

Reading Teachers' Knowledge of Children's Literature and English Phonology

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We investigated relationships among elementary teachers' reading-related content knowledge (knowledge of literature and phonology), their philosophical orientation toward reading instruction, their classroom practice, and their students' learning. Correlations showed little relationship between instructional philosophy and content knowledge, and little relationship between instructional philosophy and classroom practice. However, relationships emerged between content knowledge and instruction, and between kindergarten teachers' phonological knowledge and their students' reading achievement. We recommend that the recent focus on teacher's disciplinary knowledge be broadened to include teachers of beginning reading and that teachers be afforded opportunities to develop the necessary knowledge base to teach reading effectively.

Recent debates about national standards for teachers have focused considerable attention on issues of teacher expertise. Definitions of teacher expertise have evolved over the past 25 years, with procedural descriptions of classroom behaviors increasingly sharing the stage with discussions of teacher thinking and teacher knowledge (Borko & Putnam, 1996; Clark & Peterson, 1986; Leinhardt & Greeno, 1986; Shulman, 1987). Shulman and his colleagues (Grossman, Wilson, & Shulman, 1989; Shulman, 1987) revised the old adage about teaching when they argued that "Those who *know* teach." In disciplines such as mathematics, literature, and history, evidence indicates that teachers differ on assessments of their disciplinary knowledge as well as their disciplinary beliefs (D. Ball, 1991; Grossman, 1991; Wineburg & Wilson, 1991), and such differences can have a profound effect on classroom practice (Grossman et al., 1989).

Questions of disciplinary knowledge seem somewhat straightforward in the context of high school content areas; and indeed much of the discipline-based work on teacher knowledge has involved secondary teachers (e.g., Grossman, 1991; Wineburg & Wilson, 1991). However, Shulman (1987) argued that assumptions about disciplinary knowing hold for elementary teachers as well, and research (e.g., D. Ball, 1991) has provided a rich—if sometimes alarming—picture of elementary teachers' mathematical knowledge. Our goal was to focus a similar disciplinary lens on elementary teachers' content knowledge and beliefs about beginning reading.

READING AS SUBJECT MATTER

Specifying the content knowledge needed to teach beginning reading is difficult, in part, because reading instruction in typical elementary classrooms is embedded within the topic of language arts, an often amorphous mixture of reading, writing, and literature instruction that includes a variety of epistemological perspectives on what it means to become "literate" (Grossman, Valencia, & Hamel, 1995; Shanahan, 1994). In the past, the question of teachers' knowledge of reading has frequently been framed in terms of academic preparation or state certification standards (Austin, 1961; Bader, 1975; Braam & Oliver, 1970; Nolen, McCutchen, & Berninger, 1990; Thelen, 1972; Winkeljohann, 1976). More recently, there has been considerable discussion of "best practice" in reading instruction (Adams, 1990; Baumann, Hoffman, Moon, & Duffy-Hester, 1998; Burns, Griffin, & Snow, 1999; Pressley, 1998; Pressley et al., 1997), but less about the professional, disciplinary knowledge base that en-

ables teachers to develop and employ best practice in their classrooms. Research on teacher knowledge is emerging in the area of reading (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Cunningham, Perry, Stanovich, Stanovich, & Chapell, 2001; Ehri & Williams, 1995; Grossman et al., 1995; Mather, Bos, & Babur, 2001; McCutchen et al., 2002; Moats, 1994; Pearson, 1996; Troyer & Yopp, 1990). However, much of the debate within reading research has focused on teachers' philosophical beliefs and knowledge of instructional approaches rather than the issue of content knowledge *per se* (Alvermann, 1990; DeFord, 1985; Richardson, Anders, Tidwell, & Loyd, 1991; Sacks & Mergendoller, 1997).

What is the content knowledge (i.e., disciplinary knowledge) important for effective beginning reading instruction? Professional standards have outlined relevant knowledge at a general level (International Reading Association [IRA], 1978). Recently, the National Reading Panel (NRP), building on earlier work (Burns, Griffin, & Snow, 1999), released results of their systematic review of research on reading instruction (NRP, 2000). However, the NRP report focused more on student knowledge than teacher knowledge, concluding that issues of teacher knowledge warrant further research. The present study begins to address the issue of reading-related content knowledge by focusing on two aspects of teachers' content knowledge that have been identified as important in effective reading instruction: knowledge of children's literature and knowledge of English phonology.

KNOWLEDGE OF LITERATURE

Children's literature has long been considered an important element in reading instruction (IRA, 1978; Commission on Reading, National Academy of Education, 1985) and is frequently included as required course work in state certification requirements (Nolen et al., 1990). Although a variety of instructional goals may be served by including children's literature as part of reading instruction (Scharer, Freeman, Lehman, & Allen, 1993; Tharp & Gallimore, 1989), knowledge of children's literature seems a logical prerequisite for any literature-based instruction (Grossman et al., 1995).

Pressley et al. (1997) documented that a key feature of effective reading instruction is teachers' creation and maintenance of literate environments (i.e., well-stocked in-class libraries, and ample opportunities for students to read and write). Such an emphasis on literature is a defining characteristic of the whole language philosophy (Bergeron, 1990; Manning & Manning, 1989), although research outside whole-language traditions also documents the

importance of literary experience. Knowledge of books and magazines (reflecting the volume of reading done by an individual) is related to word recognition (Cunningham & Stanovich, 1991, 1993), reading comprehension (Taylor, Frye, & Maruyama, 1990) and spelling (Stanovich & Cunningham, 1992). In a 10-year longitudinal study, Cunningham and Stanovich (1997) found that individual differences in reading habits (measured in terms of knowledge of authors and titles) predicted differences in the growth of reading comprehension ability throughout the elementary and high school years. Furthermore, recent reviews have documented relationships between early parent-child book reading and reading achievement (Scarborough & Dobrich, 1994), as well as between book reading, emergent literacy, and language growth (Bus, van Ijzendoorn, & Pellegrini, 1995).

