ABSTRACT

WHAT'S THE STORY? MICRO- AND MACRO- ANALYSES OF NARRATIVES FROM CHILDREN WITH ADHD AND LI

by Alexa Kate Hamilton

This study examined the narrative production skills of 4 groups of children, ages 73-107 months, with ADHD, SLI, ADHD+LI, and typical development (TD). The "Aliens" story from the Test of Narrative Language (Gillam & Pearson, 2004) was elicited. Several micro- and macro-structural analyses were conducted. The mean length of utterance, a microstructure measure, differentiated the groups with linguistic impairments from the ADHD group. Lexical diversity discriminated the ADHD+LI group from the ADHD group and grammatical errors differentiated the SLI group from the TD group. Macrostructure analyses revealed a different story: the ADHD+LI group produced fewer story grammar items from the Index of Narrative Complexity (Petersen et al., 2008) than all of the other groups. Results provide insight into the value of narrative analysis as a clinical tool in assessing the language skills of school-age children.

WHAT'S THE STORY? MICRO- AND MACRO- ANALYSES OF NARRATIVES FROM CHILDREN WITH ADHD AND LI

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DEDICATION

This thesis is dedicated to my parents, Gary and Melanie Hamilton, who have raised me to be the person I am today. You have always supported me every step of the way with both my academic and research endeavors. Thank you always for your endless love and encouragement.

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Introduction

Conversations typically consist of brief narratives or retells of personal events. As such, the ability to produce an organized and complete narrative is important for children's daily social interaction and academic success (Trabasso & Stein, 1997). Because the ability to construct a well-organized narrative reflects a child's language skills and cognitive abilities, it is not surprising that school-age children with language disorders and attentional deficits may produce narratives that are less complete than typically developing children. The current study examined narrative production skills in children with two of the most common disorders that affect the school-age population— Attention-Deficit/Hyperactivity Disorder (ADHD) and Specific Language Impairment (SLI). In the sections to follow, various narrative analysis procedures are explained followed by a review of language skills and narrative characteristics in school-age children with ADHD, SLI, and in children with both conditions (i.e., ADHD+LI).

Narrative Analysis

There is no "gold standard" analysis method for the evaluation of children's narratives. Current best practice recommendations emphasize the importance of analyzing both the individual linguistic components, or microstructure, and the overall construction of a story, also known as macrostructure (for example, see Paul & Norbury, 2012).

Microstructure. Microstructural analyses focuses on two aspects— linguistic form and linguistic content as produced within an individual utterance (Heilmann, Miller, Nockerts, & Dunaway, 2010). Common "form" metrics include the total number of c-units in the narrative (Miller & Iglesias, 2012), the number of morphemes per c-unit, and the proportion of complex c-units. C-units are defined as utterances comprised of short phrases (e.g., "me too") as well as utterances comprised of complete sentences with a main clause and attached subordinate and nonclausal phrases (these latter utterances are also referred to as t-units by Hunt, 1965). The grammatical complexity of the c-units within a narrative is measured by calculating the mean length of utterance per morpheme or MLU-M, where U represents individual c-units. MLU-M is calculated by summing the total number of bound and free morphemes across all c-units and then dividing this sum by the total number of c-units. Individual c-units may be coded as simple versus complex utterances. For example, "the boy was sad because he lost his toys" would be coded as a complex c-unit because the utterance contains two clauses. Some coding systems report the proportion of complex to simple c-units as a measure of children's syntactic abilities

(e.g., Heilman et. al, 2010; Justice, et al., 2006; Nippold, Hesketh, Duthie, & Mansfield, 2005; Paul & Norbury, 2012; Schuele & Tolbert, 2001).

Linguistic content measures focus on the vocabulary produced in the narrative. The two most common metrics include the total number of vocabulary words and the total number of different vocabulary words in the narrative (Miller, Andriacchi & Nockerts, 2011). The proportion of the number of different words to total words is referred to as the type-token ratio (TTR), a measure of lexical diversity (Templin, 1957). In addition to the TTR, some coding systems account for use of specific words such as mental state verbs (i.e., think, believe, wish). These verbs reflect the child's ability to take the perspective of another individual in order to describe a character's thoughts, intentions, and feelings. Other coding systems will report the number of coordinating and subordinating conjunctions as a measure of both linguistic diversity and grammatical complexity.

Microstructure measures can also focus on the errors that a child produces within an utterance. Hoffman (2009) recently introduced the use of a "restricted" code to identify utterance errors. She defined restricted utterances as an "utterance that consists of a complete clause with both a subject and a predicate and contain one or more syntactic or semantic errors" (Hoffman, 2009, p. 367). For example, if a child describes a picture of a frog jumping out of a window, as "him jumped out" or "he jumped out the door"; these utterances would be coded as [RESTRICTED] because of their respective syntactic and semantic errors (Hoffman, 2009). Hoffmann suggested that because the judgment about the presence of an error occurs at the level of the whole utterance, each utterance should receive only one restricted code even if multiple semantic and/or syntactic errors are present. Use of the restricted codes to analyze narrative samples in school-age children was found to differentiate children with and without language impairments (Hoffmann, 2009).

Although most microstructure measures examine the form and content of individual utterances, narrative cohesion is one microstructure measure that accounts for the connection between and among utterances. Cohesion refers to the grammatical structures and vocabulary utilized to create connections across utterances within the narrative. For example, pronouns such as *he* and *she* often connect with characters introduced earlier in a narrative. Cohesive ties include pronouns, conjunctions, conjunctive adverbs, ellipsis, and the definite article *the*. These words add to a story's organization and allows for unity among sentences (Petersen, Gillam, &

Gillam, 2008). While cohesion is often considered a microstructure measure, it can also be utilized as a macrostructure measure because qualities of cohesion exceed the level of an individual utterance (Heilmann et al., 2010).

Macrostructure. Macrostructural analysis focuses on documenting the overall complexity, organization, and completeness of a narrative. One common macrostructure metric is story grammar (Stein & Glenn, 1979). Stein and Glenn (1979) proposed that a narrative includes a setting and an episode structure. Episode structure includes story grammar items such as an initiating event, internal response, plan, attempts, and a consequence. In addition, the episode may contain a character's reaction, but reactions are not considered an essential component for a complete episode (Stein & Glenn, 1979). The results of a story grammar analysis usually include a count of the number of complete episodes as well as the number of individual story grammar items within the narrative.

One recent method introduced for analyzing macrostructure is the Index of Narrative Complexity (INC; Petersen et al., 2008). The INC was developed to evaluate and monitor change (i.e., progress monitoring) of children's narrative skills; however, the INC coding system can be used to assess both story grammar and episodic complexity. The coding system includes twelve story grammar and grammatical complexity items: characters, setting, initiating events, internal responses, plans, action/attempts, complications, consequences, narrator evaluations, formulaic markers, temporal markers, and causal adverbial clauses (see Appendix A for definition of these items and scoring criteria). Petersen and colleagues (2008) validated the INC coding system on children between the ages of 6 years 4 months and 9 years 1 month. They applied the INC codes to narratives elicited by the "Aliens" subtest from the Test of Narrative Language (TNL; Gillam & Pearson, 2004). The "Aliens" subtest provides a single picture of a spaceship and an alien family who have landed in a park. The child is required to generate a complete story from this single picture. Coding agreement calculated across three coders was reported to be 90%. Moreover, children's performance across various narrative elicitation contexts (e.g., story generation, story retell) was found to show adequate agreement, with correlations ranging between $r = .604$ and $r = .898$ (unadjusted). Thus, application of the INC yielded acceptable interscorer reliability and content sampling reliability.

A child's Total INC score can range from 0 to 30. Each item is given an individual score ranging from zero to two or zero to three, based on the quantity and/or quality of the response.

Since the weighted scores were designed to reflect the importance of each element in contributing to the story as a whole (Petersen et al., 2008), this incremental scoring structure allows for higher scores to reflect a more complex narrative. For example, an individual who includes two or more distinct stated events or problems that elicit a response from the character will receive a higher score than a student who only includes one stated event or problem that elicits a response from the character. A child may also utilize vague referents such as "he" and "she," but another child may assign the characters names such as "Jack" and "Jill." While the differences may be minimal, these noteworthy differences are captured using the INC. The hierarchical scoring of the INC also reflects the importance of narrative cohesion, a microstructural component discussed in the prior section.

In summary, microstructure measures have been used to describe the length, grammatical complexity, and vocabulary diversity of children's narratives. Macrostructure measures, particularly story grammar items, have been used to describe the overall organization and completeness of children's narratives. The next sections describe narrative skills in children with ADHD, SLI, and ADHD+LI.

Attention-Deficit/Hyperactivity Disorder

ADHD is the most common neurodevelopmental disorder in children and often persists through adolescence and adulthood. As of 2011, approximately 6.4 million or 11% of children between the ages of four and seventeen have been diagnosed with ADHD in the United States (Centers for Disease Control and Prevention, 2014). The average age of diagnosis is seven years. Signs of ADHD include difficulty staying focused and paying attention, trouble controlling impulsive behaviors, and hyperactivity (National Institute of Mental Health, n.d.).

Descriptions of the language abilities of children with ADHD typically focus on expressive language skills, particularly pragmatic skills. For example, children are reported to talk too much and to frequently interrupt others (see Timler 2014 for review). Subtle differences have also been noted in receptive language tasks, particularly in tasks that require listening to long paragraphs, answering questions that require inferencing, and monitoring comprehension (McInnes, Humphries, Hogg-Johnson, & Tannock, 2003). At least one study has found that children with ADHD are more talkative in conversation than typical peers, but produce shorter stories than these peers in elicited narrative tasks (Zentall, 1988). Narrative abilities are one area that has been a specific focus of study in children with ADHD.

Several studies have documented differences in the narratives of children with ADHD and typical controls (e.g. Kim & Kaiser, 2000; Oram, Fine, Okamoto, & Tannock, 1991). In one narrative retell study, for example, boys with ADHD, ages 7 to 11 years, produced shorter narratives as documented by the number of t-units than same-age boys without ADHD (Tannock, Purvis, & Schachar, 1993). Error analyses also revealed that the boys with ADHD demonstrated more cohesion errors.

In addition to differences in microstructure measures when compared to typically developing children, children with ADHD have demonstrated differences in macrostructure measures. Parigger (2012) examined the narrative abilities of children with specific language impairment and ADHD. Children were given the "Frog, where are you?" (Mayer, 1969) wordless picture book. The story contains a clear protagonist, problem, and solution. Children were asked to flip through all pictures prior to starting their narration, in order to not overload working memory when producing their stories. The experimenter then asked the children to look at the pictures again, in sequence, and tell the story in their own words. Results indicated that children with ADHD produced fewer of the following story grammar items than typical children: setting elements, initiating events, search attempts, internal responses and outcome (Parigger, 2012). Similar to previous studies, children with ADHD also had a significantly lower mean length of utterance than typical peers.

In summary, narrative production skills of children with ADHD differ from typical children. Overall, as one might expect, children with ADHD have planning and formulation difficulties when producing a narrative, including reduced length (Zentall, 1988), poor organization (Tannock, Purvis, & Schachar, 1993), and incomplete or confusing story episodes. Sequencing errors, misinterpretations, and frequent word substitutions (Purvis & Tannock, 1997; Parigger, 2012) are also common. Furthermore, research reveals narrative production tasks can show areas of deficit that are not evident in standardized tests (Manhardt & Rescorla, 2002).

