THE RELATION BETWEEN ORAL NARRATIVE PRODUCTION AND LITERACY SKILLS AMONG CHILDREN WITH DOWN SYNDROME

by

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Chapter I
Introduction

Narratives are defined as oral or written accounts of connected events that are presented in a variety of ways including scripts, personal events, or fictional stories (Boudreau & Chapman, 2000; Hedberg & Westby, 1993). Successful narrative production requires the integration of linguistic, cognitive, social, and pragmatic abilities (Berman, 1995; Hemphill, Picardi & Tager-Flusberg, 1991) and has a significant impact on academic and social demands for young children (van Bysterveldt, Westerveld, Gillon & Foster-Cohen, 2012). Westby (1989) suggested that narrative skills form the bridge between oral language and literacy, and narrative analysis may be an important index of risk for future communication problems. As speech-language pathologists, one must consider the consequences of delayed or impaired narrative ability as it relates to academic performance among school-age children. Specifically, school-age children with Down syndrome (CWDS) present with an overall delay in expressive language, and therefore, may also exhibit delayed or impaired narrative abilities which may affect their academic achievement (Chapman, Schwartz & Kay-Raining Bird, 1991; Chapman, Seung, Schwartz & Kay-Raining Bird, 1998; Dykens, Hodapp, & Evans, 1994; Kay-Raining Bird, et al., 2008). The majority of the research on oral narrative production by CWDS has focused on analyzing these children's oral narrative structure (Miles & Chapman, 2002). Only one study, to date, has investigated the relation between oral narrative production and academic skills in CWDS (van Bysterveldt, Westerveld, Gillon, & Foster-Cohen, 2012). This current study was initiated to further validate earlier findings and to analyze oral narratives, specifically at the microstructure level, and in relation to reading comprehension. It is important to investigate the relation between oral

narrative production and literacy skills among CWDS because narrative skills may have a large impact on these children's ability to access school curricula. Therefore, the purpose of this study was to investigate the relation between oral narrative skills and reading comprehension in school-age CWDS.

Chapter II
Review of Literature

Analysis of Oral Narrative Production in Typically Developing Children

Many researchers have analyzed oral narrative production of children by examining macrostructure and microstructure. Narrative microstructure refers to measures of productivity and complexity at the sentence level and macrostructure considers the overall coherence and organization of the oral narrative (Hughes, MacGillivray, & Schmidek, 1997; Justice, Kaderavek, Ukrainetz, Eisenberg, & Gillam, 2006). In regards to macrostructure, Lahey (1988) outlined typical oral narrative development by describing the level of organization and complexity of children's oral narratives. In initial stages, oral narratives are organized as additive chains, which include separate and independent events that can be rearranged within the text without resulting in a change in meaning. Temporal chain organization is then produced, which includes some events that are sequentially organized, but there are no cause-and-effect relations. Three-year-old children typically produce narratives with a temporal sequence (Norbury & Bishop, 2003). Later stages of oral narrative production are organized as causal chains containing one cause-and-effect episode commonly referred to as "story grammar". Typically, oral narratives produced by five-year-olds have a causal chain structure (Norbury & Bishop, 2003). As language becomes more complex, children include multiple causal chains or episodes in their oral narratives. Norbury and Bishop (2003) reported that, by age 9, typically developing children's narratives contained multiple initiating events and attempts.

Story grammar (i.e., causal chain narrative) is defined by six main macrostructure elements (Trabasso & Stein, 1994). These include the setting which provides details of

the characters in the story and when and where the story takes place, the initiating event which signals "a happening" that causes the main characters to do something, the internal response which explains the characters' thoughts, wishes, or emotions as a result of the initiating event, the plan which arises from the internal response and initiating event, the attempt(s) which are the actions performed by the characters, and the conclusion which is the outcome after the attempts are made and include how the characters feel (i.e., reaction).

Contrastively, microstructure involves analysis at the sentence level (Justice, Kaderavek, Ukrainetz, Eisenberg, & Gillam, 2006). Microstructure measures of productivity include total number of words (TNW), total number of different words (NDW), total number of T-units (i.e., length), mean length of T-units in words (MLT-W), and mean length of T-units in morphemes (MLT-M). TNW and NDW are typically used to explain lexical diversity. MLT-W and MLT-M are typically used to explain syntactic complexity. Justice and colleagues (2006) used microstructure analysis to analyze narrative production of typically developing children and found a consistent developmental increase in lexical diversity and syntactic complexity from five to ten years of age.

Overall, researchers have reported an increase in complexity of macro and microstructure of oral narratives produced by typically developing children. Investigating macro and microstructure of oral narratives produced by children who present with language disorders provides detailed information about their oral narrative production and comparisons to typical peers can be made.