If teachers are to create and maintain a literate environment for their students, we might expect teachers to be knowledgeable about children's literature. Such a knowledge base would likely include knowledge of current as well as classic titles of books for children.

KNOWLEDGE OF PHONOLOGY

The second aspect of content knowledge targeted in the present study is structural knowledge of English phonology. Although such linguistic knowledge is far less likely to appear in teacher certification requirements (Nolen et al., 1990), such knowledge is reflected in many professional standards (IRA, 1978; NRP 2000). Particularly in the area of word identification, children's early reading growth is related to their insight into individual sounds within words, an insight that has come to be known as *phonological awareness* (Adams, 1990; Burns et al., 1999; NRP, 2000; Share & Stanovich, 1995). The causal relationship between phonological awareness and learning to read has been demonstrated in studies showing that phonological awareness instruction can improve students' spelling and reading achievement (Ball & Blachman, 1991; Cunningham, 1990; Lundberg, Frost, & Petersen, 1988; McCutchen et al., 2002; NRP 2000), even in combination with extensive text-reading experiences (Iversen & Tunmer, 1993).

As readers themselves, all teachers undoubtedly possess knowledge of sounds within words. However, being a skilled reader does not guarantee that a teacher has the depth of explicit knowledge necessary to navigate students through the complexities of English orthography and phonology (see Venezky, 1970, for a thorough discussion of these complexities). For most liter-

ate adults, knowledge of word sounds and knowledge of spelling patterns are so intertwined that they are difficult to separate, and adult confusions between sounds and spellings can result in needless student confusion during instruction.

Consider, for example, an actual lesson in which a teacher was teaching the long vowel sound associated with the letter *u*. Children were asked to identify the words in which the letter *u* "says its name" from among *hunt*, *shush*, *crush*, *prune*, *stump*, *abuse*, *slump*, *cute*, *stuck*, *tube*, *truck*, and *crunch*. This is a typical lesson that has no doubt been replicated in thousands of classrooms. However, the lesson glosses over the fact that the name of *u* contains two separate phonemes, /j/ (the symbol from the International Phonetic Alphabet representing the sound that begins the word *young*; see Fromkin & Rodman, 1993) and /u/, the final sound in the word *too*. These two sounds are indeed heard in the "long u" words *abuse* and *cute* from the teacher's list. However, *prune* and *tube* (at least in most American dialects) contain only /u/, not /ju/. Thus, in *prune* and *tube*, *u* does not actually "say its name," but children were nonetheless directed to categorize these words as containing "long u." As another example of this difference, compare the initial sounds within the words *use* and *ooze*. Admittedly, the internal sounds in *cute* and *prune* are close; only the presence of the prevocalic /j/ distinguishes them. However, if we expect students to attend to the same prevocalic /j/ when comparing words such as *yam* and *am*, then we should not gloss over the differences between the vowel sounds in *cute* and *prune*. Such infelicities may not be problematic for most students, but for those who struggle to learn the connections between letters and sounds, such misinformation may lead to unnecessary confusion.

If knowledge of phonology and experience with literature are important for children to acquire on the path to literacy, knowledge of phonology and literature also must be important for the teachers who guide them on that path. We were particularly interested in the content knowledge of teachers of beginning reading, so we focused the present study on kindergarten, first-, and second-grade teachers, as well as the primary special education teachers with whom they collaborate. Even though teachers in all of these settings work with emergent readers, such teachers frequently differ in terms of the age and abilities of their students, the nature of their curricula, and the character of their professional training. We asked three primary questions:

1. What is the depth of teachers' content knowledge in the areas of literature and phonology, and how fine-tuned

- is their knowledge, in terms of the grade level (K, 1, 2) or classroom placement (regular versus special education) of their students?
2. What are the relationships among content knowledge, philosophical orientation, and classroom practice?
 3. What are the relationships between teacher knowledge and student learning?

METHOD

PARTICIPANTS

Teachers were recruited by letters of invitation. Participants comprised 59 volunteer teachers¹ from a large metropolitan area: 24 taught kindergarten; 27 taught first grade, second grade, or a combination; and eight taught in special education settings. The size of the special education group was not comparable to the other two groups because we recruited regular education teachers and their special education colleagues; thus, the distribution in our groups reflects typical distributions within schools. Fifty-three participants were female and six were male. Fifty-five were Caucasian, three were African American, and one was Asian American. They had taught for a mean of 13 years with a range from 1 to 40 years.

MEASURES AND PROCEDURES

Although much of the research on teacher knowledge has relied on structured interviews and specially tailored performance assessments with small numbers of participants (e.g., D. Ball, 1991; Grossman, 1991; Wineburg & Wilson, 1991), other studies have involved survey instruments and larger samples (DeFord, 1985; Nathan & Koedinger, 2000; Sacks & Mergendoller, 1997). Our choice of measures was guided by two goals:

1. To link our study of teacher knowledge methodologically to prior studies of student reading-related knowledge.

¹A subset of these teachers participated in a related, multiyear study (McCutchen et al., 2002), the purpose of which was to assess the effectiveness of an intervention designed to deepen teachers' phonological knowledge and, most important, to measure any effect on the learning of their students. The assessments described here were administered prior to any intervention. Thus, the primary focus of the study presented here is the typical knowledge and beliefs that teachers bring to their literacy instruction, whereas the primary focus of the study described by McCutchen et al. (2002) was the intervention and resultant student learning.

2. To involve enough participants to afford some degree of generalizability.

Recognizing that our assessment instruments provide data less rich than contextualized interviews, we sought to buttress the assessments with observations of teachers' classroom practice.

