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Narrative production abilities of children with autism

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Abstract

Background and aims: Narrative abilities are crucial for effective communication and social interactions. Children with autism often struggle with narrative production and comprehension due to their unique developmental profiles. This study examines the macrostructure and microstructure narrative skills of Hebrew speaking children with autism compared to age-matched typically developing (TD) children, aiming to uncover specific areas of difficulty and proficiency.
Methods: The study included 64 children aged 6–8 years, divided equally between those diagnosed with autism and TD peers. Participants underwent narrative production tasks involving both fictional and everyday narratives, and modes of generating and retelling. Narrative comprehension was also assessed immediately after each task. Macrostructure analysis examined the organization and structure of the narratives while microstructure analysis focused on linguistic elements such as syntax and word use.
Results: Both groups exhibited comparable overall narrative production and comprehension skills. However, subtle distinctions were noted such that children with autism showed difficulties in creating complex narrative structures and integrating syntactic elements effectively compared to their TD peers. Despite the differences, children with autism demonstrated notable strengths, particularly in the retelling mode, where they sometimes achieved higher scores in the use of function words. Both groups achieved similar scores in narrative comprehension tasks.
Conclusions: The findings indicate that while children with autism can develop narrative skills comparable to their TD peers, they continue to experience specific challenges that affect their narrative production, particularly in syntactic complexity. Although not always statistically significant, these findings suggest that autistic children possess narrative abilities that emerge under certain conditions, emphasizing the importance of considering varied narrative contexts in assessments.
Implications: The study highlights the need for targeted narrative intervention programs that address the specific challenges and strengths faced by children with autism. Educational strategies should focus on enhancing syntactic construction and narrative structure to improve both academic and social communication outcomes.

Keywords

Autism, ASD, Narrative, Macro-structure, Micro-structure

Introduction

Narratives, defined as a sequence of interconnected events forming a story, are pivotal in effective communication (Sheng et al., 2020; Stirling et al., 2014). They convey perceptions, emotions, values, and attitudes within cultural contexts (Nelson, 1996), and their development is closely linked to children's literacy abilities, reading comprehension, and social interactions (Griffin et al., 2004; Kim, 2020; Lever & Sénéchal, 2011). Moreover, narratives play a crucial role in friendships and social relationships (Pennebaker & Seagal, 1999), supporting socioemotional development (Klitzing et al., 2007).

Children with autism[1] often experience challenges in social interaction, including difficulties with both narrative comprehension and production (Eigsti et al., 2011; King et al., 2013; Landa, 2000). However, while extensive research has documented these challenges, less is known about how different types of narratives such as fictional and everyday narratives (also termed personal event narratives) may uniquely affect the narrative skills of children with autism. Fictional narratives often demand higher levels of creativity and abstract thinking, while everyday narratives tend to draw on familiar, real-world experiences, potentially providing a more supportive context for children with autism.

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This study addresses the story type gap by examining the effects of narrative type (Fictional vs. Everyday) and mode (generating vs. retelling) on the macrostructure and microstructure narrative skills of children with autism compared to age-matched typically developing (TD) peers. Few studies have explored the impact of narrative type and mode on narrative abilities in children with autism, despite these factors being critical for understanding how different contexts influence their narrative production and comprehension. By investigating these understudied dimensions, this study aims to provide novel insights into the narrative capabilities of children with autism and their implications for intervention.

Narrative structure—macrostructure and microstructure level

Narrative abilities encompass two levels; macrostructure and microstructure (Geelhand et al., 2020). The *macrostructure* level refers to the content and organization of the narrative (Finestack, 2012), encompassing sequences of events (Gagarina, 2012). It involves the integration of events to form a narrative structure that includes a beginning, middle and end (Košutar et al., 2022). Stein and Glenn's (1979) *Story Grammar* model is one of the most widely used frameworks for analyzing narrative macrostructure, providing a structured approach to identifying components such as setting, initiating events, goals, attempts and outcomes. Westby (2005) builds on this framework by employing the goal-attempt-outcome scheme for a comprehensive analysis of the macrostructure level. In this scheme, the goal represents the character's desired achievement within the narrative, while the attempt signifies the character's endeavors to attain that goal, and the outcome denotes whether the character successfully reaches their goal (Lynch & van den Broek, 2007). Additionally, two framing elements contribute to the scheme: the internal state of the protagonist, such as an emotional or cognitive state that triggers or initiates the action leading to the goal, and the subsequent internal state of the protagonist in response to the outcome of the action. These framing elements are known as internal state terms (IST) (Gagarina et al., 2019). Together, these models aim to encode children's evolving abilities to understand and produce narrative structures (Faulkner & Coates, 2011).

The *microstructure* level entails linguistic skills like lexis and syntax to convey meaning (Sheng et al., 2020). The literature points to specific narrative variables that provide dependable information for microstructure level narrative analysis (Mills, 2015). Narrative length is measured in terms of total words and the number of clauses (Altman et al., 2016). Syntactic complexity is assessed through measures such as causal and temporal subordinating conjunctions, coordinating conjunctions, and adverbs. Other linguistic features include elaborated noun phrases, cognitive and linguistic verbs, and the number of different words (NDW). Additional measures include morphosyntactic complexity, mean length of utterance (MLCU), and the average length of a communication unit (C-unit), defined as a main clause with attached subordinate clauses or modifiers (Hughes et al., 1997). Examining the internal linguistic structures used in narratives, as investigated by Košutar et al. (2022), highlights the importance of age-appropriate language skills across semantic, morphological, and syntactic domains, where vocabulary and morphological skills are fundamental (Worsfold et al., 2010), and syntactic rules play a key role in constructing well-structured sentences with varied clauses and adapted linking words (Nelson, 2013).

In addition to the variables presented above regarding the macrostructure and microstructure levels of narratives, narrative comprehension involves grasping the sequence of events and causal principles within a narrative (Pesco & Gagné, 2017). It includes inferring causal relationships, discerning character goals and emotions, and integrating narrative components (Graesser et al., 1994). Narrative comprehension entails cognitive processes like inference, identifying main ideas, summarizing, and predicting (Paris et al., 1991; Paris & Paris, 2003). This process hinges on the development of various skills, including story grammar, Theory of Mind (the ability to understand and attribute mental states such as beliefs, desires, intentions, and emotions to oneself and others, and to recognize that these mental states may differ from one's own), and perspective-taking (Paris & Paris, 2003). Narrative comprehension is essential as it reveals the elements children with autism may struggle with when telling or retelling a story. These difficulties can result in narratives that are less clear and detailed, impacting their ability to construct well-structured and meaningful stories. Therefore, studying narrative comprehension provides insight into the specific challenges faced by children with autism in narrative tasks and can inform targeted interventions to support their narrative skills.

