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Content and Form in the Narratives of Children with Specific Language Impairment

Paola Colozzo,

The University of British Columbia

Ronald B. Gillam,

Utah State University

Megan Wood,

The University of British Columbia

Rebecca D. Schnell, and

The University of Texas at Austin

Judith R. Johnston

The University of British Columbia

Abstract

Purpose: This project investigated the relationship of content and form in the narratives of school-age children.

Method: Two samples of children with specific language impairment (SLI) and their age-matched peers (British Columbia sample, *Mean* 9;0, *n* = 26; Texas/Kansas sample, *Mean* 7;6, *n* = 40) completed the Test of Narrative Language (TNL, Gillam & Pearson, 2004). The relative strength of content elaboration and grammatical accuracy was measured for each child using variables derived from the TNL scoring system (Study 1) and from analysis of the story texts (Study 2).

Results: Both studies indicated that, compared to age peers, the children with SLI were more likely to produce stories of uneven strength, either stories with poor content that were grammatically quite accurate, or stories with elaborated content that were less grammatical.

Conclusions: These findings suggest that school-age children with SLI may struggle with the cumulative load of creating a story that is both elaborate and grammatical. They also show that the absence of errors is not necessarily a sign of strength. Finally, they underscore the value of

Contact author: Paola Colozzo, School of Audiology and Speech Sciences, Faculty of Medicine, The University of British Columbia, 2177 Wesbrook Mall, Vancouver, BC, Canada, V6T 1Z3. paola.colozzo@audiospeech.ubc.ca.

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Disclosure Statement

Ronald B. Gillam is an author and receives royalties for the sales of the Test of Narrative Language (Gillam & Pearson, 2004), which was used for data collection in this research.

Megan Wood is now at The Speech Therapy Centres of Canada, Richmond Hill, Ontario Rebecca D. Schnell is now at Trinity Terrace Health Care Center, Forth Worth, Texas.

Footnotes

comparing individual differences in multiple linguistic domains, including the elaboration of content, grammatical accuracy, and syntactic complexity.

Keywords

narratives; assessment; specific language impairment; school-age children

Successful production of a high quality fictional story is a demanding task that relies on many kinds of knowledge (Hudson & Shapiro, 1991; Kaderavek & Sulzby, 2000; Liles, 1993; Owens, 1996): world knowledge, genre-specific content knowledge (e.g., conventional forms used as introductions and closings), structural knowledge (e.g., plot development based on events with causal relationships), and linguistic knowledge (e.g., reference devices, causal and temporal connectives, complex syntax). Additionally, storytelling requires coordination and deployment of these bodies of knowledge in real time. Successful narrators are managing plot elements while producing grammatically accurate utterances (Liles, 1993; Nelson, 1998; Owens, 1996).

As a group, children with language impairments are generally less proficient at producing narratives compared to same-age peers. Their stories tend to be shorter (Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Reilly, Losh, Bellugi, & Wulfeck, 2004; Scott & Windsor, 2000) and to earn lower overall quality ratings (Fey, et al., 2004; McFadden & Gillam, 1996) than those of typically developing children. The narratives of children with language impairments have been shown to differ from those created by age peers in features related to content and features related to linguistic form. On the content side, the stories told by school-age children with language impairments tend to include fewer propositions, main story ideas, or story grammar elements (Bishop & Donlan, 2005; Merritt & Liles, 1987; Reilly, et al., 2004), and to contain fewer cognitive state terms (Bishop & Donlan, 2005; Manhardt & Rescorla, 2002). On the form side, the stories produced by children with language impairments have proven to be less grammatically accurate (Fey, et al., 2004; Gillam & Johnston, 1992; Norbury & Bishop, 2003; Reilly, et al., 2004; Scott & Windsor, 2000), to contain fewer cohesive devices (Liles, 1985; Norbury & Bishop, 2003), to be comprised of shorter utterances (Bishop & Donlan, 2005; Scott & Windsor, 2000), and to be syntactically less complex (Bishop & Donlan, 2005; Fey, et al., 2004; Gillam & Johnston, 1992; Norbury & Bishop, 2003; Reilly, et al., 2004).

Some studies have reported that children with language impairments have deficits in both narrative content and form. This appears to be more likely when the elicitation materials provide less support (e.g., single picture vs. picture sequence), the children in the language-impaired group have more severe deficits, and the control group is age-matched (see Bishop & Donlan, 2005; Fey, et al., 2004; Pearce, McCormack, & James, 2003; Reilly, et al., 2004). Aspects of content and form have also been shown to be correlated. Norbury and Bishop (2003), for example, found significant associations between the use of mental state verbs and references to emotions, the number of story propositions, and the number of complex sentences for both typically developing 6- to 10-year-olds and a diverse group of children with communication disorders. Bishop and Donlan (2005) and Manhardt and Rescorla (2002) also reported positive relationships between content elaboration and syntactic complexity.

The fact that both content and form are affected or that there are positive correlations between syntax and content does not necessarily imply equivalent proficiency in the various domains. In a given sample of children with specific language impairment (SLI), the child who tells the most elaborate story may also be the one with the most complex syntax, but that child may still be more deficient in one area of language than in another relative to

typically developing children. Oxelgren (1998), for example, found that four-year-old children with language impairments were more likely to talk about causal relationships between events than were younger children at equivalent language levels (i.e., mean length of utterance), but also that they were delayed in story content relative to age peers. Hence, the children with language impairments had difficulty with both content and form, but the deficits in content were not as great as those in linguistic form. Similar results were reported by Gillam and Johnston (1992). When compared with a group of younger children, the group of 9- to 12-year-olds with language impairments told stories with equivalently elaborate content (propositions and predicate types per utterance, constituents per story) but were less accurate in their use of complex sentences. Finally, in a longitudinal study, Fey and colleagues (2004) compared children with and without language impairments, in both grade 2 and grade 4, on a number of different aspects of narrative language including grammatical accuracy, clausal density, story length, and overall narrative quality. In group comparisons, it was the measure of grammatical accuracy (i.e., percentage grammatical utterances) that had the largest effect size indicating a greater degree of difficulty in this domain than in the others. In sum, studies of narrative proficiency in children with language impairments point to difficulties with story content and linguistic form, with some children struggling in both areas. When both form and content are affected, there may still be a disparate degree of deficit in these domains, with grammatical accuracy generally showing the greatest vulnerability. The main goal of the current study was to examine in more detail the relationship between content and form in children's narratives.

Discrepancies in performance among various aspects of spoken language have long been recognized, such as the special difficulties with grammatical morphology documented in children with SLI (Leonard, 1998), or the advanced lexicon seen in some children with developmental delays (Fazio, Johnston, & Brandl, 1993; J. F. Miller, Chapman, & MacKenzie, 1981). Such findings have generally been treated as indications of different rates of development in various linguistic domains (McNeil, 1983), with errors viewed as symptoms of immature or absent representations. More recently, however, performance discrepancies among various language domains have been interpreted as the possible result of in-the-moment errors arising from the demands of complex language processing (Bishop, 1994; Leonard, et al., 2000). For instance, Owen (2010) found that 5- to 8-year-old children with and without language impairments were less accurate in their production of the past tense when they produced more complex two-clause sentences, and she interpreted that the greater processing demands of increased syntactic difficulty influenced morphological accuracy.

The inherent nature of spoken narratives would seem to present many processing challenges. In telling a story, ideas must be organized into a coherent framework that serves both the plot and cultural expectations. The organized ideas must also shape the storyteller's utterances, guiding the selection of the words and sentence patterns that will best convey the story at that point. As content is mapped onto linguistic forms, verbal and nonverbal processes co-occur and interact. In contrast to conversation, narrative does not allow speakers to relinquish the floor to give themselves time to figure out how to say what they mean. In narrative, "the speaker's challenge is to both talk and organize future utterances at the same time" (Gillam & Johnston, 1992, p. 1312).

Empirical support for the view that narrative production makes particularly high processing demands comes from studies that have considered the incidence of communicative breakdowns or dysfluencies (i.e., repairs, stalls, abandoned utterances). Wagner, Nettelbladt, Sahlén, and Nilholm (2000) compared the effects of genre on language production in a sample of 5-year-olds with specific language impairment, contrasting conversational and narrative discourse. The narrative tasks elicited more words, grammatical morphemes, and

phrasal expansions per utterance, but also relatively fewer intelligible utterances and fewer fluent utterances (i.e., without mazes). Similar findings have been reported by MacLachlan and Chapman (1988) for 10- to 11-year-olds with and without language impairments. Regardless of language status, children tended to produce longer sentences and to experience a higher frequency of communication breakdowns in narration than in conversation, but the children with language-learning-disabilities were more adversely affected. (See also Thordardottir & Ellis Weismer, 2002.)

