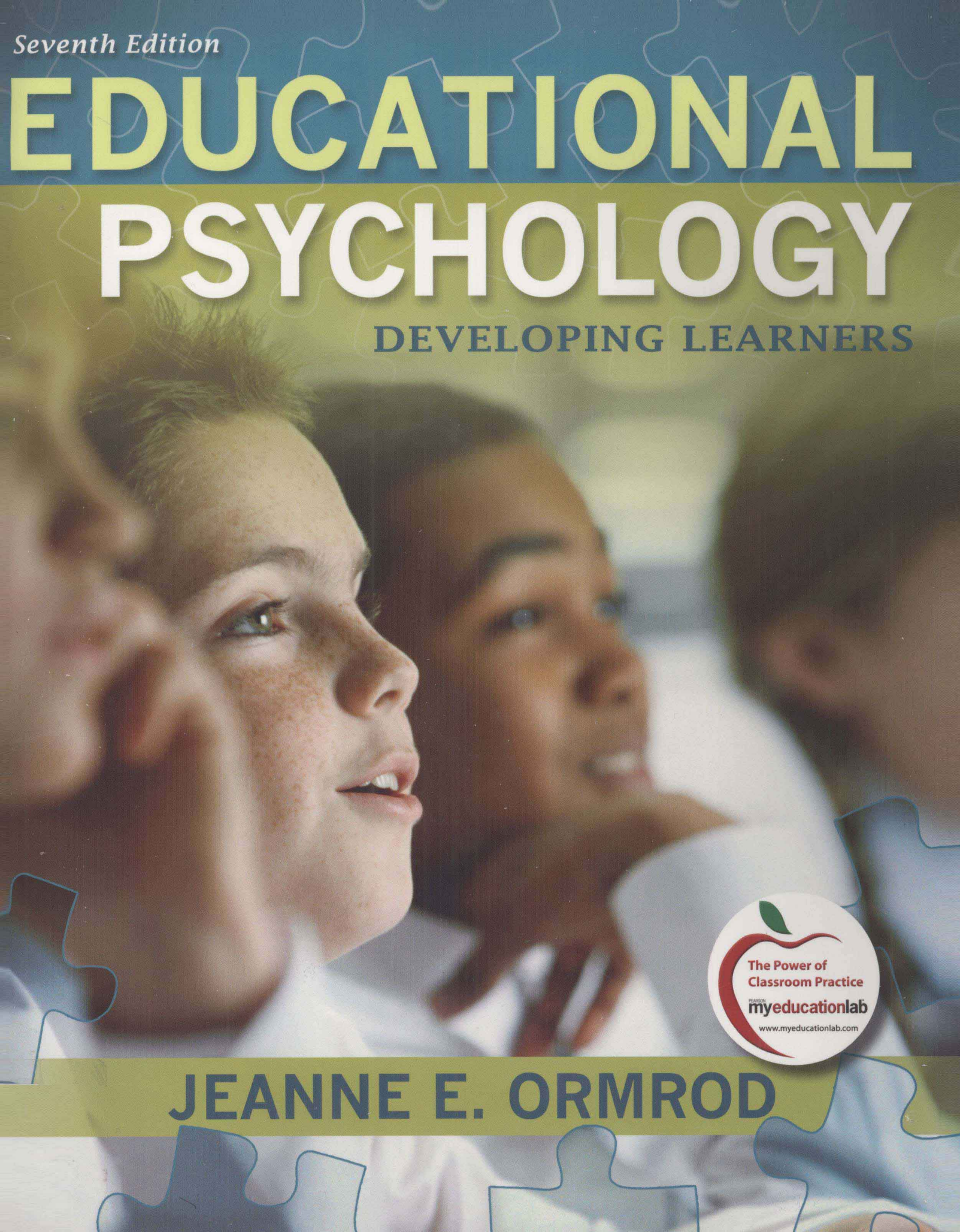
Seventh Edition

EDUCATIONAL PSYCHOLOGY

DEVELOPING LEARNERS



JEANNE E. ORMROD

SEVENTH EDITION

Educational Psychology

Developing Learners

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University of New Hampshire

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About the Author

Jeanne Ellis Ormrod received her A.B. in psychology from Brown University and her M.S. and Ph.D. in educational psychology from The Pennsylvania State University. She earned licensure in school psychology through postdoctoral work at Temple University and the University of Colorado at Boulder and has worked as a middle school geography teacher and school psychologist. She was Professor of Educational Psychology at the University of Northern Colorado until 1998, when she moved east to return to her native New England. She is currently affiliated with the University of New Hampshire, where she occasionally teaches courses in educational psychology and research methods. She has published numerous research articles on cognition and memory, cognitive development, and giftedness, but she is probably best known for this textbook and four others: *Human Learning* (currently in its fifth edition); *Essentials of Educational Psychology* (currently in its second edition); *Child Development and Education* (co-authored with Teresa McDevitt, currently in its fourth edition); and *Practical Research* (co-authored with Paul Leedy, currently in its ninth edition). With her three children now grown and out on their own, she lives in New Hampshire with her husband Richard.

Preface

New to This Edition

The seventh edition of *Educational Psychology: Developing Learners* expands on the strengths found in previous editions that make this book one of the most popular educational psychology textbooks for both instructors and students. The seventh edition includes:

- **A sharpened focus on the core principles of educational psychology**
  - Specific instructional objectives have been added to each chapter to keep students' reading on target.
  - The book has been significantly streamlined in this edition to ensure that information is presented efficiently and accessibly. The book is now 15 chapters long, making the contents easier to cover in a single academic term.
- **Additional opportunities for readers to see those principles in action**
  - Video examples allow students to explore the principles of educational psychology through the actions and words of children from various age-groups.
- **Additional opportunities to apply the principles**
  - Classroom applications are not limited to the text. Accompanying the book is an exciting new online resource, MyEducationLab, which provides readers with opportunities to apply the core principles and build their teaching skills.

