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ORIGINAL PAPER

The Effects of an Oral Narrative Intervention on the Fictional Narratives of Children with Autism Spectrum Disorder and Language Disorder

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Abstract

A multiple probe across participants design was used to examine the effects of intervention on reality-based fictional narratives. Four boys with autism spectrum disorder (ASD) and language disorder, aged 9–10, participated in a 1:1 intervention targeting the narrative macrostructure elements of character, setting, problem, feelings, and fix. Intervention involved clinician modelling, participants saying the entire narrative, narrative stimulus pictures, and macrostructure icons. An intervention effect, maintenance, and generalization to fantasy-based fictional narratives were demonstrated for three participants. Social validity measures indicated that a naive observer-rated post-intervention narratives as better than pre-intervention narratives. This study adds to the limited research into narrative intervention with children with ASD and co-occurring language disorder. The highly structured and semi-scripted intervention could be adapted to be delivered by teachers in small groups in the classroom. Areas for future research include implementing the intervention with small groups and targeting more complex narrative macrostructure.

Keywords Original fictional narrative · Intervention · Autism spectrum disorder · Language disorder · Children

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Introduction

Narratives are monologues describing real or imaginary events (Kaderavek 2015) and represent the earliest developing extended discourse (Hedberg and Westby 1993). Personal narratives relate real events and fictional narratives retell or generate imaginary events (Rollins 2014). Children begin to generate personal narratives and original fictional characters by 2 years of age (Allen et al. 1994; Sperry and Sperry 1996), and original fictional plots by age three (Benson 1993). By the time children in mainstream Western cultures enter school, most are familiar with, and are expected to produce, both personal narratives and fictional narratives (Owens 2016).

The capacity to generate narratives has been linked to the development of autobiographical memory (Reese and Newcombe 2007), social relationships (Cheshire 2000), and language (Bishop and Edmundson 1987). Narratives have been called a bridge between oral language and literacy (Westby 1991) as well as a predictor of academic success (Feagans and Appelbaum 1986; Hughes et al. 1997; Westby 1991) as they are a naturalistic means of processing abstract thought and generating the sequenced and complex language that is required in academic domains (Petersen 2011). Specifically, being able to generate oral narratives has been linked to improved performance in reading comprehension (Morrow 1985) and written narratives (Spencer and Petersen 2018).

Within the school-based academic culture, a high value is placed on narratives that are produced according to conventions of macrostructure (Caldwell and White 2017; McCabe 1991; Petersen et al. 2010), and microstructure (King et al. 2014). Macrostructure incorporates relevant content (Finestack 2012) within an overall story grammar structure (Hudson and Shapiro 1991) that typically includes setting, character, initiating event or problem, internal response and a resolution (Hudson and Shapiro 1991). Microstructure incorporates measures of productivity (e.g. total number of words) and measures of complexity (e.g. coordinating and subordinating conjunctions; Justice et al. 2006). Elements of microstructure support the structural sequence and aid in the understanding of macrostructure components (Spencer et al. 2013).

Original Fictional Narratives

Original fictional narratives are a class of narratives that represent fabricated but realistic events (e.g. dog getting stuck under a fence), or unrealistic fantasy (e.g. alien landing in the local park). Paley (1990) suggests that being able to generate original fictional narratives from an early age is the prototype for imaginative pursuits throughout life, with the added value that the narrator is able to structure events as they choose (Engel 1995).

In the mainstream Western academic school system, generating original fictional narratives plays a central role in language and literacy education (Caldwell and White 2017). Original fictional narratives are a target of instruction and an outcome measure of the Australian (Australian Curriculum, Assessment and Reporting

Authority [ACARA] 2016) and the U.K. English curricula (Department of Education 2014) and form part of U.S. Common Core Standards for the language arts (National Governors Association Center for Best Practices and Council of Chief State School Officers 2010).

Generating an original narrative places considerable demands on the narrator. The narrator must produce ideas based on a provided stimulus, structure their ideas within a macrostructure framework, and use specific linguistic devices to create a cohesive text (Johnston 2008). Creation and planning of an original fictional story may place a greater cognitive and linguistic load on narrators than retelling a fictional story or telling a personal story as narrators have to create and plan the story without the help of a model (Westerveld and Gillon 2010) or memory of events, and understand the role characters play, the way they think and feel and what motivates them to act (Benson 1993).

Narratives of Children with Autism Spectrum Disorder

Children with ASD may struggle to generate narratives for a number of reasons. They may have difficulty in understanding the perspectives of others (King et al. 2014) and therefore may struggle to produce narratives that demonstrate understanding of the thoughts, feelings, and actions of characters, or they may have reduced awareness of the audience's need for background information (King et al. 2014; Loveland and Tunali 1993). They may also have difficulty in generating adequate ideas or syntax (King et al. 2014), producing coherent narratives (Baixauli et al. 2016) or narratives that include generalized or summative information (Barnes and Baron-Cohen 2012).

