The Effects of Geographic Location and Picture Support on Children's Story Retelling Performance

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Abstract

Purpose: Analysis of children's oral narratives is a frequently used naturalistic assessment technique. Comparing children's oral narrative performance to databases of samples elicited from typically developing speakers aids in the identification of language impairment and thus enhances the clinical utility of the assessment process. To investigate the potential usefulness of existing databases across different geographic locations, this study compared the story retelling performance of English-speaking children from New Zealand (NZ) to samples from the United States (US) contained in a widely used reference database available with Systematic Analysis of Language Transcripts software (SALT). *Method:* Sixty-six NZ children (age 6;0 to 7;11) who showed typical development participated. Their performance was compared to 73 age-matched samples from the United States. All children retold the story *Frog, Where Are You?* using a standard protocol. Approximately half of the NZ children ($n = 31$) retold the story without picture support, whereas all other children were allowed to refer to the pictures during retelling. Language samples were analysed on measures of productivity, semantic diversity, syntactic complexity, verbal fluency, and story quality. *Results:* The results indicated that variables measuring verbal productivity, semantic diversity, and story quality were sensitive to changes in elicitation procedures (presence or absence of pictures during retelling), but not to differences in geographic location (US vs. NZ). In contrast, verbal fluency was sensitive to both elicitation condition and geographic location. *Implications:* The results from this study suggest that, when comparing a story retelling sample to a reference database, adhering to the language sampling elicitation protocol may be more important than the geographic origin of the database.

Key Words: narrative, children, language sample analysis, story retell

/H1/Introduction

The importance of narrative discourse to classroom participation and academic performance has been well established (e.g., Feagans & Short, 1984; Griffin, Hemphill, Camp, & Wolf, 2004; Milosky, 1987), and detailed analysis of children's oral narratives is considered an ecologically valid way to describe children's oral language skills (e.g., Boudreau, 2008). To improve the clinical utility of the oral narrative assessment process, groups of researchers from a range of geographic locations have developed databases of samples elicited from typically developing speakers to use as a comparison for their clients with language impairment (Gillam & Pearson, 2004; Miller, Gillon, & Westerveld, 2008; Miller & Iglesias, 2010; Schneider, Dubé, & Hayward, 2009). These databases provide clinicians and researchers with important information pertaining to children's spontaneous language that may be used both for research and clinical purposes (Heilmann, Miller, & Nockerts, 2010). Unfortunately, creating such databases is a time-consuming and expensive exercise. Because oral narrative performance is known to vary due to factors such as sampling contexts (e.g., fictional narrative, personal narrative, retell or generation) and elicitation conditions (e.g., pictorial support, oral versus auditory presentation, use of a model story), separate oral narrative databases need to be created containing samples elicited in different contexts and under differing conditions. What is not known, however, is whether individual databases need to be developed for each geographic location or country, especially when the same language is spoken. The current study aimed to investigate this issue. Oral narratives produced by English-speaking children from New Zealand (NZ) derived in two different elicitation conditions were compared to age-matched samples from typically developing English-speaking children from the United States (US). Samples from the US children were taken from one of the most comprehensive databases documenting children's

oral narrative skills that is available with the Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2010). Before summarizing the existing literature regarding the effects of geography, however, we need to better understand the nature of oral narrative analysis and the impact elicitation conditions may have on oral narrative measures.

/H2/Oral Narrative Analysis

Oral narrative discourse consists of a monologue describing an experience or events that are chronologically sequenced (e.g., Engel, 1995). Oral narrative ability can be analysed at two levels: (1) macrostructure level, which considers the overall quality and structure of the oral narrative, and (2) microstructure level, which takes into account the narrative's more 'local' linguistic features, including measures of syntax, morphology, and vocabulary. Examples of oral narratives typically encountered in the classroom include telling or retelling of fictional stories and sharing personal experiences during show and tell (Milosky, 1987). Analysis of children's productions of fictional narratives has received significant attention in clinical speech-language pathology. The most popular method of eliciting fictional narratives is providing the child with a sequence of pictures illustrating the key events of an unknown story. The child is then asked either to tell the story or to retell the story after listening to a model story provided by the examiner. By having all children tell the same story, we can establish expectations for story-specific features, such as use of key story vocabulary, specific story grammar elements, and story structure. In clinical practice, asking children to retell a story as opposed to generate a story has several advantages. Both children with typical development and children with language impairment provide longer samples when retelling a story, containing more story grammar elements, and more complete episodes, thus allowing for a more thorough analysis of these children's oral narrative performance (Merritt & Liles, 1989).

