Intellectual and Developmental Disabilities

Exploring Oral Narrative Abilities of Chilean School-age Children with Down Syndrome: A Preliminary Study

--Manuscript Draft--

Manuscript Number:	IDD-D-23-00095R2
Article Type:	Research
Keywords:	Narrative competence; Microstructure; Macrostructure; Storytelling; Intellectual Disabilities
Corresponding Author:	Victoria Sánchez-Gómez, Master University of Salamanca Salamanca, Salamanca SPAIN
First Author:	Victoria Sánchez-Gómez, Master
Order of Authors:	Victoria Sánchez-Gómez, Master
	Antonio Manuel Amor González, PhD
	Laura Zampini, PhD
	Miguel Ángel Verdugo, PhD
	María Isabel Calvo, PhD
Manuscript Region of Origin:	SPAIN
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Abstract

Narrative abilities are essential for school achievement and quality of life, yet children with Down syndrome (DS) often struggle with these skills. This work explores the oral narrative abilities of school-age Chilean children with DS. The participants were 11 children with DS aged between 7;2 and 12;1 (years; months). All participated in a retelling task using a wordless picture book. Microstructural and macrostructural performance were analyzed and compared with data from a reference database of typically developing Spanish-speaking children, matched by chronological age or linguistic abilities. Children with DS showed proficiency in identifying introductory story elements but faced difficulties with cohesion. Restricted microstructural performance and task completion time were observed. Ethical-methodological challenges and recommendations for practice and research are discussed.

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Introduction

Narrative skills refer to the ability to produce a chronologically sequenced account of an event (Bowles et al., 2020), whether factual or fictional. In most children, these abilities appear at a young age and are cultivated by exposure to other narratives (Fivush et al., 2011). Children develop narrative skills as a gradual process that follows a continuum marked by different levels of complexity in the organization (macrostructure) and linguistic features of discourse (microstructure) (Petersen et al., 2010). Thus, the production of a well-constructed narrative is the culmination of several years of language acquisition and is a developmental milestone that forms the basis for many of the acts of childhood (Botting, 2002). However, generating narratives is both cognitively and linguistically demanding. Oral narratives require syntactically complex expressions, with details of causality, temporality, and the context in which the story unfolds. They also require the speaker to recall concrete facts with specific information and plan and share

a coherent narrative structure in which the sequential order of events plays a key role (Botting, 2002; Diez-Itza et al., 2016).

Children with Down syndrome (DS) often develop narrative abilities slowly due to difficulties with language and cognition (Segal & Pesco, 2015). Narration may be particularly demanding for children with DS, given the different processes and functions that are associated with its production or comprehension (Spencer & Petersen, 2020). However, addressing narrative abilities in children with DS should be a priority in both clinical and educational settings. These abilities are essential for different areas of literacy development and school achievement, as these abilities are strongly related to word-level reading and reading comprehension (Cleave et al., 2012; Hessling & Brimo, 2019; Segal & Pesco, 2015), both challenging areas in children with IDD (Barton-Hulsey et al., 2017). Also, these abilities relate to the quality of life of people with IDD (e.g., social inclusion, interpersonal relations, emotional wellbeing) (Schalock & Verdugo, 2002), as they allow children to generate meaningful discourses and are a key component in social communication (Blom & Boerma, 2016), playing an integral role in communicative exchanges, in understanding oneself and others (Cleave et al., 2012; Smorti, 2020). Thus, they are essential skills during the school-age years (Cleave et al., 2012).

Narrative Abilities in Children with Down Syndrome

Children with intellectual and developmental disabilities (IDD) present limitations in their intellectual functioning and adaptive behavior (Schalock et al., 2021) that entail difficulties in language, as well as in executive functions, working memory and spatiotemporal skills, all of which can constrain their narrative performance (Barton-Hulsey et al., 2017; Blom & Boerma, 2016; Diez-Itza et al., 2016; Zanchi et al., 2021). It has been reported that the narrative ability of children with IDD may be less developed, as they have difficulty producing narratives that are as complex, cohesive, and coherent in grammatical structure as typically developing (TD) children (e.g., Baixauli et al., 2016; Barton-Hulsey et al., 2017).

Regarding children with DS in particular, their oral narration has been indicated as a strength compared to other language activities (such as conversation) (Hessling & Brimo, 2019; Miles et al., 2005). However, children with DS often present difficulties in expressive language skills that are related to their narrative production (Segal & Pesco, 2015; van Bysterveldt et al., 2012). The syntactic is an area of particular weakness, as the children with DS consistently have presented more difficulties than TD peers in expressing sentences in a grammatically correct way or with complex language structures (Cleave et al., 2012; Finestack et al., 2012; Hessling & Brimo, 2019; Miles & Chapman, 2002; Zampini & D'Odorico, 2011). These difficulties in syntax predict their narrative performance at the microstructural and macrostructural levels (Hessling & Brimo, 2019). As for the semantic abilities (e.g., vocabulary knowledge), they have been identified as a weakness in some cases (Miles & Chapman, 2002), while in others, they have been considered a relative strength (Cleave et al., 2012). In any case, the amount of semantic knowledge predicts the narrative performance at the microstructural and macrostructural levels (Hessling & Brimo, 2019). Regarding other variables that predict narrative performance, some authors mention that social abilities may also have an impact (Channell et al., 2015).