Authors of two literature reviews have presented findings from investigations into the narrative production skills of children with ASD and have concluded that despite wide variation in methodologies and findings, commonalities in the narrative skills of children with ASD are beginning to emerge (Baixauli et al. 2016; Stirling et al. 2014). Baixauli et al. (2016) and Stirling et al. (2014) concluded that children with ASD may include fewer macrostructure elements in their narratives than typically developing peers, that all macrostructure elements can be impaired but that no one element is likely to be more impaired than any other element and that narratives of children with ASD may be shorter and less semantically and syntactically complex than those of typically developing peers.

Original fictional narratives produced by children with ASD has most commonly been studied using wordless picture books (Losh and Capps 2003; Norbury and Bishop 2003). Such highly structured stimulus materials reduce the narrative demands on children as the stimulus materials provide the required macrostructure (Hedberg and Westby 1993; McCabe et al. 2008). Consequently, when macrostructure analysis is applied to narratives in this way, narrative macrostructure skills may be overestimated (Hedberg and Westby 1993) and narrative deficits underestimated.

Narrative Intervention with Children with ASD

Despite the importance of narrative to personal, social, and academic success and the documented difficulties with narrative that children with ASD experience, the effects of intervention on the oral narratives of children with ASD have been investigated in only four studies. Researchers have conducted investigations into the efficacy of interventions to develop high point personal narrative (Petersen et al. 2014), early developing personal narrative (Favot et al. 2018b), fictional narrative retells (Favot et al. 2018a), and original fictional narratives (Gillam et al. 2015). A multiple baseline design was used in all four studies and all included measures of macrostructure as a dependent variable. Data collected in all studies suggest that explicit intervention that incorporates the use of prompts such as icons to represent macrostructure elements, pictures to support narratives, clinicians modelling an entire narrative, guided practice and participants producing an entire narrative each intervention session, may be effective in developing narratives in children with ASD.

Currently, Gillam et al. (2015) have reported the only study addressing the teaching of fictional narratives to children with a diagnosis of ASD. They employed an intensive, broad intervention, involving between 17.5 and 27.5 h of one-to-one teaching, to investigate the effect of intervention on the macrostructure and microstructure of narratives produced by five participants. The intervention was structured over three phases and included instruction in retelling existing stories, vocabulary, definitions of macrostructure components, use of microstructural elements, comprehension, editing of original stories, and self-scoring. All participants presented with non-verbal intelligence within normal limits and, according to the Clinical Evaluation of Language Fundamentals, Fourth Edition (Semel et al. 2003), two participants had severe language disorder, two had a borderline language disorder, and one had language abilities within the average range. Probes were conducted after alternate intervention sessions. The intervention was effective, and maintenance was reported for four participants on a combined measure of five macrostructure elements (story knowledge index). Generalization was not examined.

The aim of the study reported here is to extend the findings in the existing literature by exploring the extent to which a less intensive intervention than that employed by Gillam et al. (2015) is effective in developing the original narratives of children with ASD and co-occurring language disorder. In addition, the first author provided an examination of generalization of the skills. The specific research questions were:

1. Does a brief individualized oral narrative intervention have an effect on the macrostructure of original fictional narratives produced by school-aged children with ASD and co-occurring language disorder?
2. Do improvements in the macrostructure of original fictional narratives produced by school-aged children with ASD and co-occurring language disorder maintain after intervention has stopped?
3. Do improvements in the macrostructure of original fictional narratives produced by school-aged children with ASD and co-occurring language disorder generalize to fantasy-based original fictional narratives?

Method

Participants

Four boys, Jem, Dashiell, Atticus, and Cooper (pseudonyms) who attended the university-based special education programme where the intervention took place, were eligible to participate in this intervention study. The project was then explained to the parents of the eligible children, and parents gave their informed consent. The participants attended the programme Monday to Friday and received instruction in a broad educational programme with a focus on literacy and numeracy. Children were eligible for participation if they (a) had a diagnosis of ASD from a paediatrician or psychologist; (b) had a receptive and expressive language disorder according to results from standardized language assessments, (c) had English as their home language, (d) had speech intelligible to non-familiar listeners as judged by the first author, (e) were able to sit at a desk and participate in a structured class activity for 10 to 15 min, as reported by the classroom teachers, (f) were able to describe recent events as based on their performance described below, and (g) did not include all of the following macrostructure elements in their original fictional narrative: *characters*, *setting*, *problem*, *feelings*, and what the character did to *fix* the problem.

To determine eligibility and for participant description, the first author, also the school speech and language pathologist, conducted language assessments using the Clinical Evaluation of Language Fundamentals, Australian, and New Zealand Standardised Edition, Fifth Edition (Wiig et al. 2017), the Peabody Picture Vocabulary Test, Fourth Edition (Dunn and Dunn 2007), and the Test of Narrative Language, Second Edition (Gillam and Pearson 2017). The final inclusion criterion was assessed using a screener narrative collected from each participant prior to the research. To collect the screener narrative, the first author asked each participant to look at a picture depicting a problem (e.g. a bleeding knee) and then create a story. This screener narrative was collected in a quiet room with the participant sitting next to the first author. The participants' classroom teachers completed the Childhood Autism Rating Scale, Second Edition (Schopler et al. 2010). Assessment results are in Table 1.