/H2/The Effects of Elicitation Conditions on Oral Narrative Retell Performance

Results from earlier investigations have clearly indicated the impact elicitation conditions have on children's oral narrative performance (e.g., Gummersall & Strong, 1999; Masterson & Kamhi, 1991; Schneider, 1996; Schneider & Dubé, 2005). One frequently occurring choice for clinicians is whether to allow the child to refer to pictures when retelling a story for language sample analysis (LSA) purposes. Previous research has indicated that the presence or absence of pictures influences children's oral narrative performance. For example, Masterson and Kamhi (1991) found significant effects for picture support on measures of syntactic complexity and verbal fluency when asking 6- to 9-year-old children to retell a short fictional narrative and describe a simple science experiment. More specifically, children were asked to: (1) retell a fictional story and describe what happened during a science experiment (no picture support), and (2) retell a story and describe the objects to be used in the science experiment (with the support of pictures). Masterson and Kamhi based syntactic complexity on clause structure, and reported the length of utterances in morphemes as a separate measure. Results showed that in the picture support condition, children used significantly less complex sentences that were less fluent and contained more lexical errors than in the no-picture support condition. Although Masterson and Kamhi did not specifically investigate the impact of picture support on measures of semantics, they suggested that the children were less inclined to use descriptive sentences in the presence of pictures, as much of the information was already present in the pictures and did not require verbal elaboration. Based on Masterson and Kamhi's (1991) findings it is expected that picture support during story retelling may yield shorter sentences and lower verbal fluency. It is not clear how variations in picture support will affect story length or story quality.

/H2/Expected Effects of Geographic Location on Oral Narrative Performance

There has been surprisingly little research investigating the effects of geographic location on English-speaking children's spoken language performance (Nippold, Moran, Mansfield, & Gillon, 2005; Westerveld & Claessen, 2009; Westerveld, Gillon, & Miller, 2004). The most likely reason for the paucity of research in this area is the expected similarities in performance, especially when considering English-speaking children from first-world countries. On the surface, we expect that most features of children's oral language productions would be consistent when geographic location is the main variable. With the exception of subtle dialectal variations (see Trudgill, Gordon, Lewis, & MacLagan, 2000, for a discussion), children would likely use the same core vocabulary. When completing LSA, general measures of vocabulary use are nonspecific and should not be sensitive to these subtle variations across languages. Although children may use different vocabulary for certain objects (e.g., *togs* in NZ versus *swimwear* in the US; *gopher* is unfamiliar to NZ children), typical measures of vocabulary, such as lexical diversity, should not be affected. Measures of children's syntax and grammar would also likely be comparable across geographic locations. For example, NZ and American English can have dialectal variation in pronoun usage (e.g., *y'all* in the US; *yous(e)* in NZ), yet common LSA measures such as utterance length and the ratio of subordinators should not be affected by these subtle changes.

Measures of pragmatics might be the most likely candidates for differences across geographic locations, given that differences in discourse rules can be a key cultural feature. As Gutiérrez-Clellen and Quin (1993) summarized, when narrating a story children respond to the cultural expectations of their listener with respect to the amount of information to include, the stylistic strategies to use, or the sequence in which the narrative should be told. However, we should not expect to see major differences based on geography alone when comparing across first-world countries with similar resources and access. This is particularly true when examining fictional oral narratives. Narrative form is generally consistent across

many Western cultures, with most narratives having a commonly used story grammar framework (e.g., Mandler & Johnson, 1977; Stein & Glenn, 1979). Furthermore, there is considerable overlap in the story books and educational readers that NZ and US children are exposed to.

