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How do students with intellectual disabilities tell stories? An investigation of narrative macrostructure and microstructure

Carmit Altman[1,2] 🄳 | Ilanit Avraham[1,3] 🄳 | Shlomit Shnitzer Meirovich[4] |
Hefziba Lifshitz[1] 🄳

[1]Faculty of Education, Bar Ilan University, Ramat Gan, Israel

[2]The Gonda Multidisciplinary Brain Research Center, Ramat Gan, Israel

[3]Efrata College of Education, Jerusalem, Israel

[4]Levinsky College of Education, Tel Aviv, Israel

Correspondence
Ilanit Avraham, School of Education, Bar Ilan University, Ramat Gan 52900, Israel.
Email: ilanitav@emef.ac.il

Abstract

Individuals with intellectual disability may have limited narrative skills. The novelty of this study lies in the examination of strengths and weaknesses which may enable a more facilitative approach to narrative and other storytelling-based methodologies among adults with intellectual disability who study in an academic enrichment program in comparison to typical students with the same chronological age. Seventeen adult students with intellectual disability and 16 typically developing students, produced narratives which were examined for microstructure (e.g., length, lexis, grammaticality, and complexity) macrostructure (e.g., goals, attempts, and outcomes) and Internal state terms (ISTs). The findings indicate that in spite of weakness of adults with intellectual disability in terms of coherence, syntactic complexity, and grammatical sentences, they exhibit strengths in narrative macrostructure story scheme and use IST. With increasing age, narratives performance of adults with intellectual disability continues to advance possibly due to maturity, life experience and indirect exposure to the environment.

KEYWORDS
intellectual disability, macrostructure, internal state terms, microstructure, narrative

1 | INTRODUCTION

Using narratives is a functional skill and a mean for sharing stories which consist of a single event or causally related events (Westby & Culatta, 2016). Storytelling has been associated with educational accomplishments, social inclusion, and emotional empowerment (Grove, 2014; Isitan et al., 2018). which is of utmost importance especially for individuals with disabilities. The current study attempts to profile the microstructure (e.g., story length, lexis, and morphosyntax), macrostructure (e.g., goals, attempts, and outcomes), and i state terms (IST) narrative abilities

of adults with mild intellectual disability who participate in post-secondary education.

1.1 | Narrative

Narration is the act of telling a story in a sequential and consecutive order (Labov, 2013; Westby & Culatta, 2016). According to one widely adopted model (Stein & Glenn, 1979), effective narration depends on microstructure (e.g., vocabulary and syntax) and macrostructure (e.g., story structure). Given their frequency, narratives are used to study

spoken language and are often an indication of spontaneous language with distinctive structural and linguistic form (Berman & Slobin, 1994). Narrative production requires perspective assumptions about the character's goals, her attempts to achieve those goals and the outcome of these attempts (Trabasso & Nickels, 1992). Narrative ability is a key factor in reading comprehension (Barton-Hulsey et al., 2017; Stein & Trabasso, 1982; Trabasso & Nickels, 1992) and has been associated with social and academic development (Spencer & Petersen, 2018).

1.2 | Microstructure and macrostructure as a mean of analysing narratives

Microstructure encompasses a wide range of linguistic elements that indicate the way the storyteller arranges words into utterances used to convey story content. Microstructure elements include measures of word frequency, proportion of content words (i.e., nouns and verbs), grammaticality and sentence complexity (Justice et al., 2006; Miller et al., 2016; Muñoz et al., 2003).

Macrostructure relates to global overall coherence and organisation of events using story grammar rules which include, Setting, Initiating Event (IE), Goals (G), Attempts (A), Outcomes (O), and Ending (Stein & Glenn, 1979). According to this organisation, narratives (with one or more episodes) begin with a setting introducing the characters, time and place. Main elements in a story are: (1) an initiating event that causes a change of state in the story and promotes an internal response on the part of the main character(s), (2) a goal which is a reaction to the initiating event reflecting the character's motivation to solve the problem or need, (3) an attempt of a character to achieve the goal followed by (4) an outcome (Ukrainetz, 2015). Causal relations consist of Enabling (exists between two Attempts forming a connection between episodes), Physical (connects an Attempt and Outcome in an episode), Motivational (connects a Goal and an Attempt within episodes), and Psychological relations (connects an Internal Response [triggered by an Attempt] and a Goal between episodes) (Trabasso & Nickels, 1992). Causal relations are also essential elements in macrostructure analysis indicating the ability of generating a constructed whole story (Gagarina et al., 2012).

Coherence represents the story structure, how the events are organised into a well-formed story (Justice et al., 2006). The coherence of the narrative relies on the ability to maintain thematic discourse (Glosser & Deser, 1992). Coherence is examined by global and local measures. Global coherence relates to the connection to the main topic discussed. Local coherence refers to the internal connection of a given sentence to the previous sentences.

Internal State Terms (IST) represent a speaker's interpretation of characters' intentions and feelings (Burns et al., 2012). Well-organised stories with a clear beginning, middle, and end may sound incomplete if they lack evaluative devices such as ISTs (Berman & Katzenberger, 2004). In this way, ISTs are associated with narrative macrostructure, since they assist in conveying crucial macrostructure elements in each episode, such as Initiating Events, Goals, and character's reactions (Gagarina et al., 2012). In support of this claim, research has shown that one of the differences between a temporally ordered list of

actions, which characterises the narratives of very young children, and a well-structured narrative is the use of different types of ISTs, such as perceptual terms ('see') and emotional terms ('sad', 'happy') (Berman & Slobin, 1994). ISTs are also grounded in lexical and semantic knowledge (Florit et al., 2011) and as such reflect microstructure knowledge as well.