To establish eligibility for inclusion, first author also asked the participants to talk about a recent holiday. All participants were able to provide some information about what they did. None of the participants provided evaluative information. The first sentence of Jem, Atticus and Dashiell's holiday narrative used correct grammar and word choice, but their narratives did not maintain coherence. Cooper was able to provide a narrative that included who, what, where information and an evaluative statement using a previously taught and accurate sentence structure.

Materials

The first author used a magnetic whiteboard (30×20 cm), Picture Communication Symbols (Mayer-Johnson 2008) representing each of the five macrostructure

Table 1 Participant description

Name	Age (years; months)	Diagnosis	Adaptive behaviour	IQ	CELF-5		PPVT-4	TNL-2 production	CARS-2	Macrostructure components in narrative screener
					Receptive	Expressive				
Jem	9;6	ASD (DSM 5)	Not available	Not available	SS 78 Mild difficulties	SS 73 Moderate difficulties	SS 92 Low average	SS 2 Very poor	30 mild to moderate symptoms	Problem, solution
Cooper	9;4	ASD (DSM 5)	Social and practical below average, communication low (ABAS-3)	Verbal IQ very low range (WISC V)	SS 69 very low range	SS 63 very low range	SS 79 Moderately low	SS 2 Very Poor	33.5 mild to moderate symptoms	Problem, partial reference to characters
Atticus	9;4	ASD (DSM 5)	Low (ABAS-3)	Verbal 63–73 delayed mildly (SB-5)	SS 91 average	SS 70 very low range	SS 90 Low average	SS 4 Poor	32 mild to moderate symptoms	Problem, partial reference to characters
Dashiell	10;2	ASD (DSM 5)	Not available	Not available	SS 67 very low range	SS 59 very low range	SS 81 Moderately low	SS 1 Very poor	32 mild to moderate symptoms	Problem

DSM 5 = Diagnostic and statistical manual of mental disorders (American Psychiatric Association 2013); ABAS-3 = Adaptive Behaviour Assessment System, Third Edition (Harrison and Oakland 2015); SB-5 = Stanford-Binet Intelligence Scale, Fifth Edition (Roid 2003); WISC V = Wechsler Intelligence Scales for Children, Fifth Edition (Wechsler 2016); CELF-5 = Clinical Evaluation of Language Fundamentals, Fifth Edition Australian and New Zealand Standardised Edition (Wiig et al. 2017); PPVT-4 = Peabody Picture Vocabulary Test, Fourth Edition (Dunn and Dunn 2007); TNL-2 = Test of Narrative Language, Second Edition (Gillam and Pearson 2017); CARS-2 = Childhood Autism Rating Scales, Second Edition (Schopler et al. 2010); SS = standard score

elements (icon prompt cards), one probe stimulus picture, and one intervention stimulus picture each session. The stimulus pictures contained situations to represent realistic problems that could likely be within the participants' experience or understanding (e.g. a spider on a toilet roll). Where possible the pictures contained only the problem (e.g. broken window), some pictures necessarily contained character and/or setting information (e.g. a dog leaving muddy footprints on a floor). The sixty-five stimulus pictures were coloured high contrast photos that provided a clear illustration of the relevant objects or events and were sourced from Google images and assigned a number. A random number generator (Random.org, n.d.) was used to select 35 narratives. Those 35 narratives were assigned as probe stimulus pictures and were not used in intervention. Probe stimulus pictures were used one time only. The remaining 30 pictures were used as intervention stimulus pictures. Intervention stimulus pictures were used in order from one to 30 and then reused. Generalization probes to fantasy-based original narratives were collected using one colour stylized drawing showing an alligator walking down an internal staircase sourced from the children's picture book "There's an Alligator Under My Bed" (Mayer 1987) and one picture of a dragon breathing fire onto a house, sourced from Google images.

Setting

In all probe and intervention sessions, the participant sat next to the first author at a desk in room measuring 3 m by 4 m in the school. The room had no external windows and contained no other furniture. The whiteboard was on the desk in front of the participant. An iPhone was in an elevated position on the desk and was used to video record all probe and intervention sessions.

Dependent Variable

The dependent variable was the macrostructure of original fictional narrative generated by each child. The five macrostructure elements used in the study were based on Stein and Glenn's (1978) macrostructure elements but were renamed as necessary to aid the participants' comprehension. The macrostructure of original fictional narrative was made up of *characters, setting* (where + activity), *problem, feeling about the problem* and *fix* (how was the problem resolved).

Based on evaluation of the entire narrative, the first author awarded each macrostructure element a score of 0, 1, or 2 according to a general scoring rubric (see Appendix 1). In total each narrative scored between a minimum of 0 and a maximum of 10 points. Two points were awarded if the information was explicit, and the scorer did not require any shared knowledge, (e.g. riding his bike on the street), one point was awarded if some information was provided (e.g. riding), and no points were awarded if the participant did not provide information or the information did not relate to the stimulus materials. Responses of any length were acceptable, and the responses were not required to be grammatically correct.

