Contrasting the Oral and Written Narratives of Six- and Eight-Year-Old Canadian Children

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Abstract

This paper quantitatively examines grammatical complexity and lexical diversity in the oral and written narrative productions from a subsample of children, aged six and eight, included in Test of Early Language and Literacy (TELL: Phillips, Hayward & Norris, 2016) narrative norming sample. For the initial analysis of the data presented here, mean length of C-unit values (MLCU) and percent dependent clauses were selected as measures of grammatical complexity, while number of different words and type-token ratio (TTR) values were used to measure lexical diversity. Findings reinforce the use of MLCU as a primary gauge of narrative development, reflecting the growth of grammatically more complex clauses between the ages of six and eight. A significant relationship to age and modality was also demonstrated for TTR, adding support to its use to highlight areas of growth in productivity and lexical diversity. While current research on children's narrative is focused on contrasting typical and clinical populations, targeted narrative analysis between age groups continues to provide insight into what indices are most efficacious for revealing typical growth, as MLCU and TTR have exhibited here.

Keywords: children, oral narrative, written narrative, mean length of C-unit, type-token ratio, Test of Early Language and Literacy

Introduction

Language acquisition is an additive process, constantly incorporating new information from what is heard, modeled and eventually, read (Clark, 2003, p. 186, 213- 215). Due to this nature, literate language forms are often first introduced orally, as conversational language with familial conversation partners informally instructing written language structures. Children are frequently exposed to narrative discourse at an early age, as caregivers entertain with recited or read stories. Purcell-Gates (1988) demonstrated that children who were read to at an early age consistently incorporated narrative stylistic components into their oral storytelling. Development of such narrative elements provides later supportive underpinnings for developing oral and written literate language abilities, helping to bridge the oral-literate language continuum (Dawkins & O'Neill, 2011; Westby, 2012). The importance of children's familiarity with narrative composition elements is highlighted by the education system itself, wherein first grade students are expected to produce oral and written narrative texts with distinct grammatical features (Alberta Education, 2000). As narrative production has displayed a well-established role in expressive and receptive language development, it can be used as valuable indicators of linguistic ability. Just as linguistic skills grow with age, so do narrative skills as children access their growing lexical, syntactical and communicative knowledge to craft a cohesive and coherent story (Hoff, 2009). Children with language impairment have demonstrated poorer narrative skills in both oral and written modes than their typically developing peers (Fey et al., 2004), a trend which has been shown to persist across grades (Boudreau, 2008).

Across typically developing children, research has largely focused on the comparison of linguistic elements between oral and written narratives. Howell (1956) was one of the first to compare elements in children's narrative productions across modalities. He found the oral stories dictated by a sampling of 7 year olds contained a greater number of total words and different words, as well as more theme generalizations, than their written stories. Harrell (1957) broadened Howell's the analysis by focusing on the compositional features of sentence length, clause length and clause subtype in stories dictated and written by $9^1/_2$ to $15^1/_2$ year old students. Several trends were demonstrated across the narrative samples regardless of student age, namely that oral stories contained slightly longer sentences and subordinate clauses, while written stories contained more total clauses. As age increased, the types of clauses utilized in written narratives transitioned from primarily noun clauses to an increased use of adjective clauses, whereas clause type remained consistent irrespective of age for oral stories. In 1984, Pelligrini et al. took a different tack in examining mode of discourse (oral vs written) by targeting measures of linguistic cohesion. Variations in measures of lexis (interrelated words) and exophora (difficulty with textual ties) were insignificant across grade and modality, however stories produced by students in the first grade had higher measures of grammatical cohesion in oral compared to written form. In the 3rd and 5th grade samples, the measures were not significantly different between the two modalities. While they posited the first grade samples could have been impacted by dictation procedures, the variance could also be indicative of specific development within narrative writing skills in students between 1st and 3rd grade.

Since the 1980s studies have continued to target a plethora of narrative elements, but contemporary studies into oral and written narrative comparisons in typically developing popu-

lations have been relatively sparse. This study will examine the oral and written narrative productions from a subsample of children included in the Test of Early Language and Literacy (TELL: Phillips, Hayward & Norris, 2016) narrative norming sample.