Specific Language Impairment

SLI represents the most common developmental language disorder, impacting 7-8% of school-age children (National Institute on Deafness and Other Communication Disorders, 2011). SLI refers to linguistic impairments in the absence of identifiable hearing, cognitive, or environmental deficiencies (Johnson et al., 1999; Tomblin et al., 1997). Children with SLI do not have other developmental delays or co-existing conditions that contribute to their language

impairment, but are often late talkers and may not produce any words until the age of two. School-age children with SLI often display difficulties learning new words, forming grammatically correct sentences, and making conversation (NIDCD, 2011). While the presence of SLI may impact all aspects of language, narrative production tasks tend to be more sensitive to the linguistic vulnerabilities in children with SLI than conversational activities (Boudreau, 2008).[1]

Individuals with SLI display both microstructural and macrostructural deficits. For example, children with SLI produce more cohesion errors in narratives than typically developing children (Cain, 2003). In one study, narratives by individuals with SLI were compared to stories told by children with an Autism Spectrum Disorder diagnosis and their typical peers (Norbury, Gemmell, & Paul, 2014). As predicted, the SLI group had shorter mean length of utterances and reduced syntactic complexity, relative to the typical comparison group. Their narratives were simple and lacked semantic richness. Many children with SLI also had significant difficulty organizing utterances into a cohesive narrative structure with a clear beginning, middle, and end. These participants also produced significantly fewer relevant utterances compared to that of their typical peers (Norbury et al., 2014).

Children with SLI also have difficulty utilizing appropriate grammar and vocabulary when telling stories (as summarized by Colozzo, Gillam, Wood, Schnell, & Johnston, 2011; Gillam & Johnston, 1992; Pearce, McCormack, & James, 2003; Reilly, Losh, Bellugi, & Wulfeck, 2004). These deficits limit the child's ability to produce "fully competent utterances" (Heilmann et al., 2010, p. 155) and impact their macrostructural skills, as they often omit story grammar components and demonstrate a lack of organization (see review by Heilmann et al., 2010). For example, Colozzo et al. (2011) elicited narratives using the "Late for School" and "Aliens" pictures, two subtests from the TNL, to compare children with SLI to their typically developing peers. Results revealed that children with SLI produced shorter stories, i.e., fewer c-units, as well as fewer complete episodes than their typical peers (Colozzo et al., 2011). The group with SLI in Norbury's study (2014) also omitted important story grammar items.

[1] The term SLI is controversial (Reilly, Bishop, & Tomblin, 2014). It's important to recognize the diversity among the diagnostic criteria that exists and the varying systems used to classify childhood language problems.

Additional areas of weakness in children with SLI, beyond the level of story grammar, include children's use of literate language (Bamberg & Damrad-Frye, 1991). Literate language describes the process of using abstract language features commonly used in the classroom by teachers and adults (Westby, 2005). Key literate language components related to narrative competence include use of metacognitive verbs (e.g., *think* and *know*), metalinguistic verbs (e.g., *say* or *talk*), and elaborated noun phrases. Studies show that literate language skills are typically present in children's oral narratives during the preschool years (Curenton & Justice, 2004) and then develop through the school years and into adolescence (Greenhalgh & Strong, 2001; Nippold, 2007; Pelligrini, Galda, Bartini, & Charak, 1998); however, literate language skills are deficient in children with language impairment (Greenhalgh & Strong, 2001).

One study by Redmond, Thompson, and Goldstein (2011) compared children with SLI, children with ADHD, and a typically developing group. As expected, the SLI group's mean TNL composite score was significantly lower than the ADHD and typically developing groups. It is important to note that some of the children in the ADHD group did score below the recommended clinical cutoff for LI (i.e., a score of 85 or lower on the TNL NLAI), reflecting that narrative organization is difficult for some children with ADHD as well.

ADHD and LI

Of particular interest to speech-language pathologists (SLPs) is that language impairment (LI) is a frequent comorbid condition in school-age children with ADHD. In fact, LI is one of the most common coexisting conditions with ADHD. When referring to children with attentional issues with an addition of a language impairment, the term LI is used rather than SLI because the children have two conditions; thus, language is not the only "specific" disorder. Children with ADHD are at elevated risk for LI in syntactic/semantic (i.e., language structure) and pragmatic (i.e., language use) skills (see review by Timler, 2014). LI has been reported in approximately 35%–50% of children who have a diagnosis of ADHD (see, e.g., Cohen et al., 2000; Jonsdottir, Bouma, Sergeant, & Scherder, 2005; Tannock & Schachar, 1996; Tirosh & Cohen, 1998). Reported rates vary by referral source, makeup of the assessment protocol, and the criteria for the LI diagnosis (Mueller & Tomblin, 2012).

LI is underdiagnosed in children with ADHD (Cohen, Barwick, Horodezky, Vallance, & Im, 1998; Cohen, Davine, Horodezky, Lipsett, & Isaacson, 1993; Cohen, Davine, & Meloche-Kelly, 1989; Mueller & Tomblin, 2012). Studies focusing on narrative production in children

with ADHD do not consistently test language skills to identify whether participants with ADHD also have a co-occurring LI. Thus, while we know that children with ADHD and children with SLI have compromised narrative production, few studies have examined narrative production in samples of children who have documentation of both conditions.

Cohen and colleagues (2000) examined the language, achievement, and cognitive processing characteristics of 166 psychiatrically referred children, ages 7-14. The children were split into four groups: ADHD+LI, ADHD with typically developing language, other psychiatric diagnoses (OPD) plus a language impairment, and OPD with typically developing language. The Story Construction subtest of the Detroit Test of Learning Aptitude, Third Edition (DTLA-3) (Hammill, 1991) was used to assess narrative ability. This subtest provides scoring for the quantity and detail of the narrative. Results showed narrative production on the DTLA-3 task was poorest for the children with the addition of a LI (ADHD+LI+ reading disability and ADHD+LI groups) (Cohen et al., 2000).

These results were replicated in a study by Luo and Timler (2008) who investigated narrative skills in four separate groups of children: (a) ADHD only (b) ADHD+LI, (c) LI only, and (d) a typically developing group. The results revealed that the language status of the children was associated with narrative organization skills, as the two groups with LI (i.e., ADHD+LI and LI) demonstrated poorer narrative organization than the ADHD only and typically developing groups, who did not differ from each other. These two studies (Cohen et al., 2000; Luo & Timler, 2008) provide evidence that ADHD alone does not necessarily lead to difficulty in organizing narratives, contradicting previous research; earlier findings almost uniformly documented organization deficits in narrative of children with ADHD. As such, the more recent research underscores the importance of identifying LI status (i.e., with or without co-occurring LI) when describing narrative skills in a sample of children with ADHD.

Purpose of Current Study

In summary, children with ADHD often have organization and planning difficulties when producing a narrative, while kids with SLI have trouble utilizing appropriate vocabulary and grammar. It is evident that the narratives of children with both conditions (ADHD+LI) are also impacted (Cohen et al., 2000; Luo & Timler, 2008), but to date, few studies have examined both micro- and macrostructure measures in children with both conditions. The current study examined narrative production skills in a well-defined sample of young children (ages 6 to 8

years) from one of four groups: ADHD, SLI, ADHD+LI, and TD. The study addressed the following questions:

1. Do microstructure measures differentiate ADHD, SLI, ADHD+LI, and TD groups?

Based on previous findings and review of the literature, it was predicted that children with SLI and children with both conditions, ADHD+LI, will produce less complete narratives as demonstrated by shorter stories with fewer words, shorter MLU-Ms, less lexical diversity, fewer complex utterances with coordinating and subordinating conjunctions, and more utterance errors than the TD and ADHD groups.

2. Do macrostructure measures, focused on story grammar, differentiate these groups?

It is predicted that children with SLI and children with ADHD+LI will produce fewer story grammar elements than the other groups.

Method

Recruitment

The archival data used for this study were accumulated from a database collected by Redmond et al., 2011 and Timler, 2014. For these prior studies, children were recruited from two universities and their surrounding cities/suburbs: The University of Utah and The University at Buffalo. The Institutional Review Boards from each university approved all aspects of these studies including participant recruitment, parental consent, and child assent procedures prior to execution.

Utah sample. Sixty-five participants came from the University of Utah sample. The specific number of children in each group are as follows: 20 ADHD, 19 SLI, 8 ADHD+LI, and 18 TD. Children in the ADHD group met the following requirements: (a) diagnosed as having ADHD combined type by a health care provider; (b) receiving treatment for ADHD at the time of the study; and (c) rated by parents within the clinical range (i.e., T score above 64) as having difficulties with attention and hyperactivity on the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) DSM–ADHD subscale (Redmond et al., 2011). All children in the ADHD group passed the Clinical Evaluation of Language Fundamentals Screening Test—Fourth Edition (CELFST-4: Semel, Wiig, & Secord, 2004) and children with a coexisting diagnosis of pervasive developmental disorder (PDD), autism, or LI were excluded. Children for the SLI group met the

following criteria: (a) diagnosed as having a language impairment by a certified SLP; (b) receiving language treatment during the time of the study; and (c) performed at or below the appropriate cutoff score for their age on the CELFST-4. Children with a coexisting diagnosis of PDD, autism, or ADHD were excluded. Children who met the criteria for both groups were identified as ADHD+LI. Participants in the TD group were required to: (a) be enrolled in regular education and not receiving special services at the time of the study; (b) have passed the CELFST-4; and (c) have been rated within the normal range by parents on attention and hyperactivity on the CBCL DSM–ADHD subscale (see Redmond et al., 2011 and Redmond, Ash, & Hogan, 2015 for additional details of participant recruitment).

Buffalo sample. Thirty participants came from the University at Buffalo sample. The specific number of children in each group are as follows: 17 ADHD, 0 SLI, 7 ADHD+LI, and 6 TD. Participants in the ADHD group met the university-based research clinic's ADHD evaluation protocol (Timler, 2014). This protocol included independent confirmation of ADHD (any subtype) by a doctoral level clinician and a developmental pediatrician. The National Institute of Mental Health Diagnostic Interview Schedule for Children, Version IV (NIMH DISC–IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) which assesses the symptoms of ADHD, as well as affective disorders (e.g., depression, anxiety), and the Diagnostic and Statistical Manual of Mental Health Disorders (4th ed., text rev.; American Psychiatric Association, 2000) were used to confirm the ADHD diagnosis. It also provides a screen for exclusionary categories, including PDD, seizure disorders, and intellectual disability (defined as a full scale IQ below 70). Two subtests from the Wechsler Intelligence Scale for Children—Fourth Edition (WISC–IV; Wechsler, 2003) were administered, and a full scale IQ was estimated from the two subtests (Kaplan, Crawford, Dewey, & Fisher, 2000; Sattler, 1988). The ADHD group was then divided into two groups, ADHD and ADHD+LI, based on LI status, determined by the Core Language subtests from the Clinical Evaluation of Language Fundamentals, Fourth Edition (CELF-4; Semel, Wiig, & Secord, 2003). Children who obtained a composite standard score of 85 or below were classified as having language impairment (Semel et al., 2003). The TD children were given the nonverbal subtests of The Kaufmann Brief Intelligence Test (Kaufman & Kaufman, 2004) to obtain an estimated nonverbal IQ to rule out intellectual disability (see Timler, 2014 for additional details of participant recruitment).

Participants

All children who participated in the current study were monolingual English speakers. The participants had normal hearing acuity, as documented by passing an audiometric screening at time of testing or through parent report. Participants were also required to pass the phonological screener from the Test of Early Grammatical Impairment (Rice & Wexler, 2001) to rule out an articulation disorder. Individuals who presented with an intellectual impairment, according to the WISC—IV or the Naglieri Nonverbal Achievement Test—Individual (NNAT–I: Naglieri, 2003) were excluded from the study. Because children with LI frequently score within the average to low average range of intelligence testing, children in the ADHD and TD groups with IQ performance above 125 were excluded from this study. Further characteristics of each participant group are displayed in Table 1.

ADHD group. Participants with ADHD included 37 children between 6;1 and 8;11 (years;months). There were 31 boys and 6 girls. Twenty-six children were Caucasian, six were African American, three were Hispanic, one was Hispanic/Asian/Native American, and one was Hispanic/Native American.

SLI group. The SLI group included 19 children between the ages of 7;0 and 8;11. There were 11 boys and 8 girls in the group. Sixteen children were Caucasian, one was Hispanic, one was Hispanic/Asian, and one was Hispanic/African American.

ADHD+LI group. The ADHD+LI group included 15 children between the ages of 6;7 and 8;11. There were 8 boys and 7 girls. Eleven children were Caucasian, two were Hispanic, one was African American/Caucasian, and one elected not to provide this information.