Many details throughout the book have changed as well. As always, I've updated every chapter with recent research findings and citations. The "Big Picture" sections at the end of each chapter have been revised to better emphasize key principles of their respective chapters. Other noteworthy additions and changes to this edition include the following:

- **Every chapter:** Specific instructional objectives that students should strive to accomplish as they read the chapter; many features within MyEducationLab are closely aligned with these objectives.
- **Chapter 1:** Discussion of teaching as evidence-based practice; new section on qualitative research; expanded discussion of action research.
- **Chapter 2:** New opening case study called "Apple Tarts" (in the previous edition, this case appeared in the middle of Chapter 7); new sections on Bronfenbrenner's ecological systems perspective, neo-Piagetian theories, sociocognitive conflict, and dynamic assessment (the last of these moved from one of the assessment chapters to accommodate the wishes of several reviewers); new section on diversity in language development, including specific language impairments and a more in-depth discussion of English language learners.
- **Chapter 3:** Expanded discussion of personality, including the "big five" personality characteristics and goodness of fit; new section on technology and peer relationships, including discussion of cyberbullying.
- **Chapter 4:** Discussions of acculturation and culturally responsive teaching; new section on cultural diversity in emotional expressiveness.
- **Chapter 5:** New section on the Cattell-Horn-Carroll theory of cognitive abilities; discussion of Section 504 of the Rehabilitation Act of 1973 as a means of providing services for students who do not meet the criteria for the Individuals with Disabilities Education Act; discussion of response to intervention as an alternative approach to identifying students with disabilities, especially those with learning disabilities; switch to the term *intellectual disabilities* for students who have mental retardation, in accordance with current trends in special education.
- **Chapter 6:** New opening case study called "Bones" (in the previous edition, this case appeared in the middle of the chapter); broader usage of the term *meaningful learning* to encompass such processes

as elaboration, organization, and visual imagery; new sections on distinctiveness, emotional overtones of cognition (including a discussion of hot cognition), and consolidation as factors affecting long-term memory retrieval and forgetting (in the previous edition, hot cognition appeared only in the discussion of affect in a later chapter).

