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DEVELOPMENTAL CHANGES IN NARRATIVE AND NON-NARRATIVE DISCOURSE IN CHILDREN WITH AND WITHOUT BRAIN INJURY

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This study presents a set of narrative and non-narrative tasks and analytic procedures for examining the discourse development of children with perinatal brain injury and typically developing children. Three oral discourse genres were collected at ages 5, 6, and 7: script, picture description, and replica play narration. Genre performances were assessed for the presence of hypothesized genre features. Results suggest these tasks and procedures are able to characterize development in discourse abilities for both a normative group and for children with perinatal brain injury. The group of children with brain injury produced shorter discourse performances with more off-task talk. This group also showed difficulty in fully differentiating the various genre types and in creating integrated discourse performances. However, most of these children demonstrated considerable growth in control of genre features over this time period. The possible utility of these tasks and procedures for clinical assessment is discussed.

INTRODUCTION

Clinical assessment of language competence has focused increasingly on children's ability to produce extended discourse, rather than isolated sentences or particular syntactic or lexical items. Production of extended dis-

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course reflects the development of skill in three major, interrelated domains: 1) the ability to construct different frames of reference (here-and-now speech vs. speech concerned with non-present events) and to mark shifts between these frames; 2) the ability, at both a global and a clause by clause level to differentiate among different discourse types or *genres*, such as the generalized, impersonal world of a script or the specific, and highly evaluated world of a story; and 3) the ability to construct integrated performances, employing genre-appropriate cohesive devices (anaphora; anchor tenses; connectives and sequencers) and macrostructures (e.g., conventional story-form) to link networks of clauses into larger units.

This theoretical construction of the components of discourse competence demands that we include a range of discourse genres in our assessments, and that we sample genres which contrast with each other in critical dimensions. In addition, for assessment to be meaningful, it is important to sample genres which have relevance for academic and social functioning. Clinically, the use of multiple genres permits the identification of specific features in each genre which pose a challenge for a particular child and which, therefore, can be targeted for intervention.

Narrative is prominent among the forms of discourse that develop in preschool and school-age children. Narrative competence has multiple consequences for children's socio-emotional and academic success. Personal narratives constitute, for example, a major form for sharing internal experiences which support the continued development of emotional attachment and peer relationships (Miller, et al., 1992; Stern, 1985; Wolf, 1993). In addition, narrative provides the context for the acquisition of many of the forms of discourse organization (e.g., anaphoric reference, thematic coherence) that are critical for the full development of literacy (Bruner, 1990; Feagans and Appelbaum, 1986; Wells, 1987). Narrative skills have been shown to have particular relevance for the clinical assessment of children with language disorders: in predicting school outcomes, particularly in reading comprehension (Feagans and Appelbaum, 1986; Feagans and Short, 1984); in distinguishing transient from persistent language impairment (Bishop and Edmundson, 1987); and in differentiating the clinical populations of children with language-impairment (Liles, 1985; Merritt and Liles, 1989), learning disabilities (Fine, 1985; Ripich and Griffith, 1988; Roth, 1986), mild mental retardation (Hemphill, Picardi, and Tager-Flusberg, 1991; Hemphill, Wolf and Camp, 1991), and brain injury (Dennis and Lovett, 1990). Given the complex skills required for narrative production, analysis of narrative discourse can be an important methodological tool for detecting both gross and very subtle language difficulties and for assessing discourse development in populations with developmental disorders.

Approaches to assessing narrative abilities in these populations have not, however, been completely satisfactory. Assessments have typically relied on

the use of single tasks (e.g., personal narrative or wordless picture book narration) and have utilized a narrow range of outcome measures, most often indices of cohesion or of story grammar elements. In addition, since the analysis procedures used in assessing narrative abilities are often cumbersome and require much specialized training, they have not been widely adopted for use in clinical assessment.

This paper presents a tool for assessing extended discourse abilities in both typically developing and developmentally delayed children. It includes 1) a set of tasks for eliciting different narrative and non-narrative genres: script, picture description, and replica play; and 2) analytic procedures for identifying the presence of expected features for each of these discourse genres.

The rationale for using multiple narrative and non-narrative genres reflects both theoretical and clinical perspectives. Our procedure uses three genres that differ in general characteristics and in features that create integrated productions. *Scripts* are one of the earliest acquired forms of extended discourse, reflecting the child's ability to report general event knowledge on familiar social themes. By the age of three, most children have mastered the essential elements of script, although scripts become more elaborate with age (Fivush and Slackman, 1986). Scripts represent impersonal, highly generalized sequences of actions that by their nature require minimal evaluation (Hudson and Shapiro, 1991). *Picture descriptions*, like scripts, are impersonal but require the speaker to construct specific introductions of relevant characters and objects and to impose a hierarchical organization from general to more specific types of information (DeTemple, Wu, and Snow, 1991). *Replica play narratives* represent personalized and highly specific sequences of actions, typically requiring evaluation of characters and events (Wolf, 1993; Wolf, Rygh, and Altschuler, 1984).

This paper has three major goals. The first goal is to explore the usefulness of these tasks and analytic procedures for characterizing growth, both in a normative population and in children with brain injury, a population considered at risk for language delays. Studies on the language development of brain injured children have typically reported initial delays in the onset of vocabulary and syntactic skills (Feldman et al., 1992; Marchman, Miller, and Bates, 1991). These initial delays tend to be followed, in some types of brain injury, by early recovery of lexical and syntactic skills by 2 to 3 years of age (Feldman et al., 1992), but recovery of basic language skills does not preclude later language difficulties particularly in the production of extended discourse (Dennis and Barnes, 1988). This is supported by the finding that some types of early brain injury lead to slower rates of language acquisition with increasing age, so that children are less able over time to make age-appropriate progress in language skills (Dennis, et al., 1987). Although researchers have begun to examine the narratives of children with brain

injury (Dennis and Lovett, 1990; Jordan et al., 1991), none of these studies has assessed discourse development over time.