1.3 | Narrative language profiles in individuals with developmental disabilities

Few studies focus on narratives produced by adult individuals with intellectual disability. Studies focus more specifically on children and adolescents with **non-specific** intellectual disability (NSID) and individuals with Down syndrome (Channell et al., 2015; Finestack & Abbeduto, 2010; Price et al., 2008). In terms of microstructure, participants with intellectual disability do not show differences in measures of mean number of words per utterance in comparison to younger children with Typical Development (TD), yet they use lower register and less complex syntax (Finestack et al., 2012). Finestack and Abbeduto (2010) showed that adolescents with Down Syndrome and with Fragile X syndrome (FXS) outperformed children with TD in macrostructure measures yet not in terms of microstructure measures (e.g., word types, sentence complexity and grammaticality). These findings indicate that adolescents and young adults with Down syndrome and FXS may have relative strengths in narrative macrostructure that can be explained by the age of the participants and their life experience, even though elements of microstructure may be significantly below average (Facon & Facon-Bollengier, 1999).

Channell et al. (2015) who examined children with Down syndrome (MCA-12.80) compared to 22 children with FXS (MCA-12.33) and TD children (MCA-4.48) found that participants with Down syndrome used fewer verbs and produced fewer story scheme elements in their narratives than TD participants. Another study focused on narratives produced by adolescents and young adults with Down syndrome (MCA-16.9) and FXS (MCA-4.95) and TD children (MCA-4.82) showed that participants with Down syndrome and with FXS outperformed the participants with TD in macrostructure measures apparent in the use of setting, character development, goals, outcomes and cohesion of events. This may signal that participants with intellectual disability may benefit from older chronological age.

The uniqueness of the current study lies in its attempt to profile the narrative macrostructure, microstructure and IST of adult students with intellectual disability who participated in Post-Secondary Education (PSE) Empowerment project for adults with intellectual disability offered by the Faculty of Education at Bar-Ilan University.

1.4 | Empowerment project: Inclusion of adults with intellectual disability in academia

The UN convention for persons with disabilities states: 'Inclusive education system at all levels and lifelong learning directed to:

The full development of human potential, talent and creativity...' (UN, 2006, pp. 20). In line with the UN agenda, the Faculty of Education at Bar-Ilan University launched the inclusion Empowerment Project for adults with intellectual disability. In a Separate/hybrid model, which offers adapted enrichment courses (Papay & Grigal, 2019; Lifshitz, 2020; Plotner & Marshall, 2015), students with mild intellectual disability attend a weekly program for four academic-adapted courses. Another group of students with intellectual disability participate in the adapted enrichment model in which typical students and students with intellectual disability study together and conduct mutual research in an undergraduate research seminar on 'Lifelong Learning of Individuals with Disability'. The role of the students with intellectual disability is to learn to collect data, analyse results, draw conclusions, and present their study. The educational objectives are: to acquire academic subjects that are population appropriate, to develop learning strategies and to conduct small research projects using the computer lab. The social objectives are: to expose students with intellectual disability to the typical students in class and during breaks, to expand the friendship circle of students with intellectual disability, to empower and strengthen their self-image, confidence, and quality of life, and to construct positive attitudes towards individuals with disability among the traditional students. The students received a certificate of participation upon completion.

The theoretical basis of the Empowerment project is anchored in two theories: The Compensation Age Theory and the Structural Cognitive Modifiability. *The Compensation Age Theory* (Lifshitz, 2020; Lifshitz-Vahav & Haguel, 2015) postulated that chronological age plays an important role in determining the cognitive ability of individuals with intellectual disability beyond their mental age. In later years, there is compensation for the developmental delay experienced by individuals with intellectual disability. Their intelligence may continue to increase until their 50s (Chen et al., 2017), thus modifying their intellectual disability at an advanced age. *The Structural Cognitive Modifiability Theory* (Feuerstein & Rand, 1974; Feuerstein, 2008) postulates that humans have a system accessible to change as a result of environmental intervention, even in the presence of three formidable obstacles usually believed to prevent change: age, aetiology, and severity of limitation.

1.5 | The present study

This study aims to examine narratives in terms of microstructure, macrostructure and IST use of students with intellectual disability who study in PSE (empowerment) project in comparison to students with similar chronological age. The operative goals are: (a) to examine the similarities and differences in narrative measures-microstructure, macrostructure and IST-between the students with intellectual disability and TD (b) to examine the association between background characteristics of participants (chronological age, mental age) and narrative measures.

Our hypotheses are that in terms of *Microstructure*, students with intellectual disability are expected to differ compared to the TD students in measures of number of different words, total words, grammatical utterances, and complex utterances, but not as much as in

former studies (Barton-Hulsey et al. (2017); Channell et al., 2015) which examined younger participants. In terms of macrostructure, adults with intellectual disability are expected to produce a story including characters, characters' goals, attempts and outcomes (Barton-Hulsey et al., 2017; Channell et al., 2015; Finestack et al., 2012; Lifshitz, 2020). With regards to ISTs, in the absence of research on IST in individuals with intellectual disability, we assume that since ISTs are more complex and grounded in lexical and semantic knowledge (Florit et al., 2011) and are used later in development (Trabasso & Nickels, 1992) they will be used less in comparison to TD peers. Finally, based on the link between narration and academic development (Spencer & Petersen, 2018) and the Compensation Age Theory in intellectual disability (Lifshitz-Vahav & Haguel, 2015, 2020), our hypothesis is that narrative language of adult students with intellectual disability will be more similar to participants with TD than in former studies focusing on children and adolescents with intellectual disability.