TD group. The TD group included 24 children between ages of 6;4 and 8;11. There were 9 boys and 15 girls in the group. Twenty children were Caucasian, one was African American/Caucasian, and one elected not to provide this information. None of the children were receiving special education services.

Procedures

Child participants completed the Test of Narrative Language (TNL; Gillam & Pearson, 2004). The TNL was one of several tests and tasks administered to the participants; however, only results from the TNL are described in this study (see Redmond et al., 2011 and Timler, 2014 for details and results from other parts of the experimental protocols). The TNL utilizes three narrative formats (no picture cues, a set of 4 sequenced pictures, and a single picture). Three scores are provided: Narrative Comprehension, Oral Narration, and a Narrative Language

Ability Index (NLAI). For this study, the story formulation from the single picture "Aliens" subtest was utilized. The "Aliens" story was administered according to standardized TNL procedures described in the examiner's manual. A certified SLP conducted or supervised the test sessions. Examiners encouraged each child to look at the single picture in the book and to formulate a story that corresponds with the picture. All test sessions were audio-recorded for data collection and analysis purposes. The narrative samples were scored and transcribed after the testing sessions.

Table 2 displays the performance of each group on the TNL, including Narrative Comprehension, Oral Narration, and NLAI scores.

Transcription and Coding

The narrative samples were transcribed and entered into the Systematic Analysis of Language Transcripts (SALT Research version 2012*;* Miller & Iglesias, 2012). Two research assistants who had not completed the original transcription checked transcription accuracy independently. Transcription differences were discussed and transcripts were corrected as needed, after mutual consensus. Microstructure and macrostructure transcription samples are provided in Appendix C and D respectively. Details for coding follow.

Microstructure measures. The SALT software program provides summaries for the following microstructural measures: total number of complete c-units, mean length of c-units in morphemes, total number of words, and number of different words. Two coders reviewed each c-unit; complex c-units were marked with a [complex] code and further marked as [coord] and [subord] when these conjunctions were present. The SALT software provided a summary of each of these codes. See Appendix B for coding rules.

Hoffman's (2009) [RESTRICTED] coding system was utilized to analyze errors. Initially, Hoffman's definition of a [RESTRICTED] code was used to mark c-units that had either a syntactic and/or semantic error. A second pass of [RESTRICTED] c-units was conducted to identify whether the error was primarily grammatical, a pragmatic/semantic error, or both. Therefore, two new codes were added to the coding system. For grammatical restrictions [RESTRICTEDG] was utilized, and for pragmatic/semantic restrictions [RESTRICTEDPS] was used. Due to this change, multiple [RESTRICTED] codes could be given for each c-unit based on which type of error was made. This decision was made in the process of coding the narratives; therefore, all of the previous [RESTRICTED] codes were

revisited and reevaluated for the correct type of grammatical and/or pragmatic/semantic code that was present in each utterance with errors.

A [RESTRICTEDG] code was assigned to utterances that contained any grammatical errors including syntactic and morphological errors (e.g., verb tense errors). For example, the sentence "the aliens camed out of it" would be coded as [RESTRICTEDG] because the child added the past tense "ed" to the irregular past tense verb "came".

The [RESTRICTEDPS] codes were assigned to utterances with errors that were pragmatic and/or semantic errors rather than grammatical errors. Pragmatic errors include issues with the social use of language, whereas semantic errors include issues with word meaning. One example of an [RESTRICTEDPS] error at the word level is the c-unit "And they were from Chinese" instead of using the correct word, China. Another example of a [RESTRICTEDPS] code is the sentence "they all went, and they put it" because not enough information is given to the audience about who "they" are, and more information needs to be given about "putting something somewhere." See Appendix B for further examples.

Macrostructure measures. Each child's narrative macrostructure was coded using the INC (Petersen et al., 2008). This coding system was selected because the "Aliens" subtest was one of the measures utilized to validate the INC. Individual utterances were examined for: characters, setting, initiating events, internal responses, plans, action/attempts, complications, consequences, narrator evaluations, formulaic markers, temporal markers, and causal adverbial clauses. The INC gives each narrative a total score out of 30. See Appendix A for examples and definitions of each component.

Agreement

Coding for each narrative was done by consensus. Two individuals who were blind to the children's group assignment analyzed the complexity of each narrative's c-units, identified coordinating and subordinating conjunctions, and coded for grammatical and pragmatic/semantic errors independently. Four individuals who were blind to the children's group assignment coded each narrative independently using the INC. The coders then met and discussed each transcript. Coding differences were settled by mutual consensus.

Results

Univariate analyses of variance (ANOVAs) were used to examine group differences among micro- and macrostructure measures. Follow-up Dunn–Sidak analyses were used to

identify significant pairwise comparisons that reached the .05 level of significance. When the homogeneity of variances assumption was found to be violated (i.e., group variances were found to be significantly different), a Welch's robust test of equality of means was used to identify group effects and follow-up Games-Howell analyses were used to identify significant pairwise comparisons. Effect sizes (i.e., $\eta 2$) were calculated and effect sizes of .01, .06, and .14 were interpreted as small, medium, and large, respectively (Green & Salkind, 2005). All results are presented in the following group order: ADHD+LI, SLI, ADHD, TD.

Microstructure Measures

Group performance on microstructure measures are displayed in Table 3. Significant differences were found for mean length of c-unit in morphemes, total number of different words, and total number of restricted codes. Post-hoc analyses revealed that the LI groups (i.e., SLI and ADHD+LI) produced significantly shorter c-units than the ADHD group. These data are displayed in Figure 1. In addition, the group with both conditions (ADHD+LI) produced fewer numbers of different words than the ADHD group. See Figure 2. No contrasts were found between the SLI and TD groups.

The SLI group produced significantly more utterances coded as restricted than the TD group. See Figure 3. More specifically, the SLI and ADHD group's narratives contained more grammatical errors than the TD group. No significant group differences were found in the number of pragmatic-semantic codes. See Figures 4 and 5 for each group's number of restricted grammar codes and restricted pragmatic-semantic codes respectively.

Macrostructure Measures

The INC Total Score results are graphically displayed in Figures 6. Macrostructure analyses reveal that the ADHD+LI group produced fewer components of the INC than all other groups. Group performances on macrostructure measures are displayed in Table 4. Significant differences were found in the following INC codes: initiating events, internal response, action, complication, and temporal markers. The ADHD+LI group produced significantly fewer initiating events than the ADHD and TD groups. The ADHD+LI group also produced significantly fewer internal responses and actions in their narratives than the TD group. The ADHD+LI group produced significantly fewer temporal markers than all other groups. No significant group differences were found for character, setting, plan, consequence, formulaic markers, knowledge of dialogue, narrator evaluations, and causal adverbial clauses.

Discussion

This study examined both micro- and macrostructure measures in children with ADHD and LI. Based on previous research, it was hypothesized that the children with linguistic impairments (SLI and ADHD+LI) would display more microstructural and macrostructural deficits than the ADHD and TD groups. Some aspects of these hypotheses were confirmed while others were not, as detailed below.

Microstructure

In the current study, the mean length of utterance per morpheme or MLU-M differentiated the groups with linguistic impairments; both the ADHD+LI and SLI groups had significantly lower MLU-Ms than the ADHD and TD groups. Similar results were obtained by Redmond (2004). Redmond analyzed conversation samples of children with ADHD, SLI, and TD. His results revealed that the SLI group also produced shorter utterances than the other two groups. Taken together, these findings confirm that ADHD alone does not necessarily impact sentence length.

Lexical diversity differentiated the ADHD+LI group from the ADHD group. Unexpectedly, the SLI group did not differ from the other groups on this measure. This finding contradicts previous research, which found that children with SLI produced fewer different words in narratives (Norbury et al., 2014) and in conversation (Redmond, 2004).

Another microstructural analysis, the use of [RESTRICTED] coding to identify errors at the utterance level, differentiated the SLI group from the TD group. Unexpectedly, the ADHD+LI group did not differ from the other groups. These results provide some support for the use of Hoffman's [RESTRICTED] coding as a means of differentiating children with SLI from their typical peers. Larger sample sizes may be needed to examine the usefulness of this code with children who have both conditions.

Several other hypotheses were not supported. The SLI group's performance on microstructure measures was not significantly different than the TD group on most measures. Significant differences were not detected for the total number of complete and intelligible c-units, the total number of words produced, the total number of complex c-units, the number of c-units with coordinating and/or subordinating conjunctions, and the total number of restricted pragmatic-semantic codes. Reasons for why differences may not have been found in these measures are discussed in the limitations section.

Macrostructure

Macrostructure analyses revealed a different story from microstructure analyses. Application of the INC scoring system revealed significant differences with the overall total score, as the ADHD+LI group produced fewer INC items than the ADHD, SLI, and TD groups. Significant differences were found in five individual INC components: initiating events, internal response, action, complication, and temporal markers.

Results of the current study show that the ADHD+LI group produced fewer initiating events than the ADHD and TD groups, contradicting previous research by Parigger (2012). Parigger investigated the narrative abilities of children with specific language impairment and ADHD using the "Frog, where are you?" (Mayer, 1969) wordless picture book. Results indicated that children with ADHD produced fewer initiating events than the typical children; however, it is important to note that there was no screening procedure of the participants in the ADHD group for co-existing language impairments. Children were only required to have a confirmed ADHD diagnosis by a pediatrician or a child psychologist/psychiatrist.

The ADHD+LI group also produced less internal response and action items than the TD group. Moreover, the ADHD+LI group produced significantly less complications and temporal markers than the SLI, ADHD, and TD groups. These are the only items from the INC that differentiated the comorbid group from all other groups. The current study provides supporting evidence for use of the INC system as a way of analyzing macrostructure and comparing performance among various clinical populations.

Previous research suggests that children with ADHD+LI have similar performance deficits as children with SLI on nonword repetition, tense marking, and sentence recall tasks suggesting that the characteristics of LI are not intensified in school-age children who have both ADHD and LI (Redmond et al., 2015). However, the results of the current study point to one area that may be doubly impacted by having both conditions. Children with ADHD+LI produced less complete stories, as evidenced by omission of more story grammar elements than the other groups. These results suggest that narrative production may be one area that is more impacted by the presence of both ADHD and LI. In conclusion, analyzing narratives at both the level of the individual utterance and the overall complexity, organization, and completeness of the story reveals different, yet valuable information.

Limitations and Future Research.

The results of the current study are based on narratives elicited from only one type of elicitation task— spontaneous generation from a single picture. Some children produced extremely short stories from this single picture task (i.e., length ranged from 4 to 98 c-units). It may be that some children would have produced longer narratives with other elicitation methods; therefore, these results likely underestimate some of the children's linguistic abilities. Clearly longer narratives would be generated from stimuli with multiple pictures such as the "Frog, where are you?" (Mayer, 1969); a story used in previous studies of narrative skills (e.g., Parigger, 2012). Future research should consider looking at other narrative tasks to examine how narrative context affects an individual child's micro and macrostructural performance. For example, do various story elicitation tasks reveal different micro- and macrostructural errors, or are the errors uniform throughout?

In addition to the limitation of our narrative elicitation technique, characteristics of our sample provide further limitations. Future examination of narrative differences among children with LI and ADHD should include children across the age range of the elementary school years (i.e., 6 to 12 years). It is likely that more differences may emerge in children with ADHD+LI as the demands for complex syntax and elaborated story grammar episodes increase in the later school years. Finally, even though the present study's sample size included 95 children, the number of participants in each group was disproportionate thus reducing the power for detecting significant differences. Nevertheless, important differences in the narrative production skills of children with ADHD+LI were revealed. Clinical implications of these differences are discussed in the next section.

