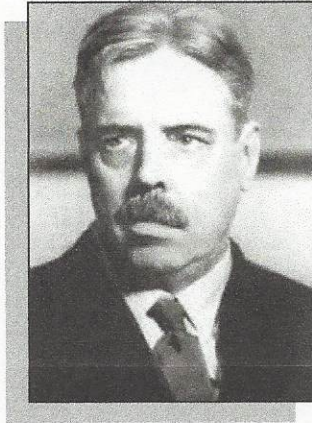


## CHAPTER 5



# Edward Lee Thorndike (1874–1949): A Look at His Contributions to Learning and Reading



*By Lou Ann Sears*

### Historical Research Process

THE BEGINNING OF my search for information about Edward Lee Thorndike, whose name I vaguely recalled from a graduate course called History of Reading Research and Instruction, was a bit like paddling a canoe into the Pacific. At some point, I realized that I had not been thinking big. It was time to get a stronger boat and drop anchor in Lake Thorndike. I thought I would examine first what Thorndike wrote, the primary sources. First, I

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*Shaping the Reading Field: The Impact of Early Reading Pioneers, Scientific Research, and Progressive Ideas*, edited by Susan E. Israel and E. Jennifer Monaghan. © 2007 by the International Reading Association.

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would let him show me who he was. Later, I would take a look at his biography and other secondary sources. Only then would I know if my own conclusions, if the impression Thorndike made on me, would measure up to what others had to say.

I was to find that Thorndike's key contributions include a definition of "reading," the creation of reading tests, the obsessive compilation of vocabulary lists, the encouragement of adult reading and learning, a look at comprehension, and the development of easy-to-read classroom materials.

## Personal and Professional Life

In 1938, Thorndike invited Robert Travers (1987) to sail to the United States to join the research team at the International Institute at Columbia University's Teachers College (p. 46). Travers, who later became "one of the world's foremost scholars in educational psychology and methodology of educational research" (Western Michigan University, 2004, n.p.), worked on his doctorate while working with Thorndike. Forty-nine years later, Travers (1987) recalled the experience:

It has taken me a lifetime to understand the full significance of the model Thorndike presented. At the time I worked with him I viewed him as a scientist who managed to apply his scientific knowledge to the improvement of education. Such was the myth that surrounded Thorndike at Teachers College, a myth that historical accounts of Thorndike and his work have perpetuated. The myth has done much to hide the full significance of Thorndike and his work and has resulted in a failure of those who followed to benefit fully from the model he provided. From breakfast to dinner, Thorndike was a scientist concerned with the expansion and integration of knowledge. The second Thorndike came to life toward evening—Thorndike the inventor. Most of the materials he developed for schools he designed and constructed during the evening hours. That is what he did for relaxation, if one can call it that. (p. 47)

Edward Lee Thorndike was born on August 31, 1874, in Williamsburg, Massachusetts, USA, to Abigail Brewster Ladd and Edward R. Thorndike, a Methodist minister (Joncich, 1968, p. 19). With one older brother, Ashley, who would later become a fellow faculty member at Columbia University; a younger brother, Everett Lynn, who would earn a PhD in history at Columbia University (p. 209); and a younger sister, Mildred (p. 196), Thorndike was

a dutiful middle child. Much was expected of the minister's children, and none disappointed.

Although he was not his parent's firstborn, Edward Thorndike would throughout his life earn the title "first." Thorndike stood apart from the crowd as early as the late 1880s when he was a student at the Lowell Massachusetts Common School. Prior to age 11 when he graduated from the eighth grade (Joncich, 1968, p. 46), he knew himself to be gifted and worried that he would be regarded as "teacher's pet" (p. 45) for his conscientious behavior and his abilities (p. 46). Like his brother Ashley before him, he began at this early age to win prizes and scholarships (p. 45).

Thorndike's capacity for standing out from the crowd extended to his secondary education. Unlike most of his peers, he went on to secondary school for several reasons. In 1886, common school was the end of the educational road for most, but Thorndike, son of a minister, won scholarships enabling him to carry on his parents' tradition of becoming more highly educated than most (Joncich, 1968, pp. 46–47). Another move related to his father's employment caused him to leave Lowell High School in 1887 and enroll in the Roxbury Latin School (p. 46), where he would earn the honor of being first or second in his class (p. 48). Another ministerial move caused him to attend the "rigid" Classical High School in Providence, Rhode Island, where he spent an extra year of high school to complete the school's requirements (p. 51).