KNOWLEDGE OF LITERATURE

In order to investigate whether teachers' knowledge of children's literature was fine-tuned to the level of their students, we administered a series of three title recognition tests shown by Cunningham and Stanovich (1991) to correlate with children's literacy achievement across the elementary years. The title recognition tests were checklists consisting of targets and foils. One test assessed teachers' knowledge of titles appropriate for use with first graders (25 items, with targets including *Where the Wild Things Are* and *Frog and Toad*). Another assessed knowledge of titles appropriate for use with third graders (66 items, with targets including *A Light in the Attic* and *The Polar Express*), and a third assessed knowledge of titles appropriate for use with sixth graders (100 items, with targets including *The Boxcar Children* and *Julie of the Wolves*). The third-grade version of the title recognition test has shown construct validity with children's daily reading diaries (Allen, Cipelewski, & Stanovich, 1992).

Clearly, knowledge tapped by such checklists is only a proxy for the kind of content knowledge required to teach literature effectively (Grossman, 1991; Pressley, 1998). Familiarity with a book title does not guarantee that a teacher can engage children in enjoyable joint reading (Bus et al., 1995; Scarborough & Dobrich, 1994) or guide children through a meaningful discussion of literary concepts such as theme, plot, or character (Tharp & Gallimore, 1989). Still, we considered it unlikely that a teacher would possess rich knowledge of literary concepts and lack at least passing knowledge of well-known titles.

KNOWLEDGE OF PHONOLOGY

To assess teachers' knowledge of the structure of language we used the Informal Survey of Linguistic Knowledge developed by Moats (1994), a survey that assesses the ability to identify sounds within words and other structural aspects of language. One phonological item, for example, asked teachers to recognize that the word *sung* consists of three speech sounds, despite its four letters. The Moats survey also assessed teachers' knowledge of morphemes, syllable structure, and historical aspects of

English spelling. Attention to these additional levels of language is especially important in helping children learn to read, spell, and understand predictable segments within multisyllabic words. For example, teachers were asked to recognize that the letters *er* represent a morpheme (i.e., a separate unit of meaning) in the word *teacher* but not in *finger*.

The Moats survey is more comprehensive—and more difficult—than most phonological assessments used with children (e.g., Lewkowitz, 1980; Stanovich, Cunningham, & Cramer, 1984); indeed a perfect score on the survey is difficult to achieve without considerable linguistic training. However, some level of difficulty is necessary to attain an accurate picture of adults' insight into word sounds. On many of the phonological assessments designed for children, literate adults can use their knowledge of spelling rather than sound to answer correctly. For that reason, many of the phonological items on the Moats survey intentionally pit teachers' analysis of word sounds against their knowledge of word spellings. If teachers are to help children think accurately about words and their component sounds, teachers must be able to disassociate sound patterns from spelling patterns when necessary. Only then can teachers avoid the sort of misinformation we described previously (i.e., implying that the letter *u* corresponds to the identical sound in *cute* and *prune*).

GENERAL KNOWLEDGE

The issue of the general academic preparation of teachers has received considerable attention (ACT, 1997; Bruschi & Coley, 1999; College Board, 1997). In order to put elementary teachers' content knowledge into a larger context, we also assessed teachers' general knowledge with the 45-item test developed by Stanovich and Cunningham (1993). Although the test was not a precise measure of academic preparation, Stanovich and Cunningham (1993) found it correlated with other measures of general knowledge (e.g., Hirsch's 1987 cultural literacy checklist) and with academic achievement. The test includes 40 multiple-choice items selected from the science and social science subsections of Form A of the *Cultural Literacy Test* (Riverside Publishing, 1989). Examples include "What political movement worked for the establishment of the state of Israel as a Jewish homeland?" and "In what part of the body does the infection called pneumonia occur?" The final five questions of the Stanovich and Cunningham (1993) measure were true-false items from the Public Opinion Laboratory of Northern Illinois University's survey of scientific literacy (Miller, 1989). Examples are "The oxygen

we breathe comes from plants" and "Lasers work by focusing sound waves."

TEACHER BELIEFS

To assess teachers' theoretical orientation to reading instruction, we used the DeFord Theoretical Orientation to Reading Profile, or TORP (DeFord, 1985). Despite questions about the TORP's currency and validity (Richardson et al., 1991), versions of the questionnaire continue to be used (Bos et al., 2001; Mather, et al., 2001; Purcell-Gates, McIntyre, & Freppon, 1995; Sacks & Mergendoller, 1997). Items on the TORP represent three theoretical orientations to reading instruction: phonics, skills, and whole language. An example from the phonics subtest is "*Controlling text through consistent spelling patterns (The fat cat ran back. The fat cat sat on a hat) is a means by which children can best learn to read.*" An example from the ten items representing the skills orientation is "*Being able to label words according to grammatical function (nouns, etc.) is useful in proficient reading.*" An example from the whole-language subtest is "*Materials for early reading should be written in natural language without concern for short, simple words and sentences.*" We derived three scores based on teachers' responses to items reflecting each orientation, resulting in a phonics score, a skills score, and a whole language score for each teacher.

CLASSROOM PRACTICE

To investigate the extent to which teacher knowledge and beliefs influence classroom practice, we followed the regular education teachers (kindergarten and Grades 1 and 2) back into their classrooms and observed their reading instruction. Participating special education teachers worked in contexts that varied too much to make comparisons meaningful, and because of inclusive practices, many of their students were assessed in the classrooms of their regular education colleagues. In addition, data were not included from one teacher who worked in an alternative elementary school with a class of only five students.

Members of the research team were routine visitors to the classrooms and became familiar to both teachers and students. Observational data were gathered for each teacher from three or four observations distributed across October through June. Observers took extensive field notes during the first 15 minutes of reading instruction and then coded the field notes using a coding scheme we developed, adding and refining categories as necessary.

We sought to develop a coding scheme that was sensitive to the conceptual content and structural features of the teachers' lessons. The coding scheme included four broad categories that identified (1) the knowledge afforded by the instructional activity (e.g., letter-sound knowledge, listening comprehension), (2) the literacy activity in which the class was engaged (e.g., teacher reading, choral reading, journal writing), (3) the textual context (e.g., whole text, isolated words), and (4) the group context (e.g., whole group, small group, individual children). Each minute during an observation received a code within each of the four categories (knowledge focus, literacy activity, textual context, and group context), and times for each code were tallied for each 15-minute observation (complete coding guidelines are available in McCutchen et al., 2002).

