Teaching Reading:

The Contribution of Multisensory Training to the Knowledge and Thinking of First-Grade Teachers

by

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Abstract

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Studies by Moats (1995), Mather, Bos, and Babur (2001), and McCutchen, et al (2002) have begun to identify the relationship between teachers' linguistic knowledge and what is known, scientifically, about how literacy is acquired by learners. Findings from these studies support the idea that linguistic knowledge—particularly knowledge of English phonology and orthography—is important for teachers of reading and can improve student outcomes in the early elementary grades. Moats (1995) and Mather et al (2001) found that teacher participants in their studies did not have the levels of linguistic knowledge that would enable expert teaching of reading.

The present study takes the research on teachers' linguistic knowledge as its thematic source and examines how linguistic knowledge enhances teachers' thinking about early literacy. Three groups of first-grade teachers participated in the present study. The first two groups were recruited from organizations that offer training in multisensory methods of teaching reading such as the Orton-Gillingham, Spalding, or Wilson methods. Multisensory (MS) methods of reading instruction involve teaching students to use more than one sense to internalize the relationships between phonemes and the letters that represent them in print. Training courses for teachers generally

involve a thorough analysis of English orthography as well as practice and feedback in use of the teaching methods. This study compared three groups of teachers: teachers who had received recent multisensory training (n=8), teachers who had received multisensory training more than one year ago (n=8), and teachers who had not been trained in multisensory methods (n=8).

Participants responded to surveys that measured their level of linguistic knowledge, familiarity with popular children's literature, and their theoretical orientation toward the teaching of reading. They also watched two segments of a video, each featuring a child reading aloud with a teacher. For each segment, teachers responded to six prompts that were designed to tap their on-task thinking about beginning reading acquisition and instruction.

While the three groups of teachers in this study did not differ significantly in their measured levels of linguistic knowledge, they did differ in the ways in which they responded to the video and prompts. Multisensory trained teachers made more specific comments about the readers in the video and suggested more teaching strategies in their responses to the prompts. Multisensory trained teachers also showed higher levels of approval for basic skills practices, and used specific information about the readers in the video to formulate teaching strategies. Implications for future research on the teaching of reading are discussed.

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CHAPTER I

Introduction

There is little debate that accurate, fluent reading is crucial for success in school, community, and workplace, but success in reading is of personal import to children as well. As the developmental theorist Erik Erikson(1950) suggested, during middle childhood, when the child's curiosity is at its natural peak, it is crucial that he or she acquires knowledge and masters useful skills; failure to do so will result in feelings of inferiority and stagnation. Today, the child who fails to learn to read is not only at risk for academic failure, but also for developing low self-esteem and poor academic self-concept. Looking further into the child's future, outside of the realm of academics, there are few modes of employment today that do not require employees to read proficiently.

The teaching of reading to young children, therefore, has become an increasingly important responsibility for schools, and the issue of how best to teach reading has come to be fervently debated by researchers, curriculum specialists, educational administrators, and even politicians. Put simply, this debate is about whether reading instruction should place primary emphasis on teaching students the code of written language and the rules that govern it in explicit ways, or on scaffolding students' use of printed language in authentic, meaning-based contexts. One side touts training in basic reading skills (i.e. phonics) as the way to address reading failure and educational inequity. The other side, usually called whole language, seeks to empower both students and teachers by placing them in control of the curriculum, and seeks to increase motivation and interest by doing away with decontextualized, rote learning. While disagreements often effect progress in

research communities, in the case of reading instruction, bifurcation has been less productive. Goldenberg (2000) describes the situation as consisting of a community of researchers "needlessly undermining one another."

> The release of every new study or report from the National Assessment of Educational Progress (NAEP) or new legislative proposal signals a battle on the horizon. There is widespread disagreement, fueled by mutual antagonism, ideological fervor, and deep suspicion, over the best way or ways to help students become successful readers and writers. The accusations and recriminations sometimes fly fast and furious, partisans for each side often declaring that they are the true last best hope for children and teachers. Policy makers, the public, and even some educators might be forgiven for looking elsewhere for answers (p. 640).

The "reading wars," as Goldenberg calls them, are compounded by a great gulf between empirically based knowledge about reading processes and what occurs every day in classrooms. Part of this disconnect has been caused by the failure of those who conduct research on reading to study teaching processes with the same rigor and enthusiasm with which learning processes have been studied. One goal of this study is to explore some of the ways in which the worlds of reading research and elementary school teaching might effectively and productively inform one another, in spite of the obstacles that theoretical disputes have placed between theory and practice in literacy education. While the traditional goal of educational psychology is to inform educators about the "right way" to teach (Munby, Russell, & Martin, 2001), a newer and, perhaps, more productive perspective is that there is a great deal to be learned from what Grimmet and McKinnon (1992) call craft knowledge—"teachers' judgment in apprehending the events

of practice from their own perspectives as students of teaching and learning" (as cited in Munby et al, 2001, p. 888). In the area of reading, studying teacher knowledge and the ways in which teachers understand and accomplish their goals sets the stage for research that moves beyond the whole language versus basic skills controversy—a controversy, by the way, that was created by researchers and theorists rather than by teachers themselves.

Much of what is known, empirically, about the teaching of reading consists of the findings of studies conducted by proponents of either the whole language or basic skills views of reading. Several studies conducted since the 1980s have sought to differentiate the qualities of teachers who subscribe to one or the other view. It has been found, for example, that teachers oriented toward the whole language philosophy of teaching are more likely to focus on their students' strengths, while those teachers oriented toward basic skills are more critical and focus on students' weaknesses (Johnston, Guice, Baker, Malone, & Michelson, 1985). A study by Badon, Oller, and Oller (2005) found that speech language pathologists judged whole language lessons as a clearer, more efficient means of remediation than phonics-oriented lessons. In a quasi-experiment in which a group of teachers participated in an intensive, linguistics-based summer workshop, McCutchen et al, (2002) found that these teachers offered more direct instruction of sound-symbol correspondences than did their counterparts in the control group. These authors also reported that students of teachers who participated in this intervention had higher levels of achievement in reading. The McCutchen et al study is of particular interest here because it bases its comparisons not on theoretical orientation but on knowledge—in this case, enhanced linguistic knowledge of the teachers in the experimental group.

Two earlier studies of teachers' linguistic knowledge (Moats, 1995; Mather et al, 2001) have measured teacher's linguistic knowledge outside of the context of teaching, usually with multiple choice items about phonics rules or applications of those rules to pseudo words. Both of these studies point toward a debilitating lack of knowledge of linguistics pertinent to the teaching of reading among teachers. What is unique about the McCutchen et al (2002) study is that it brought the study of teachers' linguistic knowledge to the level of the classroom by examining how enhancing teachers' linguistic knowledge affects classroom practice and student outcomes.

The present study delves further into the question of how linguistic knowledge affects teaching through a measure designed to assess teachers' on-task thinking. Three groups of teacher participants were assessed: a group of teachers who recently received training in a multisensory method of teaching reading, a group of teachers who received this training more than one year ago, and a third group of teachers who received no such training. Participants observed a video of two children reading aloud with a teacher. Each of the children makes several errors that offer information about their achievement in reading and some problems that they may be having as they learn to read. Five questions following the video prompted the teachers to express, in their own words, their interpretations of these students' performance and the teaching strategies that they would use to help each child advance in reading. In addition to responding to this stimulus, teachers were asked to complete measures of linguistic knowledge, familiarity with children's literature, and a questionnaire about their theoretical orientation to teaching.

The results of the study were used to test several hypotheses about the trained and untrained teachers who participated in this study. First, it was hypothesized that teachers

who had been trained in an MS method would show higher levels of linguistic knowledge, and that those teachers with more recent exposure to MS training would have higher levels of linguistic knowledge than those teachers who were trained less recently. It was also expected that trained teachers would recall more details from the video than untrained teachers, and that trained teachers would recommend instruction in letter-sound correspondences more often than untrained teachers. Finally, it was hypothesized that trained teachers would convey higher levels of approval for basic skills instruction, and that they would make more negative comments than untrained teachers. Broader questions about the relationships between knowledge, theoretical orientation, the types of comments that teachers make, and the types of strategies that teachers recommend were also addressed. The results of this study are discussed in light of emerging literature of teacher knowledge in the area of early literacy and the importance of establishing new ways of measuring and understanding what teachers do as they teach children how to read.

CHAPTER II

Literature Review

The following review of literature relevant to the study of teaching of reading has been divided into two separate sections. A review and discussion of the general configuration of teaching in educational research is followed by a more detailed review of the literature on the teaching of early reading. This second section is further divided into two sections that correspond to the two major theoretical orientations toward reading education. In this review, the two orientations are termed "whole language" and "basic skills."

The Configuration of Teaching in Educational Research: General Approaches

Part of the reason for the great gulf between the worlds of research and elementary school teaching is that, until recently, researchers have paid minimal attention to teacher cognition as an important variable in education. In his highly informative and well-structured chapter on research on teaching in the *Handbook of Research on Teaching*, Shulman (1986) describes the dominant process-product paradigm of educational research, which assesses the general effects of teacher practices on academic outcomes, as being "the most vigorous and productive of the programs of research on teaching" (p. 11). This approach emphasizes teacher behaviors rather than cognitive processes as being important determinants of student achievement, and what often emerge from process-product research are what Shulman terms "composites" of teaching behaviors that correlate with academic success (p. 10).

One of the advantages of process-product research is the methodological rigor it affords researchers. In studies of teaching, observable and potentially manipulable

teacher behaviors serve as independent variables, and standardized test scores in one or more subject areas generally serve as dependent variables. Within the realm of the possible, then, are not only correlational studies that relate identify teacher behaviors to levels of student achievement, but also randomized experiments that manipulate behaviors via training interventions, and meta-analyses that assess the impact of specific types of behavior over several studies (p. 10). As Shulman recounts, however, no sooner did the approach catch on in the 1960's than critics begin to find problems with it and to look for alternative explanations for learning outcomes. Results of experimental research in this tradition (e. g. Anderson, Evertson, & Brophy, 1979), according to Shulman, proved to be problematic. Teachers who were trained to use experimental methods in their classrooms

> . . . typically produced higher achievement gains among their students than did their control counterparts . . . [but] it was typically found that the teachers in the experimental treatments did not always engage in the 'desired' behaviors more frequently than did their control counterparts. Moreover, not all the trained behaviors continued to correlate with the student achievement criteria in the field experiments (p. 12).

A separate critique of the process-product approach is offered by Munby et al (2001), who suggest that this stance on the part of researchers alienates teachers by locating the answers to teachers' practical problems "in educational psychology" and not in teachers' "own thinking about [their] teaching experience" (p. 882). The point that Munby and his colleagues make is that, ultimately, an educational psychology based entirely on the purview of researchers will be "limited" in any effort to effect change in

classroom practices. These authors feel that, in the future, educational psychologists will need to make serious assessments of "the relationships among educational psychology, teacher education, and the character of teachers' knowledge" (p. 882). While this point may seem extreme, especially to practicing researchers in the field, I take seriously their point about relating educational psychology more directly to what teachers know and do, especially in light of the impasse at which reading research has recently arrived.

If specific teacher behaviors cannot be clearly identified as significant correlates or causes of academic achievement, then what are some other potentially important variables in the study of teaching and learning? Possible answers to this question emerge as alternative research paradigms, according to Shulman. One approach posits one or more intervening variables as mediators of teacher behavior and academic achievement. Some researchers approached the problem in terms of Academic Learning Time (e. g. Berliner, 1979) or "the accrued engaged time in a particular content area using materials that are not difficult for the student" (Shulman, p. 14). Taking a cue from the cognitive revolution, other researchers became more concerned with students' thought processes and representations (Shulman, pp. 16-17). Still others, coming from increasingly interdisciplinary backgrounds, conducted anthropological and linguistic analyses of academic environments (e. g. Jackson, 1968; Cazden, 2001).

It was not until the 1980's, according to Shulman, that a program of research that investigated teacher cognition and decision making moved the research on teaching away from behaviorist traditions and toward more cognitively-based explanations for both teacher behavior and achievement outcomes (p. 23). Data collection, in this tradition, includes the use of think-aloud procedures and careful observation of teachers' behaviors

in the contexts of planning, decision making, and problem solving. In this type of inquiry, regression and other mathematical models become viable means of depicting teachers' thought processes. An example of this type of study (not discussed in Shulman's chapter) is Cooksey, Freebody, and Davidson's (1986) analysis of 20 novice teachers' predictions of elementary students' reading achievement. These authors asked teachers to predict reading achievement scores from student profiles that contained standardized test scores reflecting students' oral language comprehension, letter knowledge, and familiarity with concepts of printed language, as well as information about the children's socioeconomic status and the type of reading curriculum used in the child's class. Their findings indicated that while most of the teachers were fairly accurate in their predictions of reading achievement, they varied significantly in the ways that they formed these predictions, and they were usually unable to explain why they weighted the different variables as they did in their thought processes. In their discussion, Cooksey et al suggest that their study serves as a model for future work that might investigate ways of providing "cognitive feedback" to teachers about their own "expectation policies in the classroom" (p. 61).

In 1986, these authors stopped short of suggesting that this type of inquiry might also be used to inform researchers about how teachers form opinions and make decisions. Research directed to this end could serve as a means of "bridging the gap between traditional research knowledge and teachers' practice" or creating "a professional knowledge base for teaching" (Hiebert, Gallimore, & Stigler, 2002). Today, however, many researchers strive to develop a shared, practical understanding of teaching that teachers themselves play a role in creating. Shulman (1986) describes this movement on

the part of researchers as the development of an emic perspective—that is, one that acknowledges what teachers do as being embedded in a rich system of knowledge and communication—as opposed to the etic perspective of earlier research that did not consider the connectedness of knowledge and instructional practice. Shulman suggests that future research models will include "teachers as collaborators and investigators" (Shulman & Quinlan, 1996). Grimmet and McKinnon's (1992) approach is the aforementioned idea of "craft knowledge," and Lytle and Cochran-Smith (1992) write about "teacher research as a way of knowing," suggesting that knowledge about teaching that is created by teachers "will alter, not just add to what we know in the field" (p. 25). Clearly, in comparison to the professional knowledge bases of other fields—Hiebert and his colleagues cite law and medicine as examples—an account of what expert thinking and decision making are like has yet to be delineated. Not only does research on teaching lag behind bodies of knowledge used to train novices in other professions, but even within the field of education, research on teacher cognition has not been pursued to the extent that research on student cognition has been (Shulman, 1986, 1987). If we acknowledge that learning is at least partially rooted in the social realm, it would seem that our understanding of learning in school settings is limited by our not probing more deeply into the thinking of teachers.

For Shulman the future for research on teaching lies in the study of teaching in specific subject areas—"teachers' cognitive understanding of subject matter content and the relationships between such understanding and the instruction teachers provide for students" (p. 25). Shulman traces his thinking to John Dewey's writings on the psychology of subject matters, which Shulman and Quinlan interpret as "the bridge

between the subject matter in the mind of the mature expert and the subject matter as it is prepared for the pupil" (p. 402). *Pedagogical content knowledge* is the term Shulman uses to name what teachers do when they "psychologize"—to use the Deweyan expression—their own knowledge in a specific subject matter in this way (Shulman, 1987; Shulman & Quinlan, 1996). In this line of thinking, taken individually, subject matter knowledge, pedagogical knowledge, and curricular knowledge do not offer valid explanations of expert teaching. Instead, a hybrid, contextual model of teacher knowledge for specific content becomes crucial to our understanding of teaching. The researcher's task becomes increasingly complex; simply observing what teachers do is not enough to explain how teachers come to choose the methods, explanations, and representations that they use in teaching, and why some behaviors do not always account for the same kinds of learning outcomes.

Shulman and Quinlan (2001) discuss the kinds of research questions that such an approach to the study of teaching might involve, and even give examples of subject matter research in the areas of mathematics and history that investigate the thinking of expert teachers. Special care must be taken, however, in applying Shulman's program to the area of early literacy instruction, for in no other academic subject area are the ability to perform the target skill—reading—and the teaching of that skill so different from one another. Whereas in the area of history a teacher might recall her own historical knowledge as well as the means through which she acquired that knowledge, in most adult readers—certainly in teachers—basic reading skills are so thoroughly automatized and were acquired so long ago that recalling one's own procedural knowledge of how to read is almost impossible. Based on my own observations and informal interviews with

elementary school reading teachers, the aspects of their own knowledge about reading that they do recall relate, rather, to the utility and the pleasure derived in using the skill rather than the early struggle to make sense of a brand new code. Because reading is a school subject in which teachers' knowledge or, in this case, awareness of the content and skills to be learned does not relate clearly to pedagogy, how teachers effectively "bridge" these two kinds of knowledge becomes an important area of inquiry. Sources of knowledge about teaching reading other than one's own experiences of learning to read, such as teacher education, professional development, apprenticeships, and mentoring programs become crucial to our understanding of how teachers develop pedagogical content knowledge in reading.

Research on Teacher Knowledge in the Subject Area of Reading

Much of the research on the teaching of reading has been framed by the ongoing debate over whether curricula should consist of explicit instruction in basic skills or meaning-based exploration of printed language. Many of the articles discussed here are not exceptions. In fact, without a working knowledge of the "reading wars," the novice reader might have a difficult time understanding the purpose of some of the recent research on the teaching of reading. Nevertheless, a considerable amount of knowledge has been generated, serving as a base from which to build the study of teachers' pedagogical content knowledge in elementary reading.

Before engaging in a discussion of specific empirical studies, a brief explanation of how each side of the ideological stalemate over reading education has understood the task of the elementary reading teacher is necessary. On the basic-skills side of the debate, it is believed that teaching reading should consist of explicit, code-based

instruction, and that elementary teachers' should have extensive linguistic knowledge, particularly in the areas of phonology, orthography, and morphology. Moats (1995), one of the most vociferous proponents of this view, believes that "our competency lists and licensing practices should state clearly that licensed teachers must themselves demonstrate phonemic awareness, have a working knowledge of the speech and sound system, and know how our orthography represents spoken English" (p. 49). Moreover, Moats believes it is imperative that teachers have the opportunity to develop linguistic knowledge in their teacher education programs. Her text, *From Speech to Print: Language Essentials for Teachers* (2000) aims to serve this purpose.

From the whole language point of view, the teaching of reading takes place within meaningful language experiences such as reading stories, magazines, and newspapers, or writing letters and "publishing" books (Galda, 2000; Gunderson, 1997). One of the major tenets of whole language is the empowerment of teachers and students through teacher or classroom control and critique of curricula. Gunderson (1997) refers to whole language as a "propositional intertext [that] represents the voices of those who view literacy as a basic, perhaps natural, human activity framed by the teacher, whose view is often, but not necessarily, similar to that of the students" (p. 225). According to Gunderson's interpretation of whole language, there is no single, referential source of information or knowledge to guide teachers' work: "There are an infinite number of . . . intertexts, as well as instructional applications inferred from them" (p. 226).

While theoretical writings like Gunderson's do not offer much information about what the teachers' knowledge base might be, a descriptive study conducted by Rickelman, Henk, and Helfeldt (1994) assessed teachers' perceptions and sources of

knowledge about whole language. The two concepts that topped a list of teachers' most frequent associations with whole language were "integration" and "children's literature." In the context of a brainstorming task, these terms were mentioned by 57% and 43%, respectively, of a sample of 254 teachers from five states.

This author's own observations of classroom teaching have also helped to clarify the ways in which the whole language orientation shapes reading instruction. An observational study (Petropoulos, 2002) found that of two teachers who had almost identical philosophies of reading, as measured by Mather et al's questionnaire (2001) *Teacher Perceptions Toward Early Reading and Spelling*, differed in the amount of explicit instruction in decoding that they offered, but built their reading lessons around works of children's literature. Videos (e. g., National Association of Elementary School Principals, 1991; Battista, 1992) and descriptive works (e. g., Galda, 2000) support the assertion that children's literature is central to whole language teaching. While whole language theorists offer no official skill set or knowledge base for teachers, observational and descriptive data suggest that a broad knowledge of children's literature and facility with use of children's literature as a vehicle for reading lessons would be important skills for teachers according to the whole language orientation.

Examples of Research on Teaching from the Whole Language Perspective

Researchers who have investigated teaching from the whole language standpoint have focused predominately on the differences between whole language teachers and their more traditional basic-skill counterparts. Morrison, Wilcox, Madrigal, Roberts, and Hintze (1999) utilized DeFord's (1985) *Theoretical Orientation to Reading Profile* (TORP), a measure of teachers' level of agreement with theoretical statements about

reading instruction, and the *Pupil Control Ideology Form* (PCI) (as cited in Willower et al, 1967), a survey of classroom management attitudes. They administered these inventories to a sample of 418 elementary school teachers from five states. Scores on the TORP were used to classify teachers as having either a whole language or a phonics approach to teaching reading, and scores on the PCI were used to classify teachers as having either a "custodial" or a humanist approach to classroom management. A Chi-square analysis of the reading orientation and pupil control ideology data revealed a strong relationship between these two variables ($p. < .01$). Teachers who were oriented toward whole language were more likely to be humanistic and more likely to reason with children as a classroom control technique. In contrast, those teachers who were oriented toward skills-based instruction were more "custodial," or more likely to use rewards and punishments to control their classrooms. The study concluded that both whole language and humanistic views are philosophically progressive, while basic-skills approaches to reading and custodial views of classroom management are essentially rooted in behaviorist thought.