For sons of Methodist ministers, Wesleyan University in Connecticut was a natural choice (Joncich, 1968, p. 52), and it was for Thorndike particularly because his brother Ashley had already set the precedent. There from 1891–1895, Edward won prizes in English literature, Latin, Greek, psychology, moral philosophy, English composition, junior exhibition, and junior debate. While there, he literally stood apart from the crowd because his antisocial feelings disturbed him (p. 59). At this time, he also quietly rejected his father's religion in favor of science, something that he told his future wife, Elizabeth Moulton, might ruin his chances of obtaining a faculty position at Wesleyan University (p. 63).

After graduating from Wesleyan University in 1895, Thorndike transferred to Harvard University, where he left behind his original aspirations of becoming an English teacher and obtained an AB degree in 1896 and an AM degree in 1897 (Adult Education History Project, 2002, para. 4). Teaching seemed like a means, rather than an end, to a man who felt the need to explore

science and psychology (Joncich, 1968, p. 78). Studying under professor and mentor William James was so inspirational for Thorndike that he found his life turning in a new direction. Thorndike grew weary of the work at Harvard University and received a fellowship at Columbia University, where he could spend more time on research, although doing so meant another unwanted move (p. 103).

In 1897, Thorndike settled in at Columbia University and met James McKeen Cattell (see chapter 1, this volume), the man who became his second significant mentor (Joncich, 1968, pp. 104–105). In just a few years, Thorndike and the world's second man to hold the title of Professor of Psychology would be colleagues. Again seeking solace from his own antisocial tendencies, Thorndike accepted Cattell's offer to use the attic in one of the university halls for an animal experimentation lab (p. 118). Thorndike's 1898 thesis, "Animal Intelligence: An Experimental Study of the Associative Processes in Animals" (published in 1936 as an article in the *Columbia University Quarterly*) was "a classic...mark[ing] the real starting point of experimental animal psychology" (Joncich, 1968, p. 148). That year, he received his PhD.

Afterward, he accepted a low-paying position as Special Lecturer in Education at Western Reserve's College for Women in Cleveland, Ohio, USA. He viewed this offer as more appealing than the alternative of teaching in a normal school, mostly because his brother Ashley was on his way to the college and because it surely enjoyed a more impressive reputation than any normal school. There, he taught courses in what Arthur Irving Gates later called "the new world of pedagogy" (quoted in Joncich, 1968, p. 153).

After one year at Western Reserve's College for Women, Thorndike began the last and longest part of his 43-year career as instructor at Teachers College, Columbia University. He taught Elements of Psychology; School Hygiene, which was "the implication of physical and mental facts for school operations" (Joncich, 1968, p. 215); Child Study; Genetic Psychology; Educational Psychology; and the Psychology of School Subjects (pp. 215–218). By 1914, the university created a division of Educational Psychology, and Thorndike began to teach only at the graduate level (p. 217).

From his various experiences as student and professor, Thorndike had many colleagues but few friends. At Wesleyan, he met Charles Hubbard Judd (see chapter 4, this volume) but became better friends with Frederick Paul Keppel, a zoology classmate (Joncich, 1968, p. 105). At Columbia, he knew

geography instructor R.E. Dodge; biologist Francis E. Lloyd; educational historian Paul Monroe, whose office was next door to his (p. 220); Elijah Bagster-Collins, a professor of German ("Prof. Bagster-Collins," 1954); and Nicholas Murray Butler, the president of Columbia at the time and someone who, like Thorndike, agreed that education was a subject worthy of study. Of course, the psychology department, "the most important center for psychological training in the U.S. because of Cattell" (Joncich, p. 220) was home to Cattell, Robert Sessions Woodworth (see chapter 2, this volume), and Albert Poffenberger (Joncich, p. 220). During the U.S. Great Depression, Thorndike awarded Abraham Maslow a Carnegie Fellowship to Teachers College, where he would do research (Joncich, p. 467).

Occasionally, Thorndike would engage in some type of collaborative work with colleagues. Thorndike and Virgil Prettyman, the principal of the Horace Mann School, opened an educational clinic in 1902 to provide special education and psychological services. Although the experience provided him with data, the business was quite possibly his only occupational failure in life. In a 1905 letter, Thorndike remembered the experience: "It was very valuable as a source of scientific data.... We got elaborate measurement of thirty defective children" (quoted in Joncich, 1968, p. 224). Woodworth and Thorndike would work together on "transfer of training," an aspect of connectionism (Cremin, 1968, p. 113) found in the next section of this chapter.