2 | METHOD

2.1 | Participants

The sample included 33 participants studying at Bar-Ilan University, age range: 22–55 years ($M = 33.52$, $SD = 10.64$). There were two groups, one of 10 females and 7 males with Intellectual Disability at a mean age of 41.65 ($SD = 8.85$) and one TD group of 10 females and 6 males aged 24.87 ($SD = 1.82$). Following Chi-Squared analyses, no gender differences were found between the groups $\chi^2 (1) = 0.05$, $p = .829$. Authorizations were obtained by IRB at Bar Ilan University and the Division of Individuals with intellectual disability in the Ministry of Social Affairs and Services who approved the participants' consent. All participants signed an adapted informed consent form.

2.2 | Materials and procedure

2.2.1 | Mental age and basic cognitive level

The Peabody Pictures Vocabulary Test—PPVT-IV (Dunn & Dunn, 2007) was used to assess the vocabulary of the participants with intellectual disability (Facon & Facon-Bollengier, 1999). The score on this test correlates with general intelligence (Dunn & Dunn, 2007). The mean scores on the PPVT of the 17 students was 14.37 ($SD = 2.72$). The Raven's Progressive Matrices (RPM Raven, 1986) is designed to assess the ability to form comparisons, deduce relationships, and reason by analogy. It is considered as fluid intelligence (Raven, Court, & Raven, 1986). The total scores were calculated by adding the raw scores. The mean scores on the Raven test was 24.82 ($SD = 2.48$).

An independent samples *t*-test comparing the differences in PPVT and Raven tests between the two age groups of the students with intellectual disability—six participants under the age of 40 and 11 above, showed no significant differences ($t(15) = 0.61$, $p = .549$ and $t(15) = 0.58$, $p = .568$, respectively).

TABLE 1 Sentence complexity ratings on a scale from 1–5

Analysis of speech (AS) rating	Example
1 = Incomplete sentence	'Babies on tree'
2 = Simple correct sentence	'The babies were hungry'
3 = Incomplete complex sentence	'The mother that came to the babies'
4 = Coordinated Sentence	'The mother bird came and the babies were happy'
5 = Subordinated Sentence	'The mother bird flew because she wanted that the babies will have food'

2.2.2 | Narrative production

The procedure took place in the university in a quiet room with minimal distractions. To elicit narratives, each participant was instructed to look at the pictures carefully and then asked to tell the story to the second author. The wordless story book included a sequence of six multicoloured pictures taken from the LITMUS-Multilingual Assessment Instrument for Narratives (MAIN; Gagarina et al., 2012, 2019; Amora et al., 2020; Hržica & Kuvač Kraljević, 2020). The stimulus script begins with the Setting ('Once there was a mother bird') and an Initiating Event (IE) ('who saw that here babies are hungry') and is followed by three episodes. All three episodes have similar internal structure consisting of an explicit Goal ('she wanted to bring food'), a character's Attempt to achieve the Goal ('she flew away'), the Outcome of the Attempt ('she came back to give them food') and ending ('and they were calm and safe'). Causal relations mentioned connect story grammar categories both within and between episodes.

2.3 | Data analyses

All narratives were initially transcribed and then coded for the presence of each of the different types of microstructural and macrostructural components as well as for IST use. Microstructure was analysed in terms of sentence-level measures, such as number of clauses, grammaticality, linguistic dysfluency measures, such as repetitions and filled pauses; and lexical-level measures, such as number of words, verbs, nouns, adjectives, pronouns, discourse markers (e.g., so, simply, like), demonstratives, and their types. We categorised sentences following Altman et al. (2012)'s Integrated Narrative Analysis using a 5-point scale ranging from incomplete sentences (1) to subordinated sentences (5) to examine complexity as in Table 1.

Macrostructure was measured by coding for the following story scheme categories: Setting, Initiating Event (IE), three Goals (G), Attempts (A), and Outcomes (O), one for each of the three episodes, and Ending (Stein & Glenn, 1979). Each of the categories was assigned a score of 0 or 1 and scores were converted to proportions out of the total number of categories.

Narrative macrostructure is viewed as a hierarchical interconnected network of relations between Goal-Attempt-Outcome components. They are interrelated through Enabling, Physical, Motivational, and Psychological causal relations. They were coded based on Trabasso and Nickels (1992) and its application in Fichman et al. (2017). One causal relation that connects elements *between* episodes is represented as Enabling relations ('she flew away... the cat tried to climb the tree'). There are three causal relations that connect elements *within* episodes as represented by Physical and Motivational and Psychological relations. Physical relations connect an Attempt and an Outcome within the same episode ('the cat tried to climb the tree and grabbed the babies'); Motivational relations connect within episode between a Goal and an Attempt ('the cat wanted to catch the babies.... The cat tried to climb the tree'); Psychological relations link Internal Responses to Attempts, Outcomes, or Goals ('she flew away... the cat said to himself: 'Good, I want the babies''). Each relation was assigned a score of 0 or 1 to indicate the presence or absence.