- **Chapter 7:** Discussion of service learning, problem-based learning, and project-based learning within the context of authentic activities (in the previous edition, these concepts were discussed only in Chapters 3 and 8).
- **Chapter 8:** Significantly updated section on computer technology as a vehicle for promoting problem-solving skills; discussion of the importance of critical thinking in online research.
- **Chapter 9:** Significant reorganization of chapter content; switch to the term *instrumental conditioning* (replacing *operant conditioning*) to accommodate a more integrated discussion of the effects of reinforcement and punishment.
- **Chapter 10:** Discussion of effortful control as a temperamental factor affecting self-regulation.
- **Chapter 11:** Integration of the previous edition's two chapters on motivation and affect into a single chapter; expanded discussion of affect and its interrelationships with motivation, learning, and cognition.
- **Chapter 12:** Discussion of backward design in instructional planning; closer links among state standards, classroom objectives, and instructional strategies (including a substantially revised table that now links state standards, instructional goals, and instructional strategies); significantly updated discussions of technology (e.g., new sections on setting up a class website and making use of instructional websites, expanded discussion of technology-based collaborative learning); expanded discussion of discovery learning to include inquiry learning.
- **Chapter 13:** Significant reorganization to more closely connect the section on preventive strategies with the section on coordinating efforts with others; discussion of I-messages.
- **Chapter 14:** New section on assessment as a means of evaluating the quality of instruction; substantially revised table that now links classroom assessment practices with state standards, instructional goals, and instructional strategies; expanded discussion of rubrics in performance assessment.
- **Chapter 15:** Expanded discussion of portfolios; expanded discussion of cultural and linguistic differences (including English language learners) and their implications for standardized and high-stakes tests.

My Rationale for the Book

As teachers, we play critical roles in the lives of children and adolescents. Some of us help them learn to read and write. Some of us help them understand their physical and social worlds through explorations of science, mathematics, geography, history, or literature. Some of us help them express themselves through physical movement, the visual arts, or music. But regardless of the subject matter we teach, we help the generation that follows us to become knowledgeable, self-confident, and productive citizens.

In my mind, teaching is the most rewarding profession we could possibly choose. Yet it is often a challenging profession as well. Students don't always come to us ready or eager to learn classroom subject matter. How can we help them develop the knowledge and skills they need to become productive adults? What strategies can we use to motivate them? What tasks and instructional materials are appropriate for children at different developmental levels? Over the years, researchers and practitioners have worked together to answer such questions. We are in the fortunate position of being able to benefit from the many insights that such experts offer.

I have been teaching educational psychology since 1974, and I've loved every minute of it. How children and adolescents learn and think, how they change as they grow and develop, why they do the things they do, how they are often very different from one another—our understanding of all of these things has innumerable implications for classroom practice and, ultimately, for the lives of young people.

I have written this textbook in much the same way that I teach my college classes. Because I want the field of educational psychology to captivate you the way it has captivated me, I have tried to make the book interesting, meaningful, and thought-provoking as well as informative. I have a definite philosophy about how future teachers can best learn and apply educational psychology, and this philosophy has guided me as I have written all seven editions of the book. In particular, I believe that human learners of all ages actively construct their own understandings of what they read in textbooks—an idea reflected in the puzzle-piece motif you will see throughout the book.

Helping My Readers Learn and Apply Educational Psychology

You can gain much more from your study of educational psychology when you:

- Focus on core concepts and principles of the discipline
- See these concepts and principles in action in your own learning and behavior
- Use the concepts and principles to understand the learning and behavior of children and adolescents
- Consistently apply the concepts and principles to classroom practice

I have incorporated numerous features into the book to help you do all of these things. I hope that you will learn a great deal from what educational psychology has to offer, not only about the students you will be teaching but also about yourself—a human being who continues to learn and develop even as an adult.

Focusing on Core Concepts and Principles

Rather than superficially explore every aspect of educational psychology, this book zeroes in on fundamental concepts and principles that have broad applicability to classroom practice. Throughout the book, core concepts appear in boldfaced purple font. Core principles are clearly identified in sections labeled "Basic Principles" or "Basic Assumptions" and then often summarized in Principles/Assumptions tables. Each table includes educational implications and concrete examples.

Principles/Assumptions

TABLE 6.2
Basic Assumptions of Cognitive Psychology and Their Educational Implications

Assumption	Educational Implication	Example
Influence of cognitive processes	• Encourage students to think about classroom subject matter in ways that will help them remember it.	• When introducing the concept mammal, ask students to identify numerous examples.
Behavior as a reflection of cognitive processes	• Ask students to explain their reasoning, and look closely at what they do and say to make educated guesses about how they are thinking about classroom topics.	• When a student says that 16+19=25 and that 27+27=44, suspect that the student is forgetting to carry when solving two-digit addition problems.
Selectivity about what is learned	• Help students to identify the most important things for them to learn and to understand why these things are important.	• Give students questions they should try to answer as they read their textbooks. Include questions that ask them to apply what they read to their own lives.
Construction of meanings and understandings	• Provide experiences that will help students make sense of the topics they are studying, and regularly	• When studying Nathaniel Hawthorne's *The Scarlet Letter*, have students convene in small

