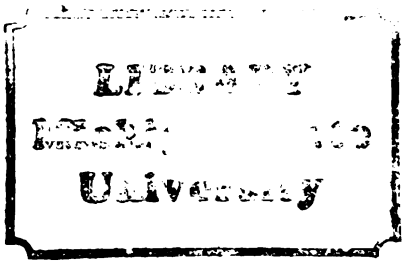

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A COGNITIVE DEVELOPMENTAL ANALYSIS

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WRITING ACHIEVEMENT:

A COGNITIVE DEVELOPMENTAL ANALYSIS

By

Susan Wildfong

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ABSTRACT

WRITING ACHIEVEMENT:

A COGNITIVE DEVELOPMENTAL ANALYSIS

By

Susan Wildfong

The purposes of the dissertation were to trace the development of children's writing over the school year using a cognitive-development model and to determine the effect of grade and reading ability on writing achievement.

Bereiter has proposed that writers progress from a stage of associative writing, in which they attain fluency at idea production and writing, to a stage of performative writing, in which they incorporate conventions, such as mechanics for producing correct text. The purpose of the present study was to determine the increase in children's use of conventions.

Narrative compositions of fifty-four fourth, fifth, and sixth grade children were analyzed for use of conventions of story structure, cohesion, sentence formation, punctuation, and spelling. Four multivariate analyses of variance revealed a significant effect for Occasion on sentence correctness and punctuation. Examinations of the means indicated that students showed improvement over the year in punctuation. Sentence correctness improved from Time 1 to Time 2 but declined from Time 2 to 3.

Occasion X Grade interactions were obtained for the other variables. Students improved over the year in spelling accuracy, except sixth graders from winter to spring. All

students declined at some time in their overall use of cohesion. Fourth graders' use of story structure increased while fifth and sixth graders' use declined. These data indicated an increase in some conventions, primarily mechanics over time. However, conventions for structuring text and providing cohesion did not increase. Differences in growth may have been due to the cognitive processes responsible for the different conventions, to differences in instruction, or to the difficulty of the conventions.

No significant main effect for Grade was found for any variable. Grade X Occasion interactions were obtained as reported.

A significant main effect for Reading Ability occurred for the sentence correctness, punctuation, and spelling variables. The better readers' advantage may have been due to greater knowledge of the surface form of written prose or to rereading skills.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

Statement of the Problem

What characterizes development in writing? Prior to the 1970's, research on writing development was primarily research on the development of features of compositions associated with quality in writing. This approach has been termed a "reader-based" approach to assessing writing (Tamor and Bond, 1980). This approach provided information about quantitative changes in lexical and syntactic features of writing and about the development of more global features, such as organization, content, and style (Loban, 1976; NAEP, 1975; Stahl, 1977). While this information was useful for describing writing at different ages, it offered little insight into the cognitive processes involved in producing written text or the skills possessed by writers of different ability levels.

In response to the need for such research, several researchers have developed models of the composing process. Flower and Hayes (1980) have described writing as a three phase process. The first phase is a planning phase during which the writer defines the writing task, sets goals for writing, and generates and organizes ideas. The second phase is a translating phase during which the writing plan, which

may be in nonlinguistic form, is translated into written language according to certain rules. The third phase is a reviewing phase during which the writer reads what he has written in order to edit it or to generate further ideas. A similar model of the composing process has been developed by Bereiter (1979).

Bereiter (1979) proposed a model of writing development based on models of the composing process. According to this model, the skills involved in producing mature prose are too numerous to be employed simultaneously by beginning writers. Writing development is characterized by a series of stages each of which involves the integration of more skills to achieve a more adaptive level of performance. Lower level skills of content and translation are integrated first, followed by higher order skills of adapting the text to an audience or to the writer's personal goals.

Some research has been conducted which supports this model. For example, Flower (1979) related the characteristics of beginning and mature prose to Flower and Hayes' model of composing. Bereiter and his colleagues (Bereiter, Scardamalia, and Turkish, 1980; Bracewell, 1980) have conducted a number of cross-sectional studies, and have demonstrated an increase with age in the use of some higher level schemes, such as those for producing certain types of cohesion.

Need for the Study

While these researchers have investigated the development of process-related features of writing, no attempt has been

made to assess improvement on several features in a single test of Bereiter's model. In addition, studies of the development of these features have provided primarily cross-sectional data. Such an approach has been criticized because it allows for confounding of age and experience. This research also has been conducted on different populations. For example, Flower and Hayes have studied the composing processes of college-aged adults while Bereiter and his colleagues have focused primarily on children. Finally, not enough data exists to allow for the characterization of writing development as continuous or discontinuous.

This dissertation extended the above research by examining growth on a set of features believed to reflect development in writing. It provided longitudinal as well as cross-sectional data on writing development. Finally, the pattern of growth of each feature was assessed.

Purpose of the Study

The purpose of this dissertation was to assess the development of several features of children's writing to determine if writing development followed stages derived from Bereiter's cognitive developmental model. Also of interest were the effects of age and reading ability on these variables and the pattern of growth of each variable.

Design of the Study

Subjects

The subjects of the study were fifty-four fourth, fifth, and sixth grade children from the area around Lansing,

Michigan. The children were students of teachers who were the subjects of a study of writing instruction conducted by the Language Arts Project of The Institute for Research on Teaching. The students in each grade possessed different social class and racial characteristics. The fourth graders were from Okemos, a community of primarily white, upper middle class professionals. The fifth graders were from Dimondale and Stockbridge, two middle class, white rural communities in central Michigan and from Lansing, a racially diverse urban center. The sixth graders were from Lansing.

The students were given a test of reading achievement at the beginning of the study. For the dissertation, they were classified as above average, average, or below average in reading ability.

Seven students in grades five and six were randomly selected from each ability level at each grade. Only sixteen fourth graders participated in the study: seven of above average, five of average, and four of below average reading ability. To conform to a proportional design, four fourth grade students were selected from each ability group.

Data Source

The data consisted of narrative compositions written by these students at three times during the school year. The compositions were produced in response to writing tasks designed by Language Arts Project members.

Research Questions

The following research questions were investigated:

1. How does the narrative writing of fourth, fifth and sixth grade children develop over the year on features derived from a cognitive developmental study of writing development?

2. How do these features differ for students of different grades?

3. How do the features investigated differ in the writing of students of above average, average, and below average reading ability?

4. What is the relationship between features attributable to a particular stage of writing development?

5. Is development on each feature continuous or discontinuous, e.g., what is the pattern of growth for each feature?

CHAPTER II

REVIEW OF LITERATURE

In this chapter, research investigations which form the background for the original research to be conducted will be reviewed. The following areas or topics will be discussed:

1. "Product-oriented" research on writing development
   a. Quantitative research on writing development
   b. Qualitative research on writing development
2. Models of the writing process
3. Bereiter's model of writing development
4. "Process-oriented" research on writing development

Product-Oriented Research

Prior to the 1970's, research on the development of writing ability focused on quantitative changes in features of children's written products, including vocabulary, sentence structure, fluency, and use of conventions of writing.

More recently, research on writing development has investigated qualitative changes, including the overall quality of children's writing, organization, and style.

Quantitative Research on Writing Development

Vocabulary development in writing has been assessed by the National Assessment of Educational Progress (1975).

The NAEP of writing assessed vocabulary level by counts of the average number of letters per word. Vocabulary level was found to increase between the ages of nine and seventeen.

Hunt (1965) developed three measures to assess syntactic complexity in the oral and written language of children. These measures included number of words per T-unit, number of clauses per T-unit, and number of words per clause. The T-unit is defined as an independent clause and any subordinate or non-clausal constructions attached to it. Hunt found that the mean number of words per T-unit in the oral and written English of children in elementary and high school increased gradually with age.

Loban (1976) conducted a longitudinal study of language development including writing development from kindergarten through twelfth grade. Syntactic maturity was assessed using several measures, including number of words per communication unit (a unit identical to the T-unit). Loban also assessed the amount of subordination, transformation, and elaboration in children's sentences. Subordination refers to the embedding of clausal and non-clausal units in complex sentences. Transformations were assessed using measures based on transformational grammar. Elaboration refers to the expansion of a communication unit beyond a simple subject and predicate.

The results of Loban's study showed that number of words per communication unit increased gradually with age. Elaboration also increased with age. One index of subordination, number of dependent clauses, increased gradually

until grade eight in the writing of high ability students and then reached a plateau, increasing past this point only for low ability students.

Friedman and Fowler (1979) assessed the development of discrete and global variables in the writing of children in grades two through six. Their measure of productivity was a count of the number of words in a composition. They found that the number of words in children's compositions increased from second through sixth grade. They also assessed the development of spelling, sentence usage, and paragraph usage. They found improvement in spelling, sentence usage, and paragraph usage between second and sixth grade except for fourth graders.

In a recent study, Stewart and Grobe (1979) found that the number of spelling errors and run-on sentences in children's writing decreased from fifth to eleventh grade.

Summary

The previously reported research documented the development of aspects of children's written compositions, assessed through quantitative measures. These aspects include syntactic maturity, fluency, and mechanics of writing. Syntactic maturity as measured by number of words per T-unit shows a gradual increase with age; however, certain aspects of sentence complexity such as number of dependent clauses do not continue to increase in later school years for high ability students. Older children may adopt more advanced forms of embedding. Fluency in writing also shows gradual development with age. Finally, children

improve with age in their use of conventions of writing such as spelling, sentence usage, and paragraph usage.

Qualitative Research on Writing Development

While quantitative research has provided information about the growth of features such as vocabulary and sentence complexity, it has yielded little insight into aspects of writing above the sentence level, such as organization and style. However, some researchers (Lloyd-Jones, 1974) feel that these aspects are critical to the effectiveness of a composition. The evaluation of more global variables, termed holistic evaluation, has been of several types.

Overall Quality

The NAEP (1975) employed subjective ratings of the overall quality of compositions to assess qualitative development in writing. This assessment revealed an improvement in quality between the ages of nine and eleven but little improvement between the ages of thirteen and seventeen.

Organization

Stahl (1977) devised a scheme for rating the structural organization of the descriptive prose of second, fifth and eighth grade children. Nine aspects of organization were assessed: indicated order, principle of selection, methods of arrangement, syntax, balance, organization, use of connectives, type of opening and type of closing. Indicated order referred to the writer's use of an order of ideas, either explicit or implicit, and to the writer's consistency

in following this order. The dimension of principle of selection referred to the extent to which a writer described critical features of an object and omitted irrelevant details. Methods of arrangement related to the way in which a writer presented the content.

The syntax dimension concerned sentence structure and relations between sentences. The dimension of balance was used to rate the amount of emphasis given to ideas. The organization category was intended to capture the writer's explicit use of planning and revision in composing, as indicated the use of an outline or corrections in writing. Finally, the introduction and closing dimensions concerned the presence or absence of a beginning or ending which were integrally related to the body of the composition.

Stahl rated children's compositions on a five point scale for each of these areas. The average composition of second grade students received a low rating on principles of selection, arrangement, syntax, balance, connectives, and introduction and conclusion; the average eighth grade composition received a high rating on these categories. Fifth grade children's compositions were bi-modally distributed (Bereiter, 1979), receiving either a low or high rating on most attributes. Children's compositions at all grade levels showed little use of an indicated order of presentation or planning and revision.

Discourse Attributes

A study of the development of different modes of discourse in children's writing was conducted by Britton,

Burgess, Martin, McLeod and Rosen (1975). The study was based on a model of discourse situations. The model specified the elements of discourse situations as: the speaker or writer, audience, subject matter, and activity. According to Britton et. al. there are three modes of discourse which can be differentiated according to the elements in the writing situation which they emphasize. Expressive writing is characterized by an emphasis on the writer and the discovery of writer's thoughts. In transactional discourse, the writer and reader play the role of participants in regard to the discourse and the focus is on the communication of information. The final mode of discourse is poetic writing. Poetic writing results from an emphasis on the written product as an artistic object. Both writer and reader play the role of spectators to the discourse.

Britton et. al. found a trend from expressive to transactional to poetic writing in children ages eleven to eighteen. However, poetic writing declined in the upper grades, reflecting in Britton's view, the effect of the evaluation system in Great Britain on children's writing.

While research on written products can describe the qualitative and quantitative changes in students' compositions, it is limited in its ability to inform about the underlying processes or abilities in writers which result in these changes. In the 1960's, Parke (1961) and Braddock (1963) suggested that process-oriented research on writing be conducted. Tamor and Bond suggest that "to be instructionally and/or theoretically useful, text analysis

procedures applied to compositions of primary school children should be based on variables derived from a well-defined model of the writing process" (Tamor and Bond, 1980, p. 7).

Models of the Writing Process

In order to assess the development of the integration of skills in writing, it is necessary to specify the mental processes that occur in the production of written text. Models of composing derive from models of the production of speech (Fodor, Bever, and Garrett, 1974; Clark and Clark, 1978).

Clark and Clark (1978) describe speaking as a goal-oriented action. Speakers speak in order to influence others, to obtain things, to represent knowledge, etc. Speaking is divided into two processes: planning and execution. In the planning phase, speakers mentally represent their discourse based on how they want to influence their listeners. In the execution phase, speakers form the sentences, phrases, and words they have planned.

The processes of planning and execution are carried out in the following specific steps. First, the speaker formulates a discourse plan by identifying the type of discourse situation he is in and retrieving an appropriate schema. Each discourse situation is a culturally recognized situation which has rules specifying the sequence and content of discourse. Speakers, through their experience with discourse situations have schema, or mental representations, for different situations. After determining if he is in

a situation calling for an argument, a story, etc., the speaker plans the specific utterances within a discourse structure so that they are congruent with and contribute to his intention.

In the next step, the speaker plans individual sentences. This step requires deciding on the speech act to be used, the thematic structure (the information that is given or known to the listener and new) and the propositional content. It also requires decisions about stylistic aspects of the utterance, for example, whether it is to communicate a message directly or indirectly.

Once the speaker has formed a general representation of the type of sentence he will utter, he plans specific constituents. A constituent is a segment of a sentence expressing a single idea or proposition. Constituent planning involves selecting the words or phrases the writer wishes to put in the constituent and ordering them. After planning the constituent, the speaker constructs the articulatory program for the elements that he will utter in that constituent. He generates and holds in working memory the phonetic segments, stresses, and intonation he will use. Lastly, the articulatory program is carried out according to directions for its execution, which specify how the muscles involved in articulation are to be used, the sequencing of action, and the timing of movements.

This outline specifies the process by which a speaker constructs a discourse plan. However, it does not describe the speaking process or how execution occurs. Execution

seems to involve some of the same units that planning does (Clark and Clark, 1978). In the execution phase, speakers begin with the constituent plan. Once the meaning of the constituent is decided, the speaker selects a syntactic structure, to convey his meaning which specifies the major slots. Following that, the speaker chooses the content words (nouns and verbs etc.) which belong in each slot. After selecting content words, the speaker plans the function words, such as articles, conjunctions, and prepositions, prefixes and suffixes which will be part of the constituent. The final step is the selection of phonetic segments of the constituent syllable by syllable.