Segmentation of audio data into utterances is based on Analysis of Speech (AS) Units (Foster et al., 2000). Each AS Unit (sentence henceforth) consists of one main clause or a main clause with a single subordinate clause. ISTs, which convey characters' emotions and thoughts were classified into seven categories following Fusté-Herrmann et al. (2006) applied in Altman et al. (2016) and in Fichman et al. (2020): perceptual (see), motivational (want), physiological (hungry), linguistic (say), emotional (excited), mental (think) and consciousness (alive).

3 | RESULTS AND DISCUSSION

This section is divided into three parts. The first part depicts what characterises students with intellectual disability and TD in terms of microstructure level which includes the amount of output measures and fluency and efficiency measures. The second part examines the similarities and differences on the macrostructure level via story scheme and coherence measures and frequency and type of ISTs . Finally, we investigate the relationship between background characteristics (chronological age, mental age) and narrative measures.

In order to find out whether dependent variables were normally distributed, we used Shapiro–Wilk tests. The dependent variables were lexis, amount of output, fluency and efficiency at the microstructure level, story scheme and coherence measures at the macrostructure level and ISTs. The results indicated that most of the dependent variables in the study deviated from the normal distribution ($p < .05$). Therefore, non-parametric Mann–Whitney tests were conducted. The tables present the mean, standard deviation (SD), median (Mdn) and range for each measure and group. It should be noted that some measures of the story scheme were measured on a nominal scale (e.g., setting, initiating event) and therefore, Chi-Squared analyses were conducted.

3.1 | Microstructure level: Lexis, amount of output, fluency and efficiency measures

The microstructure level contains lexical (11), amount of output (3) and fluency and efficiency measures (5) as seen in Table 2.

TABLE 2 Mean, SD, median and range of microstructure level measures by group

Measures	Students with intellectual disability				Students with typical development				U	p
	M	SD	Median	Range	M	SD	Median	Range		
Lexical measures										
Different verbs	16.29	13.88	13.00	5.00–65.00	18.44	8.55	17.00	7.00–34.00	99.00	.182
All verbs	16.47	13.93	14.00	5.00–65.00	19.13	8.57	18.00	7.00–34.00	94.50	.134
Different nouns	17.65	6.61	17.00	6.00–29.00	21.44	9.87	18.50	10.00–44.00	110.5	.357
All nouns	18.21	6.78	17.00	6.00–31.00	22.31	10.42	19.00	12.00–47.00	111.00	.367
Different adjectives	1.65	2.03	1.00	0.00–5.00	4.06	3.78	2.50	0.00–13.00	74.50*	.024
Pronouns	7.94	9.50	5.00	0.00–32.00	6.25	4.14	6.00	0.00–13.00	126.50	.730
Total number of words	74.18	47.39	70.00	28.00–232.00	86.81	38.20	78.50	36.00–149.00	102.00	.220
Demonstratives	4.18	4.57	3.00	0.00–16.00	1.69	2.02	1.00	0.00–8.00	95.50	.137
Proportion of verbs (%)	21.01	4.02	21.15	13.48–28.02	21.60	2.79	22.29	16.94–27.87	131.00	.857
Proportion of nouns (%)	27.80	9.09	29.26	12.07–42.86	26.75	6.38	24.39	17.11–37.22	130.00	.829
Proportion of content words (%)	58.00	6.40	58.82	47.83–71.43	55.12	3.56	54.65	49.02–62.50	98.00	.171
Amount of output measures										
Number of clauses per sentence	1.53	1.62	1.00	0.00–6.00	0.81	1.05	0.50	0.00–3.00	96.50	.131
Number of sentences	14.88	10.29	13.00	7.00–52.00	9.44	3.37	8.00	6.00–16.00	67.50*	.013
Grammaticality	0.84	0.14	0.83	0.50–1.00	0.97	0.07	1.00	0.83–1.00	58.50**	.002
Fluency and efficiency measures										
Discourse markers	8.94	4.52	7.00	2.00–17.00	3.19	3.58	2.00	0.00–12.00	40.00***	.001
False starts	0.35	0.79	0.00	0.00–3.00	0.63	1.02	0.00	0.00–3.00	116.00	.327
Fillers	1.76	2.46	1.00	0.00–10.00	2.19	2.83	1.00	0.00–9.00	133.00	.911
Total words without repetition	74.47	47.78	75.00	28.00–233.00	84.50	37.44	75.00	34.00–145.00	106.50	.288
Total words of the main idea	54.88	35.49	54.00	22.00–175.00	60.00	22.28	53.00	26.00–100.00	105.50	.272

*$p < .05$; **$p < .01$; ***$p < .001$.

As Table 2 shows, the number of different adjectives was higher among the TD students compared to students with intellectual disability. Regarding the amount of output measures, significant differences between the two study groups were found on—frequency of utterances, and grammaticality. Table 3 presents the breakdown into the 1–5 levels of sentence complexity (see also Table 1) for each participant.

In general, Table 3 shows that the complexity level of sentences produced by students with intellectual disability was less complex compared to students with TD. They produced more simple sentences (level 2, 127/201, $M=$ 7.4) compared to students with TD (56/145, $M=$ 3.5) yet fewer Coordinated sentences (level 4, 30/201 compared to 40/145) and Subordinated Sentence (level 5, 27/201 compared to 49/145 respectively). It should also be noted that while students with intellectual disability produced incomplete sentences (levels 1 and 3), students with TD did not.

