those of Sheng et al. (2020) in Mandarin- speaking children with TD and those at risk for DLD who found better performance in story-retell than story-tell on measures of overall story structure and percentage of complex clauses. The grammaticality and productivity of DLD children were relatively preserved but story macrostructure, lexical diversity, and sentence complexity were vulnerable.

The second hypothesis of our study is that children with DLD will present lower performance than TD children in the parameter of structural complexity. The above hypothesis is confirmed since the findings of our study showed that children with DLD performed

weaker than TD children in this parameter. Our findings agree with those of Sheng et al. (2020) who found a marginal difference in the structural complexity scores and a significant difference in overall story structure scores.

Yet, our findings do not agree with those of Tsimpli et al. (2016) who found no significant difference either between TD monolingual children and monolingual children with SLI or between TD bilingual and bilingual children with SLI. Also, they do not agree with Altman et al. (2016) who found neither group nor language differences regarding GAO proportion and GAO per episode. These studies did not use the story structure score but instead analyzed a score for story complexity for two narratives combined (Tsimpli et al., 2016) or counted only goals, attempts and outcomes in the narratives, respectively, (Altman et al., 2016). Although macrostructure results revealed similar performance in both languages for children with TD and those with SLI, microstructure analysis of verbal productivity, length of communication units, and lexical diversity distinguished
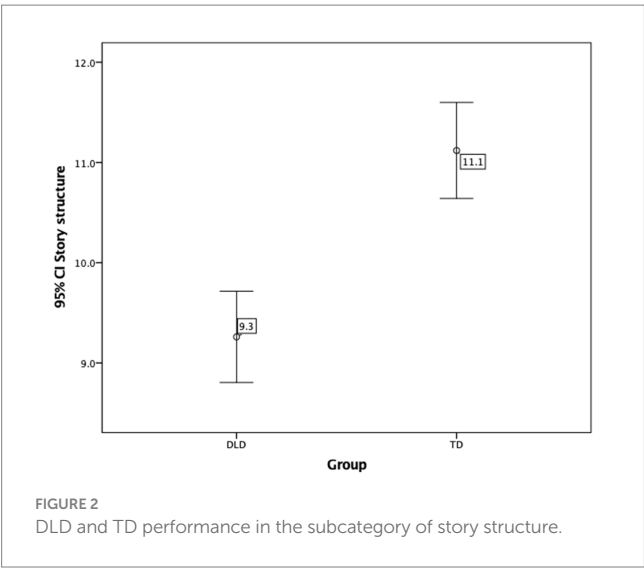
FIGURE 2
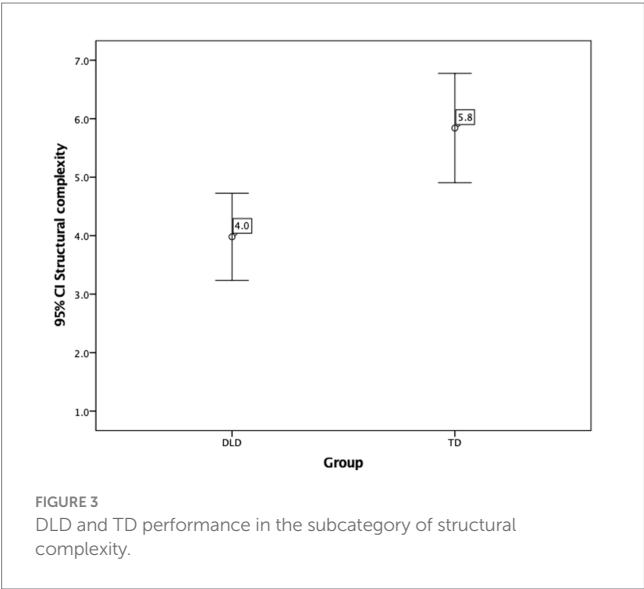DLD and TD performance in the subcategory of story structure.

FIGURE 3
DLD and TD performance in the subcategory of structural complexity.

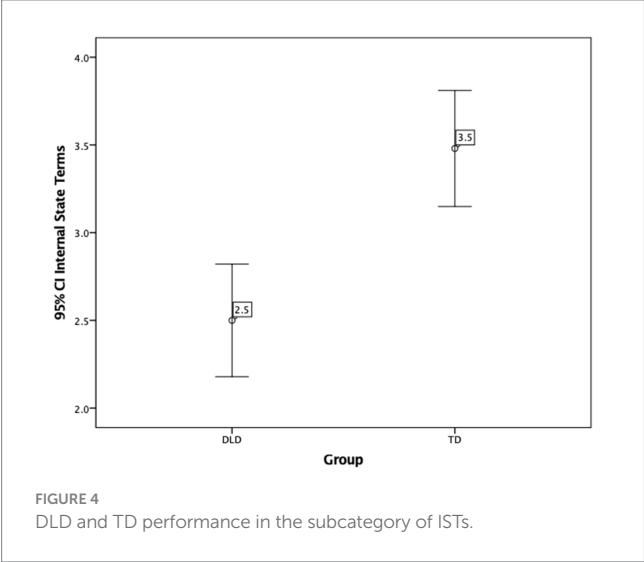children with TD from those with SLI. The difference in the results

FIGURE 4
DLD and TD performance in the subcategory of ISTs.