In terms of their narrative performance, there is quite a consensus regarding the macrostructure of spoken narratives produced by children with DS is a strength when compared to their microstructure (Finestack et al., 2012; Hessling & Brimo, 2019; Miles & Chapman, 2002). Although some studies have evidenced poorer macrostructural performance in individuals with DS when compared with chronological age (CA)-matched peers, it appears as a relative strength when compared with younger peers matched by cognitive or linguistic abilities (e.g., matched by mean length of the utterance - MLU) (Hessling & Brimo, 2019; Miles & Chapman, 2002; Zanchi et al., 2021). However, some works, such as that of Channell et al. (2015), have reported a poorer macrostructure even when compared with children matched by mental age (MA). Overall, on the macrostructural level, the literature points to children with DS showing basic narrative structure with core episodic components and some basic understanding of causal relationships

(Hessling & Brimo, 2019; Miles & Chapman, 2002), but their narratives appear to lack elaboration and present less cohesion and few mental state references (Channell, 2020; Hessling & Brimo, 2019). Regarding microstructure, studies have reported difficulties consistently (Finestack et al., 2012; Segal & Pesco, 2015). The evidence has shown that children with DS tell shorter stories than their peers of the same CA or MA (e.g., Segal & Pesco, 2015; Zanchi et al., 2021). In turn, they present more restricted syntactic complexity and semantic diversity, and take longer for the language task (Hessling & Brimo, 2019; Segal & Pesco, 2015; Zanchi et al., 2021). However, the evidence regarding semantic abilities is somewhat mixed when comparing children by different criteria. Some studies have shown lower performance compared to CA-matched or MA-matched children, while others have demonstrated equivalent performance compared to MLU-matched children (Segal & Pesco, 2015; Zanchi et al., 2021).

On the Scarcity of Studies in Spanish-speaking Children and in Chilean Context

To better support children with DS to become competent narrators and to better understand stories in their everyday lives (Segal & Pesco, 2015), it is important, as a first step, to provide evidence of the narrative skills they present, identifying the strengths and limitations that may be language-or country-specific. Most of the research on TD children's narrative skills has primarily involved English-speaking participants, including monolingual English-speaking children or bilingual English-Spanish speakers (e.g., Huang et al., 2022; Shiro & Hoff, 2021). The body of information on narration by monolingual Spanish-speaking children is sparse but growing (Barra & McCabe, 2012). Most studies with monolingual Spanish-speaking individuals have been conducted in Spain (e.g., Acosta et al., 2017; Baixauli et al., 2018), and some in South America (e.g., Barra & McCabe, 2012; Castilla-Earls et al., 2015; Dolores et al., 2012). Having information that characterizes the narrative abilities not only of different languages, but also of different regions and realities, is important given the considerable differences that have been reported in narratives among different cultural groups (e.g., Spencer & Petersen, 2020). This lack of

studies on Spanish speakers also extends to research focused on children with DS. Most studies that have been developed on narrative skills in children with DS have focused on English-speaking children from Anglo-Saxon backgrounds (e.g., Cleave et al., 2012; Finestack et al., 2017; Hessling & Brimo, 2019; Miles & Chapman, 2002; van Bysterveldt et al., 2011). Thus, there is an evident lack of studies on Spanish-speaking children with DS (Segal & Pesco, 2015).

Some studies on narrative skills in children have been conducted in Chile, although none focused on children with DS (Barra & McCabe, 2012; Camus Torres et al., 2022; Coloma & Pavez, 2017; Silva et al., 2014). One study included participants with DS in their sample but did not delve into the narrative skills of this group (Crespo Allende & Figueroa, 2016). To date, there are no studies focused on the narrative abilities of children with DS in the Chilean context. It is necessary to take into account the cultural diversity of narratives and the individual diversity of each child (McCabe, 1991), especially in cases where the demand for narrative production is more challenging. Further, although the narrative abilities of children with DS have been studied -in other countries and languages-, there are still discrepancies in the results; for example, on macrostructural performance or semantic abilities (Segal & Pesco, 2015) which may vary according to language or cultural factors.

In light of the above, the aim of this study was to explore the oral narrative abilities of Chilean children with DS. Since the evidence shows that certain differences between children with DS and TD children of the same chronological age (CA) disappear when controlling for MLU, both matched criteria (CA and MLU) were considered for a preliminary comparison. The specific aims were: i) to explore the narrative performance of Chilean children with DS at both the microstructural and macrostructural levels and (ii) to preliminarily compare their performance at these levels with that of TD children, matched by CA or by MLU. The research hypotheses were as follows: (i) Chilean children with DS will exhibit a more restricted microstructural performance compared to their macrostructural performance; (ii) At the within-subject level, Chilean children will show better macrostructural performance in identifying the core

components of the story compared to other aspects such as cohesion or mental states; (iii) Chilean children with DS will exhibit lower performance at the microstructural level compared to TD children matched by CA or MLU; (iv) Chilean children with DS will show lower performance at the macrostructural level compared to TD children when matched by CA but their performance will be similar or higher when matched by MLU.

Methods

Participants

The inclusion criteria were: having DS, being a monolingual Spanish speaker, attending primary school in a mainstream setting, and being born and residing in Chile. Participants were recruited through social networks shared through different organizations supporting families with children with DS in two cities of Chile. All interested parents whose children met the inclusion criteria were considered for participation. Out of the total number of interested parents (n = 17), five children were not included because they expressed unwillingness to participate. One child could not be included in the study as the child was nonverbal. 11 Chilean children (seven girls and four boys) with DS participated. They were between 7 and 12 years old (M = 9.70, SD = 1.69) at the time of the assessment and were in the first through sixth grades. Table 1, presented in the results, details the gender, age, grade, and type of school of each participant. It was intended to include children from different types of schools: public (fully dependent on state funding), charter (combined funding), and private (do not receive funding from the state). Participants presented mild to moderate levels of intellectual disability, as reported by the parents (according to clinical or educational records). The research was approved by the research ethics board of the Faculty of Social Sciences of the University of Chile. All participants had the informed consent of their parents and explicitly gave their own assent through an adapted procedure. The participants were also part of a longitudinal study focused on a narrative intervention. At the time of this study, they had not yet

received any intervention. All participants with DS who participated in the longitudinal study were included in this current work.