We see that the complexity and grammaticality levels were higher among students with TD yet the number of utterances was higher among the students with intellectual disability. An example illustrating this difference is seen in Excerpt 1 and 2 as seen in Table 4. The Hebrew version is written in italics followed by the English translation. The discourse marker is **bold**ed:

The student with intellectual disability in Excerpt 1 used four simple sentences that consist of one syntactic clause containing a noun,

verb, and an object if obligatory. The TD student used longer and more complex sentences with coordination and subordination as seen in Excerpt 2.

In terms of grammaticality, a participant with intellectual disability (age 43) uttered the following sentence:—*ha-xatul raa....* (the cat saw...), the verb *ra'a* (saw) requires a direct object and therefore results in an ungrammatical and incomplete sentence. Another example can be demonstrated by participant #15 with intellectual disability (age 42) who said: *ha-tinokim shel ha-ima* (the babies of the mother). This is an example of a gender error where the use of the noun 'tinok' baby in plural was related to as 'tinokim' babies instead of the correct form 'tinokot'.

In terms of the fluency and efficiency level, no differences were detected except for the discourse marker measure which was uttered more by students with intellectual disability for emphasis as in the case of describing the birds' fear, '*pashut ze ke*ilu hem mefaxadim mimeno*' (**simply like** they are afraid of him). In contrast, TD students used a variety of verbs describing fear in a higher register.

Based on previous findings (e.g., Barton-Hulsey et al., 2017), the expectation was that students with TD would outperform students with intellectual disability on **all** microstructure measures. The similar frequency of words, verbs, nouns, and pronouns exhibited by students with intellectual disability in comparison to their TD peers in this

Complexity rating

Participant #	Students with intellectual disability					Students with typical development				
	1	2	3	4	5	1	2	3	4	5
1	3	9					5		4	4
2	4	21		9	6		4		1	4
3	1	6			2		1		3	3
4		9	1	2	1		5		4	5
5		10					3		4	4
6		6		2			1		5	1
7		4		5	3		9		3	3
8		7		2			3			3
9	2	4		2			5		2	3
10	2	6		2	1		6			2
11		10					2		3	
12		4			1		2		2	2
13		6		3	1		3		2	3
14		7		1	4		1		1	4
15		9		1	4		3		4	2
16	2	5		1	1		3		2	8
17	2	10			3	—	—	—	—	—
Total	16	127	1	30	27		56		40	49
Mean	0.94	7.4	0.05	1.76	1.5		3.5		2.5	3.06

Note: Complexity rating scale: 1 = Incomplete; 2 = Simple correct; 3 = Incomplete complex; 4 = Coordinated; 5 = Subordinated.

TABLE 4 Differences in sentence complexity

Excerpt 1–intellectual disability #11, age 50	Excerpt 2–TD#33, age 26
hem margishim she-mishehu ba le-hitkarev	ha-xaxtul metapes besheqet,kedei
they feel like someone is getting close	shha*ima lo tasim lev
pashut ze ke*ilo hem mefaxadim mimeno.	The cat is climbing quietly in order for the mother not to notice
simply it's like they are afraid of him	ha-kelev lem'ase ba l'azor lao*ima
ke*ilo haya masheu	The dog came, in fact, to help the mother
like there was something	vehu moshex et ha-xatul klapei mata kedey she-ha-xatul lo yacliax
ve-az hu menase litpos oto	and he pulled the cat downwards so that the cat will not succeed
and then he tries to catch him	

study may be explained by the critical role of nouns and verbs in the construction of the narrative. This is in contrast to the use of adjectives which did distinguish between the two groups. Adjectives accurately describe events as well as allow the narrator to evaluate and interpret them (Berman & Ravid, 2008), to expand and elaborate beyond the most critical actions conveyed by nouns and verbs. These findings add to former research that found narrative skills to be a gradual effortful and complex cognitive process (Peterson & Jones, 2016). Individuals with intellectual disability in this study produced the compulsory components (nouns and verbs) like their TD peers but seem not to have reached the next level (Chapman et al., 1998; Finestack et al., 2012; Næss et al., 2011) of complexity which is enriched with adjectives.

The production of complex and grammatical sentences is an effortful endeavour which may explain the less frequent use by individuals with intellectual disability. It requires organisation and links between words for the generation of well-formed sentences (Marini et al., 2010). Use of subordinate clauses allows to pack more information into fewer words and allows more efficient self-expression (Bishop & Donlan, 2005). In previous studies, students with Down Syndrome had a conceptual understanding of the pictured story similar to students with TD, despite lexical and syntactic limitations. Language production tends to be an area of difficulty for individuals with Down syndrome and FXS, particularly weaknesses in structuring of correct sentences (e.g., Petersen & Spencer, 2016; Witecy & Penke, 2017). When addressing grammaticality, which distinguished between the two groups, a major source of difficulty was in gender agreement in Hebrew in which all nouns are lexically marked with grammatical gender. Often grammatical gender is matched with the morphological ending of the