Two observers visited 10% of the classrooms and double-coded the same 15 minutes of reading instruction. Reliability of the observational coding scheme was assessed by correlating the number of minutes coded in each category across the two observers. Some instructional activities did not occur during the double-coded sessions. However, for typical classroom activities that occur with moderate frequency, reliability correlations (Pearson's r) were reasonably high. For example, for letter-sound activities, correlations were .83 or higher; for story comprehension, .72; and for choral reading, .99.

STUDENT LEARNING

For each teacher, we derived a classroom-level measure of student learning based on the average end-of-year (May) reading performance of all students in the classroom. We assessed kindergarten students' reading with the 20 word-reading items from the *Gates-MacGinitie Reading Tests*, Level R, Form K (MacGinitie & MacGinitie, 1989). First- and second-grade students' reading achievement was assessed by their performance on the vocabulary and comprehension subtests of grade-appropriate *Gates-MacGinitie Reading Tests*. According to the test manual (MacGinitie & MacGinitie, 1989), the vocabulary subtests at Grades 1 and 2 include such common words that they are as much a measure of word reading as vocabulary. In addition, we measured first and second grade students' spelling with a group-administered adaptation of the *Wechsler Individual Achievement Test* (WIAT, Wechsler, 1991), which included the first 25 items. Finally, as a measure of first and second-grade students' writing fluency, we collected children's narratives written

in May and scored them for length. Correct spelling was not considered in the narrative assessment.

RESULTS

TEACHER KNOWLEDGE

Table I provides means, standard deviations, and reliability estimates for the measures of teacher knowledge, as well as for years teaching (because years teaching might provide a measure sensitive to possible differences in teacher education practices.) Analyses (ANOVAs) revealed no significant differences across the groups on phonological knowledge, general knowledge, literature knowledge,² or years teaching. However, the contrast between teachers' scores on the general knowledge test and the linguistic knowledge test (both reported as percent correct) is striking.

TABLE I. Means, Standard Deviations (SD), and Internal Consistency Reliabilities for Teacher Knowledge Measures.

	Kindergarten (n = 24)			Grades 1 and 2 (n = 27)			Special Education (n = 8)	
	M	SD	alpha	M	SD	alpha	M	SD
Years Teaching	13.7	8.5		12.0	7.5		13.5	12.3
General Knowledge ^a	73.9	15.8	.88	73.9	8.5	.61	82.4	9.6
Linguistic Knowledge ^b	30.7	7.3	.84	33.0	7.6	.70	35.8	10.3
Title Knowledge								
First Grade ^c	83.8	9.6	.60	83.6	7.6	.36	83.5	9.9
Third Grade ^d	77.7	8.1	.70	81.6	7.5	.50	82.6	7.4
Sixth Grade ^e	57.4	4.9	.74	60.1	4.5	.66	63.1	5.6

^apercent correct out of 45 items

^bpercent correct out of 69

^cpercent correct out of 25

^dpercent correct out of 36

^epercent correct out of 100

²Because our other measures of teacher knowledge are reported as percent correct, we used a comparable metric in reporting results of the title recognition tests. Prior studies (e.g., Stanovich & Cunningham, 1992, 1993) reported derived scores that take into account corrections for guessing. We chose percent correct to facilitate comparisons across the assessments of teacher knowledge. We did, however, analyze false alarm rates for the title recognition tests. For all measures, the modal false alarm rate was 0; means ranged from .4% to 2.9%.

Despite their high level of general knowledge, these teachers were considerably less knowledgeable about English phonology and orthography, at least as measured by the Moats survey (see also Cunningham et al., 2001). This is not to suggest that these teachers lacked reading and spelling skills themselves, or that they lacked basic phonological awareness as typically measured in tasks used with young children. However, teachers' own literacy did not guarantee them detailed insights into structural aspects of language. Despite the difficulty of the Moats survey, accuracy in the range of 30 to 35% raises concern about whether many of these teachers had the phonological knowledge necessary to assist struggling beginning readers.

Table I also provides means, standard deviations, and reliability estimates for the literature measures. A repeated measures ANOVA (with multivariate solution) revealed no significant differences across the three teacher groups; however, overall, teachers scored higher on titles geared toward first and third grade children (mean percent correct of 83.7 and 80.1, respectively) than on titles geared toward sixth grade children (59.4% correct) ($F(2,108)=224.81$, $MSE=31.40$, $p<.001$). Thus, these teachers of young children held knowledge of children's literature geared especially for younger age groups.

TEACHER BELIEFS

Table II provides means, standard deviations, and reliability estimates³ for the measures of teacher beliefs derived from the

TABLE II. Means, Standard Deviations (SD), and Internal Consistency Reliabilities for Teacher Belief Measures.

TORP Subtest	Kindergarten (n = 24)			Grades 1 and 2 (n = 27)			Special Education (n = 8)	
	M	SD	alpha	M	SD	alpha	M	SD
	Phonics (range 10–50)	30.7	5.3	.78	31.5	4.0	.55	34.3
Skills (range 10–50)	31.9	4.1	.70	32.8	4.1	.50	35.5	6.3
Whole language (range 8–40)	25.7	4.4	.64	24.2	4.7	.66	25.3	6.7

³Due to possible mean differences between the groups in some of the measures, reliability estimates were calculated separately for the kindergarten and first- and second-grade samples. In the reliability analyses, the special education teachers' data (because of the small n) are combined with those of the kindergarten or Grade 1 and 2 teachers with whom they worked.

TORP. Descriptive statistics are reported separately for kindergarten, first- and second-grade, and special education teachers.

