

Schema Theory

Linguists, cognitive psychologists, and psycholinguists have used the **concept of schema** (plural: schemata) to understand the interaction of key factors affecting the comprehension process.

Simply put, **schema theory** states that all knowledge is organized into units. Within these units of knowledge, or schemata, is stored information.

A **schema**, then, is a generalized description or a conceptual system for understanding knowledge-how knowledge is represented and how it is used.

According to this theory, **schemata** represent knowledge about concepts: objects and the relationships they have with other objects, situations, events, sequences of events, actions, and sequences of actions.

A simple example is to think of your **schema for dog**. Within that schema you most likely have knowledge about dogs in general (bark, four legs, teeth, hair, tails) and probably information about specific dogs, such as collies (long hair, large, Lassie) or springer spaniels (English, docked tails, liver and white or black and white, Millie). You may also think of dogs within the greater context of animals and other living things; that is, dogs breathe, need food, and reproduce. Your knowledge of dogs might also include the fact that they are mammals and thus are warm-blooded and bear their young as opposed to laying eggs. Depending upon your personal experience, the knowledge of a dog as a pet (domesticated and loyal) or as an animal to fear (likely to bite or attack) may be a part of your schema. And so it goes with the development of a schema. Each new experience incorporates more information into one's schema.

What does all this have to do with reading comprehension? Individuals have schemata for everything. Long before students come to school, they develop **schemata** (units of knowledge) about everything they experience. Schemata become theories about reality. These theories not only affect the way information is interpreted, thus affecting comprehension, but also continue to change as new information is received.

As stated by Rumelhart (1980),

schemata can represent knowledge at all levels—from ideologies and cultural truths to knowledge about the meaning of a particular word, to knowledge about what patterns of excitations are associated with what letters of the alphabet. We have schemata to represent all levels of our experience, at all levels of abstraction. Finally, **our schemata are our knowledge**. All of our generic knowledge is embedded in schemata. (p. 41)

The importance of **schema theory to reading comprehension** also lies in how the reader uses schemata. This issue has not yet been resolved by research, although investigators agree that some mechanism activates just those schemata most relevant to the reader's task.

Reading Comprehension as Cognitive-Based Processing

There are several models based on cognitive processing (see Ruddell, Ruddell, & Singer, 1994, p. 813). For example, the LaBerge-Samuels Model of Automatic Information Processing (Samuels, 1994) emphasizes **internal aspects of attention** as crucial to comprehension.

Samuels (1994, pp. 818-819) defines three characteristics of **internal attention**. The first, *alertness*, is the reader's active attempt to access relevant schemata involving letter-sound relationships, syntactic knowledge, and word meanings. Selectivity, the second characteristic, refers to the reader's ability to attend selectively to only that information requiring processing.

The third characteristic, *limited capacity*, refers to the fact that our human brain has a limited amount of cognitive energy available for use in processing information. In other words, if a reader's **cognitive energy** is focused on decoding and attention cannot be directed at integrating, relating, and combining the meanings of the words decoded, then comprehension will suffer. "Automaticity in information processing, then, simply means that information is processed with little attention" (Samuels, 1994, p. 823). Comprehension difficulties occur when the reader cannot rapidly and automatically access the concepts and knowledge stored in the schemata.

One other example of a **cognitive-based model** is Rumelhart's (1994) **Interactive Model**. Information from several knowledge sources (schemata for letter-sound relationships, word meanings, syntactic relationships, event sequences, and so forth) are considered *simultaneously*. The implication is that when information from one source, such as word recognition, is deficient, the reader will rely on information from another source, for example, contextual clues or previous experience.

Stanovich (1980) terms the latter kind of processing **interactive-compensatory** because the reader (*any reader*) compensates for deficiencies in one or more of the knowledge sources by using information from remaining knowledge sources. Those sources that are more concerned with concepts and semantic relationships are termed *higher-level stimuli*; sources dealing with the print itself, that is phonics, sight words, and other word-attack skills, are termed *lower level stimuli*.

The **interactive-compensatory model** implies that the reader will rely on higher-level processes when lower-level processes are inadequate, and vice versa. Stanovich (1980) extensively reviews research demonstrating such compensation in both good and poor readers.

Reading Comprehension as Sociocognitive Processing

A sociocognitive processing model takes a constructivist view of reading comprehension; that is, the reader, the text, the teacher, and the classroom community are all involved in the **construction of meaning**. Ruddell and Ruddell (1994, p. 813) state, "The role of the classroom's social context and the influence of the teacher on the reader's meaning negotiation and construction are central to this model [developed by R. B. Ruddell and N. J. Unrau] as it explores the notion that participants in literacy events form and reform meanings in a hermeneutic [interpretation] circle."