TABLE 5 Mean, SD, median and range of macrostructure measures by group

Measures	Students with intellectual disability				Students with typical development				U	P
	M	SD	Median	Range	M	SD	Median	Range		
Story scheme										
Setting[a]	1.00	0.00	1.00	1.00–1.00	1.00	0.00	1.00	1.00–1.00	—	—
Initiating event[a]	0.59	0.51	1.00	0.00–1.00	0.88	0.34	1.00	0.00–1.00	3.42	.065
Goal	1.71	1.16	2.00	0.00–3.00	2.06	0.85	2.00	0.00–3.00	113.50	.370
Attempt	2.71	0.69	3.00	1.00–3.00	2.69	0.79	3.00	0.00–3.00	135.00	.957
Outcome	2.06	0.83	2.00	1.00–3.00	2.25	1.07	3.00	0.00–3.00	111.50	.345
Ending[a]	0.76	0.44	1.00	0.00–1.00	0.69	0.48	1.00	0.00–1.00	0.25	.619
Meta ending[a]	1.00	0.47	0.00	0.00–1.00	0.19	0.40	0.00	0.00–1.00	0.51	.475
Enabling relations 1[a]	0.53	0.51	1.00	0.00–1.00	0.87	0.34	1.00	0.00–1.00	4.66*	.031
Enabling relations 2[a]	0.82	0.39	1.00	0.00–1.00	0.94	0.25	1.00	0.00–1.00	1.00	.316
Enabling relations 3[a]	0.94	0.24	1.00	0.00–1.00	0.81	0.40	1.00	0.00–1.00	1.28	.258
Physical relations[a]	0.59	0.51	1.00	0.00–1.00	0.75	0.45	1.00	0.00–1.00	.97	.325
Motivational relations[a]	0.47	0.51	0.00	0.00–1.00	0.81	0.40	1.00	0.00–1.00	4.16*	.041
Psychological relations[a]	0.53	0.51	1.00	0.00–1.00	0.56	0.51	1.00	0.00–1.00	.04	.849
Coherence										
Global	1.91	0.14	2.00	1.44–2.00	1.99	0.03	2.00	1.89–2.00	79.50**	.009
Local	1.76	0.26	1.83	1.00–2.00	1.93	0.11	2.00	1.63–2.00	73.00*	.019
Informativeness	1.69	0.18	1.75	1.40–2.00	1.85	0.16	1.89	1.50–2.00	62.00**	.007

*$p < .05$; **$p < .01$. [a]Nominal variables—χ^2 analyses were conducted.

TABLE 6 Differences in coherence

Excerpt 3—intellectual disability #15, age 42	Excerpt 4—TD#31, age 30
ha-gozalim racu le-exol the baby birds wanted to eat	ha-gozalim racu le-exol the baby birds wanted to eat
ha*ima a'fa the mother flew	veha*ima a'fa lehavi lahem mazon and the mother flew to bring them food
Ha-xatul a'la a'l ha-etz the cat climbed the tree	Ha-xatul raa et hagozalim sh-em levad bli ha*ima The cat saw the baby birds alone without the mother
ha*ima hegi'a the mother came	Ve-lachen yaca litrof otam And therefore, he went to devour them
Ve ha-kelev pashut ro*e et ze and the dog just see that	
hi nivhala kecat she was a little scared	
'axshav hu giresh o*to now he sent him away	

TABLE 7 Differences in presenting new information

Excerpt 5—intellectual disability # 14, age 55	Excerpt 6—TD #27, age 24
hi mistakelet 'alehem she looks at them	hacipor ha-em doeget The mother bird is worried
o*ex hem margishim how do they feel	hi roaa sh-hagozalim reevim She sees that the baby birds are hungry
Im tov lahem are they good	Hi afa lehavi lahem o*xel She flies to bring them food
Im hem beseder are they o.k	
Ma hem margishim what do they feel	

noun, but not always. In Hebrew, students with intellectual disability relied on the morphological form and used masculine inflection rather than the expected feminine inflection. This is typical of younger children and learners with impairment (e.g., Levie et al., 2017) and may also be explained by lexical and syntactic limitations in individuals with intellectual disability (Ashby et al., 2017).

The use of relatively more utterances by students with intellectual disability may be explained by working memory deficits (DMS-5, 2013). Studies identified impairment in verbal storage scope with weaker memory and language skills when compared to TD peers (Lifshitz et al., 2016). Since students with intellectual disability have a limited capacity both to store and manipulate information, maintaining information demands may be compensated in narratives by using shorter simpler sentences which may carry a similar message to that of a complex one used by TD peers.

Finally, the salient use of discourse markers in the stories of students with intellectual disability can be explained by discourse, pragmatic, and interactional sociolinguistic motivations. There has been

TABLE 8 Mean, SD, median and range of IST types by group

Measures	Students with intellectual disability				Students with typical development				U	p
	M	SD	Median	Range	M	SD	Median	Range		
Perceptual	1.29	1.49	1.00	0.00–6.00	2.00	2.25	1.00	0.00–8.00	113.00	.384
Mental	1.53	1.46	1.00	0.00–5.00	2.25	2.18	2.00	0.00–8.00	113.00	.369
Motivational	0.41	1.46	0.00	0.00–6.00	0.25	0.45	0.00	0.00–1.00	120.00	.390
Emotion	1.12	1.49	0.00	0.00–5.00	1.69	2.68	0.00	0.00–8.00	133.50	.921
Physiological	0.29	0.59	0.00	0.00–2.00	1.25	1.13	1.00	0.00–4.00	55.50[***]	.001
Linguistic	0.29	0.59	0.00	0.00–2.00	0.56	0.27	0.50	0.00–2.00	102.00	.147
Consciousness	0.06	0.24	0.00	0.00–1.00	0.00	0.00	0.00	0.00–0.00	120.00	.164

[***]$p < .001$.

substantial dispute within linguistic research on the role of discourse markers as cohesive devices (Banguis-Bantawig, 2019; Schiffrin, 2001) and their function as pragmatic devices serving the narrator's communicative intention (Hata, 2016).