A second goal of this paper is to explore how successfully this procedure differentiates the extended discourse abilities of children with brain injury and typically developing children. Studies comparing narrative production in children with and without brain injury have shown contradictory results. Some studies have found no differences between the narrative performance of brain injured and normative populations (Jordan, Murdoch, and Buttsworth, 1991), while others have identified important differences between these populations (Dennis and Lovett, 1990; Lovett, Dennis, and Newman, 1986; Newman, Lovett, and Dennis, 1986) including problems with reference and managing narrative macrostructures.

The third major goal of this paper is to better characterize the nature of discourse problems and achievements in children with brain injury. There is limited evidence that this population may display problems with using pronouns and other forms of reference to link clauses and utterances into larger discourse units (Lovett, Dennis, and Newman, 1986; Newman, Lovett, and Dennis, 1986). There is also case study support for the existence of problems with managing narrative macrostructures and with evaluating the narrative information reported (Dennis, 1980). This paper will attempt to expand these findings by assessing a broader range of discourse competencies for a number of narrative and non-narrative genres.

METHOD

Subjects

All of the subjects in the study were working class or middle class Caucasian children, who participated in assessments of discourse abilities when they were 5, 6, and 7 years of age. We required three observations per child in order to meet the requirements for growth modelling, a technique for characterizing change over time. The two subgroups of subjects, the normative group and the group with brain injury, were recruited from urban and suburban communities in the Northeast.

Normative Sample. The 43 children in this group consisted of all children from a larger sample of 52 Boston area children who were assessed at ages 5, 6, and 7 years of age. The larger group is balanced in terms of sex distribution and socioeconomic status, and has been followed in a longitudinal study since birth (Dale, et al., 1989). Table 1 describes the sample in terms of sex and social class. From all indications, these children were developing normally. They met major language milestones at expected ages during the toddler-preschool period. They were all in the appropriate grade

Table 1. Gender and SES of the Children with (n = 6) and without (n = 43) Brain Injury

	Brain injured	Normative Sample
Sex	5 male	21 male
	1 female	22 female
SES	4 middle class	25 middle class
	2 working class	19 working class

for age and none received special services at school. Children in the normative group were assessed in their homes, with a parent present.

Sample of Children with Brain Injury. Six children were selected from a larger group of 66 children in the Pittsburgh area who were referred to the project by child neurologists or neonatalogists. All children shared the diagnosis of a non-progressive brain injury incurred in the antepartum or neonatal period that had been documented on a modern neural imaging study. Children were excluded from the project if they had experienced congenital virus infection, maternal drug abuse, bacterial meningitis, encephalitis, or congenital abnormalities. To increase the homogeneity of subjects for this study, we restricted the sample to children with bilateral injury to the deep periventricular white matter. Of the six children with this diagnosis, four also developed spastic cerebral palsy, a common sequela of this type of brain injury.

All six bilateral brain injury subjects had intelligible speech and cognitive skills in the borderline to normal range (x = 98.7, range 77 to 122) on the General Cognitive Index (GCI) of the McCarthy Scales of Children's Abilities (McCarthy, 1972). Five of the children had been followed longitudinally since the age of two, and they had achieved basic language milestones at ages comparable to children without brain injury (Feldman, Holland & Wareham 1991; Feldman, et al., this volume). Table 1 shows the sex and social class distribution of the children with brain injury. The group with brain injury was assessed in a clinic setting at the Children's Hospital of Pittsburgh by the same investigators that had evaluated the children throughout the toddler-preschool years. Table 2 includes the 3 letter code name of each subject in the brain injured group that identifies the child in the CHILDES data base (MacWhinney, 1992) together with details of their neurological status and cognitive functioning.

Procedures

Tasks. Three different tasks were presented to each child at each age to elicit different genres: scripts, picture descriptions, and replica play narra-

Table 2. Clinical History, Neurological Characteristics and General Cognitive Index (GCI) Scores on Children with Brain Injury ($n = 6$)

Name	Clinical history	Neurological examination	Brain injury	GCI
CAL	Asphyxia Neonatal seizures	Normal	Bilateral echodensities on US	87
FRI	Fetal distress Prematurity Respiratory distress	Normal	Bilateral white matter attenuation on CT	102
YUC	Fetal distress Possible placental abruption Prematurity Respiratory distress	Spastic quadriparesis, independent ambulation	Bilateral white matter abnormality on MRI	122
YUR	Fetal distress Persistent pulmonary hypertension of the newborn	Spastic triparesis, independent ambulation	Bilateral white matter abnormality on MRI	105
CES	Extreme prematurity Respiratory distress	Spastic quadriparesis, limited ambulation with walker	Bilateral echodensities on US	99
COS	Prematurity Respiratory distress	Spastic quadriparesis, limited ambulation with walker	Bilateral white matter attenuation on CT	77

Abbreviations: CT—Computerized Tomography; MRI—Magnetic Resonance Imaging; US—Ultrasound; GCI—General cognitive index on McCarthy Scales of Children's Abilities, obtained at five years old.

tives. For all tasks, the experimenter set up the task, introduced the requirements, and elicited talk until the child concluded the task. If the child could not initiate the task, the experimenter offered an introduction, for example with the script task saying, "When I go to McDonald's the first thing I do is drive there. What happens when you go to a fast food place?" All of the tasks were videotaped for subsequent transcription.