Seeing Concepts and Principles in Action in Your Own Learning

A central goal of this book has always been to help my readers discover more about themselves as thinkers and learners. Thus, I include Experiencing Firsthand exercises throughout the book—exercises that illustrate such diverse concepts as constructive processes, working memory, sense of self, social cognition, ethnic stereotyping, and confidentiality in assessment. All of these exercises are designed to do exactly what their name implies: help my readers observe concepts and principles of educational psychology in themselves.

EXPERIENCING FIRSTHAND

Remembering 12 Words

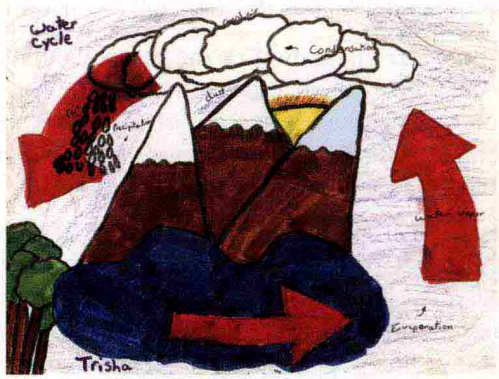
Read through the 12 words below *one time only*. Then cover up the page, and write down the words in the order they come to mind.

shirt	table	hat
carrot	bed	squash
pants	potatoes	stool
chair	shoe	bean

Understanding Children's and Adolescents' Learning and Behavior

Throughout the book I continually urge my readers to look closely at and try to make sense of what children and adolescents do and say. Each chapter begins with a Case Study that situates chapter content in a real-life scenario. I also make frequent use of real artifacts from children's journals and school assignments to illustrate concepts and principles in action.

FIGURE 7.4 In this picture 9-year-old Trisha integrates what she has learned about the water cycle.



Examining Developmental Trends Unique to this book is a focus on children's development in every chapter. For example, Chapters 2 through 15 all have one or more Developmental Trends tables that summarize age-typical characteristics at four grade levels (K–2, 3–5, 6–8, and 9–12) and offer suggested classroom strategies for each level.

Developmental Trends

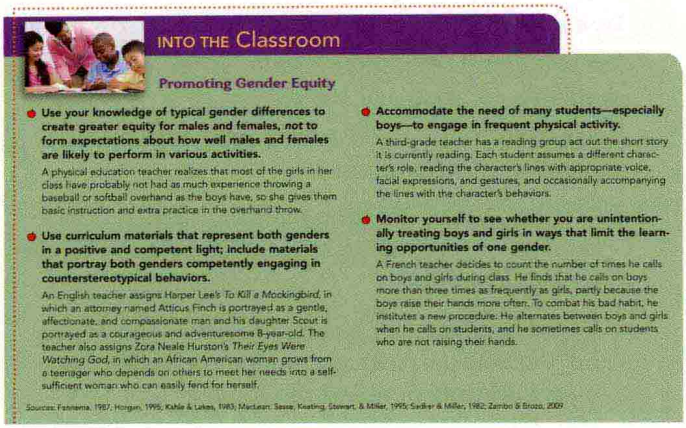
TABLE 3.1
Sense of Self at Different Grade Levels