Oral Narrative Skills of Children with Down syndrome

Miles and Chapman (2002) investigated the difference between the macrostructure of oral narratives produced by a group of CWDS, a group of MLU matched typically developing children, a group of receptive syntax matched typically developing children, and a group of typically developing children matched on cognitive ability. Further, the researchers examined the contributions of expressive and receptive syntax, cognitive abilities, and life experience on the episodic structure of oral narratives produced by CWDS. The researchers included 33 CWDS ranging in age from 12 to 26 years. The children's' expressive syntax was measured by computing the mean length of utterance (MLU) from the oral narrative sample, receptive syntax was measured by the Test of Auditory Comprehension of Language-Revised (TACL-R; Carrow-Woolfolk, 1985), and cognitive ability was measured by the Bead Memory and Pattern Analysis subtests of the Standford-Binet Test of Intelligence (Thorndike, Hagen, & Sattler, 1986). The researchers indicated that chronological age served as the measure of life experience. Oral narrative production was assessed using the *Frog Where are you?* wordless picture book by Mercer Mayer (1969). The children were prompted by saying, "Once upon a time there was a boy, a dog, and a frog," and then they were asked to look at the pictures and tell a story. Oral narratives were audio and videotaped and analyzed using Systematic Analysis of Language Transcripts program (SALT; Miller & Chapman, 1990). Within SALT, grammatical morphemes, unintelligible segments, and mazes were coded. To analyze macrostructure, the researchers used a six plot line component scale similar to the story grammar components (Mandler, 1984; Stein & Glenn, 1979). One point was given for each explicit mention of the following components specific to the story: onset of the story problem where the protagonist discovers frog is gone (i.e., initiating event), the

discovery of loss (i.e., plan), search in the house (i.e., attempt 1), search outside (i.e., attempt 2), finding the frog (i.e., resolution), and frog is the same or substitute for the missing frog.

The researchers found the MLU matched group produced fewer plot line components than the group of CWDS and cognitive matched group. They also found that oral narratives of the group with Down syndrome and the receptive syntax matched group were similar in terms of plot development and thematic content. They concluded that CWDS produced oral narratives with plot line components equal to their receptive syntax ability. Further, for the group of CWDS, Miles and Chapman (2002) found that MLU and receptive syntax contributed significant variance to the plot line component measure (i.e., 42% of the variance). The researchers did not find that cognitive ability or life experience contributed unique variation to episodic structure when MLU and receptive syntax were added to the regression model. This finding suggested that the episodic structure of oral narratives produced by individuals with Down syndrome may vary depending on individuals' expressive and receptive syntactic skills, but will not be impacted by cognitive ability or life experience.

Kay-Raining Bird, Cleave, White, Pike, and Helmkay (2008) investigated the difference between narrative micro and macrostructure produced by CWDS and reading matched peers (TD). The researchers hypothesized that the microstructure of oral narratives produced by CWDS would be less complex than reading matched peers while macrostructure would not differ when compared to reading matched peers. Further, the researchers also investigated which factors explain the variance of oral narrative micro and macrostructure for individuals with DS. This study included 20 CWDS ranging in

age from 8;6 (years; months) to 19;10 and 17 typically developing controls between the ages of 4;9 and 10;9. Participants were matched for reading performance using raw scores on The Word Identification subtest of the Woodcock Reading Mastery Test-Revised (Woodcock, 1987). The children were administered the Peabody Picture Vocabulary Test-Revised (PPVT-R, Form L; Dunn & Dunn, 1981) and the Peabody Picture Vocabulary Test-III (PPVT-III, Form A, Dunn & Dunn, 1997) to assess receptive vocabulary. PPVT-III scores were converted to PPVT-R scores to ensure consistent scores. In addition, a conversational sample was collected between the client and examiner as an additional measure of language. Phonological awareness measures included segmentation at the phoneme and syllable levels, rhyme generation, and a modified elision task (*Auditory Analysis Test;* Rosner & Simon, 1971).

The oral narrative samples were elicited by showing the children three picture sequences, each of which contained four pictures extracted from *A Boy, A Dog, and A Frog*, by Mercer Mayer (1969). Each sequence depicted actions that comprised a single complete episode and various facial expressions showing the characters' emotional reactions. The examiner pointed to each picture in the sequence and asked the child to tell a story. If the child did not respond or produced a limited response, nonspecific prompts were given to encourage continuation of the story. Narrative samples were then transcribed using Systematic Analysis of Language Transcript (SALT, Miller & Chapman, 1998) conventions. Narrative utterances were segmented into T-units. The SALT transcripts were analyzed at the micro and macrostructure levels. Microstructure measures included total number of T-units (length), total number of words (TNW), number of different words (NDW), mean length of T-unit (MLT-unit), and the number of

different internal state words. Internal state words were defined as those words that reflected feelings, volition or cognitive states, perceptions, or communicative actions. Macrostructure analysis involved identification of the proportion of pictured episodic components out of five or six predetermined story grammar elements that were included in each narrative.