Although his relationships with colleagues may have been lacking, his relationships with family were rich and plentiful. At the beginning of his career at Columbia University, Thorndike finally married Elizabeth "Bess" Moulton. The Reverend Thorndike performed the ceremony in Lynn, Massachusetts, USA. Moving to New York City brought grief and joy for the couple: Bess was unhappy with city life but tolerated it for the next 60 years (Joncich, 1968, p. 198). Life with a workaholic left her alone much of the time, but childbearing would alleviate some of that loneliness. In 1902, Bess gave birth to Elizabeth Frances; in 1904, Virginia Moulton; in 1905, Edward Moulton; in 1910, Robert Ladd; and in 1918, Alan. Elizabeth Frances became a math teacher. Ten-day-old Virginia died of a poorly formed heart. Robert became a specialist in psychological measurement, and Edward and Alan became physicists.

Just as Thorndike the father had a rich influence on his children, Thorndike the professor had a significant impact on his students. Several of Thorndike's students would win fame in the educational world. Arthur Irving

Gates (see chapter 14, this volume) and William Scott Gray (see chapter 13, this volume) became, as Monaghan and Saul (1987) note, “perhaps the two most respected figures in reading education and research” (p. 98). Between 1913 and 1914, Gray had taken a few of Thorndike’s courses at Teachers College, and Thorndike served as his master’s thesis advisor. Thorndike was also a member of Gates’s dissertation committee. Gates was hired by Thorndike to teach at Teachers College and was later permitted to revise Thorndike’s educational psychology textbook. Test makers Henry Rinsland and B.R. Buckingham became significant word counters who “personified a coming together of vocabulary research and the testing movement” (Clifford, 1978, p. 114).

Before his death on August 9, 1949—nine years after he retired from Columbia University (Adult Education History Project, 2002, para. 5)—Thorndike had published over 500 books and articles, 75 of them pertaining to language (Clifford, 1978, p. 108). He was not, as some sources indicate, only a psychologist, only an experimenter in reading, only a prolific writer, only a teacher, only a scientist, only a researcher, only a workaholic. He was, in fact, all those things.

## **Philosophical Beliefs and Guiding Principles**

Those who teach hope that their students will make connections among the things they learn and also make some sort of significant contribution to society. Thorndike was such a student. Even before he was William James’s student, he had begun to read, absorb, and devour what James had to say about psychology. In his student days at Harvard University, he also studied under Franz Boas, an anthropologist who used numbers to prove points (Cremin, 1968, p. 110). Thorndike, who had earlier imagined himself as an English teacher, saw a chance for something more in his future. Suddenly, Thorndike, who had never had a course in algebra or calculus, saw that a blend of psychological concepts and numbers could change the world.

In 1910, he published his Handwriting Scale, an event that marked the beginning of the scientific movement in education (Smith, 2002, p. 148) that has continued until today. Thorndike began the movement that would repel John Dewey and others who sought “a more equal and cooperative America” and who denounced such practices as “testing, curriculum tracking, and the influence of business on schooling” (Cohen & Barnes, 1999, p. 19). Believing

only in what he could see and measure, Thorndike “sought to create schools that would help to align the society with the economy by educating young members...for suitable positions” (p. 19).

Both Dewey and Thorndike sought a change in the educational climate that since the 1880s clearly needed rescuing (Cremin, 1968, p. 21). Largely due to the articles on schooling by the crusading reformer Joseph Mayer Rice, the United States realized the “national scope” (p. 22) of the education crisis: the corruption (p. 21), the overcrowding, the dull sameness of instructional techniques (p. 20). But as Lagemann (1989) notes, in the contest between philosophies, “Dewey lost and Thorndike won” (p. 184). With the one exception of his laboratory school concept, Dewey’s ideas for improved quality of education in the United States remained in his head and on paper, while Thorndike put his plans into action. Cohen and Barnes (1999) explain: “Dewey’s ideas never became a regular part of the research and graduate education mainstream.... Graduate research and education in education were instead largely defined by Thorndike’s views, his agenda for inquiry, and his graduate students” (p. 20). Educational testing and measuring still drive the U.S. educational system.

From the study of animal behavior, a radically new concept at the time (Chance, 1999, p. 438), Thorndike developed his learning laws. Although he studied chickens in William James’s basement (Joncich, 1968, p. 87) and monkeys that he kept in his own home (p. 267), Thorndike’s best-known animal experimentation occurred in connection with his 1898 dissertation *Animal Intelligence*, a publication that “began the systematic search for fundamental behavioral processes and laid the foundation for an empirical science of behavior” (Chance, 1999, p. 433). From putting cats into wooden puzzle boxes and observing their behavior, Thorndike dispelled the associationist notion that animals understand their own behavior and presented his findings that (a) animals do not think; (b) producing a change in animal behavior is a gradual process; (c) animals do not have the ability to distinguish “between action and consequence” (p. 437); and (d) animals must act, rather than think, which leads them to use what Thorndike called “trial and accidental success” (p. 438).

