

Licensure Tests for Special Education Teachers

How Well They Assess Knowledge of Reading Instruction and Mathematics

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To determine the extent to which knowledge of evidence-based reading instruction and mathematics is assessed on licensure tests for prospective special education teachers, this study drew on information provided by Educational Testing Service (ETS), the American Board for Certification of Teacher Excellence, and National Evaluation Systems (now Evaluation Systems group of Pearson). It estimated the percentage of test items on phonemic awareness, phonics, and vocabulary knowledge and on mathematics content. It also analyzed descriptions of ETS's tests of "principles of teaching and learning." Findings imply that prospective special education teachers should be required to take both a dedicated test of evidence-based reading instructional knowledge, as in California, Massachusetts, and Virginia, and a test of mathematical knowledge, as in Massachusetts. States must design their own tests of teaching principles to assess knowledge of evidence-based educational theories.

Keywords: *licensure tests; teacher tests; special education teachers; mathematics knowledge; reading instructional knowledge*

Licensure tests—which typically assess the basic substantive knowledge needed for professional practice—are a key measure of quality control for entry into most professions. There are two major reasons for teacher licensure tests: (a) to protect the public (as with most licenses) and (b) to make teacher training programs accountable for the initial academic competence of those who complete their programs (Stotsky, 2006, 2007a, 2007b; Stotsky & Haverty, 2004). States began to require the passing of a licensure test for entry into the teaching profession approximately two decades ago. A provision in Title II in the 1998 reauthorization of the Higher Education Act compelled all states to require licensure tests for new teachers (see Note 1). Each state henceforth had to report annually on the pass rates on tests of its own choosing for each cohort of prospective teachers completing training programs in the state's teacher training institutions. However, the provision in Title II also allowed each state to decide what licensure tests it would require and what the test would assess, to set passing scores, and to determine when tests could be taken. The expectation was that a requirement to report pass-fail scores on state licensure tests annually would upgrade the quality of the teacher preparation programs in each

state. However, as the findings of several studies noted below suggest, this has not happened in elementary licensure programs.

In the past decade, comprehensive reports were issued by national panels of distinguished scholars and researchers on the research base for the pedagogy used in teaching the two major subjects in the schools. The National Reading Panel (NRP) issued its report, *Teaching Children to Read*, in April 2000, describing the major elements supported by high-quality research for improving beginning reading instruction. The analysis conducted by the NRP found that most children can benefit from systematic instruction in the following areas: phonemic awareness, phonics, fluency, vocabulary, and text comprehension. Table 1 shows the key research findings of the NRP as summarized by two reading researchers.

Despite the research support for this body of reading instructional knowledge, two studies that examined syllabi for reading methods courses after 2000 (National Council on Teacher Quality, 2006; Steiner & Rozen, 2004) found that few schools of education expected an understanding of the above mentioned body of knowledge in their reading methods courses.

Table 1
Key Research Findings on Beginning Reading Instruction

Phonemic awareness can be taught and learned.
Phonemic awareness instruction helps children learn to read.
Phonemic awareness instruction helps children learn to spell.
Phonemic awareness instruction is most effective when children are taught to manipulate phonemes by using the letters of the alphabet.
Phonemic awareness instruction is most effective when it focuses on only one or two types of phoneme manipulation rather than several types.
Systematic and explicit phonics instruction is more effective than nonsystematic or no phonics instruction.
Systematic and explicit phonics instruction significantly improves kindergarten and first-grade children's word recognition and spelling.
Systematic and explicit phonics instruction significantly improves children's reading comprehension.
Systematic and explicit phonics instruction is effective for children from various social and economic levels.
Systematic and explicit phonics instruction is particularly beneficial for children who are having difficulty learning to read and who are at risk for developing future reading problems.
Systematic and explicit phonics instruction is most effective when introduced early.
Phonics instruction is not an entire reading program for beginning readers.
Repeated and monitored oral reading improves reading fluency and overall reading achievement.
No research evidence is available currently to confirm that instructional time spent on silent, independent reading with minimal guidance and feedback improves reading fluency and overall reading achievement.
Children learn the meanings of most words indirectly, through everyday experiences with oral and written language.
Although a great deal of vocabulary is learned indirectly, some vocabulary should be taught directly.
Text comprehension can be improved by instruction that helps readers use specific comprehension strategies.
Students can be taught to use comprehension strategies.
The following six strategies appear to have a firm scientific basis for improving text comprehension: monitoring comprehension, using graphic and semantic organizers, answering questions, generating questions, recognizing story structure, and summarizing.

Source: Armbruster and Osborn (2001).

