Story Grammar and Comprehension and Production of Narrative Prose by Students with Learning Disabilities

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This study investigated both quantitative and qualitative differences between subjects with and without learning disabilities (LD) across three grade levels on two tasks requiring active processing of story grammar. There was no evidence, for either task, of developmental differences in relation to either story comprehension or production. However, there were significant differences between students with LD and normally achieving students in the amount as well as the type of information included in the retellings and written stories. The results provide support for the hypothesis that students with LD have acquired a rudimentary but not fully developed schema for narrative prose.

Comprehending text and expressing ideas in writing are highly valued skills in today's society and are essential for success in school. The difficulties that individuals with learning disabilities experience in reading comprehension and writing place them at a disadvantage in educational settings and often preclude mainstreaming opportunities (Graham & Harris, 1988). Why some individuals manifest these academic problems is not yet clearly understood. However, research is beginning to provide a better understanding of cognitive differences that may affect performance in these areas (Scardamalia & Bereiter, 1986). Research is also providing evidence to support and validate a number of theoretical models, such as schema theory, that seek to explain the cognitive nature of reading comprehension and written language processes (e.g., Nezworski, Stein, & Trabasso, 1982).

Briefly, schema theory postulates a mental processing mechanism that guides comprehension of textual material. Researchers have begun to investigate this cognitive construct as it relates not only to the comprehension of narrative text but also to its production. The theoretical premise is that story schema, one of many structures represented within the cognitive system, comprises an "organized set of knowledge used during the encoding, representation, and retrieval of information from stories" (Stein, 1982, p. 326). It has been suggested that not only does story schema underlie comprehension of narrative prose, but it is also one of the fundamental cognitive bases for writing development (Anderson, 1978; Rentel & King, 1983; Scardamalia & Bereiter, 1986).

Research has also supported the hypothesis that story schemata develop by school age (Mandler & Johnson, 1977; Stein & Glenn, 1979) and that developmental differences in comprehension are apparent across age groups only when stories deviate from an organized, canonical framework or set of rules associated with narrative structure. Commonly referred to as story grammars, these rules specify the parts or elements of a story and their temporal and causal relations (Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Glenn, 1979; Thorndyke, 1977). Stein and Glenn's (1979) story grammar provides the theoretical framework for the present study. Their grammar consists of the following seven categories (Nezworski et al., 1982; Stein & Glenn, 1979): (1) *Major setting* introduces the protagonist; (2) *minor setting* describes the time and place of the story; (3) *initiating events* change the state of affairs in the environment and cause a response from the protagonist; (4) *internal responses* include affective or emotional responses, goals, desires, or thoughts; (t) *attempts* represent the protagonist's goal-related actions; (6) *direct consequences* indicate whether or not the goal is attained and signify changes that resulted from the attempt; and (7) *reactions* include a character's feelings or thoughts relating to the outcome, and also how characters are affected by the outcome. These elements are divided between two primary units: settings, which include information from both the major and minor settings; and episodes, which include the other five categories and their temporal or causal connections. To be considered an episode, the behavioral sequence must meet these criteria: (a) be an initiating event or internal response causing a character to formulate a goal-directed behavioral sequence, (b) be an action that is either an attempt or consequence, and (c) be a direct consequence marking the attainment or nonattainment of the goal.

Interestingly, Stein and Glenn (1979), in their study of first- and fifth-grade students, were unable to detect developmental differences except in relation to recall of total units and internal responses, with the older children recalling significantly more units and significantly more internal responses than their younger counterparts. Nezworski, Stein, and Trabasso's (1982) results corroborated Stein and Glenn's (1979), showing that children tended to transform cognitions (thoughts about actions) to actions or end states (Nezworski et al., 1982). Although the present study did not specifically investigate this tendency, it is possible that students with LD may characteristically transform characters' cognitions into action statements, which implies a focus on concrete rather than abstract conceptualizations. As reported in other cognitive processing studies, students with learning disabilities frequently behave like younger normally achieving children, a phenomenon that has been interpreted as developmental delay or maturational lag (Martin, 1986). Weaver and Dickinson (1982) reported that severely disabled readers in their study performed less well than their nondisabled peers on verbatim recall of stories and attributed this difference to deficient linguistic processing abilities rather than to inadequate knowledge of story structures or schemata. While maturational lag or linguistic pro-

cessing demands may account for some differences in recall and writing, other cognitive and metacognitive factors may be influential as well.

