

SECTION THREE

Models of Reading and Writing Processes

What's in a Model of Literacy Processes?

The word *model* can have many meanings and manifestations, as explained in Chapter 2. In this section, models are viewed as metaphors that help us visualize and understand research and theories that explain components of the reading process. Ranging from the basic to the highly sophisticated, models of reading render specific features of the reading process, such as word recognition, or depict more globally an integrated and interacting network of specific components, all of which contribute to the mind-making meaning from a text. Similarly, a model of writing helps us see how writing processes function and interact as writers create texts.

We can begin to see a reader's mind at work with the help of models. They enable us to understand how texts are constructed when a reader reads or a writer writes. Each component depicted in a model, as well as the interaction of components, is based on extensive research and theory that inform the design of a model of reading or writing. Most designers of models draw from their own theory base and research as well as that of others to construct a model. A careful synthesis of components and their functions often provides an explanation of processes that otherwise are difficult, if not impossible, to observe and understand.

Whereas some literacy models show complex, interacting systems contributing to comprehension during reading or the construction of text during writing, other models focus on only one component. In either case, our limited capacity to observe, measure, collect information, and describe processes precisely limits the accuracy of a reading model. Furthermore, models of reading, like a snapshot, often depict a moment in time described in ordinary language processed linearly, whereas reading is a continuous, recursive, and multileveled process.

The Benefits of Reading Models

Everyone who teaches reading has some model of the reading process that influences, perhaps unconsciously, their instructional decision making. We know that teachers' understanding the reading process more fully and explicitly contributes to improvements in instructional practice and deeper knowledge of their students' learning (Beck, 1989). Models provide educators with a deeper understanding of reading processes, where breakdowns in comprehension can occur, and what strategies could improve reading processes.

First, with respect to understanding reading, a model integrates research findings, makes theory graphic, and provides an explanation of how reading takes place in accord with what we currently know. Whereas taking apart a car's engine helps us see how it works and so discover how to repair it, dismantling the reading process presents us with a very different problem. Although reading is a highly complex and hidden process with no pistons, valves, or crankshafts to pull out for observation, we have a substantial amount of research and theoretical knowledge about it. What we know enables us to construct a model to visualize this mysterious, invisible process. Furthermore, once we have begun to make more visible our understanding of reading through models, we tend to move those models toward greater sophistication.

Second, a model of reading helps us detect where breakdowns in comprehension could occur. A model helps us visualize what components may fail to contribute to smooth meaning making while reading. For example, weak or slow word recognition can cause poor comprehension. In short, models help us understand what contributes to a struggling reader's troubles.

Third, a model provides clues about instructional approaches and intervention strategies that could help readers at different stages in reading development. Although using a reading model to develop prescription-based instruction is a risky practice, we can use models as resources for good hints. A well-designed model based in solid research can create more opportunities to envision instructional interventions.

From Research to Model

Models of reading and writing picture mental events based on extensive research. Much of the research and theory reported in this and earlier editions of *Theoretical Models and Processes of Reading* has contributed to the models that appear here.

The discovery of many intertextual connections awaits readers who have already explored the chapters on research from earlier parts of this book from which the models arise. Among potential interconnections are the following:

- Eras of reading research identified and described by Alexander and Fox (Chapter 1)
- Language processes, such as the windows into reading that miscue analysis provides (Goodman & Goodman, Chapter 21) or the window into writing that the close observation of young children in classrooms enables (Dyson & Genishi, Chapter 6)
- The social and cultural contexts of literacy, such as reading from a socio-cognitive perspective (Gee, Chapter 4), the dynamics of peer interaction (Forman & Cazden, Chapter 7), or the effects of linking critical discussion of student achievement to research on effective comprehension practices to meet specific student needs (Lai, McNaughton, Amituanai-Tolosa, Turner, & Hsiao, Chapter 11)

- Literacy development during early childhood and implications for early literacy instruction (Lonigan & Shanahan, Chapter 13), the development of word recognition (Ehri & McCormick, Chapter 12), and the development of fluency (Kuhn & Stahl, Chapter 15)
- Comprehension and comprehension theories and strategies, such as vocabulary development (Nagy & Scott, Chapter 18) and research on schema theory (Anderson, Chapter 19; McVee, Dunsmore, & Gavelek, Chapter 20; Spiro, Coulson, Feltovich, & Anderson, Chapter 22)
- Motivation and engagement, such as methods of literacy instruction with relevant texts that help young men of color respond to their lived contexts (Tatum, Chapter 25), and the effects of motivation, background knowledge, and cognitive strategy use on children's reading comprehension (Taboada, Tonks, Wigfield, & Guthrie, Chapter 24)
- Instructional effects on literacy development appearing in research that Clay conducted and that contributed to an early intervention known as Reading Recovery (Doyle, Chapter 26) and in research on comprehension and strategy instruction that led to reciprocal teaching (Brown, Palincsar, & Armbruster, Chapter 27)