Procedure and Narrative Task

All assessments were performed by the same examiner (the first author), an educational psychologist with previous training in the narrative task. The setting in which the assessment took place was chosen by the parents according to their preferences, among the following options: school, home, and university. All assessments were conducted in person (not remotely), in a quiet room, with a table and chairs (for the examiner and examinee) and were conducted at a 1-1 ratio. All assessments were videotaped for later analysis. Parents were not present during the narrative task; they remained in a different room until the end of the session. The session with the child to carry out the assent process, the narrative task and the story questions lasted a maximum of 45 minutes.

In the narrative task, participants told a story from a wordless picture book. The story *Frog Goes to Dinner* (FGTD; Mayer, 1974) was used in a retelling mode. First, following the script of the story page by page, the examiner told the story to the examinee. The pages of the book were shown to the child as the story was told. The examinee was then asked to retell the story in their own words while browsing the pages of the book. The examiner's prompts were a standard set of encouraging phrases (e.g., “Tell me more”, “I'd like to hear more about that”) to encourage participants to continue to the end of the story. Protocols and scripts for the FGTD story from the Systematic Analysis of Language Transcript (SALT; Miller & Iglesias, 2020) were used. The FGTD story depicts, in 30 sheets, events that can be described with different levels of detail and abstraction, from the physical actions of the characters to their intentions and emotional reactions and offers the possibility of describing anticipated events (McFarlane et al., 2023). The FGTD story was chosen since it has been used previously with participants with IDD (e.g., Barton-Hulsey et al., 2017; Finestack et al., 2012) and presents application protocols in Spanish.

After the narrative task, participants answered a series of questions about the story. Performance on these questions was considered as complementary information on macrostructural performance. The question booklets of the SALT FGTD story, in its Spanish version, were used. Specifically, questions from the following dimensions were used: Remembering, Understanding, Application, and Analyzing. Each dimension considers three questions, and each question has a score from 0 to 2 points (0= *incorrect*, 1= *partially correct*, 2= *correct*). All questions were scored using the standardized rubric provided by SALT. Although the questions were in Spanish, it was necessary to make some cultural adjustments to the expressions to make them more natural for Chilean Spanish-speakers (e.g., *"¿De qué manera son iguales?"* for *"¿En qué se parecen?*"). Moreover, since the participants had IDD, the questions were asked in a supported manner to approach the child's knowledge. First, the original question was asked (e.g., "Why didn't the saxophone work?"), and if there was no answer, another question was used to support the memory of the scene (e.g., "Do you remember when the musician played the saxophone, and the sound was horrible?" (wait for an affirmative answer) "Why didn't it work?").

Transcription and Language Analysis

The transcription process was carried out using SALT software and was conducted considering general SALT conventions and special conventions for Spanish. The transcription considered the segmentation of utterances according to communication units (C-unit) (Miller et al., 2019). Those words or sets of words that could not be understood after listening to the child 10 times at normal speed (1.0x) and 10 times at slow speed (0.5x) were recorded as unintelligible. Given the characteristics of the participants, utterances with some unintelligible segments were not excluded from the analysis. In the transcription, the word intended by the child was registered even if it was pronounced with difficulty (e.g., "*inumeto*" was transcribed as *"instrumento")*. Child-examiner interactions that were not about the story

were registered as nonverbal segments. Nonverbal segments and abandoned utterances (i.e., incomplete utterances that the child reformulates using another one) were not quantified in the analysis.

Microstructural Measures

Microstructural measures were calculated using SALT software. The following microstructural measures were used: (i) MLU: MLU in words was used as an indicator of syntax performance; (ii) Moving-average type-token ratio (MATTR): Since the number of different words (NDW) can be affected by the length of the narration, the MATTR was used as an indicator of semantic diversity. MATTR is calculated as the ratio between the NDW in each interval of 100 words; (iii) Number of words per minute (WPM): WPM was used as an indicator of verbal fluency; (iv) Subordination index (SI): SI was used as an indicator of grammatical complexity. SI is calculated as the ratio of the total number of clauses (both main and subordinate) to the number of utterances; (v) Percentage of utterance with errors (E%): grammatical errors (such as omissions of verbs, articles, word errors, or use of unnecessary words) were coded and summarized in the indicator %E; (vi) Time: The duration time in minutes of the narrative sample; (vii) and the percentage of intelligibility at the utterance level (Int.utt) and word level (Int.words). For reliability analysis, the transcription, coding, and computing of microstructural measures were performed by one of the authors (who scored 100% of the samples) and a professional service, who independently scored 63.63% of them (7 of 11 transcriptions). Inter-judge reliability was calculated using Krippendorff's alpha (kalpha). The following kalpha values were obtained: MLU = .997; MATTR = .965; WPM = .992; SI =.998; %E = .913; Int.utt = .997; Int.words = .998; Time = 1.

Macrostructural Measures

Macrostructural performance considered two types of outcomes: macrostructural measures according to the Narrative Scoring Scheme (NSS) and performance on the story questions described above. Macrostructural measures were scored under the NSS using the rubric adapted by Finestack

(2012). This scoring scheme has already been used in samples of children with IDD (e.g., Barton-Hulsey et al., 2017; Finestack et al., 2012). It was provided by the author and translated into Spanish for use in the present study. The NSS considers seven dimensions: Introduction (presence/absence of main characters and qualitative depiction of setting components throughout the story); Character Development (acknowledgment of characters and their significance throughout the story); Mental States (vocabulary used to convey character emotions and thought processes); Referencing (consistent and accurate use of antecedents and clarifiers throughout the story, use of correct pronouns and proper names and diversity of pronouns); Conflict Resolution (presence/absence of conflicts and resolutions required to express the story as well as how thoroughly each is described); Cohesion (sequencing of, details given to, and transitions between each event); and Conclusion (the conclusion of the final event as well as the wrap-up of the entire story). Each dimension is scored between 0 and 5 (with 0 = *poor performance,* 1 = *immature,* 2 = *minimal details,* 3 = *emergent/inconsistent,* 4 = *most details,* and 5 = *proficient use)*, and a total composite score is ranging between 0 and 35. For reliability analysis, the scores assigned to the NSS adapted by rubric were performed by one of the authors (who scored 100% of the samples) and a professional service, who independently scored 63.63% of them (7 of 11 transcriptions). The general reliability for NSS total scoring reaches a kalpha value of .9339 while the dimensions obtained the following kalpha indices: Introduction = .735; Character Development = .715; Mental States = .955; Referencing = .825; Conflict Resolution = 1.000; Cohesion = .714; Conclusion = 1.000. For the assignment of scores to the story questions, two authors coded 100% of the language samples independently using the rubric of SALT, and then discussed until total agreement.