Effective use of a story schema presumably requires instantiation of new information into an existing conceptual framework that reflects the structure of narrative prose, so that a coherent representation of a story can be constructed (Stein, 1982). While there is evidence that individuals with learning disabilities have acquired schematic knowledge of stories (Worden, 1986), there is also evidence that they manifest deficiencies in relation to activation of prior knowledge, conceptual knowledge, and strategic knowledge (Torgesen, 1986), which may also affect story processing. The reading comprehension and written language deficits that characterize many individuals with LD might be attributable to a lack of story schema knowledge, a failure to effectively use story schema knowledge during comprehension tasks, or a lack of awareness and control in applying knowledge when writing stories. Both cognitive and metacognitive resources are integrally involved in comprehension and production tasks. Metacognition refers not only to a person's knowledge about cognition, but also to the "self-regulatory mechanisms used by an active learner during an ongoing attempt to solve problems" (Baker & Brown, 1984, p. 354). Most researchers would agree with the notion that learning disabilities may be due primarily to metacognitive differences rather than to cognitive structural deficits. That is, students with learning disabilities may have acquired a repertoire of information processing strategies but do not spontaneously apply them when engaged in intellectual activities requiring goal-directed and planned activity (Torgesen, 1982; Wong, 1985). The limited research conducted on text structure with individuals with LD suggests that they do not have a deficient representation of story grammar, but instead may be deficient in their discrimination of levels of meaning in prose passages and less aware of subtle differences in importance in story propositions (Worden, 1986). Additionally, students with learning disabilities have difficulty recalling fine details, using connective words that signal temporal and causal relationships, and identifying text-based inferences in stories (Weaver & Dickinson, 1982).

Research in reading comprehension indicates that instructional supports, such as networking, mapping, and flowcharting, facilitate schema representation and understanding of text structure for both normally and low achieving students (Anderson, 1978; Armbruster, 1980; Dansereau, 1979; Idol, 1987). These techniques emphasize the creation of diagrams that represent relationships among the ideas presented in the text. In a classroom study of heterogeneous groups of third- and fourth-grade students, including five learning disabled and low achieving students, Idol (1987) used a story mapping procedure to improve reading comprehension for normally achieving and low achieving students and students with LD. She also found evidence of generalization of knowledge of story components to the children's journal narratives. Another study indicated increased story comprehension for five intermediate-level students with LD following story mapping instruction (Idol & Croll, 1987). These students appeared to perform better when presented with generic comprehension questions than when required simply to retell the stories, and three students demonstrated generalization of effects to other classroom reading materials.

Using self-instructional strategy training, Graham and Harris (in press) taught fifth- and sixth-grade students with LD to independently use a strategy to facilitate advanced planning and content generation for short stories. After training, no significant differences were found between students with learning disabilities and their nondisabled counterparts on story grammar elements; however, there was a difference on overall quality as determined by holistic ratings. While two previous studies found evidence that the written stories of students with LD did not meet the criteria for a complete story (Barenbaum, Newcomer, & Nodine, 1987; Nodine, Barenbaum, & Newcomer, 1985), one study conducted with students with LD concluded that they are able to produce complete stories (McArthur & Graham, 1987). However, McArthur and Graham also found that students with LD produced fewer starting events, explicit goals, or emotional reactions across all three conditions in their study: story dictation, handwritten stories, and stories produced on a word processor. Intervention studies such as these provide important information about students' processing and performance patterns.

Although a knowledge base in the area of learning disabilities and story schema is accumulating, only a few studies have been conducted with school-age students with LD. A more complete description of their characteristics in relation to story schema as a cognitive structure is needed. To facilitate reading comprehension and written expression for students with learning disabilities, it is important to capitalize on their strengths during remediation. Consequently, investigations that focus on the knowledge, use, and awareness of story grammar of students with LD are necessary in order to enhance understanding of the processes involved.

The purpose of this study was to investigate quantitative and qualitative differences between nondisabled subjects and subjects with LD across three grade levels on two tasks requiring the active processing of story grammar. The objectives of the research are reflected in the following two-part question: Are there significant differences between learning disabled and nondisabled intermediate level, junior high, and senior high students on (a) story retellings after simultaneously reading and listening to a story, and (b) handwritten stories when presented with a story starter?