Experimental Design

A multiple probe across participants design was used to investigate the effect of a brief oral narrative intervention on the original fictional narratives of school aged children with ASD and co-occurring language disorder. The conditions of the multiple probe design were baseline, intervention, and maintenance. This design provides a robust alternative to holding participants on continuous baseline, which may be both impractical and reactive (Horner and Baer 1978). The University Human Research Ethics Committee approved the research.

Procedures

Probes

Probes were collected weekly if the participant was not yet receiving intervention or four times a week if they were in "true baseline" (Horner and Baer 1978) or were receiving intervention. Participants were held in the baseline phase until the previous participant began to display an intervention effect. Five daily (true) baseline probes were collected, and monitored for stability, before the intervention phase began. When the participant entered the intervention phase, the probes were conducted immediately before the intervention took place each session.

A single probe was conducted each session. The first author began video recording, greeted the participant, placed the probe stimulus picture on the whiteboard, and secured it with a small magnet. The first author directed the participant to look at the picture if necessary and then asked them to make up a story about the picture. When the participant had stopped talking for 3–5 s, the first author thanked the participant but made no other comments.

After each session, the video recordings were transferred to a computer and were transcribed verbatim by the first author, including fillers, false starts, repetitions, and idiosyncratic articulation. Any unintelligible speech was transcribed as UI. The narratives were coded from the transcriptions.

Intervention

The intervention procedure employs strategies and materials known to be effective with this population (e.g. clinician modelling, participants saying the entire narrative, narrative stimulus pictures, and macrostructure icons; Favot et al. 2018a, b; Gillam et al. 2015; Petersen et al. 2014). Intervention was implemented immediately after the probes were collected. Participants received four intervention sessions over three days each week. Session lengths were not pre-determined and ranged between 2 and 10 min. It was considered likely session length would reduce as participants became familiar with the intervention. Each participant received the entire intervention in accordance with the intervention phase in each session. The intervention was designed so the participant would produce each macrostructure element

independently and then say the entire narrative independently. Verbal reinforcement (e.g. that's great, we could call the character X) was provided to acknowledge each correct or prompted correct response. In addition, verbal reinforcement was delivered for participation in the intervention as judged necessary to keep children involved in the activity (e.g. "You are trying really hard"). The steps and key procedures of the intervention are outlined in Table 2.

The purpose of intervention phase I (sessions one and two of the intervention) was to enable a gradual introduction to the task. Phase I involved the first author modelling how to generate a narrative**.** The first author informed the participant they would learn to make up stories and that the first author would show the participant how to do it. The procedure described below was used but the first author provided the responses to the macrostructure element questions and asked the participant to repeat them, then modelled the entire narrative and asked them to repeat it. If the participant made any errors, the first author modelled the correct answer but did not require the participant to repeat it.

Intervention phase II was implemented after phase I. The whiteboard remained on the desk during each teaching session, and the first author stated that the participant was going to make up another story and that stories include special information. The first author secured the *characters* icon on the top left of the whiteboard and said that stories include characters (e.g. "We name the characters or who is in the story."). This procedure, with an explanation of each element, was repeated for the remaining icons. At the end of this stage, the five icons were across the top of the whiteboard in the following order, *character, setting, problem, feelings, fix.*

Table 2 Steps and key procedures of original fictional narrative intervention

Step	Key procedures
1. Introduction to macrostructure elements	Name and explain 5 macrostructure elements Place icons across top of board
2. Establish the *problem* in the narrative	State that before participant can generate a story they need to know what the problem will be Elicit *problem* based on picture Error correction and or extension as required Repetition and modelling of correct information
3. Elicit 5 macrostructure elements separately	Elicit each macrostructure element Further questioning as necessary to elicit full response for each element Model response back to participant State name of element and move icon to bottom of board
4. State whole narrative	Participant says entire narrative Error correction as necessary (based on information in elicitation stage) First author models narrative Second opportunity for participant to say narrative if errors in first opportunity and error correction as necessary Remove the icons and provide another opportunity to state the narrative

The stimulus picture (e.g. plate of spaghetti fallen on the floor) was placed on the whiteboard under the icons and secured with a magnet. The participant was directed to look at the picture, and the first author said that they were going to make up a story about the picture that included all the story parts, while simultaneously pointing to the five icons in the order they were introduced.

The first author said that before they could make up the story with all the right parts, they needed to decide what the story would be about or what the problem in the story was. The first author then immediately requested the problem from the participant (e.g. "Look at the picture and say what you think is the problem in the story."). If the participant provided a response that was appropriate to the picture, then the first author repeated the participant's response and stated that they had given information about the problem in the story. If the participant made no response or an inappropriate response, then the first author immediately modelled an appropriate answer and re-asked what the problem in the story could be. The first author then restated the response regardless of the participant response and stated that was the problem in this story. If the participant provided a partial response (e.g. "Spaghetti." or "It's a mess."), the first author acknowledged the relevant ideas from the participant's response with affirming feedback (e.g. "Yes, spaghetti.") and then requested the student extend their response (e.g. "What happened to the spaghetti?"). If the participant provided a complete answer, the first author treated it as a correct response. If they provided no further information, the first author provided an appropriate response (e.g. "The plate of spaghetti fell on the ground."). The first author then re-asked what the problem in the story was and then restated the appropriate response regardless of the participant response. The first author then said that is the problem in the story.