Microstructure analysis revealed that CWDS produced significantly more T-units or longer oral narratives when compared to the TD controls. However, the DS and TD groups did not differ on measures of episodic structure or linguistic complexity. The researchers concluded that the increased length of oral narratives produced by the DS group did not result in the inclusion of more story grammar elements or greater use of internal state language. Rather, the narratives produced by CWDS were characterized by extensive repetitions and greater descriptive sequences. Since group differences were not found in these areas and the two groups were matched for reading, the researchers concluded that narrative ability was comparable to word level reading in CWDS.

This study also sought to determine how receptive vocabulary and phonological and phonemic awareness explained the variance in micro and macrostructure features of narratives produced by CWDS. The researchers found that receptive vocabulary was the strongest predictor of the number of T-units, age was the strongest predictor of MLT-unit, and phonological awareness was the strongest predictor of macrostructure. These results suggest that phonemic awareness, an important literacy skill, significantly contributes to oral narrative macrostructure produced by CWDS providing some evidence of the relation between literacy and oral narrative ability within this population.

The Relation between Oral Narrative Skills of Children with Down syndrome and Word-level Reading and Reading Comprehension

While there is an expansive evidence base for what supports literacy and overall academic success in typically developing children and even those with language delays, it is equally important to focus on what contributes to successful reading in CWDS. Only one study has investigated the specific relationship between oral narratives and academic skills within this population. Van Bysterveldt, Westerveldt, Gillon, and Foster-Cohen (2012) investigated the relation between microstructure and macrostructure features of personal narratives produced by CWDS. Further, the researchers examined the relation between reading comprehension, age, and micro and macrostructure measures of personal narratives. The researchers examined 25 CWDS ages 5;11 to 13;1 who were labeled as "beginning readers" which was defined as those children who achieved a raw score of 10 or more on the single-word reading test (i.e., *The Burt Word Reading Test-New Zealand Revision*; Gilmore, Croft, & Reid. 1981).

A standard language sampling protocol was used to elicit the narrative samples. The protocol involved showing each child a series of 11 pictures followed by a scripted introduction by the examiner who invited the child to share a past personal experience. Samples were tape-recorded and transcribed using Systematic Analysis of Language Transcripts-New Zealand Version conventions (Miller, et al. 2008). Each utterance was segmented into communication units (C-units) in which elliptical responses and phrases were all considered C-units

Within the SALT transcripts, microstructure analysis included the first 50 complete and intelligible utterances, and macrostructure analysis included all utterances.

Microstructure measures included mean length of utterance in morphemes (MLU-M) and number of different words (NDW). Macrostructure measure included analysis of personal narrative quality (PNQ). A scoring system was implemented to score the type of narrative produced by each child: a) One past event, b) two past events, c) three past events, d) leapfrog: three past events without a logical order, e) chronological: three past event with a logical order but without narrator evaluation, f) end-at-high-point: a narrative with a high point but no resolution, or g) classic-narrative: a narrative with a high point and a resolution. The children's reading accuracy and comprehension was assessed using *The Neale Analysis of Reading Ability-3* (NARA; Neale 1999).

The researchers found a considerable amount of participant variability among microstructure measures in personal narratives (i.e., syntactic (MLU-M) and semantic diversity (NDW)) across children. MLU-M ranged from 1.1 to 5.5 and, on average, the CWDS used 61 different words with a standard deviation of 25 words. Macrostructure analysis revealed that most children produced personal narratives with one past event, five children produced a narrative with three past events in a chronological order, and one child produced the most sophisticated form, the classic narrative. The researchers also found a strong, positive correlation between macrostructure and microstructure measures of oral narratives, where the most sophisticated oral narratives were produced by children who also had the longest sentences and had a higher NDW (MLU-M and NDW [$r=0.891$, $p < 0.001$], MLU-M and PNQ [$r=0.705$, $p < 0.001$, and NDW and PNQ [$r=0.703$, $p < 0.001$]). The researchers concluded that while CWDS were willing and able to participate in the task, most did not have the organizational understanding of the structure of a story

or the semantic ability to convey the message, which is required for a high-point narrative.

To analyze the relation between reading ability and micro and macrostructure measures, correlational analyses were performed. The results indicated significant moderate positive correlations between word reading accuracy and reading comprehension measures and microstructure measures. Spearman's rho values were .45 for word reading accuracy and MLU-M, .48 for reading comprehension and MLU-M and .51 for reading comprehension and NDW. Correlation values were not included for macrostructure measures and reading skills; however, the researchers reported that children who produced a high-point personal narrative also demonstrated the highest scores on reading comprehension and reading accuracy measures.

