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Using schema theory to integrate reading and writing process in composition

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USING SCHEMA THEORY TO INTEGRATE READING AND WRITING PROCESSES IN COMPOSITION

A Thesis
Presented to the
Faculty of
California State University, San Bernardino

In Partial Fulfillment of the Requirements for the Degree Master of Arts in English Composition

by
Thomas C. Allen
June 1987
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AND WRITING PROCESSES IN COMPOSITION

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In most secondary schools and colleges, the teaching of English reflects the historical separation of the subject of English into literature, composition, and grammar. Recent research, however, has identified numerous links between reading and writing, indicating that they share some important processes and that a more integrated approach may, in fact, provide more comprehensive development of students' reading and writing skills. Schema theory offers a cognitive basis for integrating reading and writing instruction. This paper explores the recent research in reading and composition and develops a schematic-processing model for teaching composition. It argues that writers must develop background and structural schemata to compose and to comprehend texts. It also argues that certain instructional strategies enhance the development of this schemata.
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USING SCHEMATA THEORY TO INTEGRATE READING AND WRITING PROCESSES IN COMPOSITION

Introduction

A definite link exists between reading and writing. However, the nature of this link and its affect on the teaching of English has yet to be clearly established. What is certain, though, and what needs to be addressed, is the separation of the teaching of English into literature, composition, and grammar. This paper will briefly explore the historical separation of the subject of English, review some of the research literature linking reading and writing, and demonstrate how schema theory bonds the reading and writing processes and offers an approach to the teaching of composition.

Historical Separation

Toward the end of the nineteenth century, English, as most students know it today, began to emerge as a subject matter. Its growth, however, was inhibited by the belief that "mental discipline" was the ultimate purpose of education. To be fully accepted as a subject worthy of serious consideration, the teachers of English had to demonstrate that the subject "had the substance that would insure the same discipline of mind that the classical languages provided" (Applebee 6). When rhetoric separated from grammar in the late eighteenth century, especially after an effort
to standardize the English language on the model of Latin and Greek, the study of literary criticism soon followed as a separate course (8). By 1810 English grammar was taught as a separate subject matter in most American elementary and secondary schools. At the same time, because many grammar texts existed, an accepted methodology was used, and grammar mirrored the "mental discipline" colleges expected, competence in English grammar began to be required for college entrance (8). Rhetoric, after separating from grammar, was often taught in conjunction with logic, a subject that subserved grammar, rhetoric, and composition (8). English literature, however, once considered a subject to be appreciated on one's own (12), did not emerge as an element of English studies until Harvard University required literature to be studied in 1873-74, "not for itself,...but as a subject for composition" (30). Later, around 1910, in an effort to give composition its "due attention" and to make it less literary, literature also became a separate subject studied for its cultural merits (40, 48).

Presently, the subject matter of English, while not taught as distinct subjects any longer, reflects the historical separation of grammar, composition, and literature. In many modern schools, English teachers do not integrate these subjects even though most school curricula require that the three areas be taught. Moreover, most English majors are trained in literature and take few undergraduate courses in composition and grammar. Even the titles of the courses in
most secondary schools and colleges reflect this disassociation: Advanced Composition, American Literature, English Literature and Composition, etc. Unfortunately, an even greater separation characterizes the teaching of remedial reading and writing. For example, in the Riverside Unified School District, Basic Reading and Basic Writing are separate subjects with separate curricula and are tested as distinct skills in the Basic Skills Assessment Test, the passing of which is required for high school graduation. At Riverside Community College basic reading courses and basic writing courses are not only in different departments, they are administered under different divisions and are taught at separate locations on campus. In addition, the separation has legal status, for the California State Legislature requires high school graduates to demonstrate proficiency in reading, in writing, and in mathematics before they can receive their diplomas.

Research Linking Reading and Writing

Recently, however, researchers have identified numerous links between reading and writing, indicating that they share some important processes and that a more integrated instructional approach may, in fact, provide more comprehensive development of students' reading and writing skills. Unfortunately, the historical separation of reading and writing and the manner by which English teachers are trained do not reflect, at the present time, the current theories linking the two language activities.
Some obvious links between reading and writing exist. Both acts share the conventions of grammar, spelling, and punctuation. Both acts share language, which according to Smith is the product of thought (1982, 65). Smith also states that the reading or writing our thoughts construct "modifies our thoughts as it is produced" (65); in other words, thought is modified as people read and write. Both reading and writing deal with meaning; readers obtain meaning and writers produce meaning. Both activities involve a complementary transaction between a writer, a reader, and a text that written language makes possible (87).

While these relationships may seem axiomatic, they are difficult to verify by empirical studies. However, research in a number of areas has begun to identify some of the specific links between the two language acts. For example, a study done by Evanechko, Olliva, and Armstrong attempted to correlate measures of syntactic complexity in students' writing and their levels of reading achievement. The authors concluded that the "correlations between the reading measures and the language measures are...indicative of the interactive relationship between the receptive and the expressive processes in language" (319). They also suggest that reading and writing share common language skills. In another study, Stotsky reviews the literature evaluating the relationship between the ability to use complex syntactic structures and reading achievement; she concludes that "general facility with linguistic structures will be related
to [reading] comprehension" (61). If this relationship is valid, then writing programs with sentence-combining exercises may develop not only writers' syntactic maturity and improve the general quality of their writing but also help readers develop a more comprehensive structural understanding of complex reading material.

In addition to establishing correlations between a writer's syntactic maturity and his reading achievement, several studies indicate that a relationship exists between reading ability and the reader's knowledge of orthographic structures. Massaro and Hestand conclude that "reading ability is positively correlated with orthographic structures among young school children" (177). They also suggest that the ability to spell correctly may develop as the child learns to read. Even though the authors demonstrate that knowledge of spelling structures do vary with children's reading levels and that children become better spellers as their abilities to read increase, how the process works has not been determined. Shanahan (1982), however, believes that the relationship of spelling and reading may have its basis in the perceptual and language development of children, even though he states that for "beginning readers, spelling...appears to contribute most highly to the reading-writing relationship" (21). Smith (1982) goes even further. He states that spelling may be the only writing skill that is learned entirely from reading. Spelling is a "textual fact...no other aspect of writing is presented so unambigu-
ously" (178). Smith also comments on the role reading has on the development of a writer's knowledge of punctuation conventions. He believes that "reading may be the source of hypotheses about punctuation" (188). However, the hypotheses must be tested by having someone determine whether or not the punctuation and spelling conventions have been used correctly.

Recent studies in brain lateralization or hemisphericity also indicate that a definite link exists between reading and writing processes. Many experts have reported that the left hemisphere of the brain controls speech and writing production and generally views the world sequentially and logically while the right hemisphere, the more intuitive side, perceives the world more visually, holistically, and spatially (Weiss; Jaynes; and Segalowitz). All agree, though, that the two hemispheres interact during the language process. Individuals with left brain dysfunctions, while not able to speak or write, are able to comprehend a text and to understand a person speaking. However, each hemisphere has a different role when language is processed or used. For example, patients with damaged right hemispheres had the ability to pronounce words correctly and to construct grammatically correct sentences, but they lacked the ability to judge the emotional tone of sentences spoken by others (Segalowitz 37). Even though the same areas of the brain control both oral and written language functions, each hemisphere serves a separate function. When composing
a text, for example, the left hemisphere controls the specific words selected and sequences the words into proper structures. It is the right hemisphere, however, that conceptualizes the general structure of the text. It is the interaction between these two halves of the brain that produces the text or speech and that makes the text comprehensible to the reader or listener. Written and spoken language, then, share essential areas of the brain and function neurologically in similar ways. It follows, too, that reading and writing, both language activities, share some essential characteristics.