Clinical Implications

The work of Manhardt and Rescorla (2002) suggests that close examination of children's narrative production skills provides unique information that standardized tests do not. The data revealed in this study illustrate just that. The ADHD+LI and SLI groups' performance was similar on the TNL subtests and the composite score of both of these groups with language impairment were significantly lower than the ADHD and TD groups. However, microstructure and macrostructure analyses revealed important differences between the ADHD+LI and SLI groups. In particular, the narratives of the ADHD+LI group contained fewer story grammar and other organizational items than the other three groups, including the SLI group. These results suggest that in-depth analysis of narrative production skills can reveal specific weaknesses that

should be addressed within an intervention— weaknesses that are not revealed by standard score performance alone.

Narrative analysis is a valuable clinical tool that should be used as part of the comprehensive assessment of children with ADHD and co-occurring language impairment. A narrative sample should be collected and analyzed on both a micro- and macro- level for children with ADHD who fail a language screening. Results from narrative analyses provide unique information that can showcase areas of deficit that standard scores from a norm-referenced test do not.

Based on the outcomes of this study, it is recommended that clinicians collect multiple narratives elicited from a variety of tasks in order to obtain the best representation of children's linguistic skills. While the analysis of narratives can be time-consuming, it is worth the investment of clinical resources as analysis of narrative samples can provide an abundant amount of information about children's language and organization skills. Areas of weakness that are revealed in a narrative analysis can be targeted during intervention, such as sentence expansion, vocabulary development, and syntax to address difficulties at the microstructure level and knowledge of story grammar elements to address difficulties at the macrostructure level. In building stronger narrative skills on both levels, children will produce more organized and complete conversations and enhance their expressive language skills.

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles.* Burlington, VT: University of Vermont Research Center for Children, Youth, and Families.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Bamberg, M., & Damrad-Frye, R. (1991). On the ability to provide evaluative comments: Further explorations of children's narrative competencies. *Journal of Child Language*, 18, 689–710.

Boudreau, D. (2008). Narrative abilities: Advances in research and implications for clinical practice. *Topics in Language Disorders, 28*, 99-114.

Cain, K. (2003). Text comprehension and its relation to coherence and cohesion in children's fictional narratives. *British Journal of Developmental Psychology, 21,* 335-351.

Centers for Disease Control and Prevention. (2014). Attention-deficit/hyperactivity disorder (ADHD): Data and statistics. Retrieved from http://www.cdc.gov/ncbddd/adhd/data.html

Cohen, N., Barwick, M., Horodezky, M., Vallance, D., & Im, N. (1998). Language, achievement, and cognitive processing of psychiatrically disturbed children with previously unidentified and unsuspected language impairments. *Journal of Child Psychology and Psychiatry, 39*, 865–877.

Cohen, N., Davine, M., Horodezky, N., Lipsett, L., & Isaacson, L. (1993). Unsuspected language impairment in psychiatrically disturbed children: Prevalence and language and behavioral characteristics. *Journal of the American Academy of Child & Adolescent Psychiatry, 32*, 595–603.

Cohen, N., Davine, M., & Meloche-Kelly, M. (1989). Prevalence of unsuspected language disorders in a child psychiatric population. *Journal of the American Academy of Child & Adolescent Psychiatry, 28,* 107–111.

Cohen, N., Vallance, D., Barwick, M., Im, N., Menna, R., Horodezky, N., & Isaacson, L. (2000). The interface between ADHD and language impairment: An examination of language, achievement, and cognitive processing. *Journal of Child Psychology and Psychiatry, 41*, 353–362.

Colozzo, P., Gillam, R., Wood, M., Schnell, R., & Johnston, J. (2011). Content and form in

narratives of children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 54,* 1609-1627.

Curenton, S., & Justice, L. (2004). African American and Caucasian preschoolers' use of decontextualized language: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools*, 35, 240–253.

Gillam, R., & Johnston, J. (1992). Spoken and written language relationships in language/learning-impaired and normally achieving school-age children. *Journal of Speech and Hearing Research, 35*, 1303–1315.

Gillam, R. B., & Pearson, N. (2004). *Test of Narrative Language.* Austin, TX: PRO-ED.

Green, S. & Salkind, N. (2005). *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data-4th Edition*. Upper Saddle River, New Jersey: Pearson Prentice Hall.

Greenhalgh, K., & Strong, C. (2001). Literate language features in spoken narratives of children with typical language and children with language impairments. *Language, Speech, and Hearing Services in Schools*, 32, 114–125.

Hammill, D. (1991). *Detroit Tests of Learning Aptitude* (3rd Edn.). Austin, TX: PRO-ED.

Heilmann, J., Miller, J., Nockerts, A., & Dunaway, C. (2010). Properties of the narrative scoring scheme using narrative retells in young school-age children. *American Journal Of Speech-Language Pathology*, *19*(2), 154-166. doi:10.1044/1058-0360(2009/08-0024)

Hoffman, L. (2009). The utility of school-age narrative microstructure indices: INMIS and the proportion of restricted utterances. *Language, Speech & Hearing Services In Schools*, *40*(4), 365-375. doi:10.1044/0161-1461(2009/08-0017)

Hunt, K. W. (1965). *Grammatical structure written at three grade levels.* Champaign, IL: National Council of Teachers of English.

Johnson, C. J., Beitchman, J. H., Young, A., Escobar, M., Atkinson, L., Wilson, B., & ... Wang, M. (1999). Fourteen- year follow-up of children with and without speech / language impairments: Speech/language stability and outcomes. *Journal of Speech, Language, and Hearing Research, 42*, 744–760.

Jonsdottir, S., Bouma, A., Sergeant, J., & Scherder, E. (2005). The impact of specific language impairment on working memory in children with ADHD combined subtype. *Archives of Clinical Neuropsychology, 20,* 443–456. doi:2005-06391-00410.1016/ j.acn.2004.10.004

Justice, L. M., Bowles, R. P., Kaderavek, J. N., Ukrainetz, T. A., Eisenberg, S. L., & Gillam, R. B. (2006). The Index of Narrative Microstructure: A Clinical Tool for Analyzing School-Age Children's Narrative Performances. *American Journal Of Speech-Language Pathology*, *15*(2), 177-191. doi:10.1044/1058-0360(2006/017)

Kaplan, B., Crawford, S., Dewey, D., & Fisher, G. (2000). The IQs of children with ADHD are normally distributed. *Journal of Learning Disabilities, 33*, 425–432.

Kaufman, A., & Kaufman, N. (2004). *Kaufman Brief Intelligence Test* (2nd ed.). Minneapolis, MN: NCS Pearson.

Kim, O., & Kaiser, A. (2000). Language characteristics of children with ADHD. *Communication Disorders Quarterly, 21*, 154–165.

Luo, F., & Timler, G. (2008). Narrative organization skills in children with attention deficit hyperactivity disorder and language impairment: Application of the causal network model. *Clinical Linguistics & Phonetics, 22*, 25–46.

Manhardt, J., & Rescorla, L. (2002). Oral narrative skills of late talkers at ages 8 and 9. *Applied Psycholinguistics, 23*, 1-21.

Mayer, M. (1969). *Frog, where are you?* New York: Dial Books for Young Readers.

McInnes, A., Humphries, T., Hogg-Johnson, S., & Tannock, R. (2003). Listening comprehension and working memory are impaired in attention-deficit hyperactivity disorder irrespective of language impairment. *Journal of Abnormal Child Psychology, 31*, 427–443.

Miller, J., Andriacchi, K., & Nockerts, A. (2011). *Assessing Language Production using SALT software: A Clinician's Guide to Language Sample Analysis.* Middleton, WI: SALT Software, LLC.

Miller, J. & Iglesias, A. (2012). *Systematic Analysis of Language Transcripts (SALT), Research Version 2012 [Computer Software]*. Middleton, WI: SALT Software, LLC.

Mueller, K., & Tomblin, B. (2012). Examining the comorbidity of language impairment and attention-deficit/hyperactivity disorder. *Topics in Language Disorders, 32*, 228–246.

Naglieri, J. A. (2003). *Naglieri Nonverbal Ability Test— Individual Administration*. San Antonio, TX: Harcourt Assessment.

National Institute of Deafness and Other Communication Disorders. (2011). *Specific language impairment.* Retrieved from http://www.nidcd.nih.gov/health/voice/pages/specific-

language-impairment.aspx

National Institute of Mental Health. (n.d.). *Attention Deficit Hyperactivity Disorder*. Retrieved from http://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/index.shtml

Nippold, M., Hesketh, L., Duthie, J., & Mansfield, T. (2005). Conversational versus expository discourse: A study of syntactic development in children, adolescents, and adults. *Journal of Speech, Language, and Hearing Research, 48*, 1048–1064.

Nippold, M. (2007). *Later language development: School-age children, adolescents, and young adults* (3rd ed.). Austin, TX: Pro-Ed.

Norbury, C., Gemmell, T., & Paul, R. (2014). Pragmatics abilities in narrative production: A cross-disorder comparison. *Journal of Child Language, 41*, 485-510.

Oram, J., Fine, J., Okamoto, C., & Tannock, R. (1991). Assessing the language of children with attention deficit hyperactivity disorder. *American Journal of Speech-Language Pathology, 8*, 72-80.

Parrigger, E. M. (2012). *Language and executive functioning in children with ADHD.* Retrieved from UvA-DARE, the Institutional Repository of the University of Amsterdam (uvapub:113644).

Paul, R. & Norbury, C. (2012). *Language Disorders from Infancy through Adolescence: Assessment & Intervention-4th edition.* St. Louis, MO: Mosby, Inc.

Pearce, W., McCormack, P., & James, D. (2003). Exploring the boundaries of SLI: Findings from morphosyntactic and story grammar analyses. *Clinical Linguistics & Phonetics, 17*, 325–334.

Pelligrini, A., Galda, L., Bartini, M.,&Charak, D. (1998). Oral language and literacy learning in context: The role of social relationships. *Merrill-Palmer Quarterly, 44*, 38–54.

Peterson, D. B., Gillam, S., & Gillam, R. B. (2008). Emerging Procedures in Narrative Assessment: The Index of Narrative Complexity. *Topics In Language Disorders*, *28*(2), 115.

Purvis, K., & Tannock, R. (1997). Language abilities in children with attention deficit hyperactivity disorder, reading disabilities, and normal controls. *Journal of Abnormal Child Psychology, 25*, 133–144.

Redmond, S. (2004). Conversational profiles of children with ADHD, SLI, and typical

development. *Clinical Linguistics & Phonetics, 2*, 107-125.

Redmond, S., Ash, A., & Hogan, T. (2015). Consequences of co-occurring attention-deficit/hyperactivity disorder on children's language impairments. *Language, Speech, and Hearing Services in Schools,* 1-13.

Redmond, S., Thompson, H., & Goldstein, S. (2011). Psycholinguistic profiling differentiates specific language impairment from typical development and from attention-deficit/hyperactivity disorder. *Journal of Speech, Language, and Hearing Research, 54*, 99–117.

Reilly, S. Bishop, D., Tomblin, B. (2014). Terminological debate over language impairment in children: Forward movement and sticking points. *International Journal of Langiage & Communication Disorders, 49,* 452-262.

Reilly, J., Losh, M., Bellugi, U., & Wulfeck, B. (2004). Frog, Where are you? Narratives in children with specific language impairment, early focal brain injury and Williams syndrome. *Brain & Language, 88,* 229–247.

Rice, M., & Wexler, K. (2001). *Test of Early Grammatical Impairment*. San Antonio, TX: The Psychological Corporation.

Sattler, J. (1988). *Assessment of children* (3rd ed.). San Diego, CA: Author.

Schuele, C.,&Tolbert, L. (2001). Omissions of obligatory relative markers in children with specific language impairment. *Clinical Linguistics & Phonetics, 15,* 257–274.

Semel, E., Wiig, E., & Secord, W. (2003). *Clinical Evaluation of Language Fundamentals, Fourth Edition*. San Antonio, TX: The Psychological Corporation.

Semel, E., Wiig, E. H., & Secord, W. A. (2004). *Clinical Evaluation of Language Fundamentals— Fourth Edition Screening Test.* San Antonio, TX: Harcourt Assessment.

Shaffer, D., Fisher, P., Lucas, C., Dulcan, M., & Schwab-Stone, M. (2000). National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV: Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry,* 39, 28–38.