Further evidence of the costs of narrative production comes from studies that have looked at the link between grammatical errors and communicative task. Thordardottir (2008), for example, reported that English-speaking school-aged children with and without language impairments produced longer utterances and more grammatical morpheme errors when providing explanations or retelling stories than in conversation, and that the children with SLI had lower accuracy rates than their age peers regardless of context. Similarly, Masterson and Kamhi (1991) found that errors for bound grammatical markers were more frequent when either typically developing children or those with language-learning disabilities retold a story from memory than with visual support.

The studies of narrative processing are just one part of a larger literature pointing to the existence of capacity limitations in children with language impairments. When compared to age peers, these children have been unable to complete as quickly, or with the same level of accuracy, a wide range of verbal and nonverbal tasks (e.g., Leonard, et al., 2007). There is as yet no consensus as to the underlying cause of such limitations. Candidate explanations range widely and include temporal processing (e.g., Tallal, et al., 1996), processing speed (e.g., C. A. Miller, Kail, Leonard, & Tomblin, 2001), the ability to hold and manipulate information in working memory (e.g., Gathercole & Baddeley, 1990; Montgomery, 2000), and the quality of lexical representations (McGregor, Newman, Reilly, & Capone, 2002), among others (for a review, see Gillam & Hoffman, 2004). Children with language impairments have shown deficiencies in each of these areas and each could directly or indirectly, singly or together, affect narrative production. Further research is needed to establish the connections between narrative production and particular aspects of cognitive processing; in the meantime, the notion of capacity limitation remains a powerful interpretive tool. In particular, it raises the possibility of interactions between various aspects of a complex task. Viewing the studies of narrative content and form from this perspective, we can ask whether children with language impairments are less successful than their peers at the simultaneous management of these two aspects of narrative production.

Narrative abilities have proven to be a particularly sensitive predictor of later language and literacy outcomes (Bishop & Edmundson, 1987; Botting, Faragher, Simkin, Knox, & Conti-Ramsden, 2001; J. F. Miller, et al., 2006; Scarborough, 1998; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). The value of narrative assessment stems directly from the challenging nature of the task. The evident clinical utility of narrative assessment has led to the development of a number of assessment tools, some standardized, some not. The Test of Narrative Language (TNL; Gillam & Pearson, 2004) is a standardized instrument with relatively strong psychometric properties (Spaulding, Plante, & Farinella, 2006). It yields scores based on the comprehension and creation of narratives in three task contexts: retelling with no visual support, a sequence of pictures, and a single picture. The TNL differentiates between children with and without language impairments and it can also compare a child's narrative comprehension and production abilities. Although the standardized scoring system does not indicate whether particular aspects of narrative are compromised in these difficult tasks, prior research, as well as our clinical experience, suggested that specific TNL items related to content and to grammaticality might be used informally to provide information

about the relative strengths of these two aspects in a child's narrative productions. One purpose of the current project was to explore this possibility.

The immediate goal of the current project was to describe the relative strength of content elaboration and grammatical accuracy in the narratives created by children with SLI. Specifically, we looked for narratives that had elaborate content but many grammatical errors or poor content but few grammatical errors. We also conducted both subject-wise and group analyses to determine whether such dissociations occurred primarily in the narratives of children with language impairments.

This project evolved in two phases. Study 1 investigates our research questions with content and form variables derived directly from the TNL scoring system. It begins with a preliminary small sample investigation of 7- to 10-year-olds from British Columbia, Canada, which is then replicated with a larger sample investigation of 7- to 8-year-olds from Texas and Kansas. Study 2 uses variables derived from in-depth story grammar and linguistic analyses to validate and illuminate the initial TNL-based findings.

Study 1

Clinical experience with the Test of Narrative Language indicated that children could earn equivalent production scores with narratives that seemed, at least superficially, to be very different. Study 1 explored whether the two narrative generation tasks (from a sequence of pictures and a single picture) and the TNL scoring system could be used to identify differences in the relative strengths of content and grammaticality in a child's narrative production.

British Columbia Sample

Method

Participants: The initial data for this project came from 26 school-age children in grades 2 to 4 from rural and suburban schools in British Columbia (BC), Canada. All aspects of the research were reviewed and approved by the Behavioural Research Ethics Board of the University of British Columbia. The 13 children with SLI (*M* age 9;0; six girls, seven boys) were identified by speech-language pathologists as presenting with persistent oral language difficulties for which they continued to receive intervention. These children were all monolingual speakers of English, and had no history of intellectual disability, sensory deficits, frank neurological disorder, or any other developmental diagnoses. The 13 typically developing (TD) children in the control group attended the same schools as those with language impairments. They were native speakers of English¹ (*M* age 9;2) with no history of any developmental or academic problems according to teacher and parental reports. The children in the two groups were matched pairwise on age (within 6 months), sex, and grade.

All children were required to obtain standard scores within or above the normal range on the Test of Nonverbal Intelligence (TONI-3; L. Brown, Sherbenou, & Johnsen, 1997) and to pass a hearing screening at 20dB sound levels in the range of frequencies important for speech recognition (500-4000Hz; American Speech-Language-Hearing Association, 1997). All participants completed at least two of the three core expressive subtests of the Clinical Evaluation of Language Fundamentals 3 (CELF-3; Semel, Wiig, & Secord, 1995): Formulated Sentences and Recalling Sentences. Most children also completed the third core expressive subtest suitable for their age, either Word Structure or Sentence Assembly.

¹At the end of data collection, we discovered that two of the control participants were in fact simultaneous bilingual children. We decided to keep them in the sample, as they were native speakers of English, and their inclusion should, if anything, have reduced any group differences.

Children in the SLI group were required to obtain a standard score of 7 or less (i.e., -1 standard deviation) on at least two of the three subtests. All children in the typical-language group obtained standard scores of 9 or above (i.e., 37^{th} percentile) on at least two of the three expressive subtests of the CELF-3. We also collected data on maternal education (number of years of schooling) as a proxy for socio-economic status, as this variable has been found to be related to speech and language skills in prior studies (Dollaghan, et al., 1999).

Table 1 presents group means and standard deviations for test measures and demographic variables. Information regarding maternal education was unavailable for two children, one in each group. Given the matching criteria used, t-tests confirmed that the groups did not differ in age in months, $M_{\text{SLI}} = 107.9$, $M_{\text{TD}} = 109.8$, $t(24) = 0.43$, $p = 0.68$, or in maternal education measured in years of schooling, $M_{\text{SLI}} = 12.3$, $M_{\text{TD}} = 12.7$, $t(22) = 0.65$, $p = .53$, based on a two-tailed critical p -value of .05, the criterion for statistical significance used throughout this study. The groups were generally in the midrange regarding maternal education, with most mothers reporting 12 to 13 years of schooling (i.e., completed high school). There was, however, a significant difference for nonverbal IQ scores to the advantage of the control group ($M_{\text{SLI}} = 98.3$, $M_{\text{TD}} = 109.6$, $t(24) = 2.92$, $p = .008$, $d = 1.1$), although all the scores for the children with language impairments fell within the typical range (standard scores of 84 to 113). This situation is frequent in studies involving school-age children who continue to present with language deficits, and it may reflect a true difference between the groups rather than a property of specific samples (e.g., Fey, et al., 2004). This discrepancy also fits with longitudinal data pointing to a measurable decrease in nonverbal IQ for many individuals with persistent language deficits (Aram, Ekelman, & Nation, 1984; Bishop & Adams, 1990; Botting, 2005; Conti-Ramsden, Botting, Simkin, & Knox, 2001; Stothard, et al., 1998; Tomblin, Freese, & Records, 1992).