Although we expect similarities across measures of form, content, and use, there could still be differences across the geographic locations (Dollaghan et al., 1999; e.g., Hart & Risley, 1995; Heath, 1982; Purcell-Gates, 1991; Scarborough & Dobrich, 1994). Differences in exposure to oral narratives could occur in the home. If a certain culture has more of an oral tradition, variations in children's narrative performance would be expected; neither the US or NZ is thought to be more or less of an "oral" culture. Differences in exposure at home could also include how much parents and family members expose children to narratives. However, such differences are most related to differences in socio-economic status (e.g., Dollaghan et al., 1999; Heath, 1982). With the US and NZ ranking 4th and 5th, respectively, according to the United Nation's Human Development Index (2011), we would expect modest differences in the samples due to SES alone. The most likely difference in exposure would occur at the level of the school, where there is variability in educational practices across NZ and the US. In NZ, 73% of 3-year-olds and 85% of 4-year-old NZ children attend formal early childhood education or care (Statistics New Zealand, 2009), and children start their first year of primary school (full days) on their fifth birthday. In the US, 47% of 3-year-olds and 74% of 4-year-old children attend formal preschool (Barnett, Epstein, Friedman, Sansanelli, & Hustedt, 2009), although this varies widely by state (e.g., 13% of 4-year-olds in California, compared with 48% in Wisconsin). Between 5 and 6 years of age (depending on their age at the beginning of the school year), children start their first year of primary school with a year of kindergarten education (Stipek, 2002).

/H2/Existing Research into the Effects of Geographic Location on Language Sample Measures

Heilmann, Miller, and Nockerts (2010) reported that spontaneous language samples collected from children (age 5;2 to 9;5) in Wisconsin and California generated comparable LSA measures both in story retelling and in conversation. When Westerveld and Claessen (2009) compared spoken language samples produced by 5- and 6-year-old children from NZ and Western Australia (WA), the only significant difference in performance was found on a measure of grammatical accuracy, with the NZ children performing better than their WA counterparts. The authors argued that these differences were most likely as a result of the socio-economic background of the participants, with the majority of the WA children attending schools in lower socioeconomic areas of Perth. Westerveld and Claessen compared conversational ($n = 24$) and story retelling transcripts ($n = 39$) from WA children to the samples of all 5;0 to 6;0 year-old NZ children contained in the SALT-NZ reference database ($n = 67$ and $n = 47$ respectively) (Miller et al., 2008). In the conversational context, exactly the same protocol was used (see Westerveld et al., 2004). In the story retelling condition, however, despite similar elicitation conditions (novel story, exposure, naive listener), children were exposed to different stories (NZ: *Ana Gets Lost*; Swan, 1992) (Australia: *A Day at the Zoo*; Strang & Leitão, 1992) that were comparable in length, semantic diversity, and grammatical complexity, but not in story structure. As a result, children's story retelling ability at macrostructure level could not be compared.

To the authors' knowledge, two studies have compared spoken language samples from NZ children to samples produced by children from the US (Nippold et al., 2005; Westerveld et al., 2004). Westerveld et al. (2004) found differences in conversational and oral narrative samples between speakers from the two countries dependent on the age group. Although there were no differences in performance at microstructure level at ages 5 and 7, at

age 6 the NZ children outperformed the US children on measures of syntax (MLU) and semantic diversity (number of different words: NDW) in conversation. In oral narration, however, the 6-year-old US children outperformed the NZ children on MLU. The authors argued that the different schooling systems of the two countries might explain the group differences in conversation at age 6. As mentioned previously, in NZ, children typically start formal schooling around their fifth birthday, which may explain the generally stronger language production skills at the age of 6. Although both databases employed similar elicitation techniques and conditions in the conversational context, marked differences in oral narrative elicitation techniques existed. To elicit oral narratives, NZ children were prompted to relate a past personal experience, whereas the US children were asked to retell a familiar story, a TV episode, and/or a movie. Relating personal narratives are less challenging to memory than story retelling tasks and are less dependent on comprehension processes (McCabe, 1996), which may well explain the differences in MLU between speakers from the US and NZ in the oral narrative context. In summary, results from these studies highlight the importance of conducting research into oral narrative language performance by children from different countries that utilises exactly the same elicitation protocol. Results from this type of research will potentially inform clinicians whether current language sample databases of English-speaking children may be clinically useful in other countries.

/H2/Purpose of the Current Study

In this study we wanted to investigate if English-speaking children from NZ and the US would show differences in their story retelling performance on narrative macrostructure and/or microstructure measures. In addition, we manipulated the elicitation condition (picture support) to evaluate the relative effects of geographic location versus elicitation condition on children's story retelling performance. The findings from this research will have important

implications for both researchers and clinicians. The results will help determine whether clinicians in NZ can reliably use overseas databases of typical performance for LSA purposes. In summary, the following research questions were addressed:

1. Which language sample measures are sensitive to changes in story retelling elicitation condition (picture support versus no picture support) in school-age children from NZ?
2. Are there differences in story retelling performance at microstructure and/or macrostructure level between school-age children from NZ and the US?
3. What are the relative effects of elicitation condition versus geographic location on school-age children's story retelling performance?