ANOVAs revealed no significant differences in theoretical orientation across the three groups of teachers. Despite possible differences in their training and the range of abilities among children they teach, special education and regular education teachers were similar in their theoretical orientations toward reading instruction. Across all three groups, teachers' scores were rather moderate on the TORP scales, indicating that these teachers were not strongly advocating one theoretical orientation over another.

Table III presents the zero order correlations between scores on the knowledge and belief measures for all teachers. There were no significant relationships between teachers' scores on the TORP and the Informal Survey of Linguistic Knowledge, or between the TORP and the title measures. Thus, theoretical orientation does not seem to be related to content knowledge. General knowledge was positively correlated with knowledge of third and sixth grade titles; and the three title measures were

TABLE III. Correlations among Teacher Knowledge and Beliefs.

Variable	1	2	3	4	5	6	7	8
Background								
1. General Knowledge								
2. Years Teaching	.23							
Theoretical Perspective								
3. TORP - Phonics subtest	-.16	-.10						
4. TORP - Skills subtest	.20	.17	.58**					
5. TORP - Whole language subtest	.20	-.08	-.25	-.09				
Knowledge of Phonology								
6. Survey of Linguistic Knowledge	.21	.03	.01	.05	.04			
Knowledge of Literature								
7. Title Recognition Test - First Grade	.21	-.01	-.02	.11	.21	.17		
8. Title Recognition Test - Third Grade	.36*	-.18	.06	.15	.12	.05	.41*	
9. Title Recognition Test - Sixth Grade	.37*	-.38*	-.10	.11	.21	.08	.37*	.56**

*p < .05; **p < .001

correlated with one another. Furthermore, years teaching was negatively correlated with knowledge of sixth grade titles.

CLASSROOM PRACTICE

Additional correlational analyses were performed to examine possible links between teachers' knowledge and beliefs, and their classroom practice. Because we observed only the regular education classrooms, these analyses excluded data from the special education teachers and the teacher in the alternative school (class size: five students). No significant correlations emerged among the belief measures and the practice measures. Among content measures, we found (surprisingly) that teachers' knowledge of literature was not significantly correlated with their use of comprehension activities (listening or reading), or with writing activities. Teachers' knowledge of Grade 1 titles (but no other literature measure) correlated with their use of explicit letter-sound activities ($r = .33, p < .05$). We also found a significant correlation ($r = .30, p < .05$) between teachers' phonological knowledge at the beginning of the school year and their use of explicit phonological activities across the year.

STUDENT LEARNING

Finally, we correlated teacher knowledge and teacher practice with student learning. Because teacher practice and student learning differ considerably between kindergarten and first grade, we examined kindergarten classrooms separately. For kindergarten teachers, both their phonological knowledge and their explicit phonological instruction correlated significantly with their students' end-of-year word reading ($r = .49$ and $.47$, respectively, $p < .05$), as measured by 20 word-reading items from the *Gates-MacGinitie Reading Tests*, Level R, Form K (MacGinitie & MacGinitie, 1989).

Many of our classrooms combined first- and second-grade students, so data from Grades 1 and 2 were combined in the analysis of student learning. Measures of reading included end-of-year scores on the Vocabulary and Comprehension subtests of grade-appropriate *Gates-MacGinitie Reading Tests* (with the vocabulary subtest considered a measure of word reading). In the first- and second-grade data, none of the knowledge or classroom practice variables correlated significantly with student word reading, comprehension, or spelling. We observed a marginal correlation between teachers' phonological knowledge and students' writing ($r = .38, p < .07$), as measured by length of story. Because we also had access to written stories from the be-

ginning of the school year, we were able to examine whether the marginal correlation we observed at the end of the year was an artifact of the teacher-student combinations. The correlation between teachers' phonological knowledge and the length of stories written by their students in the fall was .03, suggesting that the relationship observed in the spring was not present in the fall and, therefore, may have resulted from student learning. Few kindergarten students were reading at the beginning of the year, so a comparable fall-spring analysis was not possible with the kindergarten data.

DISCUSSION

Whereas previous research has emphasized relationships between teachers' theoretical beliefs and their classroom practice (Beach, 1994; DeFord, 1985; Sacks & Mergendoller, 1997), we enlarged the present study to include measures of teachers' reading-related content knowledge and student learning. Clearly, the topic warrants additional work, preferably with more fine-grained measures of teacher knowledge and practice. The present study offers a preliminary look at relationships between knowledge and practice in reading instruction.

Our snapshot of teachers revealed that they possessed solid overall academic backgrounds, based on the results of the general knowledge survey. Our assessment of their instructional beliefs provided a portrait of teachers far less polarized between whole language and phonics orientations than suggested by the rhetoric in many popular debates (Houtz & Searcey, 1998; Teichroeb, 1998). We observed little relationship between theoretical orientation to reading and content knowledge, at least as we defined and measured these constructs. Teachers did not advocate strongly one philosophical orientation or the other, nor were their theoretical orientations linked to their content knowledge.

The restricted range in teachers' TORP scores may have contributed in part to the observed lack of correlation between theoretical orientation toward reading and content knowledge. However, previous studies offered data supporting the validity of the TORP (DeFord, 1985; Sacks & Mergendoller, 1997), and in the present study, TORP scores showed sufficient variability to provide predictable correlations among the subtests. That is, teachers' scores on the phonics subtest showed a positive correlation with scores on the skills subtest and a negative (although not significant) correlation with scores on the whole-language

subtest (see Table III). Thus, the TORP may have validity problems, due perhaps to changes in teachers' beliefs over the nearly 20 years since its development, but a possibility remains that the TORP accurately reflects the eclecticism of many current teachers. When summarizing their teaching styles, many teachers in the present study characterized their approach as balanced, and their scores on the TORP largely confirmed their self-reports. As a group, teachers seemed less embroiled in the theoretical debate between whole language and phonics, and more enmeshed in the struggle to teach their students effectively (see also Pressley et al., 1997). A similar picture of teachers' perceptions of reading instruction emerged in studies by Mather and colleagues (Bos et al., 2001; Mather et al., 2001), employing an instrument derived from the TORP.

