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Interdisciplinary theoretical foundations for literacy teaching and learning

Ruth Farrar
Bridgewater State University

K. S. Al-Qatawneh

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Ruth D. Farrar
Bridgewater State College, USA

Khalil Shahadeh Al-Qatawneh
Tafila Technical University, Jordan

Abstract

This article presents an interdisciplinary approach to literacy teaching and learning. The approach views literacy as involving numerous functions, including linguistic, psychological, cognitive, social, and critical functions. Research on the teaching and learning of literacy that underlies the model is discussed first. The interdisciplinary approach is defined and discussed next. The article concludes with a discussion of conclusions and implications for literacy education.

1. Introduction

We dream of literate societies. Our perspectives of achieving this noble objective have advanced over the last 50 years. Many educators now believe that no single theory does or can explain the entire phenomenon of literacy education. Instead, fundamental improvements in reading and writing curriculum come from different theories, including linguistic, psycholinguistic, cognitive, sociolinguistic, and critical theories. Such perspectives ironically resemble ancient ideas about learning and memory as active, constructive processes and contrasts sharply with earlier 20th century beliefs about learning occurring automatically and passively.

In ancient times Greek and Roman educators believed that learners enhanced memory by constructing relationships between something familiar and something to be recalled. Recent research on cognition and instruction stresses and extends these old but newly discovered ideas to include educationally relevant problems of teaching and of learning literacy. This combination of old ideas and relatively inexpensive ways to improve teaching by gives teachers a wide variety of strategies to enhance learners' ability to construct meaning as they read or compose text in their schools and in their world.

At the time we believe that a theory explains what we observe by relating concepts in new but familiar frameworks, often uses the metaphors to help us visualize and understand a phenomenon, and predicts by indicating what we might need to consider and what we might encounter (McEneaney, 2006; Ruddell & Unrah, 2004; Tierney, 1994). We have developed a perspective of an interdisciplinary model for literacy which incorporates the essence of the related modern research from multiple theories of literacy education. The interdisciplinary model explains the reading and writing processes as they have been developed by theorists in numerous disciplines. It also describes classroom literacy practices that illustrate perspectives from several disciplines. According to this approach, a systematic, systemic and interdisciplinary curriculum must incorporate and balance all these theories in order to optimize literacy teaching and learning. The approach explains the dynamic, complex, multifaceted literacy event (Heath, 1978) as a metaphor for ongoing classroom teaching and learning. The literacy events

described in this paper, then, are "snapshots" that illustrate some of the ways readers and writers orchestrate numerous functions that interact in their prior knowledge, the text and author(s), the learning community, and the world.

The interdisciplinary model described in this paper views that multiple theories comprise the foundational underpinnings of our knowledge of the reading and writing processes. One discipline does not and cannot provide an adequate summary, explanation or prediction of literacy teaching and learning. Readers and writers call upon specific functions in their purposeful and strategic search for best-fit solutions to the search for meaning. We will argue that an understanding of the discipline-specific origins in linguistics, psychology, cognitive-psychology, sociology, and anthropology lead to a systemic and trans-disciplinary perspective. A conscious, purposeful, and systematic integration of these theories results in a careful balance of numerous teaching and learning experiences. Reading and writing curriculums, therefore, should guide instructional practices that reflect numerous aspects of communication and support a conscious world-view.

2. Linguistic Theories

Linguistic theories support the view that the reader or writer uses his/her knowledge of the nature and structure of language in an effort to make sense of a text.

2.1. Major Developments and Contributions

According to linguists, all literate societies try to represent key features of their oral language in their written language. Letters and letter units correspond to particular sounds (phonemes); spaces in between words represent junctures in spoken language; and typographical features represent other linguistic properties (emphasis, the end of the sentence, etc.). According to linguists, orthography does not need to account for every feature of spoken language because readers bring their knowledge of oral language functions to print. In the mid-1900s linguists introduced a nativist view which holds that learners are born with a biological predisposition for primary language learning (Chomsky, 1957, 1965; Harris & Hodges, 1995; Pearson & Stephens). Perhaps, most importantly, as a result of linguists' contributions to the literacy knowledge base, we saw curriculum and instruction shift from an emphasis on rote memory and whole word recognition to an emphasis on the use of cue systems to construct meaning through texts.