Thorndike’s new scientific movement came to be known as *connectionism* (Charles, 1987, p. 25). Connectionism explains the three-pronged process of learning as situation (the stimulus), response, and connection or bond (Joncich, 1968, p. 336). As Monaghan and Saul (1987) explain, “Learning

in Thorndike's view was habit formation; habits tended to be stamped in by a 'satisfyer' and weakened by an 'annoyer'" (p. 96). To Thorndike, learning was first and foremost biological: "Therefore, it is in the neurons, and not in the body as a whole, that satisfaction and annoyance are defined" (Joncich, 1968, p. 353). Any person's ability to learn is, according to Thorndike, a "struggle of neurons to conduct" (quoted in Joncich, 1968, p. 354). In a letter to Thorndike, psychologist B.F. Skinner acknowledged Thorndike's work with animal behavior as a forerunner of his own: "It has always been obvious that I was merely carrying on your puzzle box experiments" (quoted in Joncich, 1968, p. 506).

In *Adult Interests* (1935) Thorndike explains that a teacher's job is to maneuver the student into a situation that will result in a response (p. 21). If a pupil is to make connections, he or she must become at least somewhat interested in learning. Thorndike, then, offered five strategies for increasing student interest: (1) contiguity, (2) suggestion, (3) imitation, (4) conditioning, and (5) selection by rewards and punishment. Contiguity involves the teacher's attempt to surround the topic at hand with pleasantries such as the teacher's attractive personal nature, other positive experiences, or both. Suggestion—trying to get students to like something by subtly encouraging them to try it—may sometimes be enough to get someone to like a topic (p. 21). Thorndike admitted that little was known about imitation (p. 24), yet it seemed to be a plan worth trying. Some students less inclined to make connections on their own may try to learn to be like the teacher and the model students in the class (p. 26). Conditioning resembles what happens when a dog is taught to beg (p. 28). Selection by rewards refers to offering praise, which made subjects more inclined to repeat certain behaviors (p. 30), and getting an answer wrong, a punishment, may provide incentive for learning (p. 66). In *Education: A First Book* (1914a), Thorndike explains: "Interest multiplies the satisfyingness of every success and inspires effort to discover the causes of every failure" (p. 112).

Also in *Education* (1914a), Thorndike summarizes his laws of learning. Based on Thorndike's findings, if we as educators wish to have a subject respond in a particular way, we need to provide multiple opportunities for the desirable response to occur. This is Thorndike's Law of Exercise (p. 95). The Law of Effect, he notes, "is the fundamental law of teaching and learning. It is the great weapon of all who wish to change men's responses, either by reinforcing old and adding new ones, or by getting rid of those that are undesir-



able” (p. 97). The Law of Effect, then, urges educators to make activities satisfying so students will want to respond favorably to them (p. 96). As a general rule, one aspect of a given situation may be “prepotent” (p. 98) in the eyes of the student. More specifically, Thorndike identifies the Law of Partial Activity and the Law of Selective Thinking—the former referring to the fact that a subject may develop connections to one aspect of the topic at hand or with the larger picture of the topic (p. 99). The latter pertains to the accumulation of new habits that are needed for learning to occur (p. 100).

What Thorndike did for the communities of psychology and education was truly “profound” (Cumming, 1999, p. 429), although Dewey’s followers may argue that educators should not confuse “profound” with “positive.” Levin (1991) notes that Thorndike brought the educational community

a master plan for the whole class or the whole grade or cluster of grades, and the whole school or group of schools, the ubiquitous grade-level textbook accompanied by workbooks, timed tests and the underlying assumption that children should move at a certain rate through a “normal” agenda of academic exercises. (p. 74)

Fifty-seven years after Thorndike’s death, his research is still frequently cited, and school districts at all levels across the nation still operate according to his agenda.

## Contributions to the Field of Reading

Thorndike the behaviorist made significant and varied contributions to the field of reading. Holding to his habit of starting at the beginning, he first defined the term *reading*. Thorndike’s research revealed that reading is not absence of thought, and it is not “word calling” (Joncich, 1968, p. 394). His research also found that focusing on oral reading may showcase how well a student can pronounce that which he or she does not comprehend (p. 394). As Thorndike writes in “Reading as Reasoning: A Study of Mistakes in Paragraph Reading” (1917b), “The vice of the poor reader is to say the words to himself without actually making judgments concerning what they reveal” (p. 332). He also discovered that meaningful reading is not synonymous with passive perception, and looking at a textbook and reading it for understanding are two entirely contrasting matters (1917c, p. 114). If reading, then, is not simply perceiving text or uttering words, how should we think of it?