SCRIPTS: The experimenter showed the child a set of objects related to one of three activities: taking a bath, going to the doctor, or visiting a fast food restaurant. Introduction of the items was used to ensure that the child was familiar with the activity and knew appropriate vocabulary for describing it. The experimenter then asked the child to tell what happens during that activity.

PICTURE DESCRIPTION: The experimenter presented the child with a picture of a complex scene such as a playground, kitchen, or circus. The child had full view of the picture but the experimenter could not simultaneously

ee it. The experimenter asked the child to describe the picture, and tell what it was about since the experimenter was unable to see it.

REPLICA PLAY: The experimenter presented the child with a set of play animals and related props, first labeling them to ensure that the child was familiar with the names for all of the central characters and objects. Then she provided a story prompt involving verbal conflict among the animals. The experimenter then asked the child to tell the rest of the story.

Transcription. Trained research assistants transcribed the videotapes following the conventions of the CHILDES system (MacWhinney, 1992). The transcription included talk by the experimenter as well as by the child. All talk beginning with the initiation of each task was transcribed, to show the child's ability to mark moves into and out of genre talk and to manage interruptions in the genre performances. A second research assistant reviewed all transcripts for accuracy of transcription and use of CHILDES transcription conventions.

Analytic Procedures and Measures. We developed a coding system to identify talk within the task that was specifically related to the genre being elicited. Each utterance was coded as either belonging to the genre demanded by the task (e.g., picture description) or to some other form of discourse, most often conversation. These codes were included on a coding tier. A second coder independently scored 20 percent of the transcripts for utterance type, yielding an agreement statistic (Cohen's *kappa*) of .92. The automated analysis capabilities of CHILDES were used to generate two measures for each task at each age: 1) total number of utterances within the task and 2) total number of genre-related utterances.

To assess the quality of genre production across ages and across groups, we created checklists of potential features within each genre. The Boston research team developed the lists of genre features from transcripts of 7 year olds in the normative sample that were globally rated as "excellent". These transcripts were inspected for hypothesized genre features, reflecting our theoretical framework of domains of discourse competence. Twelve features for script, 10 for picture description, and 17 for replica play, were identified in the transcripts of the most skilled 7 year olds in the normative group. These genre checklists, with definitions or examples of each feature, are shown in the Appendix.

Checklists were then used to assess all the transcripts in the two groups. A score of 0 for a feature indicated that it was not present in the child's performance, and a score of 2 indicated that the feature was fully present. A score of 1 was possible on some features to indicate partial presence or inconsistent usage. Genre total scores were also created, showing the sum of the individual feature scores for all the features in that genre.

Data Analysis

Discourse Production. To compare the total number of utterances at each age in the two groups, we performed two-tailed t-tests. In addition, we calculated genre-appropriate utterances as a proportion of total utterances, and used two-tailed t-tests to compare the total number of genre-appropriate utterances for each group.

Genre Totals. To compare the groups on genre total scores, we used two-tailed t-tests at each age.

Genre Feature Acquisition. To compare the groups on order and timing of acquisition of particular genre features we calculated the proportion of children in each group who scored 2 on each item at each age.

Individual Growth Curves. In order to characterize changes in the quality of genre production over time and to explore individual differences in patterns of growth, we estimated fitted growth curves for the total checklist scores for each genre type for each child. Our procedures followed a growth modeling perspective (Willet, 1988; 1989; 1990). Checklist scores were plotted (y-axis) as a function of the child's age in years (x-axis). Visual inspection of the resulting growth trajectories suggested that linear growth models were appropriate for these scores. A regression line for each child and each genre was fitted to the actual data. The advantages of this growth modeling perspective is that a fitted growth curve, representing the summary of the pattern of change over time, has an error term that is actually less than the error terms of the individual data points. In addition, the curves can be visually inspected for patterns of individual rather than group growth. Finally, the growth modelling perspective allows us to generate means and standard deviations for the rate of change as well as for expected values at each age. These values can potentially be used in clinical assessments using similar procedures.

RESULTS

Discourse Production

A very basic index of discourse competency is the amount of talk produced. Table 3 shows the mean number of utterances produced by children in the two groups, for each task: script, picture description, and replica play, at ages 5, 6, and 7.

Across the three tasks, children with brain injury generally produced fewer utterances than children in the normative group. Differences between the group production means were statistically significant for script at ages 6 and 7 ($p \leq .001$) and for picture description at ages 5 ($p \leq .01$) and 6 ($p \leq .001$).

Table 3. Mean Number of Total Utterances and Proportion of Genre Appropriate Utterances for Children with and without Brain Injury

	Script					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	10.83	15.70	10.67	23.40[a]	7.50	17.56
SD	5.04	9.10	4.97	12.98	4.37	11.31
% genre appropriate	.55	.89	.66	.91	.82	.95
	Picture Description					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	8.00	14.63[b]	9.17	17.37[b]	8.80	14.35
SD	4.20	10.19	2.79	15.48	4.27	9.56
% genre appropriate	.52	.94	.64	.97	.84	.93
	Replica Play					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	62.33	60.52	49.17	85.76	50.67	72.52
SD	49.54	53.97	35.72	64.90	44.74	50.03
% genre appropriate	.51	.85	.70	.88	.66	.94

[a] $p < .001$
[b] $p < .01$
[c] $p < .05$

No statistically significant differences were noted in replica play. In addition, the mean number of utterances within each task generally increased with age for the normative group, but remained at about the same level across the three ages for the group of children with brain injury.