In other words, this model views comprehension as a process that **involves meaning negotiation** among text, readers, teachers, and other members of the classroom community. Schema for text meanings, academic tasks, sources of authority (i.e., residing within the text, the reader, the teacher, the classroom community, or some interaction of these), and sociocultural settings are all brought to the negotiation task. The teacher's role is one of orchestration of the instructional setting, and being knowledgeable about teaching/learning strategies and about the world.

Reading Comprehension as Transactional

The **transactional** model takes into account the dynamic nature of language and both aesthetic and cognitive aspects of reading. According to Rosenblatt (1994, p. 1063), "Every reading act is an event, or a transaction involving a particular reader and a particular pattern of signs, a text, and occurring at a particular time in a particular context. Instead of two fixed entities acting on one another, the reader and the text are two aspects of **a total dynamic situation**. The 'meaning' does not reside ready-made 'in' the text or 'in' the reader but happens or comes into being during the transaction between reader and text." Thus, text without a reader is merely a set of marks capable of being interpreted as written language. However, when a reader transacts with the text, meaning happens.

Schemata are not viewed as static but rather as active, developing, and ever changing. **As readers transact with text they are changed or transformed**, as is the text. Similarly, "the same text takes on different meanings in transactions with different readers or even with the same reader in different contexts or times" (Rosenblatt, 1994, p. 1078).

Reading Comprehension as Transactional-Sociopsycholinguistic

Building on Rosenblatt's transactional model, Goodman (1994) conceptualizes literacy processing as including reading, writing, and written texts. He states,

Texts are constructed by authors to be comprehended by readers. The meaning is in the author and the reader. The **text has a potential to evoke meaning but has no meaning in itself**; meaning is not a characteristic of texts. This does not mean the characteristics of the text are unimportant or that either writer or reader are independent of them. How well the writer constructs the text and how well the reader reconstructs it and constructs meaning will influence comprehension. But meaning does not pass between writer and reader. It is represented by a writer in a text and constructed from a text by a reader. Characteristics of writer, text, and reader will all influence the resultant meaning. (p. 1103)

In a transactional-sociopsycholinguistic view, the reader has a highly active role. It is the **individual transactions between a reader and the text characteristics that result in meaning**. These characteristics include physical characteristics such as orthography-the alphabetic system, spelling, punctuation; format characteristics such as paragraphing, lists, schedules, bibliographies; macrostructure or text grammar such as that found in telephone books, recipe books, newspapers, and letters; and wording of texts such as the differences found in narrative and expository text.

Understanding is limited, however, by the reader's schemata, **making what the reader brings to the text as important as the text itself.** The writer also plays an important role in comprehension. Additionally, readers' and writers' schemata are changed through transactions with the text as meaning is constructed. Readers' schemata are changed as new knowledge is assimilated and accommodated. Writers' schemata are changed as new ways of organizing text to express meaning are developed. According to Goodman (1994):

How well the writer knows the audience and has built the text to suit that audience makes a major difference in text predictability and comprehension. However, since comprehension results from reader-text transactions, what the reader knows, who the reader is, what values guide the reader, and what purposes or interests the reader has will play vital roles in the reading process. It follows that what is comprehended from a given text varies among readers. Meaning is ultimately created by each reader. (p. 1127)

Reading Comprehension as Influenced by Attitude

Mathewson's (1994) Model of Attitude Influence upon Reading and Learning to Read is derived from the area of social psychology. This model attempts to explain **the roles of affect and cognition in reading comprehension.**

The core of the attitude-influence model explains that a reader's whole **attitude** toward reading (i.e., prevailing feelings and evaluative beliefs about reading and action readiness for reading) will **influence the intention to read**, in turn influencing reading behavior.

Intention to read is proposed as the primary mediator between attitude and reading. Intention is defined as "commitment to a plan for achieving one or more reading purposes at a more or less specified time in the future" (Mathewson, 1994, p. 1135). All other moderator variables (e.g., extrinsic motivation, involvement, prior knowledge, and purpose) are viewed as affecting the attitude-reading relationship by **influencing the intention to read.**

Therefore, classroom environments that include well-stocked libraries, magazines, reading tables, and areas with comfortable chairs will **enhance students' intentions to read.** Mathewson (1994, p. 1148) states, "Favorable attitudes toward reading thus sustain intention to read and reading as long as readers continue to be satisfied with reading outcomes."