An important factor influencing narrative comprehension outcomes is the type of questions used during assessment. While much research has focused on reading comprehension, similar question types are employed in oral narrative assessments. Studies show that strategic questioning enhances comprehension, particularly in young children. For example, teaching narrative strategies improves kindergarteners' oral skills (Devlin, 2010), and word elaboration and coherence questions during storybook reading help preschoolers connect events and infer meaning (Strasser et al., 2013). Causal questioning techniques also foster toddlers' and early readers' comprehension by encouraging critical thinking and inference (Broek et al., 2011). These findings emphasize the importance of interactive questioning in supporting memory and higher-order cognitive processes.

In the current study, we employed three different question types (see method narrative comprehension task description) to examine the distinct cognitive abilities involved in narrative comprehension. By systematically exploring the effects of these question types, we aim to further elucidate how specific cognitive processes, such as inferencing and coherence-building, contribute to oral narrative comprehension.

Narrative skills of children with autism

Studies investigating the narrative production abilities of children with autism compared to TD children reveal conflicting findings regarding both the macrostructure and the microstructure levels (Norbury et al., 2014). Most studies tend to typically use one of the two main narrative types Fictional narratives or Everyday narratives. Fictional narratives refer to stories that are characterized by fantastical elements, often involving events, characters, and settings that do not exist. Everyday narratives are stories that revolve around real-life experiences, events, or routines encountered in one's day-to-day life. At the macrostructure level, children with autism were found to face difficulties in maintaining episodic structure, overall narrative structure, and causality between events in fictional narrative generating tasks (Norbury et al., 2014; Sah & Torng, 2015). Organization in narratives is also a concern, with children with autism producing less organized and less structured narratives compared to TD peers in fictional narrative generation tasks (Banney et al., 2015). Their retellings of fictional narratives are characterized more as a listing of discrete events rather than a structured narrative (Diehl et al., 2006).

Previous research has identified differences in narrative production at the microstructural level between children with autism and their TD peers. These differences are particularly evident in fictional narratives. Children with autism tend to produce shorter narratives with less syntactic complexity compared to TD children (Losh & Capps, 2003; Norbury & Bishop, 2003; Tager-Flusberg, 1995). Studies further indicate that children with autism produce significantly fewer propositions and employ a limited vocabulary range in fictional narrative tasks, as compared to TD peers (Norbury et al., 2014).

Some studies suggest that autistic individuals may struggle to incorporate internal states into their narratives, potentially due to difficulties with Theory of Mind, which is key to understanding and attributing mental states to oneself and others (Hilvert et al., 2016). Research suggests that elementary-aged autistic children often display less emotional expression and pay limited attention to the thoughts and feelings of characters when producing fictional narratives (Kauschke et al., 2015; Tager-Flusberg & Sullivan, 1995). These findings suggest that emotional and social aspects might play a role in the narrative production skills of children with autism.

Limited research on the narrative comprehension abilities of school-aged autistic children indicates poorer performance when compared to their TD peers. This encompasses difficulties in drawing pertinent inferences during everyday narrative comprehension tasks (Norbury & Bishop, 2002) and comprehending the overarching narrative context in fictional retelling scenarios (Diehl et al., 2006). Overall, the research suggests nuanced challenges at both macrostructure and microstructure levels, as well as emotional expression, in the narrative production and comprehension skills of children with autism compared to their TD peers.

Narratives in Hebrew

Most studies conducted in Hebrew on narrative abilities have been conducted in the context of bilingual children. Studies have found that macrostructure features like story grammar are generally similar across languages for bilingual children, while microstructure elements often differ (Altman et al., 2016; Fichman et al., 2022). For children with language impairments, differences were more pronounced in microstructure than macrostructure (Altman et al., 2016; Fichman et al., 2017). Language dominance has been found to impact narrative production, particularly in microstructure and internal state terms (Fichman et al., 2022). Hebrew's rich morphological structure and syntactic properties, such as its root-based system and flexible word order, significantly shape the narratives of Hebrew-speaking children, influencing coherence, detail, and linguistic choices (Berman, 1995). One previous study tested the narrative production abilities of Hebrew speaking children with autism using the Tuesday story from the ADOS (Autism Diagnostic Observation Schedule) battery (Kenan et al., 2019). Kenan et al. (2019) did not report any specific linguistic impairments that were attributed specifically to the Hebrew language, rather they reported that children with ASD included fewer central ideas, and fewer settings, characters, and actions in their narratives than did age-matched TD children and attributed these difficulties to the autism symptom characteristics.

The current study

This study investigated the narrative abilities of Hebrew-speaking autistic children compared to age-matched TD children. Specifically, it examined differences at the macrostructure and microstructure levels across various narrative types (fictional/everyday) and modes (telling and retelling) in both production and comprehension.

While prior research has explored narrative skills in children with autism, few studies have systematically examined how narrative type and mode are associated with these abilities (Losh & Capps, 2003; Norbury et al., 2014; Tager-

Flusberg, 1995). Moreover, there has been a significant lack of research on narrative skills in Hebrew-speaking autistic children, an understudied population. Furthermore, little is known about how children with autism perform in everyday narratives, which involve recounting real-life events, versus fictional narratives, which may require greater creativity, emotional depth, and inferential reasoning. These two narrative types are essential for assessment because they impose distinct cognitive and linguistic demands, shedding light on different facets of narrative competence in autism (Berman, 1995).

We hypothesized that there would be discernible differences in both microstructure and macrostructure aspects of narrative abilities when comparing children with autism and their TD peers (Losh & Capps, 2003; Norbury et al., 2014; Tager-Flusberg, 1995). These differences were expected to manifest across both the mode of the narrative (telling and retelling) and the type of narrative (everyday and fictional). Specifically, we predicted that children with autism would produce more literal and fact-focused accounts in everyday narratives, with limited elaboration, while in fictional narratives, they would demonstrate challenges with creating cohesive and emotionally enriched stories, resulting in more fragmented and less expressive outputs (Baixauli et al., 2016; Norbury & Bishop, 2002).