Stein, N., & Glenn, C. (1979). An analysis for story comprehension in elementary school. In R. Freedle (Ed.), *New directions in discourse processing* (Vol. 2, pp. 53–120). Norwood, NJ: Ablex.

Tannock, R., Purvis, K., & Schachar, R. (1993). Narrative abilities in children with attention

deficit hyperactivity disorder and normal peers. *Journal of Abnormal Child Psychology, 21*, 103–117.

Tannock, R., & Schachar, R. (1996). Executive dysfunction as an underlying mechanism of behaviour and language problems in attention deficit hyperactivity disorder. In J. H. Beitchman, N. J. Cohen, M. M. Konstantareas, & R. Tannock (Eds.), *Language, learning, and behaviour disorders: Developmental, biological, and clinical perspectives* (pp. 128–155). Cambridge, United Kingdom: Cambridge University Press.

Templin, M. (1957). *Certain language skills in children: Their development and interrelationships*. Minneapolis: University of Minnesota Press.

Timler, G. (2014). Use of children's communication checklist—2 for classification of language impairment risk in young school-age children with attention-deficit/hyperactivity disorder. *American Journal of Speech-Language Pathology, 23,* 73-83.

Tirosh, E., & Cohen, A. (1998). Language deficit with attention- deficit disorder: A prevalent comorbidity. *Journal of Child Neurology, 13*, 493–497. doi:10.1177/088307389801301005

Tomblin, B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997). Prevalence of specific language impairment in kindergarten children. *Journal of Speech, Language, and Hearing Research, 40,* 1245–1260.

Trabasso, T., & Stein, N. (1997). Narrating, representing and remembering event sequences. In P. van den Broek, P. Bauer, & T. Bourg (Eds.), *Developmental spans in event comprehension and representation: bridging fictional and actual events* (pp. 237–270). Mahwah, NJ: Lawrence Erlbaum Associates.

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children—Fourth Edition.* San Antonio, TX: Harcourt Assessment.

Westby, C. (2005). Assessing and facilitating text comprehension problems. In H. Catts & A. Kamhi (Eds.), *Language and Reading Disabilities* (pp. 157–232). Boston, MA: Allyn & Bacon.

Zentall, S. (1988). Production deficiencies in elicited language but not in the spontaneous verbalizations of hyperactive children. *Journal of Abnormal Child Psychology, 16,* 657–673.

Table 1. Participant characteristics.

Variable	**ADHD+LI** (***n*** **= 15)** ***M (SD)*** **Range**	**SLI** **(n =19)** ***M (SD)*** **Range**	**ADHD** (***n*** **= 37)** ***M (SD)*** **Range**	**TD** (***n*** **= 24)** ***M (SD)*** **Range**	***F*** **(91, 3)**	**Partial** η^2	**Contrasts**
Age (months)	90.0 (7.2)	94.6 (7.9)	88.7 (9.1)	92.17 (8.2)	2.353	.072	No significant contrasts
	79-107	84-107	73-107	76-107			
Maternal Education[a]	3.5 (.7)	3.4 (.9)	3.6 (.9)	3.8 (1.1)	.889	.028	No significant contrasts
	(2-5)	(2-5)	(2-5)	(1-5)			
Nonverbal	99.3 (6.4)	97.3 (8.2)	102.1 (10.6)	104.3 (11.8)	2.039	.063	No significant contrasts
	88-113	88-120	80-122	82-124			

[a]Five-point scale: 1 = *some high school*, 2= *high school degree*, 3 = *some college*, 4 = *college degree*, and 5 = *some graduate school/advanced degree*.

Table 2. Group performance on the Test of Narrative Language (TNL).

Measure	**ADHD+LI** (***n*** **= 15)** ***M (SD)*** **Range**	**SLI** **(n =19)** ***M (SD)*** **Range**	**ADHD** (***n*** **= 37)** ***M (SD)*** **Range**	**TD** (***n*** **= 24)** ***M (SD)*** **Range**	***F*** **(91, 3)**	**Partial** η^2	**Contrasts**
TNL Narrative	7.2 (2.1)	7.2 (2.7)	11.0 (2.6)	11.7 (2.7)	19.101**	.386	1 = 2 < 3 = 4
Comprehension	4-11	3-11	6-15	6-18			ADHD+LI=SLI<ADHD=TD
TNL Oral Narration	6.5 (2.3)	6.6 (2.0)	8.8 (2.1)	10.7 (3.1)	14.446**	.323	1 = 2 < 3 < 4
	4-10	3-11	5-14	7-20			ADHD+LI=SLI<ADHD<TD
TNL Narrative	81.0 (11.3)	81.7 (10.6)	99.4 (12.0)	107.6 (15.3)	22.896**	.430	1 = 2 < 3 = 4
Language Ability Index	64-97	64-97	76-124	85-142			ADHD+LI=SLI<ADHD=TD

**p < .001

Table 3. Group performance on microstructure measures.

Measure	**ADHD+LI** (***n*** **= 15)** ***M (SD)*** **Range**	**SLI** **(n =19)** ***M (SD)*** **Range**	**ADHD** (***n*** **= 37)** ***M (SD)*** **Range**	**TD** (***n*** **= 24)** ***M (SD)*** **Range**	***F*** ***(*****91, 3)**	**Partial** η^2	**Contrasts**
Total number of complete & intelligible c-units	8.9 (4.6) 4-20	18.6 (20.3) 7-98	15.7 (11.2) 3-49	17.1 (16.6) 4-87	1.459	.046	No significant contrasts
Mean length of c-units in morphemes	6.9 (1.3) 4.2-9.1	6.8 (1.1) 4.9-8.5	8.1 (1.7) 5.1-12.1	7.7 (1.4) 5.5-10.0	4.427*	.127	ADHD+LI = SLI < ADHD 1 = 2 < 3
Total number of words	56.8 (33.6) 19-122	120.7 (143.0) 41-670	115.9 (89.5) 22-424	114.5 (88.3) 25-427	.189	.051	No significant contrasts
Number of different words	32.5 (16.1) 12-65	54.4 (33.1) 24-162	60.4 (35.7) 16-183	59.3 (31.4) 21-150	3.011*	.090	ADHD+LI < ADHD 1 < 3

Total number of complex c-units	2.3 (2.0) 0-6	5.1 (7.5) 0-33	5.4 (4.8) 0-24	5.9 (5.3) 0-21	1.636	.051	No significant contrasts
Total number of c-units with coordinating conjunctions	.4 (.5) 0-1	1.2 (1.3) 0-4	1.2 (2.0) 0-10	1.0 (1.2) 0-5	1.122	.036	No significant contrasts
Total number of c-units with subordinating conjunctions	.6 (.9) 0-3	2.6 (5.1) 0-22	2.4 (2.6) 0-12	2.8 (2.9) 0-11	1.748	.054	No significant contrasts
Proportion of complex c-units	.2 (.18) 0-.6	.2 (.14) 0-.4	.3 (.18) 0-.8	.4 (.17) 0-.6	2.621	.080	No significant contrasts
Number of restricted codes	3.6 (4.5) 0-17	6.6 (7.2) 1-29	3.8 (3.8) 0-19	2.6 (1.8) 0-6	2.953	.089	No significant contrasts
Number of restricted grammar codes	2.7 (3.9) 0-15	3.8 (4.2) 0-15	1.6 (1.6) 0-8	.7 (.9) 0-3	5.364**	.150	SLI > TD ADHD > TD
Number of restricted pragmatic-semantic	1.5 (1.6) 0-5	3.5 (4.1) 0-16	2.4 (3.3) 0-17	2.0 (1.3) 0-4	1.491*	.047	No significant contrasts

codes

*p ≤. 05 **p ≤ .001

Table 4. Group performance on macrostructure measures.

Measure (possible points)	**ADHD+LI (*n* = 15)** *M (SD)* **Range**	**SLI (n =19)** *M (SD)* **Range**	**ADHD (*n* = 37)** *M (SD)* **Range**	**TD (*n* = 24)** *M (SD)* **Range**	***F*** **(91, 3)**	**Partial η^2**	**Contrasts**
Setting (2)	.9 (.9) 0-2	.9 (.7) 0-2	1.3 (.8) 0-2	1.2 (.6) 0-2	1.824	.057	No significant contrasts
Character (3)	1.5 (.9) 1-3	1.8 (1.0) 1-3	1.4 (0.8) 1-3	2.0 (1.0) 1-3	2.174	.067	No significant contrasts
Initiating Events (3)	1.3 (.8) 0-2	1.9 (1.0) 0-3	2.2 (.7) 0-3	2.4 (.6) 1-3	7.151**	.191	1<3=4 ADHD+LI<ADHD=TD
Internal Response (2)	.3 (.7) 0-2	.9 (.9) 0-2	.9 (1.0) 0-2	1.2 (1.0) 0-2	2.971*	.089	1<4 ADHD+LI<TD
Plan (3)	.4 (.6) 0-2	.5 (.8) 0-2	.6 (.7) 0-2	.7 (.6) 0-2	.726	.023	No significant contrasts
Action (2)	1.0 (.9) 0-2	1.6 (.6) 0-2	1.6 (.7) 0-2	1.8 (.5) 0-2	4.837*	.138	1<4 ADHD+LI<TD

Complication (2)	0 (0)	.3 (.5)	.3 (.5)	.4 (.6)	2.340	.072	1<2=3=4
	0	0-1	0-2	0-2			ADHD+LI<SLI=ADHD=TD
Consequence (3)	.3 (.5)	.5 (.5)	.5 (.7)	.6 (.6)	.581	.019	No significant contrasts
	0-1	0-1	0-2	0-2			
Formulaic Markers (2)	.4 (.5)	.7 (.8)	.7 (.8)	.8 (.8)	.965	.031	No significant contrasts
	0-1	0-2	0-2	0-2			
Dialogue (2)	.5 (.7)	1.1 (.9)	.6 (.8)	.8 (.8)	1.972	.061	No significant contrasts
	0-2	0-2	0-2	0-2			
Temporal Markers	.5 (.7)	1.3 (.7)	1.2 (.8)	1.3 (.8)	4.743*	.135	1<2=3=4
(2)	0-2	0-2	0-2	0-2			ADHD+LI<SLI=ADHD=TD
Narrative Evaluations	.3 (.6)	.5 (.7)	.5 (.7)	.5 (.8)	.421	.014	No significant contrasts
(2)	0-2	0-2	0-2	0-2			
Causal Adverbial	.3 (.7)	.6 (.8)	.5 (.7)	.5 (.8)	.594	.019	No significant contrasts
Clauses (2)	0-2	0-2	0-2	0-2			
Total INC score	7.7 (4.7)	12.6 (5.6)	12.6 (5.4)	14.2 (4.6)	5.162*	.145	1<2=3=4
(30)	1-16	3-23	1-27	7-22			ADHD+LI<SLI=ADHD=TD