/H1/Methods

/H2/Participants

New Zealand. Permission for this research was granted by the Massey University Human Ethics Committee: Northern region. A total of 66 children (37 girls and 29 boys) with typical development were recruited. These children attended three primary schools, located in suburban Auckland, New Zealand (NZ) that had been awarded mid-socioeconomic status by the Ministry of Education Ranking system. Teachers were asked to hand out information sheets to parents of children aged between 6;0 and 7;11, who had no known history of hearing disorder, neurological disorder, or speech-language therapy intervention, spoke English as their first language, and were progressing normally at school. To confirm that the children demonstrated typical receptive vocabulary skills, all children were assessed on the *Peabody Picture Vocabulary Test—Third Edition* (PPVT-III; Dunn & Dunn, 1997); children's scores ranged from standard score 80 to 125 ($M = 106$, $SD = 11$). Ethnic

composition was as follows: NZ European (76%), Maori (14%), Pasifika (6%), and “other” (4%).

United States. Over the past 30 years, the research team who developed the SALT software has compiled numerous databases of language sample transcripts. These databases include samples from children covering a wide range of ages and communicative contexts. They were developed so clinicians can have a frame of reference for their clients with suspected disorders (see Heilmann, Miller, & Nockerts, 2010, for an overview). One of the databases includes typically developing children from public schools in San Diego, CA, who completed the same narrative retell procedure as the NZ children in the present study. All children were judged as performing within normal limits according to the classroom teachers. The children were predominantly Caucasian (67%), with representation from other diverse backgrounds: Hispanic/Latino (15%), Asian (4%), African American (5%), and Native Hawaiian or other Pacific Islander (5%); 4% of the participants did not report race or ethnicity. Socioeconomic status was measured by maternal education. On average, the children’s mothers completed 14 years of formal schooling; only 5% of the sample did not complete high school. This subset of the SALT database included 73 children between 6 to 7 years of age. This sample was close to being gender balanced (45% boys and 55% girls).

Age matching. Mean age in months (with standard deviations in parentheses) was 85.02 (6.07) for the NZ group and 79.56 (4.48) for the US group. The NZ children, as a group, were older than the US group, $t(137) = 6.60$, $p = .01$, $d = 1.04$. To maintain the maximum number of samples, all transcripts were included in the study despite the group differences in age. Subsequent analyses controlled for age to account for the age differences.

/H2/Procedure

Three undergraduate speech-language therapy students conducted the NZ assessments under close supervision of the first author (a certified speech-language therapist). These students received extensive training in eliciting language samples using a set protocol, and debriefing sessions were held on a daily basis. Children were seen individually in a quiet room in their school. Sessions were audio-recorded using digital voice recorders (Olympus DM-1). All children listened to audio recordings of the story *Frog, Where Are You?* (Mayer, 1969), while looking at the pictures in a wordless story book. This story is about a little boy and his pet dog who are searching for their pet frog that escaped overnight. All children were asked to retell the story to the examiner immediately afterward. During the retelling of the story, the examiner showed interest in the child's performance and used neutral responses when needed (e.g., hmm, ok, anything else?) to encourage the child to continue. In NZ, the children were randomly allocated to two groups: (1) picture support (21 girls, 14 boys) and (2) no picture support (16 girls, 15 boys). Independent *t*-tests showed no differences between the groups in age ($t(64) = .34, p = .73$) or on PPVT-III scores ($t(64) = -.73, p = .47$). In the picture support condition, the children were allowed to use the pictures from the story to assist with the retell; in the no-picture support condition, children were asked to retell the story without the use of pictures. All US children had access to the pictures when retelling the story. This research design allowed for comparing the effects of geographic location and the effects of elicitation condition (picture support versus no picture support during retell) on children's retelling performance.