Johnston et al (1995) approached their qualitative study of 25 elementary school teachers serving low SES communities in upstate New York in a similar, comparative manner. In this study, it was found that that teachers who had basic-skills orientations towards reading tended to focus on students' deficiencies rather than their strengths, using normative, comparative, or hierarchical information about performance rather than information about an individual child's improvement over time. In contrast, teachers who were oriented toward the whole-language or literature-based notion of teaching,

> . . . emphasized independence, interpretation, knowledge of authors, involvement, connections, and strategy use, locating children within a more multidimensional conception of literacy. These latter teachers also used more detail in their descriptions and portrayed learning in more communal than individualistic terms (p. 365).

While the Morrison et al and Johnston et al studies are informative with regard to teacher practice, both serve as examples of how research framed by the ongoing dispute about reading instruction can cause stagnation in this area. First, both studies treat whole language and basic-skills approaches almost as if they were organic characteristics of teachers rather than ideas developed from the points of view of researchers and theorists. Both studies, moreover, ignore the fact that what and how teachers teach is often controlled at the school, district, or state level, and that this kind of control may affect teachers' theoretical orientations toward reading.

Morrison et al (1999) neglect to address the problem of differences in teacher education and teacher training related to the time at which teachers attended college and graduate school. It is likely that very experienced teachers who studied education in the 1960s or 1970s had little exposure to whole language approaches in their literacy courses. As a cohort, these more experienced teachers were probably also taught classroom control techniques that drew on behaviorist principles that were popular at that time. More recently certified teachers, on the other hand, are likely to have experienced greater opportunities to become familiar with both whole language and progressive classroom management techniques. Nevertheless, information about teachers' years of experience, age, or date of certification was not considered in this analysis.

In the case of Johnston et al (1995), the authors addressed the ways in which teachers' orientations and their thinking about student progress relate to one another, but they did not take their analysis to the level of the classroom. Tallying positively and negatively toned remarks about students made in an interview setting does tell us about teachers' reactions to students, but it does not tell us what teachers might be doing with those thoughts. While remarks that reflect positively on students' achievement are more pleasant sounding, teachers who remarked on students' shortcomings in the area of reading may use that information to tailor individual instruction or to plan review materials. The problem with this highly polemical qualitative study is that, like many studies of this type, its data beg reanalysis and the telling of alternate stories. The question of how teachers' belief systems impact their thinking about students' reading achievement, nevertheless, warrants more rigorous research, as does the question of what teachers do with the information they glean from students' errors and shortcomings in reading.

Badon et al (2005) studied the perceptions of 39 speech language pathologists through their ratings of videotapes of a clinician giving individual instruction to first-graders classified as being at risk for academic failure. There were a total of eight video segments, shown in random order. In half of the segments, the clinician, also a trained speech-language pathologist, focused on decoding, instructing the student to sound out words in the text. In the other half of the segments, the clinician took a whole language approach, focusing on the student's comprehension. Each of the four students featured in the video segments participated in one code-based segment and one whole language segment, with two students receiving whole language instruction first, and the other two

receiving code-based instruction first. Observers were asked to rate each segment on the student's comprehension, the instructor's clarity, and the instructor's enthusiasm, using a scale of one (poor) to six (excellent).

Observers' ratings for all three queries were significantly higher for the whole language condition, indicating that the speech language pathologists perceived whole language instruction as being superior to code-based instruction in terms of student comprehension, instructor clarity, and instructor enthusiasm in these videos. Analyses of students' accuracy in the videos indicated that the at-risk first graders did, in fact, read more accurately in the whole language conditions. From these results, the authors concluded that the teaching of "surface forms," (i.e., how to read words) should not be overlooked, but that they should be subordinate to both comprehension and content. They suggest that, "the more learners and teachers focus attention on the content of a text, the easier and more interesting it will be for them to work out the details of sound-symbol correspondences as well as the ways that surface forms of print map onto referents, events, and meaningful content" (p. 454).

There are limits to the generalizability of this study because, in spite of the fairly large number of responses (78), each video featured the same teacher, and her preferred teaching style would most likely be implemented with more clarity and enthusiasm. Similarly, if she lacked knowledge of how to teach sound-symbol correspondence, or if she lacked detailed knowledge of those forms themselves, her teaching in the explicit instruction condition would probably seem more confusing both to her student and the clinician observers. An interesting extension of this study would involve showing videotapes of teachers who vary in their theoretical orientation and the type of

pedagogical knowledge they have developed. Nevertheless, this study offers one interesting view of the expectations and preferences of professionals in the field of speech-language pathology.

Authors of another study rooted in the whole language ideology have resisted the comparative paradigm and have probed more deeply into the development of teachers' literacy beliefs in the context of one teacher preparation program. Johnson and Hoffman (1994) pursued the idea that "novice teachers' conceptions of how to teach are closely related to their own experiences as students, are very difficult to change, and exert a strong influence on teaching practice" (p. 74), These authors conducted a cross-sectional study of the beliefs held by education majors at the pre-fieldwork, early fieldwork, middle fieldwork, and student teaching levels of their programs of study. Participants in this study completed Gibson and Dembo's (1984) Teacher Efficacy Scale, which offers sub-scores for teaching efficacy—beliefs about the impact that teachers, in general, can have on children's lives—and personal teaching efficacy—beliefs about one's own effectiveness as a teacher. In addition, the participants were asked to define literacy, in their own words, and name as many things as they could think of that a teacher could do to foster the development of literacy in her classroom. Participants' literacy definitions were scored according to the number of elements of the UNESCO definition of literacy that they mentioned, and their lists of literacy development ideas were scored by counting the number of items that were specifically related to literacy.

The results of this inquiry suggested that fieldwork experiences play an important role in improving students' personal teaching efficacy; until students began spending time in classrooms, they did not believe in themselves as teachers. Also, novice teachers'

definitions of literacy broadened over the span of this training program to include not only ideas about the ability to read, but also the abilities to write and to function effectively as a member of a literate community. While this study is limited by its location in a single teacher education program, it raises important questions for future research, specifically, how teacher education and field experiences change teachers' beliefs and efficacy. Johnson and Hoffman give us an interesting model for new investigations in this direction.

The Basic-Skills Research Program on Teaching

Research from the basic-skills side of the debate has been more coherent in its focus and offers a great deal of insight into teachers' linguistic knowledge and the impact that this type of content knowledge can have on instruction. Moats (1995) rests her argument for advancing the linguistic knowledge of teachers on previous research (e. g., Kavale and Reese, 1991; Reynolds, Wang, and Walberg, 1992). Results of these studies reveal that even professionals in the field of learning disability are not sufficiently aware of the large body of empirical evidence showing that phonological awareness is central to reading readiness and that linguistic knowledge and phonological awareness are essential for those who teach children how to read.

Moats surveyed the linguistic knowledge of 89 teachers who elected to take a graduate course on code-based language instruction and who, by the author's account, had above average written language skills and were motivated and informed teachers. Her survey results were rather surprising. Before taking the course, less than half of the teachers could consistently count the number of speech sounds (phonemes) in a selection of printed words, demonstrating poor phonological awareness as a group. Moreover,

only 10% of the teachers were able to identify consonant blends in words (e. g., *str* in street), and none of the teachers were able to accurately identify consonant digraphs (e g., *th* in think). Participants fared somewhat better on items that tested their knowledge of spelling rules, but the picture was, according to Moats, still quite bleak. Only 30% of the teachers surveyed could explain when *ck* is used in English words or explain the *y* to *i* rule about adding suffixes to root words.[1] Teachers also performed poorly on items that tested their knowledge of morphological terms. For example, only 21% were able to identify an "inflected" verb form (e.g. the *ed* in *helped*).

Moats's study is informative because it identified and described what she believes is a debilitating deficit in the content knowledge of teachers. Mather et al (2001) support Moats's findings about teacher knowledge of basic linguistic principles, and also add some important information to our understanding of teachers' perceptions and theoretical orientations toward reading instruction. Working with 293 preservice teachers and 131 inservice teachers who had at least three years of teaching experience, these authors administered the *Teacher Knowledge Assessment: Structure of Language* (TKASL), a measure that they based on Moats's *Informal Survey of Linguistic Knowledge* (1995), as well as the *Teacher Perceptions Toward Early Reading and Spelling* (TPERS), a measure that they developed after DeFord's (1985) *Theoretical Orientation to Reading Profile*. In terms of linguistic knowledge, the teachers who participated in this study performed somewhat better than those who worked with Moats did. While none of the teachers in Moats's study seemed to know what a consonant digraph was, 16% of preservice and 47% of inservice teachers were able to match the term to its definition here. In the area

[1] *Ck* is used is used only after a short vowels, usually ending a root word. When adding an ending to a word that ends in *y* (used as a consonant), we use *i* instead of y unless the ending is *ing*.

of phonological awareness, however, Mather et al's participants were weaker than Moats's, with only 19% able to identify the number of phonemes in the word *box* (4). Overall, the inservice teachers had more linguistic knowledge than the preservice teachers did. Among preservice teachers, the average number of items correct was 50%, and among inservice teachers this figure rose to 68%. Since the preservice teachers were surveyed toward the end of their college experience, this finding suggests that either teacher education has evolved to include fewer opportunities to develop linguistic knowledge, or that teachers develop linguistic knowledge on the job, through books, manuals, graduate courses, professional development, or their own practice.

The TPERS measure was designed so that teachers received scores for their average levels of agreement with statements considered to be in accord with whole language and basic-skills orientations toward the teaching of reading. Scores ranged from one (strongly disagree) to six (strongly agree). The major finding here was that while preservice and inservice teachers were very similar in their opinions of holistic, meaning-based instructions—the average score for both groups fell between "mildly agree" and "agree"—the groups differed more in their views of code-based instruction, with inservice teachers showing significantly higher approval than preservice teachers. A closer look at individual items, however, revealed what the authors considered to be rather problematic misconceptions about reading instruction held by both preservice and inservice teachers. Fifty-seven percent of the inservice teachers felt that "basic skills should never be taught in isolation" (p. 478), even though the results of numerous studies have suggested that code-based instruction is the most effective way to teach struggling readers (e. g. Mather, 1992). Moreover, eighty percent of the preservice teachers and

74% of the inservice teachers believed that "the most beneficial strategy for identifying an unknown word was to use the context to figure it out." The authors cite Lyon (1999), Ehri (1998), and Pressley (1998) as providing research-based evidence that proficient readers depend more heavily on decoding skills to identify a word, while poor readers tend to use context clues.

In their conclusion, Mather et al (2001) remark on the unfortunate distance that exists between current research on reading disability and teacher preparation, calling for reforms similar to those that Moats (1995) advocates. The contribution of this study is that it connects teacher knowledge to specific beliefs about practice, shedding light on some important gaps in the knowledge afforded to teachers during their preparatory experiences.

Since Moats's and Mather's work, several additional studies have delineated limitations of teacher knowledge in the area of linguistics. A recent study of pre-service teachers in Australia found that while a majority of teachers believed that phonics was an integral part of early literacy education, they were unable to explain or demonstrate the concept of a phoneme and felt underprepared to teach beginning reading (Fielding-Barnsley, 2010). Looking more carefully at teacher training in higher education, Joshi, Binks, Hougen, Dalhgren, Ocker-Dean & Smith (2009) found that only 54% of their sample of professors who taught teacher education courses knew the definition of phonemic awareness. On a measure that surveyed their knowledge of pedagogy in the areas of phonics, phonology, morphology and comprehension, teachers performed better on items that tapped into their implicit knowledge (e.g. which word demonstrates the way ck is usually used in English) and poorly on items that required explicit knowledge such

as definitions of technical terms or explanations of phonics rules. These authors note that "an explicit knowledge of such critical reading strategies and skills is necessary for teaching others these same skills, because one cannot teach something one cannot express explicitly." With teachers' lack of facility with technical terms and rules now well evidenced, Joshi et al conclude that both teacher educators and teachers need opportunities to bring their implicit knowledge of reading to an explicit level as a means of enhancing the effectiveness of their craft.

McCutchen et al (2002) extended research on teachers' linguistic knowledge by framing a solution to the problem that both Moats, Mather et al, and others have articulated. These authors conducted a quasi-experiment that manipulated the level of linguistic knowledge of kindergarten and first-grade teachers. Forty-four teachers who responded to invitations participated in the study. For the purpose of forming equivalent experimental and control groups, the teachers were matched into pairs according to the socioeconomic status of the students at the schools where they taught, and were assigned to either treatment or control conditions. Preference for the experimental treatment was also given to schools that had more than one teacher participating in the study because the authors "recognized the difficulty of sustaining teacher change when teachers worked in isolation" (p. 72). All participating teachers were pretested on Moats's (1995) *Informal Survey of Linguistic Knowledge*, and teachers assigned to the experimental group participated in a two-week intensive summer workshop that addressed "phonology, phonological awareness, and its role in balanced reading instruction" (p. 73). As part of the workshop, teachers generated their own lessons in four areas of reading instruction: phonological awareness, orthographic awareness, reading comprehension, and reading-

writing connections. In the fall, researchers followed both experimental and control group teachers into their classrooms, and took detailed field notes about their practice. Field notes were later coded for the type of knowledge afforded to students by instruction: sounds, letters, letter-sound relationships, and comprehension. Students' progress was also assessed during the school year using the *Test of Phonological Awareness* (TOPA), the *Metropolitan Reading Readiness Test* (for kindergarten students only), and the *Gates-MacGinitie Reading Test-level 1* (for both kindergarten and first-grade students). At the conclusion of the study, all of the teachers participating in the study were again administered Moats's survey of teachers' linguistic knowledge.

The results of this study showed that the two-week intensive intervention was successful at increasing teachers' linguistic knowledge and increasing the amount of time that teachers spent on explicit code-based instruction in their classrooms. Kindergarten and first-grade teachers in the treatment group spent significantly more time on explicit instruction of orthographic rules of English than did teachers in the control group. Moreover, kindergarten teachers in the experimental group spent more time than their control group counterparts providing explicit phonological awareness instruction to their students. And in the first grade, experimental group teachers spent significantly more time on explicit comprehension instruction than first-grade teachers in the control group did. Kindergarteners' achievement data revealed that the amount of time that teachers spent on explicit phonological awareness training was significantly related to growth in phonological awareness and word reading at the end of the school year. Kindergarten teachers in the experimental group also had a positive effect on their students' orthographic fluency. Results for the first-grade students showed that students of

experimental group teachers made significantly greater gains in the areas of phonological awareness, reading comprehension skills, reading vocabulary, and spelling skills than students of teachers in the control group.

While the McCutchen et al (2002) study is reminiscent of the process-product approach—the authors collected data on both teacher behavior and student outcomes—it is an important departure from more traditional research in a number of important ways. First, what is thought to impact both teaching and learning here is teachers' understanding of the structure of the English language in its written form. Rather than positing one or more variables as mediating teacher behavior and student learning, in this model, teacher behavior becomes the mediator of teacher knowledge and student learning, much as pedagogical content knowledge is thought to mediate teachers' content knowledge and students' emergent knowledge of a subject matter. Second, through their research design, the authors acknowledge teachers as skilled professionals. Rather than teaching a new instructional method or scripted curriculum, the intervention that McCutchen et al offered focused on enhancing teachers knowledge of linguistics—particularly phonology—and the role of phonological awareness in literacy instruction. And in the fall, what teachers did with this newly acquired content knowledge was in no way dictated or controlled by the researchers. For this reason, the significant results with regard to student achievement are very promising: alternate methods of instruction may yield equivalent results if teachers' content knowledge and pedagogical content knowledge are well developed. Finally, in spite of the opinion popular among whole language advocates that literacy is acquired by children through implicit, meaning-based instruction such as the reading of literature (Gunderson, 1997), what emerges here is a

conception of literacy instruction as a more technical feat, requiring high levels of knowledge, precision, and planning on the part of the teacher. Future research in this area might, in addition to replicating these findings, explore the ways in which linguistic knowledge enhances or changes teachers' cognitive processes more deeply.

Working in a similar vein, Cunningham, Zibulsky, Stanovich, and Stanovich (2009), measured teachers' knowledge in the areas of phonics and children's literature and asked them to choose activities that they would use during a mandatory two-hour language arts block. Teachers who had higher scores on the phonics measure allotted significantly more time to explicit instruction than did teachers with lower scores on the phonics measure, who, as a group, preferred to spend more time on literature-based activities. In their discussion, these authors suggest that the ways teachers spend time may be more a function of what they know as opposed to what they believe about how children learn to read. The philosophical issue of how to teach reading then, might be reframed by teachers themselves as they gain knowledge and experience with more technical means of teaching reading.

With the benefits of teachers' technical knowledge well established in recent literature, another important area of inquiry emerges. That is, how does reading instruction that is rooted in the technical aspects of language impact different populations of students? A recent quasi-experimental study by Podhajski, Mather, Nathan and Sammons (2009) compared a small sample of teachers who took part in a program that taught them about phonemic awareness, phonics, and fluency and their students with a control group of teachers and their first and second grade students. In this study, the control group of students came from a community that had a significantly higher mean

income and higher parental educational levels than those of the experimental group. The control group scored significantly higher on pretests of letter knowledge, phonemic awareness, decoding, and listening comprehension. At posttest, however, the control students had caught up to and in some cases surpassed the scores of the experimental group. These results suggest that enhancing teacher knowledge may be especially important for students who come to school with lower levels of prereading skills. With better prepared teachers, fewer students might fall behind during the process of literacy acquisition.

Two recent studies by Carreker, Joshi and Boulware-Gooden (2010) also examined the impact of professional development on teacher knowledge and on-task decision making. In their first study, these authors showed that in-service teachers in their sample outperformed pre-service teachers on measures of basic linguistic knowledge of English phonemes, syllables and morphemes. In-service teachers also outperformed pre-service teachers on a measure that asked them to choose from among several possible answers (multiple choices) the best method of remediating typical spelling problems in young readers, but performance of all teachers on this measure, according to the authors, was poor, with only half of the in-service teachers scoring above 50%. In their second study, in-service teachers participated in either 30, 60, or 120 hours of professional development aimed at increasing linguistic knowledge and the teaching of spelling. In this study, the intervention was successful at improving both knowledge and the choice of appropriate teaching strategies, with the teachers who received the most training earning the highest scores on all measures. This study adds empirical support to the idea that training in the form of professional development can improve teacher

knowledge and enhance teaching skills. Additionally, by using a multiple choice measure to assess teaching skills, these authors provide an interesting model for research on teachers' decision making processes. One drawback to the measure, however, is that teachers were not allowed to add to or amend the responses offered by the measure; we don't know what kinds of strategies the teachers themselves might have generated or used if given the opportunity to answer independently and provide their own answers.

Alternative Approaches to Research on Teaching

Recently, the idea of balanced literacy instruction—teaching that involves methods associated with both basic-skills and whole language ideologies—has earned a place in the research on the teaching of reading. Wharton-McDonald, Pressley, and Hampston (1998) configure balanced instruction as a compromise to end the reading wars—a means of satisfying both the basic-skills and whole language camps. In their study, Wharton-McDonald et al investigated the kinds of methods used by exceptional teachers of reading. Their sample consisted of nine first-grade teachers from four suburban school districts serving the children of upper-middle to lower-middle-class parents. Their schools' language arts coordinators originally nominated all of the teachers in the sample as being either "exceptional" or "typical" in promoting student literacy (pp. 104-105). These teachers then became the subjects of an extensive qualitative study that, according to the authors, fills a long-standing gap in the literature on reading instruction by considering "the voices of teachers—including their personal theories and specific patterns of practice" (p. 102). Ultimately, their analysis focused on three of these teachers who were selected by the authors as teachers "whose students

demonstrated consistently higher levels of reading, writing, and engagement than students of other teachers" (p. 105).

The most important finding of this study with regard to literacy instruction was that "teachers whose students were the highest achievers offered primary-level literacy instruction that included a balance of whole-language practices and skills instruction" (p. 122). The authors call the position of these teachers the "radical middle" in the continuing political, educational, and philosophical debate about how reading should be taught to children. Their findings support an earlier claim by Pressley, Rankin, and Yokoi (1996) suggesting that effective reading teachers find both whole language and skills based instruction valuable.

This study is valuable in its depiction of the broad range of methods that expert teachers use. The idea of balanced instruction certainly may help to quell the reading wars. Nevertheless, there are several problems with this study. First, by focusing exclusively on effective teachers who serve suburban communities with populations that are largely middle-class, Wharton-McDonald et al avoid addressing one of the more serious problems for literacy educators and researchers—the fact that many schools in the United States regularly fail to teach children to read, and these schools are not usually located in suburban, middle-class communities. Using middle-class teachers and students to create a model of what effective teaching is like very likely slights the needs of educators serving students from less privileged backgrounds. Another problem with this study, and with the idea of balanced instruction in general, is that that Wharton-McDonald et al fail to explain (or even suggest) how effective reading teachers become good at what they do. Good and poor teachers alike can combine skills-based and

instructional methods—especially when methods are vaguely defined, when there is little information on the scope of basic skills instruction, and when teacher knowledge about the structure of language is as limited as other studies of teacher knowledge have suggested.

Cunningham, Perry, Stanovich, and Stanovich (2004) surveyed teacher knowledge in three areas of children's literature, phonemic awareness, and phonics, and probed teachers' calibration of their knowledge. By calibration, these authors mean teachers' awareness of "what they do and do not know." Calibration of knowledge is thought to be important because individuals who are well calibrated in their knowledge know where they lack knowledge and when they need support or improvement. The authors of this study surveyed 722 kindergarten through third grade teachers, measuring their knowledge and asking the teachers to classify themselves as being inexperienced, minimally skilled, proficient, or expert in each area of knowledge.