This model of speaking is similar to models of the composing process proposed by Flower and Hayes (1980) and Bereiter (1979). Based on their analysis of the protocols of writers in the process of composing aloud, Flower and Hayes (1980) have constructed the following cognitive process model of writing. According to this model three major elements are involved in any composing activity: the task environment, the writer's knowledge and the composing process itself.

The task environment includes two aspects: the rhetorical problem and the task environment. The writer's knowledge is the information stored in the long term memory which is relevant to the writing task, including the writer's knowledge of the audience, the topic, and plans for writing. Cognitive processes of writing include planning, translating, and reviewing.

The rhetorical problem is the communicative task faced by the writer. Elements of the problem are the communicative intention, the topic, and the audience's needs. Flower and Hayes note that the rhetorical problem is "an immutable part of the writing process, but the way in which people choose to represent this problem to themselves can vary greatly from writer to writer" (Flower and Hayes, 1980, p. 8). Less able writers may restructure writing problems, eliminating some of their features, or altering them to reduce the cognitive demands they place on the writer. Able writers on the other hand are characterized by an ability to handle these demands and to rethink the task so that it contains new features, such as the writer's own goals.

The written text is the second component of the task environment. The topic sentence, previous sentence and word choices act as constraints on the writer's choices of succeeding sentences and words. Again the effect of the "growing text" varies from writer to writer. Inexperienced writers may fail "to consolidate new ideas with earlier statements" (Flower and Hayes, 1980, p. 8). Able writers are able to plan at the inter - idea and composition level.

The writer's knowledge includes knowledge about the audience, subject area, and his representations of rhetorical problems and written discourse plans. Faced with a rhetorical problem, an experienced writer may be able to recall relevant problems, discourse plans and content knowledge and to adapt this knowledge to the rhetorical problem. On the other hand, inexperienced writers may fail to retrieve

relevant writing plans or to transform their knowledge to fit the writing task.

The final elements in a writing activity are the composing processes. Three subprocesses comprise the act of writing: planning, translating, and revision. The planning process consists of several subprocesses. The first is idea generation or the retrieval of content for a composition from memory. The second, organization, involves the reorganization of this content to fit the rhetorical situation. Such reorganization may consist of establishing new connections between elements, such as new subtopics or "superordinate concepts". (Flower and Hayes, p. 10). Finally, planning includes goal-setting or the creation of goals for writing. The aims of writing are not only provided by the rhetorical problem, but may be generated by the writer. Goal-setting usually occurs prior to writing, but goals also may emerge through associations to ideas produced during the idea generation process.

Translating is the second major subprocess in composing. It is the process of transforming the writing plan into written English. Ideas are the concepts and relations which are organized in set or network form in long term memory. These must be converted into text according to conventions for forming letters, grapheme-phoneme correspondence, rules of syntax and of discourse.

The third writing process is reviewing. Reviewing processes are involved in editing text and in idea generation and translating.

The writing processes are carried out according to directions from an executive strategist or monitor. It decides when the writer will initiate and discontinue different writing processes, such as idea generation.

Bereiter (1979) has proposed a similar but heirarchically organized model of the writing process. Directing the entire process is an executive scheme. This scheme assesses the writing task and directs the writing process according to the writer's goals and the demands of the discourse situation.

At a lower level are genre schemes. These are the writer's mental schemata for different types of discourse, which are retrieved by the executive. The genre schemes specify the following: specific intentions or speech acts appropriate to that genre, and "a set of strategies for carrying out these intentions" (Bereiter, 1979, p. 151). These strategies contain content slots to be filled, search procedures for retrieving this content from memory, and tuning instructions for translating this content into linguistic form. The tuning instructions specify surface features of language to be used, e.g. style.

At the level next to the genre scheme is a "content processor" which draws semantic material from memory and organizes it according to instructions from the genre scheme (Bereiter, 1979, p. 151). The product of the content processor is the "gist", a unit like a proposition. At the lowest level is the language processor which translates

propositions into written text, according to the tuning instructions of the genre scheme.

While there are important differences in these models, they all outline the writing process in terms of similar subprocesses. First writing involves representation of the task environment, including the writer's intention, audience, discourse situation. The writer then constructs a plan, using an appropriate discourse schema for that discourse situation. The schema specifies a set of intentions appropriate to the discourse situation. These intentions specify categories of content for each sentence, and instruction for the language (style, tone, etc.) to be used. The writer retrieves and organizes appropriate content and then translates the content into written prose according to the instructions for language use.

While these models do not describe execution, models of the speaking process would suggest that in execution the writer operates on the plan for discourse one constituent at a time. The writer presumably has in mind the meaning of the constituent and then forms a syntactic outline of the elements to convey that meaning. The semantic features would then be assigned to each slot in the outline. At this point the writer would have in memory a structure with semantic and syntactic features. Using these features the writer would then retrieve words with these grammatical and semantic features from his mental lexicon. Finally, a program specifying the motor responses necessary for writing the constituent element by element would be formed and carried out.

The models agree that the final process in writing is revision. During revision the writer reads and compares the text to the writing plan.

Bereiter's Model of Writing Development

Bereiter (1979) has proposed a model of writing development based on models of the composing process and information processing views of cognitive development, particularly Pascual-Leone's (1970) theory of cognitive development. According to this theory, cognitive development occurs due to an increase in the number of mental schemes that can be kept active in working memory. Scardamalia (in press) argues that mature writing requires attention to a number of skills, such as "handwriting, spelling, punctuation, word choice, syntax, textual connections, purpose, organization, clarity, rhythm. . ." Attention to these different skills is possible because of automatization of lower-level processes and increasing efficiency in alternation between processes.

Bereiter categorized the skills involved in mature writing into six skill systems. These are: writing fluency, that is, mastery over the skills of letter and word formation; ideational fluency, (skill at retrieving and organizing ideas); knowledge of conventions of writing, such as handwriting, spelling, and genre conventions; social cognition; literary evaluation skills; and reflective thought.

In the model, development is assumed to proceed in stages, which integrate lower level skills first followed by higher level skills. Lower order skills are those which are

necessary for a written product of any quality to emerge. They include idea production skills and letter and word formation skills. Higher order skills are those necessary for producing text adapted to the constraints of writing assignments. They include knowledge of rules for writing, literary evaluation skills, social cognition and reflective thinking skills. Children integrate "what skills they can in order to achieve a functional skill of a higher order" (Bereiter, 1979, p. 155).

The following are the stages in writing development:

1. Associative Writing: Associative writing is a type of writing involving the integration of ideational fluency and writing fluency. At this stage the writer can produce and translate ideas in a process of "controlled association" (Bereiter, 1979, p. 156). During this stage writing is under the control of the stimulus. Bereiter describes this as writing that is "data-driven" rather than conceptually driven. The writer simply writes down thoughts which occur to him as they occur and stops when he runs out of ideas. If the topic is familiar and can be assimilated to a network in semantic memory, a coherent, complete text can result.

Support for the existence of this phase comes from Flower (1979) who has described the products of immature writers and from Britton (1975) who found that expressive writing, centered around the discovery of ideas, was the first type of rhetoric mastered by students.

2. Performative Writing: In the associative stage, the writer's attention is focused on the processes of idea

generation and producing written letters and words. In the performative stage of writing development, the writer can also attend to the written product. As a result, he can begin applying mechanical and stylistic conventions for written English to his text. These include rules for correct spelling, grammar, sentence formation etc.

3. Communicative Writing: Communicative writing is the product of the integration of performative writing with social cognition. While knowledge of the recipient has been found to shape the oral messages of children as young as four years of age (Shatz and Gelman, 1973) in writing tasks, the requirement to produce text of some length which conforms to rules for written discourse must be accomplished first. Writing situations also are more difficult with respect to social cognition because communication occurs in the absence of a reader, and a shared context. As a result, many writers never achieve the communicative writing stage.

4. Unified Writing: In the communicative writing stage the writer takes account of the process, product and reader. In the unified writing stage, consideration of the reader's perspective is integrated with knowledge about literary quality. The writer produces text using his perspective as a critical reader. The writing process now involves a conscious effort to produce composition that is both an aesthetically pleasing object and a document reflecting the writer's personal style.

5. Epistemic Writing: Epistemic writing involves the integration of reflective thought with unified writing skills.

Written language differs from spoken, because it allows for the external storage, review, and alteration of information. In combination with formal thinking skills, it is ideal for prose which involves the development and analysis of ideas. Theoretical writing is prose of this type.

In summary, Bereiter proposes a heirarchical model of writing stages. This model is based on information processing theiries of cognitive development, such as Pascual-Leone's. It assumes that writing skills are schemes which take up space in working memory. Writing development begins with the integration of lower order skills to achieve at most a functional performance and proceeds through stages involving the integration of skills which allow for adaptation to constraints of the writing task, such as the teacher, the audience, the writer's critical knowledge, and the writer's thoughts. With practice, lower order skills require less attention, which can be devoted to mastering higher level skills. Bereiter proposes that six skills are part of the repertoire of able writers. These include mastery of writing, skills at generating ideas, knowledge of conventions of written language, audience awareness, literacy evaluation, and reflective thinking skills.

The first stage of development, the associative stage, is oriented around the most basic demands of writing tasks (getting content on paper). It combines the skill of producing ideas with skill at forming letters and words.

In the next stage, performative writing, the writer begins to adapt to the demand for correct prose. In this

stage, the writer can employ conventions such as penmanship, etc. This stage involves attention to the text as well as to the writing process.

Communicative writing occurs when the writer is able to combine performative writing skills with awareness of audience needs. Even though very young children can alter a message based on a recipient's needs, writers typically do not integrate this skill into their writing behavior until they have mastered skills for content and text production.

Unified writing results when skill at considering the view of the reader is integrated with the writer's knowledge of his response as a reader. With this orientation, the writer can begin producing a written product that is pleasing to him as a reader, using his critical knowledge of literature. The formation of a feedback loop between reading and writing allows the development of an individual style.

Research has not been conducted to test the model of writing development. Some studies have investigated the development of features which are related to the model. In the following section, an attempt is made to review these studies as well as theory and research from which measures for testing the model can be derived.

"Process-Oriented" Research on Writing Development

Evidence Related to Associative Writing

"Writer-based" or associative prose has been investigated by Flower (1979). According to her, writer-based

prose has a unique structure and form. Whereas reader-based prose is typically organized around key concepts, a structure suited to the reader, writer-based prose "reflects the associated narrative path of a writer's own confrontations with the subject" (Flower, 1979, p. 24). Writer-based prose can follow two formats. The first, the narrative format, contains ideas or propositions linked by temporal connections. This format reflects the structure of episodic memory, a primitive memory for specific events. Use of this format simplifies writing, because it allows the writer to present ideas in the order in which they are discovered or to embed logical relations, such as causal relations, in the events which produced them.

Writer-based prose may also follow a survey format. In this type of writing, the writer uses the internal structure of the writing stimulus, such as a picture or book to organize his prose. Thus, his composition can be a spatially organized description, if the task is to describe his apartment, or a chapter by chapter account of a book for a book report. Use of a survey format allows the writer to perform "a memory dump" of information, eliminating the necessity for reconceptualization of facts. It also removes the writer's need to generate a communicative purpose - to adapt to the communicative demands of the situation.

The form of writer-based prose also has unique characteristics. Preoccupation with the idea production process leads to an inability in the writer to shift attention from the proposition immediately under construction. The result is prose which is similar to egocentric speech (Vygotsky,

1962). It consists mainly of predicates, that is, actions or relations. The subjects of propositions, while known to the writer, are often implicit or are referred to by nouns and pronouns which have meaning only for the writer. A written text as a form of representation should express meaning autonomously. Unlike a speaker, a writer cannot rely on the external situation, gestures, intonations or other non-linguistic cues to convey his meaning. In order to produce an autonomous text, he must indicate the topic, and the relationship between successive sentences. In addition, written prose as a system of representation, is primarily employed to express and develop "ideational" meaning rather than "interpersonal meaning" (Halliday and Hason, 1979). Writers express ideational meaning by establishing a theme and using successive ideas to develop the theme.

The encoding of topic and relationships between ideas occurs through the use of linguistic devices which allow for the expression of different levels of meaning in an utterance (Clark and Clark, 1978). Linguists have divided the content of sentences into three parts: thematic structure, propositional content and communicative intention. The thematic structure is the aspect of a sentence which indicates the topic and relates it to other parts of the discourse. The propositional content is the predicate and noun(s) the speaker or writer wishes to convey in that sentence. It also is referred to as the comment. The communicative intention is the speaker or writer's purpose in uttering a sentence (e.g., to command, declare, propose).

The distinction between topic and comment is similar to a distinction by Clark and Haviland (1974) between given and new information. Given information is the information in a sentence which is known to a recipient. New information refers to content newly conveyed in a sentence. For example, in the following sentence, The one who bought my car was John, the structure indicates that the information that someone bought a car and that the car belonged to the speaker is the topic of the conversation and is known to the recipient. The sentence introduces a comment or new proposition about who bought the car.

There are several linguistic devices for marking topic and/or given information and comment and/or new information. Definite articles (e.g., the) indicate that a referent is known to the recipient, while indefinite articles (e.g., a, an) indicate that a referent is not known or able to be identified. Pronouns are used to indicate known information. Topic and comment can also be conveyed through the use of structural devices. Most commonly the grammatical subject of a sentence is used to refer to the topic, while the comment is expressed by the predicate. For example, in the following sentence: The church has a new roof, the given information or topic is, The church, which is fronted. That it has a new roof, is the comment or new information, and it is expressed in the verb phrase.

In associative prose, principles related to the writer's cognitive processes, rather than principles for correct usage may dictate the writer's use of topic/comment devices. As

noted, beginning writers often fail to mention the topics of sentences or use pronouns and definite articles inappropriately. Principles of cognitive processing may also determine their use of structure rather than topic/comment considerations. Factors such as vividness, motivation of the speaker, and naturalness have been found to influence speakers' choice of subject (Osgood and Bock, 1974). The principle of vividness determines that objects high in activity and affective meaning tend to be mentioned first in a sentence. Components which are important to the speaker or writer also occur early in a sentence. Finally, the principle of naturalness states that the order of constituents in a sentence is determined by the order in which they are attended to. Usually individuals encode the agent of an action, followed by the action and the object of an action, if attending to an action. In the associative stage these principles rather than topic/comment conventions may govern word order choices.

Other types of structural errors also may occur due to the writer's attention to content production. One such error is the failure to combine topic and comment into a single clause, e.g., The man with the hat, he is my boss. A second type of error, the sentence fragment, is usually a predicate, which takes a preceding segment of text as its subject.