/H2/Transcription and Analysis

The digital audio files from NZ were transferred to a computer, using Olympus DSS Player Pro Dictation Module (Version 4.4.0) software, and transcribed by two trained undergraduate speech-language therapy students while using headphones and Olympus RS28

foot pedals. The US samples were transcribed by a team of research assistants working in the Language Analysis Lab at the University of Wisconsin-Madison; each transcriber completed at least 10 hours of training. All transcripts were coded using SALT conventions (Miller & Iglesias, 2010). Utterance segmentation was based on communication-units (C-units), defined as one main clause with all its subordinate clauses (Loban, 1976). Elliptical responses (phrases) in response to the examiner's prompts were also considered a C-unit. In addition, sentence fragments were counted as separate C-units when the final intonation contour of the utterance indicated that a complete thought has been spoken. Only complete and intelligible C-units were used for analysis. All reformulations, repetitions, and disfluencies were placed in parentheses and considered mazes. The language samples were analysed at microstructure and macrostructure levels (see Hughes, McGillivray, & Schmidek, 1997).

Microstructure-level analysis. At microstructure level, the samples' local structure was investigated on measures of morpho-syntax and semantics. The following measures that have been shown to be sensitive to age and language competence (e.g., Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; MacLachlan & Chapman, 1988; Scott & Windsor, 2000) were calculated using SALT and used for analysis:

- Verbal productivity: total length of the sample in number of C-units (TCU) and rate (word per minute: WPM).
- Semantic diversity: number of different words (NDW).
- Syntactic complexity: mean length of C-unit in words (MLCU).
- Verbal fluency: percentage of maze words (PcMzWds).

Macrostructure-level analysis. At macrostructure level, the samples' more global structure was analyzed, using the Narrative Scoring Scheme (NSS—<http://www.saltsoftware.com/training/>). The NSS was calculated by hand and examines seven key aspects of telling effective narratives, which include the story's introduction, character

development, expression of the character's mental states, referencing, conflict resolution, cohesion, and conclusion. Each component is rated on a 5-point scale, with anchors given for *poor*, *emerging*, and *proficient* ability (scores of 1, 3, and 5, respectively). Please refer to Heilmann, Miller, Nockerts, and Dunaway (2010) for an overview of the NSS.

/H2/Transcription Accuracy and Coding Reliability

To ensure reliability of transcription and coding of the samples, the following procedure was used. First, the first author listened to the tape recordings of the story retellings produced by the NZ children and checked all transcripts for transcription accuracy, spelling, coding, and/or utterance segmentation errors. Corrections were made when needed. Each of the US samples went through the process of consensus transcription, where the sample was first transcribed by a research assistant and then checked by a second research assistant; all discrepancies were resolved.

Next, 20% of the NZ and US transcripts were randomly selected. An independent researcher experienced with language sample analysis rescored these stories on the NSS. Krippendorff alpha coefficients (Krippendorff, 1980) were calculated to document agreement between the two raters. This procedure accounted for chance agreement and the degree of differences between the judgments; for example, interjudge scores of 30 and 31 have a higher level of agreement than scores of 30 and 19. Krippendorff stated that alpha values below .67 were unreliable, alphas between .67 to .80 are adequate for making tentative conclusions, and alphas at or above .80 reflect good agreement. Krippendorff's alpha using ordinal scaling was .84 for the NSS (total score).

/H1/Results

/H2/Effects of Elicitation Condition

We first attempted to document that a variation to the elicitation procedure created predictable differences in language measures for the children. Approximately half the sample of children from NZ completed the retell procedure without having the pictures available for their production (no picture support condition; $n = 31$), whereas the other half of the children ($n = 35$) had access to the pictures during retell (picture support condition). All children from the US had access to the pictures. Table 1 reports the results for all groups of children on macrostructure and microstructure measures of narrative performance.

A series of univariate analysis of variance (ANOVA) tests was completed using each of the language sample measures as the dependent variable and condition (picture support versus no picture support) as the between-subjects variable. In addition, η^2 (eta-squared) values were calculated for each of the analyses as an estimate of the effect size. This documents the amount of explained variance in a variable as a function of elicitation condition. For example an η^2 value of .23 indicates that 23% of the variance between the two variables is explained by the elicitation condition. Results from a series of analysis of variance equations indicated that the children told significantly longer stories, TCU, $F(1,64) = 19.17, p < .001, \eta^2 = .23$, produced significantly more different words, NDW, $F(1,64) = 14.17, p < .001, \eta^2 = .18$, and demonstrated significantly fewer mazes, PcMzWds, $F(1,64) = 6.32, p < .05, \eta^2 = .09$, in the picture support condition (see first row, Table 2). There were no group differences on MLCU ($F(1, 64) = 0.82, p = .37, \eta^2 = .01$) or rate (WPM, $F(1, 64) = 2.42, p = .13, \eta^2 = .04$). However, in the picture support condition, the children scored significantly better on the NSS score ($F(1, 64) = 5.20, p = .03, \eta^2 = .08$) than the children in the no-picture support condition. The results are shown in Table 2.