Narrative as a Window Onto Developing Oral Language and Emergent Literacy

Much has been written about the integral role storytelling plays in human experience (e.g., Gazzaniga, 2008: Gottschall, 2012). Considered an act of "sense-making and self-presentation" (McCabe, 1997, p. 137), storytelling informs human interaction, from the most mundane to the most profound. In families that envelop their children in narrative talk from an early age, children begin to tell stories just as soon as their command of language allows them to produce them. For the purposes of this paper, a narrative is defined as a minimum of two sequential independent clauses that focus on the same experience or event (Labov, 1972). At around the age of two (McCabe, 1997; Shapiro & Hudson, 1991) in typically developing children and during the following three years, children's narrative skills continue to develop as their stories grow from simple, one-event narratives into elaborate, theme-based stories with a coherent plot structure (Berman & Slobin, 1994). Just as the stories they are told frame children's thoughts, emotions, and sociocultural identities, children's narratives reveal their memories, feelings, and ways of resolving interpersonal and psychological conflict (Curenton, 2006). This alone makes children's narratives a worthwhile field of inquiry; yet, children's narrative skills also offer a wealth of information about developing oral language and emergent literacy (Curenton & Lucas, 2007).

There is a strong relationship between academic success and proficient understanding and use of both oral, conversational style language and formal, literate style language (Paul, 2007). Literate language, unlike oral language, is decontextualized in that comprehension must rely solely on what is encoded in the linguistic signal, rather than on any perceptible features of the immediate context within which that signal is delivered, such as the physical features of the setting, the participants, and any nonverbal cues speakers may produce to aid understanding, such as gesture, tone of voice, or facial expression. Narrative bridges literate and oral language (Paul, 2007; Westby, 1991). It is, in the words of Curenton and Justice (2004), decontextualized talk. Narrative rests on a formal structure, the story grammar or macrolevel of narrative, while at the microlevel, the grammatical and semantic features of the narrative often closely mimic conversational style language, most clearly, but not exclusively, when the narrative incorporates sequences of dialogue.

The strong link between narrative skills and success in school has been captured in numerous studies. Narrative skills are necessary for expressing comprehension in academic settings (Heilmann, Miller & Nockerts, 2010; Petersen et al., 2010). Good narrative skills have been shown to go hand in hand with higher developed emergent literacy skills and later reading outcomes (Dickinson & McCabe, 2001; Griffin et al., 2004; Miles & Chapman, 2002). Research has further revealed a significant difference between the narrative skills of children who are developing typically and children whose language and cognitive abilities are not typically developing (e.g., Boudreau & Hedberg, 1999). Further, measures of narrative microstructure and macrostructure have been demonstrated to reliably differentiate between children with and without language impairment (Liles, Duffy, Merritt & Purcell, 1995; Scott & Windsor, 2000). As a conse-

quence, narrative analysis has become an integral part of language assessments carried out by speech-language pathologists.

Assessing Linguistic Structure in Narratives

Researchers have identified assessment of narrative skills as an accurate method of assessing the grammatical complexity and lexical diversity in children's developing oral language and emergent literacy (Bishop & Edmundson, 1987; Curenton & Justice, 2004; Curenton & Lucas, 2007). Justice et al. (2006) cogently argue that there is accumulating research evidence which reveals these microstructural measures to be "particularly sensitive for characterizing a child's linguistic competence" (p. 178). In fact, a study carried out by Liles, Duffy, Merritt and Purcell (1995) provides a particularly striking example of the predictive power of microstructural indices in relation to children's language skills.

Liles and colleagues (1995) investigated the possibility that different measures of narrative skills identified in the research literature reflect the same underlying abilities, namely, narrative ability at the level of microstructure (linguistic cohesion, complexity of syntactic structure, and length of dependent and independent clauses) and narrative ability at the level of macrostructure (episode level, episode elements: goal, attempt, consequence, etc.). Liles et al's findings show that microstructural aspects of children's narrative production more readily identified differences in children's language competence, which would be salient for diagnosis of language impairment in children, than did macrostructural aspects of children's narrative production. Microstructural aspects of children's narrative production are commonly operationalized as variables which represent productivity (i.e., number of words or syntactic units) and

grammatical complexity (Justice et al., 2006). The following sections provide an overview of some commonly used measures of grammatical complexity, namely, mean length of T-unit, mean length of C-unit and measures that reflect the syntactic structure of utterances, as well as frequently utilized measures of lexical diversity, specifically, type-token ratio and number of different words.