Not all the talk produced in response to a particular discourse prompt (e.g., "Describe the scene in this picture") belonged to the intended genre. Children asked questions of the experimenter, talked about unrelated topics of their own, or discussed task demands (e.g., "Do I have to say more than that?"). As Table 3 shows, non-genre talk was far more common for the children with brain injury than for the normative children. For the group with brain injury at age 5, there was a group mean of only 55 percent genre-appropriate utterances in the script task, 52 percent in the picture description

Table 4. Mean Number of Genre Appropriate Utterances across Genres for Children with and without Brain Injury

	Script					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	6.00	14.00[a]	7.00	21.40[b]	6.17	16.60[b]
SD	3.58	7.64	4.47	12.65	1.72	10.40
	Picture Description					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	4.17	13.70[b]	5.83	16.81[b]	7.40	13.40
SD	3.06	9.87	1.47	15.27	4.04	8.70
	Replica Play					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	31.50	51.17	34.33[c]	75.15	33.67	68.38
SD	29.02	49.08	21.87	56.87	25.17	48.40

[a] $p < .05$
[b] $p < .001$
[c] $p < .01$

task, and 51 percent in the replica play task. In contrast, the corresponding group means at 5 for the normative group were 89 percent genre-appropriate utterances in script, 94 percent in picture description, and 85 percent in replica play. These differences reflect greater difficulty for the children with brain injury in maintaining a consistent focus on the intended genre and in producing a unified discourse performance.

The proportion of genre-appropriate utterances generally increased with age, particularly for the children with brain injury. By age 7, the mean proportions of genre-appropriate utterances for the group with brain injury were 82 percent for script, 84 percent for picture description, and 66 percent for replica play. The corresponding mean proportions for the normative group at 7 years were 95 percent, 93 percent, and 94 percent. Thus, although the children with brain injury did not produce longer discourses at 6 or 7 than they had at 5, their discourses became more genre-appropriate with increasing age. Table 4 shows group means for number of genre-appropriate utterances for the two groups at age 5, 6, and 7.

Children with brain injury had consistently lower means than the norma-

Table 5. Mean of Genre Feature Total Scores for Children with and without Brain Injury

	Script					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	16.17	18.91[a]	17.67	17.79	18.50	19.40
SD	3.60	2.86	2.66	4.13	1.76	2.90
	Picture Description					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	8.17	14.65[b]	9.50	16.16[b]	13.80	16.12
SD	2.71	2.22	2.17	2.53	5.40	2.26
	Replica Play					
	5		6		7	
	BI	N	BI	N	BI	N
Mean	5.00	12.48[c]	9.50	16.02[c]	14.67	16.45
SD	4.86	6.33	6.28	5.57	4.89	5.05

[a] $p < .05$
[b] $p < .001$
[c] $p < .01$

tive group for genre-appropriate utterances at ages 5, 6, and 7. Differences between the group means were statistically significant at ages 5, 6, and 7 for script, at ages 5 and 6 for picture description, and at age 6 for replica play.

Genre Totals

While group contrasts are evident in the amount and general type of talk produced (genre-appropriate or non-genre), these contrasts provide only a very general picture of discourse competence. Total scores on the genre feature assessments, which reflect both the number of genre features present in each performance and the degree to which these features were satisfactorily achieved, provide a more detailed picture of group and developmental differences. Table 5 shows the means, ranges, and standard deviations for the genre feature total scores for each group at 5, 6, and 7.

For script, children with brain injury only show lower mean scores than the normative group at age 5 ($t = -2.13$, $p \leq .05$). Children in the normative

group show little developmental change in their total scores on this task, reflecting their mastery of most genre features at age 5; children with brain injury show modest increments from 5 to 6 to 7.

For picture description, children with brain injury show much lower mean total scores than the normative group at 5 ($t = -6.52$, $p \leq .0001$) and at 6 ($t = -6.12$, $p \leq .0001$). However at 7, the mean total scores for the two groups are much closer, 13.8 for the group with brain injury, and 16.1 for the normative group. The developmental patterns are different for the two groups, with most growth in total score occurring for the group with brain injury between 6 and 7, and most growth occurring for the normative group between 5 and 6.

For replica play, children with brain injury again show much lower mean total scores than the normative group at 5 ($t = -2.77$, $p \leq .01$) and at 6 ($t = -2.64$, $p \leq .01$), but the total scores are closer for the two groups at age 7. Again the developmental paths are different for the two groups, with the normative group showing the most growth in mean total scores from 5 to 6 while the children with brain injury show increments at 6 and again at 7.

Genre Feature Acquisition

While there are clear group differences in the total number of genres features present for most tasks and time points, these contrasts reflect more specific differences in the two group's acquisition of discourse competence. Genre totals reflect general patterns of acquisition, with some features present for most children relatively early, and other features acquired relatively late, and by only a minority of children. An important issue is whether these patterns of acquisition are similar or different for the two groups of children.

One technique for contrasting genre acquisition in the two groups is to assess the percentage of children in each group who have satisfactorily displayed each genre feature at each age. Table 6 shows the proportion of children in each group achieving full credit for each script feature at 5, 6, and 7.