The first author then asked the participant to make up the whole story about the picture (e.g. "Now that we know the problem we can make up the whole story.") and straight away evoked the *character* information (e.g. "Who are the characters in the story?"). If the participant provided an appropriate response (e.g. the character's name) the first author repeated the participant's response and stated that the participant had given information about the characters in the story. If the participant did not respond or provided an inappropriate response the first author modelled an appropriate answer (e.g. "Let's call the character Rachel."), asked again who the characters are in the story, allowed the participant time to respond then restated the appropriate response regardless of the participant response, stated that is the character in the story and then moved the character icon to the bottom of the board, under the stimulus picture. If the participant provided a partial response (e.g. "The girl.", "Her.") then the first author acknowledged the partial response and d further information (e.g. "Yes, it's a girl, but let's give her a name, what can we call her?"). The first author then stated the appropriate response regardless of the participant response, stated that is the character in the story and moved the character icon to the bottom of the board. If the participant provided a response from the previous day's intervention session the first author stated that it was the same information as yesterday and asked for different information (e.g. "You said that yesterday, let's give her a different name."). The first author re-asked who the character in the story could be, restated the

appropriate response, stated that's the character and moved the icon to the bottom of the board.

The remaining four macrostructure elements were evoked using the same procedure. At the end of this stage of the intervention all five macrostructure icons were across the bottom on the board in the following order, *characters, setting, problem, feeling, fix.*

When information pertaining to all macrostructure elements had been separately evoked, the first author then asked the participant to tell the whole narrative (e.g. "Now tell me the whole story using the information you just told me.") and pointed to the character icon as a cue to begin. If the participant omitted any information, made any alterations, or provided different information the first author provided correct information immediately and pointed to the next icon. The first author then modelled the whole narrative, using the same information as in the individual elements stage and correct grammar. If the participant made an error during the first opportunity to say the whole narrative, a second opportunity was provided for the participant to say the entire narrative again. The first author then removed the icons and told the participant that they could say the narrative without the cards (e.g. "I'm taking the cards away now, you can tell me the story without the cards."). If the participant omitted or altered any information, the first author provided the correct information and moved on. The first author stated that the session was finished.

Several changes to the intervention were implemented for Dashiell and Cooper and are represented on the graphs as phases III–VI. A summary of these changes is in Table 3.

Maintenance and Generalization Probes

Maintenance and generalization probes were collected for all participants using the same conditions as the baseline and intervention probes. Generalization probes were collected using the same procedure but with fantasy stimulus pictures. Generalization probes were collected from all four participants in the baseline phase; additional probes were collected from Atticus and Dashiell during late intervention and maintenance, from Jem during late intervention and from Cooper during the maintenance phase.

Coding Reliability

For training purposes, the second and third authors were provided with a copy of the scoring rubric and transcripts of four training narratives to code. Disagreements were discussed. Subsequently, the second or third authors independently coded 20% of probe narrative transcripts for each participant, which were selected using a random number generator. The second and third authors were blind to whether the transcripts examined were from baseline or intervention. Reliability was calculated by dividing agreements by agreements plus disagreements. Mean overall reliability across all participants was 87% (range 80–96%). Mean reliability for Jem was 80% (range 60–100); Atticus 96% (range 90–100%); Dashiell 80% (range 60–100%);

Table 3 Changes to intervention procedure for Dashiell and Cooper

Dashiell				Cooper			
Phase no	Session no	Description of change	Rationale	Phase no	Session no	Description of change	Rationale
3	20	1st intervention narrative as outlined, + 2nd intervention narrative (picture + icons on board) Request entire narrative (no other prompts) Prompt for missing macrostructure elements Request then model entire narrative Remove icons and request entire narrative	Performing within baseline range	3	6	As for Dashiell phase 3	Performing within baseline range
				4	9	As for phase 3 but no icons in 2nd intervention narrative	Able to produce complete narrative with minimal prompting in intervention but no transfer to probe
4	30	Up to 3 intervention narratives per session Picture only Request entire narrative, remind to name character and feelings	Scores increased but not to maximum, and scores in "character" and "feelings" were low	5	15	As for phase change 4 but removed initial intervention narrative, and increased intensity to 3 or 4 narratives per session	As above
				6	18	As above but intervention pictures previously unseen	As above
				7	22	Probe condition change—prompt him for macrostructure elements, request probe narrative, intervention as phase 6	As above

and for Cooper 90% (range 60–100). Coding for each participant was across five macrostructure elements; disagreements on two elements reduced coding reliability to 60% for three transcripts. Mean reliability across each macrostructure element across all participants and sessions was character 89%; setting 85%; problem 81%; feelings 93%; fix 85%. Given that the total macrostructure score was the dependent variable, a Pearson correlation was calculated between pairs of scores, resulting in a correlation of 0.94, indicating reliability of the total scores was very high between the coders.