*p ≤. 05 **p ≤ .001

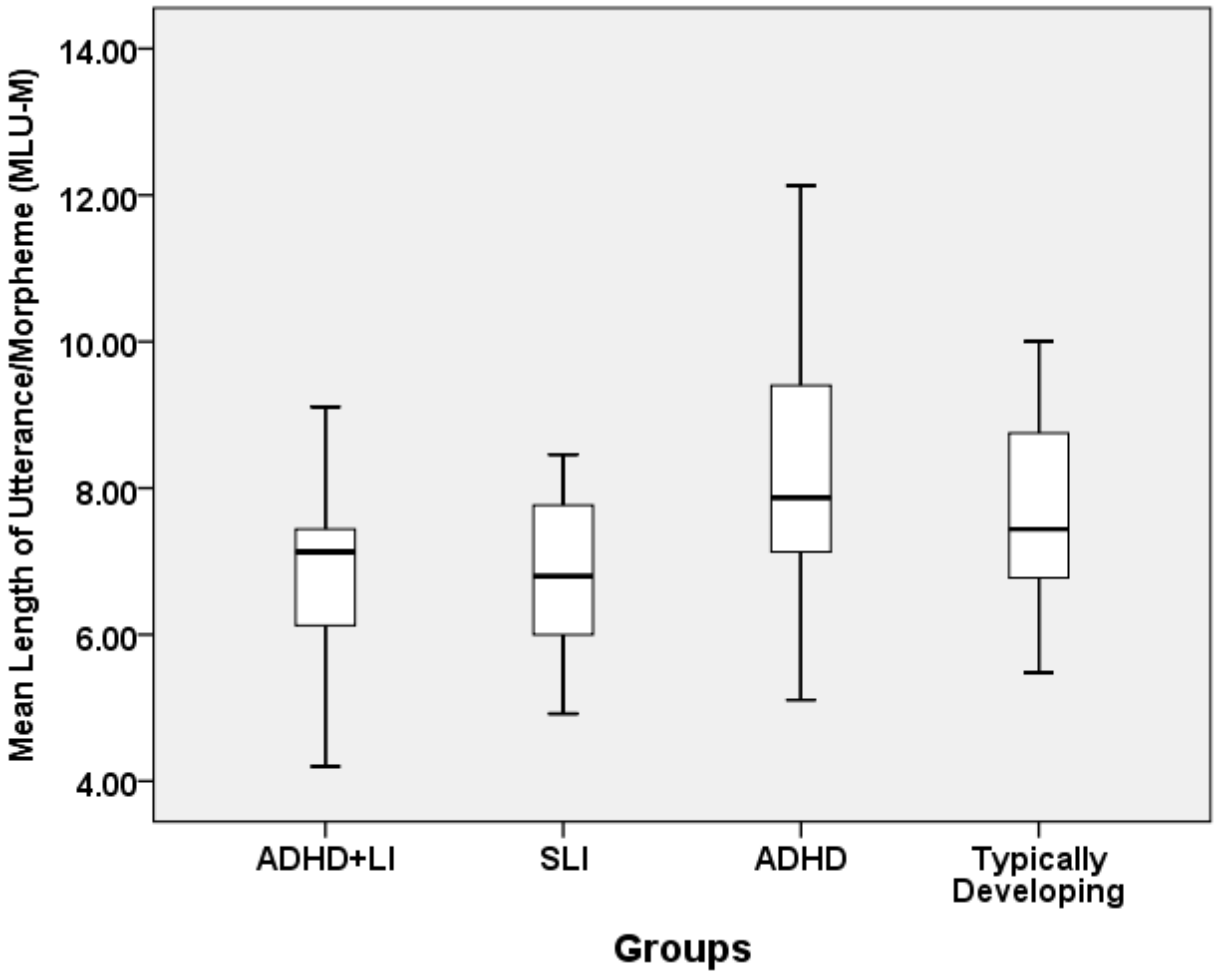

Figure 1. Mean length of utterance/morpheme (MLU-M).

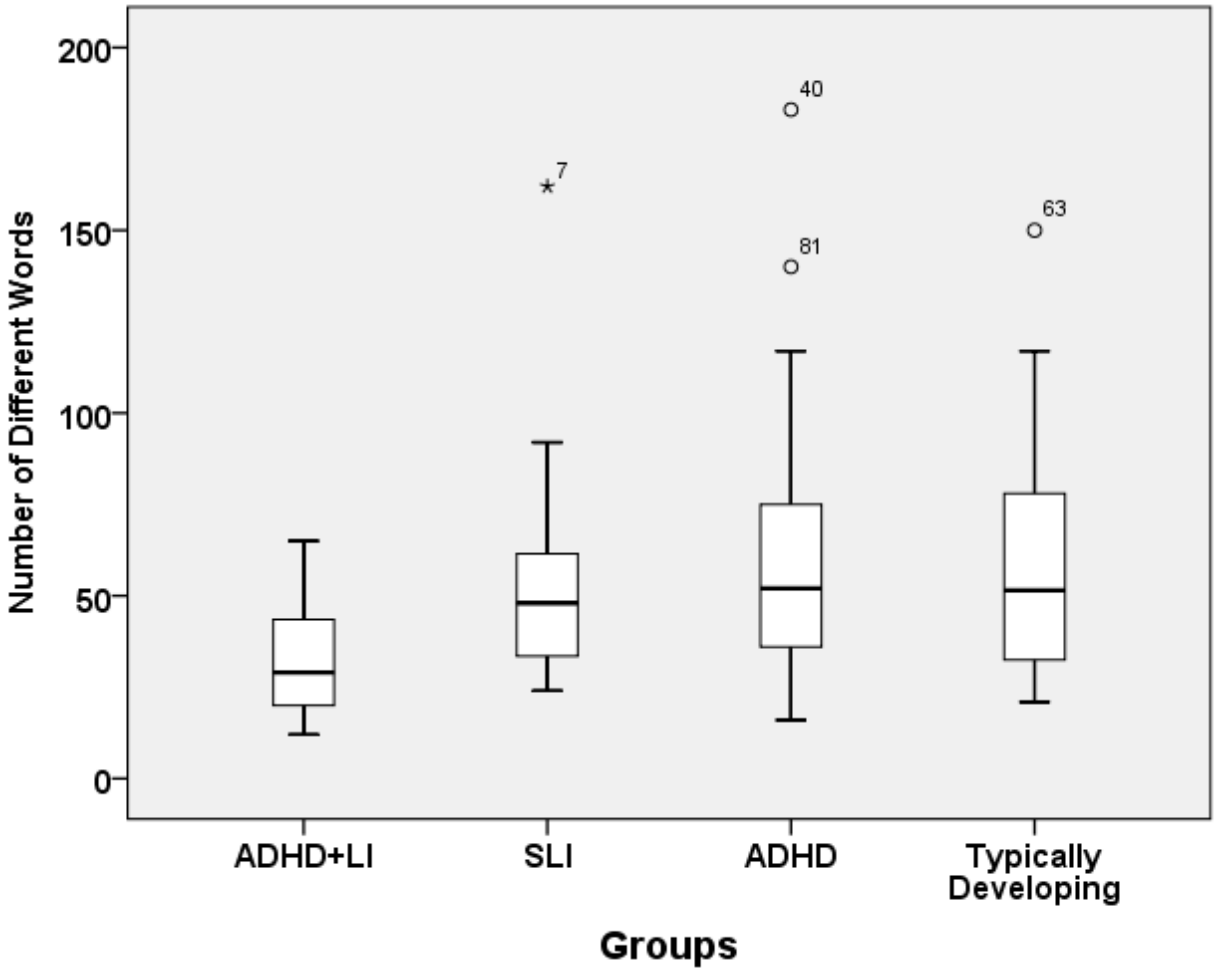

Figure 2. Number of different words.