Grammatical Complexity

Grammatical complexity can be measured in terms of Termination units (T-units) or Communication units (C-units). The two measures differ primarily in that only independent clauses, together with any related dependent clauses, count as T-units, whereas C-units also include any story-related utterances produced whose structure does not correspond to a clause containing a subject and a predicate with a finite verb. C-units are particularly useful in analyses of narratives, oral and written, as these often incorporate dialogue and, more specifically, responses to questions (Craig et al., 1998; Curenton & Lucas, 2007), utterances which may not adhere to the clausal structure necessary when using T-units as a measure of grammatical complexity. By adopting C-units as the measure of grammatical complexity, the analysis can take into account all story-related utterances produced by the child. Use of C-units in analyses of the grammatical complexity of children's narratives is the current convention in clinical practice and in research on language development and disorders (Hughes et al., 1997).

Grammatical complexity is most commonly assessed by calculating the mean length of C-units (MLCU), that is, by dividing the total number of words per C-unit by the total number of C-units in the narrative (Fey et al., 2004; Hughes et al., 1997). Higher MLCU values indicate bet-

ter command of clause structure. This is because syntactic structures typically used by children who produce clauses of greater grammatical complexity, for example, single-word modifiers, modifying prepositional phrases and modifying relative clauses, result in a greater number of words per clause. MLCU has further been shown to correlate with age (Craig et al., 1998). MLCU is a measure often used by speech-language pathologists as comparative data is available on children who are typically developing and children with language impairment (Greenhalgh & Strong, 2001).

It should be noted that the clinical use of MLCU rests on the premise that an increase in grammatical complexity corresponds to increase in number of words at the level of the C-unit. Miller (1991), for example, has rightfully pointed out that complex syntactic structures are not produced solely in the form of longer utterances, that is, longer C-units. This is recognized in the research literature. Fey and colleagues (2004) and Muñoz and colleagues (2003), for example, have proposed that MLCU can be seen to reflect narrative productivity. MLCU, however, continues to be a widely used measure of grammatical complexity.

Finally, grammatical complexity can be conceived as the "range of forms that surface in language production and the degree of sophistication of such forms" (Ortega, 2003, p. 492). Thus, grammatical complexity can also be assessed by analyzing the structure of the syntactic units produced in a narrative. Two approaches to structural analysis of syntactic units predominate in the research literature: (1) counting the number of dependent clauses (Bishop & Donlan, 2005; O'Neill et al., 2004), and (2) calculating the average ratio of clauses within C-units (Fey et al., 2004; Justice et al., 2006; Reilly et al., 2004). A third approach focuses on children's

usage rate of "literate language features", most commonly through the inclusion of modified noun phrases, adverbs, conjunctions, and mental/linguistic verbs (e.g., 'think', 'say', 'tell'). Rate of usage of literate language features is calculated by dividing the total number of instances each "feature" occurs by the total number of C-units (Curenton & Justice, 2004; Pellegrini, 1985).

For the initial analysis of the data presented in this paper, MLCU values and percent dependent clauses were chosen to measure grammatical complexity in the oral and written narratives of children aged six and eight.

Lexical Diversity

A measure of productivity, lexical diversity effectively assesses the size of a child's expressive vocabulary, more specifically, the variety and specificity of the words a child uses to narrate a story. Two commonly used measures are type-token ratio and number of different words. The research literature reveals that neither measure is without problems.

Type-token ratio. Type-token ratio (Templin, 1957; Miller, 1991; Watkins, Rice, & Moltz, 1993) is calculated as a ratio of the total number of different words produced by the child in the course of narration and the overall number of words in the narrative. Templin's (1957) investigation of TTR as an index of language development established that the number of both types (number of different words) and tokens (overall number of words) increased between the ages of three and eight. However, average TTR values did not vary across this age span, but rather remained fairly stable at approximately 1:2. In other words, in the narratives of children aged three to eight the number of times each different word is used on average re-

mains constant, while the number of different words used and the overall number of words used in narratives increases with age. A TTR of .50 was subsequently recommended as a general clinical normative guideline for the purposes of assessing children's semantic skills (Retherford, 1993). Age-appropriate lexical diversity is thus reflected by a TTR value closer to .50, whereas TTR values significantly below .50, (e.g., lower than 0.33), as suggested by McEvoy and Dodd (1992), indicate a lack of diversity that may be associated with disordered language development and/or language learning difficulty.