Statistical Analysis

Firstly, to describe the microstructural and macrostructural performance, individual observed measures, as well as the mean, standard deviation, and range, were reported. For the macrostructural

measures (NSS and questions), Friedman tests were conducted to compare the performance at the within-subject level across different dimensions, followed by post-hoc analyses using Bonferroni correction to control for type I error due to multiple comparisons. Additionally, the correlation between measures at each level (microstructural and microstructural) was reported using Pearson's Coefficient.

Secondly, to conduct the preliminary comparisons with TD children, the observed data were compared with data from a reference database. The microstructural and macrostructural measures were analyzed in comparison to data extracted from SALT's Monolingual Spanish Story Retell database of Latino children who performed the same retelling task. This reference database was collected in Guadalajara, Mexico, and was chosen because, among the available reference databases, it is the most similar to the language and socio-cultural reality (i.e., socioeconomic segregation, poverty) in Chile. The language samples collected in this database followed the same application protocols as those used in this study (SALT's protocols, scripts and scoring scheme). From this database, two comparison groups were extracted according to two criteria: (i) matched by CA, and (ii) matched by MLU.

To conduct a CA-matched comparison, the group of 11 children with DS (M = 9.69, SD = 1.70) was compared with a group of TD children (n = 23) with the same CA (M = 9.56, SD = 0.17) who performed the same retelling task. Both groups had equivalent mean CA (t = 0.253, p = .805) and were compared in terms of their microstructural and macrostructural performance. For the MLU-matched comparison, children with DS were compared with a younger group of 7 TD children (CA M = 5.90, SD = 0.08; t = 7.381, p < .001) with the same average MLU in the retelling task. Due to the lack of comparison data with MLU as low as some participants, the 4 children with DS with lower MLU were excluded from these analyses. Thus, both compared groups had similar MLU and the same size: a group of 7 Children with DS (MLU M= 5.602; SD= 0.80) and the MLU-matched group of 7 TD children (MLU M = 5.760, SD = 0.62). Both groups had equivalent MLU (t = 0.413, p = .687) and were compared in terms of their microstructural and macrostructural performance. Welch's t-tests were performed for comparisons. For each comparison, a

t-value, along with the p-value and an effect size, was reported. Hedges' g (reported as d) was used as the effect size measure, which is more appropriate for small samples to prevent overestimation of the effect size. Effect sizes (d) greater than 0.5 were considered moderate, while values above 0.80 were considered a large effect size.

Results

To address the research aims, this section is organized based on the analyzed levels: microstructure and macrostructure. For each level, the results regarding the observed performance in the sample of children with DS are presented first. Subsequently, the results of the preliminary comparison with TD children are detailed.

Microstructural Performance

Table 1 outlines the microstructural measures obtained at the individual and group levels. The children with DS took an average of 8.20 minutes to complete the retelling task (*SD* = 3.25). They presented a mean intelligibility at the utterance level of 85.81% (*SD* = 9.93) and 96.72% (*SD* = 2.27) at the word level. In terms of syntax, according to the MLU, children with DS exhibited utterances with a mean length of 4.87 words (*SD* = 1.20) in their utterances. Regarding semantic performance, they produced a mean of 45 different words per set of 100 words (MATTR *M*= 0.45, *SD* = 0.03). In terms of verbal fluency, they produced a mean of 44.6 WPM (*SD* = 17.2). Finally, regarding the complexity of their utterances, they presented a mean SI of 1.03 (*SD* = 0.07), indicating that most of their utterances were simple (without subordination) despite the fact that the story told mainly comprised utterances with at least one subordinate clause. MLU was highly correlated with WPM (*r* = .762, *p* = .006). WPM was inversely correlated with time (*r* = -.703, *p* = .016), meaning that children who took more time produced fewer words per minute. The time invested in the task was also inversely correlated with the SI (*r* = - .604. *p* =

.049), indicating that children who took longer to finish the task produced fewer complex utterances. **[Table 1]**

Table 2 presents the comparison between the microstructural performance of children with DS and the TD children from the reference database. When compared to CA-matched group, children with DS took significantly longer to perform the narrative task (p = .001), produced a lower percentage of intelligible words (p < .001) and utterances (p = .004), developed significantly shorter utterances according to MLU (p < .001), performed below in semantics according MATTR (p < .001), performed below in verbal fluency according WPM (p < .001), showed significantly less complexity in their utterances according SI (p < .001), and produced a higher percentage of errors (p < .001). All differences showed a large effect size (d > .80). **[Table 2]**

When compared to the MLU-matched group, children with DS still took significantly more time to perform the narrative task (p < .001) and made a higher percentage of errors in their utterances (p < .001); both differences had a large effect size. Although they still exhibited lower intelligibility, the difference was not significant (Int.utt p = .072; Int.words p = .054). However, the low p-value (near .05) and the large effect size (> 0.80) suggest that these differences could be significant with a larger sample. Similarly, children with DS still produced fewer complex utterances (SI), but the difference was not significant despite a large effect size (p = .085, d= 1.00). When compared with the MLU-matched group, children with DS did not show a significantly lower level of semantic diversity (MATTR) or significantly lower verbal fluency (WPM); both differences were not significant, although they had a moderate effect size.