3.2 | Macrostructure level: Story scheme and coherence measures

The macrostructure level contains story Scheme (13) and coherence (3) measures as in Table 5.

Table 5 demonstrates that there were no significant differences in terms of macrostructure story scheme: setting, initiating event, goal-attempt-outcomes, ending and meta-ending between the study groups. Significant differences in story scheme measures did appear between the groups for enabling and motivational causal relations. The percentage of students with TD who produced Enabling relations connecting episode 1 was significantly higher compared to students with intellectual disability. A similar result was found for motivational causal relations.

Regarding the coherence of the story, differences were found such that the TD group scored higher than the intellectual disability group on all three coherence measures- global and local coherence and new information. Excerpts 3 and 4 in Table 6 demonstrate the difference in terms of coherence.

Excerpt 3 demonstrates a lack of coherence between a sentence and its subsequent sentences. There is no explicit marker to connect between sentences which each open with a different character. The excerpt mentions the cat's climb, the mother-bird's return to the nest and the dog's reaction. The narrator uses pronouns which are not syntactically close or linked appropriately therefore leading to an ambiguity as to who sent who away 'axshav *hu* giresh *oto*' (now *he* sent *him* away). In contrast, the student with TD used explicit connecting markers (*ve*, *she*, *velachen*- and, that, thus) to connect between the sentences as seen in Excerpt 4.

The similar findings regarding story scheme confirm previous research with children with Down syndrome, mild intellectual disability or FXS (Barton-Hulsey et al., 2017; Channell et al., 2015; Finestack et al., 2012). Producing full episodes indicates the ability of understanding an underlying story scheme (Burris & Brown, 2014). It may

be suggested that picture support, in the form of wordless picture text, enhanced the participants' ability to produce a well-formed story scheme since it is evident that individuals with intellectual disability exhibit more strengths in processing visual information (Cohn, 2020).

Enabling relations, a macrostructure element, are crucial for coherence, since they connected the initiating event with the Attempt of the first episode, thus creating a context for the entire narrative. Students with intellectual disability apparently had difficulty reconstructing this context in introducing the storyline. Although students with intellectual disability produced fewer causal relations, their Enabling relations connecting episodes 2 and 3 were comparable to those of TD students (Table 2). Students with intellectual disability did relate to the peak of the story, which comes in episode 2 ('the cat grabbed the baby bird…'), compensating to some extent for the omission of crucial elements in episode 1 ('the baby mother flew to bring food'). The results may indicate that students with intellectual disability use markers to display relationships between subsequent utterances, and across the scheme of the story, in order to enhance the cohesiveness of the story and to compensate for the weakness in local and global coherence (Barton-Hulsey et al., 2017).

The next excerpt shows the difficulty of intellectual disability students in presenting new information in every utterance as seen in excerpts 5 and 6 in Table 7:

The narrator in Excerpt 5 repeats the word '*margishim*' (feel) twice and states the mother's goal - checking up on her baby birds in different words ('are they good, are they ok').[1] It appears that not every sentence introduces new information to the listener as opposed to Excerpt 6 produced by a student with TD that presents information not yet known to the listener in every sentence. The ability to produce informative messages requires one to select lexical representations that are appropriate in a given context and to organise them within a communicative interaction avoiding unnecessary derailments (Marini et al., 2010). The low number of informative sentences of students with intellectual disability confirms previous research with children and adolescents with Down syndrome with mild intellectual

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[1]The narrator emphasises repeatedly the mother's concern for her babies. The rhetorical emotional impact of narration is not an optional extra; it is what contributes to persuasive power, which is critical for personal narrative. This rhetorical evaluative device has a great impact on narration (see Labovian High Point Analysis; Labov,1972).

disability who were more disadvantaged in telling a consistent coherent story (Barton-Hulsey et al., 2017).

3.3 | Internal state terms

The IST measure includes seven different types of ISTs as seen in Table 8.

In general, there were no differences in IST use between the groups except for physiological state terms which appeared more among students with TD compared to peers with intellectual disability. Examining the use of physiological state terms by TD matched peers showed that they were using physiological verbs like 'hungry' in the Initiating Event triggering an internal response on the part of the main characters interconnecting episodes (e.g., 'the mother saw that the baby birds were hungry and flew to bring them food'). Students with intellectual disability were more likely to omit this initiating event and focus on the goals and attempts, which may explain their relatively lower use of physiological ISTs. The ability to use ISTs is associated with Theory of Mind (Burris & Brown, 2014). Similar results concerning the use of mental verbs had been reported by Finestack et al. (2012) who used the Narrative Scoring Scheme to examine fictional narratives of adolescents and young adults with intellectual disability and those with TD.

Finally, in an attempt to answer the second research question, Pearson correlation analyses were conducted in order to examine which measures of lexis, amount of output, fluency and efficiency (except for discourse markers) at the microstructure level, the story scheme and coherence measures at the macrostructure level and the ISTs correlate with chronological age in each study group. Among students with TD, a significant positive correlation was found between motivational state term and the students' age $r(14) = .78$, $p < .001$, indicating that as the students' age increases, motivational state terms appear more frequently. Among students with intellectual disability, significant positive correlations were found between the three story scheme measures; goal, ending and motivational relation measures and the students' age $r(15) = .50$, $p = .04$, $r(15) = .61$, $p = .01$ and $r(15) = .49$, $p = .05$, respectively. These correlations indicate that as the students' age increased, the students tended to describe more story goals with a related ending and their narrative included motivational relations which may be explained by the Compensation Age theory (Lifshitz, 2020).