Empirical investigations of the validity of TTR as an index of language impairment have raised important concerns. Most notably, Watkins, Rice, and Moltz (1993) and Rice and Bode (1993) examined the number of types and tokens from the lexical class of verbs to study diversity within this specific area of the lexicon, a word class previously identified as posing considerable difficulty for children with specific language impairment (SLI). Watkins et al. (1993) analyzed language samples from 14 children with SLI which were uniform in length (100 utterances), while Rice and Bode (1993) analyzed language samples from three children with SLI which differed considerably in length, ranging from 367 to 1111 utterances. The verb TTR values (.13 - .28) reported by Rice and Bode (1993) were significantly lower than the verb TTR value (.42) reported by Watkins et al. (1993). This difference in findings has been interpreted as evidence that TTR is highly influenced by sample length (Watkins et al., 1995). As words tend to be repeated more in longer language samples, TTR values will typically be significantly lower in longer compared to shorter samples (Hess et al., 1986; Hess et al., 1989). If we accept that TTR is highly influenced by sample length in that TTR is lower in longer samples because as high frequency words, in particular, closed-set items or words related to a specific topic which is the

subject of the narrative, are repeated, it becomes difficult to consider TTR a measure which can reliably be used to differentiate children with language impairment from typically developing children in narrative analyses.

On the other hand, TTR makes it possible to gauge differences in lexical diversity in response to different tasks. TTR, for example, allows us to establish whether a difference in tasks such as generating an oral narrative compared to generating a written narrative affects the variety of the vocabulary a child uses.

Number of different words. Number of different words (NDW) is obtained by dividing the number of uniquely occurring words by the total number of words in a narrative (Miller, 1991; Watkins et al., 1995). Unlike TTR, which has been shown to remain stable at 0.5 between the ages of 3 and 8 (Templin, 1957), NDW has been demonstrated to increase linearly between the ages of 3 and 13 (Miller, 1991). As previously mentioned, sample length exerts a significant effect on TTR. When length is controlled for, either in terms of number of words or number of utterances included in the calculation, NDW has been shown to reliably differentiate between preschoolers with and without SLI, whereas TTR did not differentiate preschoolers by language ability (Watkins et al., 1995). Larger differences in NDW values between these two groups were found when utterance length was controlled for.

Based on results previously reported in the literature, Scott and Windsor (2000) have argued that NDW is a superior measure for assessing narrative productivity. However, their study of school-age children did not conclusively find that NDW distinguished children with a language learning disability from children with typically developing language. Scott and Windsor

(2000) posit that this finding could be due to sample length. Namely, they analyzed samples of 50 to 100 words. According to their argument, it is possible that lexical diversity differences, such as those identified by NDW, may not emerge in samples relatively short in length. An alternative explanation for these findings put forward by Scott and Windsor (2000) may be due to slowed lexical growth in school age compared to preschool-age children.

If NDW is influenced by sample length, it must also co-vary with mean length of utterance (MLU) (Klee, 1992; Owen & Leonard, 2002). With NDW calculated on a fixed number of utterances, a higher MLU will correspond to a higher total number of words (TNW) in the sample. A higher NDW can be expected when the TNW is higher. Owen and Leonard (2002) argue that NDW does not allow us to distinguish a child's lexical skill from the mean length of the child's utterances when the number of utterances in the sample is controlled for. In the current study, NDW was calculated on the total number of utterances rather than on a set number of utterances.

In the present study, NDW and TTR values are used to measure lexical productivity in the oral and written narratives of children aged six and eight.

An investigation of grammatical complexity and lexical productivity in the oral and written narrative productions from a subsample of six- and eight-year-old children included in the Test of Early Language and Literacy narrative norming sample will be presented in this paper. Increase in both grammatical complexity and lexical productivity is hypothesized to occur between the ages of six and eight in both the oral and written mode. Differences in the micro-

structural aspects of children's narrative production investigated are expected to decrease between modes with age.

Methods

Participants

Participants were part of a large normative study for the *Test of Early Language and Literacy* (TELL: Phillips, Hayward, & Norris, 2016) (description provided in the Materials section below). The TELL participants represented four geographical regions in Canada: the Atlantic provinces, eastern and central provinces, western provinces, and northern territories. Children in the normative sample spoke English as their primary language or one of their primary languages at home, had not received and/or were not currently receiving speech, language or literacy intervention, and had no known history of vision or hearing impairments, cognitive delay or emotional problems. All participants attended schools where English was the primary language of instruction. The ethnic composition corresponded closely to the range and ethic diversity for Canada according to Statistics Canada data (Statistics Canada, n.d.). Ethnic groups accounting for 1% or more of the population makeup were as follows: Chinese (6.4%), South Asian (6.5%), African American (2.2%), Filipino (2.5%), South East Asian (1.5%), Latin American (1.3%) and Arab (1.1%). The data from thirty 6-year-old and thirty 8-year-old children from the Alberta normative pool were randomly selected for examination in the present study.