The results from Van Bysterveldt and colleagues (2012) provide limited evidence of the relation between oral narrative micro and macrostructure measures and reading comprehension of CWDS. Thus, it is important to provide additional evidence for the relation between oral narrative production and literacy skills among CWDS to determine whether oral narrative skills support reading comprehension in this population. Current research exists to show that oral narrative skills support reading comprehension in typically developing children (Westby, 1989), and so micro and macrostructure components of oral narratives may also support reading comprehension in CWDS. Currently, we do not have evidence to support this claim among this population. Further, the current study adds to the existing literature by eliciting fictional oral narratives instead of personal narratives. Fictional oral narratives were elicited because the macrostructure matches the story structure of reading passages, which we predicted

would relate higher to reading comprehension skills than personal narratives. No other study to date has analyzed what specific measures of micro and macrostructure contribute unique variance to reading comprehension among CWDS. These results may provide support for identifying which oral narrative skills need to be intervened to support CWDS's reading comprehension ability.

Purpose and Research Questions

Therefore, the purpose of this study was to examine micro and macrostructures of oral fictional narratives produced by CWDS and to investigate the relation between oral fictional narrative skills (i.e., micro and macrostructure measures) and reading comprehension of school-age CWDS.

Specifically, the following research questions were analyzed:

1. What is the microstructure and macrostructure of oral narrative production produced by children between the ages of 8 and 18 years with Down syndrome?
2. Does microstructure analysis predict reading comprehension (controlling for vocabulary and word level reading) of CWDS?
3. Does macrostructure analysis predict reading comprehension (controlling for vocabulary and word level reading) of CWDS?

Research Hypothesis

Based on results from previous research, it was expected that oral narratives produced by CWDS would produce highly varied narratives in relation to microstructure measures, with MLU-M ranging from 2.0 to 6.0. Use of macrostructure elements was hypothesized to be very limited and reflect early developing narrative forms (Kay-Raining Bird, Cleave, White, Pike, & Helmkay, 2008; Van Bysterveldt, Westerveldt,

Gillon, & Foster-Cohen, 2012). When controlling for vocabulary and word level reading, it was hypothesized that macrostructure use would predict reading comprehension of CWDS (Van Bysterveldt, Westerveldt, Gillon, & Foster-Cohen, 2012). Previous research has reported that children who score higher on macrostructure measures also demonstrated higher reading comprehension and reading accuracy scores.

Chapter III
Method

Participants

A total of 15 school-aged children from the North Texas metropolitan area, aged 8 to 18 years (mean age = 13;6), participated in the study. Five of the children were male and the remaining 10 were females. Eighty percent of the sample attended a local private school and the remaining children were home-schooled. All of the children were receiving speech and language and/or reading services. The mean IQ of the children was 53.67 with a standard deviation of 14.17 as measured by the matrices subtest of the Kaufman Brief Intelligence Test-2 (KBIT-2; Kaufman, 2004) or review of school cumulative file where non-verbal IQ was documented.

Procedures

Children in the study were administered oral narrative, reading comprehension, word-level reading, and vocabulary assessments during one, approximately 60-minute testing session at their school and a university clinic. To assess oral narrative ability, children were required to look at the wordless picture book *Frog Goes To Dinner* by Mercer Mayer (1969) while the examiner provided a model of a fictional oral narrative based on the pictures. The narrative presented by the researcher was an abridged version, containing a pre-determined portion of the story grammar elements related to the picture sequences. Five out of the eight original episodes were included in the narrative; see Appendix A for the story script. Once the modeled narrative was complete, the child was asked to retell the story using the same book. The examiner prompted the child to look at the pictures and tell a story, similar to the oral narrative presented by the primary researcher. If the child produced a limited response, the examiner provided nonspecific

prompts to encourage expansion of the story. Oral fictional narratives were audio and video recorded.

Reading comprehension was measured with the passage comprehension subtest of the Woodcock Reading Mastery Tests-3 (WRMT-3; Woodcock, 1987). This test used a modified cloze procedure where the children were required to read either a sentence or paragraph with a missing word and identify the appropriate word to complete meaning in the sentence or paragraph. Forty percent of the items were sentence length and contained pictures related to the text which allowed passage comprehension skills to be assessed at a lower age or skill level. Reliability of the WRMT-3 is considered to be good. Internal consistency coefficients were .90 and .86 based on the split-half reliability method based on age. The test-retest reliability coefficient was .80.