In 1917, Thorndike's "Reading as Reasoning" and "The Understanding of Sentences: A Study of Errors in Reading" appeared. According to Singer (1994), Thorndike found reading to be a cognitive issue (p. 897), not merely the act of perceiving words on a page (Thorndike, 1917c, p. 114; Joncich, 1968, p. 394). Thorndike (1917b) explains,

Reading is a very elaborate procedure, involving a weighing of each of many elements in a sentence, their organization in the proper relations to one another, the selection of certain of their connotations and the rejection of others, and the cooperation of many forces to determine final response. (p. 323)

When someone reads correctly, we are told, three things happen. First, the reader derives the intended meaning from each word. Second, he or she looks at all aspects of each word and decides which elements are most important. Finally, the reader considers the results to be sure they satisfy the purpose at hand (1917b, p. 326).

In the sophisticated scheme of things, thinking is less of a priority than comprehending. In "Reading as Reasoning" (1917b), Thorndike declares that it is common knowledge that more attention needs to be paid to "erroneous meaning" (p. 327) because some reader errors are slight, while others are drastic. So readers are wrong when they interpret terms differently. In *Adult Interests* (1935), which he wrote 18 years later, Thorndike says that people overestimate what they comprehend (p. 222), but what does *comprehend* mean?

Thorndike stresses that comprehension is not passive (1917c, p. 114). The mind has many jobs to do. It needs to make choices, turn attention to and away from certain elements, and both sort and arrange what it encounters (1917b, p. 329). As Joncich (1968) relates,

Thorndike remain[ed] convinced that "mere word knowledge" [was] the most important teachable factor in comprehension of speech and books, and [was] related to interest because ignorance of the words one meets is a very important factor in preventing or reducing interest. (p. 577)

In "The Psychology of Thinking in the Case of Reading" (1917a), Thorndike considers the notion of underpotency and overpotency. Any one word encountered in reading, he notes, may carry too much (p. 221) or insufficient weight (p. 227). From respondents' answers to questions

posed in a study, Thorndike determined that readers hone in on some particular word or line of thought and dwell on it (pp. 220–234). They can become stuck on the image of what they read, as occurred in Thorndike’s Test M: Students in grades 7 and 8 were asked to read a paragraph and answer five questions. Incorrect responses to question 2—“In what respect is a prisoner in his cell like a man with a million dollars?” (p. 224)—show the overpotency of the prison image: “Because he is shut up in a cell,” one subject replied. Another said, a “man in prison is sitting 8 hours daily with chains” (p. 225). Although the passage that students read did not indicate anything about a million dollars, it did mention a man in prison. The point is that, although no “right” answer exists and the responses the students gave do not answer the question, the students wrote anything they recalled. As they attempted to answer a question that contained unfamiliar information, they reached for scraps of understanding.

In “The Understanding of Sentences: A Study of Errors in Reading,” Thorndike (1917c) detailed the process of understanding a paragraph. He asserted that looking at a word causes the reader to connect the word to past experience. A correct meaning situates itself within the context of the rest of the words that the readers know (p. 113).

Thorndike’s study of comprehension logically extended to the examination of mistakes made in reading. He offered the following explanations of why pupils have difficulty answering questions about their reading: The generally untrustworthy student can be blamed for his own lack of understanding, his lack of control. In very few cases, pupils cannot or do not focus on the task at hand, the page, or the reading assignment (1917c, p. 99). They are liable to “follow whatever leads are offered by the shreds of meaning that [they do] see or by the mere words” (p. 108). A wrong answer to a question about the text, then, can be explained by too much attention to the wrong thing.

Reader error appears in other forms (Thorndike, 1917c):

- lack of focus on the appropriate passage and on the appropriate part of the passage (p. 102);
- failing to follow directions, or creating new directions (p. 100);
- grabbing too quickly at the first thing that pops into one’s head (p. 107); and
- making questions overpotent (p. 105).