Many other researchers and scholars have discussed the processes reading and writing share. For example, Doctorow, Whittrock, and Marks discuss the generative aspects of reading comprehension, stating that learners "use their memories of events and experiences to construct meanings for the text" (109). Tierney and Pearson argue the same principle:

Both [reading and writing] are acts of composing. From a reader's perspective, meaning is created as a reader uses his background of experience together with the author's cues to come to grips both with what the writer is getting him to do or think and what the reader decides and creates (italics mine) for himself. As a writer writes, she uses her own background of experience to generate ideas and, in order to produce a text which is considerate to her idealized reader, filters these drafts through her
judgments about what her readers background....In a sense, both reader and writer must adapt to their perceptions about their partner in negotiating what a text means. (559)

Reader-response theorists, like Iser and Fish, also speculate on the reader’s role in constructing meaning. The meaning-generating similarities between reading and writing, posited by psycholinguistic reading theorists and by reader-response literary critics, suggest that reading and writing share some essential processes. According to these theorists, readers take to the reading process their own set of background experiences that shape and determine the meaning of a text. In other words, the meaning of a text does not lie in the text alone. Instead, meaning results from the interaction between the reader and the text. Besides the generative similarities, other scholars (Shanahan 1980 and Smith 1982) explore the influence writing has on reading and the influence reading has on writing, suggesting again that reading and writing are related processes. The list goes on.

Even though most of the literature describing the relationship between reading and writing offers insight into the two processes, few scholars provide a theoretical construct that directly connects the two language activities. However, research in reading comprehension, especially the cognitive theories, not only reinforces the link between reading and writing, but offers possible instructional
strategies that may help improve writing instruction. One of these areas in particular, known as schema theory, can provide composition teachers insight into the writing process and the reading-writing connection. Schema theory, even though first introduced by Bartlett in 1932, is a relatively new area of investigation and has yet to influence the teaching of composition. It offers, however, a sound theoretical base for composition instruction. Moreover, the schema construct has direct application to the reading-writing bond. By exploring the research on background and organizational schemata, especially their application to reading comprehension, this paper will interpret the significance of schema theory and research in reading comprehension on the teaching of writing.

Schema Theory

Essentially a theory about knowledge, schema theory describes how information is processed. Schemata (the plural of schema) help individuals decipher sensory information, recover data from memory, organize new and old knowledge, and generally guide the processing of ideas in the mind (Rumelhart 34). Schema theory, sometimes postulated as knowledge stored in human memory, or knowledge structures, demonstrates how knowledge is represented and how knowledge is used in various ways. Whether called "cognitive structures" (Smith 1975) or knowledge units, this stored knowledge is packaged into categories or groups and has embedded
in these units information about how this knowledge is to be used.

According to schema theorists, every individual has a basic hypothesis about the world itself and about the things in this world. This basic hypothesis is neatly categorized into schematic units. Schemata exist for all concepts that we have, whether for objects, events, actions, or situations. They also contain a network to interrelate different schemata in an effort to interpret or to develop a personal theory, or meaning, about the object, event, or situation in question. How these units are organized depends on how complete an individual's knowledge of a particular subject is. According to Rumelhart (37), schemata "embod[y] a prototype theory of meaning." In other words, schemata are generic knowledge units. Their central function is to construct meaning from the sensory or linguistic data presented to the individual and to help the individual make sense or comprehend that input. In effect, an individual's total set of schemata "constitutes...[a] private theory of the nature of reality and supports...[an] internal model of the information perceived at a particular point in time, whether it be a text being read or written" (37).

Schemata also help new information to enter and to become part of the knowledge base. The interaction between old and new information often forges new schemata, offering the individual a new relationship among the parts that make up various schemata. According to theorists, all schemata
are made up of parts, often called variables or features. When activated, these parts are "instantiated" with particular information; that is, these variables provide concrete evidence or an instance in support of the schema. However, it is sometimes done with certain constraints. For example, if the word "tennis" is presented, the tennis schema is activated. Depending on how much information an individual has about the game of tennis, a person may call different variables to mind. An individual with substantial experience with the game would, if the word "grip" is used, immediately activate the "types of grips" schemata and might consider forehand, backhand, volley, or service grips. If the individual is particularly knowledgeable, he might break down the categories even further, perhaps into eastern forehand, western forehand, etc. However, if a novice tennis player, unaware that different techniques exist for holding racquets, is presented with new information about tennis grips, he would develop new schemata about how to hold the racquet. He would accommodate the new grip concepts into his limited "how to hold the racquet" schemata. Also associated with the tennis schemata are other sub-categories or schematic units that might be activated. For example, the phrase "grand-slam tournaments" would call to mind Wimbledon, French Open, U.S. Open, and Australian Open to the individual who has a relatively complete schema. For others, however, "grand-slam tournaments" would not activate the same categories. The individual with limited knowledge units
on tennis might infer that these tournaments were a form of tennis competition, but he would lack the complete schemata that the term implies.

Different schemata also have their own components, some of which are more salient than others. Many schemata exist and not all of them can be evaluated at once. However, according to the theorists, "control structures" help an individual activate the schemata that provide the most plausible interpretation of an event, object, or situation. Concepts or specific information may activate these schemata, and the process is referred to as "top-down" or "bottom-up" activation, or as "conceptually-driven" or "data-driven" processing. If a schema activates sub-schemata, it is called "top-down" or "conceptually-driven". For example, if the "tennis" schema activated sub-schemata like "court," "scoring," "racquets," "forehand volley," it is conceptually driven, going from the more general to specific. The "data-driven" or "bottom-up" activation moves in the opposite direction. For example, if the words "first serve and second serve" activates the "tennis" schema, it is "data-driven." In other words, conceptually-driven control structures move from whole to part; data-driven structures move from part to whole.

Schemata function primarily as a means of perception. Essentially concepts to facilitate an individual's making sense of sensory input, schemata offer a means by which a person can understand discourse, remember information, modi-
fy existing schemata, and serve as a problem-solving mechanism (Rumelhart). Two major types of knowledge structures exist: textual schemata and content schemata, sometimes referred to as organizational and background schemata. Both of these knowledge structures exist in the minds of readers and writers prior to the comprehension or the composing process. Textual schemata include "knowledge of discourse-level conventions," including, for example, knowledge of story structures, of personal letter forms, of article organizational patterns, of scientific report designs, and of rhetorical modes. (Anderson et al. 1983, 271). Content schemata refer to the reader’s and writer’s existing knowledge of the world in general, knowledge about culture, about language, about various aspects of life. These schemata include what each individual knows about such things as insects, and this information exists in schematic units or categories in our memory. Unfortunately, this knowledge is idiosyncratic and may include fictitious understanding, incomplete data, or a thorough schema.

Having discussed some of the basic elements of schema theory, this paper will now discuss the role of "background" and "organizational" schemata will have in the reading comprehension and composing processes. By investigating how individuals use schema to process text in reading comprehension and then by discussing how writers apply schema to the composing process, this paper will explore the link between the two language acts and will discuss the instructional implications of this link.
Role of Background Schemata

Schema theory has altered some of the basic assumptions about how readers comprehend a text. According to an earlier view of reading, the written text was speech in symbolic form of letters and words, strung together into sentences. This old view, known as the decoding approach to reading, presumed that if the reader was able to unlock the sounds, that is, decode the sounds into speech, comprehension would follow naturally. Still a major approach to reading instruction in schools, this phonics approach to comprehension asks readers to break the "letter-sound" code. The new view is quite different. In general, schema theorists de-emphasize the decoding mechanism, even though they recognize that decoding has a role in the reading process. For them, decoding is simply a means by which an individual comprehends a text; it is not the end product of the reading process. According to Orasanu and Penney, the schematic reading process focuses on the importance of establishing a reading purpose, of activating or calling to mind what the reader already knows about the topic, often based on the title or heading, and then, as one begins reading, of recognizing familiar words (2). This recognition is influenced "by our expectations that certain words will occur, based on our knowledge of language, communication, and what we have already read" (2). Using prior knowledge of the subject, the reader "constructs" an interpretation of the text. How this schematic view of the reading process differs from the
decoding theory is reflected by the role meaning plays in the reading activity. Decoding theorists postulate that meaning inhabits the text and that the reader must discover what the author intended to communicate. The schematic-process view, however, asserts that the reader creates or "constructs" meaning by interacting with the text. In short, meaning develops from the interplay of the text and the reader's existing knowledge of its content and its language.

This model of the reading process parallels the composing process. Using his understanding of language conventions and his prior knowledge of the topic, a writer constructs meaning and attempts to communicate his intended purpose to the reader. Both composing and comprehending, then, are active processes; both generate meaning using background knowledge or prior knowledge. The intent of this section, however, is to show the importance of background schemata in the composing process. A review of the reading research on content schemata and its role in comprehension and memory will reveal the important role prior knowledge plays in the composing process (unfortunately, little or no research has been done on the role of background schemata in composing). Moreover, the schematic process theory offers numerous teaching strategies for writing teachers.