Word level reading and receptive vocabulary are known contributors to reading comprehension (Beck, Mckeown, & Kucan, 2002; Catts, Hogan, & Adolf, 2005; Cutting & Scarborough, 2006) and were controlled to isolate the specific effect of microstructure and macrostructure measures on reading comprehension. The word identification subtest of the WRMT-3 (Woodcock, 1987) was administered to assess word level reading. Internal consistency reliability coefficients were reported by the manual as.93 and .92 and the test-retest reliability coefficient was reported as .95. Lastly, receptive vocabulary was assessed using the Peabody Picture Vocabulary Test (PPVT-4; Dunn, 2007). The internal consistency reliability coefficient for this test was reported as .94 and test retest reliability was reported as .92. All assessments were counterbalanced across children to eliminate order effects. Administration of the standardized assessments followed the published examiner's manual.

Data Analysis

This study was a non-experimental research design examining the relation between oral narrative ability and reading comprehension in CWDS. Raw scores were entered into SPSS to analyze the microstructure and macrostructure of oral narratives produced by CWDS descriptively and to conduct step-wise multiple regression analyses with reading comprehension as the dependent variable.

Macrostructure analysis.

Oral narratives were entered into the SALT program and coded using the Narrative Scoring Scheme (NSS; SALT; Miller & Chapman, 1990). The NSS was scored using a 0-5 point scale with five points awarded for "proficient" use, three points for "emerging/inconsistent" use, and one point for "immature/minimal" use. Scores were given for each of the following seven characteristics: 1) Introduction scores which were determined by the presence, absence, and qualitative description of character and setting components, 2) character development scores were based on acknowledgement of characters and their purpose throughout the study, 3) mental state scores were evaluated based on the frequency and diversity of vocabulary used to convey character emotions and thought processes, 4) referencing scores which were given for the consistent and accurate use of antecedents and clarifiers, as well as use of correct pronouns and proper names, 5) conflict/resolution scores were based on the presence/absence of conflicts and resolutions necessary to the story as well as how thoroughly each was described, 6) cohesion referred to the sequencing and transitions between each event, and 7) conclusion scores which were based on the conclusion of the final event as well as the

wrap-up of the entire story. Each area of the NSS was coded and a composite NSS score was created.

Microstructure analysis.

Narratives also were coded and analyzed at the microstructure level which included mean length of utterance per morpheme (MLU-M), number of different words (NDW), and Narrative Assessment Protocol score (NAP; Justice, Bowles, Pence & Gosse, 2010). These measures have been validated in previous research as adequate measures of microstructure (Miles & Chapman, 2002; Kay-Raining Bird, et al., 2008; Van Bysterveldt, Westerveldt, Gillon & Foster-Cohen, 2012). MLU-M measures were chosen to reflect syntactic ability and NDW was chosen to reflect vocabulary use. The Narrative Assessment Protocol was used to examine each of the following areas of language: 1) Sentence structure, 2) phrase structure, 3) modifiers, 4) nouns, and 5) verbs within a narrative context. Each area was coded for frequency of use and a composite NAP score was created.

Reliability

Transcriptions.

The first author transcribed, coded, and analyzed all oral narrative samples. A second examiner who was trained on each portion of the transcription analysis transcribed and coded 100% of the oral narrative samples. Initially, the percentage of transcription agreement calculated was 85% and percentage of agreement for number of C-units was 76%. Discrepancies between the primary and secondary transcriptions were reanalyzed by a third, trained examiner resulting in 100% transcription agreement across all examiners. The reanalyzed transcriptions were used in the data analysis. Additionally,

NSS inter-scorer reliability was 80% across the proficient, emerging, and immature categories and NAP inter-scorer reliability was 87% across all language structures.

Standardized tests.

Two trained examiners scored 100% of the standardized tests administered (i.e., K-BIT, PPVT-4 and WRMT-3) and inter-rater score agreement was 95%. Discrepancies between scores were resolved by a third, trained examiner prior to the data analyses, resulting in 100% agreement.

Chapter IV
Results

Oral narratives produced by school-aged children with Down syndrome were collected and analyzed at the micro and macrostructure levels. Additionally, the relationship between microstructure and macrostructure analysis on reading comprehension were examined.

Microstructure Analysis

The Narrative Assessment Protocol analysis (NAP; Justice, Bowles, Pence & Gosse, 2010) revealed that on average children used more phrase structures (i.e., noun or prepositional phrases; mean = 16, SD = 7.97) than sentence structures (i.e., compound, complex, negative, and interrogatory; mean = 1.93, SD = 2.49). Additionally, CWDS used more verbs (mean = 13.47, SD = 11.75) than modifiers and nouns (mean = 1.87, SD = 1.85; mean = 1.53, SD = 1.13, respectively). Upon further analysis of each language area analyzed using the NAP, it was evident that CWDS used more prepositional phrases (mean = 11.60, SD = 7.64) than any other language structure. Further, NDW and MLU-M were analyzed resulting in an average NDW of 54.5 (SD = 24.17) words and MLU-M of 6.6 (SD = 2.50). See Table 1 for NAP language structure scores, MLU-M, and NDW.