METHOD

Subjects

Twelve subjects with learning disabilities (LD) and 12 subjects without learning disabilities (NLD) were selected randomly from each of the following three grade levels in a predominantly middle class southwestern school district: (a) intermediate level—4th- and 5th-grade students, (b) junior high—7th- and 8th-grade students, and (c) senior high—10th- and 11th-grade students. There were 29 boys and 7 girls in the group with LD and 9 boys and 27 girls in the NLD group. The subjects with LD included 28 white, 2 black, 2 Hispanic, and 4 native Amer-

ican subjects, while the NLD group consisted of 25 white, 4 black, 3 Hispanic, and 4 native American subjects. All students with learning disabilities met the school district eligibility criteria for placement in the learning disabilities program. These criteria included (a) a discrepancy of at least 1 standard deviation between the measure of learning potential and academic measures; (b) evidence of a psychological processing deficit that significantly impedes the student's academic achievement; (c) elimination of exclusionary factors such as physical, psychological, and environmental correlates that underlie learning; and (d) the determination that special education services are required because the student cannot learn through ordinary methods of instruction. Nine students with LD in Grades 4 and 5 were placed in self-contained classes for students with learning disabilities. All remaining students with LD were mainstreamed for at least two class periods per day. The normally achieving students were taught in general education classrooms and received no special remedial instruction. Available IQ data indicated that mean scores of the Wechsler Intelligence Scale for Children–Revised (WISC-R) (Wechsler, 1974) verbal scale, performance scale, and full scale were in the average range for the students with LD. Table 1 lists the WISC-R means and standard deviations for the students with learning disabilities. No IQ data were available for the NLD group. The mean age and standard scores for reading and language for the subjects with LD and the NLD subjects are reported in Table 2. Group achievement test scores were not available for the students with LD in self-contained special education classes. Therefore, standard scores from the Wide Range Achievement Test (WRAT) (Jastak, Bijou, & Jastak, 1978) are reported for these students.

Table 1
Wechsler Intelligence Scale for Children-Revised-Means and Standard Deviations for the Students with Learning Disabilities

	Verbal scale scores		Performance scale scores		Full scale scores	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
Grades 4 to 5	87	18	96	9	95	16
Grades 7 to 8	101	13	95	14	97	14
Grades 10 to 11	96	12	99	11	98	10

Design and Analysis

Two factors, grade level and condition, were combined factorially to yield six between-subject cells, resulting in 3 (grade level: Grades 4 and 5 vs. Grades 7 and 8 vs. Grades 10 and 11) by 2 (condition: LD vs. NLD) design. Achievement scores on the group-administered standardized achievement tests were not incorporated as covariates because one of the major assumptions of multivariate analysis of covariance was not met: linear and robust correlation of the covariate with the dependent measures. Therefore, separate multivariate analyses of variance (MANOVAs) were employed to test the effects of the tasks, since each task employed multiple dependent variables. For each significant effect obtained on the MANOVAs, univariate *F* tests were conducted in order to determine which of the dependent variables might be responsible for significance. Scrutiny of these univariate *F*s would be insufficient, however, because a key assumption for such tests is independence of the dependent variables being tested. In the present case, subtests within each task may indeed be significantly intercorrelated. If so, this would significantly increase the possibility of a Type I error. Therefore, it was decided to attempt to corroborate findings from the initial analyses by use of discriminant analyses, both all-inclusive and stepwise, wherein subtests for a given task were used as predictors, while LD or NLD group membership was the dichotomous dependent variable.

Materials

"Judy's Birthday," a story from the Stein and Glenn (1979) study, was selected for Task One. This story was selected because it had been previously used in story grammar research and was judged typical of children's stories, yet was unfamiliar to the students. For Task Two, the creative writing task, a story starter was selected from another story grammar study (Gordon & Braun, 1985). The story starter provided was, "Once there was a brave, young knight called...." The Task One story was double spaced and printed on a separate page; the story starter for Task Two was indented and printed on the first line of lined paper.

Procedures for Task Administration

Subjects were individually administered the tasks in one session. Two graduate students who had been trained in task administration procedures tested half of the students in each group. Tasks were counterbalanced to control for order effect. At the beginning of each testing session, each subject was familiarized with the tape recorder, tape-recording procedures, and task materials. The examiner explained that the student would read along with the story and then would be asked about it. The students were told that their responses would be recorded.