TABLE 3 Frequencies and % for story picture items for DLD and TD children.

Story structure parameters		Group				χ^2	P
		DLD		TD			
		n	%	n	%		
A1 Setting	0	17	34.0%	11	22.0%	3.514	0.173
	1	33	66.0%	37	74.0%		
	2	0	0.0%	2	4.0%		
A2 IST initiating event	0	14	28.0%	8	16.0%	2.098	0.148
	1	36	72.0%	42	84.0%		
A3 Goal	0	32	64.0%	23	46.0%	3.273	0.070
	1	18	36.0%	27	54.0%		
A4 Attempt	0	12	24.0%	2	4.0%	8.306	0.004*
	1	38	76.0%	48	96.0%		
A5 Outcome	0	6	12.2%	3	6.0%	1.168	0.280
	1	43	87.8%	47	94.0%		
A6 IST reaction	0	46	92.0%	38	76.0%	4.762	0.029*
	1	4	8.0%	12	24.0%		
A7 IST initiating event	0	12	24.0%	9	18.0%	0.541	0.461
	1	38	76.0%	41	82.0%		
A8 Goal	0	40	80.0%	40	80.0%	0.000	1.000
	1	10	20.0%	10	20.0%		
A9 Attempt	0	17	34.0%	8	16.0%	4.320	0.038*
	1	33	66.0%	42	84.0%		
A10 Outcome	0	5	10.0%	1	2.0%	2.837	0.092
	1	45	90.0%	49	98.0%		
A11 IST reaction	0	33	66.0%	21	42.0%	5.797	0.016*
	1	17	34.0%	29	58.0%		
A12 IST initiating event	0	10	20.0%	10	20.0%	0.000	1.000
	1	40	80.0%	40	80.0%		
A13 Goal	0	31	62.0%	32	64.0%	0.043	0.836
	1	19	38.0%	18	36.0%		
A14 Attempt	0	28	56.0%	20	40.0%	2.564	0.109
	1	22	44.0%	30	60.0%		
A15 Outcome	0	7	14.0%	0	0.0%	7.527	0.006*
	1	43	86.0%	50	100.0%		
A16 IST reaction	0	27	54.0%	18	36.0%	3.273	0.070
	1	23	46.0%	32	64.0%		

*Statistically significant result.

between our study and the aforementioned ones could be attributed to the fact that in our study structural complexity is measured as a part of a whole scoring pattern including the full range of story grammar elements and Internal State Terms whereas the previous studies used only the Goal-Attempt-Outcome sequence score. In other words, this discrepancy in the findings comes as a result of the different methodology and scoring between our study and the ones

by Tsimpli et al. (2016) and Altman et al. (2016). Also, the participants of the two previous studies consisted of bilinguals while our study includes monolinguals.

The third hypothesis of this study is that children with DLD will present lower performance than TD children in the parameter of expressing Internal State Terms (ISTs). The findings of our study showed that children with DLD performed weaker than TD children in expressing Internal State Terms in the categories of perception/cognition, desires, intentions, consciousness, emotions, mentality, decisions and language, so our hypothesis is confirmed.

Our findings agree with the studies of (Boerma et al., 2016; Greenhalgh and Strong, 2001; Johnston et al., 2001) which revealed delays in understanding and producing ISTs among children with DLD. Also, our research aligns with two other studies that examined the causal relations in bilingual children with DLD showing that they use fewer causal relations in their narratives (Fichman et al., 2017; Kupersmitt and Armon-Lotem, 2019). Both reported the difficulty of children with DLD in producing causal relations, which are linked to the ability to create inferences about characters' intentions and mental states. Also, our findings are consistent with the study of Boerma et al., (2016) with bilinguals which showed that DLD children speaking Dutch as L2 used fewer ISTs than TD children. Our results also agree with those of Tsimpli et al. (2016) who collected narratives from children speaking Greek as L2 and reported that children with DLD used fewer ISTs terms than TD children. Moreover, our research aligns with the research of Altman et al. (2024), who examined the role of narrative microstructure and narrative macrostructure in the use of Internal State Terms (ISTs) in narratives of bilingual children with developmental language disorder (DLD) in their school language (SL). In terms of ISTs and macrostructure, bilinguals with DLD produced fewer linguistic ISTs in Attempts than their peers with TD. According to De Villiers, (2007) children with DLD usually demonstrate grammatical difficulties, poor vocabulary knowledge or deficient syntactic skills which may influence the production of Internal State verbs which require more complex complements.