Procedure

Narrative task: The three subtests of the Test of Narrative Language were administered to all participants. Testing took place individually in a separate room at the child's school. The data for this study are drawn from the two narrative production tasks that assess children's ability to generate an original story with visual support after the examiner provides a model story. In the sequential picture task (*Late for School*), the child must create a story from five pictures about a boy who encounters a series of problems that result in his being late for school. For the single picture production task (*Aliens*), the child is asked to invent a story relating to a picture about an alien spaceship landing in a park. The instructions encourage the child to produce a story that is as long and as complete as possible. Additional probes were provided only if the child seemed to lose attention to the task, did not initiate a narrative (e.g., "How does the story start?"), or seemed to end the narrative without signaling that it was complete (e.g., "Is that the end of your story?"). Feedback consisted of neutral but enthusiastic responses (e.g., "uh-huh", "yeah", "great") or occasionally of a repetition of the child's previous utterance for verification. The child's stories were audio-recorded for later transcription and scoring according to the TNL guidelines. For practical reasons and to favor consistency, scoring was done from written transcripts rather than audiotapes.²

Reliability: Graduate students in speech-language pathology who had completed a course on language transcription were provided additional supervised practice and training regarding

²During development of the Test of Narrative Language, scoring from audiotapes and from written transcripts were compared. Point-to-point intrarater agreements between scores were 93% and 91% for the *Late for School* and the *Aliens* stories, respectively (see the TNL test manual for additional details; Gillam & Pearson, 2004, p. 46).

transcription according to Systematic Analysis of Language Transcripts (SALT; J. F. Miller & Iglesias, 2006) conventions prior to completing the transcriptions of the stories from the TNL. The first author then reviewed all transcripts for accuracy. Another rater also independently transcribed the narratives of six children (23% of the sample, three per group). Mean point-by-point interrater reliability for word-level transcription within this subsample was 99% (98% to 100%). The first and third authors independently scored all the TNL protocols. Mean interrater agreement based on a randomly selected sample of 10 of the 26 children was 97% for the entire test (i.e., all three subtests, including the comprehension sections). Interrater agreement levels for the two subtasks used in this project were 96% (range 92% to 100%) for the *Late for School* story, and 87% (range 82% to 94%) for the *Aliens* story. Given the somewhat lower reliability for the *Aliens* story, the two raters compared their scoring for all of these stories, and resolved any disagreements by discussion.

Dependent measures: The *Late for School* (LS) and *Aliens* (A) stories were first scored separately. Then, each child was given a content score and a form score based upon subsets of TNL scoring items from both stories that focused on one or the other of these dimensions of storytelling.

Narrative content score: The *narrative content score* is a measure of story elaboration. It has a maximum of 10 points, with the *Late for School* and *Aliens* stories contributing a maximum of 4 and 6 points, respectively. The TNL scoring scheme for *Late for School* includes 18 items (LS1 to LS18) corresponding to specific story content elements, which together would constitute a complete and creative story. Rather than selecting a particular subset of items, the child's scores on each of the 18 items was summed and converted to a maximum of 4 points (i.e., multiplied by 4/18; e.g., a total of 9 out of 18 would convert to 2 points). For the *Aliens* story, the sum of points from three scoring items were used: items A6, A7, and A10 (up to 2 points each) require the child to establish a problem, describe the actions related to it, and explain its resolution. As such, they correspond to the minimally required elements for a complete episode in the Stein and Glenn (1979) story grammar system.

Narrative form score: The *narrative form score* is a measure of the accurate use of grammatical forms while storytelling. It also has a maximum of 10 points, with the *Late for School* and *Aliens* stories again contributing a maximum of 4 and 6 points, respectively. It corresponds to the sum of points earned on the five TNL scoring items (each receiving up to 2 points) that were judged to best reflect this dimension. To earn full points on these items, stories must be free of grammatical error (LS21 and A15), use grammatical tense appropriately (LS22 and A14), and refer clearly and consistently to characters (A13).

Relative strength of form index: The first goal of this project was to establish the relative strength of content and form in children's narratives. After determining the scores for form and content as described above, we calculated a measure of the *relative strength of form* based on the TNL scoring system (RSF-TNL) by dividing the form score by the sum of both the form and content scores. This index indicates the proportion of the total points earned on the designated items that are attributable to grammatical accuracy. Use of a ratio variable allowed us to measure the relative strength of form in the narratives of children regardless of their absolute level of competence, as children could obtain RSF-TNL values varying from 0 to 1 regardless of the actual scores they obtained for form or content (i.e., RSF-TNL values were not constrained by the highest number of points in either dimension). Many combinations of form/content scores would lead to an identical RSF-TNL value. To illustrate, 3 form and 6 content points or 5 form and 10 content points would both receive an

RSF-TNL of .33, whereas 6 form and 2 content points or 9 form and 3 content points would both result in an RSF-TNL of .75.³ An alternate variable, the relative strength of content, would have been entirely complementary to the relative strength of form and would have yielded exactly comparable results. We chose to focus on form because of the large literature attesting to special difficulties in this area.

Results and Discussion—Mean narrative content, narrative form, and relative strength of form values appear by group in Table 2. The SLI group obtained considerably lower narrative form and content scores than did the TD group (form, $M_{SLI} = 3.0$, $M_{TD} = 6.2$; content, $M_{SLI} = 4.3$, $M_{TD} = 7.9$). This pattern followed that observed for the standardized TNL Oral Narration scores (see Table 1). In addition, mean RSF-TNL values suggested that children in both groups obtained approximately 40% of their points from form, although the ranges and standard deviations revealed considerably more variability for the children with language impairments. Further analyses were designed to verify if individual patterns matched these group trends.

We divided individual RSF-TNL index scores into three categories, with those below .4 classified as *low* (i.e., low form/high content), those above .6 as *high* (i.e., high form/low content), and finally those between .4 and .6 as *balanced*. The cutoff values of .4 and .6 were chosen to be symmetrical and because they resulted in fairly homogeneous subgroups of absolute differences in form and content scores in the balanced and the imbalanced (low or high form) categories. In effect, regardless of the overall total scores, small differences (2 points) in form and content scores would generally result in an RSF-TNL value within the balanced category, thus allowing for some degree of measurement error on both scores; conversely, larger differences (3 points) would generally result in an RSF-TNL value falling within either the low form or the high form category. Other cut-off points would have made it more likely that both smaller and larger differences would have ended up in the same category. The distributions varied by group, as only 3 of the 13 (23%) children with SLI, but 8 of the 13 (62%) control children produced stories that fell into the balanced RSF-TNL index category (see Table 3), a distribution that is unlikely to occur by chance, ($\chi^2, 1, N = 26$) = 3.93, $p = .047$, 2-sided.⁴

Our final analysis considered whether the dissociations seen primarily in the narratives of children with SLI were related to the observed group difference in nonverbal IQ. While narrative is a highly verbal task, it is also a complex task that entails considerable coordination of resources. Some children may have greater ability in such executive functions and this strength could be reflected both in narrative and in nonverbal IQ scores. To examine this possibility, we looked at the correlation between TONI-3 standard scores and the degree to which a given child's RSF-TNL index deviated from the midpoint (i.e., absolute difference between the index value and .5). Given the confound between nonverbal IQ and language abilities in our sample, separate correlations were calculated for the two groups. Arcsine transformations were applied to the difference scores prior to the statistical analyses given that they were derived from proportions. Neither the scatterplots nor the correlation coefficients indicated any systematic relationship between nonverbal IQ and the extent of dissociation between content and grammaticality in this sample, SLI, $r(13) = -.40$, $p = .17$; TD, $r(13) = .22$, $p = .46$.

³This way of calculating the RSF index presents many advantages. Problems could, nonetheless, arise in cases of 0 form points or with very low scores in both dimensions. Individual scores were examined to identify these extreme cases and to determine if they were influencing results.

⁴Upon further inspection, one child with SLI in the low form category (RSF-TNL = .35) could arguably have been considered balanced (1 form point, 1.89 content points).

The data from individual children provide a very different picture from the one presented by the group means. First, there were 12 low, 11 balanced, but only 3 high RSF-TNL index values overall. Hence, high form/low content index values were relatively more infrequent than low form/high content values. In fact, the median for the RSF-TNL distribution fell somewhat below the mid-point, at .41, and five children in the control group told stories that contained at least some grammatical error and placed them in the low form category. Index values for the children in the SLI group were nonetheless more likely to fall into the extremes of the distribution (low form, $n = 7$; high form, $n = 3$), indicating that their stories showed greater differences between grammatical accuracy and content elaboration. As reported many times in the literature, the narratives of the children with language impairments were less adequate than those of age peers in both content and form. The more interesting finding was that many children in the SLI group appeared to have limitations that made it difficult for them to tell stories that were both strong in content and grammatically accurate. Either the content of their stories was stronger than their grammatical accuracy or, less frequently, the grammaticality of their stories was stronger than their content elaboration.