Linguists purport that readers and writers must call upon their knowledge coding skills (Chall, 1967), including alphabetic principles, phonics, spelling patterns and word families, punctuation, and numerous mechanical aspects of language. Coding skills function in ways that assist the reader or writer in decoding and encoding words. Knowledge of sound-symbol correspondence develops concurrently as learners attend to and manipulate the constituent parts of written language. Instruction in letter/sound correspondence is often accompanied by rules for pronunciation, grammar, punctuation, and sentence and paragraph structure. As a stand-alone to teaching reading and writing, a linguistic method is based on a false premise that language is static and fixed and tempts teachers to emphasize rapid decoding and fluent oral reading at the sacrifice of comprehension.

The linguistic approach gained popularity when behaviorist psychology was widely applied in instructional practices, and it often retains routines that expose learners to (a) repeated and controlled learning situations and (b) selected rewards and punishments that lead to the "habituation" of the reading act (Alexander & Fox, 2004, p. 35). Instruction can, therefore, reflect a narrow view of language as that which is perceived and associated and wherein reading and writing are defined as the "mastery" of a scope and sequence of skills that are taught, drilled/practiced, and tested.

2.2. Classroom Application

When curriculum and instruction are interdisciplinary, teachers design and implement activities to help learners understand the principles of oral and written language and knowledge of linguistic systems. As emerging literates, learners move through a sequence of developmentally appropriate and authentic activities; they enhance their knowledge of linguistic features, such as phonemic awareness, phonics, word families, and root words and affixes, etc. A systematic approach can be prescriptive or generative, but, unless the teacher makes a deliberate effort to integrate this instruction within the whole literacy event, it tends to be reductionist rather than gestalt. Learners are taught to examine the details or parts of language, as opposed to the whole.

As learners gain proficiency in reading and writing, according to Weaver (1994), linguistic activities include the following.

An emphasis on correct word identification and conventional pronunciation.

An emphasis on sight words to assist on rapid, fluent reading.

An emphasis on memorizing spelling and vocabulary words,

An emphasis on punctuation, capitalization, and grammar.

An emphasis on genre and text structure.

An emphasis on formulaic approaches to writing (the 5-sentence paragraph or the 5-paragraph essay).

2.3. Classroom Snapshot

In a snapshot of a classroom setting that illustrates the linguistic functions of literacy, learners are grouped individually or in small groups working on workbook exercises or flashcards, reciting oral reading selections, working with and keeping records of spelling words and vocabulary words, using exemplars as guides to writing lessons, and editing written work for punctuation, capitalization, and grammar.

3. Psycholinguistic Theories

Psycholinguistic theories support the view that a reader or writer uses cognitive functions of focus, engagement, and motivation in acting on and interacting with print in an effort to make sense of a text.

3.1. Major Developments and Contributions

During the 1970s, psycholinguists began to explore two major lines of research in language and literacy. One area of inquiry into language comprehension resulted in theories of surface structure (what is said or written) and deep structure (what is meant). Research findings led to the derivational theory of complexity—a theory that introduced reading and writing as multidimensional and complex. Psycholinguists also studied theories of language acquisition and argued that learners do not imitate written language; they acquire it by interacting with others in their family and community. As they learn they construct rules about how language works (Brown, 1970; Pearson & Stephens, 1994; Smith, 1971). Because each learner brings different experiences to school, psycholinguists argue, curriculum, instruction, and assessment must consider the role of prior knowledge in language processing.

According to Piaget (1977), children acquire new knowledge through an assimilation of information they glean from the environment. Assimilation accounts for the prior or old knowledge learners bring to the literacy event. In processing language, learners hypothesize, test, and confirm, refine, or disconfirm their theories by making sense of the "mass of data they have assembled" (Ferreiro, 1990, p. 14). According to Anderson (1994), "A reader's *schema*, or organized knowledge of the world, provides much of the basis for comprehending, learning, and remembering the ideas in stories and texts" (p. 469). Schema theories ushered in a fundamental change in understanding the origins of knowledge. Readers and writers bring their knowledge to the text and use that knowledge to

fine-tune and restructure their understanding (Rumelhart, 1981). This new emphasis on how readers activate and use prior knowledge promoted a constructivist, meaning-driven, and interactive view of reading and writing.