The role of background schema or content schema in the comprehension process has been well studied. Nearly all researchers in the field have validated, in various ways,
the importance of the reader's prior knowledge in "constructing" meaning from the text. For example, Doctorow, Wittrock, and Marks predicted that reading comprehension would improve if learners were stimulated to develop written meaning-elaborations of a reading selection and if "semantic retrieval cues" were provided to help the reader "construct" his written elaboration. In the study readers were asked to write sentences from memory about paragraphs they had read. To help the readers retrieve information, paragraph headings were inserted into the text for a second group and the results were indexed. According to the generative comprehension theory, comprehension is facilitated if readers use "their memories of events and experiences to construct meanings for the text" (109). The paragraph headings, then, activate schematic units to help the reader categorize the text information into his existing schema. The retrieval cues "activate" his schema and, as a result, enhance comprehension. Doctorow and his colleagues concluded that comprehension is increased when retrieval cues are provided and more comprehensive written elaborations are constructed. They also state: "...the recall of relevant information and the construction of meaningful elaborations for text are closely related processes in comprehension, both of which are facilitated by the insertion of retrieval cues" (117). In other words, according to the schematic-processing model, paragraph headings assisted the reader's activation of schema from "top-down" or "concept" direction.
Another study by Anderson, Pichert, and Shirey validates the schematic-processing theory discussed above. They believe that a reader's major task is "to find an overall framework, or schema, within which to understand a text" (271). This schema provides a place for the reader to organize the major ideas, the supporting concepts, and the details in a text and "may be integral to several other comprehension and memory functions..." (271). Anderson's group also believe that content schema may be more important to understanding than organizational schemata (see next section). Two major findings emerged from their research: 1) readers make inferences about a text that is consistent with their prior knowledge or background schemata, and 2) readers recall the text information that is consistent with their background schemata. According to their hypothesis, a reader's schema focuses his attention to particular aspects of the text, provides the "ideational scaffolding for assimilating the information" in the text, and helps the reader infer or fill in the gaps where the text is not explicit (272). In addition, when the text is recalled, a reader's background schema structures his memory search, edits for significant information, and helps him fabricate meaning if memory lapses exist. Using the schematic-processing model, Anderson's team concluded that activating specific background schema "selectively enhances encoding" (i.e., the construction of meaning during the reading process) and that schema "activated afterward selectively enhances retrieval" (276).
In an effort to verify the role specific background knowledge has in text processing, Spilich, Vesonder, Chiesi, and Voss (1979) and Voss, Vesonder, and Spilich (1980) contrasted how individuals with good background schema and those with poor background schema comprehended a text about a fictitious baseball game. The text used in the study was analyzed in terms of its propositional structures; these structures were classified in terms of the knowledge structures, i.e., the conceptual framework of a baseball game. For example, the background schema relevant to the play of a baseball game was charted and included the basic setting (items such as the teams playing, the team at bat, the team in the field) and the goals of the game (ideas like getting the runner advanced, and the number of balls and strikes, etc). The text was read by both the high-baseball knowledge and low-baseball knowledge individuals. The assumption was that the individuals knowledgeable about baseball would process the text more efficiently because they had a better developed baseball schema. The researchers found that high-knowledge individuals recalled more information than low-knowledge individuals about how the game actions occurred and that low-knowledge individuals had difficulty sequencing the order of game events. They concluded that specific background schemata may influence how a text is processed. If readers have difficulty processing a text about which they have little background knowledge, consider how difficult it would be for writers to generate a text about which they have little background experience.
A number of other studies develop the same theme with some variation. For example, Spiro concludes that "recall involves a process of accommodating details of what is to be remembered to what is known at the time of recall. In other words, the past is not reproduced, but is reconstructed, guided by knowledge-based principles of coherence" (94). Instead of remembering isolated facts, memory is associated with the schematic units or categories in the reader's mind. Langer and Nicholich (1981) and Langer (1984) developed a measure of background knowledge and concluded that "text specific concept and vocabulary knowledge affect the processing, interpretation, and recall of what is read" (1984, 471) and that the "level of prior knowledge is related to the measures of recall" (1981, 377). Other researchers validate the role of background schemata in text comprehension and recall (Landis; Koblinsky and Cruse; and Roller). One group, however, discovered that a reader's background schemata, especially if they are incomplete or inaccurate, may actually interfere with reading comprehension (Alvermann, Smith, and Readence). It is these incomplete or inaccurate schemata, however, that has the greatest impact on the composing process and is the primary focus of the following discussion. Content or background schemata play an important role in the composing process and, while little research on schema theory has been done outside of reading, the schematic-processing model offers an explanation for many writing problems.
Even though many composition theorists have discussed the cognitive aspects of writing, most of their work does not consider the schematic-processing model of text comprehension and production. However, schema theory does offer an explanation for the problems many writers have. For example, Mina Shaughnessy was one of the first writing instructors to discuss the role of concept development in the composing process. While not using the schematic terminology, Shaughnessy, when discussing a basic writer's difficulty in fully developing his text, states:

One of the most notable differences between experienced and inexperienced writers is the rate at which they reach closure upon a point. The experienced writer characteristically reveals a much greater tolerance for what Dewey called "an attitude of suspended conclusion" than the inexperienced writer, whose thought often seems to halt at the boundary of each sentence rather than move on, by gradations of subsequent comment, to an elaboration of the sentence. The BW essay tends, as a result, to be made up of "sentences of thought" rather than "passages of thought," and although the essays are not always short, they tend to be so because of the difficulty the writer has in staying with his point beyond its initial formulation. ...

[The basic writer] is cut off from the thoughts (italics mine) that might be awakened in less
restricting situations. The mind is not allowed to play upon the topic, to follow out the implications that lie within statements, or to recover the history of the idea as it developed in the writer's mind. (227-228)

In this passage Shaughnessy touches upon the problem novice writers have in "activating" appropriate schematic structures that would provide the conceptual framework they need to elaborate on and to develop their ideas. Basic writers fail to activate the "control structures," either the conceptually-driven or the data-driven, that would provide the framework in their minds to facilitate the development of sufficient detail for concept closure. One of the reasons for this, according to Shaughnessy, is that basic writers begin writing before they have arrived at their "starting ideas." In other words, they begin writing before appropriate background schemata have been activated. Bereiter and Scardamalia also speculate on this text processing problem. They believe that "...grasping complex characteristics of texts [whether constructing meaning from the text or constructing meaning by composing] requires taking account of relation between a number of elements... One reason children [or novice writers] may have trouble holding the necessary information in mind to form a new concept is that they lack background knowledge that would provide ready-made ways of coding and organizing the new information (179)."
One particular study by Langer (1984) attempts to verify the relationship of specific background knowledge and writing quality. According to Langer, most writing tasks students complete involve teacher-made topics requiring informational writing. Most of the comments given by teachers tend to focus on writing conventions and the accuracy of the content-related information. Moreover, most teachers do not concern themselves with the kinds of knowledge students have about the topics given and with how this knowledge affects and/or interacts with their writing performance.

Langer hypothesizes that writers with well-integrated knowledge would produce texts that are well-organized and fluent. If, however, writers had "few ideas about a topic, or when they are unwilling to risk stating the ideas they do have, their writing may rely on glib generalizations, unsupported by argument or enriching illustration" (29). She also believes that fragmentary knowledge would produce a text with disconnected ideas that lacked cohesion. This is, essentially, a description of the difference between the experienced and inexperienced writers Shaughnessy discussed. Using high school history classes, 99 students were given (four classes, two per teacher) four writing assignments. Langer used a procedure to measure topic-specific knowledge. She concluded from the data that students' topic-specific background knowledge related to the quality of their writing. She also found that
different kinds of knowledge predict success indifferent writing tasks. When the assignment calls for a simple reiteration of facts, or elaborations of a given idea, a large amount of unintegrated (or loosely linked) information will suffice. However, when the student is required to present a thesis, analyze and defend it, the degree of organization of knowledge as opposed to simple fluence, will determine success....These findings have several interesting implications....They re-emphasize the extent to which the teaching of writing is inextricably intertwined with the exploration of the topic about which students are writing.

(41)

In other words, when a writer’s background schemata about a topic are activated and that schemata are enriched and structured by direct teacher intervention, the quality of the students’ informational writing improves dramatically. It follows, then, that background schemata play an essential role in the writing process and that many of the writing problems students have result from inadequate information about the topic on which they are writing.