Grade Level	Age-Typical Characteristics	Suggested Strategies
K–2	• Self-concept largely limited to concrete, easily observable characteristics • Some tendency to overestimate abilities and chances of future success	• Encourage students to extend their abilities by tackling challenging tasks they think they can accomplish. • Provide sufficient scaffolding to make success possible.
3–5	• Increasing awareness of and differentiation among particular strengths and weaknesses • Association of such emotions as pride and shame with various self-perceptions	• Focus students' attention on their improvement over time. • Encourage pride in individual and group achievements, but be aware that students from some ethnic groups may prefer that only group achievements be recognized (see Chapter 8). • Provide opportunities for students to look at one another's work only when everyone has something to be proud of.
6–8	• Increasingly abstract conceptions of oneself • For many, a decline in self-esteem after the transition to middle or junior high school (especially for females) • Heightened concern about others' perceptions and judgments of oneself (imaginary audience) • Excessive belief in one's own uniqueness, sometimes accompanied by risk taking and a sense of invulnerability to normal dangers (personal fable)	• After students make the transition to middle school or junior high, be especially supportive and optimistic about their abilities and potential for success. • Be patient when students show exceptional self-consciousness; give them strategies for presenting themselves well to others. • Provide safe outlets for risk-taking behaviors; show no tolerance for potentially dangerous behaviors on school grounds.
9–12	• Gradual increase in self-esteem • Continuing risk-taking behavior (especially for males) • Increasing integration of diverse self-perceptions into an overall, multifaceted sense of self • Search for the "real me" and an adult identity	• When discussing the potential consequences of risky behaviors, present the facts but don't make students so anxious or upset that they can't effectively learn and remember important precautions (i.e., avoid scare tactics). • Give students opportunities to examine and experiment with a variety of adultlike roles.

Sources: Davis-Kean et al., 2008; Dweck, 2000; Elkind, 1981; Harter, 1999; Lockhart et al., 2002; Manzo, 1980; Perl, 2002; Robins & Trzesniewski, 2005; Spear, 2007; Whitesell et al., 2006.

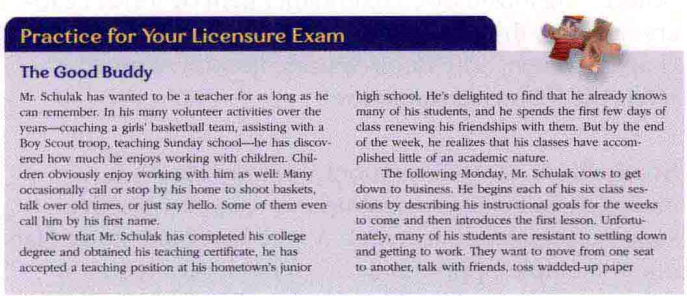
Applying Core Ideas of Educational Psychology to Classroom Practice

Throughout this text, psychological concepts and principles are consistently applied to classroom practice. I also provide Into the Classroom and Creating a Productive Classroom Environment boxes that suggest and illustrate strategies related to particular areas of concern for teachers.



This book is consistently praised for its emphasis on application, application, application. Throughout the book I identify suggested strategies—within the text, in tables, and in the margins—with apple icons that look like this:

Helping You Prepare for Licensure All chapters end with Practice for Your Licensure Exam exercises designed to resemble the kinds of case-study questions that appear on many teacher licensure tests.



Building Your Teaching Skills Throughout the book, margin notes alert readers to opportunities to apply chapter content and build their teaching skills by going to the new MyEducationLab to complete scaffolded learning units.

myeducationlab

Gain practice in applying Vygotsky's theory by completing the Building Teaching Skills and Dispositions exercise "Using Cognitive Tools and Instructional Strategies to Scaffold Learning" in MyEducationLab. (To find this exercise go to the topic Cognitive and Linguistic Development in MyEducationLab, and click on *Building Teaching Skills and Dispositions*.)

New! myeducationlab

The Power of Classroom Practice
www.myeducationlab.com

Classroom applications are by no means limited to the book itself! Accompanying the book is an exciting new online resource, MyEducationLab at www.myeducationlab.com, that provides my readers with many interactive, multimedia learning experiences. An access code for MyEducationLab is packaged with every new copy of this seventh edition of the book. I alert you to many of its resources with margin notes—again with apple icons to stress its value in helping my readers apply what they're learning to real children and classrooms.

"Teacher educators who are developing pedagogies for the analysis of teaching and learning contend that analyzing teaching artifacts has three advantages: it enables new teachers time for reflection while still using the real materials of practice; it provides new teachers with experience thinking about and approaching the complexity of the classroom; and in some cases, it can help new teachers and teacher educators develop a shared understanding and common language about teaching. . . ."[1]

Grounding teacher education in real classrooms—among real teachers and students and among actual examples of students' and teachers' work—is an important, and perhaps even an essential, part of training teachers for the complexities of teaching in today's classrooms. For this reason, the valuable, time-saving website—MyEducationLab—provides readers with the context of real classrooms and artifacts that research on teacher education tells us is so important. The authentic in-class video footage, interactive skill-building exercises, and other resources available on MyEducationLab offers a uniquely valuable teacher education tool.