Materials

The TELL was designed to be a comprehensive diagnostic test of oral language, reading, and writing for children from 3 to 8 years of age in Canada. For this study we examined the oral

and written narratives subtests. In accordance with TELL administration guidelines, testing took place individually with each child in a quiet room at their school. Examiners comprised TELL project research assistants for the normative sample group who came from a variety of disciplines, and included reading specialists, teachers, education undergraduate students and speech-language pathologists. All examiners received thorough training and feedback by the test authors to administer the TELL to ensure fidelity to the testing protocol.

To complete the Oral Narrative subtest children were instructed to look at each of the pictures in a 5-picture story sequence, think of a story containing a beginning, middle and end, and then tell it to the examiner. For any child who had difficult producing a narrative the examiner could use a set of allowable prompts (i.e., How does the story start? What happened next? ,"Is that the end?"). The examiner audio-recorded each child's narrative. For the Written narrative subtest, children were instructed to look at each of the pictures the 5-picture story sequence and asked to write, as best they were able, a story containing a beginning, middle and end.

Analyses

The recorded oral and written narratives were manually transcribed by the authors, two speech-pathology graduate students with a background in language sampling and transcription. Their transcription practices followed conventions for analysis described by the *Systematic Analysis of Language Transcripts* (SALT) software ("Summary of SALT Transcription Conventions," n.d.). Each transcript was analyzed using SALT, which generated individual Standard Measures Reports.

Grammatical complexity. Measures of mean length of C- units (MLCU) were taken from the Standard Measures Reports calculated by SALT. Percent dependent clauses was determined by manual enumeration as the ratio of dependent to independent clauses within C-units for each sample.

Lexical diversity. Measures of type-token ratio (TTR) and number of different words were taken from the Standard Measures Reports calculated by SALT.

Inter-rater reliability. Inter-rater reliability was ensured by the authors randomly selecting 5 oral and 5 written transcripts from each age group that the other had initially transcribed. Following the transcription process outlined above, the completed transcripts were analyzed with SALT software. The resulting measures and the original measures were then used to calculate Krippendorff's alpha (Hayes & Krippendorff, 2007), with a result of .99. This indicates a high level of interrater agreement, as it greatly exceeds .80, the accepted level of substantial reliability for Krippendorff's alpha.

Statistical analysis. In order to allow examination of potential interactions between Age Group, Modality and the Parameters, a repeated measures analysis of variance was completed with SPSS statistical software. The between-subjects factor was Age Group (6 year olds, 8 year olds), while the within-subjects factors were Modality (Oral, Written) and Parameter (MLCU, TTR, % dependent clauses, and # of different words). The alpha level was set at 0.05. *F*-values from the repeated measures ANOVA were used to manually calculate effect size, determining eta squared values to make post hoc comparisons.

Results

We hypothesized greater linguistic complexity and diversity in oral and written measures will be demonstrated in the narratives of 8 year olds as opposed to narratives of 6 year olds, with written measures approaching those of oral measures at the older age. Overall, Age Group had a significant effect on oral and written narrative grammatical complexity and lexical diversity measures. There was further variation between modality and each narrative parameter. The repeated measures ANOVAs performed were comprised of the independent variables Age group and Modality (oral and written), with the individual covariates of MLCU, % dependent clauses, TTR and # of different words. Main effect results for each complexity and diversity measure will be presented in the next section, in addition to effect size (eta^2 or η^2) values. Effect size indicates how strong the association is between two variables: the independent variable(s) and dependent variable(s), as delineated above. In this study, an eta^2 value of 0.02 or less denotes small effects, .13 medium effects, and .26 and greater a large effect (Cohen, in Bakeman, 2005).