For script, six genre features were mastered by 75 percent or more of the children with brain injuries at 5. Four of these features distinguish script from a traditional narrative: no protagonist, a preponderance of event clauses, no dialogue, and no use of narrative evaluation elements. The other features mastered at 5 were use of an anchor tense, and avoidance of deictic reference.

At 6, 75 percent or more of the children with brain injury were also using a conventional closing signal to end their scripts and were employing sequence to order the events reported in the scripts. At 7, 75 percent or more of these children were also using definite reference (e.g., "the restaurant") for first mention of people and objects in the scripts.

Table 6. Percentage of Children Credited with Individual Script Features

Feature	Age 5		Age 6		Age 7	
	BI	N	BI	N	BI	N
Conventional opening signal		†		†		
Conventional closing signal	†	†	††	†	††	††
Sequential ordering of events	†	††	††	††	††	††
Branching constructions	†					
No protagonist	††	†	††	†	††	†
Most clauses portray events	††	††	††	††	††	††
No dialogue	††	††	††	††	††	††
No narrative-type evaluation	††	††	††	††	††	††
Anchor tense	††	††	††	††	††	††
Definite reference for first mention of people and objects	†	††	†	††	††	††
No deictic reference	††	††	††	††	†	††
Event clauses incorporate significant objects		††	†	††	†	††

† = 50–74 percent †† = 75 percent or more

Group differences are evident in the normative group's earlier mastery of sequential ordering and use of definite reference (fully credited for more than 75 percent of the normative group children at 5), and in their earlier use of event clauses incorporating significant objects (e.g., "You go into the restaurant and look at *the menu* and ask for *hamburgers* or whatever you want to eat."). More than 75 percent of the normative group were credited with use of definite reference at 5, 6, and 7, while only 50 percent of the children with brain injury were credited with it at 6 and 7 and none were at 5.

Table 7 shows the proportion of children achieving full credit for each genre feature of picture description at 5, 6, and 7.

At 5, only two picture description genre features were credited for 75 percent or more of the children with brain injury; both of these were ones that distinguish the picture description performance from a narrative: the absence of a protagonist and dialogue. In addition, 67 percent of the children with brain injury received full credit for presenting major details first, and for using an anchor tense.

At 6, a larger proportion of children with brain injury were credited with presenting major details first in their picture descriptions (83%), and more children were credited with presenting secondary details last (67%) and with using a closing signal to end their description (50%).

At 7, 60 percent of the children with brain injury received credit for having a minority of event clauses in their picture descriptions, another mark of a non-narrative performance. The other features emerging at 7 for the brain injured children were use of a general statement at the opening of the

Table 7. Percentage of Children Credited with Individual Picture Description Genre Features

Feature	Age 5		Age 6		Age 7	
	BI	N	BI	N	BI	N
General statement at opening					†	†
Major details presented first	†	††	††	††	††	††
Secondary details last or omitted		††	†	††	††	††
Closing signal		†	†	†	††	†
No protagonist	††	††	†	††		††
Minority of clauses portray events		†		††	†	††
No dialogue	††	††	††	††	††	††
Anchor tense	††	††	†	††	††	††
Indefinite reference for first mention of people and objects		††		††		†
No deictic references		††		††	†	††

† = 50–74 percent †† = 75 percent or more

picture description, and the avoidance of deictic reference (e.g., "that thing there"), both credited for 60 percent. Interestingly, more brain injured children included a protagonist at 7 years than had at the earlier ages. This can be construed as evidence that the contrast between narrative and non-narrative performance was still poorly established for some children in this group.

At age 5, seventy-five percent or more of the children in the normative group received full credit for seven picture description genre features: no protagonist, no dialogue, major details presented first, secondary details presented later, anchor tense, indefinite reference, and no deictic reference. By 6, 86 percent of the normative group also used a minority of event clauses in their picture descriptions. Finally by 7, half of the normative group was credited with beginning their picture descriptions with a general statement.

Because of the very brief nature of the picture descriptions provided by the children with brain injury, they were credited for the absence of narrative features (a protagonist, dialogue, event clauses) as well as absence of organizational features (major details first, secondary details last, anchor tense). These may not have represented conscious choices, reflecting understanding of and control of genre characteristics. For those picture description features that require *production* of particular elements (a general statement, non-deictic forms of reference, indefinite reference), fewer of the children with brain injury received full credit.

Table 8 shows the proportion of children achieving full credit for each genre feature of replica play at 5, 6, and 7.

Table 8. Percentage of Children Credited with Individual Replica Play Genre Features

Feature	Age 5		Age 6		Age 7	
	BI	N	BI	N	BI	N
Conventional closing signal		†	†	†	†	
Return to narration after interruption		†	†	†	†	††
Protagonist			†		††	
Expressions of character intentions		†		†	†	†
Direct character speech	†	††	††	††	†	††
Reported character speech						
Anchor tense		†	†	†	††	††
Narrative high point				†	†	†
Plot resolution closing					†	†
Setting information						
Character delineation		†		†	†	†
References to characters' internal states	†	†	†	†	†	††
Complex time markers				†		†
Negatives				†		
Intensifiers and delimiters				†		†
Repetition for emphasis						
No deictic references	†					

† = 50–74 percent †† = 75 percent or more

None of the genre features of replica play were credited to 75 percent or more of the children with brain injury at age 5. Three features, use of direct character speech (e.g., "Ouch, ouch!"), reference to characters' internal states (e.g., "The monkey is mad now."), and avoidance of deictic reference, were credited to 50 percent of the children with brain injury at 5.