Method

Participants

A total of 64 children aged 6–8 participated in the study (Autism $n = 32$; TD $n = 32$). In the autistic group, 23 were in specialized classes within regular schools, and seven were fully integrated into mainstream classrooms with the support of a special education aid. All autistic participants were diagnosed by a licensed psychologist using *DSM-5* criteria (American Psychiatric Association, 2013) prior to the current study. Based on clinical records, none of the children had co-occurring conditions such as developmental language disorders (DLDs), intellectual disability, ADHD, or learning disabilities. The TD group, enrolled in regular classes at mainstream schools, had no history of psychiatric, neurological, or learning disorders, based on school records and parental reports. TD children were matched with the autistic group by age, gender, receptive vocabulary, and nonverbal IQ (CPM—Raven's Colored Progressive Matrices) standard scores (see Table 1). The participants were matched on receptive vocabulary using the Peabody Picture Vocabulary Test (PPVT) to control for variability in baseline vocabulary abilities. Receptive vocabulary was chosen as a matching criterion because it is a reliable measure of language comprehension that provides a common ground for comparisons between groups, minimizing confounding effects of vocabulary ability on task performance (Marchman & Dale, 2017). Cognitive abilities of participants were assessed using Raven's CPM as this task has been found to demonstrate high correlation with other non-verbal intelligence tests (Silleresi et al., 2020). This data ensures that the groups were comparable in nonverbal intelligence, ruling out confounding effects of cognitive disparities

Table 1. Autistic and TD children background characteristics.

	Autism	TD	*t*	*df*	*p*
Age *M* (SD)	6.5 (.39)	6.52 (.37)			
Male:female	27:5	27:5			
PPVT	94.50 (8.6)	96.63 (8.9)	−.96	61.89	.33
CPM	109.13 (15.9)	102.56 (15.6)	1.66	61.97	.1

TD: typically developing; PPVT: peabody picture vocabulary test; CPM: Raven's colored progressive matrices.
*$p < .005$; **$p < .001$.

Materials and methods

Receptive vocabulary (Peabody Picture Vocabulary Test [PPVT5]) (Dunn, 2018). The PPVT is a word receptive task, which is suitable for ages 2.5–99 years. The PPVT5 (Dunn, 2018) was used in its adapted Hebrew version (Isman et al., 2020). The task includes 240 items ranked by difficulty levels. For each item, the participant was presented with four pictures. The experimenter said the target word, and the child was asked to identify and point to the most appropriate picture. The instruction was: "I will say a word, and you will point to the appropriate picture." Each correct answer was awarded one point. The test was stopped when six out of eight consecutive responses were wrong. Test reliability (α) ranges between .67 and .84.

Nonverbal cognitive level (Raven's Colored Progressive Matrices (CPM)) (Raven, 2003). The CPM includes 36 items divided into three sets of 12 (set A, AB, and B). Within each set, items are ordered in increasing difficulty. Sets also vary in difficulty, with set B containing the most challenging items (Raven et al., 1989). No time limit was imposed for the task and the standard administration procedure described by Raven et al. was used. Correct answers were counted and converted into standard scores based on the participant's age as described in the original task.

Narrative production tasks. Two distinct types of narratives were selected—Fictional and Everyday narratives. The purpose of including diverse narrative types and modes was to investigate the narrative abilities of children with ASD in comparison to children with TD, while focusing on both macrostructure and microstructure levels. Each narrative was administered in a different session as detailed below.

Fictional narrative. "Baby Birds" and "Baby Goats" are six-picture sequences of a three-episode story from Litmus MAIN (Gagarina et al., 2012). The three episodes contain carefully constructed goal-attempt-outcome sequences for

specific characters. Both narratives are parallel in terms of length and grammar elements of the story, and both contain three episodes. First, the experimenter read the narrative aloud (Baby Goats), presenting six accompanying pictures. The participants were then asked to retell the narrative. In the next session, the participants were presented with six pictures of the additional narrative (Baby Birds), which they were asked to generate. Andreu et al. (2011) found that children with language impairments refer to less semantically relevant information when all pictures are displayed at once. Therefore, it was decided to display the pictures in a foldable form, two pictures at a time.

Everyday narratives. "Ice Cream" and "A Trip in the Forest" are picture sequences with six pictures depicting narratives containing character-problem-emotion-goal-attempt-outcome-internal state term sequences (Spencer et al., 2017). Both narratives are parallel in terms of length and grammatical elements of the story, and both contain one central character. First, the experimenter read aloud the narrative (Ice Cream) while presenting six accompanying pictures. Each picture represented a different part of the narrative: character, problem, emotion, goal, action, outcome and internal state terms (Fichman et al., 2017). The participants were then asked to retell the narrative. In the next session, the participants were presented with six pictures of an additional narrative (A Trip in the Forest), which they were asked to generate.

Narrative comprehension

After completing each narrative task (both fictional and everyday narratives, in generation and retelling), participants were presented with comprehension questions tailored to each narrative type (10 questions for fictional narratives and seven for everyday narratives). We focused on comprehension variables that were consistent across both types of narratives. Group comparisons were made using composite scores derived from the three question categories: General Understanding Questions, Conclusion Questions, and Emotion Detection Questions. These questions addressed three distinct aspects of comprehension:

1. General Understanding: Questions that assessed basic comprehension of the narrative's events (e.g., "Why is the cat climbing the tree?").
2. Conclusions: Questions that required participants to infer and explain causal relationships or outcomes (e.g., "Why is the dog grabbing the cat's tail?").
3. Emotion Detection: Questions designed to evaluate participants' ability to interpret and explain characters' emotional states (e.g., "How do you think the goat feels?").

Participants were asked to provide explanations for their answers, which were scored using a standardized system. A complete response, characterized by a connected or complex sentence or a detailed explanation involving complex emotions, received two points. A partial response, such as a simple one-word answer or a basic emotion, was awarded one point. Incorrect or unrelated responses were scored as zero.

Procedure

The research protocol received an IRB approval from the university and the Ministry of Education (approval number: 11162). Participants with autism were recruited by contacting six school principals, with two agreeing to participate. These principals involved teachers, who then reached out to 48 parents, resulting in 32 consenting. For TD participants, three principals were contacted, with one agreeing. The same process was followed, with 70 parents contacted and 32 consenting. Research tasks were conducted in participants' homes over four sessions, each lasting about 30 minutes. For participants with shorter attention spans, mainly those with autism, tasks were spread over five sessions. Each session included a cognitive background task and one narrative (generating/retelling and comprehension). To build rapport, the examiner played a short card game with the participant at the start of the first session. Administration sequence was consistent across all participants (Card game, Fictional narrative Baby Goats, CPM, Fictional narrative Baby Birds, PPVT, Everyday narrative Ice Cream, Everyday narrative A trip to the forest). At the end of each session, the participants received a sheet of stickers as a token of gratitude for their participation.

Data analysis

For the PPVT task (Dunn, 2018), responses were coded according to the original task scheme, and means along with standard deviations were computed for each group. Regarding the narrative tasks, both macrostructure and microstructure analyses were conducted for each participant's produced narratives. In terms of macrostructure, as previously described, the two story types had different approaches for analysis (Altman et al., 2016; Gagarina et al., 2019; Spencer et al., 2019). We used the largest common denominator for the coding scheme by calculating composite scores for the shared variables that were also part of Stein and Glenn's (1979) Story Grammar model Goal, Attempt, Outcome, and Internal State Terms (IST) (words or terms that express thoughts, feelings, desires, or mental states, providing insight into an individual's emotional and cognitive processes). This reduction enabled us to perform an exploratory *t*-test group comparison.