Grammatical Complexity

Mean length of C-unit. MLCU analysis results demonstrated the strongest trends between age and modality. There was a main effect for age, F (1,58) = 22.405, p < .001, eta^2 = .28, as MLCU for both modalities was higher in the 8 year old group. There was also a main effect for modality, F (1,58) = 4.766, p = .03, eta^2 = .068, as oral MLCU was significantly higher than written MLCU in the 8 year old age group. As can be seen in Figure 1.(a), the interaction of Age group X Modality was statistically significant, F (1,58) = 7.578, p = .008, eta^2 = .108. This param-

eter demonstrated high between-subjects variance as signified by the large effect size (eta^2 = .28), indicating age had a considerable impact on narrative MLCU.

Percent dependent clauses. This parameter evidenced a singular main effect for age, F (1,58) = 9.440, p = .003, eta^2 = .14, as both modalities demonstrated a larger percent dependent clauses in the 8 year old group compared to the 6 year old group. There was no main effect for modality, F (1,58) = 3.608, p = .062, eta^2 = .058, as oral and written measures both increased with age. The Age group X Modality interaction was not statistically significant, F (1,58) = .719, p = .400, eta^2 = .012, for though 8 year olds had a larger percent dependent clauses, both modalities demonstrated increases with age (see Figure 1.(b).

Lexical Diversity

Type-token ratio. Type-token ratio demonstrated an interesting trend with main effects found for age, F (1,58) = 15.525, p < .001, eta^2 = .211 and modality, F (1,58) = 13.298, p = .001, eta^2 = .183. Across the age groups, TTR measures were significantly higher for the 6 year olds, whereas modality showed significantly higher TTR measures in written narratives versus oral narratives. Despite these main effects there was no significant interaction between Modality and Age group, F (1,58) = 1.407, p = .240, eta^2 = .02; rather a near parallel trend was exhibited, with each modality measure decreasing with age, as seen in Figure 1.(c).

Number of different words. Number of different words age exhibited a main effect, F (1,58) = 22.63, p < .001, eta^2 = .28, as the 8 year old group measures of number of different words were significantly higher those of the 6 year old group. There was an additional main effect for modality, F (1,58) = 9.272, p = .003, eta^2 = .13, as oral narrative measures were significantly higher in both age groups. As can be seen in Figure 1.(d), the Age group X Modality inter-

action was just shy of statistical significance, $F(1,58) = 3.96$, $p = .051$, $eta^2 = .056$. The large eta^2 value of .28 suggests that age has a significant impact on measures of TTR despite the small sample size.