Macrostructural Performance

Table 1 also presents the NSS scores obtained at the individual and group levels. Ranked from highest to lowest, the performance in the dimensions was as follows: Introduction (M = 3.45, SD = 0.52), Conflict Resolution (M = 2.73, SD = 0.65), Conclusion (M = 2.55, SD = 0.93), Referencing (M = 2.36, SD =

0.81), Mental States (*M*= 2.36, *SD*=1.12), Character development (*M* = 2.27, *SD* = 0.47), and Cohesion (*M* = 2.09, *SD* = 0.30). Additionally, Cohesion was the dimension with the lowest variability, as all children had a score of 2, except one of them, who had a score of 3. The Friedman test showed significant differences at the within-subject level between the dimensions of the NSS (χ^2 = 28.023, p < .001), and the post-hoc analysis using Bonferroni correction showed that the Introduction dimension scored significantly higher than the Mental states dimension (p < .028), Character development (p = .020) and Cohesion (p = .002). The mean for the total NSS score was 17.82 (*SD*= 3.54), approximately half of the theoretical maximum (35), with an observed minimum of 13 and a maximum of 24 points. The performance in the Conclusion was highly correlated with the performance in Character development (r = .771, p = .005) and moderately correlated with the performance in Mental states (r = .652, p= .030). The performance in Cohesion was moderately correlated with the performance in Conflict Resolution (r = .653, p = .029).

The quality of the answers given by the children to the standardized story questions was also analyzed as a part of their macrostructural performance. A summary of their performance is shown in Table 3. The Remembering dimension presented a higher mean compared to the other dimensions (i.e., Understanding, Application, and Analysis), which presented similar and lower means. In fact, only the Remembering dimension presented a maximum score of 6. When comparing the performance between the dimensions at the within-subject level, significant differences were found (χ^2 = 11.436, p = .003), with children performing significantly better in the Remembering dimension than in Understanding (p = 0.02), Application (p = 0.13), or Analysis (p = .017). Remembering and Understanding questions showed a high correlation (r = .764, p = .006). Regarding correlations between NSS and the story questions, both Remembering and Understanding questions showed a moderate correlation with performance in Conflict Resolution (Remembering: r = .625, p = .040; Understanding: r = .693, p = .018). Application questions showed a moderate correlation with performance in Introduction (r = .626, p = .039). **[Table 3]**

Table 4 presents the comparison between the macrostructural performance of children with DS and the TD groups. When compared with the CA-matched group, children with DS showed an average performance in the Introduction dimension (t = 0.276, p = .784). However, they performed significantly lower in the dimensions of Character development (t = -4.534, p < .001), Referencing (t = -2.970, p = .007), Conflict Resolution (t = -3.601, p = .001), Cohesion (t = -7.507, p < .001), and Conclusion (t = -2.314, p = .032). The largest effect size was observed for the difference in the Cohesion dimension (d = 2.06). Regarding Mental states, although children with DS presented a lower score, the difference was not significant (p = .066). However, the low p-value (near .05) and the large effect size (d > .80) in Mental States suggest that this difference could be significant with a larger sample. In any case, it is important to note that two children with DS scored particularly high in this dimension (ID8 and ID9, see Table 1). Significant differences in the total NSS score were also found (t = -3.927, p < .001). **[Table 4]**

When compared with the MLU-matched group, the group of children with DS performed significantly higher in the Introduction dimension (t = 5.687, p < .001) and showed an average performance - slightly higher but not significantly so- in the dimensions of Character development (t = 0.944, p = .371), Mental states (t = 1.639, p = .127), Referencing (t = 1.294, p = .220), Conflict Resolution (t = 1.055, p = .316), and Conclusion (t = 1.295, p = .220). Performance on the Cohesion dimension remained lower, but the difference was not significant (t = - 0.277, p = .789), nor was the effect size large. When compared with this group, children with DS presented an equal total score for the NSS (t = 1.809, p = .101).

Discussion

This work delved into the narrative abilities of Chilean children with DS for the first time. In this section, the main conclusions of the study are drawn, along with a discussion of how each of the initially proposed hypotheses was addressed. The study's limitations and implications are also discussed. In addition, some emerging ethical and methodological issues are highlighted. Regarding the first

hypothesis, when considering both the descriptive and comparative results at microstructural and macrostructural levels, the findings align with our expectation that Chilean children with DS would exhibit a more restricted microstructural performance compared to their macrostructural performance. Further elaboration on this is provided below while discussing the results at both levels.

Concerning microstructural performance, some conclusions emerge. At a descriptive level, the observed microstructural performance exhibited restricted syntax. The observed MLU aligns with that reported in other studies involving children with DS performing similar tasks in English (e.g., Channell et al., 2015; Finestack et al., 2012; Hessling & Brimo, 2019; Laws & Hall, 2014). Additionally, they displayed difficulty with the time required for the task, which correlated with their verbal fluency and utterance complexity. At a comparative level, Chilean children with DS exhibited lower performance across all microstructural measures compared to TD children with the same CA. Participants took significantly longer to perform the narrative task, produced shorter utterances with less grammatical complexity, showed a lower semantic diversity and verbal fluency, and had a higher percentage of errors. These findings are consistent with studies reporting that children with DS produce shorter utterances, less complex narratives, more grammatical errors, and take longer on the language task than TD children (e.g., Boudreau & Chapman, 2000; Hessling & Brimo, 2019; Segal & Pesco, 2015; Zanchi et al., 2021). When compared to an MLU-matched group, some of these differences disappeared, indicating similar microstructural performance between children with DS and TD children with similar linguistic abilities according to MLU. This is consistent with other studies that have compared with equivalent MLU groups (e.g., Zanchi et al., 2021). However, they still experienced greater difficulties with the time required to complete the task. Regarding semantic performance, the children with DS outperformed when compared with children of similar CA but performed similarly when equated according to MLU. This aligns with the mixed evidence on vocabulary performance (Segal & Pesco, 2015). In this case, their performance was lower only when compared to children of similar CA. Thus, regarding the third hypothesis, we can

conclude that children with DS exhibited a lower performance when compared with children matched by CA, but when compared with TD children with the same MLU, this difference remains only in some elements (i.e., time for the task, grammatical errors, and intelligibility).