At the microstructure level, we analyzed clauses, C-units, NDW, MLCU (mean length of C-unit), content

words, function words, content to function ratio, total words, and Type-Token Ratio (TTR). Each measure was selected to capture distinct aspects of linguistic production. Clauses, C-units, and MLCU are widely recognized indicators of syntactic complexity and fluency (Nippold et al., 2007; Scott & Windsor, 2000). The NDW and TTR reflect lexical diversity, with TTR specifically measuring the balance between unique words (types) and total words (tokens) to assess vocabulary richness (Malvern et al., 2004). Content and function words provide insights into semantic richness and grammatical structuring, respectively (Berman & Slobin, 1994). To ensure reliability in data collection and analysis, 30% of the assessments and transcripts were independently coded by a second language expert. Measures included transcription accuracy and scoring consistency for the narrative tasks and the background tasks. Discrepancies were resolved through discussion until consensus was reached. A 95% agreement was achieved, reflecting high interrater reliability. This process was conducted systematically throughout data collection to minimize bias and enhance the internal validity of the study.

In order to test the interaction between the two groups and the different narrative types (Fictional/Everyday) and modes (Generating/Retelling) first on the macrostructure and then on the microstructure level, a post-hoc analysis of the Group × Mode interaction was performed using Tukey correction for each of the narrative types. For testing the differences between groups on the comprehension variables (as detailed above), *t*-tests were employed on group scores.

Results

This study examined the narrative abilities of children with autism compared to those with typical development (TD). It focused on two levels of narratives: the overall structure (macrostructure) and the linguistic details within the story (microstructure). It also focused on differences between types of narratives (Fictional vs. Everyday) and how the narratives were produced (generating a narrative vs. retelling one). The following sections provide a detailed account of the observed patterns, shedding light on the nuanced aspects of narrative production and then narrative comprehension within these two groups.

Macrostructure level

At the macrostructure level we used both *t*-tests and analysis of variance (ANOVA) in our analysis to address different research questions and ensure robust statistical interpretation of our data. The *t*-test was used to initially compare the two groups (Autism vs. TD) across the composite macrostructure narrative variables (Goal, Attempt, Outcome, and IST) for different narrative types (Fictional and Everyday) and modes (Generating and Retelling).

By applying composite scores for the shared variables Goal, Attempt, Outcome, and IST we conducted a statistical group analysis, streamlining the comparison process and reducing data complexity while preserving critical insights. Each macrostructure-level element was scored as follows: if the element appeared fully, it received two points; if it appeared partially, it received 1 point; and if the element was missing, it received 0 points. Therefore, the range of points for each macrostructure element was 0–2. Table 2 presents the average group scores for these elements.

Table 2 presents a *t*-test comparison of macrostructure-level elements (Goal, Attempt, Outcome, and IST) in narrative production between autistic and TD groups across different narrative types (Fictional and Everyday) and modes (Retelling and Generating). In fictional retelling narratives, significant differences were found between the autistic and the TD groups in Goal ($p = .04$) and IST ($p = .03$) in favor of the ASD group while the TD group had higher scores in the *Outcome* variable ($p = .02$). In the Attempt variable, no significant difference between groups were found. In the fictional generating narrative, a significant difference was found only for the *Attempt* variable with the TD group scoring higher ($p = .04$). In everyday narratives, there were no significant differences between the groups in the retelling mode across all variables. In the generating mode, a significant difference was found only in the *Outcome* variable ($p = .05$), with the TD group scoring higher. These results highlight that the most notable differences between autistic and TD groups were observed in fictional retelling narratives, suggesting differences in narrative elements such as Goal, Attempt, Outcome, and IST for children with autism.

While *t*-tests are appropriate for comparing two groups, they do not account for interactions between multiple variables, such as group, mode, and narrative type. Therefore, we performed an ANOVA to test for more complex relationships. In our study, the ANOVA allowed us to examine whether the relationship between the autistic and TD groups differed depending on the narrative mode (generating or retelling), and whether any significant group differences were influenced by the type of narrative (Fictional vs. Everyday). To test the interaction between the two groups and the different narrative types (Fictional/Everyday) and modes (generating/retelling), a post-hoc analysis of the Group × Mode interaction was performed using Tukey correction for each of the narrative types using the original variables of each narrative type for fictional narratives (Table 3), and for everyday narratives (Table 4).

Table 3 presents the macrostructure variables in fictional narratives, comparing children with autism and TD across two modes: generating and retelling. The results indicated that, for the *Setting* variable, no significant differences were found between groups, modes, or the interaction

Table 2. Macrostructure-level *t*-test comparison of autistic and TD groups on narrative production.

	Fictional						Everyday					
	Retelling			Generating			Retelling			Generating		
	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*
Goal	.63 (.49)	.41 (.49)	.04*	.43 (.5)	.62 (.49)	.68	.25 (.56)	.21 (.55)	.41	.09 (.29)	.06 (.35)	.35
Attempt	.78 (.42)	.84 (.36)	.26	.91 (.29)	1 (0)	.04*	1.46 (.8)	.56 (.8)	.32	.81 (.89)	.96 (.99)	.26
Outcome	.53 (.5)	.78 (.42)	.02*	.31 (.47)	.4 (.49)	.22	1.31 (.73)	1.46 (.71)	.19	1.18 (.59)	1.46 (.71)	.05*
IST	.41 (.49)	.19 (.39)	.03*	.12 (.33)	.06 (.24)	.2	.21 (.55)	.15 (.51)	.32	.06 (.24)	.09 (.39)	.35

TD: typically developing; IST: internal state terms.
*$p < .005$; **$p < .001$.

Table 3. Macrostructure-level variables for group (autism/TD) and mode (generating/retelling) in fictional narratives.