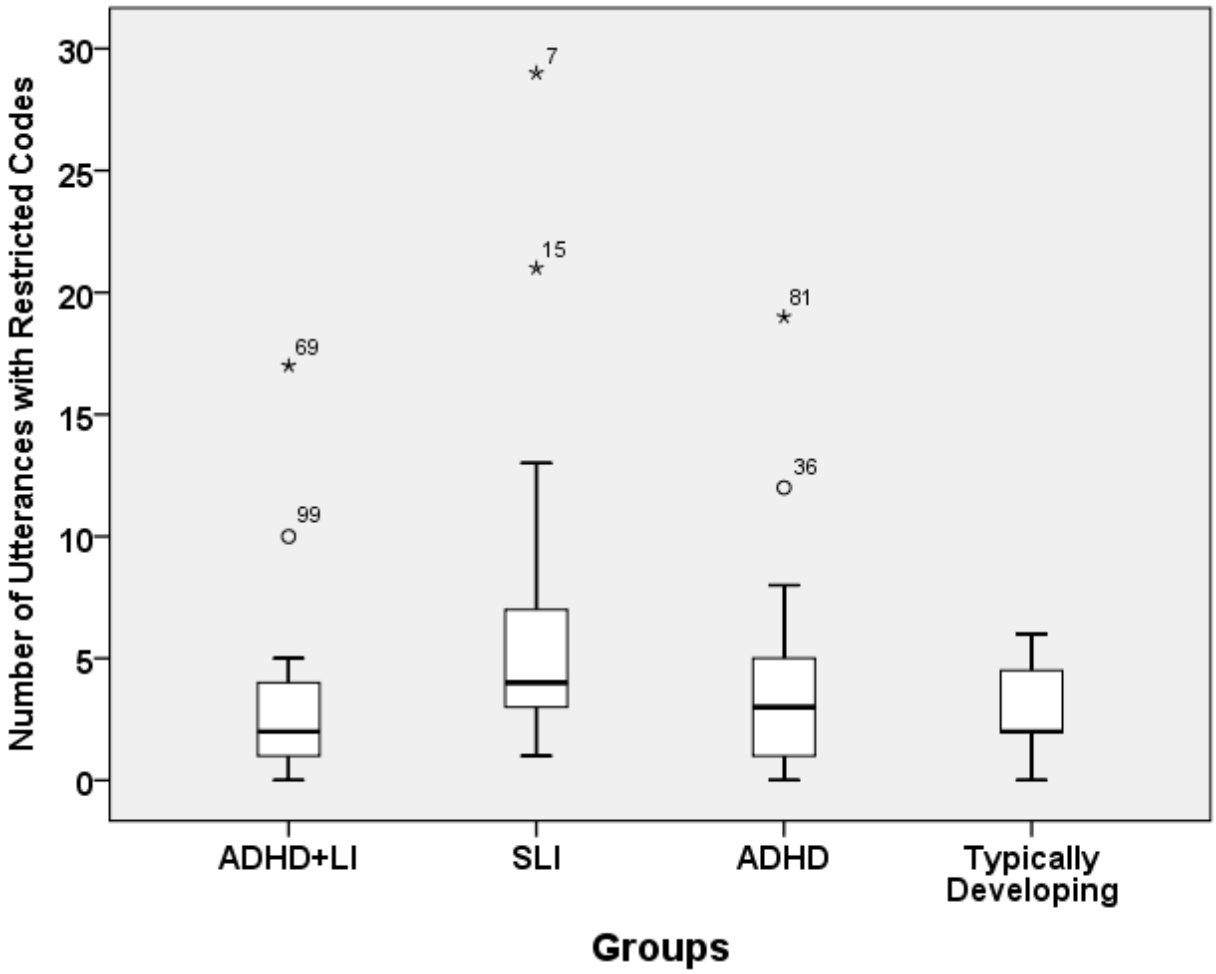

Figure 3. Number of utterances with restricted codes

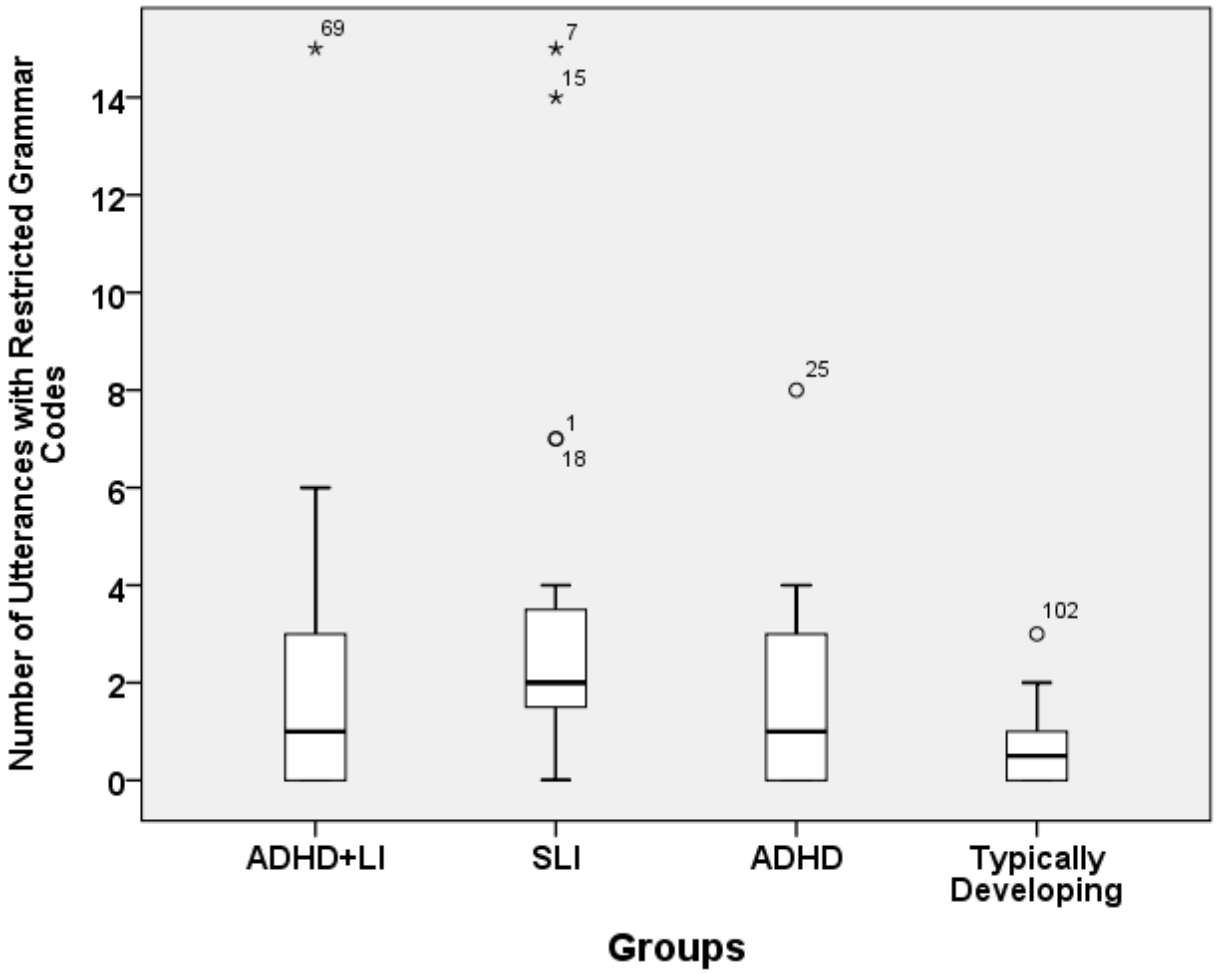

Figure 4. Number of utterances with restricted grammar codes

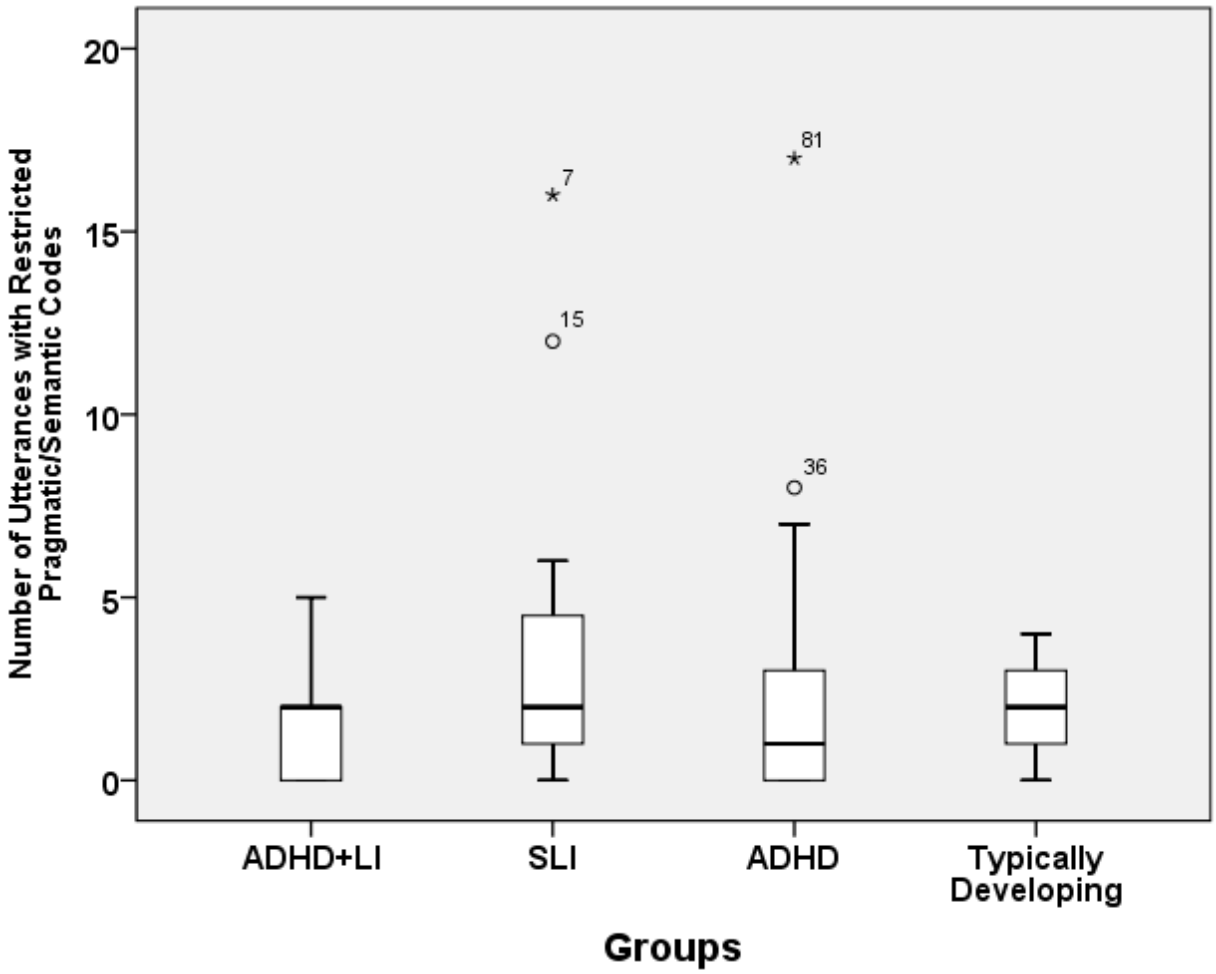

Figure 5. Number of utterances with restricted pragmatic/semantic codes

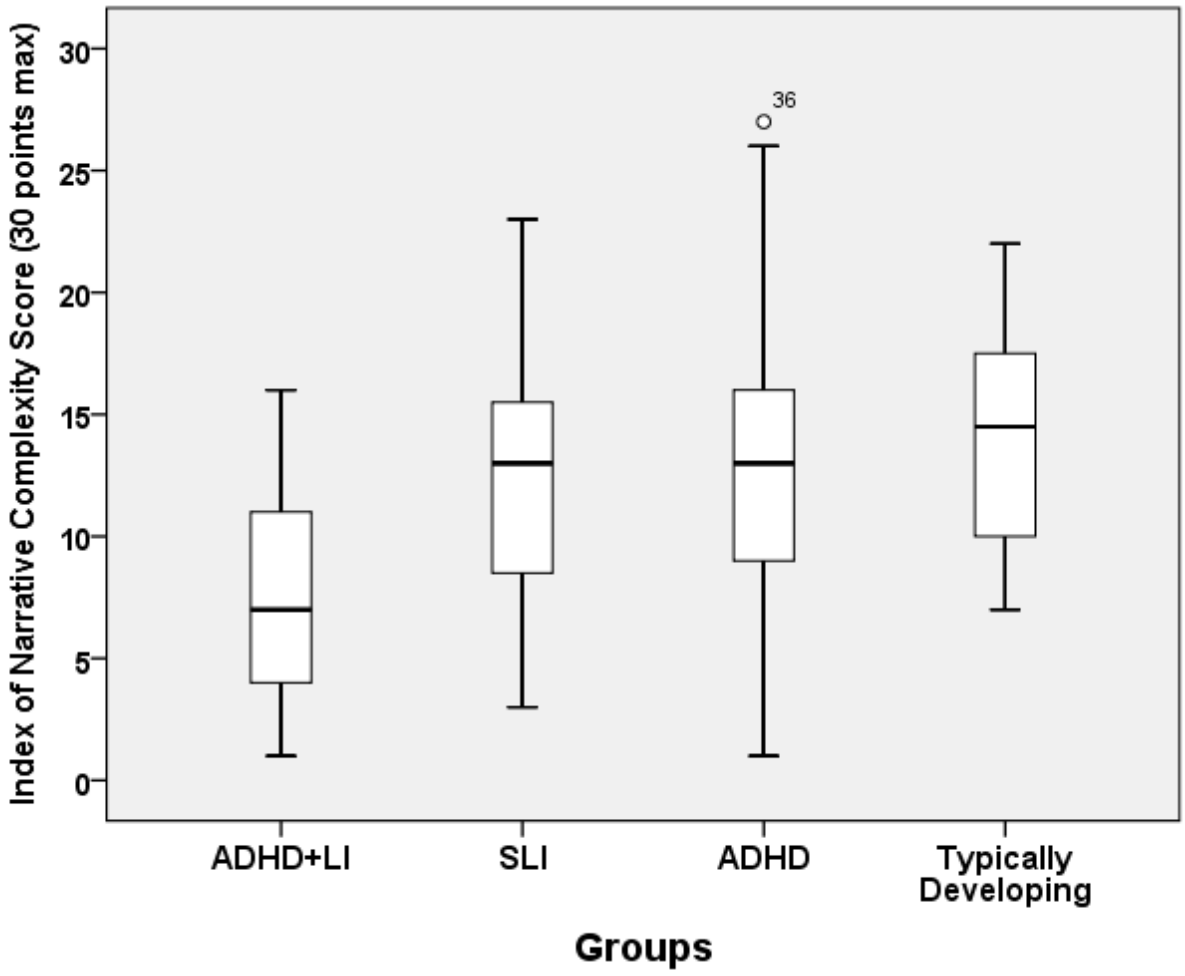

Figure 6. Index of Narrative Complexity score (30 points max)

Appendix A
Macrostructure Coding Rules and Examples[2]

Narrative Element	0 Points	1 Point	2 points	3 points
Character A character is any reference to the subject of a clause in a narrative.	*No* main character is included, or only ambiguous pronouns are used. Examples *a. They were walking.* *b. He was walking.*	Includes at least *one* main character with nonspecific labels only. *Note:* Only code each character *one* time. Examples *a. Once there was a boy.* *b. The boy was walking.*	Includes *one* main character with a specific name for the character. Example *Once there was a boy named Charles.*	Includes *more than one* main character *with specific names.* Example *Once there was a boy named Charles and a girl named Mary.*
Setting A setting is any reference to a place or time in a narrative.	No reference to a specific or general place. Example *The boy and the girl were walking.*	Includes reference to a general place *or* time. Examples *a. The boy and the girl were outside.* *b. It was daytime.* *c. One day, they went to the park.*	One or more references to specific places *or* times. Examples *a. Once there was a boy and a girl walking in Central Park.* *b. They were walking at night.*	
Initiating Event An initiating event is any reference to an event or problem that elicits a response from the character(s) in a narrative.	An event or problem likely to elicit a response from the character *is not stated.* Example *The girl looked at the boy. The boy and girl were walking in the park.*	Includes at least *one* stated event or problem that is likely to elicit a response from the character, *but there is no response directly related to that event.* Example *The girl was walking in a park and saw a spaceship land* (event/problem) *and she saw some aliens, and she saw a dog, and a table and . . . .*	Includes at least *one* stated event or problem *that elicits a response from the character(s).* Example *The girl was walking in a park and saw a spaceship land and she saw some aliens* (IE). *The girl started to run away* (action).	*Two or more distinct* stated events or problems *that elicit a response from the character(s).* Examples *The girl was walking in a park and saw a spaceship land and she saw some aliens* (IE-1). *The girl started to run away* (action). *But while she was running, her shoe got stuck in a hole* (IE-2). *She quickly knelt down and took off her shoe to get unstuck* (action).

(*continues*)

[2] *Note.* From "Emerging procedures in narrative assessment: The index of narrative complexity," by D. Petersen, S. Gillam, and R. Gillam, 2008, *Topics in Language Disorders*, *28* (2), pp. 122-125. Copyright 2008 by Wolters Kluwer Health and Lippincott Williams & Wilkins. Reprinted with permission.