Table 1.
Descriptive Statistics-Microstructure

Variables	Mean	SD
MLU_M	6.60	2.50
NDW	54.50	24.20
NAP Total Score	34.90	22.60
Sentence structure	1.93	2.49
Compound sentence	0.33	0.72
Complex sentence	0.73	1.58
Negative sentence	0.67	1.18
Interrogative	0.20	0.41
Phrase structure	16.00	7.97

Elaborated noun phrase	2.47	2.48
Compound noun	1.93	1.49
Prepositional phrase	11.60	7.64
Modifiers	1.87	1.85
Adverb	1.00	1.00
Advanced modifiers	0.87	1.30
Nouns	1.53	1.13
Pluralized noun	1.00	0.85
Possessive form	0.53	0.64
Tier-two noun	0.00	0.00
Verbs	13.47	11.75
Auxillary verb	1.53	1.77
Copula	3.73	3.58
Irregular past tense	4.20	4.02
Regular past tense	3.47	3.64
Tier-two verb	0.47	0.83
Compound verb	0.07	0.26

Note. SD = Standard Deviation

Macrostructure Analysis

Story grammar was measured by inclusion of the seven characteristics outlined in the SALT NSS Protocol (NSS; SALT; Miller & Chapman, 1990). Based on a 1 to 5 rating scale, the children scored on average 2.2 for introduction, 2.5 for character development, 2.1 for mental states, 2.3 for referencing, 2.5 for conflict/resolution pairings, 2.3 for cohesion, and 3.6 for concluding information. See Table 2. Overall, in their oral narratives, CWDS did not differentiate between main and sub characters and did not include information about the various settings presented throughout the story. They did not include what the characters were thinking (i.e., mental state verbs) and did not provide clear references to previously established characters. Further, their oral narratives lacked key conflict/resolution pairings and instead emphasized minor events in an illogical order. However, children did include concluding statements in their oral narratives.

Table 2.

Descriptive Statistics-Macrostructure

Variables	Mean	SD
NSS Total Score (out of 35)	17.50	6.80
Introduction	2.20	0.96
Character	2.50	0.99
Mental State	2.10	1.06
Referencing	2.30	1.10
Conflict	2.40	1.55
Cohesion	2.30	1.49
Conclusion	3.60	1.40

Note. SD = Standard Deviation

Relations Between Microstructure, Macrostructure & Reading Comprehension

Four hierarchical regression analyses were conducted for microstructure measures (i.e., MLU-M, NDW, NAP) and macrostructure measure (i.e., NSS) separately with reading comprehension (i.e., WRMT-3 Passage Comprehension subtest) as the dependent measure. After controlling for word level reading and receptive vocabulary, macrostructure and microstructure skills did not contribute significant variance to reading comprehension (i.e., Macrostructure: [$R^2 = .90$, $p = 0.06$] and microstructure: MLU [$R^2 = 0.88$, $p = 0.35$], NAP [$R^2 = 0.87$, $p = 0.59$] NDW [$R^2 = 0.87$, $p = 0.67$]; See Table 3). Macrostructure skills came close to significance. Although the current study did not produce significant results, strong correlations were found between literacy skills (i.e., word level reading and vocabulary) and narrative microstructure and macrostructure. Significant positive correlations were found between reading comprehension and MLU [$r = 0.774$, $p < 0.01$], reading comprehension and NDW [$r = 0.852$, $p < 0.01$], reading

comprehension and NAP [r = 0.840, p < 0.01], and reading comprehension and NSS [r = 0.888, p < 0.01]. See Table 3 and 4.

Table 3.
Regression Equations Predicting Reading Comprehension

Variable	R^2	R^2 Change	Adjusted R^2	F	p	df
Model 1 Microstructure						
Word-level Reading	0.72	0.72	0.70	33.92	<.01	(1,13)
Receptive Vocabulary	0.86	0.14	0.84	12.42	0.004	(1,12)
Number of Different Words	0.87	0.00	0.83	0.20	0.667	(1,11)
Model 2 Microstructure						
Mean Length of Utterance Morpheme	0.88	0.01	0.84	0.97	0.347	(1,11)
Model 3 Microstructure						
Narrative Assessment Protocol (NAP)	0.87	0.00	0.83	0.32	0.560	(1,11)
Model 4 Macrostructure						
Narrative Scoring Scheme	0.90	0.04	0.88	4.23	0.064	(1,11)

Note. p < 0.05; df=degrees of freedom

Table 4.
Summary of Intercorrelations

	1	2	3	4	5	6	7	8
1. Word Identification	1	0.85**	0.846**	0.630*	0.742**	0.759**	0.778**	.724**
2. Passage Comprehension		1	0.829**	0.827**	0.774**	0.852**	0.840**	0.888**
3. Phonemic Segmentation			1	0.637*	0.771**	0.831**	0.889**	0.838**
4. Vocabulary				1	0.859**	0.862**	0.797**	0.814**
5. MLU_M					1	0.894**	0.859**	0.858**
6. NDW						1	0.972**	0.918**
7. Total NAP							1	0.898**
8. Total NSS								1

Note. ** = p<.01; * p<.05

Chapter V
Discussion

The current study explored the microstructure and macrostructure of oral narratives produced by children with Down syndrome and whether these oral narrative measures predicted reading comprehension.