For Task One, the directions consisted of the following: "You will read this story to yourself while you listen to the tape recording of the story. Read it carefully because when you finish, I want you to tell the story out loud exactly as you read and heard it." Before retelling the story, the subject was asked the following four questions: "What is your most favorite subject in school?" "Why?" "What is your least favorite subject in school?" and "Why?" Subjects were then told to tell the story exactly as they had read and heard it. Directions for Task Two consisted of the following: "Now I want you to write a story. Here is a pencil and a sheet of paper. A part of the first sentence of a story is written at the top of the paper. I want you to finish writing the story. The first sentence of the story begins [the experimenter reads]. Now, you finish writing the story." Although there were no time limits for the tasks, they were completed within a 45-minute period by all subjects.

Procedures for Scoring Protocols

Procedures similar to those used by Stein and Glenn (1979) were employed

for scoring the protocols from Task One. These authors had previously identified 25 statements or propositions for "Judy's Birthday" and parsed them into the appropriate categories: major setting, initiating event, attempt, internal response, direct consequence, and reaction.

For Task One, two raters read each story recall and then identified which propositions or units were present or absent. They also identified the appropriate category for each proposition; the intercategory, intracategory, and single statement reversals; and the substitutions, additions, and deletions of material. Intercategory errors were defined as the temporal reversal of two statements from different categories, intracategory errors as the reversal of two statements within the same category, and temporal sequencing errors were defined as within-statement reversals (Stein & Glenn, 1979). Interrater reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Kazdin, 1982). Twenty percent of the protocols were randomly selected to determine reliability of scoring for total number of units and proposition categorization, which averaged 92%. Interrater reliability for number of additions was 81%.

Two scoring procedures were used for Task Two. The first consisted simply of parsing and categorizing the story propositions. Interrater reliability for the total number of units was 96%. Interrater reliability for categorization of units was not calculated, because the researchers determined that, if there was a disagreement regarding the number of total units, it was impossible to determine which category and unit corresponded. That is, if one of the raters missed a unit, the sequence of units necessarily changed. Thus, the design of the protocol did not allow the researchers to determine level of agreement on category type. The second scoring procedure for the story completions was developed by the researchers and focused on three aspects of the story: (a) cohesion, (b) organization, and (c) episodic structure. A Likert-type scale was constructed, and scores ranged from a low of 1 to a high of 5. Criteria for assigning values to the stories were established. For example, the following criteria were developed for story cohesion: clear delineation for the beginning, middle, and end of the story; temporal sequencing; and logical connections or transitions among story parts. Based on Barenbaum et al.'s (1987) criteria for cohesion, the beginning set the scene for future development, the middle contained some type of conflict, and the ending introduced a resolution of the conflict. A score of 5 on story cohesion indicated that the story included all three parts, which were temporally sequenced and logically connected; a score of 4 indicated that three parts were present but not temporally and/or logically connected; 3 indicated that the story had two temporally

Table 2
Mean Age and Standard Scores for Reading and Language

Grades 4 and 5	**LD (*n* = 12)**	**NLD (*n* = 12)**
Grade 4	LD (*n* = 6)	NLD (*n* = 10)
Age	10-9	10-4
Reading – WRAT	85 (5 subjects)	
Reading – ITBS	95 (1 subject)	131
Spelling – WRAT	74 (5 subjects)	
Language – ITBS	90 (1 subject)	132
Grade 5	LD (*n* = 6)	NLD (*n* = 2)
Age	11-6	11-0
Reading – WRAT	80 (3 subjects)	
Reading – ITBS	96 (3 subjects)	143
Spelling – WRAT	73 (3 subjects)	
Language – ITBS	95 (3 subjects)	150
Grades 7 and 8	**LD (*n* = 12)**	**NLD (*n* = 12)**
Grade 7	LD (*n* = 5)	NLD (*n* = 9)
Age	13-10	12-11
Reading – ITBS	126	171
Language – ITBS	119	172
Grade 8	LD (*n* = 7)	NLD (*n* = 3)
Age	14-5	13-11
Reading – ITBS	122	180
Language – ITBS	118	184
Grades 10 and 11	**LD (*n* = 12)**	**NLD (*n* = 12)**
Grade 10	LD (*n* = 4)	NLD (*n* = 9)
Age	16-6	16-2
Reading – SAT	621	694
Language – SAT	630	714
Grade 11	LD (*n* = 8)	NLD (*n* = 7)
Age	17-9	17-4
Reading – SAT	649	733
Language – SAT	654	730