Our assessment of content knowledge revealed that teachers' knowledge of children's literature looked markedly different from their knowledge of phonology. Teachers' familiarity with titles of children's books was considerable and fine-tuned. For teachers of early elementary children, expertise was greatest at the lower grade levels, matching the ages of their typical students. This is heartening news, especially in light of evidence indicating that joint book-reading experiences are most powerful for younger children before they develop the skills to read on their own (Bus et al., 1995).

In contrast, teachers' knowledge of language structure and phonology was lower than we might hope, given the evidence supporting the importance of children's phonological awareness in the acquisition of reading skill (Adams, 1990; NRP, 2000). Although phonological awareness is much discussed in reading research, the details of English phonology may not yet be widely understood by teachers. In a published survey (Troyer & Yopp, 1990), only about one third of the 163 responding kindergarten teachers reported that they were familiar with the concept of phonological awareness. In the intervening decade, teachers may have become more familiar with the term phonological awareness; however, our data add to an emerging recognition that teachers are still not provided with an extensive, explicit knowledge of English phonology (Bos et al., 2001; Cunningham et al., 2001; Mather et al., 2001; Moats, 1994).

We should, however, acknowledge the limitations of our measures and consider the knowledge data (both of literature and phonology) with some caution. Despite the relatively high levels of reliability (.72-.81) shown by the title measures in studies with children (Cunningham & Stanovich, 1991), the test of

first-grade titles showed a low internal reliability estimate for our sample of first- and second-grade teachers, and the reliability of the test of third-grade titles was only somewhat higher for that group. These were relatively short tests (25 and 36 items, respectively), designed for children, and a number of the items were correctly identified by all the teachers (e.g., *Where the Wild Things Are*), further limiting the number of items contributing to the reliability estimates. Thus, the low reliability estimates may be due, in large part, to the number of items on which the teachers' scores varied. It is also worth noting that reliabilities were acceptable for the sample of kindergarten teachers.

Although data derived from these measures should not be overinterpreted, the data do suggest an alternative way to think about the professional knowledge base of teachers of beginning reading. Our results indicate that teachers' beliefs were not strongly predictive of their practice. However, across all three grades, teachers' reading-related content knowledge was related to the instructional practices they used to focus children's attention on sounds and letter-sound relationships. Moreover, kindergarten teachers' phonological knowledge and explicit instruction in the alphabetic principle were related to their students' end-of-year word reading. The correlation between teacher knowledge and student literacy did not hold in the first- and second-grade sample. Perhaps we should not be surprised that as literacy practices become more complex, isolated aspects of teacher content knowledge and brief observations of classroom practice become less able to account for student outcomes. More detailed analyses of classroom interaction, possibly including video data, may illuminate such links.

In light of the positive correlation between kindergarten teachers' phonological knowledge and their students' reading, the overall low scores of the teachers on the phonological survey are noteworthy, and troublesome. Considerable research indicates that children need to develop phonological awareness to begin to read and that many children need instruction to attend appropriately to sounds within words (see Adams, 1990; Share & Stanovich, 1995, for reviews). Our data reinforce other recent findings that teachers also may need instruction to develop the phonological skills adequate to help struggling students (Bos et al., 2001; Cunningham et al., 2001; Mather et al., 2001; Moats, 1994).

We are not advocating that teachers simply enroll in advanced courses in phonology, morphology, and historical linguistics to deepen their linguistic knowledge. To use such knowledge productively in their classrooms, teachers need the

pedagogical content knowledge that results from careful analysis of children's literate work (e.g., their spelling and decoding attempts) within the context of children's linguistic development. For example, the savvy teacher would recognize that *train* spelled as *chran*, or *dragon* as *jragin*, represents sophisticated phonological analysis on the child's part, not bizarre behavior or indifference to spelling-sound correspondence,⁴ and such insight would change the teacher's instructional response dramatically. A focus on student work has proven effective in helping elementary teachers develop both content and pedagogical content knowledge to support their mathematics instruction (Carpenter, Fennema & Franke, 1996). A similar approach based on students' literate work, and the linguistic knowledge necessary to make sense of it, could prove equally effective in helping elementary teachers develop the phonological knowledge that many currently lack (McCutchen et al., 2002; McCutchen & Berninger, 1999).

CONCLUSIONS

The present study was not intended to revive the Great Debate (Chall, 1967, 1989) or more recent controversies in reading instruction. Rather, the goal was to begin to disentangle discussions of teacher content knowledge from discussions of instructional philosophies. Skilled teachers currently advocate a balanced approach to instruction (see Pressley, 1998; Pressley et al., 1997). Like many of their colleagues, the teachers participating in this study demonstrated that they were not dogmatic in either their philosophical beliefs about reading or their instructional practices. It was teachers' content knowledge, not their philosophical beliefs, that predicted their classroom practice. Such a finding illustrates the importance of the call from the National Reading Panel (2000) for more research on the knowledge base needed to teach reading effectively, especially knowledge of phonology. The inclusion of teacher content knowledge in our discussions of reading instruction may help us reposition such discussions, moving them from the realm of strident political debate into the more reasoned context of disciplinary knowledge.

⁴The alveolar stop consonants typically represented in English by *t* and *d* are similar in articulatory features to the alveolar affricates represented in English by *ch* and *j*. The articulatory, and hence phonological, similarities are exaggerated in the coarticulation effects that result when alveolar stops are followed by the sound represented by prevocalic *r*.