Even though much research has been done on the role of invention or prewriting in the writing process, the schematic-processing model of the composing process not only offers a theoretical basis for the invention stage of the writing process, it also offers a framework for teaching
invention, especially in content-area classrooms that require writing. Schema theory reflects a cognitive process and provides an explanation of how writers activate their prior knowledge about a particular topic, of how they accommodate new information into their existing schema, and of how writers construct their texts.

Nancy Stein discusses this use of background schema or knowledge. She believes that writers use their "existing knowledge to generate new information, which is then incorporated into current knowledge structures" (261). During the writing process, a new schematic organization is developed that provides a framework for the writer to understand the subject or topic in new and different ways. According to Stein, the writer not only constructs a coherent text for the audience during the writing process, but he also constructs and internalizes a new schema for himself. However, if student is asked to write on topics chosen by the teacher, and if he does not have a sufficiently developed schema, he may be unable to construct, what Stein calls, "an internally consistent representation of the topic at hand" (263). She theorizes that the ability to write prose may be related to the writer's ability to "organize, restructure, and understand a set of events for himself" (263). Furthermore, skilled writers often shift their goals or purposes based on the amount of prior knowledge they have about the topic. Stein believes that, as writers develop their internal schema about a topic (i.e., their "internal representa-
tion" of the topic), their writing goals may change to reflect the new conceptual organization. Stein concludes that "breakdowns in comprehension and composition...occur because of an inadequate knowledge base..." (286). This schematic-processing model could possibly explain the conceptual problems Shaughnessy observed in her basic writers.

While little empirical research has been done to validate the role of prior knowledge in the composing process, several scholars have discussed the issue. One study by Mosenthal, Conley, Colella, and Davidson-Mosenthal, however, used the Voss group's (1980) baseball grammar to test the role of background schema on the structure of children's narratives. Students were given a baseball recognition test which identified high-knowledge and low-knowledge students. The students were presented with a series of thirteen pictures that represented a specific baseball sequence. The students were then asked to compose a narrative about the picture sequence. The propositions in the essays were analyzed and then classified into either propositions that reflected prior knowledge, picture reproduction, picture reconstruction, or embellishment of some unidentifiable meaning source. The study demonstrated that high-knowledge students "produced significantly more significance-statement propositions" (629). Moreover, low-knowledge individuals included more irrelevant actions than high-knowledge students. Mosenthal's group emphasizes the fact that "differ-
ences in prior knowledge influences how students produce text" (630). When students fail to develop their essays fully, using appropriate density of detail, or include irrelevant or non-essential information, the problem may be the lack of sufficient background schema about the topic.

Reither addresses the instructional implications that Mosenthal's study suggests. He thinks writers must develop knowledge or come to know beyond "that which occurs as writers probe their own present experience and knowledge" (622). He states that many composition teachers assume that students have wide experiences, are well-read, and are well-informed when they arrive at schools and that all teachers have to do is to teach students ways of thinking that will help them probe this prior knowledge. Unfortunately, most students lack this sophisticated background. Reither suggests that composition teachers should focus on the role of "academic inquiry" in an effort to help the novice writer. That is, the student must learn to recognize and use what Reither calls, the "discourse community," the "knowledge community," or the "inquiry community" of the subject under consideration. In other words, the novice writer should consult the experts in the field under discussion to help them, not only to probe their own background knowledge, but to develop techniques and strategies to move beyond the limitations of their own prior knowledge schemata. For Reither, academic writing, reading, and inquiry "are inseparably linked" (625). These three processes are not learned
independently; they are learned by doing all simultaneously. Composition teachers, then, should unify the teaching of writing to both reading and inquiry. This unification would provide the necessary substance for well-written and well-developed essays, initiating the novice writer to use "what they can know, through effective inquiry, rather than suffer the limits of what they already know" (624).

Not only do background schemata have an important role in both the invention and drafting stages of the composing process, they may also have important ramifications in the structuring of sentences and with sentence style. For example, how information is ordered in sentences correlates directly with schema theory. Haviland and Clark discussed the linguistic structure of sentences and measured how long it took for readers to comprehend sentences and measured how long it took for readers to comprehend sentences that were structured differently. According to Haviland and Clark, sentences contain both "Given" and "New" information. Basically, "given" information is what a reader is expected to have in his background schema or memory, and "new" information is what the writer believes his audience does not already know. Normally, well-comprehended sentences follow, what Haviland and Clark refer to as, the "Given-New Structure," i.e., information the writer believes to be known precedes the new information given within the sentence. They use the following example to illustrate their point:

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The jokes Horace tells are awful.

Given: Horace tells jokes.

New: Those jokes are awful. (513)

Haviland and Clark state that this sentence provides two basic concepts: that Horace tells jokes and that they are awful. However, the syntactic structure of the sentence distinguishes the two ideas. The writer assumes that his readers already know that Horace tells jokes; the new information the writer wishes to convey is that the jokes are awful. The degree of success the reader has in comprehending a sentence, according to the "Given-New Strategy," depends on whether or not the prior knowledge the writer assumes the reader has actually matches the information in the reader's memory or schema.

Haviland and Clark explain the strategy as follows. Readers using the "Given-New Strategy" break a sentence into its syntactically defined given and new information. The given information activates background schema in memory; it searches for a matching antecedent. New information is then attached to this schema (accommodated). If the reader cannot find a matching background schema, he treats all the semantic units in the sentences as new information and attempts to construct a new schema by building a bridging structure or by analyzing what is "Given" and what is "New" in the sentence.
The instructional implications of this strategy are best explained by Vande Kopple. He develops his "Functional Sentence Perspective" idea using the same basic theory. However, he believes that "composition teachers should teach the principles of FSP and the ways students can manipulate English syntax so that the flow of information in their essays conforms to FSP" (56). He states that a sentence has two major parts: the topic and the comment. The topic normally refers to the grammatical subject and the comment generally refers to the grammatical predicate. FSP theorists believe that the primary role of the topic is to express "old" information (the "Given") and that the primary role of the comment is to communicate the "new" information.

Vande Kopple does, however, suggest five specific ways that using this "Given-New Strategy" might help novice writers. Students taught to use FSP should compose more coherent texts. For example, by being able to distinguish old and new information, novice writers would become more sensitive to logical connectives, especially demonstrative pronouns (this,that); comparatives; substitutions (pronouns for nouns); and certain redundancies that depend on antecedent or old information to which they would refer. Vande Kopple also believes that the "Given-New Strategy" would help writers improve the "logical continuity of their essays" (56). When students leave logical gaps in their essays, sensitivity to the FSP might help them check how often their sentence topics are unrelated to previous topics or concepts.
According to Vande Kopple, the "Given-New Strategy" would also help novice writers recognize the needs of their audiences. By determining what information the readers have acquired from earlier sentences or paragraphs, in addition to understanding the background schema a particular audience should have, writers might make decisions on how much to elaborate about a particular idea, how many terms need definition, how many points might need repeating, and/or how much new information would be appropriate to their purposes.

In addition, teaching the Given-New Strategy should, according to Vande Kopple, provide student writers with specific guidelines for revising their texts. When writers compose their first drafts, for example, they often violate FSP because they transcribe information as they think of it, not from the Given-New perspective. However, using the FSP ideas, several stylistic techniques can be used to make a text more comprehensible. For example, writers might edit sentences for extraneous information, leaving only the "new" information in the comment section. They might also move references to "old" information into subordinate clauses or phrases and out of the predicate so that the sentence conforms to FSP. In addition, writers can use techniques to position information differently. For example, they might construct shorter subjects and longer predicates because, as Vande Kopple discusses, newer information is typically expressed in longer and more complex phrases and because sentences moving from shorter to longer constructions are comprehended more easily.
While it is important to know where to place information in a sentence, the type of information used is just as important. A study done by Langer (1986) compared the lexical components of high-rated and low-rated essays. She found that the writers of the two groups used words to communicate meaning in different ways. The essays rated highest used a greater variety of words, especially nouns and pronouns that referred to concepts and not people, and used those words as the subjects of the clauses. High-rated writers also used more lexical ties "within and across sentences" (284). Using the FSP concepts to explain Langer’s findings, high-rated writers used concept-laden words in the "old" information slot, making it easier for the readers to follow the writer’s thinking and to relate that information to already existing schema in the reader’s mind.