Procedural Reliability

A research assistant was trained to evaluate procedural reliability. A checklist was discussed with the research assistant and the first author, and the assistant then watched one intervention session and rated it together. Each step on the procedural reliability checklist was scored as being correctly or incorrectly completed, and steps that were not required (e.g. error correction if no errors were made) were marked as N/A and not included in final scores. The research assistant then independently rated a further two sessions. Any questions were discussed. Following training, the research assistant conducted procedural reliability coding on 20% of intervention sessions for each participant, which were selected using a random number generator (Random.org, n.d.). Overall procedural reliability was 94% (range 84–99%).

Social Validity

A school administrative employee, who was experienced with communicating with children with language disorders but naive to the research, completed two measures of social validity. The employee was provided with six randomly selected narrative transcriptions including three from baseline and three from late intervention for each child. The transcriptions were presented in random order. She was first asked to rank the narratives in order of quality from 1 to 6 (1 = best) and then to rate each narrative on a 1 to 5 scale (1 = very good, 2 = good, 3 = okay, 4 = poor, 5 = very poor).

Results

Figure 1 shows the effect of the narrative intervention on the macrostructure of original fictional narratives for each participant. An intervention effect was demonstrated for Jem, Atticus and Dashiell and those participants displayed maintenance and generalization of the skill to fantasy-based original fictional narratives.

Jem received 14 intervention sessions and approximately 80 min of intervention. Intervention sessions ranged between 5 and 7 min in length. Examination of the figure shows a clear intervention effect. Baseline scores were low, flat and stable, between 1 and 4. There was no change in performance during intervention phase 1 (the two modelling sessions), but there was an immediate improvement in performance during intervention phase II, and his performance stabilized near the

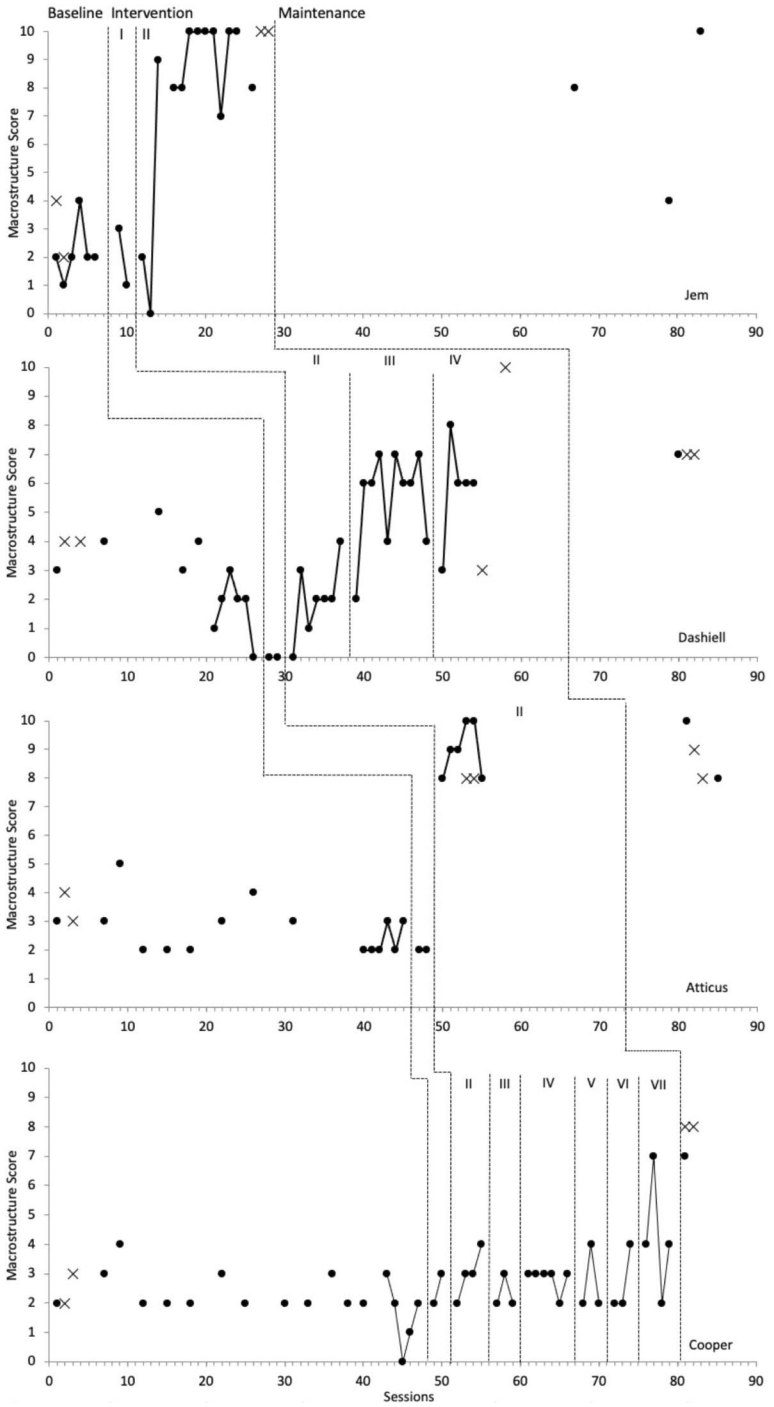

Fig. 1 Original fictional narrative macrostructure score. Roman numerals denote intervention phase; X = generalization probe

maximum possible score. Three maintenance probes were collected up to six weeks after intervention had ceased and, although his scores were variable, the majority were well above baseline. Two sets of two generalization probes were collected. Baseline generalization scores were low, and he achieved the maximum score on both probes collected on the final day of intervention.