		Standardized Test Mean	Standardized Test Standard Deviation
WRAT = Wide Range Achievement Test		100.0	15.0
ITBS = Iowa Test of Basic Skills	(Grade 4 Reading)	120.2	18.3
	(Grade 4 Language)	121.3	17.4
	(Grade 5 Reading)	132.0	19.4
	(Grade 5 Language)	132.7	18.9
	(Grade 7 Reading)	155.2	23.1
	(Grade 7 Language)	155.0	23.3
	(Grade 8 Reading)	165.2	24.2
	(Grade 8 Language)	165.1	25.3
SAT = Stanford Achievement Test	(Grade 10 Reading)	703.9	46.3
	(Grade 10 Language)	709.3	41.5
	(Grade 11 Reading)	708.4	45.8
	(Grade 11 Language)	714.6	40.5

sequenced and logically connected parts; a score of 2 indicated two parts that lacked sequencing; and, finally, a score of 1 indicated that the story contained only one part. The experimenter and a graduate student rated the stories. Again, 20% of the protocols were randomly selected to determine reliability of the scoring procedure. Interrater reliability for each component of this measure averaged 80%.

RESULTS

Internal Reliability of Tasks

Internal reliability was studied through calculation of one overall Cronbach's alpha for Task One and one alpha for each of the two scoring systems used in Task Two. The scores of all 72 subjects were used. Results were .68 for Task One, and .70 and .83 for the Task Two parsing and holistic scoring systems, respectively.

Task One Analyses

Three separate 3 by 2 (Grade Level by Condition) MANOVA analyses were first conducted: one for Task One, and one for each of the Task Two scoring systems. Subtest scores served as the multiple dependent variables in each analysis. The results reveal that the main effect for condition was significant (although marginal), $F(14,53) = 1.86$, $p < .05$, while neither the main effect for grade nor the interaction effect was significant. (The marginal main effect for condition should be interpreted in light of Stevens's, 1986, caution that in any MANOVA, the inclusion of a large number of variables, some of which are theoretically robust and some of which are simply being tried out, will serve to depress the overall p-value. Thus, in the present case, the other 11 dependent variables may have deflated the impact of the three that were ultimately found to be significant.) In order to determine the Task One dependent variables responsible for the significant main effect for condition, a series of univariate F tests were conducted by condition for each dependent variable. Only three of these were significant: total units recalled (LD $\bar{x} = 10.89$, NLD $\bar{x} = 13.94$), $F(1,66) = 11.44$, $p < .001$; internal response (LD $\bar{x} = 5.06$, NLD $\bar{x} = 7.44$), $F(1,66) = 13.52$, $p < .001$; and additions (LD $\bar{x} = 7.19$, NLD $\bar{x} = 8.97$), $F(1,66) = 3.83$, $p < .05$.

To corroborate these findings and to lessen the danger of alpha slippage due to multiple consecutive F tests and possible collinearity of the dependent measures, Task One was subjected to discriminant analysis. In this analysis, "condition" (LD vs. NLD) was treated as the dichotomous dependent variable, and each of the scores in Task One were treated as independent variables. A significant discriminant function resulted $X^2(14) = 23.55$, $p = .05$. When loadings of each independent variable were ranked by size of correlation, the three highest loadings were internal response (.65), total units recalled (.60), and additions (.35). These were the only three loadings exceeding .30, the traditional cutoff point for identification of robust loadings. Thus, the discriminant analysis corroborates the results obtained in the series of univariate F tests, reported above, for Task One. The classification matrix for this analysis revealed that the overall hit ratio was 70.83% correctly classified, with 11 false negatives and 10 false positives resulting from the application of the discriminant function prediction equation.

To further corroborate these findings, a stepwise discriminant analysis was conducted using the variables from Task One. In this analysis, each variable was tested for inclusion in the discriminant function, using the smallest Wilks' lambda (largest multivariate F) criterion. This analysis again yielded a significant discriminant function, $F(5) = 21.82$, $p < .0006$, and the same three independent variables were ranked as the three with the highest loadings (internal response = .71, total units recalled = .59, additions = .45). No other independent variables reached the cutoff loading of .30. Overall hit rate was 69.44% correctly classified, with 10 false negatives and 12 false positives.