3.4 | General discussion

The current study examined a range of microstructure, macrostructure and IST in an effort to characterise the narratives of students with intellectual disability. In terms of microstructure, the findings show that no difference was found for number of verbs, nouns, pronouns and measures of efficiency and fluency. The differences were apparent in sentence complexity, grammatically and the use of adjectives and discourse markers. In terms of macrostructure, students with intellectual disability demonstrated comparable use of story scheme

as their TD peers. Their stories included a setting, an initiating event, goals, attempts, and outcomes yet had fewer enabling relations in comparison to TD peers. Staying coherent and sticking to the topic, elaboration and presentation of new information was difficult for the students with intellectual disability. Finally, in terms of ISTs, both groups mostly used similar number and types. The findings indicate that while struggling with difficulties in terms of coherence, syntactic complexity, and grammatical sentences, students with intellectual disability exhibit strengths in narrative macrostructure story scheme and the use of IST which are key features in narrative telling. This study included a relatively small sample of participants with intellectual disability yet the largest sample that could be found since the Empowerment Program involving academic enrichment is a unique program worldwide. The current research has relevance to education and speech-language pathology, yet it offers insights to researchers engaged in inclusive narrative research about people with intellectual disabilities. At the core of the discussion are the similarities and differences on microstructure and macrostructure measures between the students with intellectual disability and students with TD.

Although students with intellectual disability show relatively lower performance on syntax and lexis, they performed similarly to their TD peers in terms of storyline. These similarities may be explained by the Compensation Age Theory (Lifshitz, 2020), which claims that there is compensation for the developmental delay of adults with intellectual disability in early years and that their intelligence and cognitive skills might peak in middle adulthood. In a series of studies, Lifshitz and her colleagues found that the crystallised intelligence of adults with non-specific intellectual disability increases from adolescence to adulthood without any specific targeted intervention between the two time periods (Chen et al., 2017). The same trends were found for adults with Down syndrome who showed an increase in lateral and figurative language among adults with intellectual disability (Froindlich & Lifshitz, 2020; Lifshitz, 2020).

Further support of using wordless pictures for individuals with intellectual disability beyond Cohn's (2020) processing visual information theory (see Section 3.2) stems from the Dual Coding Theory (Paivio, 1971, 2014). The theory presumes that there are two cognitive subsystems, one focused on representation and processing of nonverbal objects/events and the other on words and language. In the same vein, the picture superiority effect claims that pictures are better remembered than the corresponding words when it comes to recalling and recognising information, because they are mentally represented in both linguistic and perceptual codes. Thus, people can generate more than one code for pictures which enhances memorability (Curran & Doyle, 2011; Nelson et al., 1976; Stebner et al., 2017).

In the current study, there was a wide range of chronological ages (28–55). In order to determine whether correlations with age stem from the advantage of the older participants, we divided participants with intellectual disability into two groups (older or younger than 40). T-test analysis yielded no significant differences in mental age according to the PPVT between the two age groups. Furthermore, in this study we did not conduct any targeted intervention of storytelling. Thus, the correlation between storytelling and chronological age

that was found in our study can be attributed to the maturity of adults with intellectual disability and their cumulative life experience that helps them acquire and improve their repertoire of narrative macrostructure skills. In addition, our participants with intellectual disability attend the Empowerment Project. (Lifshitz et al., 2016) which is positively linked with performance on crystallised and fluid intelligence tests. The storytelling of adults with intellectual disability who do not participate in PSE should therefore be examined.

4 | CONCLUSIONS

Narrative retelling, especially in a multi-episode narrative, involves complex operations. To our knowledge, this is the first study to investigate the narrative abilities of adults with intellectual disability focusing in on microstructure, macrostructure and ISTs compared to TD peers. In this study, narratives, as in former studies of children and adolescents with intellectual disability, were produced from a wordless story book. In the narrative analysis conducted, it was important for us to relate inclusively to microstructure, macrostructure and internal state terms. For these narrative measures, we examined 20 microstructure components, 16 macrostructure components and 7 internal state terms. These 43 different components were examined in order to allow future research related to narrative ability analysis in general and narrative analysis among adults with intellectual disability, in particular, to focus on the components that distinguish between groups.

These study findings may suggest that adults with intellectual disability have acquired the conceptual knowledge needed for producing the story scheme, relating the character's thoughts and emotions. It has been evidenced that in spite of their weakness in expressing coherence in complex and grammatical sentences, their macrostructure skills and their basic microstructure skills serve as compensation in better story production. It may be explained that these skills are still developing due to age, life experience and the influence of their academic environment. The new knowledge about narrative skills by adults with intellectual disability, their strengths and weaknesses may challenge long-held perspectives about the ability of storytellers with intellectual disabilities and enable them to gradually develop their narrative language. It will also enable researchers to approach narrative and other storytelling-based methodologies in a more responsive way.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Carmit Altman https://orcid.org/0000-0002-2546-7980
Ilanit Avraham https://orcid.org/0000-0002-1996-3056
Hefziba Lifshitz https://orcid.org/0000-0002-4185-3945

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