Knowledge Needed to Teach Early Mathematics

The National Mathematics Advisory Panel (NMAP) issued its report, *Foundations for Success*, in March 2008, identifying what teaching practices are supported by high-quality research that would increase mathematics achievement in preschool, elementary school, and middle school. Among other things, NMAP identified the 27 major topics of school algebra (typically taught in Algebra I and Algebra II) and set forth the crucial mathematical concepts and skills that students need to master in PreK–7 for potential success in Algebra I. These foundational concepts and skills were organized in three categories. First, Fluency with Whole Numbers included understanding of place value; fluency in composing and decomposing whole numbers; understanding basic operations of addition, subtraction, multiplication, and division; automatic recall of number facts; fluency with the standard algorithms for addition, subtraction, multiplication, and division; and knowledge of how to apply these operations to problem solving. Second, Fluency with Fractions included a thorough understanding of positive and negative fractions as well as the ability to locate fractions on the number line, to represent and compare fractions, decimals, and related percentages, and to estimate their size. Students also need to know that sums, differences, products, and quotients (with nonzero denominators) of fractions are fractions, why and how (finite) decimal numbers are frac-

tions, and the meaning of percentages. Third and last, Particular Aspects of Geometry and Measurement included experience with similar triangles because sound treatments of the slope of a straight line and of linear functions depend logically on the properties of similar triangles.

In the area of pedagogical practices, NMAP highlighted the following findings. (a) Students with learning problems benefit from explicit and systematic instruction. (b) Formative assessment is beneficial, especially at the elementary level. (c) Small group work and the use of “real-world” problems may be beneficial but only under very specific conditions, at certain grade levels, and chiefly for developing computational skills. (d) Calculator use does not promote conceptual development, calculation skills, or problem solving. In addition, NMAP found no body of research showing that teacher-directed learning prevents students from understanding mathematics.

The NMAP report also reaffirmed teachers' knowledge of mathematics as, so far, the only identifiable characteristic of an effective mathematics teacher. Yet a study on the preparation of elementary teachers in mathematics in 77 institutions in 49 states (Greenberg & Walsh, 2008) judged only 10 of these institutions to provide adequate mathematics coursework for aspiring teachers. Greenberg and Walsh (2008) examined instructional time spent on the four areas of mathematics that an elementary teacher needs to understand: (a) numbers and operations, (b) algebra, (c) geometry and measurement, and (d) data analysis and probability. Of the four areas, Greenberg

and Walsh found algebra instruction the weakest, with more than half of all schools (52%) devoting less than 15% of class time to algebra and another third effectively *ignoring it entirely*, devoting less than 5% of class time to algebra. According to the mathematics advisory group for this study, algebra should compose roughly 25% of the preparation in mathematics for elementary teachers because teachers need to understand it as the generalization of the arithmetic they address and its connection to many of the properties, relationships, rules, and models that elementary students study.

These studies paint a dismal picture of the academic quality of reading methods courses and mathematics coursework for prospective elementary teachers. Indeed, Arthur Levine's report *Educating School Teachers*, issued in September 2006, concluded that the vast bulk of the 1,200 education schools in this country have incoherent curricula as well as excessively low admission standards. It is therefore logical to look at what is assessed on the licensure tests taken by most prospective PreK–8 special education teachers because they should know, academically and instructionally, exactly what elementary teachers should know. Although they tend to work chiefly with children who have great difficulty in reading (and writing), they also work with learning disabled children in mathematics, and their problems in learning mathematics today are compounded by the emphasis in most current mathematics programs on a great deal of reading (of mathematics problems) and writing about mathematics. The content assessed on their licensure tests should therefore serve as a measure of quality control for their academic competence and as one predictor of their future effectiveness.

Studies Examining Teacher Licensure Exams

Mitchell and Barth (1999) examined teacher licensure exams, reviewing the content of a number of different skills and subject tests produced by Educational Testing Service (ETS) and National Evaluation Systems (NES). Although Mitchell and Barth did not provide any details on the quality of the test items used to assess prospective teachers' reading skills, they judged two thirds of the mathematics items on ETS's *PRAXIS I* to be at the middle school level, noting that it contained fewer items on algebra and geometry than the 1996 Grade 8 National Assessment of Educational Progress mathematics test. The authors praised the sample items on NES's skills test for prospective teachers and administrators in Massachusetts, which they considered more complex and demanding than any of the other exams that they had

reviewed. Nevertheless, Mitchell and Barth maintained that none of the skills tests reviewed were at the level of a graduating college senior. Rather, they argued that the various tests of teachers' reading, writing, and arithmetic skills were at most at the "8th to 10th (sometimes 7th) grade level" (p. 10). More recently Rigden (2006) and Stotsky (2006) examined the licensure tests assessing reading pedagogical knowledge most commonly taken by prospective elementary teachers. Unfortunately, neither of these studies systematically examined all the tests designed expressly for, or commonly taken by, prospective special education teachers to determine to what extent their research-based reading instructional knowledge and relevant mathematics knowledge are assessed.