Insert Table 1 here

Insert Table 2 here

To further investigate the finding that children obtained a higher NSS score in the picture support condition, correlation coefficients were calculated between NSS scores and the microstructure measures of oral narrative performance in both the picture support condition ($n = 108$) and the no picture support condition ($n = 31$). Table 3 shows the results. In both elicitation conditions, high correlations were found between NSS and measures of length (TCU) and semantic diversity (NDW).

Insert Table 3 here

/H2/Effects of Geographic Location

Next, we sought to determine if there were differences in microstructure or macrostructure measures of oral narrative performance as a function of geographic location. Because the NZ children (picture support condition group) were significantly older than the US children, a series of analyses of covariance comparing the NZ and US samples (picture support condition) and controlling for age was performed (see first two columns in Table 1 for the descriptive data). As shown in Table 2 (bottom row), results indicated that PcMzWds and WPM varied significantly as a function of location, with the US children demonstrating a higher percentage of maze words ($F(1, 105) = 5.66, p = .02, \eta^2 = .05$) and higher WPM values ($F(1, 105) = 4.12, p = .045, \eta^2 = .04$). All other measures were not significantly different and accounted for <1% of the variability in the measures: TCU, $F(1, 105) = 0.14, p = .71, \eta^2 < .01$; MLCU, $F(1, 105) = 0.15, p = .70, \eta^2 < .01$; NDW, $F(1, 105) = 0.57, p = .45, \eta^2 < .01$. When comparing the performance of the US children to that of the NZ children at macrostructure level (picture support condition), and controlling for age, no differences were found on the NSS (total score) measure ($F(1, 105) = 0.00, p = .99, \eta^2 < .01$).

/H2/Relative Effects of Elicitation Condition Versus Geographic Location

Table 2 summarizes the effect sizes from the two groups of analyses described above. The eta squared values from the contrasts based on geography (NZ vs. US, bottom row) were compared to the values from the contrasts based on elicitation condition (picture support versus no picture support, top row) to determine which variable introduced more variability to the measures. The most striking differences in eta-squared values between the elicitation conditions were observed for TCU and NDW. Elicitation condition also accounted for notably more variation on the NSS score and in mazing behaviour when compared to geographic location, though not to the extent of TCU and NDW. In summary, the differences in measures due to the manipulation of elicitation condition (i.e., picture support versus no picture support) were greater than the differences in measures due to geographic location.

/H1/Discussion

/H2/Effects of Elicitation Condition

As expected, there were significant effects for elicitation condition (picture support versus no picture support) on the NZ children's story retellings at microstructure level. Although results from previous research have indicated the impact picture support can have on measures of syntax and verbal fluency (Masterson & Kamhi, 1991; Schneider & Dubé, 2005), results from the current study broaden this knowledge base by clearly documenting that children retold longer stories (containing more utterances and more different words) in the picture support condition. Considering the high correlations between these two measures ($r > .81$) it can be concluded that children's stories contained more information when they were allowed to refer to the pictures during the retelling (i.e., longer stories, containing more

different words). These results add to findings by Masterson and Kamhi (1991), who concluded, based on children's use of more compound sentences in the absence of pictures, that children were inclined to use more descriptive information when there was no picture support. In the current study, although presence or absence of picture support did not affect children's MLU (see Table 2), a significant increase in NDW was observed. Furthermore, this increase was a clear effect of the picture support, as NDW did not change as a function of children's geographic location. More direct comparisons between the two studies are not possible, however. Not only were the model stories used by Masterson and Kamhi (1991) much shorter (160 words, as opposed to 615 words), their results are based on a combination of story retelling and expository retelling (see below).