	Retelling		Generating				
	Autism	TD	Autism	TD	Group	Mode	Group × mode
Setting	.44 (.50)	.31 (.47)	.47 (.57)	.31 (.47)	$F(1, 124) = 2.48$, $p = .12$	$F(1, 124) = .03$, $p = .86$	$F(1, 124) = .03$, $p = .86$
Initiating event	.49 (.28)	.55 (.28)	.41 (.39)	.24 (.27)	$F(1, 124) = .9$, $p = .34$	**$F(1, 124) = 13.06$, $p < .001$, $\eta^2 = .10$**	**$F(1, 124) = 4.38$, $p = .04$, $\eta^2 = .03$**
Goal	.32 (.26)	.25 (.22)	.21 (.22)	.28 (.24)	$F(1, 124) = 0$, $p = 1$	$F(1, 124) = .99$, $p = .32$	$F(1, 124) = 3.03$, $p = .08$
Attempt	.59 (.25)	.58 (.27)	.83 (.24)	.83 (.19)	$F(1, 124) = .02$, $p = .9$	**$F(1, 124) = 33.72$, $p < .001$, $\eta^2 = .21$**	$F(1, 124) = .02$, $p = .9$
Outcome	.56 (.29)	.73 (.26)	.40 (.30)	.41 (.24)	$F(1, 124) = 3.41$, $p = .07$	**$F(1, 124) = 26.07$, $p < .001$, $\eta^2 = .17$**	$F(1, 124) = 2.66$, $p = .11$
IST	.17 (.19)	.09 (.15)	.06 (.13)	.04 (.11)	$F(1, 124) = 3.16$, $p = .08$	**$F(1, 124) = 8.77$, $p = .004$, $\eta^2 = .07$**	$F(1, 124) = .97$, $p = .33$

TD: typically developing; IST: internal state terms.
*$p < .005$, **$p < .001$.
Bold values show significant outcomes.

Table 4. Macrostructure-level variables for group (autism/TD) and mode (generating/retelling) in everyday narrative.

	Retelling Autism	TD	Generating Autism	TD	Group	Mode	Group × mode
Character	1.50 (.56)	1.56 (.56)	1.09 (0.46)	1.09 (.39)	$F(1, 124) = .12$, $p = .73$	**$F(1, 124) = 24.26$, $p < .001$, $\eta^2 = .16$**	$F(1, 124) = .12$, $p = .73$
Problem	1.15 (.44)	1.28 (.58)	1.25 (0.62)	1.31 (.54)	$F(1, 124) = .93$, $p = .34$	$F(1, 124) = .41$, $p = .52$	$F(1, 124) = .10$, $p = .75$
Emotion	.21 (.55)	.22 (.55)	.31 (.53)	.28 (.68)	$F(1, 124) = .02$, $p = .88$	$F(1, 124) = .57$, $p = .45$	$F(1, 124) = .02$, $p = .88$
Goal	.25 (.56)	.22 (.55)	.09 (.29)	.06 (.35)	$F(1, 124) = .15$, $p = .70$	$F(1, 124) = 3.72$, $p = .06$	$F(1, 124) = 0$, $p = 1$
Action	1.46 (.80)	1.56 (.80)	.81 (.89)	.97 (1.00)	$F(1, 124) = .65$, $p = .42$	**$F(1, 124) = 16.20$, $p < .001$, $\eta^2 = .12$**	$F(1, 124) = .04$, $p = .84$
Outcome	1.31 (.73)	1.47 (.72)	1.18 (.59)	1.47 (.72)	$F(1, 124) = 3.18$, $p = .08$	$F(1, 124) = .26$, $p = .61$	$F(1, 124) = .26$, $p = .61$
IST	0.21 (.55)	.16 (.51)	.06 (.24)	.09 (.39)	$F(1, 124) = .04$, $p = .84$	$F(1, 124) = 1.95$, $p = .16$	$F(1, 124) = .36$, $p = .55$

TD: typically developing; IST: internal state terms.
*$p < .005$, **$p < .001$.
Bold values show significant outcomes.

between group and mode, as revealed by a non-significant main effect for group [$F(1, 124) = 2.48$, $p = .12$], mode [$F(1, 124) = .03$, $p = .86$], and the interaction [$F(1, 124) = 0.03$, $p = .86$]. For the Initiating event, a significant effect of mode was observed [$F(1, 124) = 13.06$, $p < .001$, $\eta^2 = .10$], as well as a significant interaction between group and mode [$F(1, 124) = 4.38$, $p = .04$, $\eta^2 = .03$], with children in the TD group producing more initiating events during retelling compared to the generating condition. Additionally, a significant mode effect was found for Attempt [$F(1, 124) = 33.72$, $p < .001$, $\eta^2 = .21$], with both groups producing more attempts during generating compared to retelling. In terms thein terms of the Outcome… Outcome variable, a significant mode effect was detected [$F(1, 124) = 26.07$, $p < .001$, $\eta^2 = .17$], with higher outcome production during retelling. For the IST variable, the mode effect was also significant [$F(1, 124) = 8.77$, $p = .004$, $\eta^2 = .07$], but no significant differences were found between groups or the interaction between group and mode.

Table 4 summarizes the macrostructure variables for everyday narratives, examining differences between children with autism and TD across retelling and generating conditions. The results for Character revealed a significant main effect for mode [$F(1, 124) = 24.26$, $p < .001$, $\eta^2 = .16$], with higher Character mention in the retelling condition. However, no significant group differences or interaction effects were observed for this variable. Similarly, for the Action variable, a significant mode effect was found [$F(1, 124) = 16.20$, $p < .001$, $\eta^2 = .12$], indicating that children in both groups produced more actions during retelling compared to telling. No significant effects were detected for other variables, including Problem, Emotion, Goal, Outcome, and IST, highlighting the lack of group or interaction effects across conditions.

Microstructure level

We examined the microstructure variables of narrative production in children with autism and their TD peers, focusing on nine key elements across four narrative types to identify significant group differences. Detailed comparisons and post-hoc analysis explored how these elements appeared in both fictional and everyday narratives, in generating and retelling modes. Table 5 shows the microstructure variables for fictional narratives, while Table 6 compares performance on everyday narratives for both groups.

As shown in Tables 5 and 6, no significant differences were found between groups or modes for the NDW or MLCU.

In fictional narratives, TD children produced significantly more clauses than autistic children in both generating and retelling modes [$F(1, 124) = 7.62$, $p = .007$, $\eta^2 = .06$].

Table 5. Microstructure-level variables for group (autism/TD) and mode (retelling/generating) for fictional narratives.