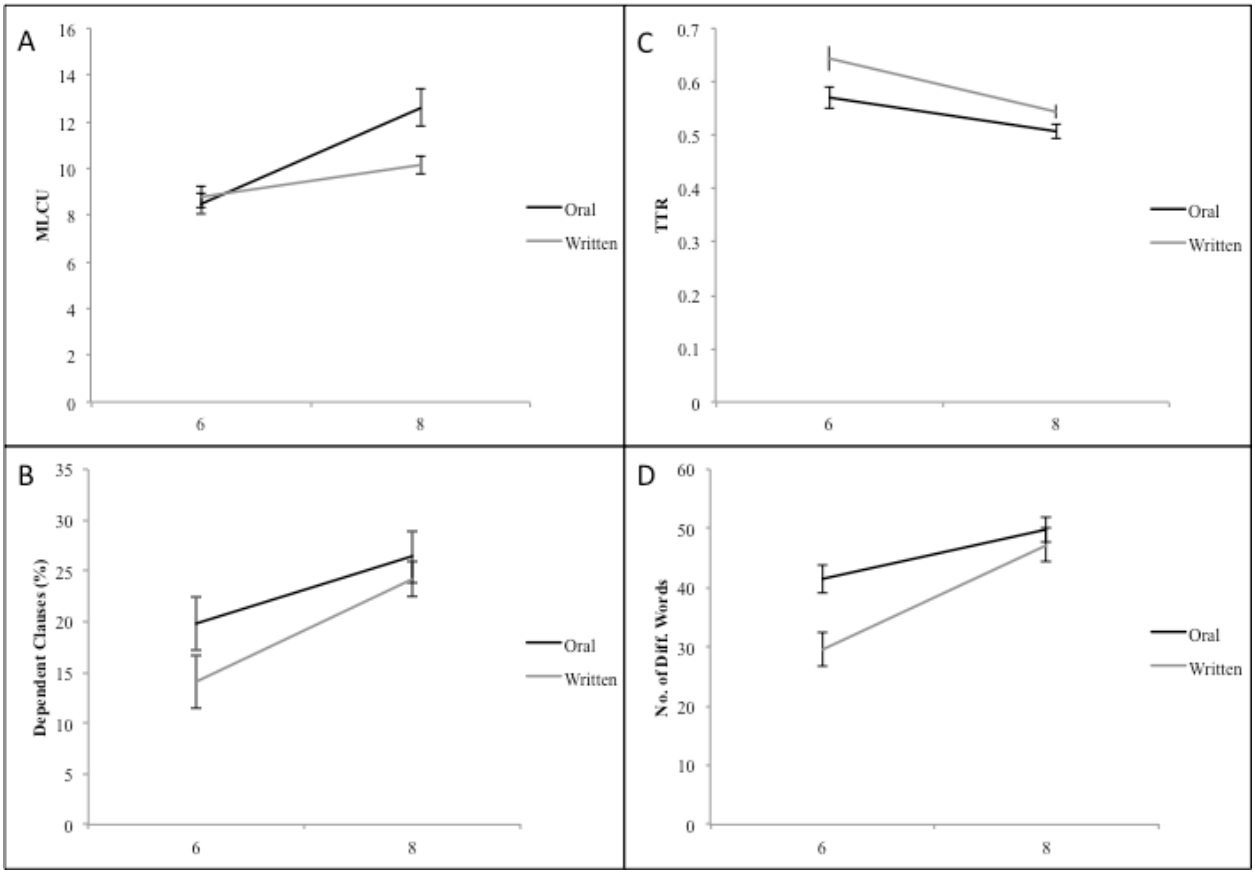

Figure 1. Mean values of MLCU (A), % Dependent Clauses (B), TTR (C) and Number of different words (D) for oral and written narratives expressed by a sample of children aged 6 and 8 in the Test of Early Language and Literacy; error bars represent standard error.

Discussion

Microstructural aspects of children's narratives have been found to readily identify differences in children's language competence (e.g., Justice et al., 2006; Liles, Duffy, Merritt & Purcell, 1995). This study examined measures of grammatical complexity and lexical diversity in the oral and written narratives of six- and eight-year-old children collected using the TELL to

add to the growing body of knowledge on the predictive power of microstructural indices in relation to children's language skills.

Grammatical Complexity

The age effect on MLCU reported in the research literature (e.g., Craig et al., 1998) was substantiated by the findings of this study. Between the ages of 6 and 8, children's development results in an increase in grammatical complexity, as measured by MLCU, regardless of modality (oral, written). A significant interaction of age and modality was also found. Namely, grammatical complexity was greater for written than for oral narratives at age 6, but lower for written than for oral narratives at age 8. The use of MLCU as a measure of grammatical complexity allowed us to incorporate fragments of dialogue, which are frequently a few words long, (e.g., "okay", "good-bye", etc.), into the analysis. Our analysis subsequently revealed that 6-year-olds used such fragments more frequently in their oral than in their written narratives, resulting in lower MLCU values for this age group's oral narratives.

When MLCU is approached as a measure of narrative productivity (e.g., Fey et al.,2004; Muñoz et al.,2003), the differences found in MLCU values between the age groups can be seen to reflect the longer narratives produced, on average, by 8-year-old children compared to 6-year-old children. Higher MLCU values are also accepted as indicating a superior command of clause structure (Fey et al., 2004; Hughes et al., 1997), as clauses of greater grammatical complexity generally require a greater number of words per clause. Viewed in this light, the results of this study show a growth in the ability to produce syntactically more complex sentences in narratives between the ages of 6 and 8, irrespective of the modality. Between the ages of 6 and

8 an increase in number of words per clause, as measured by MLCU, and posited concurrent growth in mastery of more complex syntactic structures was found for oral but not written narratives. This underscores that developing language skills are first revealed in the primary, oral, modality.

The results of the study further indicate that growth in mastery of more complex syntactic structures between the ages of 6 and 8, as shown by increase in MLCU, does not correspond primarily to increase in the use of dependent clauses. While increase in MLCU was more sharply delineated between the ages of 6 and 8 in oral narratives, the study found no significant difference between the percent of dependent clauses used in the two age groups' oral narratives. Instead, the results appear to indicate that use of dependent clauses in narratives continues to grow between the ages of 6 and 8 for both the oral and the written modality and that any difference of note between the two age groups is, in fact, to be found in use of dependent clauses in the written modality, with 8-year-olds using significantly more dependent clauses in their written narratives than 6-year-olds.