Even though background schemata play a definite role in the ordering of information in a text, their role in the revision process may be much more comprehensive than what has already been discussed. Revision is much more than fixing errors that lie in the text or rearranging information in a sentence. Revision is essentially a reconceptualization of the text as the writer responds to it as a reader. As was discussed earlier, reading comprehension is an interactive process by which the reader constructs meaning by using his prior knowledge or background schemata to accommodate the new information in the text. When a writer reads his own text, this same process takes
place. Often new ideas generate in the reader's mind as he reads. A writer, too, develops new ideas in the course of composing a text. The interaction between the writer's perspective, the reader's perspective, and the perspective of the text itself will often result in the restructuring of the topic. Frank Smith (1982) summarizes the process well:

Revision confronts writers with the text they have produced. It may be regarded as an occasion of dual reorganization: reorganization of the text as the writer responds to it as a reader, and reorganization of the specification of the text in the writer's mind. As I have said, ideas arise and develop in the original course of composition, both in the text and in the author's mind. When the author subsequently reviews the text there is the possibility of new developments among the ideas the writer now finds in the text and those in the author's mind. The interaction resumes, but now with a new and substantial basis—the structure and content of the text itself. (128)

Because revision requires reading ability and because the goal of revision, according to most scholars, is substantive change that requires a re-seeing, restructuring, or reconceptualizing of the entire text, the schematic-processing model offers not only a theoretical understanding of the revision process, but practical strategies as well.

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For example, Flower, Hayes, Carey, Schriver, and Stratmand's detailed discussion of the revision process reinforces the role prior knowledge has in re-seeing a text. They refer to revision as a "strategic, adaptive, thinking" process, one that isn't predictable (18). According to Flower's study, re-seeing a text often depends on a number of variables, including how well the original text is written, how much the writer knows about the topic, and how high the writer's standards are. If, for example, a sixth grader wrote an essay on, say, water pollution in the Mississippi delta, the substantive changes to the specific text the student might make would differ considerably from the changes an Environmental Protection Agency expert on water pollution would make. The background schema the two individuals have about that particular topic would affect the way in which each would, as readers, interact with the text. In addition, as Flower's group discusses in detail, "revision is a process that not only draws on the writer's knowledge, but actively generates new knowledge" (21). It follows, then, that the quality of our sixth grader's revised text would necessarily reflect how comprehensive his prior knowledge is. Unless a writer can activate a well-developed background schema about a particular topic, while reading his text, the writer will lack a sufficient knowledge base to expand his text and to generate new ideas about the topic under consideration.
Moreover, the ability to detect problems in the text itself reflects the writer's prior knowledge. Obviously, prior knowledge of language conventions is necessary to detect grammatical, spelling, and punctuation errors. It is the ability to detect textual problems, however, that requires a re-seeing of the text. Flower and her colleagues describe the process by which writers evaluate their texts:

Writers are comparing the text as they read it to that set of intentions and criteria which they represent to themselves. [This representative text]...is likely to consist of 1) a unique network of goals and intentions built up during planning which is guiding the act of writing, and 2) a vast set of standard and genre-specific tests and criteria for good writing already stored in the writer's long-term memory. (29)

In other words, the writer, during the act of composing, develops a new schema for the topic that reflects his new goals and intentions. Then, when revising his text, the writer compares these intentions or schemata to another set of schemata. The reviser detects problems by constructing a new representative text through reading and then by comparing that representation to his intentions. In short, the writer develops a sense of "dissonance" between the schematic concepts that must be considered if a re-seeing of the text is to take place.
Background schemata also work to help revisers diagnose the problems that are detected in the text. Flower’s group defines diagnosis as "the act of recognizing and categorizing the problem one detects in the text" (47). In order to do this, a writer must have appropriate background schema. As discussed earlier, schemata help individuals organize new and old knowledge; they package knowledge into categories or groups and contain information about how this knowledge should be used. The ability to categorize, or to match patterns, according to Flower, is essential to diagnosing problems in a text, an important component of the revision process. Flower’s team describes four ways in which categorizing helps writers diagnose problems in their texts: 1) it helps writers differentiate the problem from other communicative functions, helping them focus on specific problems on which they can work rather than on problematic texts in general; 2) it helps writers predict possible types of reader responses; 3) it brings relevant past experience and specific prior knowledge to work on the problem; and 4) it helps revisers distinguish between different focuses their text may have, even though a category might not have a name or even a specific concept base. Essentially, then, Flower’s team describes how different schemata can be used to help writers diagnose their faulty texts.

Using this schematic-processing model as a guide to revision strategies, a teacher might structure his comments
on a student’s paper so that they correspond to the model. For example, if a paper lacks adequate conceptual development, a common problem for most novice writers, the instructor could ask questions in the margins that would help the reviser activate the "conceptually-driven" or the "data-driven" control structures discussed earlier. He might also offer specific comments that would help the writer expand his schema about the topic. If instructors use models, they might activate a student’s background schema by referring them to another text for information. In addition, specific questions offered by the teacher might help the revisers expand or restructure their intentions or goals, again attempting to activate the control structures writers have.

To sum up, by using schema theory as a guide, writing teachers can structure their responses to emphasize re-seeing the text and to avoid "surface-error markings" that characterize many grading strategies.

Prior knowledge obviously plays an important role in both the reading and writing processes. Earlier Reither suggested that inquiry, reading, and writing should be linked. His ideas offer one method to integrate the reading and writing processes. Bartholomae and Petrosky offer an alternative curriculum that unifies the teaching of reading and composition. Their program is also summarized by Bartholomae (1979). Their course requires students to read twelve books and to write twenty-five drafts and revisions, and it is organized around a central theme ("Work" for the
adult classes and "Growth and Change in Adolescence" for the freshman classes). The essential idea, however, was to select a thematic unit of study that would enable students to utilize their prior knowledge and experiences. Using a subject close to the students' experiences provides an anchor for "systematic inquiry" and the basis for gathering new information, for attempting new perspective, and for reformulating, re-seeing, and developing new schemata about the subject (Bartholomae 1979, 85).

The ramifications of this thematic approach are important. Because the writing context encompasses a real subject matter that involves the student in an academic investigation, the writer develops analytical skills. He learns to investigate and to categorize concepts that have been studied by an academic community. Moreover, the writer learns to juxtapose his own communication skills with the discourse community to which the subject belongs and to the writing community within the class itself. Bartholomae (1979) states that the course provides "instruction that allows students to experience the possibilities for contextualizing a given writing situation in their own particular terms, terms that would allow them to initiate and participate in the process by which they and their subject are transformed" (89). By providing a writing context that makes their writing more real, novice writers begin to see their writing as a "problem-solving" activity, one that allows them to develop a relationship between their own
background schemata and the subject matter. For example, when given a reading assignment, students are not asked specific questions about what the text said, but instead are asked what they could say about the text. This particular strategy reflects the schematic-processing model of reading and writing. The meaning does not lie within the text itself; meaning results from the reader interacting with the text. By using extended written responses, the reader uses his background schema to interact with the text and literally "to construct" his comprehension in writing.

In addition to providing a link between the reading and writing processes, one that offers a specific approach to the teaching of composition, background or content schemata may be linked to interest. In a survey of research examining the role of interest in reading comprehension, Guthrie resolved that students comprehend high interest materials better because they know more about them. However, Baldwin, Peleg-Bruckner, and McClintock's study concluded that background knowledge and interest may have autonomous influences on reading comprehension. If this same autonomy exists in the writing process, writers need to develop strategies for accommodating new information into existing schema. Many composition teachers allow students to select their own essay topics, and most students choose to write about subjects which interest them and about which they have substantial background information or schema. However, one of the major complaints by teachers in other academic disciplines

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is that students fail to transfer the writing skills taught in English composition classes to other subject areas. To solve this problem, especially when students have not had enough exposure to a subject to develop an interest, composition teachers need to help students develop strategies of inquiry, techniques to help them acquire information for which they have not yet developed an interest. This skill should be an essential part of any writing pedagogy, especially in the academic community.

**Role of Organizational Schemata**

Even though background schema plays an important role in the reading and writing processes, it is only one of two major knowledge structures used when an individual "constructs" a text by reading or writing. Textual or organizational schemata also provide a basis for constructing meaning. Studies have demonstrated the positive role textual or organizational schemata play in reading comprehension and composition. Moreover, organizational or structural schemata seem to bridge the reading-writing gap or separation and complement both the reading and writing processes.