The purpose of the present study, therefore, was to determine the extent to which licensure tests for prospective special education teachers assess reading and mathematical knowledge. In the present study, three of the five major components of beginning reading instruction (phonemic awareness, phonics, and vocabulary) supported by the NRP (2000), as well as the amount of mathematics knowledge, were examined. These three components of beginning reading instruction have been ignored, devalued, or distorted for many years in most basal reading programs and teacher preparation programs; "skills" instruction was among the major casualties in the rise of the whole language movement, as Pearson (2004) noted in an account of the "reading wars." These three components are also easy to identify in a test description if they are mentioned at all.

The primary question the present study examined is whether subject area licensure tests required of prospective PreK–8 special education teachers adequately assess their knowledge of three components of research-based reading instruction and the mathematics they need for teaching purposes. In addition, the present study examined licensure tests designed to assess prospective or new teachers' knowledge of basic teaching practices to determine whether these tests assess understanding and use of educational theories that underlie effective research-based practices. Although knowledge of both reading pedagogy and mathematics was assessed in the present study, a disproportionate amount of information was available on reading rather than mathematics, which is thus reflected in the final analysis.

Background Information on Licensure Tests for General Education Teachers

Some background information on teacher licensure tests will help readers understand differences and limitations that exist in the tests. ETS provides licensure tests

for more than 35 states, chiefly states with small populations. In contrast, a second company, NES, contracts to provide tailor-made tests for more than 12 states, chiefly the most populous states. Well more than 50% of U.S. teachers are licensed in NES states (Mitchell & Barth, 1999). The American Board for Certification of Teacher Excellence (ABCTE) is a recent addition to the small group of organizations that provide teacher tests. In states that have approved use of their tests for an initial license, endorsement, or master teacher status, ABCTE provides tests or endorsement certificates for prospective or practicing teachers who do not wish to enroll in a traditional preparation program and for current teachers seeking master teacher status.

Most states require teaching candidates to take at least two different tests for initial licensure: one assesses the candidate's basic reading, writing, and mathematical skills, the other (sometimes more than one content test is required) assesses the content knowledge presumed needed for teaching the field of the license at the grade levels it covers. These licensure tests are taken at different junctures in undergraduate teacher preparation and licensure programs, typically not at the completion of the program, unlike most professional licensure tests. Because many, if not most, states do not mandate when their teacher tests are to be taken, a growing number of teacher training institutions use the state-required skills test to screen admission *into* their licensure programs. In states contracting with ETS, *PRAXIS I* is used for this purpose. In states contracting with NES, a skills test developed by NES is used for this purpose. The content knowledge test, which often includes items on teaching methods, is increasingly used to screen admission to student teaching. However, both the skills test and the content test are usually required for admission into postbaccalaureate programs for the initial license. College graduates who choose to become teachers via a postbaccalaureate program (e.g., a MED program) but cannot pass the needed content knowledge test may be still be admitted. However, postbaccalaureate teacher candidates are expected to take necessary academic coursework and pass the content knowledge test before student teaching is permitted.

Most passing scores do not provide clear and comparable information on academic competence. Each ETS state determines its own pass score, which may differ from that of another state using the same ETS test. NES states also determine their own pass score. Only pass scores on the tests prepared by the ABCTE are predetermined, and states may not alter them. There are no data across all states on how many test items need to be correct for a passing score on each of the different tests that states require. Test formats differ across tests and testing

companies. In some but not all NES states, tests may have about 80 multiple-choice items and 2 short essay questions. ETS tests tend to have mainly multiple-choice items, but ETS does offer tests with essay questions as well. Compensatory scoring is used for most ETS and NES tests and for ABCTE tests, that is, the test taker's raw score (before conversion to a scaled score) is the total number of items answered correctly, not a weighted number depending on the number of items correctly answered in each section of the test.

By default, therefore, licensure tests may strongly influence the content of the reading mathematics coursework aspiring special education teachers are required to take. Required tests may also influence how these aspiring teachers will teach reading or mathematics if the tests contain pedagogical items.

Background Information on Licensure Tests for Special Education Teachers

What kinds of tests does an aspiring special education teacher take? In all states, most if not all prospective teachers are required to take a test of their general reading, writing, and mathematic skills. In addition, depending on the state, prospective PreK–6 or PreK–8 special education teachers may have to take a subject matter test designated for them. Or they may be required to take, in addition or instead, one or more tests required as well for the aspiring elementary teacher. For example, in California, Massachusetts, and Virginia, prospective special education teachers must take a test of reading instructional knowledge as well as another subject test. In Illinois, they must take an elementary-level curriculum test that clearly assesses subject matter, or content, knowledge, including mathematics, not professional knowledge such as teaching methods or skills. In a few ETS states, the candidates may be required to take a similar type of test (*PRAXIS 0511*). For the secondary level in Massachusetts, the prospective special education teacher may take either an elementary or middle school subject matter test, but such an option does not seem to be available in other states. Finally, in a growing number of states, the special education teacher must also take a test of “principles of learning and teaching.” Because of the variance in regulations across states, it is necessary to examine the different kinds of tests.