Task Two Analyses

Results of the first 3 by 2 (Grade by Condition) MANOVA for Task Two indicated that neither the main effect for grade nor the effect for interaction of grade and condition was significant. However, the main effect for condition was significant, $F(9,58) = 7.09$, $p < .001$. Follow-up univariate F tests identified six variables contributing to this significant effect. From most to least robust, these were Total Units (LD $\bar{x} = 12.94$, NLD $\bar{x} = 29.19$), $F(1,66) = 50.93$, $p < .001$; Internal Response (LD $\bar{x} = 3.08$, NLD $\bar{x} = 9.67$), $F(1,66) = 43.12$, $p < .001$; Direct Consequences (LD $\bar{x} = 3.56$, NLD $\bar{x} = 7.39$), $F(1,66) = 21.30$, $p < .001$; Major Setting (LD $\bar{x} = 1.31$, NLD $\bar{x} = 2.58$), $F(1,66) = 10.62$, $p < .002$; Reactions (LD $\bar{x} = 0.78$, NLD $\bar{x} = 2.47$), $F(1,66) = 5.90$, $p < .02$; and Attempts (LD $\bar{x} = 3.06$, NLD $\bar{x} = 5.11$), $F(1,66) = 5.28$, $p < .03$.

As in Task One, to corroborate these findings and to lessen the danger of alpha slippage due to multiple consecutive F tests and possible collinearity of the dependent measures, data from Task Two were subjected to discriminant analysis, both all-inclusive and stepwise. For the all-inclusive analysis, a significant discriminant function resulted, $F(9) = 47.91$, $p < .001$. When loadings of each independent variable were ranked by size of correlation, the four highest loadings were for the same variables as those identified above as most robust. These were Total Units Recalled (.83), Internal Response (.77), Direct Consequence (.53), and Major Setting (.37). These were the only four variables with loadings exceeding .30. Thus, for this analysis of Task Two data, the discriminant analysis corroborates the results obtained in the series of univariate F tests reported above. The classification matrix for this analysis revealed that the overall hit ratio was 88.89% correctly classified, with two false negatives and six false positives resulting from application of the discriminant function prediction equation.

To further corroborate these findings, a stepwise discriminant analysis was conducted using the variables from Task Two. Each variable was tested for inclusion in the discriminant function, using the smallest Wilks' lambda (largest multivariate F) criterion. This analysis again yielded a significant discriminant function, $F(7) = 48.27$, $p < .001$, and the same four independent variables were ranked as the four with the highest loadings (Total Units Recalled = .83, Internal Response = .77, Direct Consequences = .57,

Major Setting = .37). No other independent variables reached the cutoff loading of .30. Overall hit rate was 86.11% correctly classified, with three false negatives and seven false positives.

Data from the holistic scoring of Task Two were then subjected to the same type of 3 by 2 (Grade by Condition) MANOVA, this time with Cohesion, Organization, and Episodic Structure as multiple dependent measures. Results indicated that the main effect for condition was again significant, $F(3,64) = 9.41$, $p < .001$. Follow-up univariate F tests revealed that all three variables contributed to this significant main effect. Highly robust F values were found for Cohesion (LD $\bar{x} = 3.64$, $SD = 1.40$; NLD $\bar{x} = 4.69$, $SD = .51$), $F(1,66) = 18.52$, $p < .001$; Organization (LD $\bar{x} = 3.67$, $SD = 1.31$; NLD $\bar{x} = 4.58$, $SD = .77$), $F(1,66) = 13.60$, $p < .001$; and Episodic Structure (LD $\bar{x} = 2.28$, $SD = 1.11$; NLD $\bar{x} = 3.53$, $SD = 1.16$), $F(1,66) = 21.86$, $p < .001$.

The all-inclusive discriminant analysis of these data again produced a significant discriminant function, $F(3) = 23.29$, $p < .001$. Loadings for all three independent variables were extremely robust (Episodic Structure = .88, Cohesion = .79, Organization = .68). Overall hit rate was 70.83%, with seven false negatives and 14 false positives.

The stepwise discriminant analysis provided confirmation of these findings and produced a significant discriminant function, $F(2) = 23.45$, $p < .001$. Loadings of all three independent variables were highly robust (Episodic Structure = .88, Cohesion = .80, Organization = .69). Overall hit rate was 69.44%, with seven false negatives and 15 false positives.

DISCUSSION

Both story comprehension and story production were investigated in this study. The first task required students to recall a story that conformed to a canonical story grammar framework, while the other task required students to finish writing a story after being presented with a story starter. The results of the investigation support findings from previous story schema research and also provide additional insight into the processing patterns and characteristics of students with LD.