Many of the models presented in this section rely on these and other research studies, theories that evolved from them, and hypotheses about how features focused on in one study may interact with features of another. For example, hypotheses based on schema theory provided several model builders with an explanation of how background knowledge may affect the reading process.

Theory and Research Generate Waves of Theoretical Models

Several sources of theory and research have fed the development of models for reading and writing. One of the major sources of knowledge-generating models developed since the 1970s has been fed by information emerging from research in cognitive psychology. From research on the mind's cognitive processes, especially studies that related directly to processing information and texts, designers have created several waves of cognitive processing models, some of which have crested and diminished in influence while others have remained highly influential. Some waves contained only one or two models. Other waves included many models, with earlier models influencing the design of subsequent models within that wave. The waves begin with bottom-up models, followed by top-down models, and progress to interactive or bottom-up/top-down designs (Rumelhart, Chapter 29; Samuels, Chapter 28). The wave of interactive models was, in turn, followed by important extensions and elaborations (Hannon, Chapter 33; Just & Carpenter, Chapter 30; Kintsch, Chapter 32).

Research and theory in other domains have fed several wave-generating knowledge resources. These include Sadoski and Paivio's dual coding theory (DCT;

Chapter 34) and Rosenblatt's transactional theory (Chapter 35). From research examining relationships between reading and writing from both a discourse and cognitive perspective, Parodi (Chapter 36) found significant coefficients between reading and writing on several psycholinguistic levels that could contribute to a model depicting their interrelatedness. Furthermore, advances in statistical methods and their application to the testing of theoretical models of reading are manifested in the use of structural equation models (Cromley & Azevedo, 2007; Cromley, Snyder-Hogan, & Luciw-Dubas, 2010; Hannon, Chapter 33).

The last wave of cognitive processing models addressed in this volume embeds an interactive model within the social context of the classroom, where interpretations of texts by students and teacher are shared and meanings negotiated (Ruddell & Unrau, Chapter 38). Each of these waves above is described in more detail in the following paragraphs.

Bottom-Up (Wave 1)

Gough's (1972) "one second of reading" model depicts a process that began with low-level sensory representations (letter input) and proceeded through phonemic and lexical-level representation to deeper structural representation. The flow of information is completely bottom-up with no higher level process, such as information held in long-term memory, affecting lower level representations. In "One Second of Reading: Postscript," Gough (1985) acknowledged the problems inherent in his model.

Top-Down (Wave 2)

The next (or second) wave of models focused on what readers remembered after reading a text, and the discovery that text memory was systematic. The questions guiding the design of that generation were, What do readers remember about the text they read, and what do those memories tell us about the nature of the memory representations resulting from reading? The theories arising from this wave focused on top-down memory influences, especially that of text structure. Story grammars (Stein & Glenn, 1979), script theory (Schank & Abelson, 1977), and hierarchical theories based on text structure (Meyer, 1975; Meyer & Poon, 2001) arose as answers to the questions guiding these researchers.

Top-Down (Wave 3)

Nearly synchronous with the second wave of theories was a third wave focused on a broader view of what readers bring to a text. Note that the second wave text structure–recall theories described earlier focus only on the connection between the background knowledge that a reader brings to a text and the reader's comprehension of the text (Pearson & Stephens, 1992). The provocative, third wave question became, What influence does a reader's background knowledge have on the meanings constructed when reading? Schema theory (Anderson, Chapter 19; McVee et al., Chapter 20) arose from efforts to answer that question, and the

answer constituted a new third wave of reading theory. Schema theory lies at the core of many models of reading, including several presented in this section.

Bottom-Up/Top-Down (Wave 4)

A fourth wave of models emerging mostly in the early 1980s favored a focus on a bottom-up plus top-down interaction that shaped comprehension. The question for these researchers was, What do readers do as they move through a text? These fourth wave models took into account readers' efforts to construct coherent text representations with respect to that text's referential and causal structure. Different manifestations of the fourth wave appear in Samuels's automatic information-processing model (Chapter 28), Rumelhart's interactive model (Chapter 29), Just and Carpenter's model that accounts for eye fixations (Chapter 30), Adams's processor model (Chapter 31), Kintsch's construction-integration model (Chapter 32), and Hannon's cognitive components-resource model (Chapter 33). Many of these model designers influenced one another, as is the case with Just and Carpenter's influence on Adams's model, and Kintsch's influence on Hannon's model.