Texas/Kansas Sample

The findings from the Canadian sample suggested that it would be possible to use the standardized TNL scoring process to derive separate measures of content elaboration and grammaticality and the relationship between them. In addition to indicating whether a child's narratives were age appropriate, the TNL could then offer some direction for further clinical investigation. This potential application seemed important enough to warrant a replication of our initial findings. For this purpose, we were able to access a somewhat younger and larger sample of children who had completed the TNL.

Method

Participants: De-identified data from 40 children were extracted from existing data sets. The data for 20 children with SLI (M age 7;6) were obtained from the pre-intervention testing that was conducted on children from Texas who participated in a large clinical trial (Comparison of Language Intervention Programs, Gillam, et al., 2008). They were chosen randomly among children who had a Spoken Language Quotient on the Test of Language Development-Primary 3 (TOLD-P:3; Newcomer & Hammill, 1997) that fell at least 1.5 standard deviations from the mean (i.e., standard score ≤ 78), and to conform to a 1:2–3 female to male ratio. The data for 20 control participants (M age 7;5) came from the Texas and Kansas subgroups of the normative sample for the TNL. We selected the children with typical language from the larger data pool to match pairwise with children from the SLI group by gender and chronological age (within 3 months). Selection was otherwise random. The University of Texas Institutional Review Board approved the clinical trial as well as the request to obtain and use the de-identified data from ProEd (i.e., the publisher of the TNL).

All children in the clinical trial sample (from which the current SLI sample was extracted) were selected according to the EpiSLI criteria (Tomblin, et al., 1997). A licensed speech-language pathologist identified the children as having language impairments not attributable to hearing loss, physical defects, globally depressed intellectual functioning, or emotional disturbances. These children (a) did not have a previous diagnosis of autism/PDD, intellectual disability, emotional disorder, focal brain lesion, traumatic brain injury, cerebral palsy, or seizure disorder; (b) spoke English as their primary language at home; (c) did not present with important deviations in structure or function of the oral speech mechanism; (d) passed tympanometric and hearing screenings (20 db, 500–4000 Hz); (e) passed a vision screening; (f) experienced no more than two episodes of otitis media in the 12-month period prior to testing; (g) obtained standard scores between 75 and 125 on the Matrices subtest of

the Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990); (h) earned standard scores of ≥ 81 on two or more composite scores of the TOLD-P:3. Mean composite scores obtained on the TOLD-P:3 are presented in Table 4.

All children with typical development in the age-matched group (a) had no known impairments in the domains of language, vision, hearing, gross and fine motor skills, emotional functions, and cognition; and (b) had no history of receiving speech, language, or special education services. They also spoke English as a primary language at home. Children in both groups were seen individually and completed the TNL in a single session either with a student in speech language pathology or with a licensed speech-language pathologist. All testing was recorded for later orthographic transcription and scoring of the stories. Mean scores for the TNL appear in Table 4.

Procedure and dependent measures: Analysis procedures were identical to those used with the British Columbia sample. The TNL protocols were scored from transcripts. Narrative content scores, narrative form scores, and RSF-TNL indices were calculated for each child as described previously. The RSF-TNL values were split into low form ($< .4$), balanced (from $.4$ to $.6$), and high form ($.6 <$) categories. Arcsine transformations were applied to the RSF-TNL values prior to statistical analyses.

Reliability: Well trained and qualified students in Communication Sciences and Disorders completed all transcription and scoring. Language samples were transcribed according to SALT conventions by students who had completed a course on transcription and reached 90% or better agreement on three training transcripts. After the tape was transcribed by one research assistant, a second listener indicated any disagreements. All disagreements were resolved by a PhD level research coordinator who listened to the tape as she made a third pass through the transcripts. For the TNL scoring, mean point-by-point interrater agreement for the entire test calculated for a randomly selected sample of 10% of the test protocols from both groups was 94%.

Results and Discussion—The results from the group analysis of the Texas/Kansas sample closely resembled those from the British Columbia sample (see Table 2). For the children with SLI, mean scores for both content elaboration and grammatical accuracy were markedly lower than the scores earned by their age peers. Mean values for the RSF-TNL index were quite similar ($M_{SLI} = .48$, $M_{TD} = .53$) for the two groups, but with different degrees of variability ($SD_{SLI} = .27$, $SD_{TD} = .05$).

The distribution of children based on the relative value of the RSF-TNL index (low, balanced, and high) appears in Table 3, by group. In contrast with the group means, these data strongly suggest that the two groups of children do not follow a common distribution pattern. All but three of the children with SLI (17/20) fell into the extremes of the distribution, obtaining relatively higher scores on either content ($n = 9$) or form ($n = 8$). In contrast, 18 of the 20 children with typical language earned similar portions of their points from the content and the form items. Statistical analysis confirmed that children in the SLI and TD groups differed in terms of their distribution into balanced and unbalanced (low or high) categories to a degree most unlikely to be attributable to chance, ($\chi^2, 1, N = 40$) = 22.56, $p < .001$, 2-sided.

In contrast to the British Columbia sample, the RSF-TNL values were more evenly distributed across the range of possible scores. Both the mean (.50) and the median (.51) approached .5, and the lower (.41) and upper (.61) quartile values were very close to the cutoff points we used to categorize index values as *high* or *low*. Overall, this resulted in 9 low form and 10 high form RSF-TNL values, all but two of which were earned by children

with SLI. The fact that the two imbalanced profiles occurred with approximately equal frequency within the SLI group in this younger Texas/Kansas sample was somewhat surprising given the large literature indicating special difficulties with grammatical accuracy among language impaired speakers. It raises the possibility that insufficient capacity in a given task can have multiple outcomes, an idea we will return to in later discussion.

We conducted a post hoc test of the relationship between the RSF-TNL index and the TOLD P-3 scores for the group of children with language impairments to assist in interpreting these findings. The RSF-TNL index was significantly associated with both the Syntax quotient, $r(20) = .50$, $p = .024$, and the Semantics quotient, $r(20) = -.46$, $p = .044$, but in opposite directions. Those children with SLI who obtained a high proportion of their points from grammatical accuracy items on the TNL also tended to do better on the grammatical subtests of the TOLD-P:3, but not as well on the semantic subtests. Conversely, the children with SLI who obtained a low proportion of their points from items that tapped into accuracy of form on the TNL also tended to do better on the semantic subtests of the TOLD-P:3, but worse on the syntactic subtests. These correlations provide concurrent validation that the items selected for our form and content measures do indeed deal with the grammatical versus the meaning characteristics of the stories.

As a group, the stories created by the sample of children with language impairments from Texas/Kansas fell below age expectations in both content elaboration and grammaticality. Subject-wise analysis of these stories, however, revealed marked dissociations between these aspects of narrative for 17 of the 20 children. Once again those children whose stories showed greater content development made more grammatical errors and those children who produced content-poor stories made fewer grammatical errors. The main findings from the British Columbia sample were thus replicated in this larger and somewhat younger sample from Texas/Kansas.

The similarities in the dissociations seen in the narratives of 7- to 10-year-olds in British Columbia and in Texas/Kansas, especially those with language impairments, suggest that these patterns can be expected in other locales as well. Whether this reflects the response of children to a particular test, or characterizes children's narratives in a more general way remains to be seen. As the dissociations occurred in both directions we might, for example, argue that the challenge of narrative production lies not in content elaboration or grammatical accuracy per se, but in managing the simultaneous processing demands of these and other aspects of storytelling. Before we could interpret the findings from Study 1, however, we needed to be confident of the validity of our measures of form and content. Deriving these measures from selected TNL scoring items is convenient, but may not ultimately provide the best indicators of narrative elaboration and grammaticality. Scores on the TNL are not comprehensive in their coverage of either the content of the stories or the language used in telling them. The developmental literature also suggests additional perspectives to explore form/content relationships. Study 2 was designed to address the validity of the RSF-TNL analysis with analogous ratio scores based on different measures.