Microstructure Analysis

Analysis of the oral narrative retells at the microstructure level provided information about expressive language at the sentence and phrase levels. The current study analyzed MLU-M, NDW, and NAP (Justice, Bowles, Pence & Gosse, 2010). To date, no other study has investigated microstructure of oral narratives of CWDS using the NAP scoring. The NAP scoring revealed that the oral narratives of CWDS rarely contained compound or complex sentences; however, prepositional phrases were often used to elaborate utterances. In addition, further NAP analysis revealed that verbs were used more often than nouns and modifiers. Justice and colleagues (2010) used the NAP with typically developing children and found that children with a mean age of 52 months also used many more prepositional phrases than any other language structure. Furthermore, Gummersall and Strong (1999) found that typically developing 8 and 9 year old children produced complex sentences in oral narratives. The current findings suggest that microstructure of narratives produced by CWDS lack complexity even though the mean age of the sample was 13.6 years. Berglund, Eriksson and Johansson (2001) identified that language development for CWDS proceeds at a significantly slower pace compared to typically developing chronologically age matched peers.

NDW and MLU-M are measures of microstructure that are consistently used in the literature. NDW produced by children in the current study was found to be consistent

with previous studies (Kay-Raining Bird, et al., 2008; Van Bysterveldt, Westerveldt, Gillon & Foster-Cohen, 2012). However, Miles and Chapman (2008) reported a significantly higher NDW (i.e., 119.9) compared to the current study's findings (i.e., 54.5). The research reported a standard deviation of 48.4, which suggests that the sample variation was large. This is common for studies examining oral narratives among children with Down syndrome (Miles & Chapman, 2002; Kay-Raining Bird, et al., 2008; Van Bysterveldt, Westerveldt, Gillon & Foster-Cohen, 2012). MLU-M reported in the current study was also consistent with the current literature (Miles & Chapman, 2002; Kay-Raining Bird, et al., 2008). Van Bysterveldt, et al. (2012) reported a much lower MLU-M of 2.67. One major difference between the current study and Van Bysterveldt, et al., was the difference between elicitation procedures of the oral narratives. Van Bystervelt, et al., elicited personal generative narratives while the current study elicited fictional narrative retells. Generative elicitation requires a child to produce a novel story plot and language while a retell provides a model of story plot and language. It may be easier for CWDS to produce language when provided with a model. Further, the fictional narratives were supported by a picture prompt, another major difference between the current study and Van Bystervelt, et al. (2012).

Macrostructure Analysis

At the macrostructure level, the results revealed that children included many essential story grammar components (e.g., main characters, conflict/resolution pairings, etc.) but did not provide sufficient detail (e.g., modifiers, elaborated noun phrases, etc.) about the story grammar elements. These results reflect mastery over concrete concepts presented in picture books but a decreased ability to produce abstract concepts such as

what characters might be feeling or thinking. Miles and Chapman (2002) found that CWDS include significantly more plot line and search theme components compared to the character' mental states, and their sample of children included half of the necessary details needed to tell a sufficient story.

Results from the current study and the findings of Miles and Chapman (2002) reveal that CWDS include basic story grammar elements essential to the story but lack later-developing oral narrative elements that are necessary for proficient mastery of cohesion and referencing. These are elements necessary to produce an organized narrative. Finestack, Palmer, and Abbeduto (2012) suggest that immature macrostcuture skills may reflect CWDS delay in their development across all aspects of expressive and receptive language compared to typically developing children of the same chronological age. It is important then that oral narratives be analyzed for cohesion and referencing elements especially for CWDS who produce basic story grammar elements because explicit intervention may be required to produce more abstract elements. Further, intervention focusing on narrative cohesion and referencing among other critical story grammar elements would likely generalize to conversational contexts which is similar to producing fictional narratives (Boudreau & Chapman, 2000; Hedberg & Westby, 1993).