At 6, 83 percent of the children with brain injury were credited with using direct character speech. In addition, 67 percent used an anchor tense, 60 percent were able to return to narration after an interruption (self- or other-initiated), and half constructed their replica play around a protagonist.

At 7, 75 percent or more brain injured children used an anchor tense and constructed their story around a protagonist. Less widespread features were internal state references, return to narration, direct character speech, and a conventional closing, all used by two-thirds of the children with brain injury at 7. Half of these children also were credited with expressions of character intentions, e.g., "the farmer wants the animals to be quiet", character delineation, a narrative "high point", and a resolution closing.

For the normative group, only one feature of replica play, direct character speech, was credited for more than 75 percent of the children at 5. Credited

at 5 for over half of the sample were the use of an anchor tense (for 70%), expressions of character intentions (60%), return to narration (54%), character delineation (53%), and internal state references. (50%).

At 6, direct speech remained the single feature that was fully present in the replica play narratives of 75 percent or more of the normative group. New features, emerging in the narratives of a majority of these children at 6, were use of complex time markers, use of negatives (e.g., "He couldn't catch the monkey."), and use of intensifiers and delimiters (e.g., "He was being really silly."). At 7, 75 percent or more of the children in the normative group used direct character speech, an anchor tense, references to characters' internal states, return to narration after interruption, and a narrative high point. Children in the normative group did not center their replica play narratives around a single protagonist, as most brain injured children did, but told more complex narratives involving a number of characters of equal importance to the plot.

Individual Growth Curves

These results permit the conclusion that for individual genre features, overall between-group differences combine with considerable within-group heterogeneity of performance. While the children with brain injury as a group lag behind the normative children in genre feature acquisition, individuals in the group with brain injury perform close to the level of the normative children on many of our measures. To examine individual patterns of growth, focusing on the group with brain injury, we calculated individual growth curves for the total scores on each genre. Figures 1 to 3 show individual fitted growth curves for each of the children with brain injury on script, picture description and replica play tasks. To simplify the presentation, only mean scores and scores one standard deviation above or below the mean are plotted for the normative group.

As Figure 1 shows, the slope for mean scores of the normative group on script is very modest, reflecting the fact that many children had already mastered most features of this genre by 5 years. At age 5, four of the six children with brain injury, YUR, CES, COS, and CAL, achieved genre total scores that were within or close to one standard deviation of the mean for the normative group. Two children, FRI and YUC, began more than one standard deviation below the mean for the normative group. Only FRI, however, was still lagging more than one standard deviation below the mean for the normative group at 7. The slopes for the fitted growth curves for the children with brain injury are extremely heterogeneous; some are essentially flat, some show a sharp rise in performance, and one shows an actual decline.

Figure 2 shows the fitted growth curves for genre total scores for brain injured children on the picture description task. On this task, none of the

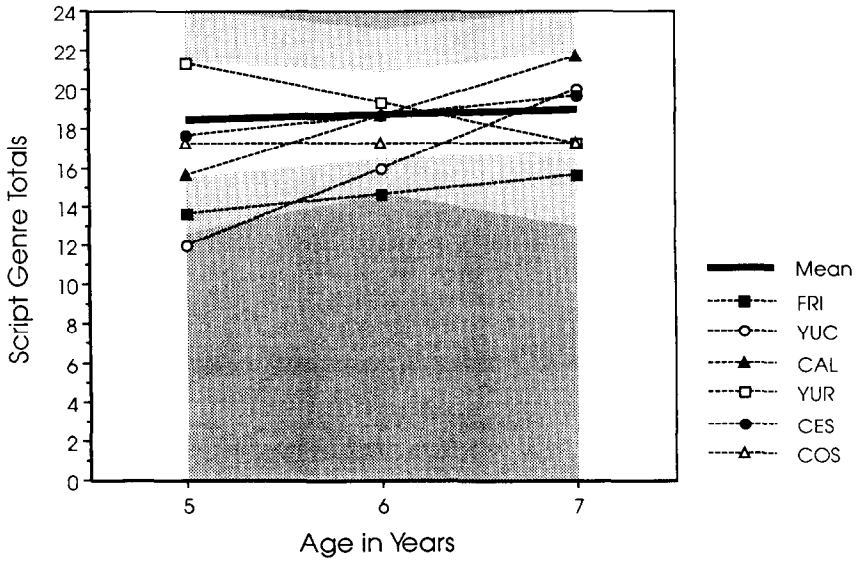

Figure 1: Fitted growth curves for children with brain injury on the script task. (Mean and background indicate outcomes for the normative sample. White denotes values $< \pm 1$ standard deviation, light gray ± 1 to 2 standard deviations and dark gray $> \pm 2$ standard deviations from the mean.)

brain injured children was within one standard deviation of the mean of the normative group at age 5 or 6. By age 7, however, three children scored within or above this range: YUC, FRI, and COS. Once again, the slopes of the fitted growth curves for the children with brain injury are very heterogeneous.

Figure 3 shows the fitted growth curves for genre total scores on the replica play task. At age 5, one brain injured child (YUC) was within one standard deviation of the mean for the normative group. By age 6, three YUC, COS, and FRI were within one standard deviation. By age 7, four of the children with brain injury were within one standard deviation of the mean for the normative group. Interestingly, the individual slopes are less heterogeneous for this task, with only two patterns evident: gradual growth, parallel to that of the normative group means, and a sharper rise.

These findings for individual fitted growth curves show substantial differences across genres, with the overall performance of the children with brain injury more nearly approaching that of the normative group in script and replica play, and lagging further behind in picture description. In addition, both initial status at 5 years and rate of growth for individuals is extremely variable across genres.