Study 2

Overall, the findings from Study 1 indicated that a majority (27 of 33, 82%) of the children with SLI, as well as a few (7 of 33, 21%) of the typical children, produced stories with one of two different patterns of strengths and weaknesses: some stories had relatively stronger content, but were less grammatically accurate, while others had relatively weaker content, but were more grammatical. In Study 2, we attempted to validate these findings with measures derived from in-depth linguistic and discourse analyses of the story texts. We measured content elaboration using the story grammar framework of Stein and Glenn

(1979), and proficiency with language forms using a length-normalized measure of grammatical accuracy. If our findings once again revealed dissociations between these aspects of narrative content and form, we could be confident that this finding reflected facts about the stories and was not an artifact of a particular scoring system derived from a standardized test. We also added a measure of syntactic complexity in order to provide a more complete picture of form/content relationships.

Method

Participants—Our intention in Study 2 was to validate the narrative performance patterns seen in both of the samples in Study 1 using measures derived from comprehensive and more in-depth linguistic and discourse analysis. Given the good agreement in the findings from the Canadian and U.S. samples in Study 1, we decided to conduct our validity study with the two samples combined. The data for Study 2 consisted of the transcribed *Late for School* and *Aliens* stories for all the participants from Study 1 ($N = 66$, 33 children per group).

Coding

Utterances (C-Units): We segmented utterances into communication units (C-units) as defined by Loban (1976). A C-unit consists of one main clause along with any dependent phrase(s) or clause(s). Coordinated clauses (using *and*, *but*)⁵ are treated as separate C-units except in cases where the co-referential subject of the second clause is omitted (e.g., “Then he poured the cereal and started eating”). The C-unit is often used in the analysis of narratives as it is easier to apply consistently than segmentation judgments based on prosody (i.e., pauses, intonation; Loban, 1976; Scott & Stokes, 1995), and avoids the inflation of length or complexity indices that can result from excessive use of formulas such as *and then*. Direct quotations consisting of more than one clause were segmented according to the same rules (e.g., “And then they said don’t be afraid / we’re not going to hurt you”). Interjections introducing a dependent clause were kept with the clause that followed and the entire construction was counted as a single C-unit (e.g., “Lisa said yeah, you’re right”). Story closings (e.g., “the end”, “that’s it”), tangential comments, questions to the examiner, or repetitions in response to requests for clarification were excluded from the main story body, as were unintelligible or abandoned utterances. Mazes (including filler words, false starts, reformulations, and repetitions) were excluded from the word count. (See the Appendix for examples of transcripts that show parsing into C-units.)

Story elements: We coded the transcribed and segmented *Late for School* and *Aliens* stories for story elements based on the adaptation by Merritt and Liles (1987) of the story grammar system proposed by Stein and Glenn (1979). In this framework, a story contains a number of causally or temporally linked episodes, each potentially comprised of the following story elements: (a) *initiating events*: external/internal events that influence and cause a character to respond; (b) *internal responses*: the psychological state that motivates a character to formulate a goal plan; (c) *attempts*: the application of the goal plan actions, meant to cause or lead to a resolution; (d) *direct consequences*: the attainment or nonattainment of the character’s goal or other changes in the sequence of events caused by a character’s actions; and, (e) *reactions*: a character’s feelings about the attainment or nonattainment of a goal. A *complete episode* as defined by Stein and Glenn (1979) minimally contains (i) an initiating event *or* an internal response, (ii) an attempt, and (iii) a direct consequence. Reactions may appear but are not essential.

⁵In most instances the conjunction *so* appearing alone functioned as a “loose connective” (Burchfield, 1998, p. 722) equivalent to *and then*, and was treated as a coordinating conjunction.

Working within this framework, we coded each utterance according to the story element(s) it contained. A given utterance could be coded for more than one story element (e.g., an initiating event and an internal response), or for none (e.g., extraneous information or contradictory statements). Episode bridging events that served as both a direct consequence and an initiating event or as both an internal response and a reaction were coded only once, as an initiating event and an internal response, respectively. (See Stein and Glenn, 1979, and the adaptation developed by Merritt and Liles, 1987, for further details regarding coding.)

Grammatical errors: We coded the transcribed and segmented stories from Study 1 for the following types of errors: (a) *grammatical errors*: omissions or substitutions of closed-class words or bound morphemes; (b) *tense errors*: non-motivated changes of tense or problems of tense agreement; (c) *reference errors*: ambiguous or incomplete references to characters; and (d) *utterance-level errors*: word order errors, missing obligatory arguments, etc. These error types parallel the scoring items from the TNL that were used to derive a narrative form score in Study 1.

Syntactic Complexity: For another perspective on language form, we derived a measure of syntactic complexity: *clausal density*. For this purpose, all main clauses and subordinate clauses in the stories were tagged, including both finite and nonfinite (i.e., -ing and -ed participles, and the base form used as an infinitive) subordinate clauses (Crystal, 2004a, 2004b; Huddleston & Pullum, 2005) and cases of permissible ellipsis of main verbs (e.g., “He said[CI] ‘go[CI] back to the ship’ / And then they did[CI]” [permissible ellipsis of *go*]; 2 C-Units, 3 clauses).

Reliability: Graduate students in speech-language pathology parsed utterances into C-units. The first author reviewed all transcripts for accuracy of segmentation into C-units and also tagged each clause. Another rater independently coded the narratives of 16 children (24% of sample, 8 per group). Mean point-by-point interrater reliability was 97% (range 72% to 100%) for parsing into C-units and 96% (range 89% to 100%) for clause identification. Following extensive training and practice, two raters (including the first author) independently coded the stories for story elements and for errors, and then achieved consensus via discussion. The total number of C-units, clauses, and errors, as well as the mean length of utterance in words (MLCU-w) were calculated automatically using the SALT program.

Variables—In parallel with Study 1, we used two variables derived from the combined *Late for School* and *Aliens* stories to create an index that indicated each child’s degree of accuracy in using language forms relative to the degree of content elaboration. The *mean number of errors per C-unit* was used as the measure of accuracy of form. The *total number of story elements* was taken as the measure of content elaboration. The children’s stories were ranked separately for each of these variables (mean number of errors per C-unit; descending order; total number of story elements; ascending order) based on the distribution of scores of all 66 children, both groups combined. The measure of the *relative strength of form* based on language sample measures (*RSF-LSM*) was then calculated by dividing the form rank by the sum of both the form and content ranks. If a child’s ranks in both dimensions of narrative were similar, the RSF-LSM value would be close to .5. Alternatively, if the form rank was higher, the RSF-LSM value would be above .5, and if the content rank was higher, the RSF-LSM value would be below .5. By converting the actual scores for the mean number of errors per C-Unit and for the total number of story elements into ranks, it became possible to make comparisons across these variables in spite of very different distributions. Also, calculating a ratio from the ranks once again presented the advantage that the dimensions of form and content could be compared independently of a

given child's developmental narrative level. Hence, regardless of the actual ranks obtained for form or content, each children could in theory obtain an RSF-LSM index score across the entire range (i.e., varying from 0 to 1). To illustrate, many combinations of form/content ranks with different highest ranks would lead to an identical RSF-LSM value: a form rank of 3 with a content rank of 9 or a form rank of 13 with a content rank of 39 would both receive an RSF-LSM of .25, whereas a form rank of 8 with a content rank of 2 or a form rank of 60 with a content rank of 15 would both yield an RSF-LSM of .80.

Two additional variables, *story length in C-units* and *clausal density* (mean number of clauses per C-unit), were used to assist with the interpretation of the findings.

Results and discussion

Mean scores for the length, content, accuracy, and complexity measures are provided in Table 5, for each group, both stories combined. These descriptive variables are well in line with the results of prior research (e.g., Bishop & Donlan, 2005; Fey, et al., 2004; Gillam & Johnston, 1992; Merritt & Liles, 1987; Norbury & Bishop, 2003; Reilly, et al., 2004; Scott & Windsor, 2000). With regard to story length and content, the stories produced by the children with SLI contained fewer C-units ($M_{SLI} = 20.9$, $M_{TD} = 31.3$, $d = 0.9$), as well as fewer story elements ($M_{SLI} = 17.7$, $M_{TD} = 33.6$, $d = 1.5$) than those produced by the typically developing children. The effect sizes were large in both cases.⁶ The stories of the children with SLI also differed in language form. They were less grammatically accurate, as indicated by a higher rate of errors per C-unit ($M_{SLI} = 0.65$, $M_{TD} = 0.16$, $d = 1.6$). They also contained shorter utterances and were less syntactically complex, as evidenced by the lower means for MLCU-w ($M_{SLI} = 6.4$, $M_{TD} = 8.3$, $d = 1.5$) and clausal density ($M_{SLI} = 1.32$, $M_{TD} = 1.72$, $d = 1.6$) respectively. The effect sizes were large for all three measures. The variability was much reduced, however, for the error per utterance measure in the TD group; all children with typical language essentially had low error rates, and there was little overlap between groups for this variable. Although the absolute difference between the group means was small for clausal density, the distributions were nonetheless very different, with 30 of the 33 children in the typical group obtaining a score of at least 1.5 clause per C-Unit compared to only 9 of the 33 children with SLI.