We also found that children showed significantly less mazing behaviour in the picture support condition. This result seems to contrast the finding by Masterson and Kamhi (1991), who investigated the effect of contextual support on primary school-age children's ability to produce sentences in oral narrative and expository discourse. These authors found that children's language was more disfluent when allowed to refer to pictures. One reason for this apparent difference in findings relates to the fluency measure adopted by Masterson and Kamhi ("The ratio between number of hesitations and number of words in each utterance," p. 552). Unlike the fluency measures in Masterson and Kamhi's study, the PcMzWds measure utilised in the current study did not include pauses or elongations. A second reason concerns the context in which children's language was elicited. In Masterson and Kamhi's study, children were asked to retell a story as well as describe and explain a science experiment. The latter may be regarded as a simple expository task (see Nippold & Scott, 2010), which is considered more difficult than story retelling and may thus affect verbal fluency (Westerveld, 2010). From a theoretical point of view, the finding in the current study that children used a higher percentage of mazed words in the no picture support condition may be explained

within a limited capacity working memory model, resulting in a trade-off between linguistic processes (see Baddeley, 2003; Crystal, 1987). That is, faced with the added difficulty of retrieving content information from memory, children's verbal fluency suffered.

When analysing the children's stories on the macrostructure measure NSS, significant effects for elicitation condition were found. Children in the picture support condition scored significantly better on the NSS than the children who retold the story without the use of pictures. Further analysis of the results indicated that the NSS may be sensitive to the amount of information children provide in their retellings. NSS scores showed significant positive correlations with the number of different words in both the picture support condition ($r = .67$) and the no-picture support condition ($r = .83$). In the no-picture support condition this correlation may be considered strong, as it exceeded .80 (Portney & Watkins, 2000). These findings are consistent with those from Heilmann, Miller, Nockerts, and Dunaway (2010) who found a significant, strong correlation ($r = .58$) between performance on the NSS and a measure of productivity (total number of words) and semantic diversity (NDW), jointly explaining 33% of the variance.

/H2/Effects of Geographic Location

This study subsequently investigated differences in story retelling between children from NZ and the US on oral narrative macrostructure and microstructure measures. The results clearly indicate that most oral language measures derived from children's narrative retells did not vary on the basis of geography. The clearest evidence was documented with the microstructure variables measuring length (TCU) and semantic diversity (NDW) showing sensitivity to changes in elicitation procedures (picture support versus no-picture support during retelling), but not to differences in geographic location. In fact, the only variables that were sensitive to geographic location were mazing behaviour (PcMzWds) and rate (WPM),

explaining 5.1% and 3.8% (respectively) of the variability. All other measures, including performance on the narrative macrostructure rubric, accounted for <1% of the variability in the measures across geographic locations. These results suggest that children may activate a similar cognitive schema (see Westby, 2005) when retelling a story, despite their different cultural backgrounds, geographic locations, or year of schooling. It should be noted, however, that the story used in the current study (*Frog, Where Are You*), is a fairly typical story containing familiar characters and events. It is not clear, if differences in performance between children from NZ and the US would be found if a more country-specific story is used.

The generally faster speaking rate (words per minute) demonstrated by the US children in the current study was consistent with findings from previous research comparing speaking rate in children from NZ and the US in conversation (Robb & Gillon, 2007; Westerveld et al., 2004). For example, Robb and Gillon investigated general speaking rates (syllables per minute and phones per second) of 3-year-old children in conversation and found significantly faster speaking rates for US children compared to their NZ peers. Similarly, results from Westerveld et al. (2004) indicated faster speaking rates in 5- and 7-year-old children from the US. In contrast, no differences in speaking rates were found between the 6-year-old age groups from the two countries. It is interesting to note that previous research comparing speaking rate in adults have revealed opposite findings; that is, NZ adults speak at a faster rate compared to US adults (Robb, Maclagan, & Chen, 2004). Robb and Gillon (2007, p.6) therefore questioned at “what point in development does the rate of NZE [New Zealand English]-speakers surpass AE [American English]-speakers.” Results from the current study indicate this change does not occur before the age of 6 or 7.

It was interesting to find that, along with a faster speaking rate, the US children displayed a higher degree of mazing than their NZ counterparts. To our knowledge there is no

previous research investigating this verbal fluency measure across geographic locations. Consistent with a limited capacity working memory model, there may be a trade-off between linguistic behaviours in cognitively demanding tasks (Baddeley, 2003; Crystal, 1987). That is, a generally faster speaking rate may result in less fluent language output. Further analysis revealed significant positive correlations between the percentage of mazed words and the rate measure (see Table 3: picture support condition $r = .40$; no picture support condition $r = .49$), lending support to this hypothesis (i.e., more words per minute is associated with a higher percentage of mazed words). Moreover, the verbal fluency measure seemed sensitive to elicitation condition, with the NZ children demonstrating a higher percentage of mazed words in the no picture support condition compared to the picture support condition. Taken together these results suggest that mazing behavior may be particularly susceptible to cognitive demands in a story retelling condition.