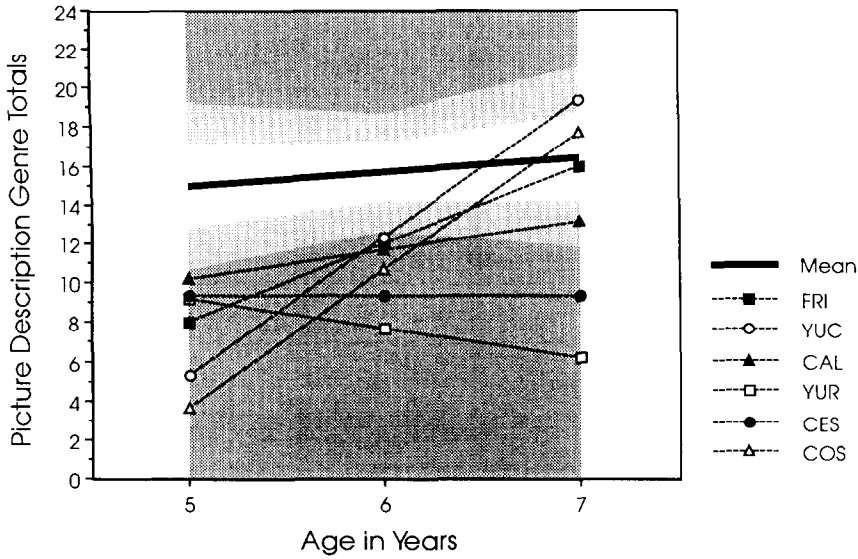

Figure 2: Fitted growth curves for children with brain injury on the picture description task. (Mean and background indicate outcomes for the normative sample. White denotes values $< \pm 1$ standard deviation, light gray ± 1 to 2 standard deviations and dark gray $> \pm 2$ standard deviations from the mean.)

DISCUSSION

These tasks and procedures have proved useful for characterizing development in this time span both for the normative group and for the group of children with brain injury. Although overall production measures were useful only for characterizing change in the normative group, the proportion of genre-appropriate talk increased in both groups. Total scores on the genre feature checklists improved in a linear fashion over time, particularly for the group of children with brain injury, who scored at lower levels initially. The genre total scores and the analysis of genre features suggests a developmental progression, with scripts mastered at 5 years by most children in the normative group, picture description largely achieved by 6, and replica play substantially achieved by 7. Some features of replica play, however, were still being acquired by the normative group at 7.

We documented the same developmental progression with some delays evident in the children with brain injury. Scripts were largely mastered by age 6. Central genre features of picture description and replica play emerged for most children in this group at 7. However, despite improvements in genre totals over time, all three genres demonstrated gaps in the achievement of selected genre features.

The combination of the tasks and the genre feature assessment was successful in differentiating the discourse performances of children with

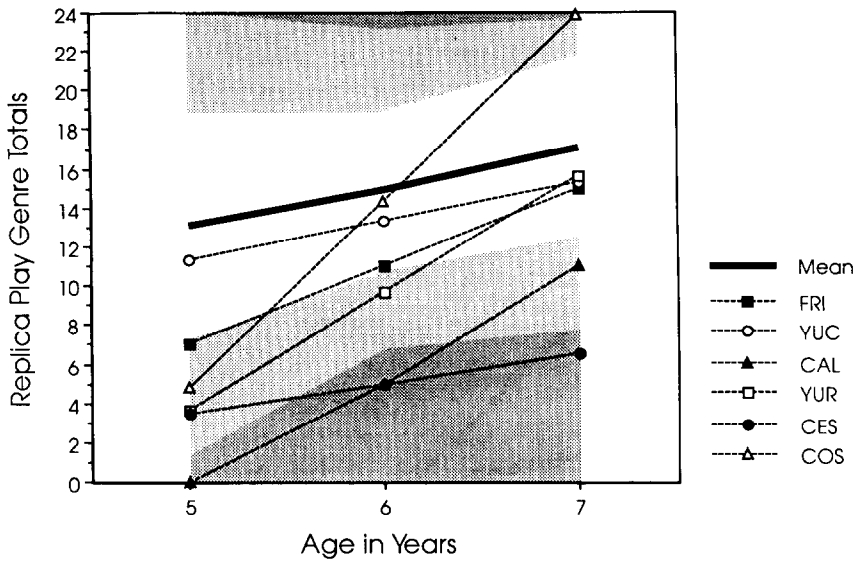

Figure 3: Fitted growth curves for children with brain injury on the replica play task. (Mean and background indicate outcomes for the normative sample. White denotes values $< \pm 1$ standard deviation, light gray ± 1 to 2 standard deviations and dark gray $> \pm 2$ standard deviations from the mean.)

brain injury and a normative group. Major group differences were evident in the amount of talk per task, the amount of talk that was genre-appropriate, and in total scores on the genre feature assessment. These results are important because they were found in brain injured children whose early course of syntactic development was largely similar to normal children and who achieved comparable scores on a syntactic production index.

These tasks and assessment procedures also proved useful for characterizing the nature and extent of discourse achievements and difficulties in children with this type of brain injury. While children with brain injury mastered essential features of the targeted genres in this 5 to 7 year old age period, they did so behind the schedule of children in the normative group. The pattern of delays in acquisition of genre features and failure to acquire specific features showed little relation to either level of cognitive functioning or to concomitant motor impairments. The child COS, for example, who has spastic quadriplegia and the lowest GCI score in the group, achieved better genre scores than individuals with no motor involvement and with higher GCIs.