In the spirit of increasing reading comprehension and bettering the world, Thorndike invented educational materials. These significant contributions to reading created increased access to a successful education for pupils of all ages. One type of educational material that he invented was a reader-friendly statistics manual for college students. In *An Introduction to the Theory of Mental and Social Measurement* (1919), Thorndike invites those who share his lack of mathematical aptitude to venture into the territory of statistics: "It would be unfortunate if the ability to understand and use the newer methods of measurement were dependent upon the mathematical capacity and training which were required to derive and formulate them" (p. 1). He challenges readers to see that statistics are little more than "refined common sense" (p. 2).

Thorndike's son Robert remembered computing the algebra problems and constructing the answer keys for his father's invention, a common-sense algebra text that contained "realistic [problems] such as a child might meet rather than the absurd puzzles of the sort that had tended to appear in texts at that time" (R. Thorndike, 1991, p. 143). Thorndike expected that students might respond more favorably to a text that tapped into their prior knowledge, increased their chances of learning, and sounded sensible. *Thorndike Arithmetic*, a 1917 series, achieved bestseller status (Kappa Delta Pi, n.d., para. 8), a result, no doubt, of its practicality and reader friendliness.

In *The Teacher's Word Book* (Thorndike, 1927) and the updated *Teacher's Word Book of 30,000 Words* (Thorndike & Lorge, 1944), Thorndike and his coauthor and former student Irving Lorge switched to the topic of vocabulary. These texts, they believed, did the thinking for untrustworthy teachers and students, a particular necessity in the case of what he considered to be less capable female teachers and students. The preface to the 1927 book explains that the book

enables a teacher to know not only the general importance of each word so far as frequency of occurrence measures that, but also its importance in current popular reading for adults...and its importance in such juvenile reading as schools and libraries approve. (p. xi)

After all, only some words deserve to be owned (p. xi). Both word books highlight the obsessive collecting, memorizing, and cataloging of words that students would be most likely to meet in their reading journeys (R. Thorndike, 1991, p. 143). The lists were used for vocabulary-building courses

es in college, radio announcements, dictionaries in other languages, school spelling lists, study skills booklets for college students, and typing and shorthand manuals (Joncich, 1968, p. 393). From these works, Thorndike created teacher manuals (Clifford, 2003, p. 2562).

Thorndike's scientific triumph over progressivism changed the course of reading instruction. *The Teacher's Word Book* (1927) added to the body of research on adult vocabulary size and continues to be respected today (Clifford, 1978, p. 110). The book "provide[d] vocabulary test-makers with a tool other than sheer, unaided judgment for selecting word series that better judge the precision of a child's comprehension of the words being tested." Thorndike also began a movement of "new" standardized vocabulary tests (p. 114). Others used his lists to devise tests based on words found in "reading materials more specific to children's interests" (p. 115).

Contemporary concern for "relevance and realism" in children's readers can be traced to Thorndike's 1917 breakthrough concept of reading as reasoning (Clifford, 1978, pp. 121–122). If reading could no longer be considered on an equal plane with word pronunciation, then "meaningful reading" (p. 121) required the teacher to tap into his or her students' background knowledge. By 1938, the number of students who made it to high school had nearly doubled since 1900; therefore, to have a chance at success, the larger student body needed more easy-to-read materials (p. 122).

The Thorndike-Barnhart dictionaries for children (Thorndike & Barnhart, 1929/1988), juniors (1935/1962), and high school students (1952/1957) are perhaps Thorndike's best-known and most significant contributions to the field of reading (R. Thorndike, 1991, p. 143). Ever since 1929, students have used the books to make more sense of their worlds, exactly what Thorndike intended. Clarence Barnhart summarizes the deliberate features used in the dictionaries to increase student interest: "language that pupils could understand, illustrative sentences, [and] sentences often written so that they force the meaning home to the pupil" (Thorndike & Barnhart, 1929/1988, pp. 6–7).

The world took notice when Thorndike, in his 1927 address to the Association for Adult Education, reported that people possess "a lifelong ability to learn" (quoted in Joncich, 1968, p. 484). Adults, he declared, may indeed have legitimate reasons for learning (1935, pp. 56–57). For example, studying adults in secretarial schools, he discovered no age-related difference in the success students had in learning shorthand and typing: Older students did just as well as younger students (Thorndike, Bregman, Tilton, &

Woodyard, 1928/1932, p. 79). Ever logical, Thorndike progressed to the study of why adults often do not learn, even though they are able to learn (p. 107). He found that adults do not realize their own potential for learning, care less about it than they should, and may, by learning, fall out of favor with their peers (p. 125). Through this study, Thorndike revealed a new audience for reading education.