3.2. Classroom Application

Classroom instruction that incorporates listening, speaking, reading, and writing into a unified field of literacy or language arts (Alexander & Fox, 2004) draws upon the learner's inherent need to make sense of his/her world through a variety of language experiences. Learners must control and orchestrate numerous physical and psychological impulses with the decision or 'will' to engage in and interact with the text (Clay, 1991). Teachers, therefore, provide numerous meaningful, language-based opportunities that invite readers and writers to connect their knowledge and experiences to print. They measure and report achievement through a positivist (what the learner does) rather than deficit (what the learner does not do) approach to performance (Goodman & Goodman, 1994).

As learners gain proficiency in reading and writing, according to Weaver (1994), psycholinguistic activities incorporate and integrate linguistic and psychological functions in the literacy event through the following.

An emphasis on helping learners bring their own knowledge and experience to print.

An emphasis on composing their own oral and written narratives.

A gradual release of responsibility from teacher-centered to learner-centered activities.

An emphasis on how the details support and/or relate to the whole of an experience.

An emphasis on using prior knowledge and experience to construct personally-relevant meaning in and through language.

3.3. Classroom Snapshot

In a snapshot of a classroom setting that illustrates the psycholinguistic functions of literacy, the teacher and learners are making a language experience chart. It is the first day of the week, and the teacher acts as a scribe as s/he asks the learners to describe their weekend experiences. The resulting chart shows a record of individually dictated personally-relevant sentences—a written text for reading and re-reading. In creating the language experience chart young learners can see that anything they say can be written and anything that is written can be read. The teacher also uses the chart to point to the linguistic functions of their story, asking learners to identify letters, sounds, and other linguistic features. In another snapshot activity, learners are given time to select their own reading material for a period of silent reading and responding. Learners select from a group of texts that are matched to their reading level. They read silently for 30 minutes and then write personal responses in their journals. Later the teacher will read and write in each journal, which focuses on how the learners identified with and reacted to the stories they have read.

4. Cognitive Theories

Cognitive theories support the view that a reader or writer uses his/her declarative (content) and procedural (strategic) knowledge to monitor and regulate his/her comprehension of a text.

4.1. Major Developments and Contributions

Cognitive psychologists have been primarily interested in purpose, motivation, and the physical/neurological functions of reading, including perception, attention, comprehension, learning, memory, and executive control (Pearson & Stephens, 1994). One group of cognitive psychologists emphasized the role of text structure on learning and retelling information (Robinson, 1983). Another group examined internal versus external motivation. Anticipating a correlation between the learner's

self-efficacy and reading achievement, new attention was given to the value of explicit strategy instruction in reading and studying expository materials.

4.2. Classroom Application

In applying cognitive perspectives to literacy curriculum and instruction, teachers define reading as solving problems, unlocking meaning, and interpreting and analyzing information and ideas. Teachers assume that because readers and writing draw on a wide range of differentiated abilities, attitudes, experiences, and skills, literacy is not always "natural" for all learners. Therefore, teachers must use assessment information to design explicit instruction that scaffolds individual learning from one level of independence to the next. Teachers begin each lesson by asking learners to call up their prior knowledge and engaging them in an active search for meaning by way of making connections— connections to their own knowledge, connections to other texts they have read or experienced, and connections to the world as they know it. Readers and writers are taught to process information with the use of specific text-processing strategies, including summarizing, clarifying, questioning, predicting (Brown, Campione, & Day, 1981). Readers and writers are also taught to use text features, such as grammar, cohesion, and structure to optimize this experience. Instruction in comprehension includes three phases. (a) In pre-reading/writing activities, learners preview the text or task, survey and make predictions, call up and use prior knowledge, and establish purposes. (b) In during-reading activities, learners are asked to focus on and enhance the reading or writing processes. Because learners have been taught to monitor and regulate their performance, they generally work independently and self-select appropriate strategies and methods for accomplishing the desired outcomes. (c) Post-reading activities include summarizing, discussing, reflecting, or responding to the text; post-writing activities include peer conferencing, sharing, and publishing. While their individuality is honored, learners are also held to high levels of accountability.