To complete our main analyses, we divided the children's RSF-LSM indices into three categories. Once again, those falling at or below .4 were classified as *low*, those falling between .4 and .6 as *balanced*, and finally those above .6 as *high*. The RSF-LSM values were quite evenly distributed across the range of possible scores, with both the mean (.51) and the median (.48) approaching .5, and the lower (.40) and upper (.60) quartile values corresponding to the cutoff points used to determine *low* and *high* values. Overall, this resulted in 15 low form, 35 balanced, and 16 high form RSF-LSM values (see Table 3).

Although the mean values for the RSF-LSM index were similar for the two groups ($M_{SLI} = .49$, $M_{TD} = .52$), the distributions were not (see Tables 3 and 5). Whereas 21 of the 33 (64%) children with SLI fell into one of the imbalanced RSF-LSM categories (low form, $n = 12$; high form, $n = 9$), only 10 of the 33 (30%) children with typical language (low, $n = 3$; high, $n = 7$) did so. These dissimilar distributions for the two groups are unlikely to occur by chance, ($\chi^2(1, N = 66) = 7.36$, $p = .007$, 2-sided).⁷ The RSF-LSM index derived from

⁶To avoid unnecessarily increasing the number of statistical comparisons, we reported Cohen's d for data that did not directly address the research questions.

⁷The RSF-LSM ratio generally worked well, with only 1 of 66 participants standing out as having obtained a questionable classification. This child ranked very low for both form (1st) and content (3rd), but nonetheless fell into the low form category (RSF-LSM = .25). Also, the results and the conclusions would have been almost identical had we used the same procedure, but analyzed the British Columbia and Texas/Kansas samples separately. In fact, only 6 of the 66 children (3 per group, and 3 per sample) would have fallen in a different RSF-LSM category.

linguistic and discourse analyses of the stories indicated that a majority of the children with SLI produced stories with one of two different patterns of content/form dissociations. There was no obvious difference in age for the children who fell within the low form (M age 94 months) and the high form (M age 97 months) categories, although results from Study 1 had suggested this possibility. Finally, those children in the SLI group in the balanced RSF-LSM category tended to be low on both form (mean rank 18.2) and content (mean rank 20.0).

To further validate the findings from Study 1, we looked to see whether a given child landed into the same category for the two relative strength of form indices, the RSF-TNL derived from TNL scoring items, and the RSF-LSM derived from analyses of the story texts. We did not expect perfect agreement given the differences in the nature of the underlying measures. Nonetheless, there was considerable agreement for both groups of children, with 67% (22 of 33) of the children with SLI and 79% (26 of 33) of the children in the typical group falling within the same RSF-TNL and RSF-LSM categories. The level of agreement was essentially comparable for all categories, with one exception. Specifically, quite a few children (5 of 16) who were categorized as low form based on their RSF-TNL values appeared more balanced based on their RSF-LSM values. This is not altogether surprising given the differences in the measures and, in particular, the fact that each of the TNL scoring items used to create the narrative form score in Study 1 would have received a score of 0 as soon as a child had made a few errors (2 or 3 depending on the item) regardless of story length. The fact that two-thirds of the children with SLI showed the same form/content profile in both studies indicates the possible clinical value of the RSF-TNL procedure. The fact that one-third did not invites caution.

Finally, in order to provide a more complete picture of the form/content connections and to interpret the findings, we looked at the relationships between content elaboration and both story length and the second measure of proficiency with language form, clausal density. As one might expect, the stories with more elaborate content were also longer, as the number of story elements was positively and significantly related to the number of C-units, $r(66) = .88$, $p < .001$, one-tailed. Existing evidence (Bishop & Donlan, 2005; Manhardt & Rescorla, 2002; Norbury & Bishop, 2003) indicates that elaborate content and complex syntax should go hand in hand. Visual inspection of the story data suggested that this relationship was likewise present here, but only for the group of children with SLI. This was confirmed statistically, as we found a significant positive correlation between the number of story elements and clausal density, $r(33) = .67$, $p < .001$, one-tailed, but virtually no relationship between these variables for the typically developing group, $r(33) = -.01$, $p = .48$, one-tailed. The results were virtually identical for the relationship between the number of story elements and mean length of C-Unit in words.

As a further check of the practical significance of these correlations for the group of children with SLI, we compared the stories of the children who fell into the low form and the high form categories in terms of story length and syntactic complexity. The children with language impairments who obtained RSF-LSM index values placing them in the low form/high content category did in fact produce longer stories that were also syntactically more complex ($M = 26.6$ C-Units; $M = 1.42$ clauses per C-Unit) than did those who fell in the low form/low content category, ($M = 13.1$ C-Units; $M = 1.18$ clauses per C-Unit). Hence, the combined demands of producing longer, more elaborate, and syntactically more complex stories apparently led to higher levels of errors per C-Unit in the group of children with SLI.

The absence of relationship for the typical children between the content of their narratives and syntactic complexity was unexpected and invites explanation. One possibility is that it reflects greater language skill. The temporal and causal relationships inherent in a good story may invite complex syntax, but a storyteller who is able to use complex sentences with

little effort and cost might use them even with less elaborated content. Alternatively, this finding could also be specific to this sample of typically developing children who produced, on average, only an additional 0.4 clause per C-Unit compared to their peers with SLI (1.72 vs. 1.32). Hence, they may have been able to convey an elaborate story using relatively simple sentences. Finally, this result may reflect the specific way that clausal density was measured here (i.e., including both finite and nonfinite subordinate clauses). Only additional research could help to tease apart these possible explanations.

Overall, the results of Study 2 indicate that a majority of the children with SLI did in fact produce stories with form/content dissociations. Our analyses using the story grammar framework of Stein and Glenn (1979) to measure content elaboration and a length-normalized measure of grammatical accuracy to reflect proficiency with language forms provide a general validation of the TNL-based findings of Study 1. Some children produced stories with more elaborate content and relatively lower grammatical accuracy. These stories also tended to be longer and syntactically more complex. Other children told stories that were unelaborated—in some cases not even meeting the minimal requirements of a story—but grammatically more accurate; they were also generally shorter and syntactically simpler (see Appendix for examples).

General Discussion

The goal of this project was to describe the relative strength of content elaboration and grammatical accuracy in the narratives created by children with SLI. The results of the two studies provide an interesting picture of dissociation in the stories produced by many school-age children with language impairments, with one or the other of these dimensions scoring high or low relative to the other. This result was initially found in two samples from different geographic locations with somewhat different selection criteria regarding age and severity, using measures derived from the scoring system of the Test of Narrative Language. It was then confirmed using measures resulting from linguistic and discourse analyses of the story texts.

The first sort of dissociation, strong content with low grammaticality, is consistent with the results of prior research (Fey, et al., 2004; Gillam & Johnston, 1992). To our knowledge, the complimentary pattern, poor story content with few grammatical errors, has not been reported elsewhere, though it seems theoretically plausible. It is particularly interesting that the children with language impairments distributed more or less evenly between the low form accuracy and the low content elaboration subgroups. The few children with language impairments who were more balanced in terms of content and form tended to do poorly in both dimensions.

The observed form/content relationships could reflect limitations in processing capacity. Results from both studies suggest that many school-age children with SLI do not succeed in selecting, deploying, and coordinating with equal proficiency all of the schemes needed to tell a story. One could argue that it is logically possible to view the findings on accurate use of grammatical forms and elaboration of narrative content as independent facts. However, given that these dissociations were robust, bidirectional, and seen more frequently in the stories of children with SLI than of age peers, it seems more likely that they are the interrelated and systematic consequences of limitations in language competence and in processing capacity.