Regarding macrostructural performance, it appears to be a relative strength. This is consistent with other studies that have highlighted the macrostructure of narratives of children with DS as a stronger aspect (e.g., Finestack et al., 2012; Segal & Pesco, 2015). At the descriptive level, children with DS exhibited the highest performance in Introduction (i.e., the presence of the main characters and qualitative depiction of setting components throughout the story). Conversely, they presented the lowest performance in Cohesion (i.e., the sequencing and transitions between each event, as well as the use of temporal transitions). The strength in the Introduction dimension is consistent with other studies that reported that children with DS show good performance when introducing essential components of the story, such as characters, story settings, and episodic elements (e.g., Finestack et al., 2012; Hessling & Brimo, 2019). For example, Estigarribia et al. (2011) reported that children with DS scored higher on introductory items than children with other diagnoses (i.e., fragile X syndrome with and without autism) and similar to TD children. This is also consistent with the fact that the second-best performing dimension was Conflict Resolution, related to mentioning key events of the story. Regarding the performance in the Cohesion dimension, the finding is consistent with studies that reported a more restricted cohesion in the narratives of children with DS (e.g., Boudreau & Chapman, 2000). The Mental states and Character development dimensions were low and significantly lower than Introduction, which aligns with the second stated hypothesis of this study. A low performance in Mental State has already been reported in other studies (e.g., Finestack et al., 2012; Hessling & Brimo, 2019). It should be noted that the use of mental state words is related to variables such as vocabulary and emotion knowledge (Channell, 2020). This may explain why two children in our sample performed so well on this component, although it was a low-performance dimension for the group. The mean total score of the NSS was very similar to that reported

in other studies with children with DS who performed the same retelling task in English (e.g., Hessling & Brimo, 2019). When analyzing the story questions, the children showed significantly better performance on those that were of a recall processing level (Remembering). In this domain, the children presented few difficulties and, in some cases, achieved the maximum possible score. On the contrary, the understanding, application and analysis questions presented greater difficulty. For this reason, their ability to remember the stories could be considered a strength. This is consistent with previous findings indicating that individuals with DS have strengths in storing, retaining, and retrieving visual information (Michael et al., 2012).

At the comparative level, this study did not find significant differences in the Introduction dimension, even when compared to TD children of the same CA, and they showed better performance in this dimension when compared with TD children with the same MLU. All other dimensions exhibited lower performance than TD children when matched by CA, but the performance was similar when compared to TD children with the same MLU. This is aligned with the literature that has reported that macrostructural performance in narrative production of children with DS is comparable or even more complex when compared to TD children matched for linguistic abilities (Boudreau & Chapman, 2000; Cleave et al., 2012; Finestack et al., 2012). Regarding our fourth hypothesis, we can confirm that the differences observed in macrostructure when compared with CA-matched TD children disappear when compared to children with the same MLU.

A central limitation of this study is its small sample size, which affects the generalizability of the results, in addition to limiting the possible analyses, such as comparisons by variables like type of school. Future studies comparing the performance of children with DS based on the type of school would be relevant, given that research has demonstrated the significant impact of socioeconomic status on the development of children with DS in Chile (Arango et al., 2018). However, this work is a first approximation and exploration of the narrative abilities of children with DS in Chile, so it sheds light on the current need

for research. It is necessary to replicate this study with a broad sample of participants ideally representative of the population of children with DS in this country. Another relevant limitation of this study is that it does not consider MA. The inclusion of nonverbal MA assessment measures would have added to the descriptive information on the participants and the comparisons. Unfortunately, this information was not considered in the study design. Further studies could delve into a comparison of the performance of Chilean children with DS based on MA, as other studies have done (e.g., Finestack et al., 2012; Zanchi et al., 2021).

This study made comparisons according to other relevant criteria used in previous literature, such as CA and MLU. However, it is important to note that the comparison groups were derived from a reference database and were not collected by the research team under the exact conditions. It is important to recognize that although the language samples included in this reference database followed the same application protocols, there could be other uncontrolled confounding variables that we are unaware of. Likewise, although this reference database was selected because it was the most similar, within what was available, to our context of interest, it is not equivalent. According to Barra and McCabe (2012), cultural differences in narrative performance in Spanish are such that Spanish-speaking children from North America, Central America, and South America should be considered differentially. Thus, it is necessary to advance in the development of reference databases that share not only the characteristics of the language but also its cultural and local variants. Thus, it would be ideal to develop a country-specific database, as was done in other studies; for example, the work of Westerveld et al. (2009) in New Zealand. It would also be optimal to rely on databases that include children with different developmental profiles in addition to TD children, such as children with IDD. Having reference data on children with IDD, could help to make more complete assessments that are linked to intervention options. A comparison of children's narrative abilities relative to other children with disabilities would identify strengths that may go unnoticed when making comparisons with TD children.

Finally, some emerging ethical-methodological challenges on conducting narrative language samples with children with IDD are worth stressing. While it is stipulated in other works and in SALT recommendations to use verbal prompts to keep the child motivated and on task (e.g., “tell me more”), in this study, it was common to have to do more motivational work to keep the child on task and to make the child feel that they were doing well so that they did not give up out of frustration. It was common for participants throughout the task to present moments of frustration (e.g., "I can't", "I don't know", "Now I don't know"), and thanks to intervention with prompting options (e.g., "It's okay if you don't know”, “You can tell me how you want”, “You're doing great”) it was possible to support children to stay on task and generate relevant content. Crucially, narrative assessments with children with IDD, must be conducted by trained examiners who are skilled at sympathizing and being friendly with the children and not intimidating them during the task. These are children who already have a life story in which they are aware of their challenges. It is also advisable for the examiner to have training in communicating with children who have difficulty with diction. Demonstrating during the narrative task that one understands them (i.e., repeating what they are telling you, e.g., "The frog jumped salad, very good") lets them know that they are doing well and that they can continue. This was especially helpful in the children with DS who participated in the study. This was not only because of the quality and quantity of the information produced, but above all, because of the research ethics involved.