In terms of teacher knowledge, this study supports Moats's (1995) and Mather et al's (2001) assertions that many teachers are lacking in the basic knowledge that is important for teaching reading. Twenty percent of their participants were not able to get any of the items correct on a phoneme segmentation task, and only 30% were able to segment at least half of the words correctly. When the authors examined teachers' performance on individual items of the segmentation task, they found that teachers seemed to focus on spellings as opposed to sounds. For example, a common mistake was to count the sound most commonly made by the letter x as one sound instead of two (e.g. /*ks*/). This type of mistake, according to the authors, displays a lack of pedagogical knowledge because beginning readers have little orthographic knowledge and must

develop and use their knowledge of speech sounds in order to master the code of written language. The teachers also performed poorly in the area of phonics, where just 28% answered more than half of a series of questions about explicit phonics rules correctly, and just 11% were able to identify which words had having irregular spellings in a list of common words. This latter finding, the authors believe, is a significant problem because it indicates that teachers cannot tell which words need to be taught as sight words and which words can be decoded according to regular phonics rules. With regard to children's literature, data suggest that teachers may be lacking knowledge in this area, as well; only 10% of their participants were able to recognize a majority of children's book titles in a titles recognition task.

Teachers' calibration of their knowledge differed according to the three areas. In terms of phonemic awareness, the teachers who classified themselves as being proficient or expert actually had lower scores on the segmentation task than did teachers who classified themselves as being inexperienced or minimally skilled. For phonics, there was no relationship between teachers' knowledge and their self-ratings in either explicit or implicit phonics. In literature, however, teachers exhibited some calibration; those who believed themselves to be proficient or expert did perform significantly better on the titles recognition task than did those who believed themselves to be less proficient.

This study also probed the roles of experience and credentials on teachers' knowledge and calibration. To explore the role of experience, the authors extracted two groups from their sample, representing the least and most experienced teachers. The first group was comprised of teachers who had between zero and three years of experience, and the second group, of teachers who had more than 15 years of experience. The less-

experienced teachers had higher levels of knowledge in both phonemic awareness and phonics, perhaps, the authors suggest, reflecting the effect that recent empirical research has had upon teacher education. These less-experienced teachers also rated themselves as being more knowledgeable in all three areas.

Two different groups of teachers were constructed in order to analyze the role of teacher credentials. In this case, those teachers who had "full and clear" (p. 158) credentials were compared to those who had no credentials or some other type of credential (for example, emergency or temporary teacher certification). These comparisons revealed that the uncredentialed teachers were more likely to rate themselves as being proficient or highly skilled in all three areas. Surprisingly, in terms of knowledge, these two groups differed only in terms of knowledge of literature, in which the credentialed teachers had higher levels of knowledge than their otherwise credentialed counterparts. These results call into question the credentialing processes for teachers. As the authors note, many of the teacher participants admitted "that they had not received any training surrounding the complexity of consonant and vowel sounds in their credentialing program" (p. 153).

This study is an important departure from earlier studies of teacher knowledge because it presents teacher knowledge as a more complex body and prioritizes knowledge that is held as important in both whole language and basic skills perspectives on reading education. The analyses of teacher experience and credentials, moreover, broach some important questions about teacher education and certification practices. These authors also confirm what Moats and others have suggested about teacher linguistic knowledge—that is, that it is severely lacking—and suggest that the same may be true of teachers

knowledge of children's literature. An important follow-up to this study and to other studies that outline deficits in teacher knowledge might address what kinds of knowledge teachers do have and how they apply knowledge to their work. This might be achieved by accessing teachers' on-task thinking.

In their study of teacher knowledge, Walker and Roskos (1994) focus specifically on the development of teachers' knowledge through a particular learning experience—a reading diagnosis course that involved readings, interactive activities, and after school tutoring sessions with elementary school students. The goal of this study was to build on the work of Black and Ammon (1992) and Kitchener and King (1990), who have suggested that teachers "may move over time from the view that knowledge about teaching is gained by passively receiving it toward the view that knowledge is actively constructed" (Walker and Roskos, 1994, p. 60). The participants were 122 preservice teachers at two institutions of higher education—a public college serving "nontraditional" students in a rural area, and a private university "comprised of middle- and upper-class students" (p. 61).

At the outset and at the conclusion of a reading diagnosis course, Walker and Roskos (1994) asked preservice teachers to analyze a case study of a struggling reader and describe what they would do to support this students' literacy development. They coded teachers' pre- and posttest responses to these prompts by using a schema created by Belenky, Clinchy, Goldberger, and Tarule (1986) for understanding "women's ways of knowing." The idea behind the work of Belenky et al is that learners of all types can benefit from knowing how they know what they know. Belenky and her colleagues propose separate stages or "ways of knowing," each reflecting a different source and

orientation of knowledge, and moving from passive, received ways of knowing, to more constructed, active epistemologies. The first stage or category, according to Belenky et al, involves knowledge that is "received." Walker and Roskos coded teachers' comments that either had no specific source or referred to an expert or authority as being of this received or passive orientation. Statements such as "Whole language is a good idea," or "I would have the school psychologist evaluate them," fell into this category (p. 63). The second stage in Belenky et al's schema is concerned with subjective knowing, or knowing that involves personal sources of information. Walker and Roskos placed comments that revealed held assumptions about one or more learners or the use of intuition or emotion in this category. Examples reflecting this type of knowledge orientation include, "I choose the approach I do mainly because I feel Jamie needs it," and "When something is right, you feel it is personally right" (p. 63). The third stage of knowing involves procedural knowledge, or a more situated ability to make informed decisions. Walker and Roskos coded comments that referred to facts or observations about students drawn directly from the case study and specific teaching or diagnostic methods that they had had been exposed to through the class as being procedural.

The results of this study show that the knowledge of these preservice teachers changed as a result of their participation in the reading diagnosis course. Compared to their original analyses and recommendations, participants generally had more to say after having completed the course. Pretest analyses yielded a total of 2,896 comments coded as units of meaning, while posttest analyses yielded a total of 3,365 comments—about four additional comments per teacher. The orientation of comments also shifted. At the beginning of the course 22.3% of the teachers' comments were coded as received

knowledge, 60.6% were coded as being subjective, and only 16.9% reflected procedural knowledge. At the conclusion of the course, however, only 12.5% of the teachers' comments fell into the received category, 33.4% were in the subjective category, and 53.8% were coded as procedural. Most interesting about these data is the authors' observation that after completing the course, teachers were more likely to base their analyses of case studies on "observed data" rather than on unreferenced beliefs about learners and their reading failure. The authors also surveyed the teachers about what parts of the course content influenced their thinking the most, and teachers felt that learning about the reading process, diagnostic practices, and instructional techniques were most influential.

The main limitation of this study is that it is bound to the context of a specific course, and the particulars of this context—teachers, students, time, and place—hence limiting its generalizability. This study makes an important contribution, however, by documenting cognitive change and the kind of impact it can have on teachers' thinking and problem solving skills. Moreover, the method that Walker and Roskos used to depict teachers' thinking serves as an interesting and useful model of how teachers' knowledge evolves with educational and practical experiences.

Another important topic in the research on teacher knowledge addresses the connections between knowledge, teaching and student achievement. In their study of novice teachers, Spear-Swerling and Brucker (2004) showed very clearly how teachers' who were tutored in English word structure not only outperformed controls on measures of linguistic knowledge, but were also able to enhance their students' performance on measures of basic reading and spelling skills. These authors argue that knowledge of

English word structure is an important component of teacher knowledge in the area of reading and should be included in teacher preparation programs.

In a similar vein, Piasta, Connor, Fishman, and Morrison (2009), examined the complexities of the relationships between teacher knowledge, instructional time, and student achievement. In their study, neither teacher knowledge nor time spent on explicit instruction predicted student outcomes. However, an interaction between teacher knowledge and time spent on explicit decoding instruction significantly predicted student scores on a word reading task. Further challenging the process product model for research on teaching, these authors found that time spent on decoding instruction was actually associated with poorer outcomes for students of teachers with lower levels of knowledge, while the reverse was true for students of teachers with higher levels of linguistic knowledge. These authors suggest that the teaching of reading could be improved first by increasing teachers' knowledge of linguistic qualities of written English; prescribing what they should teach and for how long might not be as effective.

While these recent studies on teacher knowledge in the area of reading broach the importance of linguistic knowledge for teachers of reading, neither describes the link between linguistic knowledge and the teachers' use of this knowledge in practice. Both studies adhere to the process-product model in the sense that they focus on formulas for student gains—albeit via the enhancement of teacher knowledge—as opposed to attending to the complex learning process that exists between teacher and learner.

Multisensory Methods of Reading Instruction

Multisensory (MS) methods of teaching reading such as the Orton-Gillingham method, the Spalding method, and the Wilson method, take as central to the reading

process the connections between sounds and the letters that represent them. Although there has not been a great deal of research on any one specific program, the elements of MS programs (attention to sound-symbol correspondence, decoding, and phonics) have all been shown to improve reading in dyslexic elementary school students (Birsh, 1999). The basic idea behind MS teaching is that when students use more than one sense to map sounds onto letters, they strengthen these connections, and gain proficiency and fluency with printed language. MS teaching involves the use of listening, moving, and speaking as means of internalizing the complex code of written English in order to achieve a level of automatization necessary to decode text. For example, in an MS reading class, students would learn to associate sounds with the various ways that they are spelled in English. They would also associate the shapes of letters with the sound and the kinesthetic sense of writing and saying those letters.

Teachers who learn to teach in this way spend a great deal of time working with the phonemes that make up the English language and the many ways in which they can be spelled. Having participated in such a course, it is this author's belief that instruction in MS methods helps teachers to see written or printed language from the point of view of the beginning reader and to more clearly understand the tasks of both teacher and learner in the beginning reading situation. Moreover, because they take as central to the teaching of reading the graphic representations of sounds in English, a course in any of the three methods mentioned would cover the same linguistic content—how approximately 70 single or multiple letter combinations are used to spell the 45 commonly used phonemes of English. The goals of both the pilot and the study proposed here are to assess the impact of MS training on teachers' linguistic knowledge, the ways that they think about

errors that beginning readers make, and their ideas about the teaching and remediation of beginning readers.

Conclusions

The ongoing debate over how best to teach reading has colored much of the research on teacher knowledge and its impact on instruction. Unfortunately, findings that serve the debate often tell us little about how effective teachers come to know their craft, or how researchers might forge better working relationships with teachers. In spite of this, research on teachers' linguistic knowledge, conducted by those who believe that explicit instruction in letter-sound correspondences is important for beginning reading, has emerged as the most coherent research program in the area of literacy instruction. Research on teachers' linguistic knowledge coincides with Shulman's (1987) notion that research on teaching needs to be conducted in specific subject areas, and that both content and pedagogical content knowledge in these subject areas will serve as important areas of inquiry for our emergent understanding of teaching as a set of complex cognitive skills. One potential shortcoming of this research agenda stems from the fact that linguistic knowledge is not the only kind of content knowledge that teachers of reading need in order to promote students' literacy. The teaching of reading comprehension, writing, and creative use of language certainly involves different kinds of content knowledge.

Pilot Study

The pilot study described here sought to extend the work of McCutchen et al (2002) by studying how in-service teachers who have received training in a multisensory method of reading instruction might differ from in-service teachers who have not

received this training. Teachers were recorded as they talked about some of the difficulties that beginning readers often have and planned instruction and review for students they observed in a video. This study also examined teacher background variables such as years of experience, type and level of education, and familiarity with popular children's literature. Data consisted of written surveys and transcripts of teachers' oral responses to questions about two segments of a video that each featured one child reading orally with a teacher.

The data were used to test several hypotheses. First, it was hypothesized that teachers who were trained in an MS method would have higher levels of linguistic knowledge, as measured by Mather et al's (2001) *Teacher Knowledge Assessment: Structure of Language* (TKASL). The idea that training in an MS teaching method enhances linguistic knowledge is based on the fact that this type of teacher training consists of teachers' activating and enhancing their knowledge of phonemes and phoneme representation in English orthography.

It was also hypothesized that teachers who had received MS training would produce more detailed explanations of reading difficulty than would untrained teachers. Level of detail of explanations was measured by the number of specific comments made by teachers in their responses to the video. Comments that were classified as specific were those in which teachers recalled particular reading behaviors of the children in the video. Similarly, it was hypothesized that trained teachers would suggest a greater number of strategies for review and/or remediation than would untrained teachers. While these ideas are new to the study of the teaching of reading, they were drawn directly from Shulman's (1986) idea of pedagogical content knowledge, according to which the

knowledge base that teachers use combines explicit knowledge of the subject matter—in this case linguistic knowledge of English phonology and orthography—with a version of that knowledge that is prepared for the learner. In this sense, these two hypotheses extend the work of Moats (1995) and Mather et al (2001) who measure explicit linguistic knowledge, but do not illustrate how teachers apply this knowledge to their teaching. Asking teachers to discuss teaching and remediation in light of a specific student, it was thought, would provide evidence for the value of linguistic knowledge in the form of teaching strategies and increased attention to sound-symbol correspondences.

This pilot study also addressed some questions of particular interest from a whole language perspective. None of the three previous studies most closely related to this study (i.e., Moats, 1995; Mather et al, 2001; and McCutchen et al, 2002) addressed the role of knowledge of children's literature in the teaching of reading. This issue was taken up in the pilot. Knowledge of children's literature was measured by a checklist based on the Children's Titles Checklist (Senechal, Lefevre, Hudson, & Lawson, 1996). With regard to these data, it was hypothesized that years of teaching experience would relate positively to scores on the titles checklist. Relationships between familiarity with children's titles and other variables were also examined.

Furthermore, the pilot sought to explore how MS training relates to the number of strengths and weaknesses identified by teachers as they interpreted information about the reader seen in the video. Johnston et al (1995) found that teachers oriented toward whole language were more likely to focus on strengths while teachers oriented toward basic reading skills were more critical of their students and focused on deficiencies rather than

strengths. If MS trained teachers are more skills oriented, then we would expect them to focus more on deficiencies than untrained teachers.

The participants in the pilot were six first grade teachers. All of the participants were females. Three were recruited from a local organization that offers teacher enrichment courses based on the Orton-Gillingham method of teaching reading, and one of these three was an instructor of an MS methods course at this organization. The teaching experience of these teachers ranged from 8 to 19 years, and all three had masters' degrees in education. Three additional first-grade teachers were recruited through word of mouth. Two of these teachers had two years of teaching experience, and the third had only one full year of teaching behind her. The two more experienced of these teachers had earned masters' degrees, and the third intended to begin her graduate work the following autumn. One of the two teachers holding a master's degree had also taken an Orton Gillingham-based course in reading education as part of the Teach for America Program. This was unexpected and provided greater variety among teachers in this study. While the original plan for the pilot study was to compare trained and untrained teachers, because three distinguishable groups presented themselves, teachers with no training, teachers who received training in the past year, and teachers who received training more than one year ago were compared on the various dependent measures. Characteristics of the six teachers are reported in Table 1.

Table 1: Education, Experience and Training of Pilot Study Teachers

Teacher	Degrees	Years of experience	OG
A	B.A. Elementary Education	1	No
B	B.A. English with Elementary Concentration and Middle School Extension M.A. Reading Education	2	No
C	B.A. Fine Arts M.A. Elementary Education	8	Yes
D	B.A. Psychology M.A. Early Childhood Education	19	Yes
E	B.A. Art History and Italian M.A. Elementary Education	2	Yes
F	B.A. Early Childhood Education M.A. Early Childhood and Elementary Education	10	Yes*

- Teacher of an Orton-Gillingham based teacher enrichment course.

Measures used in the pilot included three surveys and a series of prompts that were used with the video. A background survey adopted from Langenthal's (2004) written questionnaire for first-grade teachers assessed the teachers' educational, professional, and language backgrounds, with special attention paid to the number of undergraduate and graduate courses that teachers took in reading education, and whether those courses focused on or sought to develop the teachers' linguistic or structural knowledge of English and literature (Appendix A). The second survey used in the pilot was Mather et al's (2001) Teacher Knowledge Assessment: Structure of Language, a measure of linguistic knowledge consisting of 22 multiple-choice items (Appendix B).

Teachers' knowledge of children's literature was measured by the titles checklist adapted from Senechal et al's (1996) measure (Appendix C).

The video segments to which teachers responded were taken from *An Observation Survey* (2000), a video by Clay, Todd-Wynn, Macky, and Koefoed and produced by the Reading Recovery Council of New Zealand. This video features teachers demonstrating the use of Marie Clay's (2002) *An Observation Survey of Early Literacy Achievement*—a set of tasks commonly used to assess children's reading achievement. Two approximately five-minute sections were chosen as stimuli for this study. Both segments focus on oral storybook reading, but each features a different child (Aidan and Chris) working with a different teacher and a separate set of three storybooks of increasing difficulty. The use of this video as stimulus was piloted with two first-grade teachers in 2004, and it was discovered, then, that these two segments offered teachers more interpretable information about reading achievement than did other segments of the video. After viewing each segment, teachers responded orally to five questions created to access both pedagogical knowledge about learning processes in reading and their in situ decision making processes. These questions are listed in Table 2.

Table 2: Video Prompts Used in the Pilot

1. Recount for me what you saw in this segment of the video.
2. How far do you think this child has progressed in learning how to read?
3. Describe any problems you think this child is having or will have in learning how to read.
4. How would you help this child advance in reading, or how would you remediate problems?
5. Is there enough information here to make this kind of assessment? If not, what more would you like or need to know about this child?

Quantitative data from the background survey and scores from the TKASL and titles checklist were entered into SPSS, and teachers' responses to the question prompts were transcribed. After an initial review by the author, transcripts of teachers' responses to all five prompts were coded in a number of different ways. First, individual statements in the transcripts were coded. Statements were defined as complete thoughts, similar to but not always corresponding to complete sentences. Statements that were repeated or that were almost identical to statements that preceded them were marked with a number two or higher to indicate the number of repetitions. Each statement was then coded in a number of ways by two coders.

First, each coder decided whether the statement provided general or specific information. General statements were those that referred to the child but did not refer to any specific behaviors. Examples of general comments include, "He had trouble," and "He's pretty advanced for first grade." Specific comments were those that recalled the child's behaviors as he interacted with the text. Examples of specific comments include, "It was 'asleep' and he was saying 'sleeping,'" and "Like, whenever it would say 'tiger,' he would say 'he.'" Some comments did not fit into either of these categories, and these were marked as "other." An example of this type of comment is, "A lot of the kids I teach, actually all of the kids that I teach, are bilingual." These comments generally did not pertain directly to the teachers' analysis of the problem at hand, and were therefore dropped from the analysis. The author and a second coder agreed on the category in which statements belonged 91.6% of the time.[2]

[2] This figure is based on the calculation of inter-coder agreement on one transcript. The number of statements that were agreed upon was divided by the total number of statements in the transcript.

Next, statements from the transcripts were coded as containing or not containing a teaching or remediation strategy. The coders agreed on the classification of statements as teaching or remediation strategies 88.1% of the time. Examples of statements that contained teaching strategies are "I would give him more books on an easier level . . ." and "He needs review of short vowels sounds." Finally, the coders classified statements that indicated either strengths or weaknesses of the young reader. Only those instances in which teachers clearly expressed their feelings or beliefs about the behavior as positive or negative in terms of reading achievement were included in this coding scheme. An example of a positive comment is, "He's . . . looking at picture cues, which is a really good strategy for learners." An example of a negative comment is, "The problem that I'm seeing is that he's not looking at the initial consonant of the word." An example of a comment that does not qualify as either positive or negative is, "He was doing a lot of picture searches." Intercoder agreement was slightly lower for this scheme—78.4%.

Results for the TKASL, Children's Titles Checklist, and totals for the various coded variables are reported in Table 3. Four of the teachers (three who were recruited from an enrichment program and one who had participated in Teach for America) had been exposed to an MS teacher training program and two teachers had not received this training. The sample size was small, hence precluding statistical analyses comparing the three groups. However teachers with MS training appeared to differ substantially from teachers without this training in several respects. Trained teachers scored higher on the TKASL. In fact, every score of the trained teachers was higher than any score of the untrained teachers. These findings support the hypothesis that trained teachers possessed high linguistic knowledge (see Table 3).

Table 3: Results for the Pilot Study

Training	No MST		MST: Past		MST: Recent	
Teacher	A	B	C	D	E	F
Degree	B.A	M.A.	M.A.	M.A.	M.A.	M.A.
TKASL	9	12	14	16	16	17
Titles Checklist	7	8	7	11	15	13
Specific Comments	1	3	2	3	18	7
Ratio of sound-symbol/total strategies	0/4 0%	2/6 33%	4/6 67%	1/2 50%	3/8 38%	6/8 75%
Strengths	7	4	3	5	9	5
Weaknesses	3	3	4	6	13	10

MST: Multisensory Training
TKASL: Teacher Knowledge Assessment: Structure of Language

As evident in Table 3, trained teachers tended to be more familiar with children's books than untrained teachers (i.e., range of scores = 7 to 15 for trained teachers vs. 7 to 8 for untrained teachers, max = 50), indicating that they had greater familiarity with children's literature. This could have resulted however, not from training, but from teachers' years of teaching experience which favored the trained over the untrained teachers.

The majority of trained teachers (i.e., 3 out of 4) recommended sound-symbol strategies to help children with their word decoding problems more times (i.e., numbers ranging from 3 to 6) than the untrained teachers recommended (i.e., numbers ranging from 0 to 2). (See Table 3.) This suggests that MS training made teachers more aware of the value of phonics instruction.