His final contribution to the field of reading involved the creation of tests. In fact, the name Thorndike seems synonymous with *test*. The *Thorndike-McCall Reading Scale for the Understanding of Sentences* (1921) helped to elevate the status of reading instruction within the school curriculum. As a result, vocabulary and comprehension began to receive attention as valued components of the study of reading (Joncich, 1968, p. 394). In "The Measurement of Ability in Reading" (1914b) Thorndike included his three scales "meant to measur[e] school achievement" (p. 207): (1) Scale A for Visual Vocabulary, (2) a Scale for Measuring the Understanding of Sentences and Paragraphs, and (3) Scale Alpha for Measuring the Understanding of Sentences. Thorndike's Scale A for Visual Vocabulary measured whether or not fifth graders could classify words. A Scale for Measuring the Understanding of Sentences and Paragraphs holds more significance for educators because elementary education concerns itself most with students' comprehension of sentences and paragraphs (p. 238). For grades three to eight, the Scale Alpha for Measuring the Understanding of Sentences involved reading a passage and writing an answer to a question, underlining text, or crossing out a letter or number (p. 253). All three scales illustrate Thorndike's mission to promote silent-reading efficiency.

Throughout his versatile career, Thorndike created other intelligence tests as well as tests for college entry, law school entry, English usage, drawing, and geographical understanding. He helped to construct and later administered the 1917–1919 Alpha and Beta tests for literate and illiterate soldiers (Clifford, 2003, p. 2566). In 1925, he devised an intelligence test called the CAVD that concentrated on completion, arithmetic, vocabulary, and directions (Joncich, 1968, p. 390). In addition, he conducted the first major "study of ability tests and school records as predictors of later vocational performance" (R. Thorndike, 1991, p. 149).

Thorndike probably made more of a mark on the field of reading than anyone who came before him or anyone who came after him. He captured the elusive creature called *reading*, put it under a microscope, dissected it,

introduced the world to its true nature and composition, created materials that would help the world understand it, and started the educational community on a quest for more information. His rich and varied research and practice have stood the test of time.

## Lessons for the Future

Knowing about Thorndike is significant on several levels. From a critique of his assumptions about human behavior, learning, and teaching, educators can become more aware of our own. Despite his philosophical shortcomings, he provides two types of useful lessons: (1) the ones he specifies to us and (2) the ones we gather from a long, close look at his work. If we let him, he can help us to influence the future of reading education.

Many of Thorndike's assumptions would be characterized today as racist and sexist. Like Cattell and Judd, Thorndike carried his "hereditarian and racial determinist attitudes" (Lagemann, 1989, p. 212) with him at all times and, therefore, made assumptions about who could learn. Almost anyone can learn, but, Thorndike instructed, not everyone should bother (1935, pp. 111–112). One race cannot be taught, he believed, by the same methods as another (1914a, p. 32). After all, he warned, different races have different capabilities (p. 68). Thorndike was baffled by the early 20th-century trend toward prolonged education of the masses and was, therefore, amazed at what he considered the foolishness of spending much time on low- and average-ability students (p. 33). If teachers were being forced to try to reach students of varying abilities all sharing the same classroom, so be it, and with luck perhaps some of them could be taught "to want the right things" (p. 11). Thorndike felt that some women could become more than wives and mothers. However, he specified that if they must be educated, they should be taught home economics and child maintenance and be kept away from the more promising students (p. 3). Giving away the best to the least capable was, to Thorndike, poor practice (Seller, 1978, p. 9).

Thorndike assumed that the world, too, was not to be trusted. Changing the world for the better, something that he held dear (Cremin, 1968, p. 113), required taking control of as much as possible. Science, as opposed to his father's religion, dictated that everything can and should be measured. Everything must be scientifically observed, recorded, quantified, calculated (Clifford, 2003, p. 2564). God cannot be measured; therefore, Thorndike be-

lieved, he could not exist and could not be trusted. In addition, Thorndike felt that society had no idea what was good for it (1914a), so it could not be trusted either. He also believed that students certainly could not be trusted to do the right thing (1914a, pp. 165, 173). To determine what they want to learn and where to get that information, Thorndike believed that adult students would need an expert's advice (1936, pp. 131–132).

Teachers, too, would not survive without his assistance, Thorndike argued. Without his direction, he worried that they might mistakenly teach what is “nonexistent” rather than what is “real” (1914a, p. 128). The pages of Thorndike's texts are laden with teaching advice. For example, he mentioned that if teachers would only follow the word books they would be spared having to think about which words are important for students to learn. Eisner (1983) suggests that such examples show Thorndike's attempt to “create a better, more predictable world” (p. 6).