Some challenges with respect to intelligibility can also be pointed out. As expected, children with DS presented significantly lower intelligibility. In this respect, although low intelligibility (below 80% according to SALT) is associated with less reliable language samples, it is an ethical-methodological dilemma to take into consideration when working with participants with DS. A dilemma arises between excluding participants with lower intelligibility from the study or risking the quality of the data to include all participants. The authors consider that including those children with lower intelligibility is relevant to avoid underrepresentation in this type of research, even if this entails some loss of data quality. However,

this study only considered children who use verbal language for communication. Future studies could explore narrative aspects in verbal and nonverbal children, for example, using techniques based on gesture analysis, as some studies have done (e.g., Mastrogiuseppe & Lee, 2017).

In conclusion, this study contributes insights to the limited literature on narrative skills in Spanish-speaking children with DS. This work confirms, for the first time with Chilean children, some aspects already foreseen in the literature regarding the narrative skills of children with DS. This work has also highlighted some implications for practice that may be relevant for practitioners or researchers. On the one hand, identifying the difficulties and strengths that children with DS present in this type of task may shed light on how to orient narrative interventions; on the other hand, the methodological and ethical considerations that have been made may serve as a reference for researchers or professionals who want to conduct assessments based on narrative language samples.

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Table 1.

Individual Measures and Descriptive Statistics – Microstructure and Macrostructure.

	Participants' ID											Descriptives		
	ID1	**ID2**	**ID3**	**ID4**	**ID5**	**ID6**	**ID7**	**ID8**	**ID9**	**ID10**	**ID11**	*M*	*SD*	*Range*
Participants' characteristics														
Gender	F	M	F	F	F	F	M	M	F	M	F		-	
Age	12;1	10;9	7;10	8;7	11;4	10;3	7;2	7;8	11;5	9;1	10;6	9.70	1.79	7 - 12
Grade	6th	4th	2nd	1st	4th	3rd	2nd	1st	2nd	2nd	4th		-	
School	CH	PU	CH	PR	PU	CH	PU	PR	CH	PR	PU		-	
Microstructural performance														
Time[1]	6.6	6.3	10.4	7.9	16.7	8.2	8.3	6.8	3.8	7.8	7.5	8.20	3.25	3.8 - 16.7
Int.utt	86.9	71.4	92.3	74.0	91.5	96.1	94.7	92.9	78.3	71.6	94.2	85.81	9.93	71.4 - 96.1
Int.words	96.7	95.4	98.0	94.0	97.3	99.4	99.0	97.8	95.1	92.3	98.9	96.72	2.27	92.3 - 99.4
MLU	4.43	6.62	3.82	5.71	3.28	6.65	5.36	3.31	5.33	4.01	5.12	4.87	1.20	3.28 - 6.65
MATTR	0.41	0.53	0.46	0.44	0.46	0.46	0.41	0.48	0.47	0.44	0.44	0.45	0.03	0.41 - 0.53
WPM	43.7	65.3	21.0	64.7	20.5	44.9	40.3	27.9	69.9	40.7	51.3	44.6	17.2	20.5 - 69.9
SI	1.00	1.13	1.00	1.00	0.94	1.10	0.94	1.00	1.14	1.09	1.08	1.03	0.07	0.94 - 1.14
%E	30.0	28.8	22.0	40.6	20.5	21.9	31.4	60.6	40.4	15.5	51.3	32.9	13.94	15.5 - 60.6
Macrostructural performance														
IN	3	4	3	4	3	4	4	4	3	3	3	3.45	0.52	3-4
CD	2	2	2	2	2	3	2	3	2	2	3	2.27	0.47	2-3
MS	1	3	2	1	2	3	4	4	2	1	3	2.36	1.12	1-4
RE	3	4	2	1	2	3	2	2	2	2	3	2.36	0.81	1-4
CR	2	3	2	2	3	4	3	3	2	3	3	2.73	0.65	2-4
CH	2	2	2	2	2	3	2	2	2	2	2	2.09	0.30	2-3
CN	2	3	2	1	2	4	2	4	3	2	3	2.55	0.93	1-4
NSS	15	21	15	13	16	24	19	22	16	15	20	17.82	3.54	13-24

F: Female; M: Male; PU: Public; CH: Charter; PR: Private. [1] In minutes; Int.utt: Intelligibility at utterance level (%); Int.words: Intelligibility at word level (%); MLU: Mean length of the utterance; MATTR: Moving average type-token ratio; WPM: Words per minute; SI: Subordination index; %E: Percentage of utterances with errors. *IN: Introduction; CD: Character development; MS: Mental states; RE: Referencing; CR: Conflict Resolution; CH: Cohesion; CN: Conclusion.*

Table 2.