Based on Johnston et al.'s (1995) research, it was expected that MS trained teachers would qualify as being more skills oriented and hence would focus more on students' reading deficiencies than on their strengths in contrast to teachers not trained in this method. All six teachers identified several strengths (ranging from 3 to 9 among teachers with MS training and from 4 to 7 among those with no training). Comparison of the proportions of comments that referred to strengths and weaknesses in Table 3 reveals that all four MS trained teachers identified a greater proportion of weaknesses than strengths, whereas the two untrained teachers produced a greater proportion of strengths than weaknesses. This supports the hypothesis about trained teachers' inclination to note student weaknesses. The question of what teachers do with information about students' weaknesses is an important one: are they simply reflecting negatively on students or using this information to diagnose difficulty and strategize for more effective teaching on the individual level?

Findings bearing on some of the hypotheses were inadequate to draw any conclusions, mainly because of the small sample size. No conclusion could be drawn regarding the relationship between MS training and the amount of detail that teachers provided in explaining children's reading difficulties, or between training and the number of strategies that teachers indicated they would use in teaching children.

The four trained teachers differed with respect to when they had received their training, with two having current or very recent exposure to the MS method, and two having experienced the program in the past. This led to a comparison of three groups: teachers who had no exposure to MS teaching methods, teachers who had exposure more than one year ago, and teachers who had recent (less than one year) exposure to

multisensory teaching methods. Although the numbers are small, some of the differences observed are suggestive and provoke questions about the longevity of effects of the teacher training program.

As evident in Table 3, the two teachers with the most recent experience showed equivalent if not higher scores than all of the other teachers on several measures: linguistic knowledge, title recognition, number of specific comments, total number of strategies to be taught to the children, and number of weaknesses detected in students' reading. Scores of the other two teachers whose training had occurred in the past showed lower scores in the number of specific comments, the number of strategies to be taught, and the number of weaknesses detected in students. This indicates that knowledge and use of MS training to reason about children's reading problems and how to treat them may be most active and rich in teachers who are currently or were very recently involved in learning about and using the MS method. The purpose of the present study was to replicate and extend findings of the pilot study.

While training in MS methods of teaching reading seems to be an effective way of increasing teachers' linguistic knowledge, important questions about how linguistic knowledge changes teachers' thinking, how much linguistic knowledge teachers need, and how this knowledge can be maintained remain unanswered. The delineation of a pedagogical content knowledge for the subject area of reading would depend upon this information.

In this small-scale study, teachers who had recent exposure to MS methods training had higher levels of linguistic knowledge. Although results were stronger for teachers who had participated in the training more recently, teachers who had training

were also better able to recall specific reading behaviors of the children featured in the videos and to use these recollections in their analyses of the child's overall reading achievement when compared to teachers who had not undergone this training. Specifically, teachers who had training seemed to pick up on weaknesses in students' reading and to use these as a starting point for further instruction. Trained teachers were also more likely to recommend teaching strategies that involved the direct instruction of sound-symbol correspondences. These results suggest, albeit inconclusively, that teachers who have higher levels of linguistic knowledge are better able to interpret errors or other reading behaviors in light of what is required linguistically of children as they learn to read and are, perhaps, better able to serve those children. Unfortunately, teachers who studied MS methods more than one year ago performed more like those teachers who had had no MS training at all.

To the question of how much linguistic knowledge teachers need, the answer may be "a great deal." As qualitative analyses revealed, only teacher F, who herself was a teacher of the MS course, made clear connections between reading behaviors, generalizations, and ideas for remediation. For example, while all but teacher A noted specific problems with Aidan's decoding, only teacher F included direct instruction in sound-symbol relationships as a means of improving the child's decoding. The most popular strategy among these teachers for dealing with Aidan's shortcoming was to ask him to go back over the text and read more slowly with the hope that he would recognize his errors. But a child who is just learning how to read may or may not have the knowledge necessary to find his or her own errors, and only teacher F addressed this need.

The pilot study also called into question the meaningfulness of comparing whole language, balanced literacy, and direct instruction orientations of teachers. Traditional delineations among the different philosophical orientations—knowledge of children's literature, focus on decoding errors, or focus on comprehension—were blurred here. The present data suggested that teachers who have high linguistic knowledge also tend to have high familiarity with children's literature. Teachers in this study expressed concern for children's proficiency in both decoding and comprehension of written language without privileging one or the other. In fact, teachers E and F, who emerged as the most expert of the six participants, displayed more concern and clearer ideas about remediation for both decoding and comprehension than did any of the other teachers. They also had the highest scores on both the TKASL and the Children's Titles Checklist.

The idea of delineating a pedagogical content knowledge for teachers of first-grade reading, then, presents itself again. What do teachers need to know about the subject matter, what do they need to know about learners, and how are these fields of knowledge applied in practice? In light of the teachers observed here, a few things come to mind. First, based on the problems that teachers identified, a large part of early reading seems to consist of achieving successful decoding and developing a repertoire of sight words. Word reading skill is a fundamental component of learning to read. Even though proficient adult readers rarely access their decoding skills, teachers of early reading have a special need for thorough and complete knowledge of English phonemes and graphemes. Moreover, teachers need to know where their children stand in relation to mastery of this body of information or code. Presumably, many teachers do obtain this type of information through working with their students, but curricula, materials, and

measures that enable teachers to help children master sound-symbol correspondences and word reading skill are essential.

Finally, in spite of the emphasis placed upon teachers' linguistic knowledge here, this study suggests that linguistic knowledge is actually just one part, albeit an important one, of the complex network of knowledge and skills that teachers develop. Fluency, comprehension, confidence, and the development of a sight word vocabulary, to name a few, are also areas that warrant further inquiry in terms of both teaching and learning.

Dissertation Study

The goal of the present study was to contribute to the research on teacher cognition in the subject area of reading. As Shulman (1986) and others have suggested, teachers' knowledge of specific subject areas and the ways in which they prepare and apply this knowledge are important means of bringing research and practice together and effecting improvement in teacher preparation, instruction, and academic outcomes. In the present study, the tension between the whole language and basic skills perspectives on the teaching of elementary reading was recognized and questions asked by researchers of both orientations were addressed. Studies by Moats (1995), Mather et al (2001), McCutchen et al (2002) have begun to outline the relationship between teachers' linguistic knowledge and what is known, scientifically, about how literacy is acquired by learners. Findings from these studies reveal the importance of linguistic knowledge—particularly the knowledge of how letters represent sounds in the English orthography—for teachers of reading. Therefore, in the present study research on teachers' linguistic knowledge was considered to be central to its theme and methodology. The specific

ways in which the current study built upon this area of research are outlined in the following paragraphs.

The quasi-experiment of McCutchen et al (2002) demonstrated that a two-week training course on phonology in reading instruction increased teachers' linguistic knowledge and the amount of time teachers spent on code-based instruction in their classrooms. Measures of reading achievement also showed that students of teachers in the experimental group made greater gains in reading skills than students of control group teachers. Using Mather et al's (2001) TKASL as a measure of linguistic knowledge, a pilot of the present study found a substantial difference in the level of linguistic knowledge of teachers who were trained in a multisensory (MS) teaching methods course compared to teachers who had had no such training. A secondary finding of this pilot was that teachers who had been exposed to MS training courses recently (less than one year prior to participation) scored higher than teachers who had been exposed to courses less recently. Given the small number of participants in the pilot (N=6), replication of the findings was attempted with a larger number of participants (N=24) in the dissertation study. While the comparison of trained and untrained teachers served as means of probing the efficacy of MS methods courses for developing linguistic knowledge in teachers, a second comparison of recently-trained and less-recently trained teachers opened the analysis to questions about whether multisensory training changes teacher thinking over time. The hypotheses tested were:

1.) Teachers who have been trained in an MS methods course will have higher levels of linguistic knowledge than teachers who have not received this training.

2.) Teachers who have recent exposure to training in MS methods will have higher levels of linguistic knowledge than teachers who have taken MS methods courses more than one year ago.

Based on findings of the pilot, a third hypothesis concerned the relationship between training and the number of comments that teachers make regarding the children's specific reading behaviors:

3.) It is expected that trained teachers will recall more details from the video than untrained teachers will.

In their study of pre- and in-service teachers, Mather et al (2001) found that many teachers not only lacked basic linguistic knowledge of English and phonemic awareness, but also held misconceptions about many of the practices that are supported by empirical research on reading. One finding was that the teaching of letter-sound relationships outside of the context of meaningful text (phonics) was viewed negatively by more than half of the teachers who were surveyed by Mather et al. This finding is surprising in light of the amount of research that demonstrates the importance of knowledge of sound symbol correspondences in beginning reading. It raises two important questions: Are teachers afforded sufficient opportunity to learn about the linguistic aspects of literacy in their education and training? Would teachers' attitudes about phonics change as a result of enhanced linguistic knowledge?

In the pilot of the present study, teacher participants watched two video clips of beginning readers reading aloud with their teachers, and they responded to a series of prompts that were designed to tap into their on-task thinking. In their responses to questions about how they might help these children advance in reading, teachers who had

participated in MS methods training suggested decontextualized, direct instruction of sound-symbol correspondences as a means of instructing these students more often than untrained teachers. This tendency suggests that MS training provided teachers with a better understanding of the usefulness of such instruction.

The present study further explored teachers' opinions and use of direct instruction of sound-symbol correspondences. Participants watched the same two video clips and then responded to a set of prompts that were refined to probe more specifically the teachers' interpretation of errors, diagnosis of difficulty, and strategies for remediation. Three of the more general questions that were used in the pilot were followed by three new questions that focused on a specific error that each child was observed to make. The two errors upon which the prompts focused were chosen because they were the ones that most often elicited teaching strategies from the teachers in the pilot. In each case, teachers were asked to interpret the error and to explain if and why they believed the error might be indicative of reading difficulty. Finally, teachers were asked to describe how they might help the child avoid making such errors in the future. Using both general and specific questions about reading performance allowed teachers greater opportunity than they were afforded in the pilot to explain their thinking about reading difficulty and remediation.

Responses to the video prompts were scored using a strategies checklist developed from the pilot responses. Strategies that teachers suggested in the pilot were listed and categorized as either offering or not offering direct instruction of sound-symbol correspondences and were further categorized as utilizing oral reading, writing, whole-word recognition, meaning, or other techniques to enable reading. This new measure (see

Table 4) enabled the quantification of both teachers' resourcefulness (how many ways might they approach teaching) and their willingness to teach or review letter-sound correspondences with beginning readers. Checklist scores were used to test the hypothesis that MS training will lead teachers to recommend instruction in letter-sound correspondences more often in response to prompts than untrained teachers. This finding would suggest that enhanced linguistic knowledge arising from MS training increases teachers' awareness of and willingness to use direct instruction, constituting an important connection between subject matter knowledge and the ways in which teachers think about transmitting this knowledge to young learners.

Table 4: Checklist of Teaching Strategies for Coding Responses

Type of strategy and definition	Examples
Sound-symbol strategies • Involve the use of letter sounds to decode words.	• Teach blends • Teach suffixes • Teach the long vowel-silent e pattern • Go over the sounding out of cvc words.
Meaning-based strategies • Use literature, story and context as a means of teaching reading.	• Make predictions about text/words in text • Remind child to look at pictures. • Expose student to more books
Writing strategies • Use writing exercises to form connections between oral and written forms of words.	• Ask child to write out a word he doesn't know. • Have the child do air writing of unfamiliar sounds.
Oral reading strategies • Use the oral reading of texts to teach reading	• Coach students on fluency. • Engage in shared or round-robin reading. • Model slower or faster reading.
Whole word strategies • Focus on identification of whole printed words.	• Make and use flashcards • Ask him to find words on a page • Teach sight words
Other strategies • Strategies that do not qualify for any of the above categories.	• Ask the child to self-monitor • Give him easier books • Have him pre-read quietly before reading aloud

Mather et al's Teacher Perceptions Toward Early Reading and Spelling (TPERS) was administered to the participants of this study as a means of clarifying the relationship between teacher training, knowledge, and perspective on teaching practice. The TPERS (see appendix D) consists of 25 statements that exemplify either the basic-skills or whole language perspectives toward reading acquisition. Teachers were asked to rate each item on a scale of one (strongly disagree) to six (strongly agree). Each teacher received four separate scores indicating their levels of approval and disapproval of whole language and basic skills practices. These data were used to probe the question of whether or not teachers' theoretical orientation plays a role in the kinds of strategies they recommend for the students in the video. The hypothesis tested was that the MS trained teachers will show higher approval of basic skills instruction than the untrained teachers who may show higher approval of whole language practices.

In the pilot of this study, a second measure of teacher knowledge was used to assess teacher's familiarity with children's literature—the cornerstone of whole language instruction. The rationale behind the use of this measure in the pilot was to show that orientations toward basic-skills and literature are not polar opposites, and that the commitment to basic skills versus literature is more the creation of researchers and others in higher education than it is a reality for teachers of elementary reading themselves. In the pilot, this measure distinguished trained from untrained teachers, suggesting that teachers' knowledge is not specialized in either basic-skills or children's literature. This analysis was also replicated here, using Cunningham et al's (2004) newer measure of teachers' familiarity with children's literature. These data allowed exploration of

questions about how knowledge of literature relates to theoretical orientation and teaching strategies.

A final question about theoretical orientation that has concerned researchers and that was addressed by this study is how one's orientation toward the teaching of reading might affect the kinds of judgments and emphases that teachers place on children as they learn to read and how those judgments and emphases might be used in planning instruction and review. The study by Johnston et al (1995), found that teachers who were oriented toward basic-skills methods were more critical of their students than were teachers who embraced whole language as their philosophy of reading education, making more negative comments about students' reading than did teachers of whole language orientation. Their assertions were at least partially supported by the pilot; teachers trained in MS methods made more negative than positive comments about the children in the video whereas untrained teachers made more positive than negative comments about the children's reading. In the pilot, comments were judged by two coders to be positive or negative when teachers clearly denoted elements of a child's reading to be either a strength or a problem to the child's progress in reading. Further analysis of these positive and negative comments indicated that teachers who had been trained in MS methods made better use of information from the video in their suggestions for teaching strategies. In most cases, MS trained teachers picked up on more of the children's errors, used these errors to think constructively about specific shortcomings or gaps in the child's knowledge or skills for reading, and suggested instruction that would remediate these problem areas.

In the present study, teachers' responses to the first three general prompts (those prompts given prior to the questions about each child's specific error) were coded for teachers' recognition of strengths and weaknesses of each child's reading. These data were used to analyze relationships between teachers' use of children's specific errors and shortcomings to plan appropriate remediation.

In summary, the present study addressed several questions about teacher cognition in reading education by testing several hypotheses about the differences between trained and untrained teachers who participated in this study. First, it was hypothesized that teachers who had been trained in an MS method would show higher levels of linguistic knowledge, and that those teachers with more recent exposure to MS training would have higher levels of linguistic knowledge than those teachers who were trained less recently. It was also expected that trained teachers would recall more details from the video than untrained teachers, and that trained teachers would recommend instruction in letter-sound correspondences more often than untrained teachers. Finally, it was hypothesized that trained teachers would convey higher levels of approval for basic skills instruction, and that they would make more negative comments than untrained teachers. Broader questions about the relationships between knowledge, theoretical orientation, the types of comments that teachers make, and the types of strategies that teachers recommend were also addressed.

CHAPTER III

Method

Participants

Twenty-four first-grade teachers were recruited by fliers emailed to elementary schools and organizations that offer courses in MS training, and through word-of-mouth. Four organizations that offer courses in MS methods in the Northeast were located and contacted via the internet and all agreed to post or forward the recruitment flier to participating teachers. Teachers who responded to the invitation to participate were selected on a first-come-first-served basis and on the basis of their level of multisensory training. Several of the participants were also able to refer teachers who had appropriate levels of training to the study. Three separate groups of teachers were formed: teachers who had no training in multisensory methods (n=8), teachers who received multisensory training within the past year (n=8), and teachers who received multisensory training more than one year ago (n=8). Because of the specific requirements with regard to recent and less recent training, and because of scheduling difficulties (most teachers were only able to participate on weekends), recruitment of participants took several months. Teachers were paid $100 for their participation, which took approximately two hours.

The participants were 23 women and one man who taught first-grade at public or private schools in urban and suburban schools in the Northeast. The participants' average age was 37. The average number of years teaching at the first grade level was five, and the average number of years of total teaching experience was 8.83. Nine of the teacher participants had majored in education as undergraduates. Twenty-one of the teachers had achieved masters' degrees in education, with the remaining three teachers pursuing

graduate degrees in education at the time of data collection. (See Table 5 for a summary of this information.) In their graduate studies, participants reported taking an average of six reading education courses. Thirteen teachers reported participating in ongoing professional education or communities for continued learning.

Table5: Teacher Experience, Education, and Tasks

	No training (N = 8)	Recent Training (N = 8)	Trained more than one year ago (N = 8)	Mean	F (21)
Years at first grade	4.75 (4.10)	3.62 (2.62)	6.62 (6.02)	5.00 (4.45)	.92 (ns)
Total years of teaching	9.88 (9.72)	7.38 (5.78)	9.25 (7.59)	8.83 (7.59)	.22 (ns)
Total reading courses	6.88 (5.14)	8.38 (7.31)	14.12 (7.12)	9.79 (7.07)	2.69 (ns)
Graduate reading courses	3.38 (3.20)	4.88 (3.40)	10.25* (5.29)	6.17 (4.92)	6.30**
Phonics courses	0.88 (0.99)	1.25 (1.75)	1.88 (1.64)	1.33 (1.49)	.91 (ns)
Children's literature courses	1.38 (0.74)	1.38 (1.60)	2.13 (1.81)	1.63 (1.44)	.71 (ns)
Linguistics courses	1.00 (1.07)	0.75 (0.89)	1.50 (.93)	1.08 (0.97)	1.26 (ns)
Assessment courses	0.75 (0.71)	1.88 (1.81)	1.63 (1.06)	1.41 (1.32)	1.71 (ns)
Disability courses	1.50 (1.93)	1.38 (0.92)	3.75 (3.01)	2.21 (2.32)	3.15 (ns)
Literature-based methods courses	0.88 (1.13)	1.38 (1.77)	2.00 (1.31)	1.42 (1.44)	1.25 (ns)
Linguistic knowledge	17.38 (2.26)	16.13 (3.60)	18.25 (1.67)	17.25 (2.67)	1.3 (ns)
Children's titles (35 max)	20.24 (5.87)	24.13 (5.46)	21.38 (5.83)	22.00 (5.72)	1.00 (ns)

**Significantly greater than untrained or recently trained teachers at $p < .01$.

"ns" denotes comparison as not significant

With regard to their linguistic background, all teacher participants reported English as their first language. Nine of the 24 teachers reported speaking one other language, and one teacher reported speaking two other languages. These languages included French, Spanish and Hebrew, and all of the teachers reported learning these languages in high school, college, or after school programs (e.g. Hebrew school). There were no significant differences between groups in terms of additional spoken languages. Similarly, nine of the 24 teachers reported the ability to read and/or write one other language and one teacher reported the ability to read and/or write three additional languages. These languages included French, Spanish and Hebrew, and all of the teachers reported learning these languages in high school, college, or after school programs. There were no significant differences between groups in terms of literacy in other languages.

Measures and Materials

Participants completed several tasks administered in the following order: background survey, test of linguistic knowledge, survey of reading instruction orientation, test of knowledge of children's literature, and video prompts.

Background Survey. Teachers completed a background survey that addressed their educational, professional, and general language backgrounds. This survey was based upon Langenthal's (2004) written questionnaire for first-grade teachers. Special attention was given to the number of undergraduate and graduate courses that teachers took in reading education, and whether those courses focused on or sought to develop linguistic or structural knowledge of English. The survey also asked about teachers' professional experience and their perceived effectiveness as reading teachers. This survey is presented in Appendix A.

Test of Linguistic Knowledge. The Teacher Knowledge Assessment: Structure of Language test (Mather et al, 2001) consisted of 22 multiple-choice items and was administered to participants as a measure of their linguistic knowledge. This measure focused on knowledge of phonology and phonological linguistic terms, orthographic rules, and instructional terminology relating to the teaching of letter-sound correspondences. The authors reported a reliability coefficient of .83 (Cronbach's alpha) for this measure. The TKASL was scored by counting the number of items answered correctly. This measure is reprinted in Appendix B.

Instructional Orientation. Participants responded to the Teacher Perceptions Toward Early Reading and Spelling (TPERS). Originally created by Deford (1985), this measure was used by Mather et al (2001) to survey of teachers' orientation toward whole language and basic skills practices in reading instruction. Reprinted in Appendix D, each of the 25 items consisted of a statement with which teachers were asked to disagree or agree on a scale of one to four. Twenty items represented ideas associated with basic skills and five of the items consisted of ideas commonly associated with whole language. For this measure, teachers were given four separate scores for their levels of agreement and disagreement with basic skills and whole language practices. For their agreement with basic skills, teachers were given one point for agreement, two points for strong agreement and no points if they indicated disagreement, creating raw scores that could range between zero and 40 on this portion of the measure. Raw scores were calculated the same way for disagreement with basic skills; teachers were given one point for disagreement, two points for strong disagreement, and no points if they had agreed with the item. Scores for agreement and disagreement with whole language were calculated in

the same manner, although the smaller number of items created raw scores that ranged from zero to ten. Raw scores for basic skills were later scaled to ten for ease of comparison, with scores of ten indicating the strongest agreement or disagreement with the ideas represented. Mather et al reported this measure to have a reliability of .74 (Cronbach's alpha).

Knowledge of Children's Literature. Cunningham et al's (2004) Title Recognition Test (TRT) was created for use with elementary teachers of grades one through three, this test was piloted and refined by the authors (Cunningham & Stanovich, 1990, 1991; Stanovich & West. 1989). The measure consisted of 35 titles and 15 foils. Teachers were asked to check those titles that they recognized as titles of children's books. The TRT took about five minutes to administer, and it was scored by totaling the number of titles and subtracting the number of foils that each teacher checked. Cunningham et al reported the measure's reliability to be .86 (Cronbach's alpha). This measure is reprinted in Appendix E.