Summary

According to Flower, beginning writing has a distinct structure and form. Its structure is either a narrative or survey structure. In the narrative the writer represents ideas in a format which follows the idea discovery process or

embeds perceived relations, such as logical or causal relations, in an event script. The survey form permits the writer to represent information by using the structure of the subject itself. The form of writer-based prose also reflects the idea generating process. Topics of sentences are often omitted. Other errors in form characterize writer-based prose. These include ambiguous pronouns, articles and nouns, and poor sentence constructions.

Evidence Related to Performative Writing

Bereiter believes that from the time they begin to write, children's composing processes are similar to those of mature writers. Writing development consists of the "gradual refinement and elaboration of schemes at different levels in the process" (Bereiter, 1979, p. 152). Once lower level schemes are developed, schemes higher in the heirarchy of composing processes can be perfected. One way to view the level of schemes is in terms of their salience to the writer. Most salient are probably the writer's long term memory and strategies for retrieving and organizing content. These schemes are developed in the associative stage. Less salient is the task environment. The text is probably the most salient feature of the task environment. Schemes for perfecting it are developed in the performative stage.

A second way to view the development of abstract schemes is in terms of information processing and writing. Like reading, writing is an act which makes use of several knowledge sources. In the information processing view of reading,

knowledge of letters, letter-sound correspondences, and word segments are used to identify individual words. The reader then uses his knowledge of syntax to parse the input into constituents. Finally, the contents of semantic memory are applied to assign meanings to sentences and to build a meaningful representation. In writing, the writer must proceed in the reverse direction. The associative stage of writing development involves semantic memory and enough knowledge of text characteristics necessary to translate propositions into workable prose. After these elements are under control, linguistic knowledge about the surface features of the text is employed. Linguistic knowledge can range from rules governing whole texts, e.g., text grammar and governing inter-sentence relationships to rules for sentences and words.

The purpose of this study was to examine the development of the following conventions governing different levels of text: discourse structure, cohesion, sentence correctness, punctuation, and spelling.

Discourse structure in narrative. In models of the composing process, it is hypothesized that after constructing a representation of the discourse problem, writers retrieve an appropriate discourse schema. This schema is a representation of the content categories in a type of discourse and the relations between them. Discourse schemata are defined as generalized representations of types of discourse situations, acquired through repeated experience.

Until recently, research on discourse processing focused on the investigation of the role of discourse schemata in the

comprehension and retention of prose. Bartlett (1932) was among the first investigators to study memory for prose. He found that in recalling a story, subjects did not remember verbatim the structural or semantic elements of a story but recalled versions in which transformations, deletions, and elaborations of the original material had occurred. The transformations were not random, but corresponded to the subjects' culturally acquired knowledge of cause and effect. Based on his findings, Bartlett argued that subjects used schemata to interpret discourse. A schema is an "active organization of past reactions and experiences which are always operating in any well-developed organism" (Bartlett, 1932, p. 20). Comprehension involves an interaction between schemata and entering information; new material is assimilated to schemata, while, at the same time, schemata are modified to fit new experiences. Comprehension and memory for prose are constructive processes during which subjects attempt to form an overall representation of a story and to remember single elements based on their expectations about the whole.

Recently, researchers (Rumelhart, 1975; Mandler and Johnson, 1977; Stein and Glenn, 1979) have developed grammars of the mental structures used in story recall. Stein and Glenn's grammar is representative of this work. According to it, the basic unit in a story is the proposition. This unit contains a predicate: an action or some relation, and one or more arguments. The propositions in a story are of certain types. These categories of information or nodes are differentiated according to their function in the story.

Stein and Glenn assume that the categories are organized in a heirarchical network. Categories are related to each other within the network by relations which express the degree of causal influence between successive categories.

The two major nodes in a story are the setting and episode system. The setting category introduces the main character(s) and "describes the social, physical, or temporal context within which the remainder of the story occurs" (Stein and Glenn, 1979, p. 59).

The second major category of a story is the episode system. The episode system can contain one or more episodes. Each episode describes an entire behavioral sequence. An episode contains the following parts: "the external or internal events which influence a character, the character's internal response (goals, cognitions, and plans) to the events, his external response to his goals, and the consequence resulting from his next responses" (Stein and Glenn, 1979, p. 80).

The events which bring about a response in the protagonist are called the initiating events. They can be actions, internal events, or natural events. An action by the protagonist or another character can initiate a response. For example, the main character's action of cheating on a test might cause him to have an internal response. An internal event such as the perception of an object might lead to a desire for the object and some action to obtain it. A natural event is some "change of state" in the external

world, such as a storm which brings about a reaction in the protagonist.

The initiating event is causally connected to the next higher level category: the response category. This category contains the character's internal response to the initiating event and a plan sequence. The internal response category includes statements describing the protagonist's affective, cognitive, or goal responses to the initiating events. Each of these types of responses can occur in the internal response category.

The internal response motivates the character's plan sequence. The plan sequence is a higher level category containing the protagonist's internal plan and plan application. The internal plan category contains statements describing the character's cognitions about the events and his subgoals for achieving his goal.

The character's internal plans motivate his plan application. The plan application category consists of two categories: the attempt (the character's behavioral responses to obtain his goal) and the resolution (the consequences of his attempt).

The resolution category contains the direct consequence of the character's attempt to obtain his goals and his reaction to the consequence. The direct consequence category contains statements which describe the character's success or failure at reaching his goal, describe any change in events brought about by his attempts, or serve to bring about a reaction in the character. The last category,

the reaction category, contains statements describing the affective, cognitive, or behavioral responses of the character to the consequences of his attempt to reach a goal.

As Stein and Glenn point out, very few stories correspond completely to this model. Most stories contain more than one episode. Stories also can contain more than one setting, internal response or other category. Some elements such as the setting or reaction can occur in another location in a story than the one specified in the grammar. Finally, some elements of a story may be omitted; the internal response and reaction often are omitted from stories because this information is obvious from the initiating event and direct consequence. The internal plan is also not included in many stories. Stein and Glenn specify that in order to be considered an episode, the episode system must at least contain an initiating event or an internal response which initiates a "goal-directed behavior sequence", an action, and a direct consequence.

Several studies have investigated the role of discourse schemata in children's comprehension and recall of narrative (Stein and Glenn, 1979; Mandler and Johnson, 1977). Stein and Glenn (1979) found that children of all ages used story categories in recall. Stein and Glenn also found high consistency across age groups in the categories recalled. The categories recalled most frequently were the setting and direct consequence. Initiating events and attempts were recalled with slightly less frequency. Internal responses

and reactions were recalled least frequently. Stein and Glenn conjecture that the high frequency of recall for the setting category was due to its role as a primary cue in story recall. They hypothesize that the initiating event and direct consequence were recalled frequently because they are central to the "logical progression" of an episode.

Some age differences were found in these studies. Older children tended to recall more propositions and to recall the internal response and reaction categories better than younger children.

Stein and Glenn (1979) examined story structure in stories produced by children. They found that the stories of first and second graders frequently contained only setting information. The stories of older children contained episode systems, but these systems frequently lacked information necessary for the logical progression of events. Stein and Glenn note that logical relations between elements of a story often have to be generated after some idea generation takes place.

Bereiter, Scardamalia, and Turkish (1980) investigated children's conscious knowledge and use of categories of content in stories, arguments, and directions. Children in fourth and sixth grade were interviewed about types of writing and later asked to produce a composition of each type. Children were found to name an average of 3.35 of the categories used in Stein and Glenn's grammar. The mean

number of categories used by children in their stories was 5.51.

Children used more categories in their stories than they were able to name. In addition, they most frequently named categories which were used frequently. However, there was a slight negative correlation between the frequency with which children named categories and the frequency with which they employed them in their stories.

From these results, Bereiter et.al. concluded that "children have a substantial fund of discourse grammar knowledge. . ." but "that the effects of discourse grammar knowledge are not mediated through conscious thought as they evidently are, to some degree in skilled writers" (Bereiter, Scardamalia, and Turkish, 1980, p. 2).

In the present study, children's narratives were analyzed to determine if children appeared to use discourse schemata. The number of categories used by children of different ages and ability groups was determined. Development was measured by calculating the increase over time in the number of story grammar categories used. In addition, the types of categories used were identified. Finally, the correlation between number of categories used and performance on other measures was obtained.

Stein and Glenn argue that stories are understood through a top-down process involving the use of schemata. During comprehension, individuals parse incoming input into categories of content. In the last step of processing individual propositions within each category are assigned a meaning.

Warren, Nicholas, and Trabasso (1979) propose, in contrast, that a bottom-up process is used in story comprehension. They argue that in comprehension the understander begins at one point in a narrative, the focal event, and using world knowledge, attempts to construct an organized semantic representation of the linguistic input.

For example, given the following story,

David left work.

He took the bus home.

He opened the door to his apartment.

He heard shouts from within.

He'd forgotten it was his birthday.

an individual would begin with the focal event: David's hearing shouts from the inside. He would then attempt to construct a meaningful representation of the text using world knowledge, e.g., by recalling what might lead to shouts from within an apartment, what he knows about surprise parties, etc.

The statements centered around the focal event in a narrative are referred to as the event chain. An event chain occurs with reference to a single character. Warren, Nicholas, and Trabasso (1979) categorized the content of event chains along three dimensions important in social cognition: an objective-subjective dimension, an overt-covert dimension, which involves information about the behavior or appearance of an individual vs. psychological information, and a dimension concerning intentionality of behavior.

They also identified inferences used in story comprehension to relate these types of content.

Seven types of propositions can occur in an event chain. These include: 1) states, 2) events, 3) actions, 4) cognitions, 5) displays, 6) impulses, and 7) goals.

A state is an objective condition of the physical world or of a character. An event is an objective change of state which may be caused by the protagonist's actions, another character's actions, or natural causes.

An action is a voluntary external behavior of the main character. A cognition is a voluntary mental behavior, such as thought, perception, judgment, image, or plan.

Displays are involuntary external behaviors of the main character. Such acts as taking flight, or reflex movements would be displays. Impulses are involuntary internal experiences, such as feelings, intuitions, beliefs.

A goal is involuntary or voluntary. It can be referred to in the text as a need, desire, or plan.

These proposition types are "non-heirarchical descriptors" of the types of information in stories. They are connected by an understander into an event structure by logical inferences.

Logical inferences serve to fill in missing slots in the surface structure of a text, or connect basic level events in a higher level structure. The types of logical inferences are: physical causation inferences, motivation inferences, psychological causation inferences, enablement inferences, temporal, and additive inferences.

Physical causation inferences specify the mechanical causes for objective events and states. A physical causation inference would connect the following propositions:

1. He hit the ball (Action)
2. It struck the fence (Event)

Motivation inferences specify the causes for a character's voluntary action, thoughts, or goals. The following propositions would be connected by a motivation inference.

1. Harry's pet canary died (Event)
2. He decided to get a new canary (Goal)

Psychological causation inferences connect involuntary displays, impulses, or goals to their causes. A psychological causation inference would connect the following two propositions.

1. Sarah saw the talking bird show (Action)
2. She laughed at the cockatoo's tricks (Display)

Enablement inferences connect events, actions, and displays to conditions which are necessary for them to occur but are not causal. An enablement inference would connect the following propositions.

1. George started the car.
2. He drove off down the highway.

States, events, actions, thoughts, displays and impulses may occur spontaneously in a story or they may be caused by other events.

Story production, like comprehension, might occur through bottom-up processing. The writer may first generate a focal event and then an event chain using information

logically related to the event. In this study, one question was whether children used semantic knowledge rather than text schema in their stories. It was thought that the use of semantic relations rather than story schemata to organize prose might be reflected in an emphasis on the event chain in a story, which might be apparent in greater use of the focal or initiating event category than other categories. Focal events or initiating events are those which produce a response in the main character. In this study the proportion of propositions in the focal or initiating events category in children's stories was compared to the proportion of propositions in other categories.

Lower level organization in narrative - an alternative view. An alternative to the view that semantic knowledge dictates story production is the argument that even beginning writers use text representation in their story writing. Such a perspective would be supported by Stein and Glenn's finding that young children's narrative products often contain only setting information. If story knowledge is composed of superordinate and subordinate nodes which are temporally organized, it may be that beginning writers include predominantly setting information in their stories because of the primary effect of the setting category in memory for text structure. When writers begin to generate propositional content within that category, the demands of text and idea production may make it impossible for them to return to subsequent categories, e.g., to shift back and

forth between lower level content and the higher level categories. Emphasis on setting information in children's first stories would seem to be evidence that children are using a text structure to produce stories, while emphasis on focal events would seem to indicate that semantic knowledge is being used to guide story production. For this dissertation, the difference between the proportion of propositions in the setting and initiating event categories was of particular interest.

Cohesion. One skill required of writers is the ability to produce organized prose that conveys meaning independent of the context. Bereiter and Scardamalia (1980) point out that integrating ideas in writing is more difficult than in speech. In speech the order of ideas is determined by conversational rules, such as rules for turn-taking. Coherence between ideas is provided by contextual information and by other speakers. However, in writing, a writer must indicate explicitly the topic and the organization of ideas. To do this, writers make use of devices for marking topic and comment.

There are several devices to indicate topic and the relationship between ideas in text. As indicated, grammatical structure is one such device.

A second type of device is the cohesive tie. Halliday and Hasan (1976) have introduced the concept of cohesion to refer to the unity of a text and particularly to the lexical

and syntactic devices used to integrate ideas. A disagreement exists currently about the composing process responsible for providing cohesion (Hidi, 1980). Flower and Hayes (1979) maintain that the construction of cohesive prose occurs during the translation process, while Bereiter assigns this construction to the content processor.

The basic concept in the study of cohesion is the tie. A tie refers to the device used to express a relation and the elements presupposed by it. Some ties can be exophoric, relating an element in the external situation to an item in the text, or endophoric, relating two or more items in a text.

There are several types of cohesion. They differ in the linguistic elements through which semantic relations are conveyed. The types are:

Reference: Reference is a type of cohesion in which the meaning of an item can only be interpreted through reference to another item. Types of referential ties are:

pronominal: e.g., There are several poor readers in the school, but I don't have any of them.

demonstrative: e.g., There are many career opportunities for nurses. These are the ones you should consider.

comparative: e.g., A taller man.

These types of reference can be exophoric or endophoric.

Substitution: A substitution tie is one which relates two items with a similar grammatical function. The different

types of substitution are nominal, verbal, and clausal. The following is a complete list of the items that occur as substitutions:

nominal: one, ones, same

verbal: so

clausal: so, not

Ellipsis: Ellipsis is, according to Halliday, "substitution by zero" (Halliday, 1979, p. 142). Ellipsis exists when a sentence or clause contains empty slots which must be interpreted with reference to some presupposed item in a similar grammatical slot. An example of ellipsis is:

Do you like driving? Not much.