4.3. Classroom Snapshot

In a snapshot of a classroom setting that illustrates the cognitive functions of literacy, learners spend part of each day reading and writing to solve problems. To prepare students for this type of activity, the teacher has provided explicit instruction in reading and writing strategies that yield high levels of information. Students are able to call up a repertoire of strategies for asking questions, reading to find answers, and writing to explain and/or solve problems. Each reading strategy centers on a routine of pre-, during-, and post-reading steps that require thoughtful and purposeful engagement. Learners use a variety of information sources, including the internet, and mass media. Teachers often schedule small groups of students in a rotation of activities that include (a) reading and evaluating expository materials with the teacher, and (b) a period of working with peers to develop and present their information and ideas on the topic of study. These presentations are vital to this instructional approach because they expose children to multiple levels of information on a topic. In this snapshot, learners can be seen reading, researching, estimating, calculating, writing notes and summaries, viewing documentaries, listening to interviews, and surfing the internet for information about climate change. As they compile the information they must organize, evaluate, test, synthesize, and generate a conceptually-driven presentation of the topic.

5. Sociolinguistic Theories

Sociolinguistic theories support the view that a reader or writer uses everyday social and cultural knowledge and values in acting on and interacting with print in an effort to make sense of a text.

5.1. Major Developments and Contributions

Sociolinguists have contributed to the literacy knowledge base by studying the "interaction between people and print" (Harris & Hodges, 1995, p. 236). They argue that people assign meaning to words and that context shapes the literacy event. Meaning is contextualized by a cluster or group of words in a sentence. Meaning is contextualized by instructional, non-instructional and home and community factors (Bloome & Green, 1984). Sociolinguists hold the view that reading and writing are social processes and cultural constructions (Pearson & Stephens, 1994, pp. 35-36). They draw attention to (a) oral language as foundational to beginning reading, (b) the functions of language in serving our needs (Halliday, 1973), (c) language as a social phenomenon (Heath, 1983), (d) preschool experiences and home language as related to achievement in school (Wells, 1986), and (e) reading and writing as "embedded in and not separable from multiple contexts" (Pearson & Stephens, p. 37).

5.2. Classroom Application

The application of information-processing theories alone to classroom practice has proven to be inadequate because it neglects the power and influence of social interaction. Sociolinguistic perspectives envision the classroom as a community of learners who care about one another and are concerned about identity and power within the immediate and larger communities (McLaren, 1998). Learners are taught to value process over product and share their literacy and learning. With an emphasis on broad, informal, conceptual knowledge, cooperative and collaborative learning groups work together to solve problems, share information and ideas, generate concepts, and change existing structures. Teachers invite and honor learners' multiple ways of knowing (Harste, 1994) through their exploration of multiple media forms. This trend shifts the delivery of instruction from departmentalized and disciplinary to integrated and trans-disciplinary. It also supports a generative curriculum which invites learners to explore concepts with the knowledge, attitudes, and skills of a variety of domains. With increasing access to internet and other communication technologies, social and contextual factors are expanded and offer new challenges and opportunities for a changing world view. Sociolinguists argue that a major role of school is to create social contexts for the mastery of and conscious awareness in the use of cultural tools such as speech and writing (Moll, 1994). Curriculum and instruction look to networks of community members as sources of knowledge, skills, information, and assistance. The social interplay between classroom and community mediates learning (Vygotsky, 1978). As with the social interdependence of members of a household or neighborhood, learners are taught to mobilize their collective resources and engage in acts of cooperation that result in shared information and new achievements. Teachers invite learners to draw on their social and cultural experiences in (a) writing narratives, (b) explaining social and cultural traditions, (c) interpreting historical events, (d) predicting future trends, (e) observing social and scientific phenomena, and (f) interpreting literature.

5.3. Classroom Snapshot

In a snapshot of a classroom setting that illustrates the sociolinguistic functions of literacy, family and community members are assumed to be funds of knowledge that play an active role in helping learners gain control of their own thinking and learning. The teacher has visited learners' homes and established trusting and reciprocal relationships with parents and community members. In this snapshot, to initiate a study of family dwellings or homes, the learners have researched library and internet resources to develop background knowledge of the similarities and different types of family dwellings. The teacher and learners have invited parents (masons, carpenters, electricians, plumbers, etc.) who work in various stages of construction to visit their classroom and explain their work. In this snapshot, learners are interviewing a carpenter who is demonstrating the use of his tools in building a wooden family home.

6. Critical Theories

Critical theories support the view that the reader or writer uses evaluative functions in acting on and interacting with print in an effort to understand how print reflects, sustains, or transforms relations of power and dominance.