Children with brain injury showed difficulty across all of the domains that we propose are important for extended discourse production. Speakers are expected to mark movements into and out of genre talk, for example shifts between conversation about things that are present in the immediate environ-

ment and narratives about past experience. The very high proportion of non-task talk in the group with brain injury, particularly at age 5 and 6, and delays in acquiring markers of the initiation and close of task talk are evidence for particular difficulty in managing this discourse competency.

Another major speaker responsibility is marking the genre type of a particular discourse and differentiating it fully from other possible genres. In this respect, the children with brain injury presented a mixed picture. Although they successfully differentiated script from narrative (scripts lacked a protagonist and omitted evaluative elements and dialogue), their picture descriptions were poorly differentiated from narratives. Most of the picture descriptions produced by the children with brain injury at 7 centered around a protagonist, and contained high proportions of event clauses, another feature of narrative. The personal, highly evaluated nature of narrative was also poorly achieved in replica play, where brain injured children made only infrequent reference to character's internal states and failed to indicate markers of the narrator's stance towards the information reported (i.e., intensifiers and delimiters), even at age 7.

In creating an integrated discourse performance, the group with brain injury again showed a mixed picture. Anchor tense was mastered in all three genres, again behind the schedule of the normative group. Only one child, YUC, acquired the genre-specific systems of reference that mark people and objects being introduced for the first time and referents that are already part of the discourse. More sophisticated connectives and sequencers were also completely absent from the performances of the children with brain injury, who linked their utterances either implicitly or with the generic markers "and" and "and then".

Thus although the children with brain injury made important gains in discourse competence over the period of time studied here at 7 they still showed specific gaps in genre differentiation, and in the ability to create fully integrated discourse performances.

Growth modelling procedures were useful for documenting individual differences in the acquisition of discourse competence. Generalizing across genres, 3–4 children showed sharp rises in genre total scores, approaching the achievement of the normative group by age 7, after initially scoring lower. Two or three other children, however, remained below age expectations for the whole time period and showed growth curves that were flat or only modestly inclined. We need to follow these children further to determine if they represent a distinct sub-group with more serious discourse problems. Because even relatively modest delays in basic language skills have been linked to later problems in academic functioning for children with brain injury (Aram, 1988), these outlying children need to be followed further, particularly in relation to school outcomes.

Finally, this approach to discourse assessment has provided not only a characterization of discourse problems in a group at risk for language delays

but also direction for therapeutic intervention. Our assessments of a normative group detail the order of acquisition of particular genre features and the ages at which they are typically mastered. Our procedures can be used to identify specific gaps in children's discourse abilities, and they can help identify targets that can be reasonably accomplished, given the other features already present in an individual's genre performances.

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APPENDIX

Narrative Checklist: Script

Conventional signal for opening
"First you" (unmarked present tense verb)

Conventional signal for closing
"And then you go home", "And that's it"

Sequential ordering of events
with some clause-initial markers like "and", "and then", "after that", or "when"

With branching constructions
"Sometimes but not . . . ", "When" subordinate clause introducers

No protagonist: instead impersonal 2nd person pronouns
"You pick up your meal at the counter."

Most clauses portray events

No dialogue

No narrative-type evaluation

Anchor tense: historical present
"You drive there, you sit down."

Definite reference is used for first mention of people and objects
(except in durative descriptive clauses or in branching constructions)
"You use the shampoo to wash your hair."

No deixis: Objects/people are named; deictic references are omitted or self-corrected
"They bang that thing, what's it called, a reflex hammer, on your knee."

Event clauses incorporate significant objects
(not just actions and not insignificant objects)
"You use your washcloth to wash your face."

Narrative Checklist: Picture Description

General statement establishing the implied theme in first 3 utterances
"It's a playground."

Major details presented first which are centrally relevant to the theme
"A man and his little girl are buying tickets."

Secondary details presented last or omitted which are less thematically relevant
(colors of objects, back-ground details)

Closing signal
"That's all."

No protagonist
"There's a boy on the swing and a girl is there and a daddy is standing."

A minority of clauses portray events
(Less than 50%)

No dialogue

Anchor tense: present/present progressive
"There's a clown and he's holding a balloon."

Indefinite reference used for first mention of people and objects
"There's a clown" rather than "there's the clown"

No deixis: Objects/people are named, deictic references are omitted or self-corrected.
"It's, the restaurant is very neat."

Narrative Checklist: Replica Play

Conventional signal for closing
"the end"

Return to narration after interruption
without experimenter prompting

Protagonist

Expressions of character intentions
tried, wanted, hoped, etc.

Direct character speech

Reported character speech

Anchor tense

Narrative highpoint

Plot resolution closing
"they all lived in peace", "they never had to worry dragon again", "and then they had a party"
Setting information
efforts to describe or redescribe the play world

Character delineation
provision of information that reidentifies the characters and elaborates on aspects of their identity

References to characters' internal states
expressions of emotions: mad, sad, afraid, lonely, happy; expressions of cognitions: think, know, remember, believe, imagine, forget, guess; and expressions of physical state: tired, wet, cold, hot, dirty, sick, thirsty, bloody etc.

Complex time markers
suddenly, finally, one day, still, about to, kept on, the next thing, when, while, as

Negatives
that are a defeat of expectations: "He didn't land in the pond"

Intensifiers and delimiters
really, very, even, just, hardly

Repetition for emphasis
"he was very, very mad"

No deictic references

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