There was no evidence, for either task, of developmental differences in relation to either story comprehension or production. This supports the hypothesis that most school-age children have acquired knowledge of story schema and are able to use that knowledge during story comprehension and production tasks. However, there were significant differences between students with learning disabilities and normally achieving students in the amount as well as the type of information included in the retellings and written stories. The students with LD, compared to NLD students across grade levels, recalled significantly fewer total units of information and significantly fewer internal responses of characters after simultaneously reading and listening to a story. Similar results were obtained on the writing task. That is, the students with learning disabilities produced significantly fewer total units than the normally achieving students across grade levels. The most salient differences on this task were found in the internal response, direct consequence, and major setting categories.

The outcome of the present study provides support for the hypothesis that students with LD have acquired a rudimentary but not fully developed schema for narrative prose (Worden, 1986). In other words, young children and students with LD may process most categories of information that are reflected in a story grammar, but may not effectively process characters' internal responses or motives, thoughts, and feelings. Additionally, they may not have fully developed the ability to express affective information, which may affect their fluency of expression as indicated by their significantly shorter recalls. This processing deficiency could result from lack of expertise in the interpretation of human intentionality, social interactions, and problem solving, which appears necessary for the development of story schemata (Mandler, 1982; Stein, 1982).

The significant difference between additions to their retellings by the students with LD and the NLD students in the present study suggests that NLD students not only recall more information than students with LD, but also include more additional information when they retell stories. However, further inspection of the information added revealed that the types of additions were proportionally similar for both groups. For example, 53% of the additions by both NLD students and students with LD were conjunctions such as *and, but, so,* and *because,* and 8% of the additions by both groups were pronouns. Based on these data, it appears that if students with LD were able to recall more information, particularly in the internal response category, their protocols would closely resemble those of NLD students, both in quantity and quality. General fluency problems appeared evident not only in the story retellings but also in the writing of students with LD. As previously mentioned, the quantitative differences found may have been affected by the low number of characters' internal responses the students with LD included in their story recalls and written completions. It seems possible that, if students with learning disabilities could be taught to focus on the goals, motives, thoughts, and feelings of the characters in the stories they read and write, story length would increase proportionate to the increase in the internal response category. Direct instruction in the clarification of characters' internal states and reactions may facilitate processing of this category of story information for students with LD. Recent research suggests that elementary students can be taught strategies for determining story characters' internal states (Dunning, 1987; Emery & Mihalevich, 1987).

Analyses of the data collected on measures of story writing also yielded significant main effects for condition, suggesting that stories written by students with LD are incohesive, unorganized, and incomplete in relation to episodic structure. However, it should be noted that only 9 of the 36 students with LD in the present study did not include at least one complete episode defined by the criteria described earlier in this paper. Although there was no main effect for grade, inspection of the data indicated a tendency for senior high students with LD to write more organized stories than the intermediate level or junior high level students with learning disabilities.

It is important to note the limitations of this study for future investigations of discourse schema processing. First, the

small number of subjects per grade level may have masked developmental differences. Future studies should incorporate larger samples, to verify the outcomes of this study. Second, due to the lack of ability data on the NLD students, it was not possible to incorporate verbal ability or general intelligence as covariates in this study. Researchers should attempt to include these variables in future studies, due to the highly verbal nature of the tasks used in story grammar research.

Despite its limitations, the present study supports the accumulating research base in text structure with individuals with LD by suggesting that narrative discourse schema, although evident, is rather rudimentary and unsophisticated compared to the schema of their NLD peers. The most salient quantitative differences between the students with LD and their normally achieving peers were detected in total units and the internal response story grammar category for both the comprehension and production tasks. Qualitative differences were also noted in the cohesion, organization, and episodic structure of the written stories, although two thirds of the students with LD produced a story containing at least one complete episode. Additionally, the lack of developmental differences in this study suggests that individuals with learning disabilities do not significantly improve their ability to process affective information that is important for comprehending and producing narrative text. Future story grammar research with students with LD should focus on techniques to facilitate information processing of story elements, with particular consideration of characters' cognitions and emotions, in order to fully activate the schemata necessary for comprehending and producing narrative prose. Additionally, interventions should provide students with techniques to improve the cohesion and organization of narrative compositions.