Video and Prompts. Portions of *An Observation Survey* (2000), a video by Clay, Todd-Wynn, Macky, and Koefoed and produced by the Reading Recovery Council of New Zealand (2000) were used as a stimulus. After an extensive search of educational and instructional videos of teachers and children in first-grade reading settings, this video was chosen for its clear portrayal of students and teachers in one-one-one interactions with oral reading. This video featured teachers demonstrating the use of Marie Clay's (2002) *An Observation Survey of Early Literacy Achievement*—a set of tasks commonly used to assess children's reading achievement. Two approximately five-minute sections were chosen based on the information they offered and on the responses of the teachers

who participated in the pilot study. Both selections focused on oral storybook reading, but each featured a different child (Aidan and Chris) working with a different teacher and a separate set of three storybooks.

A set of prompts was used to elicit responses after the teachers watched each segment of the video. The prompts are presented in Table 6. These were a refined version of the prompts used in the pilot of this study. The questions asked the teachers for general responses to the children's reading as well as comments about specific errors that the children made in the video. Teachers' responses to the prompts were recorded and transcribed for coding.

The author and one additional coder, who was blind to the identity of the participants, worked independently to code all of the transcripts according to three separate schemes. The first coding scheme involved designating each comment made by teachers as either general or specific. Examples of general comments include, "He had a hard time with that story," and "He seemed frustrated." Specific comments were those that recalled the child's behaviors as he interacted with the text. Examples of specific comments include, "It was 'asleep' and he was saying 'sleeping,'" and "He clearly didn't look at the letters, he just said, 'cock-a-doodle-doo." Some comments did not fit into either of these categories, and these were marked as "other." An example of this type of comment is, "A lot of the kids I teach, actually all of the kids that I teach, are bilingual." These comments generally did not pertain directly to the teachers' analyses of the problem at hand, and were therefore dropped from the analysis. The author and a second coder agreed on the category in which statements belonged 93% of the time,[3] and in cases

[3] Intercoder agreement was calculated by dividing the number of agreed-upon statements by the total number of statements and multiplying by 100.

of disagreement, the coders discussed and came to an agreement upon how each comment should be classified. The numbers of general and specific comments made by each teacher were totaled and entered into the SPSS database.

For the second coding scheme, the two coders highlighted each teaching strategy suggested in response to any of the six prompts. Teaching strategies were defined as instruction or activities that have the specific purpose of teaching the child something about reading or helping the child to discover something about reading. Suggestions that were aimed evaluating or diagnosing a child's reading ability or disability were not counted as teaching strategies. The coders then used the checklist of strategies (see Table 4) to classify each strategy into one of six categories that were created based on the teacher responses in the pilot of this study. These categories are sound symbol strategies, meaning-based strategies, writing strategies, oral reading strategies, whole word strategies, and other types of strategies. Definitions and examples of each category are provided in Table 4, and a comprehensive list of the actual strategies that teachers recommended is provided in Appendix F. Each teacher received a score for the total number of strategies and the strategies falling into each of the six categories, and scores were entered into the database. Intercoder reliability for the identification of strategies was 97.5%. The coders agreed upon the classification of strategies 89% of the time, and resolved discrepancies by discussing the criteria.

Table 6 : Video Prompts Used in the Present Study

<table>
<tr><td colspan="2">General Prompts</td></tr>
<tr><td colspan="2">1. Recount for me what you saw in this segment of the video.</td></tr>
<tr><td colspan="2">2. Describe any problems you think this child is having or will have in learning how to read.</td></tr>
<tr><td colspan="2">3. How would you help this child advance in reading, or how would you remediate problems?</td></tr>
<tr><td colspan="2">Specific prompts</td></tr>
<tr><td>Segment 1: Aidan</td><td>Segment 2: Chris</td></tr>
<tr><td>4. Aidan makes reads the printed word “asleep” as “sleeping.” Can you interpret this error or explain why he may have done this?</td><td>4. In this segment, Chris is unable to read the word “blackberry,” and his teacher identifies it for him. On a subsequent page, he was unable to identify the same word. Can you interpret this error or explain why Chris may have done this?</td></tr>
<tr><td>5. Do you think this error is indicative of a reading problem or difficulty?</td><td>5. Do you think this error is indicative of a reading problem or difficulty?</td></tr>
<tr><td>6. What would you do to help this child avoid making similar mistakes in the future?</td><td>6. What would you do to help Chris avoid making similar mistakes in the future?</td></tr>
</table>

The third coding scheme involved the discrimination of the strengths and weaknesses that teachers reported seeing in the children in the video. Only those instances in which teachers clearly expressed their feelings or beliefs about the behavior as positive or negative in terms of reading achievement were included in this coding scheme. An example of a positive comment is, "He's . . . looking at picture cues, which is a really good strategy for learners." An example of a negative comment is, "The problem that I'm seeing is that he's not looking at the initial consonant of the word." An example of a comment that does not qualify as either positive or negative is, "He was doing a lot of picture searches." Strengths and weaknesses were highlighted in separate colors, and the number of strengths and weaknesses that each teacher noted were counted and entered into the SPSS database. For this scheme, intercoder agreement was 91.4%, and disagreements were resolved through discussion.

Procedures

The investigator met with teachers individually to administer the tasks in a video equipped room at the Graduate Center. Sessions were usually scheduled on Saturdays or Sundays in order to accommodate teachers' work schedules. Teachers were met at the entrance of the building and escorted to and from the room where the session took place. Each session lasted between 90 and 120 minutes, depending on the length of the teachers' responses and the amount of time it took them to complete the surveys. After completing the five separate tasks, teachers were paid and the investigator offered to answer questions about the study, the materials used, and how the participants' responses would be used in the study. All of the teachers were cooperative and expressed interest in the study and its implications for their work. Many expressed concern about the correctness

of their responses on the Teacher Knowledge Assessment. In these cases, correct answers were discussed with the teachers, and they were assured that their performance on the measure would not reflect on them personally, as their participation in the study was entirely anonymous.

Design and Data Analysis

The primary goal of data analysis was to examine whether differences were detected among the three groups of teachers in terms of linguistic knowledge, theoretical orientation, familiarity with titles, and responses to the video prompts. Analyses of variance were used to compare the means of the three groups. In cases of significant differences between the groups, the LSD post hoc procedure was used to test whether mean performance differed significantly between groups.

A secondary goal of data analysis was to investigate relationships among continuous variables. Correlations between measures were calculated, including different types of courses that the teachers had taken, their linguistic knowledge, theoretical orientation, familiarity with titles, and responses to the video prompts. Also, trends in the responses to the video prompts were further investigated. The different types of comments that teachers made were analyzed qualitatively as a way of delving into teachers' thinking. Particular emphasis was placed on the formulation of teaching strategies and the kinds of comments and observations that supported the formulation of teaching strategies.

CHAPTER IV

Results

Background Survey

Results of the background survey were used to determine whether the three training groups differed in their teaching experience and education (see Table 5). There were no significant differences between the three groups of teachers in terms of total years of teaching and years of teaching first grade. Similarly, the groups showed no significant differences in the total number of reading education courses taken in their undergraduate programs, or in the total number of courses in phonics, children's literature, linguistics, assessment, disability, or literature-based methods courses. The total number of graduate reading courses, however, was significantly larger for the group trained more than one year ago. At the time of participation, all of the trained teachers in the study had completed master's degrees, while only 62% of the untrained teachers had completed master's degrees.

Linguistic Knowledge

With a total of 21 items on the Teacher Knowledge Assessment, the scores for all participants ranged from 10 to 20. ANOVA revealed that there were no significant differences between the three groups on total mean scores or on any individual item. Teachers' mean scores were relatively high, ranging from 73% to 83%, indicating substantial linguistic knowledge. Results do not support the hypothesis that trained teachers possessed greater linguistic knowledge than untrained teachers.

All of the teacher participants answered item eleven, which asks how many speech sounds are in the word *box*, incorrectly. While the correct answer to the question

is four, all but two of the teachers guessed that there were only three speech sounds in the word box. One teacher in the untrained group guessed that there were two speech sounds in box, and one teacher in the recently trained group guessed that the word contained only one speech sound.

The next most-commonly missed items were items five, 12, and 16, which were each answered incorrectly by nine of the 24 teachers. Item five asks teachers to "count the speech sounds in consonant group *str*." (The correct answer is three.) Five of the eight untrained teachers were unable to do this, while two recently trained and two less recently trained teachers also missed the question. Seven of the nine teachers who missed this question guessed that the consonant group contained only two speech sounds. The remaining two errors were made by untrained teachers who guessed that "str" contained only one speech sound. Similarly, item 12 asked teachers to "count the speech sounds in the word *grass*." The correct answer to this item is four, and only one of the teachers in the group that was trained more than a year ago answered this item incorrectly, while four of the teachers trained recently and four of the untrained teachers answered incorrectly. Similarly, all of the teachers counted fewer speech sounds than there actually were; all but one of the erring teachers reported three sounds, with one recently trained teacher guessing that "grass" contained only one speech sound.

Item sixteen asked the teachers to choose among the terms *phonics, phonemics, orthography* and *phonetics* as the correct term for "a reading method that focuses on the application of speech sounds to letters." (Phonics is the correct answer.) Only two of the untrained teachers missed this item, while four of the recently trained teachers and three of the less recently trained teachers also answered incorrectly. The most common error

for this item was the response “a or d,” which represents phonemics or phonetics. Six of the nine teachers guessed “a or d,” with one untrained teacher guessing phonetics was the correct answer, and one each of the recently and less recently trained teachers guessing that phonemics was correct.

Analysis of teacher responses to individual items indicates that, despite relatively high mean scores, some items on this measure presented difficulties to teachers in each of the three groups. When asked to count speech sounds in words or groups of letters, the teachers’ errors always tended toward under counting the sounds, perhaps in a way that is adaptive to spelling patterns of English orthography. These results also confirm the absence of support for the hypothesis favoring trained teachers.

Teacher Perceptions Toward Early Reading and Spelling (Mather et al, 2001)

Group means and test statistics for the TPERS are shown in Table 7. Results do not support the hypothesis that teachers who were trained in multisensory methods would show higher approval for basic skills methods. The group of teachers trained more than one year ago showed a slightly lower level of agreement with whole language than did the other two groups and this comparison approached significance ($p<.10$). Overall, however, the teachers who participated in this study had higher levels of approval for basic skills than they did for whole language practices. With a maximum score of 10 indicating the highest level of approval, the teachers’ average level of approval for basic skills was 6.3, whereas their average level of approval for whole language was 2.19. Conversely, as a group the teachers’ level of disagreement with basic skills was low—0.87—while their disagreement with whole language was somewhat higher at 3.33. These trends differ from those found in the pilot study, indicating that first grade

teachers' opinions may have shifted toward basic skills as effective means of teaching reading in the approximately three years between conduct of the pilot and the dissertation study.

Table 7: Group Means on the TPERS

	Untrained	Recently Trained	Trained more than one year ago	All teachers	F (21)	Sig.
Agreement with basic skills	5.97 (0.65)	6.44 (1.48)	6.50 (2.23)	6.30 (1.54)	0.267	.77
Disagreement with basic skills	0.78 (.84)	1.03 (1.62)	0.81 (0.80)	0.87 (1.11)	0.112	.90
Agreement with whole language	2.63 (1.51)	2.50 (0.93)	1.44 (0.82)	2.19 (1.21)	2.69	.09
Disagreement with whole language	2.88 (1.13)	3.13 (1.73)	4.00 (1.60)	3.33 (1.52)	1.23	.31

Note: Raw scores scaled to ten, indicating highest possible level of agreement or disagreement. There were eight participants in each group.

Survey of Children's Titles

Teachers' scores on the Survey of Children's Titles ranged from 12 to 33 (maximum of 35), with an overall participant mean of 22. As evident in Table 5, differences between groups were not significant. These results do not replicate those in the pilot study where it was found that MS trained teachers had greater knowledge of children's literature than untrained teachers.

The survey scores were also subjected to correlational analyses as a means of detecting relationships between familiarity with literature and other variables. These statistics are reported in Table 8. Title checklist scores were found to correlate

significantly with only two variables. A significant correlation was found between the titles score and the number of assessment courses that teachers had taken (r = .41, p < .05). A significant negative correlation was also found between the title scores and the number of disability courses that teachers had taken (r = -.46, p < .05). Since knowledge of titles and both assessment and disability courses do not seem logically related, these correlations may have occurred by chance. In addition, because 22 correlation coefficients were calculated and tested at p < .05, one of these correlations could emerge as significant by chance.

Table 8: Titles Checklist Correlations

Variable	Pearson Correlation	Sig.
Total reading courses	-.15	ns
Phonics courses	-.05	ns
Literature courses	-.31	ns
Linguistics courses	-.34	ns
Assessment courses	.41*	.05
Disability courses	-.46*	.03
Courses in literature-based approaches	.07	ns
Teacher Knowledge Assessment	-.10	ns
Agreement with basic skills	-.18	ns
Disagreement with basic skills	.08	ns
Agreement with whole language	-.04	ns
Disagreement with whole language	-.12	ns
General comments	.32	ns
Specific comments	.34	ns
Total strategies	.31	ns
Sound-symbol strategies	-.01	ns
Whole word strategies	.07	ns
Oral reading strategies	.22	ns
Meaning-based strategies	.18	ns
Writing strategies	-.01	ns
Positive comments	.17	ns
Negative comments	.22	ns

Note. *p< .05; ns: not statistically significant. There were 24 participants.

Video and Prompts

Teachers viewed the two videos and following each were prompted to discuss what they had seen. Their responses to the six prompts (see prompts in table 5) were transcribed and coded. The number of responses in the various categories were summed. Mean performance is shown in Table 9 where it is apparent that the three groups of teachers did not differ significantly in the number of general comments that they made about the students in the video. They did, however, differ significantly in terms of the number of specific comments that they recalled about the students. Post hoc tests revealed that the two trained groups of teachers each made significantly more specific comments on average than the untrained teachers made, but that the average numbers of specific comments made by the two trained groups were not statistically different from one another.

Similarly, the three groups differed significantly in the number of strategies mentioned. Post hoc tests revealed that the two groups of trained teachers suggested significantly more teaching strategies in response to the video than did the untrained teachers. However, no significant difference was detected between the two trained groups (see table 9). Teachers' strategies were categorized according to the Strategies Checklist. As evident in Table 9, in five of the six categories, trained teachers suggested more strategies than untrained teachers. The exception to this trend was the category of meaning-based strategies, and in this case the untrained teachers' average was slightly higher than the recently trained teachers' average. Sound-symbol strategies were the most common type of strategies suggested by all three groups of teachers. Both groups of trained teachers identified, on average, a greater number of sound-symbol strategies

than the untrained group, but differences between groups were not significant in this case. Another notable point was that, overall, teachers produced fewer responses in the category of writing strategies than any other category, and untrained teachers, as a group, did not produce any strategies in this category.

Table 9: Results for the Video Prompts

	No Training	Recent Training	Training More than 1 year ago	F (21)	Post hoc	Percent reporting 0
General comments	10.0 (3.3)	12.5 (4.8)	9.50 (2.8)	1.48 (ns)		0
Specific comments	1.25 (1.4)	3.50 (1.9)	4.00 (2.1)	5.19 *	YT=RT>U	4%
Total strategies	9.00 (3.1)	12.50 (3.9)	13.38 (2.7)	4.02*	YT=RT>U	0
Sound symbol strategies	3.00 (2.0)	3.63 (1.3)	5.00 (2.3)	2.32 (ns)		4%
Whole word strategies	2.50 (1.6)	3.38 (1.7)	2.63 (1.6)	.68 (ns)		4%
Oral reading strategies	0.75 (0.9)	2.00 (2.0)	2.25 (2.0)	1.78 (ns)		29%
Meaning based strategies	0.75 (1.4)	0.38 (0.5)	1.25 (1.8)	.83 (ns)		58%
Writing strategies	0 (0)	0.25 (0.5)	0.25 (0.5)	1.17 (ns)		79%
Other strategies	1.75 (1.2)	2.88 (2.3)	2.00 (0.8)	1.17 (ns)		4%
Positive comments	2.25 (1.8)	2.38 (2.1)	2.25 (2.1)	.010 (ns)		21%
Negative comments	4.88 (3.2)	6.75 (2.4)	5.88 (3.0)	.84 (ns)		0

Note. *Differences between groups are statistically significant at $p<.05$

Teachers' transcripts were also coded for the number of positive and negative comments (the pointing out of students' strengths and weaknesses) that they made about the students in the video. The means for positive comments was approximately equal for

the three groups. The two groups of trained teachers made more negative comments about the students, but the differences between the three groups were not significant.

Correlational Analysis

Additional correlation coefficients were calculated among the remaining continuous variables. These include the numbers and types of courses taken by teachers, responses to questions on the background survey, scores on the TKA:SL and the TPERS, the numbers of different classifications of strategies, and the numbers of positive and negative comments that teachers made.

In table 10 the correlations among the numbers of different kinds of courses that teachers had taken and the other variables (the numbers of different kinds of courses that teachers had taken were not correlated with one another). Because of the large number of correlations calculated and the small number of participants in the study, only those correlations significant at $p \leq .01$ were considered significant. The total number of reading courses and the number of phonics courses that teachers had taken both correlated positively with teachers' measured disagreement of whole language ($r = .52$, $p = .01$ and $r = .60$, $p < .01$, respectively). Not surprisingly, the number of courses in literature-based approaches to reading that teachers took related positively to both their agreement with whole language ($r = .55$, $p = .01$) and the number of meaning-based strategies that they suggested in response to the prompts ($r = .50$, $p = .01$).

Table 10: Correlations for Types of Courses

	TKASL	Agreement with basic skills	Disagreement with basic skills	Agreement with whole language	Disagreement with whole language	Titles checklist	General comments	Specific comments
Total Reading courses	-.22	.14	-.26	-.32	*.52	-.15	.20	.07
Phonic courses	-.21	.22	-.26	-.19	*.60	-.05	.25	.16
Literature courses	-.27	-.03	-.08	-.11	.30	-.31	.21	-.31
Linguistics courses	-.21	.22	-.35	-.18	.24	-.34	-.1697	.00
Assessment courses	-.41	-.17	-.11	-.38	.38	.41	.45	.20
Disability courses	-.09	.02	-.16	-.05	.26	-.46	-.15	-.08
Literature-based approaches	-.04	.25	-.31	*.55	.07	.28	.08	.20

(continued) *$p \leq .01$. *There were 24 participants*

	Total strategies	Sound-symbol strategies	Whole word strategies	Oral reading strategies	Meaning-bases strategies	Writing strategies	Positive comments	Negative comments
Total reading courses	.03	.24	-.01	-.10	-.17	.13	-.04	-.23
Phonics courses	.18	.22	.21	-.02	-.09	.28	-.11	-.11
Literature courses	-.15	.15	-.14	-.29	-.22	-.04	-.05	-.17
Linguistics courses	-.17	-.02	-.41	.17	-.12	.31	-.01	-.34
Assessment courses	.11	.14	-.01	-.16	-.07	-.06	.24	-.04
Disability courses	-.08	.32	.01	-.23	-.19	-.09	-.15	-.30
Literature-based approaches	.03	.07	.16	-.04	*.50	-.11	-.04	-.04

*Note: *p ≤ .01 There were 24 participants*

Table 11: Correlations among other variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Total years teaching experience													
2. Years teaching at first grade	.67**												
3. Teacher Knowledge Assessment	-.06	.13											
4. Agreement with basic skills	.02	.12	.36										
5. Agreement with whole language	.03	.00	-.06	.05									
6. General comments	.12	.02	-.12	.09	-.02								
7. Specific comments	.04	-.01	.11	.09	-.47*	.24							
8. Total number of strategies	-.14	.15	.11	.19	.03	.30	.54**						
9. Whole word strategies	-.42*	-.34	.07	.08	-.01	.22	.29	.42*					
10. Oral reading strategies	-.28	-.07	.55**	.32	-.14	.03	.56**	.46*	-.01				
11. Meaning based strategies	-.03	.24	.05	-.26	.12	.08	.21	.52**	.22	.15			
12. Writing strategies	.06	.21	.09	.52**	-.07	-.02	-.04	.14	-.17	.28	-.01		
13. Positive comments	.62**	.50*	-.06	.24	-.15	.33	.30	.06	-.08	-.06	.11	-.13	
14. Negative comments	-.27	-.14	.12	-.18	.02	.48*	.48*	.59**	.35	.38	.50*	-.09	-.13

*Note: *p<.05, **p<.01. There were 24 participants.*

Correlations among the remaining variables are presented in Table 11. Variables excluded from the table include disagreement with basic skills philosophies and the number of sound symbol strategies, neither of which correlated significantly with any other variables included in the table. Disagreement with whole language philosophies was also excluded because its only significant correlation was a negative correlation with agreement with whole language philosophies. The number of sound symbol strategies recommended by teachers was excluded because these correlations were discussed in the results section about this measure.

Among the other variables, the two teacher experience variables related significantly to the number of positive comments that teachers made, with years at first grade correlating with positive comments at $r = .62$, $p < .01$ and total years of teaching correlating with positive comments at $r = .50$, $p = .01$, suggesting that the more experience a teacher may have the more he or she may focus on student strengths. Years at first grade also bore a significant negative relationship to the recommendation of whole word strategies ($r = -.42$, $p < .05$).