Method

To arrive at an estimate, weights indicated on the ETS Web site for the section or sections for reading instruction were used. Next, the weights for the subsections that

Table 2
Estimated Percentage of Test Addressing Phonemic Awareness, Phonics, and Vocabulary Knowledge

ABCTE <i>Elementary Test</i> : 9% to 10%	California RICA: 45% to 50%
ABCTE <i>Reading Test</i> : 38%	Illinois 110: 5% to 6%
	Massachusetts 90: 54%
<i>PRAXIS 0011</i> : 7% (17 states)	Michigan 83: 2%
<i>PRAXIS 0012</i> : 1% (7 states)	New York 02: 12%
<i>PRAXIS 0014</i> : 3% (22 states)	Oklahoma 50: 25%
<i>PRAXIS 0201</i> : 39% (1 state)	Virginia VRA: 25%

Note: ABCTE = American Board for Certification of Teacher Excellence; RICA = *Reading Instruction Competence Assessment*; VRA = *Virginia Reading Assessment*.

mentioned the three components (phonemic awareness, phonics, and vocabulary) were added. If any one of the three components was mentioned in a long list of topics in a subsection, the percentage of the weight for the whole subsection that relevant test items might reflect was calculated. Finally, all subsection percentages that were calculated to percentages of the total test were converted and added up for the final total.

Results

Below, the results are reported according to the specific test for prospective elementary teachers and special education teachers.

Tests Designed for Prospective Elementary Teachers: Reading and Mathematics Content

Profiles of 13 tests assessing reading pedagogical knowledge wholly or in part are contained in an online appendix to this article (see <http://journaloflearningdisabilities.sagepub.com/supplemental>). The profiles indicate their major categories (how their objectives are organized), their weights (how much the items in each category count as a percentage of the test), and where the three components of reading pedagogical knowledge are addressed in the online descriptions of these tests. Four of these tests are offered by ETS as part of the *PRAXIS II* series. A large majority of the states require one or more of these four ETS subject tests for an initial elementary license and sometimes for an initial special education and/or early childhood license as well. Seven of the tests are used by states that contracted with NES for their development. Because the most populous states as well as a few smaller states contract with NES, this study includes those required by California, Illinois, Massachusetts, Michigan, New York, Oklahoma, and Virginia to cover a variety of NES states. It also includes two tests offered by ABCTE because some states now allow them as an alternative to

the required tests for an elementary or special education teacher. In all cases, information was drawn from the descriptions available on the Web sites of these organizations because it is not possible to examine the actual contents of licensure tests (which must be secure) and report on details in their test items.

As indicated earlier, the present study examined the weights in the tests for the development of phonemic awareness, phonics knowledge or decoding skills, and vocabulary knowledge, not only because each is supported by a large, consistent, and credible body of research evidence (e.g., see Chall, 1996a, 1996b, 2000; NRP, 2000) but also because these three areas were emphasized in the Reading First initiative. The weights for reading comprehension or fluency were not examined because the former is assessed on all tests assessing reading instruction, and thus noting its presence and weight provides no distinctive information, whereas the latter may be listed under a variety of synonymous words or phrases and is thus not easily identifiable.

Table 2 provides an estimate of the total percentage of the score on each of these 13 tests that may be accounted for by test items on the three components. Table 2 also notes the number of states that either require the test or make it one of two or three test options. Many states require more than one *PRAXIS* subject test for the elementary or special education license. In states that require the *PRAXIS 0012*, which consists of four essay questions, an additional test is then usually required.

These 13 tests differ markedly in what they expect a new teacher of elementary-age children to know. As can be seen, the estimated percentages range from 1% or 2% to 50% or 54%. To judge by these percentages, there is large variation in the importance these tests attach to an understanding of the implications of the alphabetic principle for reading instruction and the role of vocabulary knowledge in developing reading skills. As can also be observed, states contracting with NES tend to expect prospective teachers of elementary-age children to acquire more knowledge of these three critical components of beginning reading instruction than do states using ETS tests. Three of these states (California, Massachusetts, and Virginia) try to ensure a high level of knowledge in these three areas by requiring a test of reading pedagogy in addition to a general, or multisubject, test. Oklahoma also has a high percentage of content regarding reading pedagogy because the particular multisubject test chiefly consists of reading and language arts. On the other hand, at least two NES states (Illinois and Michigan) have no higher expectations than those states using ETS's elementary tests. This analysis demonstrates that the content of an NES test appears to be determined by the state contracting with NES.