Organizational or structural schemata have many names; in the research literature they are known as macrostructures, genre schemes, top-level structures, text structures, rhetorical patterns, global plans, macropropositions, topics or *topoi*, discourse structures, semantic bridges, or thought paradigms. All the forms share an important function, how-
ever. They provide a structural framework for individual semantic units to coalesce into meaningful discourse. In addition, organizational schemata have many different forms and levels of sophistication (that is, they may encompass the entire text or operate at the sentence level).

According to Kinneavy (48), the author’s purpose or aim determines the arrangement of discourse. Kinneavy surveys and compares many different views of purpose in discourse (51). He concludes that a writer’s purpose or aim can be divided into the following categories (each of which has its own organizational schemata): the expressive, which emphasizes the encoder or writer; the persuasive, which emphasizes the decoder or audience; the referential, which emphasizes the subject itself and is divided into scientific, exploratory, and informational writing; and the literary, which focuses on writing as a product, a thing to be appreciated in its own right. If Kinneavy is correct, then a writer must understand the organizational schema of a particular discourse type if he is to communicate his purpose. Moreover, the reader, if he is to understand the writer’s purpose, must recognize the structural development of the discourse type. Unfortunately, not all students learn to differentiate between the discourse types. Elementary students, for example, are often not exposed to expository schemata (i.e., referential and persuasive discourse patterns) because many of the lessons originate in basal-reader materials that are dominated by narratives and poems.
Even though expressive and literary discourse have a function (after all, students are learning to use narrative structural patterns in their writing and to recognize them when they read), these organizational patterns or schemata become inadequate when students must read complex content or organize it in their own writing. For example, when elementary students do read expository prose included in basal readers, the pieces often "lack the main and subheads that characterize conceptual and relational content" (Hennings 8). Taylor (1983) agrees that elementary students have difficulty processing expository texts. She thinks expository texts have "greater conceptual density,...more unfamiliar concepts, and a...less familiar text structure" (517). Because elementary students fail to develop an understanding of the structure of expository prose and because they normally write stories, poems, and paragraphs describing their personal experiences, these students must overcome their limitations and learn the expository schemata used almost exclusively in the secondary schools and colleges. Often, however, secondary and post-secondary students acquire the rhetorical schemata by unconsciously assimilating them (a kind of literary osmosis) with little or no direct instruction. Current research, though, indicates that awareness of text structure not only improves reading comprehension and the production of expository prose, but may be a vital link between the reading and writing processes. Moreover, research indicates that direct
instruction in text structure improves reading comprehension and writing quality.

Organizational schemata are not new. Aristotle refers to the basic rhetorical patterns as *topoi*, topics or forms for ordering and analyzing the subject under consideration. He used the patterns to "invent" ideas about subjects. Considered one of the five parts of classical rhetoric, invention, or "prewriting" in the modern jargon, helps the writer to discover the details to present in a text. Modern scholars, however, view these "topics" differently. Anderson's group (1978) and Nelson cite evidence that organizational schemata may serve a conceptual role in both the reading and writing. Nelson states that the "cognitive function underlying language are species-specific, and that they consist of ubiquitous processes of extracting and categorizing similarities" (1). Nelson argues that the topics or organizational schemata are simply patterns of thought which are inherent in the human language, that categorizing has significant utilitarian value in all forms of human behavior, and that these categories are identifiable. In other words, organizational schemata reflect basic thinking patterns or thought paradigms inherent to language and thought. Anderson's group takes this concept a step further. They think organizational schemata may serve as a cognitive structure that furnishes "ideational anchorage." Readers require a thought paradigm where new ideas and information can be learned and retained more efficiently; they need "...a slot into which
some of the specific information described in a message will fit" (434). Roen and Piche argue that these text structures, if they activate appropriate and adequate schemata in the reader, do not require surface-level transitions or logical connectives. Readers simply "integrate new textual information into existing knowledge structures" (21); that is, readers, if they are able to determine the organizational pattern of the text, can use the structure to assimilate new ideas and to infer the relationship of the various semantic units to each other. Anderson and his colleagues (1983) also demonstrate that an existing "schema allows the reader to place the major themes, secondary themes, and supporting details in proper relation to one another and may be integral to several other comprehension and memory functions" (271). In a similar process, textual schema allows the writer, when producing a text, to structure the semantic units in a similar way. The writer essentially uses the text structure to anchor ideas in a clear organizational pattern.

Numerous empirical studies have demonstrated the positive role an awareness of text structure has on reading comprehension and recall (Kintsch and Yarbrough; Frase; Meyer 1979, 1982; Hiebert et al. 1978, 1983; Brooks and Dansereau). All the studies indicate that knowing the general structure of a passage aids recall. Meyer (1979) "...assumes that an important strategy for reading comprehension is the ability to identify and to use the top-
level structure of text for both encoding and retrieval. In processing the text, the skilled reader will use the same type of superordinate schema as that used by the author in writing the text" (111). Meyer discovered that good readers used text structure to understand and to recall material and that poor readers were not aware of text structure; moreover, poor readers did not use the organizational patterns when they tried to recall the material. Meyer also found that students who used text structures were able to recall more information. In another study, Kintsch and Yarbrough reached a similar conclusion:

Subjects were better able to answer topic and main idea questions for texts that were clearly organized according to a familiar rhetorical structure than for text with identical content but without such an organization. [Moreover], ...the rhetorical cues and canonical ordering that distinguished the good forms of the text from the bad forms facilitate the macroprocesses in comprehension, presumably because they permitted the successful use of rhetorical comprehension strategies.... (833)

The use of text structure as an aid to recall was validated in yet another study. Taylor and Samuel (1983) also found that text structure awareness improved recall of information.

Based upon the research in comprehension and recall that tested the value of organizational schemata, Meyer (1979)
concluded that reading programs should incorporate schema theory, that top-level structure awareness is an important reading strategy, and that it can be taught to most secondary students. Brooks and Danereau validate Meyer’s conclusion. Their experiment demonstrated that students can be trained to use structural schemata and that this instruction improved the recall of scientific texts. All the studies seem to validate Anderson’s theory that text structure provides an "ideational anchorage." Furthermore, text structure recognition not only improves comprehension, but also serves as a cognitive structure where new information can be placed in long-term memory.

If writers are to communicate effectively, they, too, must understand and use organizational schemata. A writer must develop a plan, and the reader must follow the plan for communication to take place. According to Meyer (1982), the "presence of a visible plan for presenting content plays a crucial role in assuring the interpretability of a passage" (38). When writers use a clear structural schemata, content, concludes Meyer, "is better integrated and organized, and readers retain more with less time and effort" (41). Her work demonstrates the link between reading and writing that structural schemata offer. Moreover, writing ability reflects the use of basic rhetorical principles and forms. D’Angelo (1976) discusses this concept in detail. He argues that each mode of discourse has a distinct shape and structure, a concept that other rhetoricians advocate (See
Kinneavy 1971). However, D'Angelo believes that writing ability is clearly associated with the composer's use of "the overall plan or design or configuration of particular kinds of discourse" (144). While other factors, like the mechanical conventions and syntactic grammars, cannot be overlooked, the "writing plan" serves a conceptual role for the writer (and the reader) and is more directly related to meaning.

In addition to serving a writer's purpose and to helping a reader comprehend the text more effectively, organizational schemata may be intrinsically involved in the composing process. Atwell reported that rhetorical plans "act as a guide throughout the production of discourse" (12). Using blind writing, where writers were not able to read their texts, Atwell reported that above-average writers resorted "to increased reliance on their plans in order to keep their writing recursive" (13). The above-average writers stopped to read the developing text and matched it against their plans. They would modify either the text or the plan if necessary. However, when unable to read their developing text, good writers resorted to "mental plans," which act as a guide while composing the text. According to Atwell, the mental plan or scheme for the text helped the writer to define "his semantic field" and to develop his text logically. The text structure also helped the writer avoid "less predictable outcomes." Atwell's study, then, suggests that writers make use of structural schemata when writing, that
they read their texts as they write, and that they use the conceptual plans to frame the ideas they attempt to communicate. A study by Perl reinforces the role re-reading plays in the composing process. Even though she uses protocols to develop her claims, Perl states that writers return to "their notion of topic" (45). What they are doing, however, is returning to their "global plans."