As an educational psychologist, I am truly excited by the many resources that MyEducationLab can offer my readers—resources that can help them understand and apply the concepts and principles I describe in this book.

MyEducationLab is easy to use and integrate into both assignments and courses. Wherever you see the apple icon in the margins or elsewhere in the text, follow the simple instructions to access the videos, supplementary readings, and activities on MyEducationLab. MyEducationLab is organized topically to enhance the coverage of the core concepts discussed in the chapters of this book. For each topic covered in the course readers will find most or all of the following resources:

Connection to National Standards Now it is easier than ever for readers to see how course work is connected to national standards. In each topic of

[1]Darling-Hammond, L., & Bransford, J., Eds. (2005). *Preparing Teachers for a Changing World*. San Francisco: John Wiley & Sons.

MyEducationLab readers will find intended learning outcomes connected to the appropriate national standards. All of the Assignments and Activities and all of the Building Teaching Skills and Dispositions exercises in MyEducationLab are mapped to the appropriate national standards and learning outcomes as well.

Assignments and Activities Designed to save instructors preparation time and enhance student understanding, these assignable exercises show concepts in action (through videos, case studies, or student and teacher artifacts). They help readers synthesize and apply concepts and strategies they read about in the book. (Feedback for these assignments is available to the instructor.) Assignments and Activities include:

- Understanding Research exercises related to particular topics that help readers enhance their research interpretation skills and
- Student and Teacher Artifact Analysis and Video Analysis exercises that provide additional opportunities to practice applying chapter content to interpretations of actual students' work and teachers' classroom practices.

Building Teaching Skills and Dispositions These exercises help readers practice and strengthen skills that are essential to quality teaching. First the reader is presented with core concepts and ideas and then given an opportunity to practice their understanding of these concepts and ideas multiple times by watching video footage (or interacting with other media) and then critically analyzing the behaviors and strategies.

IRIS Center Resources The IRIS Center at Vanderbilt University (http://iris.peabody.vanderbilt.edu—funded by the U.S. Department of Education's Office of Special Education Programs, or OSEP)—develops training enhancement materials for pre-service and in-service teachers. The Center works with experts from across the country to create challenge-based interactive modules, case study units, and podcasts that provide research-validated information about working with students in inclusive settings. MyEducationLab has included this content in appropriate topic areas to enhance the content coverage in the book.

Teacher Talk This feature links to videos of teachers of the year across the country discussing their personal stories of why they teach. This National Teacher of the Year Program is sponsored by the Council of Chief State School Officers (CCSSO) and focuses public attention on teaching excellence. MyEducationLab includes motivational and inspiring Teacher Talk videos in topic areas to which they are relevant.

General Resources on Your MyEducationLab Course The Resources section on MyEducationLab is designed to help teacher candidates pass their licensure exam, put together effective portfolios and lesson plans, prepare for and navigate the first year of teaching, and understand key educational standards, policies, and laws. This section includes:

- Licensure Exams: Access guidelines for passing the Praxis exam. The Practice Test Exam includes multiple choice questions, case history questions, and video case studies with sample questions.
- Lesson Plan Builder: Create and share lesson plans.
- Licensure and Standards: Link to state licensure standards and national standards.
- Beginning Your Career: Access tips, advice, and valuable information on:
  - Resume Writing and Interviewing: Expert advice on how to write impressive resumes and prepare for job interviews.
  - Your First Year of Teaching: Practical tips to set up a classroom, manage student behavior, and plan for instruction and assessment.
  - Law and Public Policies: Specific directives and requirements teachers need to understand under the No Child Left Behind Act and the Individuals with Disabilities Education Improvement Act of 2004.
- Special Education Interactive Timeline: Build detailed time lines based on different facets of the history and evolution of special education.

Book-Specific Resources The Book-Specific Resources section of MyEducationLab contains useful material organized by chapter rather than by topic. Readers can go to this section to check their comprehension of chapter content. The Book-Specific Resources section offers the following resources:

Study Plan A MyEducationLab Study Plan is a multiple-choice assessment tied to chapter objectives, supported by study material. A well-designed Study Plan offers multiple opportunities to fully master required course content as identified by the objectives in each chapter:

- Chapter Objectives identify the learning outcomes for the chapter and give readers targets to shoot for as they read and study.
- Focus Questions help guide the reading of chapter content.
- Self-Check Quizzes assess mastery of the content. These assessments are mapped to chapter objectives. Readers can take the multiple-choice quizzes as many times as needed. Not only do these quizzes provide overall scores for each objective, but they also explain why responses to particular items are correct or incorrect.