The percentages on these tests provide further information, given the strong possibility that passing scores are not set so high as to fail a majority of those who take the tests for the first time. Thus, prospective special education teachers taking the NES elementary test required in Illinois and Michigan, or any of ETS's elementary tests, need not worry if they have learned little about phonemic awareness or phonics (or decoding)—two basic components of beginning reading. Nor do they need to be concerned about how little they may have learned about the nature of the vocabulary of the English language and the variety of approaches needed for developing vocabulary knowledge—the basic element in reading comprehension in all content areas. These aspects of reading instruction receive such minimal attention that test takers could fail every question on these topics and, because of compensatory scoring, still pass these tests no matter where the passing score is set. Therefore, there are no negative consequences for their professional preparation programs if education faculties have included little about these three components in their methods courses and insisted that reading vocabulary be taught only “in context” or on the basis of “prior knowledge” (i.e., not through explicit instruction), injunctions that appear in ETS's test descriptions whenever vocabulary is mentioned at all.

An independent analysis of the contents of eight licensure tests assessing reading pedagogical knowledge supports the analysis and conclusions presented above. In a report for the National Council for Accreditation of Teacher Education, Rigden (2006) examined five ETS tests as well as the information that NES provides on the reading tests it developed for California, Massachusetts, and Virginia. She wanted to see if these eight tests address the knowledge base for effective reading instruction. Rigden found that only the three NES tests and one ETS test (*PRAXIS 0201*), a reading test required only in Tennessee (and for which test takers get credit simply by taking it), have items that address the five components of research-based reading instruction. Thus, Rigden argued that *PRAXIS 0011* “is not a good measure of a teacher candidate's knowledge of the five components of effective reading instruction” (p. 18).

Only six states (California, Connecticut as of 2009, Massachusetts, Oklahoma, Tennessee, and Virginia) require a separate reading test for licensing prospective elementary teachers and sometimes other teachers of elementary-age children (although only about 70% of Oklahoma's test actually assesses reading and the language arts, and the number of items in each subsection varies widely across test administrations) (see Note 2).

Tests Assessing Mathematics or Mathematical Pedagogical Knowledge

There are as yet no tests of mathematical pedagogical knowledge similar to those that assess reading pedagogical knowledge, and prospective special education teachers are not required to take a mathematics subject test in any state (except in Massachusetts as of 2009). Moreover, there is almost no information available on the nature and quality of the items assessing mathematics or mathematical pedagogical knowledge on the tests described in the previous section that may be required of prospective special education teachers as well as elementary teachers (e.g., *PRAXIS 0011*, *PRAXIS 0012*, *PRAXIS 0014*, ABCTE's *Multiple Subjects Exam*, and *New York's Multiple Subject Test 02*). Rigden's (2006) study, for example, does not provide any information on how ETS's commonly used multisubject tests for elementary licensure address the mathematics or mathematical pedagogical knowledge needed for teaching mathematics in Grades 1 to 6.

The profiles of these tests on their Web sites do indicate that their sections on mathematics knowledge and mathematical pedagogical knowledge (which are usually mingled) tend to be organized according to the major categories found in state PreK–12 mathematics standards documents (e.g., numbers and operations, measurement, geometry, patterns and relationships, and data analysis). Beyond that, however, we know nothing. Because of test security issues, the NMAP itself could obtain no information on the mathematical content and quality of licensure tests for those who teach mathematics at any educational level and to any population. Nor have researchers provided this information in studies examining the relationship between elementary students' achievement in mathematics and their teachers' scores on the licensure tests they took, as Stotsky (2007b) reported in a critical review of these studies.

Table 3 shows the estimated percentage of test content addressing mathematics knowledge and/or mathematical pedagogical knowledge for the 13 tests described in the previous section as well as the estimated percentage of test content addressing the three components of reading pedagogical knowledge examined in this study, as summarized earlier in Table 2. For the estimate of mathematics content, the percentage for mathematics content given in the test description itself was generally used. However, for some tests some of the objectives listed in their descriptions assess knowledge of pedagogical strategies rather than of mathematics content itself. Table 3 also shows the estimated percentage of test content addressing reading pedagogical knowledge and mathematics

Table 3
Estimated Percentage of Test Addressing Three Components of
Reading Pedagogical Knowledge and Mathematics Content