Regression Analysis

Lastly, very few studies have examined whether microstructure and macrostructure measures contribute to reading comprehension among CWDS. The macrostructure measure was the only variable that came close to predicting reading comprehension. This suggests that metalinguistic awareness, specifically meta-awareness of story structure, may be a better predictor of reading comprehension than

microstructure within this population. Roth, Speece and Cooper (2002) proposed that children bring and apply knowledge of story grammar to reading and comprehending text. Although the current study did not produce significant results, strong correlations were found between literacy skills (i.e., word level reading and vocabulary) and narrative microstructure and macrostructure suggesting that CWDS who have good literacy skills may also have good grammar (as measured by the NAP) and good narrative structure (as measured by the NSS). Roth and colleagues (1996) also found correlations between oral language measures (i.e., phonological awareness and metasemantics) and early reading. Further, Van Bysterveldt and colleagues (2012) reported strong and significant correlations between reading ability and macrostructure measures. Kay-Raining Bird, et al. (2008) found that CWDS who demonstrated good microstructure and macrostructure abilities also had good decoding abilities. The findings from the present study found strong correlations between literacy skills (i.e., word level reading and vocabulary) and narrative microstructure and macrostructure, supporting previous findings. Overall, the predictive value of macrostructure on reading comprehension suggests that metalinguistic awareness may be a better predictor of reading comprehension than microstructure analysis among CWDS.

Limitations of the Study

The standardized measures used to assess vocabulary, word identification, and passage comprehension are measures used consistently in the literature. However, these assessments have inherent limitations when used with CWDS because the measures were not normed on this population. Additionally, the elicitation technique used in this study (i.e., *Frog Goes To Dinner* story retell) may prompt different microstructure and

macrostructure measures when compared to narratives gathered in more naturalistic contexts. Lastly, the sample of children in this study varied considerably in age and ability level and reflected a rather small sample size overall. Replication of the current findings with a larger sample size is recommended.

Summary and Clinical Implications

The findings from this study can help guide curriculum and intervention development related to narrative production among school-aged CWDS. As mentioned previously, the ability to produce narratives has both social and academic implications and therefore consideration must be taken to determine the best teaching methods to strengthen micro and macrostructure skills. Narrative macrostructure was closer to significance than other measures when examining skills that contribute to reading comprehension. This provides initial evidence to support possible interventions targeting narrative macrostructure and microstructure to improve reading comprehension. Further, interventions targeting microstructure measures such as syntactic complexity may provide CWDS with the language to express themselves coherently and effectively. This research begins to identify macrostructure as an important narrative component and intervention targets for children with Down syndrome.

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Appendix A

Frog Goes To Dinner Story Script

Page	Script
1	A boy was getting dressed in his bedroom. His pet dog, frog and turtle watched as he put on his best clothes.
2	While the boy was petting the dog, the frog jumped into his coat pocket. The boy didn't know he was there.
3	As the boy left with his family, he waved and said "Goodbye" to his pets. The frog waved goodbye too.
4-5	When the boy and his family arrived at a fancy restaurant, the doorman helped them out of the car. The frog peeked out of the boy's pocket but no one noticed him.
6-7	The boy and his family sat down at a table in the restaurant. While they were looking at the menus, the frog jumped out of the boy's pocket towards the band.
8	The frog landed right in the man's saxophone! "Squeak" went the saxophone.
9	The man looked inside the saxophone to see why it made that awful noise.
10	Then the frog fell out of the horn and landed right on the saxophone player's face!
11	The saxophone player was so surprised that he fell backwards into the drum.
22-23	The waiter, who had caught the frog, was going to throw him out of the restaurant. But the boy saw the waiter carrying his frog and shouted, "Hey, that's my frog!" The boy's mother told him to be quiet.
24	The boy asked the waiter to give him back his frog.
25	The angry waiter told the boy and his family, "Take your frog and get out of this restaurant at once. Don't you ever bring that frog in here again!"
26-27	On the way home the boy's family was angry with him. The frog has ruined their dinner!
28-29	When they got home the boy's father scolded him, "You go to your room and stay there!" The dog and the turtle peeked around the corner to see what was going on.
30	When they got in his room, the boy and the frog laughed about everything that had happened at the restaurant. The more they thought about it, the more they laughed.

ABSTRACT

THE RELATION BETWEEN ORAL NARRATIVE PRODUCTION AND LITERACY SKILLS AMONG CHILDREN WITH DOWN SYNDROME

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This study examined the micro and macrostructures of oral fictional narratives produced by children with Down syndrome and examined the relation between oral fictional narrative skills and literacy skills within this population. Microstructure analysis revealed findings consistent with previous research regarding MLU-M and NDW. Further analysis of sentence complexity using the Narrative Assessment Protocol revealed a reliance on prepositional phrases and narratives that contained more nouns than verbs. Macrostructure analysis revealed the inclusion of concrete story grammar elements but lacked abstract concepts such as mental state references. Macrostructure was the only variable that came close to predicting reading comprehension, suggesting that metalinguistic awareness may be a better predictor of reading comprehension than microstructure analysis among children with Down syndrome. We conclude that strong correlations were found between literacy skills (word level reading and vocabulary) and narrative microstructure and macrostructure.