The idea that "form" or structural schemata performs a generative role in the composing process is not new. In classical rhetoric, topoi or topics, now associated with the arrangement of essays, were part of invention. They were used to help orators "discover" ideas about a topic. However, the role of form in the modern process-orientated theories of composition needs clarity. Coe's discussion of the role of form in modern composition theory offers some insight by tracing the history of process approaches to composition and arguing against the "form" versus "content" dichotomy. Coe states, "...mental schema...allow[s] us to perceive pattern in the thousands of bits' of input that would otherwise overwhelm our mental capacities" (17). However, the most important concept Coe discusses deals with the generative and constraining aspects of form or structural schemata. Even though he offers no empirical evidence, Coe's reasoning parallels Aristotle and other classical rhetoricians. Coe writes:

Form, in its emptiness, is heuristic, for it guides a structured search. Faced with the emptiness of a
form, a human being seeks matter to fill it. Form becomes, therefore, a motive for generating information. Like any heuristic, it motivates a search for information of a certain type: When the searchers can anticipate what shape of stuff they seek, generation is less free, but much more efficient; by constraining the search, form directs attention. (Heuristic, in this sense, are distinct from unstructuring discovery techniques such as freewriting.) (18)

Not only does form provide a generative structure, it also offers writers an opportunity to use patterns that certain readers recognize. If each discourse community or academic discipline uses unique forms to communicate its content, then writers who use the forms inherent to the discipline will communicate their message more clearly, allowing the readers in that particular discourse community be better understand the message. Coe's discussion is validated by the reading comprehension research discussed earlier, and his notion of discourse communities parallels Bartholomae's idea of academic communities.

If Nelson's and Anderson's idea that organizational patterns serve a conceptual role in reading and writing is developed as theory of text production, text schemata can be viewed from a different perspective. According to Smith (1982), text structures or, as he refers to them, "genre schemes" act as a guide that determines how the writer's
intention should be ordered. Smith suggests that when a writer's purpose becomes too complex to be understood, he must formulate a more "global intention" to keep the individual ideas coherent. Smith refers to this phenomenon as "chunking," organizing the parts of the discourse into a "more concise and independently manipulable whole (9). van Dijk concurs, stating that macrostructures (his term for structural schemata) define the meaning of the individual concepts or propositions developed in the text. In other words, macrostructures or organizational schemata serve a cognitive function by organizing complex semantic information during text production. The writer's task, paralleling Brooks' idea that a reader fills the structural schema with appropriate information when he reads unfamiliar texts, is to categorize the individual semantic units into the appropriate rhetorical structure. This structure or pattern facilitates the reader's comprehension, makes it easier for the writer to organize his ideas, and reflects a complementary process that reading and writing share.

Because awareness of text structure appears to improve the performance of both readers and writers, direct instruction in using text structures should benefit students. Recent experiments done by Brooks and Dansereau and by Meyer (1979) demonstrate that direct instruction in using organizational schemata improves comprehension and recall. Training in using text structures also helps the composing process. A study done by Horowitz demonstrated that teaching
text structure to students helped them to develop the ability to elaborate upon ideas and to compose a specific rhetorical form. In this study students received instruction in both recognizing (reading instruction) and producing text structure. According to Horowitz, "...reading and writing training significantly influenced use of macro and micro cause-effect structures in writing" (540). In another study Taylor and Beach (1984) found that reading instruction and practice in writing summaries of the text helped students "hierarchically organize their own expository writing, with the end result of improvements in overall writing ability" (145).

In a more specific discussion of the use of structural schemata in the teaching of writing, Frank D’Angelo (1986) reviews readability research and schema theory and applies those ideas to the teaching of the topic sentence in paragraph development. After presenting the historical background and the modern criticism of the teaching of the topic sentence, D’Angelo shows the relationship of macrostructures to the topic sentence concept (437). While not all paragraphs have topic sentences, all well-written paragraphs have "higher-level propositions" that help organize the ideas not only in the individual paragraphs, but also the ideas in the subsequent paragraphs. If the author does not use a macroproposition or macrostructure to organize his text, or if the controlling idea is unidentifiable or inefficient, D’Angelo states that the reader must impose his
own pattern on the text. If this happens, the reader has a more difficult time understanding the material, has less retention, and requires a longer reading time. The implications for writing are clear: Students should use some "global" structure to organize their writing. As D'Angelo states:

In brief, topic sentences and macropropositions can help writers to organize their ideas more effectively and readers to follow the logical development of the writer's thoughts. (439)

Again, organizational schemata not only provide an essential link between the two language processes, but also serve generative, organizational, and communicative functions.

In addition to their role in the initial production of prose (prewriting and composing stages in the writing process), organizational schemata serve an important role in the revision process as well. Witte explored the function of topical structures and revision. He found numerous differences between "low-score" revisions and "high-score" revisions. "Low-score" revisions lacked both local and global coherence when selecting and ordering sentence topics. He concluded that a successful reviser understands the structure being revised. He discovered that low-score writers in his study "could neither perceive the topical structure of the original text nor create a suitable topical structure revisions" (333). The poor revisers tended to make only surface or sentence-level changes that did not
reflect the more global intentions of their texts. He also found that the high-score revisions reduced the number of sentence topics, making the overall structure more tightly organized and developing the ideas of those retained more fully. Witte concluded that "how students decide to revise a text is largely dependent on their understanding of the text, an understanding garnered only through reading. If writers cannot read and understand their own texts, or those of others, it is difficult to see how they could ever become effective revisers" (335). Clearly, then, good revisers use organizational schemata when revising their texts. However, they are also able to read their own writing. Witte, by studying the revision strategies of good and poor revisers, has verified the role structural schemata play in the composing process; he has also established the function reading comprehension has in the revision process.

Flower and her colleagues also comment on the writer's ability to read his drafts. When a writer rereads his text, he builds and retrieves his organizational plan. Atwell's research also demonstrates that reading helps the better writers form a rhetorical framework. Both researchers emphasize that the ability to recover this plan during the revision process is essential. By helping novice writers focus their attention on the content and structure of their texts, rather than on the surface errors like punctuation and spelling, they would be more likely to re-see their texts.
If revision, as defined by Flower's group, is "a strategic action, adapted to the necessities of the task" and also "draws on the writer's knowledge" (19), organizational schemata will contribute to the reviser's ability to detect problems within the text, to diagnose these problems, and to choose a strategy for attacking them. According to Flower's model, the writer's long-term memory, including his knowledge of the topic and of writing structures, is an essential component of cognitive processes in composing. They also show how textual schemata function in the actual generating of the text (23). According to their model, textual schemata also serve a major function in the revision process. They conclude that "substantive revision or 're-seeing' cannot go on unless a writer has created a manageable representation (a gist or a plan, for instance) to work with" (28). To make the draft more congruent with the writer's mental representation and to eliminate, what Flower's group calls "dissonance" between the mental text structure constructed from reading the draft and the one representing the writer's intentions, the organization plan must become the focal point during the revision process. When writers are unable to detect problems with their texts, they are actually unable to compare their intentions with the text itself. According to Flower, one of two things happens: the writer "has either a poor representation [goals or plans] of the text before him, or an inadequate representation of the intentions (goals or criteria) he should be
using" (29). This problem becomes more apparent during the actual revision process. Writers, who have not perceived their textual structures (their rhetorical plans), may be using the reading of the texts to connect discourse at the sentence level, rather than at the more global level. As a result, most novice writers, especially those who view revision as "correcting" errors, fail to use the textual plan as a guide.

Textual schemata may also serve an important role in the diagnosing stage of the revision process. Students taught the basic rhetorical modes (compare-contrast, classification-division, definition, cause-effect, for example) may be better able to identify and to define problems with the organization of their texts. Using certain discourse frames, especially those representing a specific discourse or academic community, allows writers, particularly novice writers, to place the content of their texts into conventionally arranged patterns. If these patterns are thought paradigms, as Nelson suggests, then the knowledge of specific textual structures would help revisers diagnose the thinking errors as well as the text structure errors existing in their texts. And as the revisers become experienced with a specific discourse community, they will learn to recognize that both the content and structural schemata of that particular discourse community complement one another.