Narrative Element	0 Points	1 Point	2 points	3 points
Internal Response An internal response is any reference to information about a character's psychological state including emotions, desires, feelings, or thoughts.	*No overt statement* about a character's psychological state.	*One overt statement* about a character's psychological state *not causally related* to an event or problem. Example *The dog was sad, the girl was happy.*	*One or more overt statements* about a character's psychological state *causally related* to an event or problem. Example *The aliens' landed. Sara saw the ship and was terrified.*	
Plan A plan is any cognitive verb reference that is intended to act on or solve an initiating event. It must include a "cognitive verb" that indicates a plan. *Note:* The plan and the action/attempt can share the same clause (see 2 Points example b)	*No overt statement* is provided about the character's plan to act on or solve the event or problem. Example *The girl was very excited and she ran out to meet the aliens.*	*One overt statement* about how the character might solve the complication or problem. Example *The girl thought that it would be neat to go and meet the aliens.*	*Two overt statements* about how the character might act on or solve the event(s) or problem(s). Examples *a. The girl was very excited and she told the boy that she wanted to go meet the aliens.* *b. The boy was very scared so he decided to sneak away quietly.*	*Three or more overt statements* about how the character might act on or solve the event(s) or problem(s).
Action/Attempt Actions are taken by the main characters but are not directly related to the IE. Attempts are taken by the main character(s) that are directly related to the IE.	No actions are taken by the main character(s), Example *There is a girl. There is a boy. It is sunny.*	Actions by main character are not directly related to the IE. Examples *a. The boy and the girl were walking in a park.* *b. They saw a boy alien waving.*	Attempts by main character are directly related to the IE. Example *The girl thought that it would be neat to go and meet the aliens so she got away from the boy and walked out on the grass.*	

(*continues*)

Narrative Element	0 Points	1 Point	2 points	3 points
Complication				
A complication is an event that prohibits the execution of a plan or action taken in response to an initiating event. *Note*: A complication can also be a second initiating event. In this case code both a complication and initiating event.	*No* complications.	*One* complication that prohibits a plan or action from being accomplished. Example *The spaceship landed. The girl decided to get away from the aliens and started running from the spaceship. While she was running, her shoe got stuck in a hole. She could not get away from the aliens.*	*Two* distinct complications that prohibit plans or actions from being accomplished. Example *The girl was walking in a park and saw a spaceship land and she saw some aliens* (IE-1*). The girl started to run away* (action-1*). But while she was running, her shoe got stuck in a hole* (complication-1/IE-2*). She quickly knelt down and took off her shoe to get unstuck* (action-2*) but she was shaking too much to get her shoe off* (complication-2*).*	
Consequence				
A consequence resolves the problem or does not resolve the problem. It must be related to the IE and be explicitly stated. *Note:* A consequence for one episode can often be the IE for another.	*No* consequence to the action/attempt is explicitly stated. Examples *a. She got away from the boy and walked out onto the grass.* *b. The alien girl had a dress on.*	*One* consequence Example *The spaceship landed. The girl went out to see them. The aliens were scared of her. They ran back to the ship and flew off.*	*Two* consequences Examples *a. They told their parents the spaceship was in the park. "But their parents didn't believe them." When they took their parents to the park "the spaceship was gone."* *b. The boy wanted a frog. He went to the woods to find one. He couldn't find a frog. He decided "he really wanted a dog."*	*Three or more* consequences

(*continues*)

Narrative Element	0 Points	1 Point	2 points	3 points
Formulaic markers				
A formulaic marker is any standard utterance used to mark the beginning or ending of a narrative. For example, *The end, once, once upon a time, they lived happily ever after.*	*No* formulaic markers	*One* formulaic marker Example *Once upon a time*	*Two or more* formulaic markers Example *Once upon a time… The end.*	
Temporal markers				
For example, *when, next, then, immediately, instantly, after, again, already, always, before, lately, now, once, presently, rarely, today, weekly, while*	*No* temporal markers	*One* temporal marker Examples *a. The girl walked over to the aliens. "Then" they all ate some lunch.* *b. "After" the aliens landed, the girl screamed.*	*Two or more* temporal markers Example *"When" the girl saw the aliens, she ran out to meet them. She "already" knew they would be nice.*	
Causal adverbial clauses				
For example, *because, since, so that, therefore, as a result, consequently, thus, hence.*	*No* causal adverbial clauses.	*One* causal adverbial clause Example *The aliens were not nice to the girl because they were scared.*	*Two or more* causal adverbial clauses Example *The aliens were not nice to the girl because they were scared. Since they were mean, she ran away.*	
Knowledge of dialogue				
Knowledge of dialogue is registered by a comment or statement made by a character or by characters engaging in conversation.	*No* dialogue	*One* character makes a comment or statement Examples *a. He said "Ow"* *b. He said "Don't come over here"*	*Two or more* characters engage in conversation Example *He said "Oh look, there is an alien" and she said "Oh, lets go see them."*	
Narrator evaluations				
Narrator evaluations are any explanation provided in the story to justify why an action or event took place.	*No* narrator evaluations	*One* narrator evaluation Example *She ran up to say hello to the alien. She always wanted to meet one.*	*Two or more* narrator evaluations Examples *a. She knew that it was an alien spaceship. Everyone knows about UFOs.* *b. He wanted to run from the aliens. They were his worst nightmare.*	

Appendix B
Microstructure Coding Rules and Examples

Complex sentences [complex]: Any c-unit with 1 or more dependent clauses; complex sentences may receive additional codes of **[COORD]** and **[SUBORD]** as noted below:

1. Sentences with **infinitive clauses** are counted as [complex] but are not coordinating or subordinating.
    a. *Example: He went outside to try **to get** to the bus [complex].*

2. Sentences with "**gonna" wanna" hafta**" (i.e., shortened version of "going to," "want to," and "have to") are counted as [complex]
    a. *Example: I/'m **gonna** call this story "The Bad Day" [complex].*

3. Helping verbs, or verbs a part of a verb phrase, do not classify the sentence as [complex], unless a second verb or verb phrase is included within the same c-unit. These include: can, have, am, do, be, shall, will, is, may, could, has, are, does, being, should, would, might, had, did, been, was, must, were, etc.
    a. *Example: They did not know her name.*

4. Sentences that are [subord] and/or [coord] will always be [complex].

5. [coord] conjunctions at the start of a c-unit do not count as [complex], but [subord] conjunctions at the start of a c-unit may be a complex if a clause follows:
    a. *Example: And they walked away. That/'s what Lisa thought [complex] [subord].*

6. Elsewhere in the sentence, "and" is not [coord] if it joins two noun phrases, but it is [coord] if the "and" is used to join one or more verb phrases
    a. *Example: Once upon a time, there was a girl and a boy. They could shoot laser/s from (your) their eye/s and kill you [coord]. They look/ed and look/ed [coord].*

7. **Mental state verbs** (i.e. thought, guess, believe) always create [complex] [subord] sentences, even if "that" is not directly stated.
    b. *Example: But Persy thought they might kill them [complex] [subord].*

8. If the word "**when**" or "**after**" can be substituted for the word "**once,"** code as [complex] [subord]
    c. *Example: And once we got on the moon, they fire/ed blaster rifle/s [complex] [subord]. After the earth was save/ed, they went back to earth [complex] [subord].*

9. [complex] [SUBORD] codes are used after the word "**except**" even if "that" is not directly stated if "except" is part of a clause.
    Example: And they don't have four eye/s except they/'re all alien/s. [complex] [SUBORD] [restricted].

10. The abbreviated word "cause" can still be coded as [complex] [subord], if used to represent the term "because"

Syntactic or semantic errors [RESTRICTED]: Utterances that consist of a complete clause with both a subject and a predicate and contain one or more syntactic or semantic errors are coded as [restricted]. An utterance that contains multiple semantic and/or syntactic errors would receive **only one [restricted] code** because the judgment occurs at the level of the whole utterance. For example, when looking at a picture of a frog jumping out of a window, the child utterances "him jumped out" or "he jumped out the door" would be coded as [RESTRICTED] because of their respective syntactic and semantic errors. The [RESTRICTED] utterance code reflects aggregated instances of morphosyntactic errors, including verb inflections or clausal structure errors, as well as instances of inaccurate references or word meanings (e.g., pronoun reversals, substituting door for window or whenever for while), in any utterance in which one or more of these errors occurred.

1. Sentences that are self-corrected, or include repetitions, are not coded as [restricted] unless the self-correction is an error.

2. Sentences with (*) within parenthesis are not coded as [restricted], but outside of parenthesis, automatically [restricted]

3. If introducing a new object, person/character, or place, "a" must be used, instead of "the"
   Example: When they ran to the swing/s, they saw <u>the strange ship</u> thing in the sky [restricted].

4. However, assume related objects are already introduced and do not code [restricted] if the child uses the article "the" instead of "a"
   Example: They were at <u>a park</u>. And they were by <u>the bush</u>. {"bush" is assumed to be part of the park}

5. If the child switches narrators between boy/girl and the aliens, or point of view, code [restricted]
   Example: We saw a couple of alien/s. They got really scared [restricted].

6. Always check pronouns, if child does not introduce character's name prior to using he/she, code [restricted].

7. Always check verb tenses, if the child is changing tense throughout the story, code [restricted].

8. If the child interchanges girl/boy for gal/guy, code [restricted] because we cannot assume they are talking about the same character.
   Example: The <u>boy</u> was/n't interested, but the girl was. And so the <u>guy</u> said "no, stop" [restricted].

9. Interjections, such as the word "like" are not coded as [restricted].

10. Items in parenthesis, also known as mazes or restarts, are not coded as [restricted]

11. > Identifies an abandoned utterance, or incomplete phrase, so do not code

12. Only code utterances related to the story, in some way
    Example: I just want to go to my mother because I want to stretch out.

13. Do not code utterances after clinician asks content questions; however, if clinician asks, "anything else?" continue to code.

14. XXX identifies an unintelligible utterance, so automatically [restricted]

15. ER identifies errors at the word level and EU identifies errors at the utterance level and are automatically coded as [restricted]

16. All made-up words are coded as [restricted]

17. Words such as "stuff" and "thing" are not coded as [restricted], until they identify the object. However, once they identify the object, they cannot switch back.
    Example: They saw a spaceship. And then the aliens walked out of this <u>thing</u> [restricted].

Above information was excerpted from the following source: Miller, J. & Iglesias, A. (2012). Systematic Analysis of Language Transcripts (SALT), Research Version 2012 [Computer Software]. Middleton, WI: SALT Software, LLC.

Appendix C
Microstructure Coding Sample

C (One there) One day when there was a spaceship *that came to earth [complex] [subord] [restricted] [restrictedG].
C There was [EW:were] little people from outer space [restricted] [restrictedG].
C and the people was [EW:were] scared on the earth [restricted] [restrictedG].
C and there was an outer space dog and an outer space everyone.
C And they came to earth.
C and (they like) Everybody was scared.
C And they ran and ran from the park.
C They was [EW:were] runn/ing all over the place [restricted] [restrictedG].
C And it was not funny.
C But some people thought it was funny [complex] [subord].
C but no it was/n't cause they could get kill/ed [complex] [subord].
C And then people that came to the planet they ruin/ed everything [complex] [subord].
C they smash/ed some (some) stuff down [restricted] [restrictedPS].
C They smash/ed the tree/s.
C and some people thought it was so funny [complex] [subord].
C but it was/n't funny.
C they could be kill/ed.
C they could be really really toast.

Appendix D
Macrostructure Coding Sample

+ Character: 1
+ Setting: 2
+ Initiating Event: 2
+ Internal Response: 2
+ Plan: 0
+ Action: 2
+ Complication: 0
+ Temporal Markers: 2
+ Causal Adverbial Clauses: 1
+ Consequence: 0
+ Formulaic Markers: 1
+ Knowledge of Dialogue: 0
+ Narrator Evaluations: 0
+ Total: 13