Licensure Tests Assessing Reading Pedagogical Knowledge for Prospective Elementary and Sometimes Other Teachers (see the online appendix at http://journaloflearningdisabilities.sagepub.com/supplemental)	Percentage in Three Areas of Reading	Percentage of Mathematics Content
<i>PRAXIS 0011 (Elementary Education: Curriculum, Instruction, and Assessment)</i> , ETS (17 states)	7	22
<i>PRAXIS 0012 (Elementary Education: Content Area Exercises)</i> , ETS (7 states)	1	25
<i>PRAXIS 0014 (Elementary Education: Content Knowledge)</i> , ETS (22 states)	3	25
<i>PRAXIS 0201 (Reading Across the Curriculum: Elementary)</i> , ETS (1 state)	39	0
<i>Multiple Subjects Exam (for Elementary Education)</i> , ABCTE ^a	9–10	27
<i>Reading Endorsement for K–6</i> , ABCTE	38	0
California RICA, NES ^a (1 state)	45–50	0
Illinois 110 (<i>Elementary/Middle</i>), NES (1 state)	5–6	20
Michigan 83 (<i>Elementary Education</i>), NES (1 state)	2	20
Massachusetts 90 (<i>Foundations of Reading</i>), NES ^b (1 state)	54	0
New York 02 (<i>Multi-Subject Test: Grades PreK–9</i>), NES (1 state)	12	18
Oklahoma 50 (<i>Elementary Education Subtest I</i>), NES (1 state)	25	0
Virginia VRA, NES ^b (1 state)	25	0
Licensure tests for prospective special education teachers		
<i>PRAXIS 0353 (Education of Exceptional Students: Core Content Knowledge)</i> , ETS	0	0
<i>PRAXIS 0351 (Special Education: Knowledge-Based Core Principles)</i> , ETS	0	0
<i>PRAXIS 0511 (Fundamental Subjects: Content Knowledge)</i> , ETS	1	25
<i>Special Education (K–6)</i> , ABCTE	9	0
Illinois 155 (<i>Learning Behavior Specialist I</i>), NES	1	1
Michigan 63 (<i>Learning Disabled</i>), NES	4	1
New York 60 (<i>Students with Disabilities</i> , CST), NES	1	1
Licensure tests of teaching skills for beginning teachers		
<i>PRAXIS 0521 (Principles of Learning and Teaching: Early Childhood)</i> , ETS	0	0
<i>PRAXIS 0522 (Principles of Learning and Teaching: Grades K–6)</i> , ETS	0	0
<i>PRAXIS 0523 (Principles of Learning and Teaching: Grades 5–9)</i> , ETS	0	0
<i>PRAXIS 0524 (Principles of Learning and Teaching: Grades 7–12)</i> , ETS	0	0
New York 90 (<i>Elementary Assessment of Teaching Skills</i>), NES (1 state)	2	0

Note: ETS = Educational Testing Service; ABCTE = American Board for Certification of Teacher Excellence; RICA = *Reading Instruction Competence Assessment*; VRA = *Virginia Reading Assessment*; CST = Content Specialty Test. The number of states requiring the test for prospective elementary teachers is in parentheses after its title.

a. Required of both prospective elementary and special education teachers in the state.

b. Required of prospective elementary, early childhood, and special education teachers in the state.

content or mathematical pedagogical knowledge in the tests described in the next two sections.

Tests Designed for Prospective Special Education Teachers: Reading Pedagogical and Mathematics Content

Many states that use *PRAXIS II* tests for most, if not all, of their subject tests require a test designated for aspiring special education teachers. However, two of the *PRAXIS II* subject tests for aspiring special education teachers examined for this study (see Table 3) contain *little if any* reading pedagogy or mathematics content, according to their descriptions. To judge by what is on the ETS Web site, other *PRAXIS* tests for special education teachers have no reading pedagogy or academic content, except for *PRAXIS 0511*, which is not specifically designated for special education teachers but is now beginning to be used for them. The

situation is the same for the special education test in many NES states (e.g., Illinois, Michigan, and New York).

Only in states that require special education teachers to take a reading test in addition to a test designed for them will they be likely to be assessed adequately on research-based reading pedagogical knowledge. California requires all prospective special education and elementary teachers to take its state-specific reading test. Virginia and Massachusetts require all future early childhood, special education, and elementary teachers to take their state-specific reading test. Of the states that use *PRAXIS II* tests, only Tennessee requires its aspiring special education teachers to take a licensure test that includes an assessment of reading pedagogical knowledge, but because Tennessee has set no cut score for that test, the test has no consequences.

The fact that special education teachers are not held accountable for any mathematics knowledge on their own

licensure tests was obliquely noted in the NMAP report. It commented that the “Praxis II exams for those who will teach mathematics as content specialists or as generalists vary in the amount and level of mathematical knowledge assessed” (p. 37) and that some of these tests do not assess any mathematics content at all. The report strongly recommended strengthening the mathematics preparation of elementary and middle school teachers, and it spelled out the mathematics that should be taught in preparation programs for early childhood, elementary, middle school, and special education teachers and assessed on their licensure tests.