One subgroup of children with SLI attempted to produce stories that follow conventional story schema, show clear plot development, and present some interest for the listener. These goals require a high degree of planfulness as the narrator must hold diverse general schemes

in mind while producing utterances, constantly moving between global and sentential levels. This focus on content also invites more complex syntax (i.e., coordination, subordination, sentential complements), as children strive to explain the relationships between events and their consequences. From a processing perspective, the joint demands of planful use of general content schemes and production of complex syntax over multiple utterances may have exceeded some children's capacity, leaving them without sufficient resources to be fully grammatical. Given that inadequate control of English morphology has frequently been reported for atypical groups (Chapman, Seung, Schwartz, & Kay-Raining Bird, 1998; Johnston & Schery, 1976; Roberts, Rice, & Tager-Flusberg, 2004), it is not surprising to find that this reduction is particularly, though not uniquely, manifest in the morphological system. The high processing demands of narrative production can apparently lead to costs with diverse manifestations, including increased frequency of mazes (e.g., MacLachlan & Chapman, 1988), of sound effects (Botting, 2002), or of grammatical errors (e.g., Fey, et al., 2004; Gillam & Johnston, 1992; Thordardottir, 2008).

The second subgroup of children with SLI produced minimal and unembellished narratives, more akin to a description or a simple chaining of events, lacking a complete plot structure, and with little evidence of any global planning. Such narratives tended to be shorter, less syntactically complex—and grammatical. A story that is low in content but highly grammatical could indicate a “grammaticality above all” prioritization by the child. Alternatively, it could be merely the unintended by-product of impoverished narrative schemes, with relatively more resources available to produce grammatically correct utterances due to a lack of investment in the early stages of narrative production. We prefer the latter explanation because the first one would entail an oddly dysfunctional attention to form at the expense of content, and would run counter to what is known about the priorities of young speakers (R. Brown, 1973).

This process-oriented explanation of our data is not meant to rule out the influence of development and learning. A child's processing capacity is determined to an important degree by prior knowledge and the availability of task-specific routines (Kail & Bisanz, 1982). As new material is acquired and mastered, functional capacity will change. By definition, the children in the TD group had more language knowledge, more language experience, and hence greater mastery of familiar language schemes—at least some of which were likely to aid in storytelling. The availability and low cost of these language schemes translated directly into increased capacity and the more balanced performance by the typically developing children for this task. When resources are adequate for the task, choices made in one aspect of narrative will not constrain options elsewhere, and the story can evenly reflect the child's developmental level.

We have argued thus far that the two imbalanced narrative profiles reflect the adequacy of processing capacity as a function of the mismatch between the child's resources and the requirements of the task. Data from training studies could further validate this process-oriented explanation. Children whose initial stories were relatively free of error should begin to make grammatical errors as they progress through a narrative intervention program that boosts both narrative content and syntactic complexity. This view that grammatical *errors* can be symptoms of *progress* elsewhere in the language system is supported by recent reports that preschoolers who are in the midst of developing their grammatical abilities show a higher incidence of disruption (i.e., repetitions, fillers, pauses, revisions) when they are producing utterances that are “at the most advanced or ‘leading edge’” of their syntactic abilities (Rispoli & Hadley, 2001, p. 1140). It is also supported by longitudinal data reported by Fey and his collaborators (2004) from stories produced by a combined group of children with typically developing language and children with language impairments. These researchers found that, between grades 2 and 4, children's stories increased in length,

quality, and syntactic complexity, whereas the grammatical accuracy of utterances declined by a significant, albeit small, degree.

Further research could investigate the developmental course of these patterns of narrative dissociation, as well as the extent to which the specific form/content profiles are genre-specific, reflect characteristics of given stories, or correspond to more immutable facts about subgroups of children with SLI. Studies that looked at the conceptual requirements of narrative—the child’s understanding of cause, temporal order, and human motivation—and their influence on grammaticality or syntactic complexity would also be valuable. Finally, although narrative deficiencies are the product of the total cost of deploying knowledge and operational schemes at all phases of speech production, research is needed to determine whether certain schemes (e.g., lexical access, sentence frames, global text structure) are more amenable to therapy than others.

Clinical Implications

The follow-up analyses of scores from the Test of Narrative Language revealed that, beyond their generally low scores, most children with language impairments also exhibited pronounced difficulties in either grammatical accuracy or content. These results were confirmed by more in-depth linguistic and discourse analyses. One practical outgrowth of this project is that clinicians could complement the standardized scoring procedure of the TNL with calculation of the RSF-TNL as an indicator of whether particular children might fall into one of these zones of imbalance. Using the TNL in this fashion should, of course, be done conservatively. One could essentially use the RSF-TNL as a signpost, then see whether this matched the overall impression from listening to the stories, and complement with other data to further validate these results.

All things considered, data from this project present a picture of narrative production that can be reasonably explained within a processing framework. From this perspective, one of the most interesting findings also leads to an intriguing possible application. The children with SLI who produced stories with imbalanced form/content profiles split almost equally into the two unbalanced categories. Despite the fact that one subgroup is stronger in grammatical accuracy and the other in content, it seems likely that children in both subgroups would benefit from therapy activities that focused on narrative content and the syntax it requires. These activities would be geared towards helping children learn and/or practice: (1) how to develop stories with a plot structure based on causally (physical and psychological) and temporally linked episodes; as well as (2) the syntax needed to express these ideas, such as coordination, subordination, and sentential complements.

Our thinking is as follows. Children in the low form subgroup seem to have at least some of the basic narrative and syntactic structures available. Their stories are not at age-level, but these children are clearly working with scripts and story grammars, and have some sense for the art of storytelling. The therapist’s role as the children continue to advance in narrative ability is to provide graded practice activities that will help them use their narrative structures and the accompanying syntax with increased efficiency and ease, thereby freeing up resources and reducing grammatical error.

The low content profile can be explained in two quite different ways. First, children may tell minimal stories in order to avoid communicative breakdowns. Experience may have taught them that creating fictional stories is difficult and that they are likely to run into sentence formulation difficulties, as they must coordinate form and content at many levels in the service of telling an adequate story. To avoid struggling with online sentence production and the unavoidable lapses in grammaticality, they essentially do not even try to tell a story although they know enough of the basic narrative frameworks to do so. This situation may

be especially likely to occur in the school or in a therapy setting where the child has worked on grammatical targets in the past. To explore this possibility, the clinician could elicit narratives with familiar content, such as personal event narratives or a favorite movie, and see whether content properties of the narratives now improve. If so, the original low content score may point to poor self-confidence rather than gaps in language knowledge and skill.

An alternate interpretation would be that children in the low content group have few of the basic narrative structures available, and hence are in some absolute sense unable to tell a story. Their difficulties could also stem from limited syntactic abilities, which could constrain narrative production. If so, the therapist's role would be to design activities that will help such a child learn the components of a story and their order, build general event schemes, and formulate complex sentences. Note that by this account, both the low form and the low content subgroups would need therapy targets in the area of content as well as syntax—one group in mastering their structures, the other group in acquiring them. While this therapy may in the short run lead to decreased grammaticality (Fey, et al., 2004), the value of narrative as a bridge to the development of later language and literacy skills is worth the cost (Botting, et al., 2001; Stothard, et al., 1998; Westby, 1999).

Conclusion

The literature on children's fictional narratives has repeatedly shown that children with language impairments tell stories that are weak in many respects. In most of the prior work, however, researchers have not compared the extent of deficiencies in content and form relative to each other, nor have they considered the performance of individual children. The studies reported here employed both of these design features and were thus able to provide a new view of the stories created by children—a view that informs our understanding of specific language impairment and of the demands of narrative production.

This study explicitly compared relative proficiencies in the elaboration of narrative content and the accurate use of grammatical forms. As predicted, we found that many children with SLI exhibited patterns of dissociation of two sorts. One subgroup of children showed relative strengths in content coupled with weakness in accuracy of form, as has been described by prior researchers (Fey, et al., 2004; Gillam & Johnston, 1992; Liles, Duffy, Merritt, & Purcell, 1995; Scott & Windsor, 2000). The second subgroup of children has been less noticed, perhaps because they make fewer grammatical errors. Their grammaticality, however, is accompanied by poor narrative content and reduced syntactic complexity. They seem either to be children who “play it safe,” creating more simplistic stories with incomplete episodes, or children who do not have the ability or experience that would enable them to produce content-rich stories.