Dashiell received 26 sessions and approximately 167 min of intervention. Sessions ranged between 5 and 10 min in length. Baseline probes varied between 3 and 5 for Dashiell and true baseline was variable with scores between 0 and 3. Performance remained at 0 for intervention phase I (modelling), but there was an upward trend during phase II and all data overlapped with baseline. On introduction of intervention phase III there was an increase in performance which stabilized, with most data above baseline levels. The phase IV intervention did not result in any further improvement in performance. One maintenance score was collected 12 weeks after intervention ceased. Three sets of generalization scores were collected. Generalization probes conducted during baseline were low, late intervention probe scores were variable, one low and the other a maximum score, and maintenance probe scores were both above baseline.

Atticus received nine intervention sessions and approximately 32 min of intervention. Intervention sessions ranged between 2 and 6 min in length. Both probe and true baseline scores varied between 2 and 5 with no trend. Intervention phase I (modelling) had no impact but intervention phase II resulted in an immediate effect with performance stabilizing between 8 and 10 with no overlap with baseline data. Two maintenance probes were collected up to 12 weeks after intervention ceased, and maintenance effect and generalization to fantasy-based narratives was observed with scores between 8 and 10.

Cooper received 25 intervention sessions and approximately 120 min of intervention. Sessions ranged between 2 and 10 min in length. An intervention effect cannot be asserted for Cooper, as seven phase changes were implemented. Cooper's data was flat, and scores varied between 2 and 4 across all baseline and intervention phases with the exception of two scores of 7 late in the study. Although there was some improvement in his scores, a decision was made to stop intervention as it was the end of the school term. One maintenance probe was collected after intervention had ceased. His maintenance and generalization scores did increase in the maintenance phase.

The first social validity task was assessed by asking the observer to rank six narratives (three from baseline and three from intervention) from each participant in order from 1 (best narrative) to 6. Intervention narratives were ranked at position 1 and 2 for all participants, for two participants the final intervention narrative was ranked at position 3, for one participant the final intervention narrative was ranked at position 4, and for one participant the final intervention narrative was ranked at position 5. The second social validity task required the observer to rate the same narratives for each participant on a scale of 1 (very good) to 5 (very poor). Overall, the intervention narratives were more highly rated. The average rating for each participant was as follows, Jem baseline 2.7, intervention 1.3; Dashiell baseline 2.7, intervention 2; Atticus baseline 4.3, intervention 2; Cooper baseline 4, intervention 3.

Discussion

The purpose of this study was to investigate the effects of an oral narrative intervention on the fictional narrative generations of four children with a diagnosis of ASD and co-occurring language disorder. The study supports previous research on oral narrative intervention in children with ASD (Favot et al. 2018a, b; Gillam et al. 2015; Petersen et al. 2014) as an experimental effect and maintenance effects were demonstrated for three of the four participants. The current study extends the research of Gillam et al. (2015) and Petersen et al. (2014) as measures of generalization were included and overall intervention time was less and intervention focused solely on the development of the macrostructure of original fictional narratives. The results of this study are in keeping with previous oral narrative interventions that have also employed icons, pictures to represent narratives, modelling and generation of a complete narrative in each session (Favot et al. 2018a, b; Petersen et al. 2014). These results are also consistent with those of Gillam et al. (2015) in that the macrostructure-based oral narrative intervention appeared to be an appropriate intervention to develop original fictional narratives for children with language disorder.

The study reported here extends the study conducted by Gillam et al. (2015) in a number of ways. Firstly, the intervention was brief, with participants receiving between 0.5 and 2.8 h of intervention, compared to 17.5 to 27.5 h in Gillam et al. (2015). A contributing factor to the greater efficiency of the current intervention may have been the highly structured teaching procedure and the tight focus on teaching macrostructure. Gillam et al. (2015) provide general and limited information regarding their teaching procedures, but it is possible that this current study employed tighter procedures. Secondly, three of the four participants generalized the taught skills to fantasy-based original fictional narratives, whereas Gillam et al. did not include generalization measures. The fantasy-based narratives used in this study to assess generalization tested participants' skills to a greater extent than the daily probes, as they required an application of the learned skill to situations outside of their experience and not based in reality. Lastly, the daily probes were collected before the daily intervention, whereas Gillam et al. collected probe data after intervention sessions. Probe data collected after an intervention session may be influenced by the preceding intervention session while data collected beforehand may better assess participant mastery of targeted skills (Alberto and Troutman 2017).