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AUTHORS' NOTES

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NATIONAL ASSOCIATION CONVENTION CALENDAR

March 15–16, 1990 • **Council for Learning Disabilities Spring Regional Conference** • Williamsburg, Virginia • Contact: CLD, PO Box 40303, Overland Park, KS 66204; 913/492-8755

March 17–18, 1990 • **AD-HD: Assessment and Treatment, University of Minnesota Conference** • Montreal, Canada • Contact: Trisha Tatam, University of Minnesota, 204 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455; 612/625-3369

March 22–24, 1990 • **New York Branch of The Orton Dyslexia Society, 17th Annual Conference** • New York, New York • Contact: 80 Fifth Ave., New York, NY 10011; 212/691-1930

April 19–21, 1990 • **Fifth Pan American Conference on Rehabilitation and Special Education** • South Padre Island, Texas • Contact: Julian Castillo, Division of Health Related Professions, Pan American University, Nursing Education Bldg., #228-A, Edinburg, TX 78539

April 23–24, 1990 • **Michigan Association of Infant Mental Health, 14th Annual Conference** • Ann Arbor, Michigan • Contact: Ann Saffer, 2340 Hickman Rd., Ann Arbor, MI 48105; 313/994-8168

April 23–27, 1990 • **Council for Exceptional Children, 68th Annual Convention** • Toronto, Ontario, Canada • Contact: CEC, 1920 Association Dr., Reston, VA 22091-1589; 703/620-3660

April 27, 1990 • **Effective Instruction for Learning Disabled Students** • Lincoln, Massachusetts • Contact: Barbara C. Boger, Director, The Carroll School Outreach Program, Baker Bridge Rd., Lincoln, MA 01773; 617/259-8342

April 27–28, 1990 • **The Child's Eye, Face, and Brain: Normal and Abnormal Development** • Houston, Texas • Contact: Lila K. Lerner, Office of Continuing Education, Baylor College of Medicine, One Baylor Plaza, Houston, TX 77030; 713/798-6020

April 27–28, 1990 • **Treatment of Childhood Disorders, University of Minnesota Conference** • San Diego, California • Contact: Trisha Tatam, University of Minnesota, 204 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455; 612/625-3369

April 28, 1990 • **Cognitive–Behavioral Approaches to Treating Children and Adolescents,** University of Minnesota Conference • Phoenix, Arizona • Contact: Trisha Tatam, University of Minnesota, 204 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455; 612/625-3369

May 3–4, 1990 • **International Congress on Treatment of Mental Illness and Behavioral Disorder in Mentally Retarded Persons** • Amsterdam, The Netherlands • Contact: PAOS, PO Box 325, 2300 AH Leiden, The Netherlands

May 3–6, 1990 • **The American Academy of Private Practice in Speech Pathology and Audiology** • Houston, Texas • Contact: R. Ray Battin, 713/621-3072

May 4–6, 1990 • **The Disturbed and Disturbing Child, University of Minnesota Conference** • Long Beach, California • Contact: Trisha Tatam, University of Minnesota, 204 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455; 612/625-3369

May 6–10, 1990 • **International Reading Association, Annual Conference** • Atlanta, Georgia • Contact: IRA, 800 Barksdale Rd., PO Box 8129, Newark, DE 19714-8139; 302/731-1600

May 27–31, 1990 • **American Association on Mental Retardation, Annual Conference** • Atlanta, Georgia • Contact: 1719 Kalorama Rd., NW, Washington, DC 20009; 202/387-1968

June 15–17, 1990 • **Integration - European Perspectives and Practice** • Dublin, Ireland • Contact: Irish Association of Teachers in Special Education, Teachers Centre, Drumcondra, Dublin 9 Ireland

June 22–24, 1990 • **AD-HD: Assessment and Treatment, University of Minnesota Conference** • San Antonio, Texas • Contact: Trisha Tatam, University of Minnesota, 204 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455; 612/625-3369

July 9-13, 1990 • **Fifth World Conference on Computers in Education** • Sydney, Australia • Contact: WCCE/90, PO Box 319, Darlinghurst, NSW 2010. Australia; 612/211-5855

October 4–6, 1990 • **12th International Conference on Learning Disabilities** • Austin, Texas • Contact: CLD, PO Box 40303, Overland Park, KS 66204; 913/492-8755

October 18–20, 1990 • **1990 CEC's Multicultural Symposium** • Albuquerque, New Mexico • Contact: CEC 1920 Association Dr., Reston, VA 22901; 703/264-9448