	Retelling Autism	TD	Generating Autism	TD	Group	Mode	Group × mode
Clauses	7.25 (3.3)	8.93 (3.82)	6.56 (2.87)	8.03 (2.83)	**$F(1, 124) = 7.62$, $p = .007$, $\eta^2 = 0.06$**	$F(1, 124) = 1.94$, $p = .17$	$F(1, 124) = .04$, $p = .85$
C-units	8.93 (2.55)	9.68 (3.62)	8.56 (3.2)	9 (2.52)	$F(1, 124) = 1.24$, $p = .27$	$F(1, 124) = .99$, $p = .32$	$F(1, 124) = .09$, $p = .77$
NDW	30.46 (7.81)	29.53 (10.28)	29.65 (11.09)	31.71 (7.16)	$F(1, 124) = .05$, $p = .83$	$F(1, 124) = .04$, $p = .84$	$F(1, 124) = .29$, $p = .59$
MLCU	5.34 (1.61)	5.28 (1.44)	5.25 (1.68)	5.56 (1.38)	$F(1, 124) = .21$, $p = .65$	$F(1, 124) = .12$, $p = .73$	$F(1, 124) = .48$, $p = .49$
Content words	19.4 (4.75)	19.5 (6.22)	19.4 (6.91)	20.03 (4.31)	$F(1, 124) = .05$, $p = .83$	$F(1, 124) = .36$, $p = .55$	**$F(1, 124) = 6.11$, $p = .01$, $\eta^2 = .05$**
Function words	11.06 (3.8)	10.03 (4.67)	10.25 (4.78)	11.68 (3.59)	$F(1, 124) = .05$, $p = .83$	$F(1, 124) = .36$, $p = .55$	**$F(1, 124) = 6.11$, $p = .01$, $\eta^2 = .05$**
Content to function ratio	1.86 (.43)	2.17 (.67)	2.08 (.60)	1.93 (1.08)	$F(1, 124) = .39$, $p = .53$	$F(1, 124) = .01$, $p = .92$	$F(1, 124) = 3.15$, $p = .08$
Total words	52.25 (15.76)	52.78 (20.95)	47.43 (17.49)	49.78 (13.26)	$F(1, 124) = .23$, $p = .64$	$F(1, 124) = 1.67$, $p = .20$	$F(1, 124) = .90$, $p = .77$
TTR	62.90 (8.72)	61.27 (10.12)	67.62 (8.8)	66.63 (15.09)	$F(1, 124) = .45$, $p = .50$	**$F(1, 124) = 6.73$, $p = .01$, $\eta^2 = .06$**	$F(1, 124) = .03$, $p = .87$

Clauses: *M* productions; C-units: *M* productions; NDW: number of different words; MLCU: mean length of C-units; Content words: percent of content words out of NDW; Function words: percent of function words out of NDW; TTR: Type-Token Ratio.
Bold values show significant outcomes.

Table 6. Microstructure-level variables for group (autism/TD) and mode (generating/retelling) in everyday narratives.

	Retelling Autism	TD	Generating Autism	TD	Group	Mode	Group × mode
Clauses	5.71 (1.7)	6.84 (2.7)	4.21 (2.25)	5.43 (1.98)	**$F(1, 124) = 9.14$, $p = .003$, $\eta^2 = .07$**	**$F(1, 124) = 14.06$, $p < .001$, $\eta^2 = .10$**	$F(1, 124) = .02$, $p = .90$
C-units	7.37 (2.12)	8.12 (2.33)	6.59 (1.73)	6.93 (2.16)	$F(1, 124) = 2.16$, $p = .14$	**$F(1, 124) = 7.01$, $p = .009$, $\eta^2 = .05$**	$F(1, 124) = .30$, $p = .59$
NDW	27 (7.42)	27.75 (7.99)	25.75 (8.06)	26.62 (7.98)	$F(1, 124) = .27$, $p = .60$	$F(1, 124) = 1.90$, $p = .17$	$F(1, 124) = .39$, $p = .53$
MLCU	5.75 (1.27)	5.62 (1.36)	5.56 (1.13)	6 (1.41)	$F(1, 124) = .46$, $p = .50$	$F(1, 124) = 1.17$, $p = .68$	$F(1, 124) = 1.50$, $p = .22$
Content	17.03 (4.1)	18.53 (4.97)	15.59 (4.94)	16.78 (4.46)	**$F(1, 124) = 6.23$, $p = .01$, $\eta^2 = .05$**	**$F(1, 124) = 6.57$, $p = .01$, $\eta^2 = .05$**	$F(1, 124) = .01$, $p = .92$
Function	9.96 (4.09)	9.21 (3.7)	10.15 (4.13)	9.84 (4.28)	**$F(1, 124) = 6.23$, $p = .01$, $\eta^2 = .05$**	**$F(1, 124) = 6.57$, $p = .01$, $\eta^2 = .05$**	$F(1, 124) = .01$, $p = .92$
Content to function ratio	1.96 (.83)	2.34 (1.36)	1.64 (.57)	1.91 (.68)	**$F(1, 124) = 4.12$, $p = .04$, $\eta^2 = .03$**	**$F(1, 124) = 5.31$, $p = .02$, $\eta^2 = .04$**	$F(1, 124) = .12$, $p = .72$
Total Words	46.4 (14.84)	46.93 (15.75)	40.43 (11.51)	42.12 (15.04)	$F(1, 124) = .19$, $p = .66$	**$F(1, 124) = 4.50$, $p = .04$, $\eta^2 = .03$**	$F(1, 124) = .05$, $p = .82$
TTR	63.88 (11.72)	62.25 (7.01)	64.92 (12.7)	68.35 (12.83)	$F(1, 124) = .20$, $p = .66$	$F(1, 124) = 3.17$, $p = .08$	$F(1, 124) = .59$, $p = .21$

Clauses: *M* productions; C-units: *M* productions; NDW: number of different words; MLCU: mean length of C-units; Content words: percent of content words out of NDW; function words: percent of function words out of NDW; TTR: Type-Token Ratio.
Bold values show significant outcomes.

Table 7. Macrostructure-level *t*-test comparison of autistic and TD groups on narrative comprehension.

	Fictional						Everyday					
	Retelling			Generating			Retelling			Generating		
	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*	Autism *M* (SD)	TD *M* (SD)	*p*
General understanding	1 (0)	.90 (.29)	.43	.78 (.42)	.78 (.42)	.48	1.38 (.32)	1.34 (.35)	.45	1.18 (.36)	1.21 (.46)	.5
Conclusion	.87 (.21)	.92 (.18)	.49	.92 (.18)	.92 (.18)	1	1.4 (.43)	1.5 (.47)	.48	1.37 (.55)	1.32 (.64)	.37
Emotion detecting	.96 (.12)	.95 (.14)	.47	.73 (.25)	.70 (.24)	.46	1.79 (.30)	1.78 (.33)	.47	1.79 (.35)	1.70 (.47	.18

*p < .005, **p < .001.

Interaction effects were found for content words [$F(1, 124) = 6.11$, $p = .01$, $\eta^2 = .05$] and function words [$F(1, 124) = 6.11$, $p = .01$, $\eta^2 = .05$], indicating that TD children used more content and function words in the generating mode, while autistic children used more function words in the retelling mode. Additionally, the TTR variable was significantly higher in the generating mode [$F(1, 124) = 6.73$, $p = .01$, $\eta^2 = .06$], suggesting greater lexical diversity in generating a narrative.