/H2/Limitations and Future Directions

Although the results from this research are promising, it is not clear if these findings would generalise to other geographic locations where English is spoken as a first language, including Canada, Australia, or the UK. It is also not known if the results would generalize to other discourse genres, including personal narratives or expository skills. It may well be that the commonly used story grammar for fictional stories (see Stein & Glenn, 1979) obscures potential cultural differences. Future research may consider eliciting personal narratives across geographic locations to further investigate this issue (see Bliss & McCabe, 2008, for a discussion). Finally, future studies should conduct cross-geographic comparisons with respect to the story retelling abilities of younger children who do or do not attend structured preschool education.

/H2/Clinical Implications

The findings from this study suggest that clinicians may have confidence in using overseas story retelling databases of samples produced by children with typical development for use as a comparison for their young school-age clients with language impairment, as long as the same language is spoken. The results highlight the importance, however, of adhering to the elicitation protocols that were used to create these databases to ensure children are provided with the same type of support when retelling the story.

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Table 1. Participant Details and Story Retelling Performance by Geographical Location and Elicitation Condition

Country	US	New Zealand	
Condition	Picture Support	Picture Support	No Picture Support
<i>n</i>	73	35	31
Age in months	80 (4)	85 (6)	85 (6)
	72–89	73–95	74–95
TCU	37 (10.2)	39 (12.4)	26 (11.3)
	12–77	12–72	7–46
MLCU	7.6 (1.2)	8.1 (1.4)	8.3 (1.0)
	5.7–12.7	4.3–10.4	6.9–10.4
NDW	101 (20)	110 (36)	80 (27)
	47–150	33–192	34–128
PcMzWds	10.0 (5.9)	7.5 (4.0)	11 (7.0)
	2–27	2–19	0–27
Rate (WPM)	90.8 (23.8)	82.4 (26.1)	91.5 (21.1)
	44.5–148.8	12.4–141.3	36.8–123.1
NSS	19.9 (2.9)	20.0 (6.0)	17.0 (4.7)
	12–26	3–30	11–27

Note: Means (SD) and range are reported. TCU = Total number of C-units; MLCU = Mean length of C-unit; NDW = Number of different words; PcMzWds = Percent mazed words; WPM = Word per minute; NSS = Narrative Scoring Scheme.

Table 2. Eta-Squared Values Summarizing the Amount of Variance Accounted for by: (1) the Presence or Absence of Pictures During Retell, and (2) Geographic Location

	TCU	MLCU	NDW	PcMzWds	WPM	NSS
Pics vs. no	.23*	.01	.18*	.09*	.04	.08*
Pics						
NZ vs US	<.01	<.01	<.01	.05*	.04*	<.01

Note: TCU = Total number of C-units; MLCU = Mean length of C-unit; NDW = Number of different words; PcMzWds = Percent mazed words; WPM = Word per minute; NSS = Narrative Scoring Scheme.

* Group differences significant at $p < .05$

Table 3. Correlations Between the Macrostructure Measure NSS and Microstructure Measures

A. Picture Support Condition ($n = 108$)

	NSS	TCU	MLCU	NDW	PcMzWds	WPM
NSS	1.0	.53**	.53**	.67**	-.051	.35**
TCU		1.0	.208*	.81**	.12	.35**
MLCU			1.0	.60**	.04	.33**
NDW				1.0	.02	.35**
PcMzWds					1.0	.40**
WPM						1.0

B. No Picture Support Condition ($n = 31$)

	NSS	TCU	MLCU	NDW	PcMzWds	WPM
NSS	1.0	.81**	.29	.83**	.26	.15
TCU		1.0	.12	.94**	.30	.34
MLCU			1.0	.34	.05	.04
NDW				1.0	.37*	.36*
PcMzWds					1.0	.49**
WPM						1.0

Note: TCU = Total number of C-units; MLCU = Mean length of C-unit; NDW = Number of different words; PcMzWds = Percent mazed words; WPM = Word per minute; NSS = Narrative Scoring Scheme.

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