This study also adds to the small, but growing, body of literature that suggests that the absence of grammatical errors may not always be an indication of strength, nor the presence of such errors an indication of grammatical difficulty (Owen, 2010; Thordardottir, 2008). Once the basic forms have been acquired, their successful deployment will depend on the total processing load of particular communication tasks. Finally, the results of this investigation should encourage researchers and clinicians alike to consider individual differences among children with SLI, with respect to content, grammatical accuracy, and syntactic complexity in narrative production tasks.

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Appendix

Examples of *Aliens* stories

Story 1

Minimal narrative produced by a child with SLI (age 8;6). It lacks plot development but contains very few grammatical errors. This child obtained the following scores based on the *Late for school* and *Aliens* stories combined: *RSF-TNL* = .76; *RSF-LSM* = .71; story elements = 15; mean errors per C-unit = 0.25; clausal density = 1.25.

One (s*) Saturday (um Daniel no) Mark and Daniel went for a walk.

And (they) there was a spaceship (on) on the ground.

And (then here they're th* they) then (they went) they came and saw the (s* um) aliens.

And they had six legs.

And the dog was alien.

And there [sic] were pretty funny.

Story 2

An original and interesting story with many grammatical errors produced by a child with SLI (age 9;0). Scores based on the *Late for school* and *Aliens* stories combined: *RSF-TNL* = .11; *RSF-LSM* = .12; Story elements = 35; mean errors per C-unit = 0.91; clausal density = 1.59.

Once upon a time (there is) there is a brother and sister.

The brother's name was (um) John.

(And the other) and the sister was named Mary.

(And) and (when they) when they want to go to the park, they saw an alien (um) ship.

(They try) they hide.

(Then) (hhmm) and Mary didn't want to hide.

He wanted to look at the aliens.

(And) and (this) this little girl (um) had an alien dog.

(And and the family) one day (the f* the f* hhmm which um um) Mary wanted to go near them.

(And and) and John tries to stop her.

(But) but she couldn't.

(And and) and when she was there, the aliens (skir* s* um) scared her.

And (she) she hided right under the bushes.

And then the aliens said "Where did she go".

"Where (d*) did she go"? And then (one day) one day the brother stand up called John.

(he) he ran up (to) to the alien and then said "Go back to the ship".

And then they did and forgot (the) the alien dog.

And the alien dog ran as fast as (I) he can right in this ship.

And then the aliens (righ*) go right out of the planet.

(And then) and then (they) they have fun again.

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Table 1

Demographic Data Standard Test Scores, by Group, Study 1, British Columbia Sample

	SLI (<i>n</i> = 13)			TD (<i>n</i> = 13)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Age (months)	107.9	11.9	89-125	109.8	11.2	90-128
Maternal education ^a (years)	12.3	1.9	8-16	12.7	1.2	12-16
TONI-3	98.3	10.1	84-113	109.6	9.6	92-125
CELF-3, Formulated Sentences	4.7	1.4	3-7	10.6	2.0	8-14
CELF-3, Recalling Sentences	4.3	1.2	3-7	12.1	2.4	9-17
TNL, Oral Narration	6.2	2.2	3-10	11.4	1.5	9-14
TNL, Narrative Comprehension	8.2	2.7	2-13	12.0	1.5	10-15
TNL, NLAI	83.2	13.4	58-103	110.2	6.3	97-121

Note. Maternal education corresponds to number of years of schooling. TONI-3 = Test of Nonverbal Intelligence 3 (L. Brown, et al., 1997); mean quotient 100, standard deviation 15. CELF-3 = Clinical Evaluation of Language Fundamentals 3 (Semel, et al., 1995); Formulated Sentences and Recalling Sentences, mean standard score 10, standard deviation 3. TNL = Test of Narrative Language (Gillam & Pearson, 2004); Oral Narration and Narrative Comprehension, mean standard score 10, standard deviation 3; NLAI = Narrative Language Ability Index, mean standard 100, standard deviation 15.

^a Maternal education data missing for child in each group.

Table 2

Narrative Scores and Relative Strength of Form Index (RSF-TNL) for Study 1, by Sample and by Group

	British Columbia sample						Texas/Kansas sample					
	SLI (<i>n</i> = 13)			TD (<i>n</i> = 13)			SLI (<i>n</i> = 20)			TD (<i>n</i> = 20)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Form score	3.0	2.0	0-6	6.2	2.2	2-9	4.6	3.1	0-9	8.2	1.3	6-10
Content score	4.3	2.6	1.9-8.2	7.9	0.9	6.3-9.3	4.0	1.9	.7-7.1	7.3	1.2	4.8-8.7
RSF-TNL index	.39	.23	.00-.76	.43	.09	.24-.55	.48	.27	.00-.90	.53	.05	.45-.66

Note. Narrative form and narrative content scores derived from items of the Test of Narrative Language (TNL), maximum 10.
RSF-TNL = narrative form score / (narrative form score + narrative content score).

Table 3

Number of Children with Low, High, and Balanced Proficiency in the Accurate Use of Grammatical Forms Relative to the Strength of their Narrative Content, by Group and by Study

Study 1: Relative strength of form index (RSF-TNL)			
	Low	Balanced	High
British Columbia sample			
SLI	7	3	3
TD	5	8	0
Texas/Kansas sample			
SLI	9	3	8
TD	0	18	2
Study 2: Relative strength of form index (RSF-LSM)			
	Low	Balanced	High
SLI	12	12	9
TD	3	23	7

Note. RSF-TNL = Relative strength of form index derived from the Test of Narrative Language.

RSF-LSM = Relative strength of form index derived from language sample measures.

Table 4

Ages and Standard Test Scores, by Group, Study 1, Texas/Kansas Sample

	SLI (<i>n</i> = 20)			TD (<i>n</i> = 20)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Age (months)	89.8	7.8	73-104	89.4	8.5	74-107
TNL, Oral Narration	7.2	1.6	4-10	12.7	2.0	9-18
TNL, Narrative Comprehension	6.5	2.5	2-10	11.3	2.4	8-15
TNL, NLAI	81.0	10.5	64-97	111.9	10.9	97-139
TOLD-P:3, Spoken Language	73.8	3.9	65-78	--	--	--
TOLD-P:3, Syntax	71.4	7.4	59-87	--	--	--
TOLD-P:3, Semantics	79.5	8.0	68-96	--	--	--

Note. TNL = Test of Narrative Language (Gillam & Pearson, 2004); Oral Narration and Narrative Comprehension, mean standard score 10, standard deviation 3; NLAI = Narrative Language Ability Index, mean standard score 100, standard deviation 15. TOLD-P:3 = Test of Language Development-Primary 3 (Newcomer & Hammill, 1997). All quotients have a mean of 100 and a standard deviation of 15. Composite scores result by combining the six core subtests according to different dimensions. Spoken Language: Picture Vocabulary (PV) + Relational Vocabulary (RV) + Oral Vocabulary (OV) + Grammatical Understanding (GU) + Sentence Imitation (SI) + Grammatical Completion (GC); Semantics: PV + RV + OV; Syntax: GU + SI + GC. Only the children in the SLI group completed the TOLD-P:3.

Table 5

Measures of Story Length, Content Elaboration, Form Accuracy, Relative Strength of Form, Utterance Length, and Syntactic Complexity, Study 2 (samples combined)

	SLI (<i>n</i> = 33)			TD (<i>n</i> = 33)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
C-units	20.9	10.0	8-45	31.3	13.0	15-72
Story elements	17.7	9.5	7-46	33.6	12.2	15-64
Errors per C-unit	0.65	0.42	.20-1.85	0.16	0.10	0.00-0.37
RSF-LSM index	.49	.24	.09-.95	.52	.11	.36-.81
MLCU-w	6.4	1.2	4.8-9.8	8.3	1.3	5.4-11.9
Clausal density	1.32	0.25	0.89-1.92	1.72	0.25	1.28-2.35

Note. RSF-LSM = form accuracy rank / (form accuracy rank + content elaboration rank); ranks based on language sample measures (LSM), errors per C-Unit (form) and story elements (content).

MLCU-w = mean length of C-unit in words. Clausal density = clauses per C-units.