In everyday narratives, significant group and mode differences were found for clause (group $F(1, 124) = 9.14$, $p = .003$, $\eta^2 = .07$; mode $F(1, 124) = 14.06$, $p < .001$, $\eta^2 = 0.10$), content words (group $F(1, 124) = 6.23$, $p = .01$, $\eta^2 = .05$; mode $F(1, 124) = 6.57$, $p = .01$, $\eta^2 = .05$) and content to function ratio (group $F(1, 124) = 4.12$, $p = .04$, $\eta^2 = .03$; mode $F(1, 124) = 5.31$, $p = .02$, $\eta 2 = 0.04$) in favor of the ASD group and in function words in favor of the TD group (group $F(1, 124) = 6.23$, $p = .01$, $\eta^2 = .05$; mode $F(1, 124) = 6.57$, $p = .01$, $\eta^2 = .05$). Here, TD children produced more of this variable in the generating mode. Mode effects also influenced C-units [$F(1, 124) = 7.01$, $p = .009$, $\eta^2 = .05$], and Total words [$F(1, 124) = 4.50$, $p = .04$, $\eta^2 = .03$].

In summary, the analysis revealed both similarities and differences in microstructure variables between children with autism and their TD peers. While the two groups showed comparable performance in NDW, MLCU, and C-units across narrative types, differences were particularly evident in the use of clauses, content and function words, especially in the context of everyday retelling narratives.

Narrative comprehension

The analysis of narrative comprehension between the autistic and TD groups revealed similarities albeit small differences across various aspects. By focusing on the composite scores for General Understanding, Conclusion, and Emotion Detecting, we were able to compare the two groups. The results provide a detailed comparison of how participants from each group understand Fictional and Everyday narratives. Table 7 shows the group comparisons across various comprehension variables evaluated at the end of each narrative.

Table 7 demonstrates that no significant differences were discerned between the groups. Moreover, for most variables, both groups exhibited ceiling levels of performance, indicating that children with autism comprehended the narratives as proficiently as their TD peers.

Discussion

This study investigated the narrative abilities of school-aged autistic children compared to their TD peers, focusing on macrostructure and microstructure elements across various narrative types and modes. Both groups exhibited similar

patterns in narrative production, with no significant differences in comprehension. The following sections discuss the results at the microstructure and macrostructure levels.

Our analysis of macrostructure elements revealed distinct patterns between fictional and everyday narrative types. Differences between narrative types were found in variables like Attempt, Outcome and IST, in the and in Character and Action in the everyday narratives. fictional narratives. Lower scores in Outcome for the autistic group suggest difficulties in grasping and conveying the story's structure and resolution, supporting previous research that children with autism may struggle with higher-order cognitive processes like planning and integrating story elements (Baixauli et al., 2016; Capps et al., 2000). The higher scores in IST for the autistic group are particularly intriguing. They suggest that while children with autism may struggle with the structural aspects of narratives, they might be more attuned to or focused on the emotional and psychological states of characters. This could be indicative of a cognitive processing style where children with autism prioritize or are more focused on specific aspects of the narrative, such as the emotional or psychological states of characters, rather than its structural elements. This attentional bias toward detail-oriented or socially salient information may provide a foundation for targeted interventions. Narrative interventions could be tailored to leverage these strengths in IST while addressing structural challenges. For example, several studies (Gillam et al., 2015; Henry et al., 2021) found that interventions that explicitly teach story complexity and structure, while simultaneously encouraging the use of mental state and causal language, could help children with autism integrate their attentiveness to emotional and psychological states into more cohesive narratives.

In everyday narratives, the lack of significant differences in most elements, except for the *Outcome* in the generating condition, suggests that familiar contexts may help bridge some of the narrative gaps observed in more abstract, fictional contexts. This aligns with the idea that everyday experiences, being more concrete and relatable, provide a stronger scaffold for narrative construction in children with autism. The distinct challenges in fictional narratives suggest that targeted support is needed to help children with autism develop skills in goal-setting and outcome articulation. Interventions could include structured story planning exercises and explicit teaching of narrative structures as was found to be effective in the study by Tam et al. (2022). Additionally, the focus on IST in autistic narratives indicates a strength that can be leveraged. Therapists and educators can build on this ability to enhance overall narrative structure and integration, using children's awareness of internal states as a foundation for developing more complex narrative skills.

At the microstructure level, children with autism performed similarly to their TD peers, but key differences emerged. Notably, TD children produced more clauses than those with autism, indicating potential differences in syntactic structure use. However, further analysis of clause types and syntactic features is needed to fully assess syntactic complexity (Baixauli et al., 2016; Losh & Capps, 2003; Norbury & Bishop, 2003). In contrast, children with autism showed greater use of function words, likely reflecting the emphasis on vocabulary expansion and basic linguistic elements in Speech Language Therapy during early education in special education preschools in Israel. This raises the question: If autistic children received focused interventions, why did TD children still produce more clauses? One explanation is that therapy may prioritize vocabulary over complex syntax, such as clauses, leaving more advanced syntactic skills underdeveloped. Previous research supports this notion, showing that while autistic children may catch up in vocabulary, they continue to struggle with complex syntax (Meir & Novogrodsky, 2020; Sukenik, 2023; Sukenik & Friedmann, 2018). The gap in clause production suggests that further targeted interventions may be beneficial to improve narrative abilities in children with autism. Another explanation may be, that while we controlled for vocabulary levels (i.e., PPVT), we did not control the groups for syntactic levels. Previous research has found that while children with autism may perform well on vocabulary tasks, these tasks are not always indicative of syntactic impairments or DLD as was found in Sukenik (2017).

Although TD children outperformed children with autism in several macrostructural (e.g., inclusion of key story elements) and microstructural (e.g., number of clauses) aspects of narrative production, there were instances, especially in narrative retelling tasks where children with autism performed comparably or even achieved higher scores. These differences, while not always statistically significant, indicate that children with autism may perform better in structured or familiar narrative contexts such as everyday retelling narratives, compared to spontaneous production. This suggests that conventional narrative measures that in many cases utilize fictional picture elicitation tasks may not fully capture the narrative strengths of children with autism, especially in tasks where the structure or content is vaguely provided. These results highlight the importance of task context, suggesting that children with autism may perform better in structured or familiar narrative contexts, such as everyday retelling narratives, than in spontaneous production. Familiar contexts likely provide a scaffold that reduces cognitive demands, enabling children with autism to focus on producing coherent and detailed narratives. This aligns with previous research indicating that structure and familiarity can mitigate narrative difficulties in autism by supporting memory retrieval and organizing story elements (Diehl et al., 2006; Westerveld et al., 2020). However, these findings also underscore a limitation of conventional narrative measures, which often rely on fictional picture elicitation tasks. Such tasks, with

their abstract and open-ended nature, may not fully capture the narrative strengths of children with autism, particularly in contexts where the structure or content is vaguely provided. This observation is consistent with studies suggesting that children with autism benefit from narrative interventions that incorporate structured supports, such as visual aids or guided storytelling frameworks (Gillam et al., 2015; Henry et al., 2021).