As with previous similar interventions (e.g. Favot et al. 2018a), amendments were made to the intervention procedure as two participants were not making adequate progress. Single case research designs are well suited to interventions with idiosyncratic populations as they allow for modifications to be made to the procedure if the intervention is not working (Rapoff and Stark 2008). Modifications to intervention may be necessary when working with children with ASD as no single intervention works with all children with ASD (Layne 2007; Lindgren and Doobay 2011). Amendments in the current study were designed to increase intervention intensity and opportunities for practice, to reduce the amount of

verbal prompting and for Dashiell to highlight missing macrostructure elements. The initial intervention was not intense enough and did not provide Dashiell enough opportunities for practice. Increasing intensity, providing more opportunities for practice and reducing verbal prompts was sufficient for Dashiell's scores to increase but not for Cooper.

Assessments completed prior to this study to assess Cooper's eligibility do not provide any obvious insight as to why he was not responsive to this intervention. There are a number of other possible explanations for his lack of progress. Firstly, even though a probe variation of the multiple baseline design was employed, it is possible that the extended period on baseline, during which time his narratives were not developed, and he was explicitly thanked for each narrative he produced, could have reinforced his minimal responses to the stimulus materials and the standardized verbal prompt. Secondly, it is possible that even though he learned to generate narratives in the intervention sessions, he "stipulated" (Engelmann and Carnine 2016) this behaviour to the intervention condition and did not generalize to the range of possibilities to which the skill could apply. This could possibly be addressed by varying the verbal prompts used to evoke the probe and intervention narratives, by explicitly stating that he could make up a story at any time. Even though Cooper may have stipulated (Engelmann and Carnine 2016) in the realistic narrative probe, this stipulation may have been limited to that probe without affecting the generalization probe. There were limited generalization probes, and this further may not be a reliable measure of performance.

Limitations

The results described in this paper should be interpreted with caution. The intervention was conducted with a small number of participants, using a single subject methodology which has limited external validity. Internal validity is weakened as probes were done weekly but not necessarily on the same day that intervention started with another participant. In addition, procedural changes were made for two participants limiting confidence with which experimental control can be asserted. A further limitation to this study is that generalization was only examined in relation to fantasy-based narratives.

Implications for Practice and Future Research

The outcomes of this intervention study indicate that the intervention may be effective, and it has further reinforced the value of previous interventions that have used similar approaches. The highly structured, semi-scripted intervention could be adapted to be delivered in small groups in school settings by classroom practitioners. While current evidence suggests that intervention of this type can be successful, classroom practitioners should carefully monitor student progress.

Future research in the area could be extended in several ways. In the future to avoid the possible effects of stipulation, researchers should be conscious of holding children in baseline for too long. Researchers in the future studies could also

investigate the efficacy of intervention with children ASD and co-occurring language disorder in small groups in either clinic or classroom settings. Spencer el al. (2017) demonstrated an intervention effect when delivering a similar intervention to students in small groups. Future researchers could also investigate how to develop the complexity of the narratives produced by children by exploring the development of intervention sequences aimed at moving from simple original fictional narrative to original fictional narratives with more complex macrostructure. Further areas for investigations include the capability of participants to generate narrative in response to a different stimulus (e.g. provided with different macrostructural component such as picture of setting or in response to verbal stimuli) or the generalization of oral narrative to written narrative.

Conclusion

The effects of a brief explicit oral narrative intervention on the original fictional narratives of four participants with ASD and co-occurring language disorder are described. There was a strong intervention effect for two participants and a moderate intervention effect for one participant. Amendments were made to the intervention for two participants indicating the advantages of single case research with children with ASD and co-occurring language disorder. The taught skills were maintained for three participants with evidence of generalization to fantasy-based fictional narratives. The results of this research indicate that a short fictional narrative intervention can be effective for children with ASD and co-occurring language disorders. Areas for future research could include measuring the effect of intervention within a small group setting and transferring the effect with simple macrostructure to more complex macrostructure.

Appendix 1

Macrostructure element	2 points	1 point	0
	Scorer should not need shared knowledge to understand the information	Key words or phrases, but not specific or clear, may be attributed to the wrong person	No information or incorrect information
Character	Main character's name	Broad character description (e.g. the boy, the brother)	Pronouns, someone
Setting	Activity and the location (e.g. eating pizza in the kitchen), "home" acceptable if story makes sense	Activity or location (e.g. say "home" or "eating pizza")	No information or incorrect information

Macrostructure element	2 points	1 point	0
Problem	Statement of what went wrong in the story	Incomplete, not clear, uses vague vocabulary	No information or incorrect information
Feelings about the problem	Specific appropriate emotion	Emotion named but may be inappropriate, or general behaviour related to the problem (e.g. "didn't like it)	No information or incorrect information
Fix	Specific information that states what characters (main or secondary) did to fix the problem, can use dialogue or description, may assume the voice of the character	Broad description of what was done (e.g. asked for help, X helped Y), correct actions but attributed to the wrong people or it's unclear	No information or incorrect information

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and / national research committee and with the 1964 Helsinki declaration and its later amendments of comparable ethical standards.

Informed Consent Informed consent was obtained from parents of all individual participants included in the study.

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