6.1. Major Developments and Contributions

A critical perspective begins with the premise that reading and writing are not "neutral" but are socially constructed practices that either reinforce or challenge values, traditions, patterns of power, and identities within social settings (Harris & Hodges, 1995, p. 48-49). Critical theories emphasize the inextricable interdependence of the individual and his/her society. McLaren (1989) argued that it is not possible to construct meaning outside the context of social and political reality; there is a subjective quality to all that is read and all that is written. At one end of the spectrum, critical reading is described as thinking, solving problems, and communicating on an interpretive rather than literal level (Robinson, 1983). At the other end of the spectrum, critical theories examine and analyze the role of ideology and belief systems in maintaining the *status quo* or transforming relations of power. Teaching reading and writing is viewed as a moral act imperative to transforming the social order (Hull, 1993; Powell, 1999).

Critical pedagogy emphasizes a capacity-building model with a goal of bringing about change. Learners access, interpret, evaluate, and generate information through a variety of media forms for a variety of purposes. Critical readers examine the author's credentials, credibility, intent or purpose, accuracy, logic, reliability, and authenticity. Critical writers know how to select, construct, and manipulate messages toward a specific outcome. Learners examine the power structures (cultural, ethnic, linguistic, economic, etc.) within their classroom and their school and community. They learn to use and evaluate numerous resources and to entertain numerous theories in their pursuit of knowledge. "Engaged" learners (Guthrie, Wigfield, Metsala, & Cox, 2004) are taught to interact with print and nonlinear, interactive, and visually complex materials and to test, evaluate, and synthesize information from numerous sources. The current proliferation of information sources and text types "complicates perceptions of reading and places new demands on today's readers" (Alexander & Fox, 2004, p. 54). These complications point to a direct relationship between the reader's knowledge, interest, and strategic behaviors, and his/her level of engagement and learning.

6.2. Classroom Application

According to Kempe (2001) six principles guide the critical classroom.
1. Identifying the values inherent in texts and whose interests these values are.
2. Analyzing different texts to examine the issues involved in the contradictions between and among them.
3. Challenging taken-for-granted or dominant ideas.
4. Examining how the selective use of language and the structured silences work to position the reader to accept the underlying ideology of the text.
5. Exposing the gaps and silences of texts.
6. Constructing socially critical readings of one's texts and one's culture.

6.3. Classroom Snapshot

In a snapshot of a classroom setting that illustrates the critical functions of literacy, learners and their teacher are comparing several texts to understand how texts position them as readers. As they engage in critical reading, the teacher asks questions to promote discussion. *As you read the text the first time, stop at several points to predict how the story will unfold. How do your predictions change from point to point? What happens when you read this same text a second time? What did you notice this time that you hadn't before? What happens when you read this a third time? Whose ideas and values are*

represented in the text? Whose ideas are not represented? Whose ideas are misrepresented? How are your thoughts influenced by your background and prior knowledge? What is the author asking you to think or believe? How could the ending of this story be changed and what would that mean? The teacher as a facilitator invites the full participation of all the learners in the group. In listening, learners hear and learn to appreciate perspectives that are different from their own. In speaking, learners formulate their thoughts in seeking to understand their identity and relations of power.

Learners in a critical classroom develop an expanding world view. They address issues related to race, gender, culture, ethnicity, language, religion, economic status. The curriculum and instruction are multicultural, and learners are asked to the consider complexities of embracing, understanding, and caring for all members of our human family.

7. Interdisciplinary Theories

Interdisciplinary theories support the view that in constructing meaning through texts, the reader or writer orchestrates numerous functions, including linguistic, psychological, cognitive, social, and critical functions.

7.1. Major Developments and Contributions

As a result of the cooperative research of linguists, psychologists, and psycholinguistics in the 1970s, an interdisciplinary perspective was born. Researchers demonstrated how learners acquire language and literacy. (a) All humans follow similar patterns of language development (Pearson & Stephens, 1994). (b) Learners learn language naturally by participating as members of their community (Chomsky, 1957, 1965; Smith 1971). (c) Learning is rule-governed (Brown, 1971). (d) Learning is an active and reflective process that is driven by trial and error (Goodman, 1971). (e) Readers use numerous cue systems or systems of information in their search for meaning (Goodman; Smith). (f) Reading is a predictive and constructive process when we use what we have read and what we know to anticipate meaning in the text (Goodman; Smith). (g) Language is given meaning through contexts as they are inevitably associated with situations, cultural models, and sociocultural and political groups. Language yields not one but many different socioculturally-situated readings (Gee, 2000).