- Study Material: Review, Practice and Enrichment gives readers a deeper understanding of what they do and do not know related to chapter content. This material includes text excerpts, activities that include hints and feedback, and interactive multimedia exercises built around videos, simulations, cases, or classroom artifacts.
- Flashcards help readers review the core concepts and principles within each chapter.
- Common Beliefs and Misconceptions about Educational Psychology help alert readers to typical misunderstandings in educational psychology classes.

Video Examples Video examples, referenced by margin notes in every chapter, provide concrete illustrations of various concepts and principles illustrated in each chapter.

Supplementary Readings Supplementary readings related to chapter concepts provide an opportunity to explore certain topics in more depth.

A Practice for Your Licensure Exam Exercise Each chapter ends with a Practice for Your Licensure Exam exercise that resembles the kinds of questions that appear on many teacher licensure tests. The same chapter-ending exercise is also located on MyEducationLab. Once on MyEducationLab, readers can complete the exercise while receiving hints that help scaffold the reader toward a correct response. The reader can also compare their responses to the expert feedback provided.

Visit www.myeducationlab.com for a demonstration of this exciting new online teaching resource.

Customizing Your Textbook

It is now possible for instructors to customize textbooks by selecting portions of this book and perhaps combining them with portions of other Pearson Education books. In addition to creating a standard seventh edition of my book, I have divided most of the book's content into a number of stand-alone modules that instructors can order singly or in combination. Instructors should contact their local Pearson sales representative for information on how to customize their textbook.

Ancillary Materials

Support Materials for Instructors

Videotapes The videotapes that accompany this textbook portray a wide variety of teachers, students, and classrooms in action. Many of the videos present numerous case studies in many content domains and at a variety of grade levels. Two additional videos are: *A Private Universe* (which examines learner misconceptions in science) and Constance Kamii's *Double-Column Addition: A Teacher Uses Piaget's Theory* (which depicts a constructivist approach to teaching mathematics). Opportunities to react to these videos in class discussions can further enhance students' ability to think analytically and identify good teaching practices.

- *Double-Column Addition: A Teacher Uses Piaget's Theory* (0-13-751413-1)
- *Windows on Classrooms Video Case Studies* (0-13-579948-1)
- *Educational Psychology: Video Package, Video 1* (0-02-389496-2)
- *A Private Universe* (0-13-859646-8)
- *Elementary Video Case Studies* (0-13-118642-6)
- *Secondary Video Case Studies* (0-13-118641-8)
- *Video Workshop for Educational Psychology:* Student Learning Guide with CD-ROM, Second Edition (0-205-45834-3).

Instructors should contact their local Pearson sales representative to order copies of these videos.

The following resources are available for instructors to download on www.pearsonhighered.com/educators. Instructors can enter the author or title of this book, select this edition, and then click on the "Resources" tab to log in and download textbook supplements or request premium content for a course management system.

Instructor's Manual (0-13-700118-5) An Instructor's Manual includes suggestions for learning activities, supplementary lectures, case study analyses, discussion topics, group activities, and additional media resources.

PowerPoint Slides (0-13-700117-7) The PowerPoint slides include key concept summarizations, diagrams and other graphic aids to enhance learning. They are designed to help students understand, organize, and remember core concepts and theories.

Test Bank (0-13-700078-2) and TestGen (0-13-700115-0) I've personally written all of the test questions in the Test Bank that accompanies the book. Some items (lower-level questions) simply ask students to identify or explain concepts and principles they have learned. But many others (higher-level questions) ask students to apply those same concepts and principles to specific classroom situations—that is, to actual student behaviors and teaching strategies. Ultimately, it is these higher-level questions that assess students' ability to use principles of educational psychology in their own teaching practice. The test bank is also available electronically in computerized test bank software known as TestGen, which enables instructors to create and customize

exams. TestGen is available in both Macintosh and PC/Windows versions.

Web CT (0-13-700160-6) and BlackBoard (0-13-700159-2) Course Content Cartridges The course content cartridges contain the content of the Test Bank, available for use on either course management system.