For educators and therapists, this suggests a need to diversify narrative assessment methods to include tasks that reflect both structured and spontaneous narrative contexts. Incorporating everyday retelling tasks into assessments could provide a more accurate representation of the narrative abilities of children with autism, highlighting strengths that may be overlooked in more abstract tasks. Similarly, interventions that emphasize familiar and structured narrative formats, while gradually introducing elements of spontaneity and abstraction, may help bridge the gap between familiar and novel storytelling contexts. By doing so, practitioners can better support the development of narrative skills that are transferable to real-world communication situations.

Our investigation into *narrative comprehension* abilities of autistic children compared to their TD peers yielded intriguing findings. Contrary to initial expectations, there were no significant differences between the two groups in terms of narrative comprehension across various narrative types and modes. This result challenges common assumptions about the comprehension abilities of children with autism, given their known difficulties in social communication and language processing. The similarity in comprehension performance between the autistic and TD groups is noteworthy, especially considering the extensive literature documenting comprehension challenges in children with autism (Capps et al., 2000; Chen & Chang, 2005; Norbury et al., 2014; Sah & Torng, 2015). One possible explanation is that the groups were matched on receptive vocabulary, which may have mitigated some differences in comprehension performance, even if they differed in syntactic abilities. Additionally, children with autism may have employed compensatory strategies, such as relying on visual cues, context, and prior knowledge, to support comprehension and overcome social communication deficits. Alternatively, the narrative tasks in this study might not have been sufficiently sensitive to capture the subtle comprehension difficulties often reported in children with autism, as the tasks may have been more concrete or straightforward, reducing the complexity of narrative comprehension. Finally, it is possible that the children with autism in this study had access to early and intensive interventions that contributed to enhanced narrative comprehension skills. In future studies, employing more complex and varied narrative tasks could provide a deeper understanding of the specific comprehension challenges faced by autistic children. Tasks that require inference, understanding of figurative language, and grasping the intentions behind characters' actions might reveal more about their comprehension abilities. Furthermore, the presence of notable variability in comprehension performance within the autistic group suggests a need to explore individual differences more thoroughly. Factors such as cognitive abilities, language proficiency, and social skills should be examined to understand their impact on narrative comprehension.

Our study revealed significant differences in narrative production between generating and retelling modes, highlighting the impact of narrative mode on narrative skills. Both groups performed similarly in comprehension, but their narrative production varied, with mode influencing each group's abilities differently. Fictional narratives were particularly sensitive to group differences, often requiring higher-order cognitive processes like generating fictional scenarios, understanding characters' motivations, and predicting outcomes. These tasks are challenging for autistic individuals due to difficulties with perspective-taking and theory of mind (Hamilton et al., 2009). The retelling of fictional narratives was especially difficult for children with autism, whereas TD children's higher clause production allowed for more complex sentences and better performance in Story Grammar elements. This aligns with previous research indicating struggles with abstract thinking and perspective-taking in children with autism (Uddin, 2021). Conversely, everyday narratives, based on familiar experiences, elicited more consistent structures and content, making them more accessible to autistic individuals. This suggests that the type of narrative task significantly influences how children with autism demonstrate their linguistic skills, with the level of abstraction and complexity in fictional narratives contributing to differences in narrative structure and organization.

Study limitations

This study has several limitations. First, both groups had small sample sizes, with 32 participants each. Additionally, all participants were high-functioning, matched by age and receptive vocabulary scores (PPVT), which may limit the generalizability of the findings to the broader autism population. Notably, while we controlled for vocabulary levels using the PPVT, we did not control for syntactic levels. Future studies should control for syntax which may influence the results. Future research should include larger cohorts with a wider age range to provide developmental insights and a clearer understanding of the impact of speech–language pathology (SLP) treatments. Furthermore, given the variations in results across different narrative types and modes, including a post-task questionnaire could be valuable. This would allow participants to share which narratives they found easier to produce and explain why. Comparing these responses with the study's results could help assess the alignment between subjective experiences and objective findings. Future research could

focus on analyzing the individual profiles of children with autism to gain deeper insights into their narrative abilities. Investigating how background factors such as cognition, schooling, therapy, or parental speech influence their proficiency could provide a more comprehensive understanding of these influences. While this study did not differentiate participants based on *ICD-11* linguistic subtypes, future research could explore how specific subtypes of autism, categorized by linguistic and intellectual profiles, impact narrative skills. Such an approach would provide a deeper understanding of how individual differences shape narrative production and comprehension and could inform more targeted intervention strategies. Additionally, employing mixed-effects models to examine within-group variability would help uncover the individual differences within the autistic group.

Conclusions

This study provides a detailed analysis of narrative abilities in autistic children, examining both macrostructure and microstructure levels. It found that 6–8 year-old autistic children demonstrate narrative production and comprehension abilities comparable to their TD peers. A key insight from our research is the risk of overlooking subtleties in routine linguistic evaluations, which often focus on superficial aspects like word variety, character names, and stating the problem. Such oversights may incorrectly suggest that a child with autism no longer needs SLP support. Our findings indicate that, while children with autism can produce narratives, they still struggle with complex syntactic structures and specific word types. Moreover, our results show variability in performance both within the autistic group and compared to TD peers, depending on the narrative type and mode. This suggests that relying on a single type of narrative for assessment could distort the understanding of a child's narrative abilities, potentially leading to inaccurate assessments of their skills and the effectiveness of interventions. Notably, fictional narratives highlighted significant group differences, revealing the nuanced linguistic challenges that persist despite overall proficiency. These findings underscore the importance of clinicians and educators adopting a vigilant and nuanced approach when assessing and supporting narrative skills in children with autism.

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Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Ethical approval and informed consent statement

The study was approved by the IRB at Bar Ilan University and the ministry of education. Informed consent was obtained from all participants and their legal guardians prior to participation in this research.

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Note

1. In this manuscript, we use the term "children with autism" or "autistic children" rather than "children with ASD." We recognize the ongoing discussion regarding preferred terminology within the autism community and the shift toward identity-first language (e.g., "autistic children"). However, we chose "children with autism" to align with terminology commonly used in prior research, ensuring consistency and clarity for readers familiar with this body of literature. Additionally, "children with autism" is a term often used in clinical and educational contexts, reflecting a broader audience's familiarity. We acknowledge that preferences for terminology vary and respect the diversity of perspectives within the autism community.

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