Organizational schemata also offer the writers, when selecting a strategy for revision, alternative ways in which
to cast the content of their texts. Often using a different mode to structure thoughts can help writers generate new ideas about a topic. Even though the primary role of textual schemata in classical rhetoric was to invent arguments, their use in the revision process to re-structure or re-see a text is equally important. Additionally, the ability to categorize and to recognize patterns is a skill that Flower's team believes separate experienced writers from inexperienced ones. They discuss how "in the process of pattern matching, the expert categorizes the new situation as a version of an older one, and, in doing taps information stored in memory on what to do about it" (48). This process is exactly how schema theorists view cognitive functions.

All of the studies cited above define the role organizational schemata play in the reading and writing processes. Empirical evidence demonstrates that knowledge of text structures positively influences both reading comprehension and recall and the ability to compose expository prose. More importantly, these text structures affect all stages on the writing process. Text structures help writers prewrite, generate ideas, and revise. They also affect the readability of the text itself.

Conclusion

The schematic-processing model has a relatively long history in reading research. Its application to the teaching of writing, however, has only just begun to surface.
What the writer brings to the composing process provides a foundation on which the writer can generate ideas; it also helps writers restructure these ideas during revision. Furthermore, both content and textual schemata reflect an important link between the reading and writing processes. From the research on reading comprehension and its application to the composing process, schema theory suggests a cognitive basis for processing texts, whether constructing meaning during comprehension or composing. In essence readers and writers rely on background schemata, both content and textual, for the receptive and expressive acts in the communication process.

Specifically, the schematic-processing model provides the theoretical basis for linking reading with composition instruction. No longer should literature and composition be taught as separate subject matter; they should be integrated. The primary basis for linking the teaching of reading and writing in English classes, remedial classes, and content-area classes are as follows: 1) reading and writing are interactive processes and affect each other; 2) both readers and writers "construct" ideas, or meaning, as they process texts; and 3) both readers and writers use content and textual schemata to process texts and to generate ideas. If these conclusions reflect the cognitive activities involved in reading and writing, the schematic model should be used as a basis to frame English curriculum. Several specific instructional recommendations would result. For
example, the topics for composition would reflect the background knowledge students have. Obviously, students arrive with different experiences and different levels of preparation. However, if English instructors provide appropriate readings and discussions to help students develop and expand their background schemata, both content and textual, the quality of their writing and their ability to read complicated texts should improve.

English teachers might also begin by returning to the 19th century idea of using literature as the subject for composition. Students study literature for its cultural value, which include historical knowledge, knowledge of aesthetic forms, and knowledge of different philosophical systems. Asking them to respond to those values and the ideas embedded in the literature is one practical approach to integrate reading and writing. Reader-response theorists actually use the schematic-processing model as a basis for their theory. They all agree, for example, that meaning has no real existence except in the reader's mind. The reader interacts with the text to create meaning or to co-create meaning by supplying ideas that may only be implied in the text. Essentially, though, the reader's cognitive activity replaces the literary text as the subject of attention. Meaning does not lie in the text alone; instead meaning is developed as the reader interacts with the text using his own background schemata as a basis for this "construction" of meaning. Moreover, each reader develops an idiosyncratic
manner of interpreting a text, an interpretive style that reflects his background schemata.

Bleich suggests a way that a reader can activate his background schemata. If understanding literature is essentially idiosyncratic, the reader can record his responses or, according to Bleich, his "subjective interpretation" of the text through composition. In other words, Bleich's readers "compose" their understanding of the text through a series of response statements that are negotiated by an "interpretive community" that validates the ideas the readers construct. From the schematic-processing perspective, the readers use their background schemata to interact with the text. The members of the interpretive community gather together to discuss the individual interpretations, through which new or expanded schemata are developed. For Bleich, readers develop knowledge together, making education a "communal pursuit" in which both teachers and students are equally engaged in constructing a "true" interpretation. What makes this approach to teaching literature an integrative process is that readers actually compose texts that record the interaction between their background schemata and the literary text. The text "activates" content schemata, which in turn provide a frame for textual schemata to plan how this interaction is to be composed. The reader's text is then modified and/or expanded when the interpretive community offers additional possibilities for schema development. In essence, a discourse community is established, one
that offers additional content and alternative textual strategies for composition.

In addition, the reader-response approach makes reading and writing a social act. Bruffee discusses this idea in great detail. According to Bruffee, if the meaning of a text is considered to be embedded in the text itself, then the reader reads defensively. He sees the text as a product that should communicate a specific message. As a result, because the reader is not encouraged to interact with the text, he tends to have an "adversarial" relationship with the writer (159). Bruffee believes that we learn "group-licensed ways of seeing" a text (162). In other words, as Bleich and even Bartholomae and Petrosky suggest, writers should "join a community of knowledgeable peers by acquiring that community's language" (162). It is this collaborative or social knowledge inherent in the discourse community that will help writers expand their content schemata about a particular topic. The texts from this community also model how to structure this "tacit" knowledge," as Bruffee calls it. This principle could apply to the use of prose models in the teaching of writing. The models become tacit knowledge in the sense that the more one reads, the better the novice writer is able to solve the writer-composition puzzle.

Furthermore, the instructor, being a member of this discourse community, actually engages in a collaborative learning process with the novice writer. He comments on the content and the structure of the text as a reader, better
yet a translator, of the particular writing community. The teacher, knowledgeable about the subject being discussed, verifies the validity of the students’ texts and directs students, if necessary to outside sources of information. Bartholomae and Petrosky’s thematic approach to the teaching of composition provides such a framework. Using a topic, say, about nuclear technology and its practical merits offers an opportunity to integrate reading and writing and to establish a discourse community. Reading selections could be selected from both fiction and nonfiction, from general periodicals to sophisticated scientific reports. General themes and specific examples would be discussed. Even content-area teachers could use this approach with their exams and writing assignments. From such an approach, students react in writing to various texts, compose their own arguments, and use a variety of textual material as models of writing in that particular discourse community. In addition, a restructuring and reorganizing of students’ background schemata take place. In simple terms, this expanded schema is learning. As a result, students’ compositions have substance and a knowledge base from which to generate new ideas and to test those ideas.

Other English instructors may elect to apply schema theory to the teaching of writing by manipulating the nature and sequence of assignments. For example, Sandra Schor uses what she calls "the proleptic grasp" to help basic writers tap their background and textual schemata. Using Jerome
Bruner's theory than interrupted tasks are more often completed and remembered than uninterrupted ones, Schor developed an effective approach to the teaching of composition that reflects the schematic-processing model. Because most basic writers lack the ability "to confront an idea and pursue its rhetorical and intellectual sources and consequences" (49), Schor has constructed a sequence of assignments where she interrupts the students as they write by asking them to consider only one part of the essay. She uses initially a nonstop "fastwriting" about a topic that requires students to record whatever comes to their minds. She then interrupts their efforts by asking them to consider only "one piece of the essay as a way of producing in them a more exact anticipation of the whole" (50). This "proleptic grasp" helps students focus on their major concerns. For example, Schor asks students to write a narrative essay about a disagreement with an authority figure. After the students "fastwrite," a freewriting activity essentially, Schor will require students to write an impromptu definition of "authority" in their own words, which are then discussed by the entire class. She follows this activity with a dialogue assignment that asks students to bring a written dialogue between them and some authority figure they had confronted. At this point, Schor introduces a new assignment before the narrative is completed where she asks students to freewrite about instances of injustice.
Schor's assignment sequence forces students to access their background schemata, to accommodate new information into their schemata that was acquired from their peers, and to view the concept from another perspective by merging, for example, the authority schema with the injustice schema. Schor makes an effort "to devise assignment in pairs, one of which resonates against the other" (51). In essence, Schor's approach parallels Bartholomae and Petrosky's thematic method. The difference lies in the use of outside readings. Schor replaces them with peer response. Both strategies, however, require students to use and to expand their background schemata.

Again, research demonstrates that teachers consider two essential concepts in the teaching of English: 1) Students with adequate content and textual schemata read and compose more effectively; and 2) English teachers must provide opportunities for writers to develop and expand their content schemata and offer direct instruction of text-structure patterns. Literature offers a rich body of material for writing and, if nonfiction were added to complement the imaginative literature in English textbooks, well-written models for numerous rhetorical strategies would exist. However, because writing is not the exclusive domain of the subject of English, the use of thematic units which represent different subject matter should also be introduced. Content area reading and writing activities offer students the opportunity to learn and to experience the written con-
ventions of different discourse communities, an essential component in any comprehensive writing program.
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