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References

- ACT. (1997). *The high school profile report: Normative data*. Iowa City, IA: Author.
- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Allen, L., Cipielewski, J., & Stanovich, K. E. (1992). Multiple indicators of children's reading habits and attitudes: Construct validity and cognitive correlates. *Journal of Educational Psychology, 84*, 489-503.
- Alvermann, D. E. (1990). Reading teacher education. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 687-704). New York: Macmillan.
- Austin, M. C. (1961). *The torch lighters: Tomorrow's teachers of reading*. Cambridge, MA: Harvard University Press.
- Bader, L. A. (1975). Certification requirements in reading: A trend. *Journal of Reading, 19*, 237-240.
- Ball, D. L. (1991). Research on teaching mathematics: Making content knowledge part of the equation. In J. Brophy (Ed.), *Advances in research on teaching* (vol. 2) (pp. 1-48). Greenwich, CT: JAI Press.
- Ball, E. W., & Blachman, B. A. (1991). Does phonemic awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26*, 49-66.
- Baumann, J. F., Hoffman, J., Moon, J., & Duffy-Hester, A. M. (1998). Where are the teachers' voices in the phonics/whole language debate? Results from a survey of U.S. elementary classroom teachers. *The Reading Teacher, 51*, 636-650.
- Beach, S. A. (1994). Teacher's theories and classroom practice: Beliefs, knowledge, or context? *Reading Psychology: An International Quarterly, 15*, 189-196.
- Bergeron, B. (1990). What does the term whole language mean? Constructing a definition from the literature. *Journal of Reading Behavior, 22*, 301-329.
- Borko, H., & Putnam, R. T. (1996). Learning to teach. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 673-708). New York: Simon & Schuster Macmillan.
- Bos, C., Mather, N., Dickson, S., Podhajski, B., & Chard, D. (2001). Perceptions and knowledge of preservice and inservice educators about early reading instruction. *Annals of Dyslexia, 51*, 97-120.
- Braam, L., & Oliver, M. (1970). Undergraduate reading education. *The Reading Teacher, 23*, 426-428.
- Bruschi, B., & Coley, R. (1999). *How teachers compare: The prose, document, and quantitative skills of America's teachers*. Princeton, NJ: ETS.
- Burns, M. S., Griffin, P., & Snow, C. E. (Eds.). (1999). *Starting out right: A guide to promoting children's reading success*. Washington, DC: National Academy Press.

- Bus, A. D., van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, 65, 1-21.
- Carpenter, T. P., Fennema, E., & Franke, M. L. (1996). Cognitively Guided Instruction: A knowledge base for reform in elementary mathematics instruction. *Elementary School Journal*, 97, 1-20.
- Chall, J. S. (1967). *Learning to read: The great debate*. New York: McGraw-Hill.
- Chall, J. S. (1989). Learning to read: The great debate 20 years later. *Phi Delta Kappan*, 70, 521-538.
- Clark, C. M., & Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed.) (pp. 255-296). New York: Macmillan.
- College Board. (1997). *College bound seniors: A profile of SAT program test takers*. New York: Author.
- Commission on Reading, National Academy of Education. (1985). *Becoming a nation of readers*. Washington, DC: National Institute of Education.
- Cunningham, A. E. (1990). Explicit versus implicit instruction in phonemic awareness. *Journal of Experimental Child Psychology*, 50, 429-444.
- Cunningham, A. E., Perry, K. E., Stanovich, K. E., Stanovich, P. J., & Chapell, M. M. (2001, June). *Is teachers' knowledge of important declarative knowledge of reading well calibrated?* Paper presented at the annual meeting of the Society for the Scientific Study of Reading, Denver, Colorado.
- 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, A. E., & Stanovich, K. E. (1993). Children's literacy environments and early word recognition subskills. *Reading and Writing: An Interdisciplinary Journal*, 5, 193-204.
- Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, 33, 934-945.
- DeFord, D. E. (1985). Validating the construct of theoretical orientation in reading instruction. *Reading Research Quarterly*, 20, 351-367.
- Ehri, L. C., & Williams, J. P. (1995). Learning to read and learning to teach reading. In F. Murray (Ed.), *The teacher educator's handbook: Building a knowledge base for the preparation of teachers* (pp. 231-244). San Francisco: Jossey-Bass.
- Fromkin, V., & Rodman, R. (1993). *An introduction to language*. Forth Worth, TX: Harcourt Brace Jovanovich.
- George, J. C. (1974). *Julie of the wolves*. New York: Harpercollins.
- Grossman, P. L. (1991). What are we talking about anyway? Content knowledge of secondary English teachers. In J. Brophy (Ed.), *Advances in Research on Teaching* (vol. 2) (pp. 245-264). Greenwich, CT: JAI.
- Grossman, P. L., Valencia, S. W., & Hamel, F. (1995). Preparing language arts teachers in a time of reform. In J. Flood, S. B. Heath, & D. Lapp (Eds.), *Handbook for research on teaching literacy through the communicative and visual arts* (pp. 407-416), New York: Macmillan.
- Grossman, P. L., Wilson, S. M., & Shulman, L. S. (1989). Teachers of substance: Subject matter knowledge for teaching. In M. C. Reynolds (Ed.), *Knowledge base for the beginning teacher*. New York: Pergamon.
- Hirsch, E. D., Jr. (1987). *Cultural literacy: What every American needs to know*. Boston: Houghton Mifflin.
- Houtz, J., & Searcey, D. (1998, February 15). *A battle over the ABC's*. The Seattle Times, p. A1.