The numbers of specific comments and the number of negative comments that teachers made were the only two variables that related to the total number of strategies made by teachers. Specific comments was correlated with total strategies at $r = .54$, $p < .01$, while the number of negative comments that teachers made correlated with total strategies at $r = .59$, $p < .01$. In terms of strategy type, specific comments correlated positively with oral reading strategies, and negative comments correlated positively with meaning-based strategies. Specific comments and negative comments were also positively correlated with each other. Taken together, the relationships between

specificity, negative comments and the generation of strategies emerge as strongly connected elements of teachers' on-task thinking.

Qualitative Analysis

Careful reading of these transcripts reveals several tendencies among teachers that were not quantified in this study. The words that teachers choose, the reasoning they use when recommending teaching strategies, and their understanding of the child's perspective are rich in information about teacher thinking. The purpose of this section is to examine some of the qualitative aspects of the ways that teachers described reading and prescribed teaching for the students in the videos.

When considering elements of teacher thought that quantitative analysis might not have accurately measured or described, the issue of vocabulary figures prominently. As was the case is several studies that preceded this one (e.g. Moats, 1994), the teacher participants had limited knowledge of technical linguistics terms as measured by the TKA:SL. These results suggested that teachers lack knowledge about linguistic concepts that pertain to literacy education. In their transcripts, however, teachers expressed substantial knowledge of some important linguistic concepts, albeit using their own very practical terms. For example, in response to Aidan, the first child in the video, one recently-trained teacher who missed TKA:SL questions involving linguistic vocabulary said, "He had difficulty with the word 'cluck," [and] I would have him sound it out. I'm working with students like this now and we do a lot of tapping out of the letters to get the sounds to help them figure out the word." Another teacher who also missed some key questions about linguistic aspects of literacy told us that Chris, the second child in the video, "needs decoding skills to help [him] understand the job of letters within a word

and how they are used." These comments illustrate how pedagogical content knowledge of reading may differ from what researchers assess when they attempt to measure teacher knowledge. Expressions like "the job of letters" and techniques like "tapping out of the letters" are possibly more important to the everyday work of teaching reading than are the terms listed as multiple choices in the teacher knowledge survey.

The strategies formulated by teachers also revealed tendencies that were not quantified in this study, namely, the precise ways in which different types of coded comments were connected to teachers' strategies. While the prompts used in this study were not designed to elicit such connections in a clear way, there are many excellent examples that illustrate how teachers used information from the video to tailor their teaching plans. The following quotation contains two comments that were coded as specific and comes from a teacher who was a member of the recently-trained group:

> *[Chris] read 'where' at some points but at other points he didn't recognize the word. He recognized [it] in the beginning of sentences at some points when it was a question, but not at other times. He didn't' recognize it in the middle of sentences at all. He confused 'for' with 'after' or 'after' for 'for.'*

This teacher's observations were specific in that they pertained to two words that were misread one or more times by the child in the video. In the transcript, the teacher went on to use these specific comments to explain the problem she believed the child was having and proceeded with strategy formulation based on her current practice:

> *I think that maybe in terms of trying to decode the word, he didn't attempt it at all, or maybe he was trying to process it, but he couldn't' decode it. . . . If he recognizes it in the beginning and then a few lines later [is unable to]—maybe it's*

> *some sort of memory issue. I know that working memory is a big problem for a lot of my kids. Being able to hold that information and then being able to use that information to interpret other things at the same time. . . . I think he is a child who needs help with sight words*[4]*. I think that he is also a child who needs help using context clues and using visual information in the story. And then I think that basic decoding strategies would help him, you know, make the sound of the first, you know the beginning of the word, and then what would make sense. What are we already seeing in terms of sounds? Whenever I'm reading with my students, I don't give them the word automatically. First I tell them to tap it out which, you know, is a Wilson strategy. But if words can't be tapped out, then I give the word to them. So if the word is black, I would tell them to tap the first few letters b-l-a. And then I say, what would make sense in the story right now. So, it's a combination of sounding out the word and being able to connect that to the story.*

After describing what she saw, this teacher identified two problems quite clearly—the inability to recognize words, and the inability to decode words. She knew what needed to be addressed and how she would address it in her classroom.

Comments made by teachers in this study were also coded as being either negative or positive in tone, but close reading of the transcripts reveals that specific comments and negative comments often overlapped, communicating much of the same information, and connected to strategies in similar ways. For example, all of the teachers were questioned about Chris's inability to read the word "blackberries" after the teacher identified it for him in the text, and 19 of the 24 teachers responded with comments that were coded as negative, four teachers' comments were coded as specific, and one teachers' response was coded as general. All but three of the teachers, however, explained the error in similar ways and came up with strategies that fell into four general

[4] Earlier in the transcript, this teacher explains in detail how she uses a word wall and drills students on

categories to help Chris overcome this type of reading problem. These were a.) attending to first consonants, b.) chunking the longer word into parts, c.) reviewing color words, and d.) preteaching the word, with many teachers naming more than one strategy. The remaining three teachers did not produce any strategies for helping Chris with the "blackberry" problem, and these three teachers were in the untrained group. The characteristics for coding a comment as negative, then, might be seen as arbitrary, and the occurrence of negative comments might be an issue of personal style as opposed to teacher knowledge or skill. The significant correlation between negatively coded comments and strategies suggests that locating weaknesses may be an important part of teachers' work and a key to planning how and what will be taught.

Table 12 shows the responses of three untrained and three trained teachers and the strategies they suggest in response to the "blackberries" error. Comparison of their comments shows that the trained teachers' strategies were more closely tied to their observations, and they focused in on the remediation of a specific type of error.

Table 12: Comparison of observations and strategies of untrained and trained teachers

Observation	Strategies
Untrained	
It may have been a new word for his vocabulary. It may have been the first time he's seen it.	What I do is, when we read new books, I have the words that might come across, the new sight words or vocabulary words on index cards around the book. So the kids now we already reviewed them. When they come across them they see it and they match it. So they know that it's blackberries because it's right here and we talked about it as a new word.
This child may not have background knowledge. He may not be matching the picture with the word.	I would implant vocabulary when necessary and determine background knowledge and preteach things he didn't

their words each morning before their reading period.

	know.
My assumption would be that blackberries were unfamiliar to him. He may not have ever tried them so both the word and concept were new to him. My guess is that he would not have made the same error with a more common fruit like strawberries or apples.	I would preteach vocab words. I would also elicit his prior knowledge before reading by asking him if he had ever eaten a blackberry or gone to pick blackberries like the bear. This strategy can be used with new concepts in all books. It also helps comprehension.
Trained teachers	
He saw it the first time, and he remembered it. So he just remembered that the word was blackberries, but then when he got to it after reading a few words, he didn't have the short term memory to hold that word. It is a harder word, so it's not unexpected that he didn't know the word, but he's not looking at it in chunks. He probably knows the word black.	Talk about syllable types. Talk about maybe covering up berries so he could sound out black. Talk about how words are made of different syllables. Even with him, maybe go so far as if you see these letters together it makes the vowel short, because they are at the end of the word, so he's starting to sound out the words as opposed to just looking at it and guessing, which it seemed like he was doing.
Well, I noticed that, even within the book there were some words that he wasn't sure and the teacher pointed it out, and later on, I guess he couldn't hold it in his memory, so he forgot it, and he made a mistake and he said a different word. So it was similar to the blackberries. It's more like he's trying to read the words and not put the words together as a story. So he's trying to visually memorize what the words look like, and when he comes across them even through it might have been on the previous page that he was them, the word, he totally forgets it.	One of the strategies is that I would put the word in his word bank, so he would come across it more often. So if I were doing a warm up, he would se the word over and over again. Some of his words, like blackberries, that's a long word, so I would break it up. But also because that's a word that maybe he's seen before, in a book that he likes to read, then I would put it in his word bank so that it would be easier for him to read.
Chris was working so hard on every word trying to figure out what was going on. Also, there were quite a few words that began with the letter b. I think they were all getting all jumbled up in his head. Another reason was because he wasn't really reading or making any sort of connection to the word. Hew as just repeating what his teacher had said and not remembering the printed word.	Blackberries is a compound word, so I would first draw his attention to that. I would have him look through it and look for chunks he may know. I would also have him compare the word blackberries to another word beginning with b from the text so he can engage in a discourse comparing and contrasting words.

Another important qualitative aspect of the transcripts of the trained groups is a more detailed account of the child's thinking and experience of reading—the attempt to memorize words or the difficulty of tackling a longer, unfamiliar word in the midst of a story. One of the ways that multisensory training may change teachers' thinking, then, is by re-introducing some of the basic tasks that the reader is faced with and the ways in which these skills are acquired by children. For example, a teacher of the group that was trained more than a year ago talked about the blackberry error in broader terms of teaching reading and acknowledged the difficulty adults sometimes have in understanding children's reading difficulties:

> *Oh, he's going to make a connection and associate. . . . hopefully when he sees it again and again. Sometimes we expect the child to see it twice or three times and we expect them to get it. Not at this age. And just because they are not getting it after a couple of times doesn't mean they are dyslexic or having a reading disability. It just means that we have to build their ability to retain. And it's seeing it multiple times, in multiple different ways. You know, it's so funny, because some children need to see it in, like, different venues, and some children need it, like, spelled out. And we have to see what works for him and how he remembers it.*

This teacher's comment also reveals the complexity of teaching reading to a class of children who have varying strengths, weaknesses, and learning styles. Reaching each child in a different way takes time and planning that would seem to require a high level of expertise and flexibility on the part of the teacher.

An issue that ten of the 24 teachers recognized and incorporated into their formulation of strategies was Chris's "frustration" or "exhaustion"—a result of attempting to read a text that was, according to these teachers, beyond his reading level. (These comments are shown in Table 13 and a transcript of Chris's reading can be found

in Appendix G.) These observations and the teachers' discussion of them lend themselves to yet another aspect of pedagogical content knowledge that warrants attention—the teachers' awareness of the emotional and motivational state of the child and its impact on teaching. In the video, the second child, Chris, reads three books of increasing difficulty, and by the third book, according to several of the teacher participants, he experiences frustration. What is qualitatively important about these comments is that they illustrate how pedagogical content knowledge enables a fuller understanding of the student, not only in terms of what they do or do not know, but also in terms of students' affective responses and resulting motivation. Several of the teachers noted that they would have chosen to stop rather than have Chris experience frustration and self-perceived failure.

Dealing with the emotions of young learners is a skill that involves both knowledge of the subject matter (i.e. Does the child have the knowledge and skills required for this text?) as well as knowledge about students that is personal and developmental. When discussing Chris's difficulty, one of the teachers from the group that was trained more than one year ago explains how and why her responses to students' difficulty often vary depending on the individual:

> *Sometimes when a child is reading, it's a big thing—do we correct them right then and there, do we wait till after they're done. It's kind of like you have to go in the moment and you have to know the child, too. There are certain children, if you correct them right then and there and if it's one on one it's different than if it's in a group you know because you have to look at the child' s ego. Some kids will take that criticism and keep going. But reading is such an emotional experience, especially at this age. So I think knowing the child is very important.*

Table 13: Teacher Comments about Chris's Frustration

Untrained Teachers
Well, the body language. After he finished the second book, there was a sigh of relief. And the third one, he really struggled with. And it seemed like the skills were starting to deteriorate at the third book. . . . There were attentional issues. I think it was a level of fatigue that he was experiencing.
Recently Trained Teachers
He seemed to be getting a little frustrated, by the third book, and my first reaction to that was that it was too much to begin with, and by the end of the second book, it would have been my cue, possibly, to take a break. Because I could see right away when he started the third book that the attention was not where it needed to be. So, I sometimes like to take a quick break and do something else for a second and then we kind of come back and start again fresh. . . . I would rather a child have success in a shorter period of time than to make the sit there for a longer period of time and not be successful. Because then the next time they come back they're just not going to feel confident about their reading, which is what I've found with a lot of my kids.
I think that he was totally frustrated, I mean, in these last two books. He shouldn't have been reading them in my opinion, but what else can you do? You have to tell him because he wasn't going to get them. So, I don't know why he was reading this book because it has to be frustrating to miss 20% of the words, but I guess that's what you have to do.
He was . . . finding great difficulty. . . . I think, obviously, the last book was way too difficult for him and he needs to be working on a level less difficult, so he can be successful at applying three cuing systems together.
[It was] above his reading level so . . . it kind of seemed inappropriate.
Teachers Trained More Than One Year Ago
So, at the very end, he's not even connecting what he's saying to the book, which may be because he's really tired. That's a really difficult book. . . . I think I would start with easier texts and make sure that he has one to one matching and understands what reading is.
You could tell with his body language; he really lacked confidence. He knew that he was struggling. He knew that he was a struggling reader.
He definitely looked like he was exhausted from that. The second book for him, when he finished it, he looked like he was done. Like that third book was a push. It was exhausting, it wasn't coming naturally, he was really looking at the pictures.
I would have stopped at the end of that text because that text would have given me his instructional level. Making the poor child read through this difficult [third] text, you know, use your professional discretion. She did it, I would have said, "Ok, we're going to stop here." Because the poor guy, he went through and it was definitely too difficult for him. He's not here yet. You could tell his reading was laborious.
He's staying with the story, but it was really labored. The last b0ok was definitely too hard for him, and he had a lot of trouble with the decoding. And stamina—he just didn't have the stamina for that book. I think he probably couldn't wait for it to be over. I really felt for him.

CHAPTER V

Discussion

Hypotheses

This study compared three groups of teachers—teachers with no multisensory training, teachers with recent multisensory training, and teachers who received multisensory training more than one year ago—on a variety of measures that were expected to reveal ways in which they might differ in their approach children's reading difficulties. The first two hypotheses addressed the levels of linguistic knowledge of the three groups of teachers. It was expected that trained teachers would have higher levels of linguistic knowledge, as measured by Moats's Teacher Knowledge Assessment, and that recently trained teachers would have higher levels of linguistic knowledge than teachers who were trained more than one year ago. Neither hypothesis was tenable; differences between the three groups were not significant. It was also hypothesized that trained teachers would express stronger approval for the teaching of basic skills in early literacy, that trained teachers would recommend strategies that involved the teaching of sound-symbol correspondences more often than teachers who had not received any multisensory training, and that trained teachers would make more negative comments than untrained teachers would make. These hypotheses also proved to be untenable. As a group, however, the teachers in this study showed higher levels of approval for basic skills methods of teaching than they did for whole language methods. With a maximum score of ten, the average level of approval for basic skills of all teachers was 6.3, while the average level of approval for whole language practices was 2.19.

Taken together, these results suggest that multisensory training may not enhance teachers performance on measures of teacher knowledge such as the TKA:SL, which requires some knowledge of linguistic vocabulary. Also, multisensory training may not significantly alter teachers' opinions about how reading should be taught and raise their commitment to basic skills. The fact that all of the teachers showed greater support for basic skills than they did for whole language suggests that teachers are aware that basic skills are a necessary part of reading education in first grade; they do not need to be convinced of the value of phonics. When asked specifically about errors that the children in the video made, all of the teachers in this study recommended phonics instruction of some kind. Some used more technical terms like *phonics, blend* or *vowel sounds,* while others talked about reviewing specific sounds, letters or letter combinations. Others used child friendly terms like *sounding out* or, as was discussed earlier, "the job of letters in words." In sum, these teachers not only agreed in theory that phonics is an important part of the teaching of reading, but also agreed in practice that basic skills are the building blocks of reading skills. These results run counter to those of Mather et al (1992), who found teachers theoretical orientation to be misaligned with the existing research on teachers' opinions about basic skills instruction, and may represent a shift in teacher thinking over time.

In this study, the significant differences between trained and untrained teachers were located in their on-task thinking and problem solving. Data from this study supported the hypothesis that trained teachers would recall more details, as evidenced in the number of specific comments that they made, from the video than untrained teachers. In this case, the two groups of trained teachers outperformed the group of untrained

teachers, with no significant difference between the groups that were recently and less recently trained. This difference between trained and untrained teachers supports the idea that multisensory training enhances teachers understanding of what the early reader needs to accomplish thereby enabling them to become more sensitive in their observations of students.

Similarly, the hypothesis that trained teachers would produce more strategies in their responses to the video was supported. Trained teachers were able to come up with more teaching strategies than were untrained teachers, with no significant difference between the two trained groups. Moreover, qualitative analysis of the transcripts revealed that specific information (details) drawn from the video often informed the strategies that teachers created for the students in the video in meaningful ways. Taken together, these results suggest that multisensory training enhances teachers' ability to analyze what young readers do mentally as they approach the task of reading and to problem solve in ways that are appropriate to the needs of the individual reader. Since teacher knowledge has proven so difficult to measure and define, the paradigm presented here and in Table 12—that observations directly inform teaching strategies—may be a useful means of examining pedagogical content knowledge in the future. Because these observations and strategies were drawn from teachers' responses to a series of prompts about a video that they observed, it would be important to know if teachers' thinking follows this pattern when they are teaching in a classroom or when they are not presented with questions that might direct their thinking.

It was also hypothesized that teachers who had been trained in multisensory methods would make more negative comments than teachers who had not received any

training. Johnston et al (1995) found that teachers who were theoretically oriented toward basic skills focused on students' deficiencies rather than their strengths and made more negative comments about students than teachers oriented toward whole language made. In this study, the issue was reframed as one about teacher knowledge and it was hypothesized that teachers who had been trained in multisensory methods would point out more shortcomings than those who had not received the training. This hypothesis was rejected. There were no significant differences between the groups in the number of negative comments produced. Rather, it was found that teachers in all three groups used their negative comments to catalogue what the young readers lacked in terms of knowledge necessary for successful reading and to inform their decisions about teaching. The number of negative comments made by teachers correlated significantly (r=.59, p< .01) with the total number of strategies that teachers presented in their responses. In light of these results, theoretical orientation and the various ways it has been construed by researchers to influence teaching might be reconsidered. Comments that were negative or cognizant of shortcomings, in these transcripts, appeared to play an important role in teachers' problem solving and did not necessarily reflect negatively or pessimistically on the children in the video.

A final research question that was presented at the outset of this study addressed how teachers' familiarity with children's literature related to theoretical orientation and teaching strategies. To explore these relationships, correlations between teachers' scores on the Titles Checklist and other variables were calculated (see Table 8). With only two out of 22 correlations falling into the significant range at p<.05, these results suggest that

familiarity with children's literature has little to do with theoretical orientation and the ways that teachers strategize about teaching reading.

Measurements and Observations

With the hypotheses about linguistic knowledge untenable, it is important to consider the ways in which this variable was measured and whether its relationships to what teachers do is valid. Most of the teachers answered items on the TKA:SL that involved linguistic vocabulary incorrectly but revealed their understanding of some linguistic concepts quite clearly in their own words. For example, one of the most commonly missed questions on the TKA:SL in this study asked the teachers to distinguish between the terms *phonics, phonemics, orthography,* and *phonetics*. While these terms certainly represent concepts that are important to literacy, they are not words that teachers use or encounter in their daily practice, and it was not surprising that teachers who answered the question incorrectly were nevertheless adept at describing how they would help a child to sound out a word, review consonant sounds, or attend more carefully to the spelling of a difficult word.

The contrast between the results of the TKA:SL and the wide range of knowledge revealed in the transcripts suggests that what is understood about the pedagogical content knowledge of reading teachers has not yet been clearly delineated for the purpose of studying teaching. Moats (1995) and others who study teacher knowledge might reconsider the kinds of measures they use to assess teacher knowledge, perhaps using expert teachers to inform the development of new measures that take into account the context of teaching and the practical language of teachers. Researchers might also

consider the difference between measuring what teachers know and whether or not they are able to apply that knowledge to their work with children.

Additionally, these results call into question the importance of the distinction between teachers implicit and explicit knowledge of written English. Joshi et al (2009), found that teachers were lacking in the latter, which, they believe is necessary for both teachers and teacher educators. In this study, teachers demonstrated both the understanding and the ability to communicate knowledge about written English to children in spite of their lack of explicit, rule-based knowledge. This calls into question the importance of "explicit" knowledge for teachers, as the in-service teacher's understanding of concepts may be deeply embedded in his or her work with children. This idea may also account for some of the discrepant findings in the work of Cunnignham et al (2004), who found that teachers rated their own knowledge at much higher levels than they were able to perform on measures of teacher knowledge; teachers may have been rating their implicit knowledge or "know how," which was not reflected by their test scores.

Based on the results of this study, the use of video as a stimulus was an effective means of accessing teacher's pedagogical content knowledge and eliciting responses. The prompts that were developed for use with the video were useful in detecting important differences between trained and untrained teachers. With the technological advancements of recent years, video has become even more accessible and may become an important research tool in the future, as it allows teachers to see and hear students and enter into their on-task thought processes. Video assessments could be used to explore specific types of learning problems or teaching pitfalls, and teachers' responses could be

used to create new coding schemes or scoring rubrics. These kinds of measures would begin to allow for a more accurate description and explanation of teachers' pedagogical content knowledge in the area of reading.

Limitations

Several limitations of this study must also be addressed. First, with a sample size of 24, the study has low power; replication of these findings with larger groups of teachers would offer greater confidence in these findings. There were several hypotheses that were rejected here because differences between groups were small and statistically insignificant. I have argued that this is because researchers have created measures that do not tap into teacher thinking in meaningful ways, but these findings should be replicated as a means of supporting my conclusions. In the cases of the supported hypotheses—that trained teachers recalled more details from the video and produced more teaching strategies in their responses—larger samples would also provide greater support for these findings, leading to a greater understanding of what multisensory training offers teachers.