Lexical Diversity

Dependent clauses are just one of a range of structures that contribute to grammatical complexity and, certainly, only one type of syntactic structure that can account for increase in MLCU, others being, for instance, nominal premodifiers, such as determiners and adjectives, adverbial and prepositional phrases, and relative clauses. Use of a greater variety of structures and corresponding word classes would, in addition to accounting for higher MLCU values, also account for higher NDW values. The significant differences in the number of different words

used in the oral and written narratives of the two age groups and significant main effects when age groups and modalities were compared indicate that growth in mastery of grammatical complexity is most clearly revealed in increased use of a variety of syntactic structures, rather than primarily in use of one particular type of structure, namely, the dependent clause.

The results of this study show that number of different words increases between the ages of 6 and 8 and thus contribute additional evidence to that already reported in the research literature of the growth in expressive vocabulary in the early school years. The analysis of TTR values for the oral and written narratives of the two age groups further corroborates the conclusion that narrative productivity as well as lexical diversity, more specifically, the variety and specificity of the words a child uses to tell a story, increases between the ages of 6 and 8. As effect size calculations point to TTR as being the measure which most clearly distinguishes between the two modalities, oral and written, the results of this study indicate that TTR is a particularly useful measure for analyses which aim to explore the difference between the oral and written narratives of children in the early school years.

Conclusion

The more that is known regarding pediatric language and literacy development, the more effectively assessment and intervention can be shaped. Using established narrative indices, this study has suggests several cogent patterns of developmental indicators within the oral and written narratives of typically developing children, supporting and expanding previous studies of the topic.

Grammatical complexity findings reinforce the use of MLCU as a primary gauge of narrative development, reflecting the growth of grammatically more complex clauses between 6 and 8 years. Percent dependent clauses exhibited its limited utility as a measure of syntactic expansion, as moderate age effects were found but significance was limited to written language.

The two measures of lexical diversity showed opposite trends in age groups, and it must be acknowledged that previous studies emphasized effects of sample length. Sample length was not controlled for in this study, however values of type-token ratio in both modalities demonstrated a considerable relation to age and modality, adding support to its use to highlight areas of progress in productivity and lexical diversity. The second measure of lexical diversity, number of different words, demonstrated a substantial relationship to age for the typically developing sample. It must be acknowledged that controlling for length of samples may have resulted in different findings.

In addition to possible impacts due to uncontrolled sample length, other limitations of this study include examining merely two grammatical and two lexical microlevel measures, the small sample size, and only contrasting two age groups for students from just one province. Limited to using two discrete age groups, a longitudinal study would provide additional information regarding individualized change over time.

There are a large number of other narrative analyses available to future studies to extend the current findings. Macrolevel measures, that of story grammar and episodic complexity, could provide information regarding the structural composition and completeness of the narratives. Much more can be learned at the microlevel however, with a greater number of analyses

available to more readily identify narrative differences. Grammatical complexity could be expanded in examining types of subordinate clauses and clause connectivity, elaboration of noun phrases, types of verbs and adverbs, sentence length (as measure of syntactic complexity) and measures of temporal expression (tense, aspect, mood). In regards to lexical diversity, further research would benefit from using measures that account or adjust for sample length. VOCD-D and HD-D are recently developed algorithms which attempt to assess TTR change as a function of length (deBoer, 2014), though another measure, the "Measure of textual lexical diversity" (MTLD) has demonstrated it may be the measure least affected across small text ranges, such those seen in this study (Koizumi & In'nami, 2012). Other lexical characteristics that could be examined include word length, lexical density, register, noun abstractness and complexity of lexical and phrasal connectives. Another possibility involves comparing the narratives qualitatively. As demonstrated in a recent study by Carretti, Motta and Re (2016), blind ratings can be used to assess adherence to the task's requirements, general impression of coherence and text richness, text structure, lexicon and syntactic structure. This is a valuable avenue of assessment, as it addresses elements of both macro- and microstructure.

Current comparative narrative research is highly focused on contrasting typical and clinical populations, but much can still be learned from targeted narrative analysis between age groups. As demonstrated by the variation within grammatical and lexical parameters for a small sample of Alberta children, development of narrative elements cannot be generalized across modalities. Research regarding this topic provides insight into what indices are most efficacious for revealing typical growth, as MLCU and TTR have exhibited here.

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