It is true that there may be about 25% mathematics content on some of the state tests that aspiring special education teachers are required to take that are also required of other generalist teachers. But as noted in the previous section, information in any study on licensure tests about the quality of the test items in this area and their level of difficulty is not available. Nevertheless, each state can do what Massachusetts is now doing to strengthen its preparation programs for elementary and special education teachers. Since 2003, Massachusetts has required prospective special education teachers to take the same general curriculum test taken by prospective elementary teachers. In 2007, because of concern that even 25% of a general test was no longer adequate and because there was no clear information on the level of difficulty of this 25%, the state’s board of education approved the construction of a new 40-item mathematics test that counts for 50% of this general test. This test has its own cut score and took effect in March 2009 (see Note 3). The board of education also approved a set of guidelines for the contents of the test to help elementary and special education licensure programs to develop appropriate mathematics coursework (Massachusetts Department of Education, 2007). This is a national “first.”

In conclusion, one can only hope that licensure programs for special education in all states require some coursework in reading and mathematics pedagogy and content. But prospective teachers in these programs are clearly not being held accountable for knowledge in these areas on licensure tests specifically designed for them in an ETS state, no matter which *PRAXIS II* test their state requires for them. They will be held accountable for knowledge in these areas in some NES states at present, but only a very few. This may be viewed as a disservice to the nation’s special education children.

Tests of Prospective Teachers’ Knowledge of the Principles of Learning and Teaching: Reading Pedagogy and Mathematics Content

A majority of states now require all beginning teachers to pass a licensure test of basic teaching knowledge

in addition to a subject matter test (and a test of the teacher’s own skills). This kind of test is important to examine because it assesses new or prospective teachers’ knowledge of the educational theories or principles that guide classroom practice and instructional programs in every subject area. We need to know whether this kind of test is constructed in ways that favor or disfavor particular teaching or learning theories or principles. It may support or undermine what has been taught in methods or content courses.

Most NES states have developed their own test (e.g., New York). Other states require one of the tests ETS offers as part of a *PRAXIS* series, called *Principles of Learning and Teaching*. This set of tests is designed to assess “a beginning teacher’s knowledge of a variety of job-related criteria” (ETS Web site, p. 1). Although a few of the states listed on the ETS Web site as requiring these tests indicate that they are to be used for the second level of licensure (i.e., after a new teacher has begun teaching), the others require the grade-relevant test for *initial licensure*. As Table 3 shows, there are four tests in this set of tests, one for early childhood (0521), one for Grades K to 6 (0522), one for Grades 5 to 9 (0523), and one for Grades 7 to 12 (0524). Each consists of 24 multiple-choice questions and 4 “case histories” that are each followed by 3 short-answer questions scored on a scale of 0 to 2. Test content is organized in four categories:

- I. Students as Learners (33%, 22% of which is based on short-answer questions)
- II. Instruction and Assessment (33%, 22% of which is based on short-answer questions)
- III. Teacher Professionalism (22%, 11% of which is based on short-answer questions)
- IV. Communication Techniques (11%, solely based on short-answer questions)

These ETS tests assess no reading instructional or mathematics content. But they appear to have serious limitations from a special education (and elementary) perspective. (See Stotsky, 2008, for evidence on this point in a longer version of this report on the University of Arkansas’s Education Working Paper Archive.) They promote student-directed learning and downgrade teacher-directed instruction, even though the research base for both reading and mathematics instruction supports explicit and systematic instruction for struggling students. The NMAP found that “explicit instruction with students who have mathematical difficulties has shown consistently positive effects on performance with word problems and computation. Results are consistent for students with learning disabilities, as well as other students who perform in the lowest third of a typical

class” (p. xxiii). Moreover, the NMAP found no body of research evidence to support an emphasis on either a “student centered” or “teacher directed” approach.

Discussion and Conclusions

The purpose of the present study was to determine the extent to which licensure tests for prospective PreK–8 special education teachers assess knowledge of three major components of beginning reading instruction identified by the NRP—the development of phonemic awareness, phonics, and vocabulary knowledge—and relevant mathematics content. The question explored was whether states’ licensure tests adequately assess the knowledge they need for research-based reading instruction and for teaching mathematics. Based on the analysis reported in this article, the answer is negative.

Table 3 lists all the licensure tests whose descriptions were analyzed for this study, together with an estimate of the percentage of the test items on each test addressing these three components and mathematics content (often mingled with some mathematical pedagogical knowledge). As can be seen, the tests designed for aspiring special education teachers have little content from either area on them. The ETS tests of “principles of learning and teaching” also do not contain objectives referring to reading (or mathematical) pedagogical knowledge (one would not expect mathematics content on such tests). Only among tests designed for elementary teachers do we find important elements of beginning reading instruction as well as some mathematical content adequately addressed. In addition, in many states these tests are often required for the prospective special education teacher as well.