In addition to encouraging us to reexamine our own assumptions, Thorndike also left us with other lessons. The first lessons are specific ones. Researchers, historians, and teachers of all levels may find wisdom in Thorndike's teachings. The *Thorndike-Barnhart Children's Dictionary* (1929/1988) and *Education: A First Book* (1914a) challenge us to define our terms and start at the beginning. The children's dictionary asks us to visually demonstrate what we are saying. In *Education* (1914a), Thorndike issues a timeless warning: “We stay below our own possibilities in almost everything we do” (p. 108). In a sense, he asked educators to look for challenges and increased opportunities to make a difference in their field. His specific teaching tips also seem appropriate today. Students, he urged, need more practice in reading and studying (1917c, p. 112). Because students may not transfer what they have learned without help, educators might look for ways to create situations to assist them (Lagemann, 1989, p. 211). In itself, *Adult Interests* (1935) is a 200-page mini library of teaching methods.

The lessons we can learn from taking a long, close look at Thorndike's work indirectly challenge us to move the field of literacy forward. Like Thorndike, we should be open to new ideas and to the possibilities of tapping different disciplines. Robert Thorndike recalled his father's willingness to try new things and explore new territory: “He took whatever came his way that seemed to need doing and devoted himself wholeheartedly to it” (R. Thorndike, 1991, p. 151). Thorndike was one of the first researchers to be aware of the potential significance of educational psychology to education.



Although he did not invent educational psychology, he was key to its emergence as a “separate discipline” (Walberg & Haertel, 1992, p. 8).

Blending two disciplinary worlds came naturally to Thorndike. In his preface to the *Thorndike-Barnhart High School Dictionary* (Thorndike & Barnhart, 1952/1957), Barnhart notes, “Thorndike was the first lexicographer to apply statistical methods and the techniques of the psychology of learning to the making of dictionaries” (p. vi). Thorndike and his coauthors of *Adult Learning* (Thorndike et al., 1928/1932) assert, “If we keep on learning, we may expect to lose less of our ability to learn” (p. 133).



Why should we remember Edward Lee Thorndike? What was so significant about him? Some men are thinkers. Others are doers. Thorndike was both. His most significant contributions to learning and reading were multifaceted, groundbreaking, and long lasting. From the perspective of later reading researchers, his Handwriting Scale of 1910 marked the beginning of the scientific movement in education (Smith, 2002, p. 148). He and Robert Sessions Woodworth conducted transfer-of-training studies that “shattered time-honored assumptions about the ‘disciplinary’ value of certain studies and thereby accelerated utilitarian tendencies already gaining in the schools” (Cremin, 1968, p. 113). His definition of reading forever changed the world’s educational outlook. His work with word lists directly affected the instruction of reading (Monaghan & Saul, 1987, p. 97). His studies on learning and the wealth of learning material that he created raised awareness of the field of education as a serious profession (Cremin, 1968, p. 114). Overall, “Thorndike was never as interested in the acquisition of initial skill in reading as he was in improving the possibilities for long-term growth in reading” (Clifford, 1978, p. 182). He indeed had a far reach. As Cremin reports, “Certainly no aspect of public-school teaching during the first quarter of the twentieth-century remained unaffected by his influence” (p. 114).

In 2006, Thorndike’s thoughts and practices continue to dominate the public schools, colleges, and universities. The current obsession with lectures, quickly scored tests, midterms, finals, SATs, ACTs, GREs, and memorization may be crowding out real learning; however, some teachers delight in the convenience of easy-to-check tests. Students who have not been taught

how to study are only occasionally aware that they are memorizing in the hope of collecting the prize, the acceptable grade. What is often missing is the making of connections, the quest for the long term, and the genuine experiences that result in learning. Proponents of the No Child Left Behind Act of 2001 (2002) may argue that this method works because it has measurable outcomes, and if testing equals learning, this statement may well be true. Thorndike can have no better advertisement.

## Reflection Questions

1. How does Thorndike's maxim "We stay far below our own possibilities in almost everything that we do" (1914a, p. 108) apply to ourselves and to our students?
2. Are we still using school district-prescribed vocabulary lists such as Thorndike's, and do they lead to "permanent knowledge" (Thorndike & Lorge, 1944, p. xi)?
3. How does Thorndike's theory of connectionism explain comprehension? Do you agree with this explanation?
4. What can we do to assess whether our students are aware of the active part they need to play in comprehending material?
5. In what ways does the U.S. educational structure still operate on Thorndike's themes of control, testing, and dependence on quantitative results? Is this a topic in need of examination? Why or why not?

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# Shaping the Reading Field

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Scientific Research, and Progressive Ideas



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