Microstructural CA-matched and MLU-matched comparisons

	Children with DS (n=11)			**CA-matched TD group (n=23)**			**Comparison**		
Measures	*M*	*SD*	*Range*	*M*	*SD*	*Range*	*t*	*p*	*d*
Time[1]	8.20	3.25	3.82 - 16.72	3.88	1.23	2.25 – 7.10	4.265	.001**	2.07
Int.utt	85.81	9.93	71.40 - 96.10	99.31	1.40	95.24 - 100	-3.599	.004**	2.39
Int.words	96.72	2.27	92.30 - 99.40	99.90	0.21	99.28 - 100	-4.637	< .001**	2.48
MLU	4.87	1.20	3.28 - 6.65	7.70	0.90	6.06 - 9.90	-6.943	< .001**	2.82
MATTR	0.45	0.03	0.41 - 0.53	0.51	0.03	0.48 – 0.56	-5.456	< .001**	2.00
WPM	44.56	17.23	20.46 - 69.96	96.24	23.79	47.72- 131.11	-7.194	< .001**	2.35
SI	1.03	0.07	0.94 - 1.14	1.34	0.13	1.00 – 1.54	-9.023	< .001**	2.70
%E	32.99	13.94	15.50 - 60.60	12.75	6.71	0 – 26.19	4.569	< .001**	2.11
	Children with DS (n=7)			**MLU-matched TD group (n=7)**			**Comparison**		
Measures	*M*	*SD*	*Range*	*M*	*SD*	*Range*	*t*	*p*	*d*
Time	6.93	1.57	3.82 – 8.28	3.45	0.91	2.75 - 5.43	5.145	< .001**	2.71
Int.utt	85.09	10.45	71.40 – 96.10	93.90	4.25	89.47 - 100	-2.066	.072	1.01
Int.words	96.93	2.18	94.00 – 99.40	98.92	0.76	98.16 - 100	-2.281	.054	1.21
MLU	*5.60*	*0.80*	*4.43 – 6.65*	*5.76*	*0.62*	*5.03 -6.95*	*-0.418*	*.684*	*0.22*
MATTR	0.45	0.04	0.41 – 0.53	0.49	0.06	0.38 - 0.57	-1.468	.171	0.78
WPM	54.29	12.10	40.32 – 69.96	65.45	18.47	32.76 - 90.18	-1.337	.210	0.71
SI	1.06	0.08	0.94 -1.14	1.14	0.08	1.03 - 1.29	-1.870	.085	1.00
%E	34.91	9.78	21.9 – 51.30	17.3	5.45	9.30 - 25.71	4.161	< .001**	2.22

[1]*In minutes.* Int.utt: Intelligibility at the utterance level; Int.words: Intelligibility at the word level; MLU: Mean length of the utterance; MATTR: Moving-Average Type Token Ratio; WPM: Words per minute; SI: Subordination index; %E: percentage of errors. *** p < .01; * p < .05*

Table 3.

Performance on story questions

Question	*M*	*SD*	Range	Brief description of question
RE 1	1.45	0.69	0 - 2	*Where was the family going?*
RE 2	1.55	0.82	0 - 2	*On which instrument did the frog jump?*
RE 3	1.00	0.63	0 - 2	*Who was left behind when the family went out to dinner?*
Total RE	4.00	1.73	1 - 6	
UN 1	0.45	0.52	0 - 1	*What is a luxury restaurant?*
UN 2	1.45	0.69	0 - 2	*Explain two problems caused by the frog.*
UN 3	0.00	0.00	0 - 0	*What the story is about?*
Total UN	1.91	0.83	0 - 3	
AP 1	1.09	0.30	1 - 2	*Why wasn't the saxophone working?*
AP 2	0.27	0.47	0 - 1	*Why was family upset in the end?*
AP 3	0.82	0.98	0 - 2	*Why would the waiter take the frog out?*
Total AP	2.18	1.25	1 - 4	
AN 1	0.50	0.85	0 - 2	*How are the saxophonist and the salad lady similar?*
AN 2	1.36	0.67	0 - 2	*Which part of the story did you find funniest?*
AN 3	0.40	0.52	0 - 1	*Did the family have dinner?*
Total AN	2.18	0.98	1 - 4	

RE: Remembering; UN: Understanding; AP: Application; AN: Analyzing.

Table 4.

Macrostructural CA-matched and MLU-matched comparisons

	Children with DS (n=11)			CA-matched TD group (n=23)			Comparison		
	M	*SD*	*Range*	*M*	*SD*	*Range*	*t*	*P*	*d*
IN	3.45	0.52	3-4	3.39	0.72	2- 5	0.276	.784	0.09
CD	2.27	0.47	2-3	3.22	0.74	2 -4	-4.534	< .001**	1.42
MS	2.36	1.12	1-4	3.09	0.67	2 - 4	-1.997	.066	0.87
RF	2.36	0.81	1-4	3.26	0.86	2 - 4	-2.970	.007**	1.06
CR	2.73	0.30	2-4	3.48	0.90	1 - 5	-3.601	.001**	0.98
CH	2.09	0.30	2-4	3.57	0.84	2 - 5	-7.507	< .001**	2.06
CN	2.54	0.93	1-4	3.30	0.82	1 - 4	-2.314	.032*	0.88
NSS	17.81	3.54	13-24	23.30	4.33	14 - 29	-3.927	< .001**	1.33
	Children with DS (n=7)			**MLU-matched TD group (n=7)**			**Comparison**		
	M	*SD*	*Range*	*M*	*SD*	*Range*	*t*	*p*	*d*
IN	3.57	0.53	3-4	2.29	0.76	1 - 3	3.655	.003**	1.95
CD	2.28	0.49	2-3	1.86	1.07	0 - 3	0.944	.371	0.50
MS	2.42	1.13	1-4	1.43	1.13	0 - 3	1.639	.127	0.87
RF	2.57	0.98	1-4	1.86	0.90	1 - 3	1.294	.220	0.75
CR	2.71	0.76	2-4	2.14	1.21	0 - 4	1.055	.316	0.56
CH	2.14	0.38	2-3	2.29	1.38	0 - 4	-0.277	.789	0.15
CN	2.57	0.98	1-4	1.86	1.07	0 - 3	1.295	.220	0.69
NSS	18.28	3.81	13-24	13.21	6.36	2 - 21	1.809	.101	0.96

*IN: Introduction; CD: Character development; MS: Mental states; RE: Referencing; CR: Conflict Resolution; CH: Cohesion; CN: Conclusion. ** p < .01; * p < .05*