Lexical: Lexical cohesion involves the use of similarity in word meaning to relate items. Lexical ties are of several types:

repetition: Lexical repetition involves repetition of a lexical item, e.g., The volcano erupted killing several people. It is not expected to erupt again.

synonym: A synonym is an item with a similar meaning to the presupposed item, e.g., The average pay for waitresses is very low. Most waitresses need a higher wage.

general noun: A general noun is a word such as people, place, animal, thing used to substitute for a presupposed item, e.g., Our dog bit the mailman again. I don't know what to do with that animal.

lexical superordinate: Use of a lexical superordinate involves use of a category label to substitute for a member of a category, e.g., She is a good principal. The other administrators should follow her example.

collocation: This type of lexical cohesion is created through use of items which are usually associated with each other, such as boy, girl, e.g., The food there isn't very good; neither are the drinks.

Conjunction: Conjunction is different from other types of cohesion because it links clauses, sentences, or larger sections of text. Ties which express conjunction relations include:

additive ties: and, or, in addition, e.g., Yesterday I heard those students talking. And they said the exam was too easy.

adversative ties: but, however, instead, yet, e.g., We wanted to go to the movie. Instead we ended up at the stock car races.

causal: if, consequently, so, because, therefore, e.g., He provided her with jewelry and furs, so she died a wealthy woman.

temporal: then, after, next, e.g., We plan to see Rome first. Then, we'll travel to Switzerland.

In summary, unity within a text is provided in part by linguistic elements which express relations between items. Some cohesive ties can be exophoric, linking textual elements

to elements in the situation, or endophoric, linking textual elements. The types of cohesive relations include: reference, substitution, ellipsis, lexical cohesion, and conjunction.

Bracewell (1980) investigated the development of cohesion in children's writing. Fourth, eighth, and twelfth grade students participated in an experiment in which they were asked to write an opinion essay. Students' essays were analyzed using Halliday and Hasan's scheme for analyzing cohesion. The proportion of cohesive ties used by writers at all ages was equal: approximately .40 for all students. Some grade level differences were found in the types of cohesive ties used. Older students used a significantly higher proportion of lexical superordinates and causal conjunctions than younger students. Older students used a higher proportion of endophoric ties than younger students, and there was an increase with age in proportion of inter-t-unit as opposed to intra-t-unit cohesive ties. Bracewell hypothesized, based on Bereiter's model, that difficulty in producing a highly coherent text was due to an inability to attend to surface features of text independent of the semantic content of the composition. In a second study, Bracewell (1980) attempted to examine the effect of content concerns on writing by manipulating the degree of subjects' exposure to content. He exposed children to different amounts of the same content and asked them to write about it. He found that children's inclusion of surface features of text

was inversely related to their familiarity with the content of the composition.

A third study by Bracewell and Scardamalia (1980) examined the potentially interfering effects of the linear form of text on children's ability to express relations between semantic elements. In this study students were presented with several relatable propositions in matrix or in sentence form. They were asked to write an integrated sentence using these propositions. Students in the matrix condition were able to produce more highly integrated text than students in the sentence condition.

In the present study, the cohesion of children's writing at different ages was assessed. Bracewell's findings suggest that the number of ties used by writers does not indicate attention to surface features of text; however, the use of certain types of cohesion, a decreasing use of exophoric ties, and the expression of inter-sentence relations may be indicators of a deliberate effort to produce a readable text.

Some cohesive devices may express more complex relations than others and so reflect greater manipulation of ideas. Others may demand a more conscious control over language. Referential pronouns simply express an identity relation between two words. Additive conjunctions, such as and, can be used to express a relation between elements which were linked together in the idea discovery process, or can express a true co-ordination relationship between elements.

Conjunctions such as adversative or causal conjunctions integrate two or more propositions into a higher level proposition, and so are more complex. For example, the two propositions, "Andrew has a cold," "he is able to go on the field trip," when connected by an adversative conjunction "but" express a single idea, a qualified participation for Andrew. Lexical cohesion may involve more deliberate use of language than other types, because it occurs through vocabulary selection.

The use of endophoric reference rather than text-external reference indicates adaptation to constraints of writing rather than the use of a conversational strategy. The degree to which endophoric ties are used indicates the writer's ability to respond to these constraints and produce text which conveys meaning independent of content. Finally, the use of inter-sentence cohesive ties may be more indicative of attention to the surface text than intra-sentence cohesion. Whereas intra-sentence cohesion can occur simply through operations on the proposition or clause currently being constructed, inter-sentence cohesion may necessitate reading and review of the text because of the limits of working memory.

The development of cohesion in the compositions of fourth, fifth, and sixth grade children was investigated. The frequency with which cohesive ties and lexical ties were used was determined. The proportion of endophoric reference and inter-sentence ties was calculated. Finally, the

relationship between these and other variables was determined. It was expected that increases would occur in the use of each type of tie and that the use of cohesion would be positively related to the use of other conventions.

Mechanics. In the performative stage, writers presumably master conventions of mechanics, such as spelling, punctuation, and sentence usage (Bereiter, 1979). For this study, the maturity of children's spelling, punctuation, and sentence usage was assessed. Each composition was assigned a rating of either poor, minimally adequate, good, or excellent on spelling and punctuation. The use of sentence conventions was assessed by determining the ratio of correct sentences to all sentence-type forms, including sentence fragments and run-on sentences.

The Pattern of Development in Writing

Bereiter has noted that there is insufficient data at present to allow for the characterization of writing development as continuous or discontinuous. Development from one level to another could be gradual: as writers acquire mastery over some skills, they could simply integrate new ones into their repertoires. Alternatively, writing development could occur in stages. Bereiter argues that this pattern would occur if "the writing process has organization and . . . the incorporation of a new skill requires reorganization of the process" (Bereiter, 1979, p. 154).

One question of the present study was whether growth on each feature was linear or discontinuous.

CHAPTER III

METHOD

Subjects

Subjects of the study were fifty-four fourth, fifth, and sixth grade students. The grade levels were selected because important growth in writing achievement has been found to occur during these years (NAEP, 1974; Stahl, 1977).

The subjects were students of teachers who participated in a study of writing instruction conducted by members of the Language Arts Project of The Institute for Research on Teaching.

The fourth graders were drawn from a classroom in Okemos, Michigan. The members of this community are predominately white, upper-middle class professionals. The fifth graders were from Dimondale, Stockbridge, and Lansing. Dimondale and Stockbridge are rural villages near Lansing, where residents are also primarily white but middle to lower-middle class. Lansing is a racially mixed urban community with a mix of social classes. Students in the study were from a school in a lower-middle class neighborhood. The sixth graders were also from this school.

The Woodcock Reading Mastery Test was administered to all students as part of the Language Arts Project at the

beginning of the study. A reading grade total score was obtained by each student. Students were classified into below average, average, or above average reading ability groups using their reading grade total scores. Those students who received a grade level score of 4.5 or below were classified as low reading ability students. Those who obtained grade level scores of between 4.5 and 5.5 were categorized as average, and those who obtained scores above 5.5 as above average in reading ability.

Seven students in the fifth and seven in the sixth grade were randomly selected from each ability group. Only one fourth grade classroom, with eighteen students participating was involved in the study. Seven of the students were of below average ability, five of average, and four of above average ability. The number of fourth grade students made it impossible to use a balanced design. However, since proportional designs can be used without violating assumptions of independence a proportional design was employed. Four students from each ability group were selected from the fourth grade.

Instruments

The Woodcock Reading Mastery Test was employed to test reading ability. The Woodcock contains subtests of the following reading skills: letter identification, word identification, word attack, word comprehension, and passage comprehension. Students' subscores on these subtests are combined to yield a total reading grade score. Test-retest

and split-half reliabilities of the Woodcock have been obtained. Test-retest reliability was .95 and split-half reliability was .97.

The narrative compositions were produced in response to three writing tasks developed by Dr. Laura Roehler and other members of the Language Arts Project. In the first task, students listened to a tape recording of the story of Hansel and Gretel and then were asked to retell the story from the witch's point of view. In the second task, students were shown a photograph of a girl who had fallen in a field and asked to tell a story about it. The third writing assignment was to write a story about a painting of a man sitting on a branch of a tree.

Investigators have demonstrated that the discourse situation and content knowledge affect writing. San Jose (1972) and Perron (1977) investigated the effect of mode of discourse (narrative, exposition, argument, description) on syntactic complexity in children's writing. They found that the degree of sentence complexity was greatest in argument then exposition, narrative, and description. Scardamalia et. al. (1980) found that familiarity of content affected the production of ideas in children's writing.

An effort was made to design tasks which would not require particular content knowledge. In addition, for this dissertation, development in only one mode of discourse

was assessed. However, in this study the stimuli for writing tasks were different. Confounding could have existed between the time of year and measure. The instruments used to analyze writing were the following:

Narrative Structure Instruments

Stein and Glenn's story grammar was used to classify the categories of propositions which occurred in children's stories. The categories of information in a story according to their grammar are:

Setting: The setting provides information about the main character and the spatial, temporal, and physical context of the story. Setting information about the main character is referred to as major setting information. Context information is minor setting information.

Initiating Event: The initiating event initiates the episodic structure of a story. It can be a natural event, action or internal event in the main character. It produces a response in the main character. The response is directed to altering the change of state produced by the initiating event.

Internal Response: The internal response is the character's psychological response to the initiating event. It can be an affective or cognitive response

or goal. The internal response motivates the main character to form a plan.

Internal Plan: The internal plan consists of the character's cognitions and sub-goals about how to produce the desired change motivated by the internal response.

Attempt: The attempt consists of statements about the character's behavioral attempts to produce a desired state.

Direct Consequence: The direct consequence category contains information about the resolution of the character's attempts. It describes some event, end state, or action which relates to the character's goals and functions to produce a reaction in the character.

Reaction: The reaction category contains statements about the character's response to the direct consequence and his achievement or non-achievement of his goal. Reactions can include affective or cognitive responses and actions which occur as the result of the main character's implicit or explicit internal response.

The measures of structure were designed to assess both lower level and text structures in prose.

Warren, Nicholas, and Trabasso's scheme was used to categorize the type of semantic elements and relations in narrative compositions. The propositions in children's stories were categorized as:

States: A state is an objective physical condition in the world or in a character in the story.

Events: An event is an objective change of state which occurs either because of natural causes or another character's actions.

Actions: An action is a voluntary external behavior performed by the protagonist of an event chain.

Cognitions: A cognition is a voluntary internal behavior by the protagonist. Cognitions include thoughts, plans, judgments, decisions.

Displays: A display is an involuntary external behavior performed by the protagonist.

Impulses: An impulse is an involuntary internal behavior of the protagonist. Impulses include feelings, intuitions, dreams, beliefs.

Goals: A goal is an involuntary or voluntary desire, need, or plan of the protagonist.

These propositions may be related by motivation, physical causation, psychological causation, or enablement connections to form the logical structure of a story. The types of logical connections are:

Motivation connections: Motivation connections exist between a voluntary action or cognition and the events which cause it.

Physical causation connections: Physical causation connections exist between an objective event or state or an external behavior and an event which causes it.

Psychological causation connections: A psychological causation connection is a relation between an involuntary action or internal event and the event which causes it.

Enablement connections: An enablement connection links an event to a state of event which is a precondition for it, but does not cause it.

Cohesion Instrument

Cohesive ties were categorized according to the following categories defined by Halliday and Hasan.

References: Referential ties allow interpretation of one item through reference to another item. There are three types:

pronominal - pronouns, e.g., she, he, it

demonstrative - demonstrative pronouns, e.g., these, those, this, that

comparative - comparative terms, e.g., better, worse, best

Substitution: Substitution ties relate two items which share a grammatical function. The types of substitution and items that occur as substitutes are:

nominal - one, ones, same

verbal - do (including tenses)

clausal - so, not

Ellipsis: Elliptical ties are omissions from the surface structure which can be interpreted with reference to an item in the same grammatical slot, e.g., Do you like games? Some.

Lexical ties: Lexical ties relate elements through similarity of meaning. The types of lexical cohesion and the way they are achieved are:

repetition - use of repetition of a presupposed item

synonym - use of a word with similar meaning to another word

general noun - use of a general noun, e.g., people, place - to refer to a specific noun

superordinate - use of a category label to refer to a member of the category

collocation - use of words that are associated, e.g., colors

Conjunction: Conjunctions relate clauses, sentences, and larger units of text. The types of conjunction are:

additive - e.g., and, or, in addition

adversative - e.g., but, however, instead, yet

causal - e.g., if, so, because, consequently, therefore

temporal - e.g., then, after, next

Sentence Correctness

Errors in sentence formation were assessed by classifying the surface structure used by students into the following categories:

Sentence fragments: A sentence fragment was defined as any form punctuated as a sentence which lacked a subject, main verb or both.

Run-on sentences: A run-on sentence was defined as a form, punctuated as a sentence, which contained more than two independent clauses joined either by the co-ordinate conjunction "and" or run together without a co-ordinating conjunction.

Correct sentences: A correct sentence was any form constructed according to rules for correct sentence formation. Sentences which contained two or fewer independent clauses and any embedded clauses were considered correct, even if they lacked capitalization or correct punctuation.

Mechanics:
Punctuation Maturity

Performance on mechanics was assessed using rating scales developed by members of the Language Arts Project. Compositions were assigned one of the four following ratings on punctuation:

Poor: A composition with poor punctuation had many punctuation errors making the composition difficult to read. The errors could be omissions or inappropriately used punctuation marks.

Minimally adequate: A minimally adequate rating was assigned if a composition contained some errors but was readable, and correct usage involved mainly simple forms, such as capitalization.

Good: A composition with good punctuation had few punctuation errors and contained a variety of types of punctuation. However, it did not have the quality of adult writing.

Excellent: Excellent compositions contained no punctuation errors and a variety of punctuation forms like those found in average adult writing.

A score of one was given for a poor rating and a score of four for an excellent rating.

Mechanics:
Spelling Maturity

Spelling maturity was determined by using two scores: a spelling accuracy rating and a combined spelling score, which was the product of the spelling accuracy rating and a rating of the difficulty of word selection. These ratings were developed by Language Arts Project members. The difficulty of word choice rating was included because it was felt that some students might achieve a high degree of accuracy by avoiding difficult words. These dimensions were assessed using two four point scales. The spelling accuracy scale was as follows:

Poor: A poor composition contained many errors making the composition difficult to read.

Minimally adequate: A minimally adequate rating was assigned to readable compositions with some errors.

Good: A good rating was used for compositions with very few misspellings.

Excellent: An excellent composition contained no errors and resembled average adult writing.

The level of difficulty of students' vocabulary was assessed using the following ratings:

Poor: A poor rating was assigned to short selections with a very simple vocabulary.

Minimally adequate: A minimally adequate composition was one of average length with a simple vocabulary.

Good: A good composition was one of average length which included some difficult words, but which did not approach an average adult composition.

Excellent: An excellent rating was assigned to compositions which contained the type of vocabulary found in average adult writing.

Data Collection

The Woodcock Reading Mastery Test was administered to students at the beginning of the study by a member of the project. The writing assignments were given at three times during the year at equal intervals in November, February, and May. The first two assignments were presented by the teacher using a set of instructions developed by Language Arts Projects members. A member of the project was present to assist the teacher and to ensure that the instructions were

followed. The third task was presented by a project member. Students were allowed one hour to complete each assignment.