Because the training requirements for participation in this study were quite specific and because participation was on a purely voluntary, first-come first-served basis, the sample of teachers used here cannot be considered representative of the population of trained or untrained teachers. Future studies might select randomly from pools of trained and untrained teachers and control for other teacher knowledge variables such as education and years of experience, which may also have a strong influence on teacher knowledge. It should be duly noted that recruitment of teachers who fit the criteria for this study was time consuming, and that participation required teachers to take time out of their weekends for a small incentive of $100. As a result, most of the teachers

who did participate seemed to do so out of their own enthusiasm for teaching and interest in research on teaching methods. This interest was noted in teachers' correspondence with me and in their comments and questions about the study. While such enthusiasm is certainly appreciated, a study conducted with teachers who show less enthusiasm for their work and for research may yield somewhat different results. Enthusiasm for both work and research, then, may also be a teacher variable of interest in future research. Moreover, school variables such as SES, public/private and urban/suburban should also be considered, as these may affect the knowledge, skill and beliefs of teachers in the subject area of reading.

Finally, many correlations were calculated in this study as a means of exploring relationships between the variables that were measured, and some of the significant relationships probably occurred by chance. Correlational findings that warrant further study include the positive relationships between the numbers of specific and negative comments made by teachers with the total number of strategies that teachers produced. These findings may be of importance to the study of how teachers think and strategize about their work and support the paradigm of linking observations with teaching strategies.

Directions for Future Research

Taken together, the results of this research point toward a more complex interpretation of teacher knowledge than may have previously been acknowledged in the research on the teaching of reading. Not only is it important to measure what teachers know, but also to understand the ways that teachers use that knowledge as they approach their students' needs. The idea of pedagogical content knowledge incorporates

knowledge of subject matter, knowledge of learners, and the skills and processes involved in preparing information that is to be taught to the learner. In this study, teachers who were trained in multisensory methods of reading instruction demonstrated pedagogical content knowledge by making careful observations and offering instruction that was appropriate to the age and skill level of the learner. In doing so, teachers tapped into a body of pedagogical content knowledge that seems to be deeply embedded in the context of teaching and not easily extracted for the purpose of research. Their responses often referred to children and the kinds of difficulties they face as they learn to read as opposed to the technical or theoretical knowledge that researchers use to discuss teaching. Moving forward, it will be imperative to observe this knowledge in situ, and incorporate what we know about pedagogical content knowledge into our more general knowledge about literacy education. While research that is concerned with student outcomes is certainly important in the area of reading education, the depiction of a pedagogical content knowledge for reading teachers will eliminate some of the guesswork of the process-product research that has, until recently, served as the basis for what we know about the teaching of reading.

Specific recommendations for future research based on this study include further investigation of how teachers link observations to teaching strategies. While the teachers in this study gave many examples of how they tailor instruction to students' needs based on what they see and hear their students do, whether or not teachers think this way in real classrooms should be further investigated. New measures that assess how teachers strategize are needed, but should be developed using teachers' own language. Studies like those by Carreker et al (2010) assess teacher thinking in terms of strategy, but still

fall into the trap of offering teachers solutions in the form of multiple choices as opposed to asking teachers to generate responses based on their own knowledge and practice.

Another important area of research might concern teachers' understanding of the tasks of reading from the child's point of view. For the teachers in this study, multisensory training seemed to provide a window into the child's experience of literacy instruction and the challenges of reading. Their understanding of the early reader's struggles helped them to make decisions about how to proceed in their teaching. It would be important to understand how teachers come to understand students' needs in terms of knowledge, skills, and motivation. This type of research might also involve the use of video and teachers' explanations about their own decision-making processes in the classroom.

Finally, there is little known, empirically, about multisensory training for teachers of reading. Because it breaks written language down into a sequence of to-be-learned sounds and patterns, multisensory training may be particularly effective at filling in some of the gaps in teacher education both in terms of linguistic content and pedagogical content knowledge. Its efficacy on various populations and its effects on student learning warrant further research and discussion. With regard to teachers, one important question might be whether multisensory training is as successful with teachers who are required to participate in training as it is with teachers who chose to participate in training. Also, this study did not address the different types of multisensory training that are available to teachers and the different materials that are used in the teachers courses. These too may offer some important insight into how multisensory training enhances teachers' understanding of the reading process.

Implications for Practice

Beyond the obvious recommendation that training in multisensory methods of reading instruction be incorporated into teacher training, this study presents several ideas that are important to early reading instruction and teacher practice. The idea that teachers' skills are embedded in the act of teaching and in the language they use for teaching suggests that novice teachers—those who have little experience in the classroom—would benefit from in-classroom support. Opportunities to observe expert teachers in classrooms or consult with more experienced colleagues or mentors might help less experienced teachers to adapt declarative knowledge (i.e. what was learned in coursework) to the less predictable world of classroom practice. The teacher transcripts from this study also indicate that the most effective teaching requires a great deal of attention to the details of individual students' performance. Learning how to attend to and use errors in the formulation of teaching strategy, then, is another skill that would be important for novice teachers to develop.

Teachers in this study who were trained in multisensory methods also demonstrated greater understanding of and respect for the point of view of the child. Certainly knowledge of phonics (i.e. what needs to be learned in order to decode) but also practical knowledge of how to help children to surmount their difficulties in reading is important to successful teaching. This field of knowledge would include diagnostic, motivational and developmental knowledge of children. While multisensory training does not address these things explicitly, teachers in this study seemed more attuned to students' needs as learners.

Conclusion

This research yielded a mix of expected and unexpected results. While the teachers who were trained in multisensory methods did not exhibit enhanced linguistic knowledge, nor favor basic skills, nor produce more negative comments than untrained teachers, the trained teachers did respond to the videos in more specific ways and they did suggest a significantly greater number of teaching strategies in response to the video. Multisensory training methods, which build upon linguistic concepts and offer teachers insight into early reading processes, seem to enhance teachers' ability to extract important information from students' reading behaviors and to use this information in planning instruction. Qualitative differences between the trained and untrained groups showed that that the trained teachers in this study were better able to connect their observations to meaningful teaching strategies, although this aspect of teaching was not quantified in this study.

Perhaps the most important outcome relates not to the analysis of data but to methodology. A variety of measures were used in this study, and these included published tests, surveys, and transcripts that were coded in various ways. While the measures of linguistic knowledge and theoretical orientation yielded insignificant results in terms of group differences, the analysis of teachers' own words revealed pronounced differences in the responses of trained and untrained teachers. These results indicate the difficulty of quantifying and comparing what teachers do and the distance between existing quantitative research on teaching and the complexity of teacher thinking in the subject area of reading. In order for the study of pedagogical content knowledge in the

area of reading to move forward, new ways of assessing and quantifying what teachers do need to be created and validated.

Appendix A

Background Survey

Name: **Gender:** **F** **M**

Age: Under 30 **31-40** **40-50** **50-60** **60-70** **70+**

Undergraduate Education

1. From where and when did you receive your undergraduate degree?

2. What was your undergraduate major?

3. As well as you can remember, how many **undergraduate** reading education courses did you take in the following areas, and how much information about the teaching of reading did these courses offer you? Use the following chart to answer these questions.

Area	Number of courses	Titles of courses	Amount of information (0=no information to 4=valuable information)
Phonics			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Literature			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Structure of language/ linguistics/ English grammar			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

Assessment			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Reading disability			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Literature-based approach to reading instruction			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Other reading instruction methods			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

Comments:

Graduate Education

1. Do you have an advanced degree? If yes, from where, and when did you receive it, and what was your major/ area of concentration?

2. Did you complete a masters' thesis? What was the subject?

3. As well as you can remember, how many **graduate** reading education courses did you take in the following areas, and how much information about the teaching of reading did these courses offer you? Use the following chart to answer these questions.

Area	Number of courses	Titles of courses	Amount of information (0=none to 4=intense focus on this subject)
Phonics			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Literature			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Structure of language/ linguistics/ English grammar			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Assessment			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Disability			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
Literature-based approach to reading			0 1 2 3 4 0 1 2 3 4

instruction			0 1 2 3 4 0 1 2 3 4
Other reading instruction methods			0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

Comments:

Professional experience

1. For how long have you been teaching?
2. What grade(s) have you taught? For how long did you teach each grade level?
3. What is your current job and how long have you had this position?
4. Why did you choose to become a teacher?
5. Do you enjoy teaching reading? Why or why not?
6. Are you an effective teacher of reading and writing? Why or why not?
7. What experiences helped you learn to teach reading?

8. What role did your field experience or student teaching play in your learning to teach reading?
9. Are you currently involved in any in-service development programs or communities of learners?

Cultural-Linguistic Background

1. What is your first language?
2. Do you speak any languages other than English? If so, how did you learn this language(s)?

3. Do you read and/or write in any languages other than English? If so, how did you learn to read this language(s)?

Appendix B

Teacher Knowledge Assessment: Structure of Language (adapted from Mather, Bos, & Babur, 2001)

1. Which word contains a short vowel sound?

   a. treat b. start c. slip d. paw e. fool

2. A phoneme refers to

   a. a single letter b. a single speech sound c. a single unit of meaning d. grapheme

3. A pronounceable group of letters containing a vowel sound is a

   a. phoneme b. grapheme c. syllable d. morpheme

4. If *tife* were a word, the letter i would probably sound like the i in

   a. if b. beautiful c. find d. ceiling e. sing

5. How many separate sounds are pronounced in the consonant group *str*?

   a. one b. two c. three d. four

6. A schwa sound is found in the word

   a. cotton b. phoneme c. stopping d. preview e. grouping

7. In the word *coat*, the letters *oa* make how many separate sounds?

   a. one b. two c. three d. four

8. How many separate sounds do the letters *th* make in the word *think*?

   a. one b. two c. three d. four

9. How many separate sounds do the letters *th* make in the word *the*?

   a. one b. two c. three d. four

10. How many speech sounds are in the word *eight*?

    a. two b. three c. four d. five

11. How many speech sounds are in the word *box*?

    a. one b. two c. three d. four

12. How many speech sounds are in the word *grass*?

    a. two b. three c. four d. five

13. Why do many students confuse the sounds /b/ and /p/ or /f/ and /v/?

    a. Students are visually scanning the letters in a way that letters are misperceived.

    b. The students can't remember the letter sounds so they are randomly guessing.

    c. The speech sounds within each pair are produced in the same place and in the same way, but one is voiced and the other is not.

    d. The speech sounds within each pair are both voiced and produced in the back of the mouth.

14. What type of task would this be? "I am going to say a word and then I want you to break the word apart. Tell me each of the sounds in the word *dog*."

    a. blending b. rhyming c. segmentation d. manipulation

15. What type of task would this be? "I am going to say some sounds that will make one word when you put them together. What does /sh/ /oe/ say?"

    a. blending b. rhyming c. segmentation d. manipulation

16. A reading method that focuses on teaching the application of speech sounds to letters is called

    a. phonics b. phonemics c. orthography d. phonetics e. either a or d

17. Which of the following nonsense words best demonstrates the way *ck* is used in English?

    a. zock b. zocke c. ckazem d. zeckes

18. Count the number of syllables in the word *unbelievable*.

    a. 4 b. 5 c. 6 d. 7

19. Count the number of syllables in the word *pies.*

    a. 1 b. 2 c. 3 d. 4

20. If you say the word, and then reverse the order of the sounds, *ice* would be:

    a. easy b. sea c. size d. sigh

21. If you say the word, and then reverse the order of the sounds, *enough* would be:

    a. fun b. phone c. funny d. one

Appendix C
Children's Books Title Checklist
Adapted from Senechal, LeFevre, Hudson, & Lawson (1996)

The following is a list of titles of children's books that are appropriate for use with elementary school children. Some of these are actually the titles of popular books, and some are made up. Please read the titles and put a check next to the ones that you know. Please do not guess.

1. Just Me and My Dad ___
2. Go Dog Go ___
3. Scuffy the Tugboat ___
4. Terry Toad ___
5. Alligator Pie ___
6. Worry No Longer ___
7. Clarissa's Patch ___
8. Jelly Belly ___
9. Caps for Sale ___
10. Where the Wild Things Are ___
11. Happy Birthday Moon ___
12. Franklin in the Dark ___
13. Farmer Joe's Hot Day ___
14. Tracy Tickles ___
15. Annie and the Wild Animals ___
16. The Pokey Little Puppy ___
17. Alexander the Terrible, Horrible, Not Very Good, Very Bad Day ___
18. A Difficult Day ___
19. Curious George ___
20. Bears on Wheels ___
21. Three Cheers for Gloria ___
22. The Paper Boat's Trip ___
23. The Wonderful Pigs of Jillian Jiggs ___
24. Walter the Farting Dog ___
25. Martha Rabbit's Family ___
26. I'm a Big Boy Now ___
27. Red is Best ___
28. Eleanor and the Magic Bag ___
29. What Do I Hear Now? ___
30. Snowflakes are Falling ___
31. The Polar Express ___
32. How Stephen Found a Pet ___
33. The Velveteen Rabbit ___
34. A Pocket for Corduroy ___
35. Winter Fun on Snowy Days ___
36. The Toy Trunk ___

Over>>>>

37. I Was So Mad ___
38. Love You Forever ___
39. Whispering Rabbit ___
40. Kitty's in My Neighborhood ___
41. Big Old Trucks ___
42. High Tide in Hawaii ___
43. The Very Hungry Caterpillar ___
44. Green Eggs and Ham ___
45. Tootle ___
46. I Hear a Knock at My Window ___
47. Matthew and the Midnight Tow Truck ___
48. Dora Loves Boots ___
49. Martha Rabbit's Family ___
50. Zack's House ___

Appendix D
Teacher Perceptions Toward Early Reading and Spelling
Mather, Bos, and Babur (2001)

Please rate your agreement or disagreement with each of the following statements.

1. Ability to rhyme words is a strong predictor of early reading success.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

2. Letter recognition is a strong predictor of early reading success.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

3. Poor phonemic awareness (awareness of the individual sounds in words) inhibits learning to read.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

4. Encouraging the use of invented spelling can help children develop phonemic awareness.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

5. K-2 teachers should know how to teach phonological awareness, i.e., knowing that spoken language can be broken down into smaller units (words, syllables, phonemes).

1	2	3	4
strongly disagree	disagree	agree	strongly agree

6. Individual differences in phonological awareness in children can help explain reading growth during primary grades.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

7. A teacher should not be concerned when early readers' miscues do not change meaning.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

8. When early readers do not know how to pronounce a word, the most beneficial strategy to suggest is to use the context.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

9. When early readers do not know how to pronounce a word, one good strategy is to prompt them to sound it out.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

10. Learning to use context clues (syntax and semantics) is more important than learning to use grapho-phonic clues.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

11. A significant increase in oral reading miscues is usually related to decrease in comprehension.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

12. Beginning readers need to encounter a new word a number of times to ensure it will become a part of their sight vocabulary.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

13. Poor memory for the visual features of words affects development in word identification.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

14. Visual memory for the features of words is essential for accurate spelling.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

15. Transpositions (e.g. saw for was) remain a persistent problem for a few children when reading.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

16. Materials for early reading should be written in early language without regard for the difficulty of vocabulary.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

17. Basic skills should never be taught in isolation.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

18. The development of word identification and spelling are closely related.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

19. For fluent reading, rapid identification of whole words is necessary.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

20. Reading comprehension is related to fluent word identification.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

21. Controlling text through consistent spelling patterns (e.g., the fat cat sat on a hat) is a method by which some children can most easily learn to read.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

22. K-12 teachers should know how to teach phonics.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

23. Phonic rules are generalizations should be taught to early readers.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

24. Phonics instruction can help a child improve spelling abilities.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

25. Children who make repeated spelling errors are likely to benefit from systematic instruction.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

Appendix E
Title Recognition Test
Cunningham, Perry, Stanovich, & Stanovich (2004)

Please put a check next to the titles that you recognize as children's books. There are foils among the list, so don't guess!

__Grandmother's Surprise
__If You Give a Pig a Pancake
__Kofi and His Magic
__Gerald McBoing Boing
__Danny and the Dinosaur
__Caps for Sale
__Backyard Safari
__Bedtime for Francis
__Down by David's Pond
__Brown Bear, Brown Bear, What Do You See?
__Oh, the Places You'll Go
__Corduroy
__Goodnight Moon
__Cootie Catchers
__Blame it on Billy
__The Clock with No Hands
__Down by the Sea
__Flat Stanley
__Dog Heaven
__The Adventures of Chatter the Squirrel
__House on East Eighty-Eighth Street
__Guess How Much I Love You
__Wacky Wendell
__Click, Clack, Moo
__The Fall of Freddie the Leaf
__The Story of Ferdinand
__The Rabbit Acrobats
__The Blueberry Kazoo
__Eloise
__Are You My Mother?
__Chicka Chicka Boom Boom
__The Colors of Me
__Bartholomew and the Oobleck
__What Rhymes with Orange?
__Biscuit
__Where the Wild Things Are
__Follow the Drinking Gourd
__The Muffin Maker
__Harold and the Purple Crayon

__My Friend the Mailman
__The Going to Bed Book
__Open Up
__Father Bear Comes Home
__Runaway Bunny
__Moo, Baa, LA LA LA
__Chrysanthemum
__Cloudy with a Chance of Meatballs
__The Last of the Really Great Whangdoodles
__Jamberry
__Because I Love You

Appendix F
Strategies

Strategies involving initial sounds or letters (18)

I would have him point out that first letter and I'd say, what letter, what sound does this say, and he would say "a" and we would go from there.
Looking at initial and ending sounds.
Attending to the beginning sounds
I would probably want to give hi some instruction with, like, put your finger at the beginning sound.
I would make sure he knows all his initial sounds first because if he doesn't have his sounds then pictures aren't really a helpful cue.
I would also say, let's look at the first letter.
He needs to be taught to notice the letters at the beginning of a word.
I would have been pointing out the beginning letters.
I wouldn't give the word exactly. I would say the beginning sound, like "bl," and see if he can get out the rest of it instead of saying the whole word.
You know, cuing with the first sounds cause he's missing some words that he would be reading.
I would encourage him to attend to the initial letter in this word and others.
Maybe some words starting with a, you know, go to the specific structure of the words and teach that.
I would practice attending to beginning sounds when reading.
I would have directed him to use either the initial sound or the first two sounds of the word and think about what he was reading.
I would ask hi what sound the word sleeping starts with and point out the word asleep. We could then look at the difference.
I would probably do like a covered word, so he would look at the beginnings.
I think I would have covered up the word asleep and ask him what letter he would expect to see in the beginning of sleeping and have him check his work to notice that the word begins with an a instead. So it can't be sleeping. What can it be?
I would probably want to give him some instruction with, like, put your finger at the beginning sound.

Strategies involving sounding out or decoding one or more words (16)

I would try to . . . incorporate more phonetically regular words.
Maybe having him sound out, like, asleep, so that he sees the a before the sleep part.
Talk about maybe covering up berries so he could sound out black.
I would have the student try to use the strategies that he learned in the previous lessons in order to decode that word.
If he had difficulty with a word, I would have him sound it out.
Practice a little more with the decoding of certain words.
Tapping out of the letters to get the sounds to help them figure the word out.
And for the ones that need to be sounded out—break down each sound little by little and then work on bringing it together.
I would point out the letter and have him try to decode the word.

Basic decoding strategies would help him, you know, make the sound of the first letter and what are we seeing in terms of sounds.
I tell them to tap it out. So if the word is black, I would tell them to tap the first few letters, like this, b l a.
I would teach him to sound out words and practice sound[ing] them out and breaking them down.
I would ask him to backtrack on the pages where he made an error and look again and try to decode the words that he tripped up on.
I would remind him to slow down and focus more on the word and the letters that make up the word. Not to focus automatically on the picture.
I would focus on the decoding skills and then build up to bigger things.
I would have him tell me differences and similarities between here and hungry and let him take ownership of his reading and see that he has to look through the whole word to decode correctly.

Strategies that involve teaching phonics, in general (13)

I would definitely do more phonics with him.
Do blending drills so he's seeing the different sounds in letters.
Using a program that would systematically teach him the rules.
He probably does need a little bit of instruction in some phonics.
He would definitely benefit from some sort of phonics program.
He needs decoding skills to help understand the job of letters within a word and how they are used.
I think some phonics rules would help him.
Compliment that with systematic phonics instruction.
More phonics!
I would teach him digraphs.
I would go over short vowels.
More work on consonant sounds.
I would teach him phonics so that he could learn the different parts of words and some of the unusual spellings we have.

Strategies that involve chunking or breaking words into pieces (15)

Make it very visual for him. Show him that each word can separate into chunks, syllables, or each phoneme.
I would say this is a compound word, it's made up of two words, and we would look at black and do the bl, and then the ending, the ack.
It would help him to look for chunks in words as a way to tackle longer words or less familiar words.
I would have him look through it and look for chunks he may know.
Blackberries. That's a long word, so I would break it up.
I would do framing and chunking the word.
I would probably reach over and cover up parts of the word. Maybe I would cover up berries.
I might break apart the word and I might put on a card a and then sleep and actually have

him sound out the two separate words and then have him put it together and work that way.
I would ask him to split it up and look at the different parts of the word.
I would make sure before he approaches a hard word, to simplify it into parts that he could sound out, like black and berries. Those would be easier, but you could do it even more.
I would show him how to break apart words so that he could manage better. Look for chunks, blends.
Write it on a board and talk about what we see—beginning, ending of the word, parts we know.
I would cover up part of the word to allow him to decode the parts of the word he knows.
I would like to see that sort of instruction—making sure he's aware to look for chunks that he recognizes in words first.
I would have probably used my finger or maybe something to block out parts of the word.

Strategies that address words on the level of syllables (5)

I would focus on words with more than one syllable and looking at that initial syllable and that initial sound.
Look at syllables and blending of letters.
Talk about syllable types.
Talk about how words are made of different syllables.
What I use is sentence strips. I separate the sounds and syllables and clap it out or tap it out and kind of use that as a strategy.