- International Reading Association (IRA), Committee on Professional Standards and Ethics. (1978). Guidelines for the preparation of reading teachers. *The Reading Teacher*, 32, 48-55.
- Iversen, S., & Tunmer, W. E. (1993). Phonological processing skills and the Reading Recovery Program. *Journal of Educational Psychology*, 85, 112-126.
- Leinhardt, G., & Greeno, J. G. (1986). The cognitive skill of teaching. *Journal of Educational Psychology*, 78, 75-95.
- Lewkowicz, N. K. (1980). Phonemic awareness training: What to teach and how to teach it. *Journal of Educational Psychology*, 72, 686-700.
- Lobel, A. (1979). *Frog and toad are friends*. New York: Harpercollins.
- Lundberg, I., Frost, J., & Petersen, O. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. *Reading Research Quarterly*, 23, 263-284.
- MacGinitie, W. H., & MacGinitie, R. K. (1989). *Gates MacGinitie reading tests* (3rd ed.). Chicago: Riverside.
- Manning, G., & Manning, M. (Eds.). (1989). *Whole language: Beliefs and practices, K-8*. Washington, DC: National Education Association.
- Mather, N., Bos., C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice educators about early reading 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. (2002). Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities*, 35, 69-86.
- McCutchen, D., & Berninger, V. W. (1999). Those who know teach well: Helping teachers master literacy related content knowledge. *Learning Disabilities Research and Practice*, 14, 215-226.
- Miller, J. D. (1989, January). *Scientific literacy*. Paper presented at the annual meeting of the American Association for the Advancement of Science, San Francisco.
- Moats, L. C. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia*, 44, 81-102.
- Nathan, M. J., & Koedinger, K. R. (2000). An investigation of teachers' beliefs of students' algebra development. *Cognition and Instruction*, 18, 207-235.
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington, DC: National Academy Press.
- Nolen, P. A., McCutchen, D., & Berninger, V. (1990). Ensuring tomorrow's literacy: A shared responsibility. *Journal of Teacher Education*, 41, 63-72.
- Pearson, P. D. (1996). Six ideas in search of a champion: What policymakers should know about the teaching and learning of literacy in our schools. *Journal of Literacy Research*, 28, 302-309.
- Pressley, M. (1998). *Reading instruction: The case for balanced teaching*. New York: Guilford.
- Pressley, M., Wharton-McDonald, R., Rankin, J., El-Dinary, P. B., Brown, R., Afflerbach, P., Mistretta, J., & Yokoi, L. (1997). Elementary reading instruction. In G. D. Pyle (Ed.), *Handbook of academic learning: Construction of knowledge* (pp. 151-198). San Diego, CA: Academic Press.
- Purcell-Gates, V., McIntyre, E., & Freppon, P. A. (1995). Learning written story book language in school: A comparison of low-SES children in skills-based and whole language classrooms. *American Educational Research Journal*, 32, 659-685.
- Richardson, V., Anders, P., Tidwell, D., & Lloyd, C. (1991). The relationship between teachers' beliefs and practices in reading comprehension instruction. *American Educational Research Journal*, 28, 559-586.

- Riverside Publishing. (1989). *Cultural literacy test*. Chicago: Author.
- Sacks, C. H., & Mergendoller, J. R. (1997). The relationship between teachers' theoretical orientation toward reading and student outcomes in kindergarten children with different initial reading abilities. *American Educational Research Journal*, 34, 721-739.
- Scarborough, H. S., & Dobrich, W. (1994). On the efficacy of reading to preschoolers. *Developmental Review*, 14, 245-302.
- Scharer, P. L., Freeman, E. B., Lehman, B. A., & Allen, V. G. (1993). Literacy and literature in elementary classrooms: Teachers' beliefs and practices. In D. J. Leu & C. K. Kinzer (Eds.), *Examining central issues in literacy research, theory and practice* (pp. 359-366). Chicago: National Reading Conference, Inc.
- Sendak, M. (1988). *Where the wild things are*. New York: Harpercollins.
- Shanahan, T. (1994). *Teachers thinking, teachers knowing*. Urbana, IL: National Council of Teachers of English: National Conference on Research in English.
- Share, D. L., & Stanovich, K. E. (1995). Cognitive processes in early reading development: Accommodating individual differences into a model of acquisition. *Issues in Education: Contributions from Educational Psychology*, 1, 1-57.
- Shulman, L. S. (1987). Knowledge and teaching: Foundations for the new reform. *Harvard Educational Review*, 57, 1-22.
- Silverstein, S. (1987). *A light in the attic*. New York: Harpercollins.
- Stanovich, K. E., & Cunningham, A. E. (1992). Studying the consequences of literacy within a literate society: The cognitive correlates of print exposure. *Memory and Cognition*, 20, 51-68.
- Stanovich, K. E., & Cunningham, A. E. (1993). Where does knowledge come from? Specific associations between print exposure and information acquisition. *Journal of Educational Psychology*, 85, 211-229.
- Stanovich, K. E., Cunningham, A. E., & Cramer, B. B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparability. *Journal of Experimental Child Psychology*, 38, 175-190.
- Taylor, B. M., Frye, B. J., & Maruyama, G. M. (1990). Time spent reading and reading growth. *American Educational Research Journal*, 27, 351-362.
- Teichroeb, R. (1998, January 20). Phonics teaching debate is back. *Seattle Post-Intelligencer*, p. A1.
- Tharp, R. G., & Gallimore, R. (1989). Rousing schools to life. *American Educator*, 13, 20-52.
- Thelen, J. N. (1972). Everyone shall have the right to read, but who is going to teach them? *The Reading Teacher*, 25, 612-615.
- Troyer, S. J., & Yopp, H. K. (1990). Kindergarten teachers' knowledge of emergent literacy concepts. *Reading Improvement*, 27, 34-40.
- Van Allsburg, C. (1986). *The polar express*. Boston: Houghton Mifflin.
- Venezky, R. L. (1970). *The structure of English orthography*. The Hague: Mouton.
- Warner, G. C. (1942/1989). *The boxcar children*. Morton Grove, IL: Albert Whitman.
- Wechsler, D. (1991). *Wechsler individual achievement test*. San Antonio, TX: Psychological Corp.
- Wineburg, S. S., & Wilson, S. M. (1991). Content knowledge in the teaching of history. In J. Brophy (Ed.), *Advances in research on teaching* (vol. 2) (pp. 305-347). Greenwich, CT: JAI Press.
- Winkeljohann, Sr. R. (1976). State certification of reading teachers. *The Reading Teacher*, 29, 524-525.