Data Preparation

Copies of the students' original compositions were used for the cohesion, spelling, punctuation and sentence coding. If a copy was unreadable as was the case for a few compositions, coders were given a typed version. Only about eight compositions were unreadable.

For the text structure and event chain coding, students' compositions were divided into propositions and statements by the author. Warren et. al.'s definition of a proposition as any verbal unit plus one or more nouns which is a basic element of a story was employed. Micro-analysis of the text such as Kintsch (1974) has employed was avoided. Warren et. al. believe that this micro-analysis is unnecessary.

Some propositions seemed to be parts of higher level units which constituted more logical units of analysis. Propositions in these units were grouped together for analysis, and the units were referred to as statements. Two types of statements occurred in stories: quotations, which contained propositions uttered by a character of the story, as well as propositions referring to the speaker and the act of speaking, and statements which contained a new proposition and a repetition of a previously stated proposition. An example of a quotation in a story would be as follows:

1. Cynthia cried,
2. "Help me
3. I'm stuck"

In this case, the unit of meaning in the story seems to be Cynthia's action of crying for help. For this story the three propositions would have been grouped together to form one statement.

An example of a statement which contained a repetition of a previously mentioned proposition would be as follows:

1. Mary's friends came running.
2. They grabbed her and
3. she climbed out of the mud.
4. After she climbed out
5. she ran home.

In this case, the first proposition referring to Mary's climbing out of the mud would seem to be a meaningful element of the story and the second a repetition designed to achieve coherence, which logically belongs with the proposition which follows it. For coding, these propositions were joined and the higher level unit coded.

The propositions in students' stories were typed and numbered. Propositions which were joined together in statements were bracketed. Coders were then given a copy of the typed version.

Data Reduction and Analysis

Students' compositions were coded for the features of text structure, cohesion, sentence correctness, punctuation,

and spelling. The coding procedure was as follows:

The author analyzed students' compositions for sentence correctness since sentence completeness is an objective, easily observed dimension. The punctuation and spelling assessment in the fall and spring was conducted by Language Arts Project members. Punctuation and spelling were two dimensions of a holistic assessment of students' compositions carried out by the Language Arts Project. The raters were faculty and graduate students at Michigan State University. They were trained for a period of three weeks. At the end of this period, rater agreement was adequate and Project members coded the remaining compositions independently.

Since the holistic assessment was conducted only on compositions produced in the fall and spring, two additional raters were trained by the author to rate the winter compositions. The raters were a graduate and undergraduate student at Michigan State. They received instructions on the rating systems and practiced on four compositions at an initial training session. They then discussed their evaluations with this author and received a review of the instructions. Ten compositions were given to the coders to be double coded. The percent of agreement was calculated for each feature. For punctuation, it was 62%, for spelling accuracy, 70%, and for difficulty of word choice, it was 61%. Because of the low inter-rater agreement and the small number of compositions remaining, the decision was made to

double code the remaining compositions. Disagreements in ratings were resolved by the author.

For the analysis of text structure, event chain representation and cohesion, the procedures were identical and were as follows: Two coders were assigned to code each feature. Five of the six were undergraduate students at Michigan State University. One graduate student was employed to code cohesive ties. None of the coders was familiar with the study or the hypotheses being investigated.

The coders were given instructions at an initial session and two compositions for coding practice. The author then discussed their coding with them and reviewed instructions. Twenty identical compositions were given to each coder each week for two weeks. Coders met after each week to discuss the completed coding. The percent of coder agreement was determined at the end of the second week.

For the cohesion coding the percent of agreement was determined for each tie. Agreement about each type or if there were subcategories, for each subcategory, was determined. Agreement about endophoric reference and intersentence cohesion was also determined. Failure to count an item as a tie and conflicts about the type of tie were counted as disagreements. For the text structure and event chain coding, the percent of agreement with respect to each proposition were determined. For the event chain coding the proportion of agreements for connections was also determined.

Percentage of agreement was used to capture inter-coder agreement because the data were nominal. Percent of

agreement was the ratio of the number of agreements to the number of agreements plus disagreements.

At the end of the second week of training the percent of agreement for the cohesion coding was 81%. For the story structure coding it was 72%, and for the event chain coding, 75%.

At the end of the two weeks coders were told that they would be coding different compositions but that their agreement would be checked at random. For the next seven weeks, coders received twenty compositions to code. Every seventh composition was double coded. The proportions of agreement for the double coded compositions were as follows: For cohesion, (.80, .83, .70, .79, .89, .86, .81, .86, .88, .90, .76, .97, .90, .81); for story structure, (.74, .83, .79, .70, .65, .83, .80, .48, .76, .81, .70, .75, .85, .77); and for the event chain coding (.88, .65, .75, .74, .45, .84, .88, .88, .94, .87, .77, .76, .93, .75). The coders continued to meet every week with the author to discuss any problems they were having and to review the coding instructions.

Design

The design was a repeated measures design with two independent factors with three levels each. The two independent factors and levels were: grade (fourth, fifth, and sixth) and reading ability (above average, average, and below average). The dependent variables were the variables of story structure, cohesion, sentence correctness,

punctuation, and spelling discussed in the hypothesis question. They include:

1. the mean number of categories from Stein and Glenn's story grammar

2. the mean number of content categories from Warren et. al.'s event chain representation

3. the mean proportion of cohesive ties

$$\frac{\text{\# of cohesive ties}}{\text{\# of words}}$$

4. the mean proportion of lexical ties

$$\frac{\text{\# of lexical ties}}{\text{\# of words}}$$

5. the mean proportion of endophoric referential ties

$$\frac{\text{\# of endophoric referential ties}}{\text{\# of total referential ties}}$$

6. the mean proportion of between-sentence ties

$$\frac{\text{\# of between-sentence ties}}{\text{\# of between and within-sentence ties}}$$

7. the mean proportion of correct sentences

$$\frac{\text{\# of correct sentences}}{\text{\# of sentence fragments, run-on, and correct sentences}}$$

8. the mean punctuation rating

9. the mean spelling rating

The dependent variables included the proportion of propositions in each category of Stein and Glenn's story grammar.

The following were the testable hypotheses of the study:

1. H1: there will be an increase over time in the following features of children's stories:

   a. the mean number of categories from Stein and Glenn's story grammar

b. the mean proportion of lexical ties

c. the mean proportion of cohesive ties

d. the mean proportion of endophoric referential ties

e. the mean proportion of between-sentence ties

f. the mean proportion of complete sentences

g. the mean rating on punctuation

h. the mean rating on spelling accuracy

i. the mean combined spelling score

2. Hl: There will be no increase over time in the number of content categories in children's stories.

3a. Hl: There will be a significant difference between the fourth, fifth, and sixth graders in each feature discussed in the first hypothesis.

3b. Hl: There will be a significant difference between the fourth, fifth, and sixth graders in the pattern of growth on each feature.

4. Hl: There will be a significant difference between students of above average, average, and below average reading ability in each feature discussed in the first hypothesis.

The pattern of growth on each variable and the relationship between dependent variables was determined. Finally, the proportion of propositions in the setting category as opposed to the initiating event category was obtained.

Statistical Analysis

Four multivariate analyses of variance of repeated measurements were employed to test the main hypotheses and

to determine the pattern of growth for each variable. Pearson Product Moment Correlations between the dependent variables were obtained to determine their relationships.

CHAPTER IV

RESULTS

The purpose of the analysis was to trace the development in children's narratives of features associated with the performative stage of writing development.

Four 3x3 multivariate analyses of repeated measures were performed on the measures of story structure, cohesion, sentence correctness, punctuation, and spelling. The factors in the analysis were: Grade (Four, Five, and Six) and Reading Ability Level (Above Average, Average, and Below Average). Each measure was taken on three occasions. Polynomial contrasts were performed to independently assess the linear, and quadratic trends for the set of measures. If a multivariate analysis indicated a significant effect for any factor, univariate analyses of factor effects on each measure were performed. The major analysis was conducted on the variables of: number of story grammar categories, proportion of cohesive ties, proportion of correct sentences, punctuation rating, and spelling accuracy rating. Included in the other analyses were other cohesion variables and the combined spelling score. The results will be discussed for each hypothesis. Interactions will be discussed first. If no interactions were found in the overall analyses making it possible to consider main effects, these effects will be discussed.

Hypothesis #1: There will be a significant increase over time in the mean number of story grammar categories, the mean proportions of cohesive ties, lixical ties, endophoric referential and between-sentence ties, the mean proportion of correct sentences, the mean punctuation rating, and the mean spelling rating.

The design over measure analysis in the first multivariate analysis of repeated measures revealed no significant Occasion X Grade X Reading Ability interaction. However, a significant Occasion X Grade interaction was obtained for the linear component of the Grade effect, $F(12,34) = 4.22$, $p<.0005$. Univariate analyses indicated significant Occasion X Grade interactions for the linear term of the story structure measure, $F(1,45) = 14.57$, $p<.0005$, the linear term of the cohesion measure, $F_{lin}(1,45) = 9.45$, $p<.004$, and the linear and quadratic term of the spelling accuracy measure, $F_{lin}(1,45) = 5.91$, $p<.02$; $F_{quad}(1,45) = 5.19$, $p<.03$.

The Occasion X Grade interactions in general seemed to be due to the fourth graders' showing the greatest improvement on the greatest number of measures and to a decline in performance by the sixth graders at Time 3.

The Occasion X Grade interaction for the number of story grammar categories indicated that the number of story grammar categories in fourth graders' writing increased over the year. The number in fifth graders' stories remained constant between Time 1 and Time 2 and decreased between Time 2 and Time 3, and the number in sixth graders' stories

decreased between Time 1 and Time 3. Cell means for this interaction are as follows: Fourth graders (4.50, 4.75, 5.00); Fifth graders (4.90, 4.90, 4.57); Sixth graders (5.71, 4.95, 3.57).

The Occasion X Grade interaction for the proportion of cohesive ties indicated that the proportion of cohesive ties in fourth graders' writing decreased from Time 1 to Time 2, but increased from Time 2 to Time 3. Cohesive ties in fifth and sixth graders' writing decreased from Time 1 to Time 3. The cell means for this interaction were: Fourth graders (.37, .34, .38); Fifth graders (.37, .35, .34); Sixth graders (.41, .36, .32).

Univariate analyses also indicated a significant Occasion X Grade interaction for the spelling accuracy rating. This interaction resulted from an improvement during the year by the fourth and fifth graders' spelling accuracy. The sixth graders' accuracy improved from Time 1 to Time 2, but declined from Time 2 to Time 3. Cell means for the three times are as follows: Fourth graders (2.00, 2.17, 2.91); Fifth graders (1.71, 2.09, 2.14); Sixth graders (1.76, 2.19, 2.05).

The univariate tests revealed no significant Occasion X Grade interaction for the variables of punctuation maturity and the proportion of complete sentences. Therefore, it was possible to examine the main effect for Occasion. A significant main effect for Occasion was found in the overall analysis, $F(12,34) = 4.99$, $p<.0002$. The univariate tests revealed a significant linear trend for the punctuation

variable, $F_{lin}(1,45) = 6.47$, $p<.01$ and a significant quadratic trend for the sentence correctness variable, $F_{quad}(1,45) = 5.60$, $p<.02$. The students showed a steady improvement over the year in punctuation. The means for the three times for this variable were: 1.74, 1.92, and 1.98. The proportion of correct sentences increased from Time 1 to Time 2 but decreased from Time 2 to Time 3. The mean proportions for each time were: .68, .75, and .68.

In order to test the hypotheses that the proportion of lexical ties, endophoric referential ties and between-sentence ties would increase, three additional multivariate analyses of repeated measures were performed. One analysis was also employed to test effects for the combined spelling score. The first additional multivariate analysis was performed on the variables of lexical cohesion, the combined spelling score, the proportion of correct sentences, the story structure and content measures. Only effects for the lexical cohesion and combined spelling score which were not tested in the main multivariate analysis will be discussed. The analyses revealed a significant Occasion X Grade X Reading Ability interaction, $F(48, 133) = 1.45$, $p<.05$. Univariate tests indicated that an Occasion X Grade X Reading Ability interaction existed for the combined spelling score. The interaction is complex and difficult to interpret. The fourth graders at all ability levels, the fifth graders of average and below average ability, and the sixth graders of below average ability showed some improvement in their combined spelling scores over the year. The

above average fifth graders and the average sixth graders received lower scores in the spring than in the winter. The above average students' scores dipped in the winter.

The second additional multivariate analysis was performed on the measure of endophoric reference as well as the story structure, sentence correctness, punctuation, and spelling accuracy measures. Only effects for the endophoric reference variable will be discussed. The overall analysis revealed no significant three-way interaction. It did indicate a significant Occasion X Grade interaction for the linear term of the Grade effect, $F(12,34) = 3.36$, $p<.003$. The univariate analyses revealed a significant Occasion X Grade interaction for the quadratic term for endophoric reference, $F_{quad}(1,45) = 5.55$, $p<.02$. The Occasion X Grade interaction resulted from the fact that the fourth graders' use of endophoric reference remained constant from Time 1 to Time 2 and increased from Time 2 to Time 3, while the fifth graders' use of endophoric reference increased from Time 1 to Time 2 but remained constant from Time 2 to Time 3. The sixth graders showed growth in the use of these ties from Time 1 to Time 2 but their performance decreased from Time 2 to Time 3. Means for these groups were as follows: Fourth graders (.67, .68, .88), Fifth graders (.64, .73, .74), Sixth graders (.59, .74, .60).

The final multivariate analysis was conducted on the measure of between-sentence cohesion as well as the story structure, sentence correctness, punctuation, and spelling measures. Again, only the variable of interest: the

proportion of between sentence ties will be discussed. There was no significant Occasion X Grade X Reading Ability interaction in the overall analysis. There was a significant Occasion X Grade interaction, $F(12,34) = 3.31$, $p<.003$, however, for the linear component of the Grade effect. The univariate F test for the Occasion X Grade interaction for the proportion of between-sentence ties was not significant. There was a main effect for Occasion in the overall analysis. Examination of the univariate tests for the Occasion main effect indicated no main effect for Occasion on the proportion of between-sentence ties.

In summary, four multivariate analyses of variance of repeated measures were performed to test the hypothesis that there would be significant improvement over the year in students' use of conventions for producing written prose. The results indicated a significant improvement in some conventions. However, improvment varied as a function of the type of convention and the grade of the student. In addition, the use of certain features showed no increase or decrease over the year for some students.

Students showed the greatest improvement in the use of mechanics, such as spelling, punctuation, and sentence conventions. Punctuation increased over the year for all students. Spelling accuracy improved, except for sixth graders from Time 2 to Time 3. Sentence correctness improved from Time 1 to Time 2, but decreased from Time 2 to Time 3. Students may have shown the most improvement in their use of mechanics, because these conventions require attention to the

surface features of text, such as letter and word formation, and sound-letter relationships rather than to the semantic aspects of texts. Use of these conventions may require less depth of processing during editing. In addition, these skills traditionally receive more emphasis from teachers. Research has demonstrated that teachers devote more time to the instruction of mechanics than to the instruction of other aspects of composing. Finally, the mechanical skills may have shown greater improvement because they are skills applied during editing which the production of cohesive text, for example, is not. The use of sentence conventions may have shown less improvement than the use of other surface conventions because they apply to larger units of text than spelling and punctuation conventions.