7.2. Classroom Application

Classrooms that are designed to reflect an interdisciplinary perspective allow for a variety of teaching and learning venues that accommodate learners in individual work, small group work, and whole class instruction. The architecture guides a flow of activities that support the linguistic, psychological, cognitive, social, and critical functions of language and literacy. The teacher organizes a balance of these activities so that learners are matched to appropriate tasks and materials. Teachers are role models, mentors, collaborators, facilitators, and sources of information. They explicitly demonstrate skills and strategies; they invite and support learners as they try new things. A spirit of inquiry drives each unit of interdisciplinary studies; learners ask questions and use multiple media sources to find answers. Learners are held accountable for their work through systematic assessment procedures that are intertwined with teaching and learning. Teachers and learners use assessment information to establish outcomes and goals. As a result of multivariate assessments, teachers are able to be responsive not only to the curricular needs and interests of individual learners, but also to their learning strategies and styles (Weaver, 1994).

7.3. Classroom Snapshots

Four snapshots are based on theories of concept-oriented reading instruction (Guthrie, Van Meter, McCann, Wigfield, Bennett, Poundstone, Rice, Faibisch, Hunt, & Mitchell, 1996), which demonstrate how learners work within and across the disciplines in conceptualizing their world. In the first

snapshot, the whole class is in a meeting to explore a question of interdisciplinary dimensions: The example here is: *How are food resources shared throughout the world?* The learners have knowledge of farms and methods of transportation in their own country, but they have many questions about food sources and distribution in other parts of the world. The teacher makes a chart of what learners know (including mis-information) and what they want to learn. In the second snapshot, individuals are reading and taking notes to answer their question about world-wide food resources and distribution. Because the teacher has carefully used multiple assessments to develop an in-depth knowledge of each learner's reading and writing level, s/he has matched the level of the texts and tasks to the level of each reader. The snapshot shows that learners are using multiple media forms to gather information and develop their notes. The teacher has provided explicit instruction in specific strategies that assist learners in independent reading of linear and hypertexts and will collect their notes and hold them accountable for information in their reading materials. The third snapshot shows several groups of children working together to compile the information they have to develop a summary of information. This level of synthesis requires critical and analytical thinking. One group is working on agriculture and farming, one on monetary and food trade, one on transportation, another on diets and food preferences, and so on. The fourth snapshot is taken at the end of this unit of studies. Learners have prepared numerous maps, charts, and written summaries to answer the questions they asked at the beginning of the unit. They have integrated numerous information sources to present a conceptual understanding of the world's resources and distribution of resources. Their interdisciplinary and conceptual understanding is the result of a problem-solving or cognitive approach to reading and writing. They will conclude this interdisciplinary unit of studies by taking political action. Some learners will gather food items to distribute locally; others will petition the government to budget more money for international aid programs; others will investigate areas of service through international non-profit agencies; and all will express a deep knowledge and consciousness with regard to local and global issues in food supply and demand.

8. Conclusions

The interdisciplinary approach described here engaged learners in a range of literacy functions. As supported by psycholinguistic and cognitive theories, learners used declarative and procedural knowledge to identify the problems of world-wide food distribution. As supported by linguistic theories, they read and wrote with accuracy and enhanced their knowledge of technical words to support their understanding of the concepts. As supported by sociolinguistic and critical theories, learners investigated social and political issues that have led to vast inequities in the existing systems of food distribution. They concluded the unit of studies with a conceptual grasp of consciousness of facts and ideas that will guide their thinking for years to come.

We have chronicled the contributions of several disciplines to today's broad consensus of reading and writing activities that, at their best are interdisciplinary and embody linguistic, psychological, cognitive, social, and critical functions. Within each literacy event, the reader or writer calls up a dynamic network of strategies to construct meaning. As the reader or writer matures and becomes more proficient, s/he gains strategic control over external and internal information to predict, confirm, disconfirm and monitor his/her meaning-making processes. Our current knowledge of reading and writing is informed by numerous disciplines and our theories of these processes are now explained as a rich and varied interplay of linguistic, cognitive, psychological, social, and critical functions that support the meaning making processes.

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