A major problem in the effort to upgrade the academic content of licensure programs for special education teachers is to determine exactly what their licensure tests should address and to encourage all states to enact similar testing requirements. An assessment of their professional knowledge may not be the best use of a subject matter test for aspiring special education teachers. In the eyes of some special education experts, that may seem to be the focus of a subject matter test for them. But proficiency with this kind of knowledge may more appropriately be the focus of the tests they take in their special education coursework and of their student teacher evaluations.

A requirement that prospective special education teachers pass a test of reading pedagogy that assesses evidence-based pedagogical knowledge with a high pass score, such as the tests used in California, Massachusetts, or Virginia to license aspiring special education as well as

elementary teachers, will help to assure the public that new teachers have sufficient reading pedagogical knowledge to be effective teachers of reading *in their first 3 years of teaching*, before value-added measures can be used to gather empirical evidence on effectiveness. In addition to reading content, the percentages on mathematics content in the tests they now take (whether in Table 3 or not) do not assure us that prospective teachers who pass these tests will necessarily have an adequate knowledge of relevant mathematics content. No current test for K–8 nonmathematics teachers comes close to the 40-item mathematics section now on a redesigned general curriculum test for prospective elementary and special education teachers in Massachusetts.

It is clear that the licensure tests taken by most prospective special education teachers cannot make their preparation programs teach them what research indicates they should know with respect to reading pedagogical knowledge or mathematics content. Instead, Title II’s vague requirement may have helped to keep Reading First, an important programmatic piece of the No Child Left Behind Act of 2001, from being even more effective than the 2008 results for minority groups on the Grade 4 long-term trend reading test given by the National Assessment of Educational Progress suggest it has been.

Current licensure tests may continue to point new special education teachers away from the basic components underlying the successor to Reading First in the Obama administration. This conclusion is supported by the results of Rigden’s (2006) report, which found little alignment between four of the five ETS tests she examined and the requirements for Reading First (also see Stotsky, 2006). The latter tests promote an educational philosophy unsupported by high-quality research evidence that should have been declared a failure long ago for students with learning disabilities and abandoned after consideration of the many federal, state, and private funds that have been allocated to efforts to improve students’ reading skills in the past three decades. Clearly, we face an uphill battle to ensure that special education and elementary teachers are given adequate coursework in their preparation programs in research-based reading instructional knowledge, as well as in mathematics content and pedagogy, and are then licensed by tests that assess their knowledge adequately.

Recommendations

Teacher licensure is a state responsibility; therefore, each state needs to undertake its own critical examination of the group of tests it requires for those who teach

special education children or who supervise or support those who do, regardless of the test developer. Each state should first determine whether and to what extent the tests reflect the research-based knowledge underlying sound reading instruction and whether and to what extent they assess the mathematical knowledge teachers need for teaching mathematics.

Second, each state should examine the pedagogy embedded in the tests of general pedagogical knowledge that it may require along with a subject test as well as the pedagogy promoted in the observational instruments it may *also* require schools to use to assess a new teacher's classroom performance. If tests of general pedagogical knowledge used for licensing teachers, or the observational instruments used for rehiring new teachers, subtly coerce teachers into adopting an exclusively student-directed approach to learning and eschewing a teacher-directed approach to teaching, these tests and instruments will undermine the benefits of sound mathematics coursework, sound reading and mathematics methods courses, and soundly constructed tests assessing research-based reading and mathematical pedagogical knowledge. The NMAP (2008) report has much to say about the need for all children to acquire "fluency with the standard algorithms" (p. xix) to achieve computational proficiency.

Third, each state should examine its own professional teaching standards. These standards should reflect the research-based recommendations in the NRP and NMAP reports. If not, they should be revised, and the tests that the state uses should be revised to reflect these recommendations.

Finally, Title II should be amended to provide criteria for the content of all the licensure tests taken by prospective elementary, reading, early childhood, and special education teachers as well as reading specialists to ensure that these tests assess research-based reading and mathematical pedagogical knowledge as well as mathematics knowledge itself. These amendments might also recommend model tests as determined by the Institute for Educational Sciences, with financial incentives for states that develop or use sound tests. Requiring all states to use sound criteria in the development or choice of tests they require prospective teachers to take for licensure might be the most useful step Congress could take to raise the academic achievement of the students in our public schools.

Notes

1. This provision was a direct consequence of the nationwide publicity attending the low scores of the first administration of teacher tests in Massachusetts (spring of 1998). The approximately

60% failure rate on the Massachusetts tests prompted the U.S. Department of Education and Congress to insert the requirement that each state test each cohort of prospective teachers and annually report their individual preparation programs' pass-fail rates to the U.S. Department of Education.

2. The Connecticut Board of Education voted in April 2008 to require all prospective early childhood and elementary teachers as of July 2009 to take and pass a reading test almost identical to the one used in Massachusetts.

3. National Evaluation Systems has made available a practice test at http://www.mtel.nesinc.com/PDFs/MA_FLD003_SubtestII_PRACTICE_TEST.pdf.

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