The use of devices to produce coherent, organized prose showed less improvement than the use of mechanics. The only type of cohesion to improve was endophoric reference. The proportion of cohesive ties decreased over the three times in fifth and sixth graders' writing and from Time 1 to Time 2 in the writing of fourth graders. The use of lexical cohesion showed no increase over time for any grade and there also was no increase in the use of between-sentence ties. Students did show improvement in their use of endophoric reference, indicating an adaptation with time to the demands inherent in writing situations for explicit reference.

The use of text structure also showed less improvement than the use of mechanics. The number of story grammar

categories decreased in the writing of fifth and sixth graders but increased in the writing of fourth graders.

The absence of significant improvement over time in the use of most types of cohesion and text structure may have been due to the greater difficulty involved in operating on semantic and structural aspects of text. An alternative explanation is instructional: teachers traditionally do not offer instruction in structural elements or devices for improving coherence. Schemes for using cohesive ties and story grammar may be applied during the planning process, rather than as part of editing, and so may be independent of conventions for improving text. A related explanation which would clarify the decline over time in the number of story grammar categories used by fifth and sixth graders and the decline in the proportion of cohesive ties is that attempts to apply mechanical conventions may interfere with skills of idea generation and organization. Students may regress in certain skills while attaining mastery over others.

Table 1 shows the means, standard deviations, and univariate F statistics for the Occasion effect. Table 2 shows the means, standard deviations, and univariate F statistics for the Occasion X Grade interactions.

TABLE 1 - Occasion Effect

TABLE 1 - Occasion Effect

Variable	Time 1 Mean	Time 1 S.D.	Time 2 Mean	Time 2 S.D.	Time 3 Mean	Time 3 S.D.	Univariate F	* = p<.05 ** = p<.01 *** = p<.001
Proportion of cohesive ties	.38	.05	.35	.06	.34	.07	F_{lin} F_{quad}	12.11*** 2.91
Proportion of lexical ties	.08	.03	.08	.04	.09	.05	F_{lin} F_{quad}	2.64 .00
Proportion of endophoric reference	.63	.23	.72	.25	.72	.27	F_{lin} F_{quad}	3.98* 1.92
Proportion of between-sentence ties	.64	.23	.66	.25	.64	.31	F_{lin} F_{quad}	.65 .55
Punctuation rating	1.74	.80	1.92	.67	1.98	.79	F_{lin} F_{quad}	6.47* .45
Proportion of correct sentences	.68	.22	.75	.24	.68	.31	F_{lin} F_{quad}	.02 5.60*
Combined spelling score	4.33	3.05	5.02	2.46	5.80	2.98	F_{lin} F_{quad}	30.33*** .03
Spelling Acc.	1.80	.83	2.15	.79	2.28	.90		
Number of story grammar categories	5.13	1.67	4.89	.74	4.28	1.73	F_{lin} F_{quad}	9.58** .93

TABLE 2

Grade x Occasion Interactions

Variable	Grade	Time 1 X	Time 1 S.D.	Time 2 X	Time 2 S.D.	Time 3 X	Time 3 S.D.	Univariate F * = p<.05 ** = p<.01 *** = p<.001
Spelling Accuracy	4	2.00	.74	2.17	.94	2.92	.90	Grd-Lin
	5	1.71	.78	2.09	.83	2.14	.79	$V_{128\ Lin} = 5.91^{*}$
	6	1.76	.94	2.19	.68	2.05	.86	$V_{128\ Quad} = 5.19^{*}$
Proportion of Cohesive ties	4	.37	.06	.34	.05			Linear Grade
	5	.37	.04	.35	.05			$C_{1\ Lin} = 9.45^{**}$
	6	.41	.04	.36	.08			
Proportion of Endophoric Referential Ties	4	.67	.21	.68	.29	.88	.06	Linear Grade
	5	.64	.25	.73	.27	.74	.31	$C_{17\ Quad} = 5.54^{*}$
	6	.57	.22	.74	.22	.60	.27	
Number of Story Structure Categories	4	4.50	1.93	4.75	1.05	5.00	1.04	Linear Grade
	5	4.90	1.89	4.90	.44	4.57	1.66	$V_{3\ Lin} = 14.57^{***}$
	6	5.71	1.05	4.95	.80	3.57	1.91	

Hypothesis 2: There will be no increase over time in the number of content categories in children's stories.

The four multivariate analyses were conducted with the number of content categories as one dependent variable. Results of the univariate tests indicated that the linear and quadratic trends for the content variable were significant, $F_{lin}(1,45) = 7.62$, $p < .01$; $F_{quad}(1,45) = 6.62$, $p < .01$. The means for the three times for content categories were (4.39, 4.61, 3.37).

The content categories were the types of propositions from Warren, Nicholas, and Trabasso's scheme. It was thought that the number of propositions a writer used would be determined by his ideational fluency and that since ideational fluency is presumably mastered prior to conventions for writing the number of categories should not increase over the year. The results reported above indicate that the number of content categories increased slightly from Time 1 to Time 2 but decreased from Time 2 to Time 3. Thus, only partial support of hypothesis was obtained. There was development on this feature from Time 1 to Time 2, but not from Time 2 to Time 3.

Table 3 shows the means, standard deviations, univariate F statistics, and p values for the content category variable.

TABLE 3

Variable	Time 1 $\bar{X}$	Time 1 S.D.	Time 2 $\bar{X}$	Time 2 S.D.	Time 3 $\bar{X}$	Time 3 S.D.	Univariate F * = $p<.05$ ** = $p<.01$ *** = $p<.001$
Number of Content Categories	4.39	1.16	4.61	1.36	3.78	1.57	$F_{lin} = 7.62$** $F_{quad} = 6.62$**

Hypothesis 3a: There will be a significant difference between the fourth, fifth, and sixth graders in the variables discussed in the first hypothesis.

Hypothesis 3b: There will be a significant difference between children in the fourth, fifth, and sixth grades in the pattern of growth on each feature. There was no significant main effect for grade in the four multivariate analyses. However, Occasion X Grade interactions were found in the overall analyses, as reported, supporting the second hypothesis. Univariate tests revealed significant Occasion X Grade interactions for the spelling accuracy, overall cohesion, endophoric reference, and text structure measures. The results of the univariate tests have been reported and will simply be summarized here.

The fourth and fifth graders' spelling accuracy scores improved over the year. The sixth graders' spelling accuracy scores improved from Time 1 to Time 2 but declined from Time 2 to Time 3. Overall cohesion showed a decline over the year, in the fifth and sixth graders' writing. In the fourth graders' stories, cohesion declined from Time 1 to Time 2 but increased to its original level at Time 3. The number of story grammar categories in the writing of fifth and sixth graders declined over time, while the number of story grammar categories in fourth graders' stories increased over the year.

The absence of a main effect for grade level on any feature is surprising, since Bereiter (1979) has theorized and researchers have discovered that writing ability improves

with age. The absence of age differences may be attributable to social class differences between the students in the different grades. Socioeconomic status was inversely related to grade in this sample. Upper middle-class families have been found to use more objective, elaborate language with their children than lower class families, who seem to use a semantically confined, subjective code (Bernstein, 1964). The fourth graders may have had linguistic ability which compensated for the greater age and experience of the other students.

The Occasion X Grade interactions for the spelling accuracy, cohesion, endophoric reference, and text structure measure may be attributable to social class background or other features associated with grade level. The fourth graders, who had an upper middle-class background, showed consistent improvement on the greatest number of measures. The fifth graders, who were from a middle-class background, showed consistent improvement on some measures but a decline in performance on others. The sixth graders showed improvement on some measures, but only from fall to winter. Their performance on others declined. The types of measures which showed the least improvement generally were text structure and cohesion. Students from advantaged backgrounds may have had more ability to master linguistic devices for integrating content and for organizing than students from less advantaged backgrounds.

Instructional factors may also have accounted for differences in the pattern of growth. The fourth graders could have had more instruction in writing or in text structure and cohesion, than students in other grades. The decline in the performance by sixth graders in the spring may be attributable to their particular instructional experience. They were attending graduation exercises and other activities during the last few months of school and so may have spent less time in academic activities.

There may also have been grade level differences in motivation which accounted for differences between grades in the pattern of growth. Finally, low correlations between students' performances at different times on the cohesion and text structure measures were found. The absence of an occasion effect may have been due to lack of reliability in these measures.

Hypothesis 4: There will be a significant difference between students of above average, average, and below average reading ability on the variables discussed in the first hypothesis.

The first multivariate analysis on the number of story grammar categories, proportion of cohesive ties, proportion of correct sentences, spelling accuracy rating and punctuation rating revealed no significant Occasion X Grade X Reading Ability interaction. There was no significant interaction between Reading Ability and Grade or Occasion. Therefore, the main effect for Reading Ability could be examined. A significant main effect for Reading Ability was obtained,

$F(12,80) = 4.39$, $p<.0001$. Univariate analyses revealed a significant effect for reading ability on the measures of sentence correctness, $F(2.45) = 5.18$, $p<.01$, spelling, $F(2,45) = 25.09$, $p<.0001$ and punctuation, $F(2,45) = 24.52$, $p<.0001$. The means for the three groups were as follows:

Spelling Accuracy Rating:

Above Average (2.55, 2.72, 2.89)

Average (1.50, 2.11, 2.11)

Below Average (1.33, 1.61, 1.83)

Punctuation Rating: Above Average (2.33, 2.39, 2.61)

Average (1.55, 1.94, 1.44)

Below Average (1.33, 1.44, 1.44)

Proportion of Correct Sentences:

Above Average (.80, .81, .88)

Average (.63, .72, .62)

Below Average (.61, .73, .55)

The second multivariate analysis of the measure of lexical ties, the combined spelling score, and the other variables revealed a significant Reading Ability X Grade X Occasion interaction, $F(48, 133) = 1.45$, $p<.05$. Univariate tests indicated a significant Reading Ability X Grade X Occasion interaction for the combined spelling scores.

As noted, the groups showed very complex patterns of growth. There was an increase in the combined spelling score over the year for the fourth graders of all ability levels, the fifth graders of average and below average ability and the sixth graders of below average ability. The fifth graders of above average ability and the sixth graders of average

ability showed an increase in their scores from Time 1 to Time 2 and a decrease from Time 2 to Time 3. The sixth graders of above average ability showed a decrease from Time 1 to Time 2.

The third multivariate analysis was conducted on the proportion of endophoric referential ties as well as the other measures. No significant interactions between Reading Ability and any other factor were obtained. A significant main effect was obtained for Reading Ability, $F(12,80) = 4.39$, $p<.0001$. However, univariate tests indicated no significant effect for reading ability on the proportion of endophoric referential ties.

The final multivariate analysis was conducted on the fourth cohesion variable: the proportion of between-sentence ties as well as the other measures. There was no significant interaction between Reading Ability and any other factor in this analysis. Again, a significant main effect for Reading Ability was found in the overall analysis, $F(12,80) = 5.57$, $p<.0001$. Univariate analysis indicated no significant effect for reading ability on the proportion of between-sentence ties, the variable of interest in this analysis.

In summary, the results of the four multivariate analyses revealed a significant main effect for reading ability on three measures: the spelling accuracy, punctuation, and sentence correctness measures. A significant Ability X Grade X Occasion interaction was found for the combined spelling score. Thus, higher reading ability was positively related to the use of mechanics but not to the use of cohesion or text structure.

Greater reading ability may have had an effect on the use of conventions because better readers have more knowledge of the surface features of text. Better readers also may have greater facility at re-reading, which is a component of the editing process. Alternatively, reading and writing ability may both have been affected by a third factor, such as intelligence or motivation to achieve.

The lack of a main effect for reading ability on the proportion of cohesive ties of any type may be attributable to the composing process responsible for cohesion. Cohesive ties may emerge during the planning process of idea production and organization and thus may not be related to reading or linguistic ability.

The absence of a main effect for reading ability on text structure usage also may be due to the composing process responsible for providing structure to the text. Text structure may be provided during the idea organization process which involves operations on non-linguistic units. Text structure may have been more related to cognitive development than to reading ability. Formal operational thinking may facilitate organizational processes in writing. Finally, the lack of a main effect for reading ability on text structure and cohesion may have been due to a lack of reliability in these measures. Table 4 contains the means, standard deviations, and univariate F statistics for the reading ability effects.

Appendix A contains the overall tables for each of the four multivariate analyses of repeated measures.

TABLE 4 - Ability Effects

Ability Group		Above Average		Average		Below Average		Univariate F
Variable		Mean	S.D.	Mean	S.D.	Mean	S.D.	
Proportion of Cohesive Ties	Time 1	.39	.04	.37	.05	.39	.05	.82
	Time 2	.32	.07	.37	.04	.36	.07	
	Time 3	.34	.06	.34	.06	.35	.09	
Proportion of lexical ties	Time 1	.09	.03	.08	.03	.07	.04	2.30
	Time 2	.09	.04	.09	.03	.07	.02	
	Time 3	.08	.03	.11	.07	.08	.05	
Proportion of endophoric reference	Time 1	1.63	.21	.71	.24	.54	.21	.92
	Time 2	.78	.19	.68	.24	.71	.31	
	Time 3	.78	.19	.60	.35	.78	.23	
Proportion of Between-Sentence ties	Time 1	1.70	.20	.64	.22	.60	.27	.61
	Time 2	.69	.20	.64	.27	.67	.30	
	Time 3	.69	.24	.59	.37	.63	.31	
Punctuation Rating	Time 1	2.33	.91	1.55	.61	1.33	.48	24.52***
	Time 2	2.39	.61	1.94	.54	1.44	.51	
	Time 3	2.61	.61	1.44	.51	1.44	.61	
Proportion of Correct Sentences	Time 1	.80	.14	.63	.24	.61	.24	5.18**
	Time 2	.81	.25	.72	.24	.73	.23	
	Time 3	.88	.17	.62	.33	.55	.33	
Combined Spelling Score	Time 1	7.22	3.06	3.22	2.07	2.55	1.34	29.96***
	Time 2	6.89	1.91	5.00	2.40	3.17	1.46	
	Time 3	8.22	2.36	5.11	2.80	4.05	2.07	
Spelling Acc. Rating	Time 1	2.55	.78	1.50	.62	1.33	.48	25.09***
	Time 2	2.72	.57	2.11	.76	1.61	.61	
	Time 3	2.89	.58	2.11	.96	1.83	.78	
Number of Story Grammar Categories	Time 1	5.78	1.26	4.89	1.97	4.72	1.60	1.33
	Time 2	4.94	.64	5.00	.69	4.72	.89	
	Time 3	4.39	1.61	4.05	2.01	4.39	1.61	
Number of Content Categories	Time 1	4.89	.76	4.27	1.53	4.00	.91	1.17
	Time 2	4.72	1.18	4.89	1.23	4.22	1.63	
	Time 3	3.83	1.58	3.67	1.49	3.83	1.72	

* = p<.05
** = p<.01
*** = p<.001

One area of interest was the degree to which the measures, which were believed to all assess skills acquired in the performative stage of writing development, were related. Pearson Product Moment Correlations were obtained for the averages of the dependent variables over the three times. Table 5 contains the correlations of the dependent variables.