Strategies that involve teaching letters, letter patterns, or spelling rules (12)

I would review or introduce making the long u sound.
If you see these letters together it makes the vowel short, because they are at the end of the word.
Making words with magnetic letters.
You could also give words that are very similar, and words that have similarities. Then they have to focus on the letters and sounds to get it right.
I would mark the letter with a color to make it more noticeable.
He needs to learn sounds like sh and be able to read them automatically.
He needs to attend to and sort out final s's for plurals and possessives and eventually see this knowledge in his oral reading.
Read through the words to see the final s.
He needs to focus on letters, not chunks quite yet.
I would show him how to attend to letters visually.
He needs practice with letter recognition.
I might explicitly teach what the sound is, use it as a springboard for a lesson.
Instead of just telling him this book is Blackberries, really going over the letters.

Strategies that mention the use of visual cues in reading (10)

Teaching him that that's not the only cue that we look for, that we have to focus on and

read what we are seeing.
Looking through the word.
I think reading across the whole word.
I would want to focus on the visual letter cues to cross check his reading in order to self correct.
My focus with this boy would be to really focus on the visual letter cues to self correct.
He needs to be instructed to use visual cues.
I would ask him to read through the word.
He may need to be more formally directed and taught how to check for visual cues.
I would repeat and really focus on the visual part of remembering sounds.
I would teach him to focus on visual cues in words.

Other sound/symbol strategies (4)

What sounds do you hear at the end of sleeping? Do they match?
Some phonetic books would be helpful, too.
I would also do a lot of phonemic awareness tasks with him.
Sing it as a song.

II. Whole word strategies

Strategies that involve the teaching and learning of sight words (22)

Definitely sight word drills. Saying it, seeing it.
I think Chris would benefit from one on one instruction to build his sight word bank.
Well, before trying to make him read more complex books, I would have to teach him basic sight words—words that you can't sound out. You have to know them.
He needs more sight words. I think he would benefit from that.
I would work a lot on sight words.
He needs to learn basic sight words like said, no, are and were.
If he had a bigger sight word vocabulary he could tackle compound words.
I think I would focus on my wall with sight words.
Maybe do some sort of drill with him every day with sight words.
I would put the words that he misses from the books on cards and have him read them and see if he gets them and then go back to the books after that.
I would add the word to his word bank.
One of the strategies is that I would put the word in his word bank, so he could come across it more often. So if I were doing a warm up, he would see the word over and over again.
He needs . . . a lot of basic sight words.
He'd be getting some more word work than the other students might need.
I would use repetition to practice sight words.
I would continue doing the sight word instruction.
Sight words "said and "shouted," you know the length of the word "shouted," that didn't help him. So basic sight words.
Chris needs to know sight words.
Give him lots of practice with sight words.

He could practice sight words so that they become more available when he's reading.
Point out the important sight words that he missed.
He just needs to, you know, be made to focus on, you know, really learning the words.
This could be helped with more sight word work and sight word readers so that he can see the words n context.

Strategies that involve pointing to words (9)

Pointing to the word might help him.
If there were a new word that came up several times, I would have him . . . point to it every time he sees the word blackberries and read it before he started.
I would take my finger to guide him over the words so that he could read each word rather than trying to stick words in that might not be there.
I would have him definitely point to the words.
Focus on pointing to the words as he's reading so that he's seeing all the words.
I would have hi point to the words on the page.
Finger pointing. It helps them understand that that's a word, this is a word, this is a word.
Finger pointing.
St this level, I would have him point to the words as he reads so that he can see his errors, like the short length of the word cluck.

Strategies that address compound words (5)

Chunking compound words into words he might already know.
He also needs to learn to recognize compound words and to look for little words in big words like black and berries, on which he stumbled.
I would h old my fingers on either side of the word black so he could focus just on that part of the compound word and see if he recognized it as a color word.
I might even introduce the word blueberries to see if he could read the word blue and then transition to black.
Blackberries is a compound word, so I would first draw his attention to that.

Strategies that address one to one correspondence of words (5)

I would work on . . . even one to one correspondence of whole words.
Using more one to one correspondence word correspondence.
Make sure that he has one to one matching.
I'd probably have him match and finger point each word to make sure he understands what one word is.
He also needs one to one correspondence or matching.

Strategies that involve the teaching and learning of vocabulary (6)

The visual recognition of new vocabulary is something I would focus his attention on more.
I would introduce more vocabulary within his stories.
Emphasize unfamiliar words.
I would ask him to identify any unfamiliar words on each page so when we read together he had an understanding of the word first.

I might teach this word as a vocab word and introduce it with the text.
I would also preteach vocab words like blackberries and basket until he builds on his skills a bit more.

Strategies that focus on a word that was misread or read with difficulty (10)

I would first bring him back to that page and show him that it really wasn't sleeping.
Just bring his attention to the fact that he didn't change the meaning, but he didn't read the correct word.
Doing a word search and having him find the word blackberries in the book additional times.
I think I would try to draw his attention to, you know, "We just read that word, can you read this word again, do they look similar?"
I would try to isolate that word. I wouldn't let the student go any further until they figure out that word.
I guess if it were a guided reading book I would say, "This word is asleep." With a word like that, he may not know the word.
Practice with them the different contexts of the word sleep, asleep, sleeping.
I would give the students other books where the word asleep occurs and talk about how the words are related.
I would practice using [the word] in original sentences.
I would look back at the cover [and ask], "Do you remember what this word was?"

Other whole word strategies (10)

I've done it with bingo games.
Maybe do a semantic mapping.
If I noticed a pattern of certain words that he was missing, I would try and have him practice reading those types of words.
I would expose him to more words that have the schwa sound.
I would give lots of prompts. I would, you know, sound context cuing, does it look right does it make sense, does it sound right. Those three cuing systems.
Uncover each word as you go along.
Having him look at the whole word.
I have the words that we might come across, the new sight words or vocabulary words, on index cards around the book. So the kids know we already reviewed them. When they come across them they see it and they match it. So they know that it's blackberries because it's right here, and we talked about it as a new word.
I would show him how to attend to words as a whole.
Looking at the whole word would help him.

II. Oral reading strategies

Strategies that involve repetition (13)

I would have him reread stuff he's read before. Easy books over again periodically.
Rereading texts—I think that would help him.
I would ask him to . . . reread what he has read.

We could reread that page.
Repeat readings. So, once he masters this, you know, don't move on to the next level, have him build. It's not that he's not fluent, but he tends to rush.
A lot of repeated readings because that fluency piece is tough.
A lot of repetition.
Have him do repeat readings.
He needs a lot more reading experience and some repeat readings.
Read stories more than one time to gain fluency and vocal practice.
I'd be reading a lot of the same, you know, rereading the same books for practice.
Lots of repetition.
I would say, "Let's read to the end and then come back."

Strategies that involve slowing down (6)

I would encourage him to read more slowly.
I would encourage him to slow down.
He may also need to slow down to keep from making avoidable errors as he progresses to a higher level.
He seems to need some help slowing down as he reads.
He would have to slow down a little bit.
Slow down to check for accuracy.

Strategies that involve modeling reading for the beginner (6)

Giving him a text or a few sentences to read over and over again and then showing him how to, modeling fluency for him.
I would model fluent reading for him.
I would have him echo my reading and follow the text.
Sometimes reading the page and saying, "This is how I would read it, why don't you try it."
In terms of his fluency, I would do a lot of like echo reading and choral reading and things like that to help him mimic the way you sound when you are reading.
Some echo reading, too.

Strategies that aim to improve fluency (10)

Fluency practice at his instructional level, definitely.
His fluency would be the next step that I would be working on.
I think his problems . . . can be overcome if more attention is put on phrasing.
I would work on fluency.
He may need fluency and intonation practice.
I would use his finger less as a tracking device to help with fluency and sounding less choppy.
I would practice punctuation cues with him for fluency.
Some things I've done are readers' theater, where they are really working on expression and tone.
Showing him how to scoop like I taught in my class. Scooping up a bunch of words and

grouping them together and practicing reading them over and over again until he sounds, he hears it how it's supposed to. I tell my kids not to read like a robot. Reading like it's supposed to be spoken.
I would encourage him to scoop words, groups words, and read them fluently.

Other oral reading strategies (5)

You know, shared reading would help him.
Guided reading of course.
Teach when there's a question mark at the end that your voice rises at the end of a sentence when you see a question mark.
It might help him to follow and keep up with the text if he used his finger.
Recording them or taping them and having them hear it back.

IV. Meaning based strategies

Strategies that teach or review background knowledge about the story (6)

You know, a lot of kids don't have experience with blackberries, so it could just be a word, you know, when you're six, you know strawberries, you know blueberries, but blackberries may need to be taught. So I would instruct in that way, too.
I think he might need more exposure or explanation to enhance his background knowledge.
To help, I would introduce a new book and I would want to clarify concepts that might be unfamiliar to Chris.
I would talk to the student about important concepts to familiarize them.
Use new concepts in our own stories.
I would also elicit prior knowledge before reading by asking him if he had ever eaten a blackberry or gone to pick blackberries like the bear. This strategy can be used with new concepts in all books. It also helps comprehension.

Strategies that involve looking at pictures (3)

I would encourage him to go back to some of the more basic reading behaviors like checking with the pictures.
Look at the picture.
I would encourage him to use pictures as a reference.

Strategies that involve predicting or previewing (3)

Predicting and previewing a story first usually helps to identify vocabulary and break a story pattern.
I would preview the story and make predictions first about each page.
I would make predictions first.

Strategies that involve retelling (2)

I would have him retell the stories.
I would practice sequencing a story for retell purposes and comprehension.

Other meaning based strategies (5)

If he were my student, I would be teaching, “Does it make sense in the story?”
I would stop him after each book to check for meaning.
More exposure to literature in texts.
I would practice comprehension strategies, responding orally and in writing.
Work on how words correctly fit in a sentence.

V. Writing strategies

Doing a dictation to make it a little bit easier for them to hear the sound and understand that.
Really go over all the letters and have him maybe trace them.
I would also tie in the visual component of his reading with his writing.
He needs to practice writing words.

Appendix G
Transcript of Video for Chris's Reading
Blackberries

Teacher: Here, it's called *Blackberries.*

Chris: [Reading cover] *Blackberries*
[Reading title page] *Blackberries*

Father Bear and Baby Bear and Mother Bear went to look for blackberries.

[Turn page]

Father bear

[Pause]

Teacher: Blackberries

Chris Blackberries

[Pause]

Teacher: Went

Chris Went into this basket. Mother's

[Pause]

Teacher: Blackberries

Chris: Mother Bear's blackberries went into this basket. Baby Bear's blackberries went into this basket.

[Turn page]

"Blackberries

[Pause]

Blackberries. I like blackberries," said Baby Bear.

[Turn page]

"Where is Baby Bear," said Father Bear

[Pause]

Said Mother Bear and Father Bear.

[Pause]

Teacher: [Pointing]

Try it again, Father.

Chris: Father Bear

[Pause]

Teacher: Are

Chris Are looking for Baby Bear.

[Pause]

Oh.

Teacher: Said

Chris: Said Father Bear

[Pause]

Teacher: Where

Chris: Where is he?

[Turn page]

[Pause]

Teacher: Where

Chris: "Where are you," said Father Bear. "Baby Bear, where are you?" said Mother Bear.

[Turn page]

"Here I am," said Baby Bear. "I am here."

[Turn Page]

Father Bear looked and

[Pause]

Teacher: In

Chris: In Baby Bear's basket. "Where are your blackberries?" he said.

[Turn page]

"In here," said Baby Bear. "In"

[Pause]

Teacher: Side

Chris: Side my stomach.

Teacher: Mmmmm, weren't they?

References

Anderson, L, Evertson, C, & Brophy, J. (1979). An experimental study of effective teaching in first-grade reading groups. *Elementary School Journal, 79,* 193-223.

Badon, L. C., Oller, J. W., & Oller, S. D. (2005). Ratings within and across ethnic boundaries of methods of one on one reading instruction. *Journal of Communication Disorders, 38,* 445-457.

Battista, M. N. (1992). *Whole language: A philosophy that works* [Videotape]. Evanston, IL: Altschul.

Belenky, M., Clinchy, B., Goldberger, N., & Tarule, J. (1986). *Women's ways of knowing: The development of self, voice and mind*. New York: Basic Books.

Birsh, J. (1999). Research and reading disability. In J. Birsh (ed.) *Multisensory teaching of basic language skills*. Baltimore, MD: Paul H. Brookes:

Black, A. & Ammon, P. (1992). A Developmental-constructivist approach to teacher education. *Journal of Teacher Education, 43,* 323-335.

Carreker, S., Joshi, R. M., & Boulware-Gooden, R. (2010). Spelling-related teacher knowledge: the impact of professional development on identifying appropriate instructional activities. *Learning Disabilities Quarterly.* Retrieved December 08, 2010 from http://www.thefreelibrary.com/Spelling-related teacher knowledge: the impact of professional...-a0234934406

Cazden, C. (2001). *Classroom discourse: The language of teaching and learning.* Portsmouth, NJ: Heineman.

Clay, M. (2002). *An Observation Survey of Early Literacy Achievement*. Porstmouth, NH: Heinemann

Clay, M., Todd-Wynn, D., Macky, M., & Koefoed, B. (2000). *An Observation Survey: The Video*. Portsmouth, NH: Heinemann.

Cooksey, R. W., Freebody, P., & Davidson, G. R. (1979). Teachers' predictions of children's early reading achievement: An application of social judgment theory. *American Educational Research Journal, 23*, 41-64.

Cunningham, A., Perry, K., Stanovich, K., & Stanovich, P. (2004). Disciplinary knowledge of K-3 teachers and their knowledge calibration in the domain of early literacy. *Annals of Dyslexia, 54,* 139-167.

Cunningham, A. E. & Stanovich, K. E. (1990). Assessing print exposure and orthographic processing skill in children: A quick measure of reading experience. *Journal of Educational Psychology, 82,* 733-740

Cunningham, A. E. & Stanovich, K. E. (1991). Tracking the unique effects of print exposure in children: Associations with vocabulary, general knowledge, and spelling. *Journal of Educational Psychology, 83,* 264-274.

Cunningham, Zibulsky, Stanovich, & Stanovich (2009). How teachers would spend their time teaching language arts: The mismatch between self-reported and best practices. *Journal of Learning Disabilities, 42*, 418-430.

DeFord, D. E. (1985). Validating the construct of theoretical orientation in reading instruction. *Reading Research Quarterly, 20,* 361-367.

Ehri, L. C. (1998). Grapheme-phoneme knowledge is essential for learning to read words in English. In J. L. Metsala & L. C. Ehri (Eds.*). Word recognition in beginning literacy* (pp. 3-40). Mahwah, NJ: Erlbaum.

Erikson, E. H. (1950). *Childhood and society*. New York: W. W. Norton.

Fielding-Barnsley, R. (2010). Australian pre-service teachers' knowledge of phonemic awareness and phonics in the process of learning to read. *Australian Journal of Learning Difficulties, 15,* 99-110.

Galda, L. (2000). *Looking through the faraway end: Creating a literature-based curriculum for second grades*. Newark, NJ: International Reading Association.

Gibson, S. & Dembo, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76,* 569-582.

Goldenberg, C. (2000). The voices of researchers: Conflict and consensus in reading research and policy. *Reading Teacher, 53,* 640-641.

Grimmet, P. P. & MacKinnon, A. M. (1992). Craft knowledge and the education of teachers. *Review of Research in Education, 25,* 94-99.

Gunderson, L. (1997). Whole-language approaches to reading and writing. In S. A. Stahl & D. A. Hayes (Eds.) *Instructional models in reading.* Mahwah, NJ: Lawrence Erlbaum and Associates.

Hiebert, J., Gallimore, R. & Stigler, J. W. (2002). A knowledge base for the teaching profession: What would it look like and how can we get one? *Educational Researcher, 31*, 3-15.

Jackson, P. W. (1968). *Life in classrooms.* New York: Holt, Rinehart & Winston.

Johnson, R. & Hoffman, N. E. (1994). Preservice teachers' efficacy beliefs, literacy definitions, and conceptions of literacy development. In E. G. Sturtevant, & W. M. Linek (Eds.) *Pathways for literacy: Learners teach and teachers learn*. Commerce, TX: College Reading Association.

Johnston, P., Guice, S., Baker, K., Malone, J., & Michelson, N. (1995). Assessment of teaching and learning in "literature-based" classrooms. *Teaching and Teacher Education, 11,* 359-371.

Joshi, R. M., Binks, E., Hougen, M., Dalgren, M. E., Ocker-Dean, E., & Smith, D. L. (2009). Why elementary teachers might be inadequately prepared to teach reading. *Journal of Learning Disabilities, 42,* 392-402.

Kavale, K. A. & Reese, J. H. (1991). Teacher beliefs and perceptions about learning disabilities: A survey of Iowa practitioners. *Learning Disability Quarterly, 14,* 141-160.

Kitchener, K. S. & King, P. M. (1990). The reflective judgment model: Transforming assumptions about knowing. In R. T. Clift, W. R. Houston, & M. C. Pugach (Eds.), *Encouraging reflective practice in education* (pp. 159-176).

Langenthal, A. B. (2004). How do novice and experienced first-grade teachers evaluate reading progress in their students? Unpublished doctoral dissertation, Graduate Center of the City University of New York, New York.

Lyon, G. R. (1999). *The NICHD research program in reading development, reading disorders, and reading instruction.* Washington, DC: National Center for Learning Disabilities.

Lytle, S. L. & Cochran-Smith, M. (1992). Teacher research as a way of knowing. *Harvard Educational Review, 62,* 447-474.

Mather, N. (1992). Whole language instruction for students with learning disabilities: Caught in the cross fire. *Learning Disabilities Research and Practice, 7,* 87-95.

Mather, N., Bos, C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice teachers about early literacy instruction. *Journal of Learning Disabilities, 34*, 472-482.

McCutchen, D., Abbott, R. D., Green, L. B., Beretvas, S. N., Cox, S., Potter, N. S., Quiroga, T., & Gray, A. L. (2002). Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities, 35*, 69-86.

Moats, L. C. (1995). The missing foundation in teacher education. *American Educator, 19*, 43-51.

Morrison, T. G., Wilcox, B., Madrigal, J. L., Roberts, S., & Hintze, E. (1999). Teachers' theoretical orientations toward reading and pupil control ideology: A national survey. *Reading Research and Instruction, 38*, 333-350.

Munby, H., Russell, T., & Martin, A. K. (2001). Teachers' knowledge and how it develops. In V. Richardson (Ed.) *Handbook of research on teaching (4th ed.).* Washington DC: American Educational Research Association.

National Association of Elementary School Principals (1991). *Making whole language happen* [Videotape]. Livinston, NJ: Instructivision.

Petropoulos, C. (2002). Teaching Reading: The effect of the whole language movement on teacher practice and student achievement. Unpublished manuscript.

Piasta, S.B., Connor, C.M., Fishman, B. J. & Morrison, F.J. (2009). Teachers' knowledge of literacy concepts classroom practices, and student reading growth. *Scientific Studies of Reading, 13*, 224-248.

Podhajski, B., Mather, N., Nathan, J. & Sammons, J. (2009). Professional development in scientifically based reading instruction: Teacher knowledge and reading outcomes. *Journal of Learning Disabilities, 42,* 403-417.

Pressley, M. (1998). *Reading instruction that works: The case for balanced teaching.* New York: Guilford.

Pressley, M., Rankin, J., & Yokoi, L. (1996). A survey of the instructional practices of outstanding primary-level literacy teachers. *Elementary School Journal, 96,* 363-384.

Reynolds, M. C., Wang, M. C., & Walberg, H. J. (1992). The knowledge bases for special and general education. *Remedial and Special Education, 13,* 6-10.

Rickelman, R. J., Henk, W. A., & Helfeldt, J. P. (1994). The cohesiveness of preservice and inservice teachers' whole language perceptions and the information sources contributing to this knowledge base. In E. B. Sturtevant & W. M. Linek (Eds.) *Pathways for literacy: Learners teach and teachers learn*. Commerce, TX: College Reading Association.

Risko, V. J. & Kinzer, C. K. (1999). *Multimedia cases in reading education.* [Multimedia] New York: McGraw Hill College.

Senechal, M., Lefevre, J., Hudson, E., & Lawson, E. P. (1996). Knowledge of Storybooks as a Predictor of Young Children's Vocabulary. *Journal of Educational Psychology, 88,* 520-536.

Shulman, L. S. (1986). Paradigms and research programs in the study of teaching: A contemporary perspective. In M. C. Wittrock (Ed.) *Handbook of research on teaching (3rd ed.)* New York: Macmillan.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57,* 1-22.

Shulman, L. S. & Qunlan, K. M. (1996). The comparative psychology of school subjects. In D. C. Berliner & R. C. Calfee (Eds.) *Handbook of educational psychology.* New York: Macmillan.

Spear-Swerling, L., & Brucker, P. (2004). Preparing novice teachers to develop basic reading and spelling skills in children. *Annals of Dyslexia, 54,* 332-364.

Stanovich, K. E. & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly, 24,* 402-433.

Walker, B. J. & Roskos, K. (1994). Perservice teachers' espistemology of diagnostic reading instruction: Observations of shifts during coursework experiences. In E. G. Sturtevant & W. M. Linek (Eds.) *Pathways for literacy: Learners teach and teachers learn*. Commerce, TX: College Reading Association.

Wharton-McDonald, R., Pressley, M., & Hampston, J. M. (1998). Literacy instruction in nine first-grade classrooms: Teacher characteristics and student achievement. *The Elementary School Journal, 99,* 101-128.