Bottom-Up/Top-Down + Sociocultural Context (Wave 5)

A fifth wave of model building puts the reader with a text in a social and cultural context. That context may be one that shapes and defines the reader (Gee, Chapter 4) or influences responses to texts (Alvermann, Young, Green, & Wisenbaker, 1999). Ruddell and Unrau (Chapter 38) present a sociocognitive model of reading in which meanings are constructed during a socioculturally contextualized bottom-up/top-down reading process. Readers interpret and negotiate meanings not only for linguistically based texts but also for tasks, sources of authority, and sociocultural factors.

Resources Stimulating Additional Model Development

Several other resources have stimulated the creation of models of reading, writing, and the relationships between them. Those models include ones grounded in dual coding theory, transactional theory, research on reading-writing connections, and rhetoric.

As a theory of general cognition first developed to explain verbal and nonverbal influences on memory, DCT was extended by Sadoski and Paivio (Chapter 34) into the realm of literacy and reading comprehension. The authors draw on DCT to explain decoding, comprehension, and readers' responses to texts. Their DCT model, rich in explanatory power, provides an alternative to reading models based primarily on verbal processes, such as schema theory. Authors of the DCT model have also demonstrated how DCT can explain written composition (Sadoski & Paivio, 2001).

From an array of disciplinary perspectives, including philosophy, comparative literature, aesthetics, linguistics, and sociology, which formed early in the 20th century, Rosenblatt (Chapter 35) developed a transactional theory and model

of both reading and writing. Her model differs in significant ways from cognitive processing models of reading and can be viewed as a wave unto itself. Rather than thinking of reading as a separate reader taking in a separate text, Rosenblatt views the reader and text as two aspects of a dynamic process. Readers do not get meaning from the text because meaning does not reside in the text; meaning issues from the transaction between the reader and the text. Readers, while transacting with a text, form a structure of the text's elements that becomes an object of thought, what she calls the evocation. Readers then respond to emerging evocations while reading and form interpretations that report, analyze, and explain those evocations. Furthermore, according to Rosenblatt's transactional model, readers adopt a stance toward a text on an efferent–aesthetic continuum. Readers adopt an efferent stance when their purpose for reading is to extract and retain information from a reading event. They adopt an aesthetic stance when their purpose for reading is to engage in a lived-through experience. These two stances are sometimes incorrectly identified as binaries; however, according to Rosenblatt, both stances are manifest in every reading on an efferent–aesthetic continuum.

Growing concerns internationally about the limited ability of students to read and write persuasive or argumentative texts have given impetus to research on reading and writing processes during interaction with argumentative texts and to the development of intervention programs to improve students' strategic and critical approaches to more complex texts. For example, in Chile, Parodi (Chapter 36) investigated the relationships between comprehension and the production of argumentative texts. His findings suggest how a network of reading–writing connections could contribute to the development of more effective classroom instruction and promote students' mastery of reading and writing argumentative texts. Increasing concerns in the United States over the large and often increasing numbers of college students arriving for their freshman classes underprepared to read and write expository prose (ACT, 2005; Intersegmental Committee of the Academic Senates. . . , 2002; Joftus, 2002) spurred the development of intervention programs to better prepare students for the rigors of college reading and writing. Many of these interventions were implemented at the college level in the form of remedial courses, but a newer form of intervention at the high school level has been developed and implemented in California. Called the Expository Reading and Writing Course, the program is based on a template that serves as a model for the development of instructional modules based on engaging and challenging texts. Students learn to read rhetorically, connect reading to writing, and write rhetorically as they progress through a series of modules that focus on various topics and themes.

With advances in technology and new methods to study reading processes, such as functional magnetic resonance imagery, new sources of knowledge are beginning to contribute to our understanding of how the brain functions while reading (Hruby & Goswami, Chapter 23). Still over the horizon, future models of reading may be useful in identifying brain patterns of highly effective and skilled readers as well as those of readers who are experiencing delays or difficulties.

We are clearly on a threshold of discoveries that may add enormously to our understanding of reading processes, to the formulation of new theories, and to the creation of innovative models.

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