TABLE 5

	Punctuation	Spelling Accuracy	Difficulty of Word Choice	Combined Spelling	Prop. of Correct Sentences	Prop. of Cohesive ties	Prop. of Ref. Ties	Prop. of Substi-tutions	Prop. of Ellipsis	Prop. of Lexical Ties	Prop. of Conjunctiond	Prop. of End Reference	Prop. of Between-Sentence Ties	Number of Story Categories	Number of Content Categories
Punctuation	1.00														
Spelling Accuracy	.75	1.00													
Difficulty of Word Choice	.72	.63	1.00												
Combined Spelling	.81	.94	.83	1.00											
Prop. of Correct Sentences	.63	.56	.62	.57	1.00										
Prop. of Cohesive Ties	-.13	-.07	-.08	-.10	-.10	1.00									
Prop. of Ref. Ties	-.15	-.12	-.32	-.21	-.21	.54	1.00								
Prop. of Substi-tutions	.00	.15	.06	.11	-.06	.07	-.03	1.00							
Prop. of Ellipsis	-.04	-.04	.00	-.03	-.02	.07	-.19	-.03	1.00						
Prop. of Lexical Ties	.26	.27	.45	.35	.22	.49	-.28	.17	.08	1.00					
Proportion of Conjunctions	-.35	-.34	-.45	-.43	-.31	.09	-.002	.08	-.14	-.16	1.00				
Proportion of Exophoric Reference	.25	.33	.38	.38	.28	-.07	-.16	.20	-.14	.37	-.27	1.00			
Proportion of Between-Sentence Ties	.43	.34	.53	.57	.77	-.11	-.36	-.03	.15	.38	-.26	.37	1.00		
Number of Story Grammar Cate-gories	.28	.38	.33	.37	.37	.10	.10	.08	-.21	.37	-.36	.44	.19	1.00	
Number of Content Categories	.33	.35	.28	.32	.37	.13	.13	-.08	-.34	.36	-.08	-.38	.25	.62	1.00

The Pearson Product Moment Correlations indicated that some of the features thought to be text conventions adopted in the performative stage of writing development were highly related while others were not. The skills of punctuation, spelling, and sentence formation were positively related. The proportion of cohesive ties was not related to these measures, however, there were positive correlations between the proportion of lexical ties, endophoric referential ties, and between-sentence ties used and the mechanics measures. The number of story grammar categories and content categories employed were highly related to each other and moderately related to the other variables except the proportion of cohesive ties.

The correlations seem to indicate that mechanical conventions are acquired by writers together and that there may be a unitary stage of performative writing. Features such as cohesion and text structure however are not among the attainments of this stage either because they are not applied during editing or because control over them is acquired later than control over mechanics.

One question of interest concerned the pattern of growth shown by each feature assessed. The four multivariate analyses of variance of repeated measures included contrasts of the constant, linear, and quadratic terms of the occasion effect for each feature. The results indicated a significant overall linear trend for the punctuation rating, $F_{lin}(1,45) = 6.47$, $p < .01$ and a significant overall quadratic trend for the

proportion of correct sentences, $F_{quad}(1,45) = 3.24$, $p<.05$. There were significant Occasion x Grade interactions for other variables. The variables which showed improvement for any grade were: the spelling accuracy rating, the proportion of endophoric referential ties, and the number of story grammar categories. The means for each grade for the spelling accuracy rating were as follows: fourth grade (2.06, 2.16, 2.92), fifth grade (1.71, 2.09, 2.14), and sixth grade (1.76, 2.19, 2.05). The means for the proportion of endophoric referential ties for each grade were: fourth (.67, .68, .88), fifth (.64, .73, .74), and sixth (.59, .74, .60). The use of text structure improved only for the fourth grade. The mean number of categories used by the fourth graders for the three occasions was: 4.50, 4.75, and 5.00.

These results demonstrate that there was a steady improvement in the punctuation rating, overall, while there was irregular growth in sentence correctness. Students may have had more difficulty controlling sentence conventions than punctuation conventions on different tasks because sentence conventions apply to large linguistic units. The means for the other variables reveal different patterns of growth for each age. The means for spelling accuracy demonstrate that spelling accuracy increased steadily in fifth graders' writing, but in the fourth and sixth graders' writing it showed irregular growth. The growth of the proportion of endophoric referential ties was uneven with all grades showing improvement from one time to another rather than over all three times. The fourth graders' showed

improvement only from winter to spring, while the fifth and sixth graders showed improvement from fall to winter. The number of story grammar categories in the fourth graders' stories increased steadily over time, but decreased in the writing of fifth and sixth graders.

These results do not permit any straight forward conclusions about the pattern of growth in writing.

The final question concerned the types of story grammar categories found in children's stories. Of particular interest was the contrast between the proportion of propositions in the setting category as opposed to the focal or initiating event category in children's first stories. It was thought that an emphasis on the use of the setting category would reflect use of text structure to construct stories, while an emphasis on the initiating event might reflect a strategy of using content to organize a story.

The data analysis showed that the largest proportion of propositions in the fall occurred in the attempt category (.36) followed by the initiating event (.17), direct consequence (.17), setting (.10), reaction (.08), plan (.07), and internal response categories (.05).

These results imply that the event chain or plot in a story is emphasized more than the setting category in beginning writing. Writers may construct stories in a bottom-up fashion, beginning with the action sequence. However, the results of this study suggest that the focal point in early story construction is the behavior of a character. Writers may produce stories by generating actions first and then logical causes and effects of actions.

CHAPTER V

SUMMARY AND CONCLUSIONS

This chapter presents the results and conclusions drawn from the data analysis. The limitations of the present study and implications for future research are presented at the end of the chapter.

Summary

This study was undertaken to trace the development in children's writing of features derived from a cognitive-developmental model of growth in writing (Bereiter, 1979). This model incorporates concepts from current theories of the writing process. According to one such model, developed by Flower and Hayes, there are three elements to the writing process: the task environment, the writer's knowledge, and the writing processes themselves. The task environment consists of the writing problem and the developing composition. The writer's knowledge is comprised of the writer's knowledge of discourse, content, and mechanics. The writing processes are planning, translating, and reviewing. During the planning phase, the writer generates ideas and organizes them into some kind of structure. During the translating phase, the writer transforms the products of the planning phase into English words and sentences. The reviewing

phase is the phase during which the writer checks and corrects the written text.

According to Bereiter, writing development occurs in a series of stages, each involving the refinement of skills employed during different phases of the composing process. There are six different skill systems employed during these phases by mature writers: ideational fluency, writing fluency, knowledge of writing conventions, social cognition, literary criticism skills, and formal thinking skills. Only the first two stages were of interest in this study. During the first stage of associative writing, skills of idea generation and writing are developed. During the performative stage, skill at using text conventions is developed. It is not clear from Bereiter's description which conventions are applied during the performative stage. Different types of conventions apply to different levels of text: words, sentences, segments of discourse, and discourse. Such conventions include spelling, punctuation, cohesion, and discourse structure.

Research on process-related features of text indicates an increase with age in the use of spelling, punctuation, and sentence formation rules and some types of cohesion (NAEP, 1975, Bracewell, 1980). However, no study has assessed the development of all these features over time. Previous research on process-related features has been conducted using cross-sectional rather than longitudinal designs. It also has not been clear to what extent each stage is a unitary one. Finally, there is not enough

information available on writing development to characterize the nature of growth in writing as linear and continuous or discontinuous.

The purpose of this dissertation was to provide longitudinal as well as cross-sectional data on the development in writing of a set of features associated with attainment of the performative stage. These features included spelling maturity, punctuation maturity, sentence correctness, cohesion, and text structure. A second purpose was to examine the effect of age and reading ability on these variables. In addition, the relationship between measures was determined. Finally, the nature of growth in writing was identified.

The study was done using fifty-four children whose teachers were participating in a study of writing instruction conducted by the Language Arts Project of The Institute for Research on Teaching. The fourth grade children were drawn from an upper-middle class community which has only a small percent of minority families. The fifth grade children were from two rural, lower-middle to middle class communities which were predominantly white, and from an urban, lower-middle class racially mixed community. The sixth grade children were from the urban community also.

The measuring instruments included a test of reading ability and measures of the dependent variables. The Woodcock Test of Reading Mastery was used to assess reading ability. The measures of the dependent variables were: rating scales of punctuation maturity and spelling accuracy

and a combined spelling score, a sentence assessment scheme, Halliday and Hasan's scheme for analyzing cohesive ties, Stein and Glenn's story grammar, and Warren et. al.'s event chain scheme.

Students were assigned narrative writing tasks in the fall, winter, and spring. Writing samples were coded for each dependent variable. Each type of coding was performed by two coders, with the exception of the sentence correctness coding.

Four 3 x 3 multivariate multivariance analyses of repeated measures were performed on the dependent variables. The linear and quadratic trends for each feature were identified. Pearson Product Moment Correlations between the dependent variables were calculated.

Conclusions

There was improvement over the year in the use of some conventions for producing correct written prose. These results support Bereiter's hypothesis that writing development involves an increasing ability to employ conventions for writing. However, development varied as a function of the type of convention and grade. The results will be discussed separately for each feature.

Text Structure

Narrative schemata are generalized representations of the categories of content and relations in stories. Even young children have been found to use narrative schemata in their comprehension and recall of stories. Researchers

(Stein and Glenn, 1979; Bereiter, Scardamalia, 1980) have found that children use story schemata in their story production. Stein and Glenn (1979) found that younger children used fewer categories than older children. However, Bereiter, Scardamalia, and Turkish (1980) found no difference between fourth and sixth graders in the number of categories used in stories. They found that fourth and sixth graders used an average of 5.51 categories out of the 8 devised by Stein and Glenn.

In the present study children used 5.13 categories at Time 1, 4.89 categories at Time 2, and 4.13 categories at Time 3. They used fewer categories than those used by Bereiter's subjects. Bereiter and his colleagues used subjects from Ontario, Canada. The greater number of categories in their studies may have been related to background characteristics such as greater reading or writing experience. The students in the present study used fewer categories but the number they used seems to indicate that they employed story schemata in their composing.

The number of categories used increased over the year only in fourth graders' stories and declined in fifth and sixth graders' stories. However, the sixth graders used the greatest number of categories at Times 1 and 2 followed by the fifth graders, and then fourth graders.

According to models of the composing process, structure in writing is provided during the organization phase of planning. The function of this process is to select and sequence appropriate ideas from those generated during idea

production. However, text structures also are one type of literary convention, which writers can have in conscious awareness and employ during editing. Bereiter, Scardamalia, and Turkish compared children's conscious knowledge of story grammar to their ability to use story categories in writing. They found that children used more categories in their writing than they were able to name, suggesting that children did not employ conscious awareness of any elements in their story production.

The decline in the number of categories used by sixth graders in the winter and spring, and fifth graders in the spring suggests that while these students could employ story categories, the structure in their stories was not the product of conscious knowledge which could be applied regardless of task. Structure in their narratives may have been provided by planning rather than editing processes.

In his model, Bereiter proposes that writers attain automaticity at lower level processes before refining higher level skills. The decline in story grammar usage by the fifth and sixth graders may indicate that these students began to develop surface conventions before they had mastered organizational processes. Their attention to mechanics may have resulted in regression in the skill of organization, because the skill still required conscious thought. Thus, students may not follow the developmental course described by Bereiter.

They may incorporate some higher level skills, especially those such as mechanics before lower level skills are automatic, particularly if higher level skills are emphasized by a teacher.

The decline in text structure usage by sixth graders in the winter and spring may also have been due to the cognitive processes required at the three times. As noted, in the fall task, students were required to retell a story from the perspective of a non-protagonist, a recall task. In the winter and spring, children had to generate stories in response to a photograph or painting. The decline in text structure usage in the spring by sixth and fifth graders could have been partially due to the stimulus. The spring stimulus could have been a difficult one because it was very static (The stimulus was a print of a man seated in a tree). Students may have found it difficult to generate a plot around this picture.

The increase in the number of categories in the fourth grader's stories seems to indicate that while they had less well-established story schemata in the fall, as the year progressed, they acquired schemata which they were then able to employ regardless of the task.

The absence of improvement by most students except fourth graders in the use of text structure may be attributable to other factors. Social class, teacher, and school factors confounded with grade may have accounted for the pattern of growth in story structure.

The writing samples produced by the sixth graders in the winter and spring and the fifth graders in the spring may have been too short to provide a representative sample of their text structure knowledge. The mean number of words used by children in each grade at each time was as follows: Fourth graders (138, 92, 148); Fifth graders (168, 93, 91), and Sixth graders (212, 124, 104).

The lack of an increase in the number of story categories may also have been due to lack of reliability of the text structure measure. The correlations for the number of categories was (.18) between Times 1 and 2, (.11) between Times 1 and 3, and (.02) between Times 2 and 3. The low test-retest reliability of the measurers may have resulted in the lack of a relationship between text structure and other measures.

Cohesion

There was no increase over time in the proportion of cohesive ties, or overall cohesion. The proportion of cohesive ties declined in fifth and sixth graders' stories.

Cohesive ties are lexical and syntactic devices for relating propositions and sentences in text. They are one means for creating unified text. Researchers (Hidi, 1980) have disagreed about the composing process responsible for cohesion. Bereiter (1979) suggests that cohesive prose is the result of semantic relations discovered during the idea generation and organization processes. Hayes and Flower (1979) suggest that the production of cohesive text is due to the application of knowledge of the surface conventions of text.

Bracewell (1980) found no increase with age in the proportion of cohesive ties. His findings and those of the present study may suggest that the production of cohesive text is a function of the idea production and organization process which is mastered earlier than the transformation of ideas into correct writing.

Hidi (1980) investigated children's ability to produce coherent sentence sequences under two types of conditions. The first was a Before vs. After condition in which children were provided with a sentence and required to produce a semantically and logically related sentence to precede or follow it. The second type of condition varied the type of semantic content of the writing stimulus from concrete to abstract. Children produced more coherent sequences in the After condition in which they had to generate a sentence to follow a given sentence. According to Hidi, this result occurred because "discourse production which proceeds in a linear, forward-going manner develops earlier than discourse production which requires switching between forward and backward-going production" (Hidi, 1980, p. 1). Hidi also found that the type of semantic category influenced the ability to compose semantically and linguistically organized text sequences. More abstract categories were more difficult than concrete categories.