The fourth hypothesis is that there will be significant dependence between the groups of children (DLD vs. TD) in the subcategories of the story structure. The results of our study showed that there is a relatively significant dependence between the groups of children on the subcategories of the story structure and as a result our hypothesis is partially confirmed. In particular, TD children scored higher than DLD ones in all subcategories of the story structure, however, only in the components of IST reaction, attempt and partially outcome the results were statistically significant (attempt and IST reaction of the first episode, the attempt and IST reaction of the second episode and the outcome in the third episode). In these categories, TD children achieved a score of 1 (correct response) at a significantly greater proportion compared to DLD ones. Considering some further explanation why the majority of components did not yield differences makes us skeptical of the sample size. The small size of the sample might not have enough power to detect a difference even if it exists. Also, there may have been a ceiling effect which occurs because the measure used is easy and it has an upper limit, causing many participants to achieve the highest possible score.

It is expected that TD children will be able to mark the situation, the initiating event, the goal and all attempts and consequences (i.e., outcome) in the year prior to entering school around five years old and to progress more quickly in this developmental pattern of narrative competence than children with DLD (To et al., 2010). Yet, in our study

DLD children had a better performance in the individual components of the story structure than expected. A possible explanation for this result could be that having an adult model benefited both groups in sentence complexity and story macrostructure and potentially helped maintain the performance in TD children (Sheng et al., 2020).

In addition, DLD children might not have been relied exclusively on their linguistic competence but they might have been affected from the exposure to a prior audiovisual model, in other words the picture retelling task, which seems to have benefited both groups. Previous research has shown that visual elicitation decreases processing demands and facilitates the process of recalling information (Kraljević et al., 2020).

Our findings are partially in line with the study of Kraljević et al. (2020) who showed that in the retelling task children with TD more frequently marked all parts of the story (except reaction) than children with DLD. IST Reaction seems to represent the part of the episode that relates to the expression of the feelings and attitudes of the story characters. Therefore, DLD children may exhibit a lower level of empathy and emotional regulation than their peers with TD (Kraljević et al., 2020). These results suggest that TD children can not only produce a story with a well-formed structure but are also more likely to express their inner feelings about the events. On the other hand, the expression of their feelings about the events seems to be a weakness for DLD children who managed to do well in other story structure elements.

Also, our findings are partially consistent with Kraljević et al. (2020) who found a difference in their research in the component of outcome (77% compared to 51%) between TD and DLD groups. In our study there is a difference in the outcome component only in the third episode (100% compared to 86%) between TD and DLD groups. A possible explanation for this difference in the outcome component could be the influence of the presented model of the story which facilitates the process of recalling information.

Regarding the pedagogical implications of our study it is evident that this research comes to fill in the gap that exists in the Greek literature, but also to validate and expand the research data of the international literature, since in Greece few studies have been conducted on the narrative skills of children with DLD with most of them focusing on both monolinguals and bilinguals (Tsimpli et al., 2016) or ASD (Peristeri et al., 2017). Moreover, most research studies concern preschool age children, with a significant lack of research concerning school age children or combining both.

5 Limitations and directions for future research

Our research provided valuable results but is subject to some limitations. One of these is that both DLD and TD children produced shorter narratives than expected not only in the lower but in the higher grades as well. As literature supports the majority of children between the 5th-6th years of age are capable of constructing fully formed narratives and with many story-structure components as age increases from 3 to 9 years old (Khan et al., 2016). At that age, a hierarchical increase of the Mean Length of Utterance (MLU) across the different age groups is observed (Safwat et al., 2013).

A possible interpretation for the short length of their narrations could have been their anxiety or fatigue during their assessment. According to previous research, when children narrate they say more and make longer narrations if they do not see the interaction as a test (McCabe and Rollins,

1994). On the other hand, fatigue sometimes may be the reason for low performance in narrative assessment or misinterpreted as language impairment (Peña et al., 2006). This might have affected the representativeness of the narrative measures used. Therefore, the specific narrative measures need to be investigated through longer narratives in future studies in order to confirm the present findings.

Also, there is a need for further research with larger sample size in order to fully confirm previous research in the field and elucidate the specific difficulties the children with DLD face in the domain of narrative skills in the Greek language. Furthermore, another limitation derives from the fact that no results of microstructure analysis are included in this paper. Such results could have provided a more holistic profile of narrative competence in DLD and strengthened the discussion of linguistic complexity.

Moreover, concerning task effects, the results from previous studies indicate that researchers need to be cautious when using the different stories of MAIN. These stories which are intended to be parallel both in their macrostructure and in their comprehension questions, may not be completely comparable (Lindgren, 2022). Maybe it would be interesting to repeat our study one or two years later to check if the narration capability of DLD and TD children continues to develop gradually. Obviously, story-retell constitutes a valuable form of narrative assessment and should be further investigated in future larger scale studies. The empirical findings of this study aim to broaden the scope of the existing research on children with DLD indicating deficits in their narrative skills. Additionally, they can lead to the creation of educational interventions based on storytelling aiming to improve the language skills of children with DLD.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the University of Thessaly ethics committee. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

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