The children in the present study may have produced cohesive discourse early in the year because narrative writing is a linear, forward-moving process, and coherent text could be produced even by beginning writers. The decline

in cohesion over time may have been due to the requirement in Tasks 2 and 3 for the generation of semantic frames. In contrast, Task 1 provides students with a semantic context.

The proportion of cohesive ties used could have shown a decline because of an increase by students in the use of conventions, such as punctuation, for producing correct text. Students who lacked automaticity in the idea generation and organization processes may have regressed on these skills when required to attend to new skills. The decline in cohesion, like the decline in text structure suggests that students may attempt to integrate new skills into their repertoire, especially skills which are emphasized by teachers, before they are ready. Such a finding contradicts a seeming assumption by Bereiter that students do not integrate higher level skills until lower level skills are automatic. An alternative to the view that cohesion is the product of content processing is proposed by Flower and Hayes (1979) who attribute the production of coherent text to the translating process. The translating process is one in which the writer transforms the output of idea generation into linguistic form. Bracewell and Scardamalia (1980) make a similar suggestion that cohesion is the product of the metalinguistic knowledge of resources available for producing coherent prose. Some of Bracewell's research seems to support this. He found that a writer's familiarity with content was negatively related to his ability to produce a coherent text. The lack of development of overall cohesion

among the students in this study seems to indicate however that cohesion is not the result of the deliberate application of metalinguistic knowledge but the result of the idea production process.

Lack of improvement in the use of cohesion may have been due to characteristics of writing instruction. Tamor and Bond (1980) maintain that elementary school teachers offer instruction primarily in "transcription" skills of punctuation, spelling, and penmanship rather than more complex skills such as organization. Even when students are given creative writing assignments, teachers respond primarily to the surface characteristics of text.

Students in the study, especially fifth and sixth graders, produced shorter samples at Time 2 and Time 3 than at Time 1. The samples may have been too short to provide a representative sample of their ability to integrate ideas in text. A final factor which might account for the lack of improvement in cohesion may have been lack of reliability of the measure of cohesion.

There was no increase over the year in one type of tie: the proportion of lexical ties in students' writing. Bracewell (1980) found an increase with age in the proportion of lexical superordinate ties. In the present study, the use of lexical ties was positively related to the use of conventions of punctuation, spelling, and sentence formation. Therefore, the use of lexical cohesion seems, unlike overall cohesion, to be related to conscious knowledge and use of devices for producing mature text. Logically, lexical cohesion should be related to attempts to shape language

because it results from the use of similar items in the writer's lexicon, a type of linguistic knowledge. The absence of improvement in the use of lexical ties may have been due to their difficulty. Writing conventions apply to outputs of different levels of the writing process. Mechanics, such as spelling and punctuation, apply to surface features of text, such as sound-letter correspondences or sentence beginnings and endings. The use of these devices during reviewing would require the operations at the surface level. The use of lexical ties, however, would require the analysis of the meaning and the selection of alternate words to express this meaning. The use of lexical cohesion would require deeper processing during reviewing than the use of other conventions.

However, lexical cohesion may not have increased in writing because of other factors, such as writing instruction.

The use of endophoric referential ties increased over time for all students except sixth graders from Time 2 to Time 3. Explicit reference is necessary for the interpretation of most written texts. In conversations, the speaker can rely on the listener's knowledge of the context, however, a writer must communicate meaning independent of the situation. The increase in endophoric reference indicates that students were adapting this convention for producing written prose.

There was no improvement over time in the proportion of between-sentence ties. In contrast, Bracewell (1981)

found an increase with age in the proportion of inter T-unit ties. The measure employed in this study was the inter-sentence tie because the process of dividing compositions into T-units would have been too difficult. Since there was a positive correlation between the proportion of between-sentence ties and the punctuation, spelling, and sentence formation measures, the inter-sentence tie seems to have been a valid measure of writing ability, and the use of inter-sentence ties also would seem to be a text convention. The absence of growth in inter-sentence ties may have been due to their difficulty. The use of a between-sentence tie requires operations on the semantic content of separate sentences. It also may require prior mastery of sentence formation rules. The proportion of between-sentence ties also may not have increased due to the factors associated with grade level, the size of the writing samples in winter and spring, and lack of reliability of the measure.

There was no significant difference between students in the fourth, fifth, and sixth grade in the features assessed. The lack of grade level differences was surprising, since previous research indicated an increase with age in writing ability. The NAEP (1975) reported significant increases between children ages nine and eleven in their spelling accuracy, punctuation maturity, and sentence formation ability. Bracewell (1980) found an increase with age in the proportion of lexical superordinates, endophoric referential ties, and inter T-unit ties. Stahl (1977) reported an increase with age in organizational features.

The absence of grade level differences may have been due to confounding of social class with grade. Social class background was inversely related to grade. Social class background has been found to relate to linguistic ability (Bernstein, 1964). The greater linguistic ability of younger children may have compensated for their age.

Significant Grade x Occasion interactions were found for the variables of spelling accuracy, proportion of cohesive ties, endophoric reference, and number of text structure categories. Fourth graders showed improvement over the year in spelling accuracy, endophoric reference, and text structure usage. The fifth graders improved from Time 1 to Time 3 in fewer features: spelling accuracy and endophoric reference. Their use of cohesion and text structure decreased. The sixth graders showed the least improvement over time on the fewest features; only their spelling accuracy and endophoric reference improved from fall to winter. Their performance on all conventions declined in the spring. The variations in growth may have been due to the type of convention and grade level. Important differences between conventions have been discussed. Grade level effects also have been discussed briefly. The differences between the grades in pattern of growth may have been due to age or to the factors associated in this study with grade: social class background, and educational experience.

The fourth graders' social class background and presumably greater linguistic ability may have enabled them to develop over the year on a number of dimensions, including

text structure. If text structure is a convention, fourth graders showed more ability to employ text categories on any task. Fifth graders, who were from a middle class background, showed improvement was more prolonged than that of sixth graders. This pattern may be attributable to social class differences between fifth and sixth graders.

Differences in educational experience may also have accounted for the differences in writing growth. The absence of grade level differences in the face of development over the year points to the importance of schooling in writing development. Britton's results suggest that schooling has an overwhelming influence on writing development. It seems likely then that the pattern of growth may have been related to instruction. The decline in sixth graders' writing performance in the spring may have been due to their participation in graduation activities and orientation to junior high school in the spring. Grade level differences may also have been due to a greater frequency of writing instruction in certain grades and/or instruction about certain features of text such as cohesion. Finally, declining performance on some measures may have been due to a decline in motivation.

Reading ability had an effect on the use of some conventions for producing written prose. These conventions included the mechanical rules for spelling, punctuation, and sentence formation. Reading ability did not relate to the use of cohesion or text structure.

A strong relationship between reading and writing ability has been demonstrated (Loban, 1976). Reading ability

may have been related to performance mechanics because it is related to knowledge of the surface features of text. Reading ability also may relate to facility at rereading and therefore editing.

The absence of an effect for reading activity on the cohesion variables may be attributable to several factors. Bracewell (1980) proposed that reading ability might be negatively related to the use of cohesion because better readers are more able to abstract the propositional content from sentences. This ability may result in better readers' having less knowledge of, or memory for, elements of thematic structure than less able readers.

An alternative explanation for the lack of effect of reading ability involves the composing process responsible for cohesion. If devices for indicating relations between ideas are a result of the idea generation process, there is no reason to expect that greater linguistic knowledge (and reading ability) should be related to their use.

Reading ability had no effect on the number of story grammar categories used. The absence of a relationship is surprising because better readers would be expected to have more well-established narrative schemata. The absence of a relationship may have been due to the composing process responsible for text structure. If the organization subprocess is responsible then reading or linguistic ability could have little influence.

Text structure usage may not have been mediated by text structure knowledge even if it was present in readers.

Bereiter, Scardamalia, and Turkish demonstrated that knowledge does not determine the structure used by children in their stories.

Text structure use may have been more related to cognitive development than to reading ability. Bereiter, Scardamalia, and Turkish suggested that because of the formal nature of discourse grammars, use of story grammar in writing might depend on formal operational thinking skills; however, as stated, they found that the number of story grammar categories used was not determined by children's conscious knowledge. Formal operational skills might, however, affect ability to provide organization in prose. In the present study, a difference between grades in text structure usage did occur in the fall and winter. Sixth graders used the greatest number of story grammar in the fall and winter, followed by fifth and fourth graders.

Pearson Product Moment Correlations indicated that some of the skills thought to be employed during the performative stage were related. Punctuation, maturity, spelling accuracy, and sentence correctness were highly related. Overall cohesion was not correlated with these skills; however, the proportions of lexical ties, endophoric referential ties, and between-sentence ties were. Story grammar usage and content coverage were moderately related to all other variables except overall cohesion.

These results seem to indicate that skills for producing correct text are related. They suggest that there may be a set of skills acquired in the performative stage

of writing performance. These skills include punctuation, spelling, sentence formation, lexical, between-sentence, and endophoric referential ties, and possibly text conventions. The use of cohesion, for reasons discussed earlier, may be a separate skill, perhaps a function of the idea generation process. The use of lexical, endophoric, referential, and between-sentence ties was positively related to the use of text conventions. As stated, logically, these types of cohesion seemed to demand more conscious knowledge of the linguistic aspects of text than other types of cohesion. The use of story structures was moderately related to punctuation, spelling, and sentence formation ability. However, these structures were not as highly related to other skills as they were to each other. Text structure knowledge may not be a skill applied during the editing process. Its moderate relationship to other features may be explained by the fact that skillful writers are able to use both text structure and rules for correct writing.

The absence of strong positive relationships between the cohesion and text structure measures and other measures may also have been due to lack of reliability of these measures.

No clear pattern of growth in writing was apparent from the data analysis. Bereiter (1979) has pointed out that there is not enough research evidence available to allow for the characterization of writing growth as continuous or discontinuous. Loban (1976) found a gradual increase from kindergarten through twelfth grade in syntactic

complexity and elaboration in children's writing. However, the NAEP (1975) reported an improvement in writing quality between the ages of nine and eleven, but no improvement between ages thirteen and seventeen.

The question of the pattern of growth was not resolved by the data in this study. Only two features showed similar patterns of growth across the three grades. One, punctuation maturity, improved steadily, while the other, sentence correctness, showed uneven growth. Development on the other features varied as a function of grade.

The final question of the study concerned the types of categories used by children in story construction. As noted, Stein and Glenn (1979) found that the categories used most frequently during recall by children and adults were the setting category followed by the initiating event, direct consequence, and attempt categories. Subjects did not recall a high proportion of propositions from the reaction or internal response categories. Their investigations of story production demonstrated that setting information was used most frequently by younger subjects. The purpose of the present study was to determine the frequency with which different types of categories were used in stories produced at the beginning of the study. Of particular interest was the question of whether setting or initiating event information would be used more frequently. It was argued that an emphasis on the setting category would be evidence that children were using story structure in composing, whereas an emphasis on the initiating event would result from use of

meaning and the most meaningful element in forming stories.

The results indicated that the category which received the most emphasis in the stories produced at Time 1 was the attempt category. The category used next most frequently was the initiating event category, followed by the direct consequence, setting, reaction, plan, and internal response categories. These results suggest that children use meaning and semantic relations rather than story structure in organizing their first stories. However, the most meaningful element may not be the initiating event but the main character's behavior. Rather than beginning with an event to which the main character responds, students begin with his behavior. Story production then presumably emerges through generation of logical causes and consequences of the main character's behavior.

The emphasis by students in the fall on semantic relations in structuring their stories supports Bereiter's proposal that beginning writers emphasize content production and organization in their beginning writing. These results may also suggest that the notion of story or text grammars, like the notion of deep structure, may have to be revised. Stories may not be the product of knowledge of the structure of texts but may be representations of a writer's experiential knowledge.

Implications

The results of the study suggest the following implications:

1. Growth in writing seems to follow the developmental course described by Bereiter, at least from associative to performative writing. Writers show an integrated increase in the use of several conventions for producing correct text. However, use of these conventions may vary depending on the students' linguistic ability and instructional experience, and the task. These results would suggest that teachers diagnose the stage of writing development of their students and gear their instruction accordingly. They may wish to allow students to strengthen and consolidate skills at one stage before teaching skills of a new stage. The model also suggests a way for teachers to program writing instruction so that higher level skills such as the development of a personal style are not taught while the student is in a much lower stage.

2. While some features, such as mechanics, may show improvement, others, such as cohesion and text structure may not, suggesting that these skills are employed at an earlier point in composing, are more difficult, or do not receive as much emphasis from teachers. Students may even slip back on these skills while attempting others. The results may indicate that teachers should wait until their students have acquired control over idea production and organization processes before requiring them to use all their mechanical skills in writing. Instruction in the use of cohesive ties and text structure which is similar to the instruction they receive in mechanics might give writers similar conscious

control over these features. Alternatively, instruction in improving the use of text structure and cohesion may be more useful if the writer is instructed to use them during the planning subphases of idea generation and organization.

3. The absence of grade effects seems to indicate, as might be expected, that writing development may depend more on instructional experience and linguistic ability than age, cognitive development or even prior experience, assuming that older students are more developmentally advanced and had greater writing experience. Writing may be a skill that for most children, especially lower class children, is learned in school or not at all. As expert writers claim, it may be necessary to constantly practice writing to improve.

4. The relationship between reading ability and some writing variables may indicate that reading experience can facilitate writing achievement. However, certain aspects of writing, such as cohesion may not relate to ability, either because they are a function of the task or non-linguistic processes such as idea generation, are more difficult, or because they do not receive enough emphasis by teachers. Even good readers may not maintain or improve these devices in the absence of any instruction in them. Teachers may have to help them to improve more than just the surface features of text.

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APPENDIX A

Table A.1

First Multivariate Analysis of Variance of Repeated Measures

Source	df	Multivariate F	p
Occasion	12,34	4.99	.0002
Grade-Linear	6,40	.58	.7464
Grade-Quadratic	6,40	1.55	.1868
Reading Ability	12,80	4.39	.0001
Occasion X Grade-Linear	12,34	4.21	.0005
Occasion X Grade-Quadratic	12,34	.66	.7748
Occasion X Reading Ability	24,68	1.10	.3665
Grade X Reading Ability	24,140.75	1.42	.1053
Occasion X Grade X Reading Ability	48,133	.96	.5445

Table A.2

Second Multivariate Analysis of Variance of Repeated Measures

Source	df	Multivariate F	p
Occasion	12,34	5.30	.0001
Grade-Linear	6,40	.70	.6495
Grade-Quadratic	6,40	1.32	.2713
Reading Ability	12,80	5.26	.0001
Occasion X Grade-Linear	12,34	3.16	.0042
Occasion X Grade-Quadratic	12,34	1.10	.3891
Occasion X Reading Ability	24,68	1.1025	.3651
Grade X Reading Ability	24,140.75	1.2111	.2425
Occasion X Grade X Reading Ability	48,133	1.4552	.0495