Supplementary Materials for Students

***Case Studies: Applying Educational Psychology* (2nd ed.)** Many instructors use Ormrod and McGuire's *Case Studies* book (0-13-198046-7) as a supplement to this book. It includes 48 real cases involving students and classrooms ranging from preschool to high school. It illustrates concepts and principles in many areas of educational psychology, including child and adolescent development, learning and cognition, motivation, classroom management, instructional practices, and assessment.

Artifact Case Studies: Interpreting Children's Work and Teachers' Classroom Strategies Another possible supplement to the book is my Artifact Case Studies book (0-13-114671-8). The artifact cases in this supplement offer work samples and instructional materials that cover a broad range of topics, including literacy, mathematics, science, social studies, and art. Every artifact case includes background information and questions to consider as readers examine the artifact. Instructors should contact their local Pearson sales representative to order a copy of this book.

***Simulations in Educational Psychology and Research* (version 2.1)** This CD-ROM (0-13-113717-4) features five interactive psychological/educational experiments, along with exercises and readings that can help students explore the research components and procedures connected to the experiments. Qualitative and quantitative designs are included. Instructors should contact their local Pearson sales representative to order a copy of these simulations.

Observing Children and Adolescents CD-ROMs: Guided Interactive Practice in Understanding Development This unique set of three CDs (0-13-094379-7) guides students through activities that help them develop a discerning "eye" for the developmental nuances of children's behavior. In more than 50 activities, students view video clips of real children from infancy through adolescence, reflect on their observations, and record their interpretations. Students can explore 14 topics, including Memory, Intrinsic Motivation, Cognitive Development, Emotional Development, Families, Friendship, and Intelligence. Viewing these clips and responding to a series of questions across five age groups will familiarize students with the abilities and concerns of children at every development level—and enhance their understanding of many key concepts. Instructors should contact their local Pearson sales representative to order a copy of these CDs.

Acknowledgments

Although I am listed as the sole author of this textbook, I have been fortunate to have had a great deal of help in writing it. First and foremost, this book would not be what it is today without a long-term partnership with my former editor, Kevin Davis. Kevin first came on board as developmental editor for the book in 1989 and continued to stand by my side through several promotions. Kevin has not penned the words, but his influence permeates every page, and with each new edition he has insisted that I stretch my knowledge and skills in ways I never imagined and didn't think were possible. I thank Kevin for his inspiration, guidance, friendship, and undying dedication to the quality of teacher education.

Taking over Kevin's role as editor in the fall of 2008 was Paul Smith, of whom I am also most appreciative. As I've worked with Paul in the last few months, I've found him to be a continuing source of advice and support in my ongoing efforts to make this book the very best that it can be. To quote Rick Blaine in one of my favorite movies, *Casablanca,* "I think this is the beginning of a beautiful friendship."

I am equally indebted to Christie Robb, developmental editor for the seventh edition. Christie has always "been there" for me, generously dropping what she's doing at a moment's notice to provide counsel or assistance. She's kept me on course—no doubt about it—whenever I've gone astray from my mission. And on numerous occasions, she's helped me to take a deep breath and calm down when new, unanticipated, do-it-yesterday tasks have appeared at my doorstep.

Four previous developmental editors have left footprints on the book as well. Linda Peterson helped shape many of the book's pedagogical features in the first and second editions. Linda Bishop and Julie Peters brought fresh perspectives and creative ideas to the third and fourth editions, respectively, as did Autumn Benson for the fifth and sixth editions. All of these women continued to keep me upbeat and on-task throughout my arduous, yearlong writing efforts. I am thrilled that I can continue to work with Autumn in her new role as Media Producer.

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J. E. O.

APPENDIX A

Describing Associations with Correlation Coefficients

- Do students with high self-esteem perform better in school than students with low self-esteem?
- Which students are more likely to answer questions correctly: those who answer questions quickly or those who are slow to respond?
- When students take two different intelligence tests in the same week, how similar are their scores on the two tests likely to be?
- Are intellectually gifted students more emotionally well adjusted than their classmates of average intelligence?

Each of these questions asks about an association between two variables—whether it be an association between self-esteem and school achievement, between speed and accuracy in answering questions, between two sets of intelligence test scores, or between giftedness and emotional adjustment. The nature of such associations is sometimes summarized by a statistic known as a **correlation coefficient**.

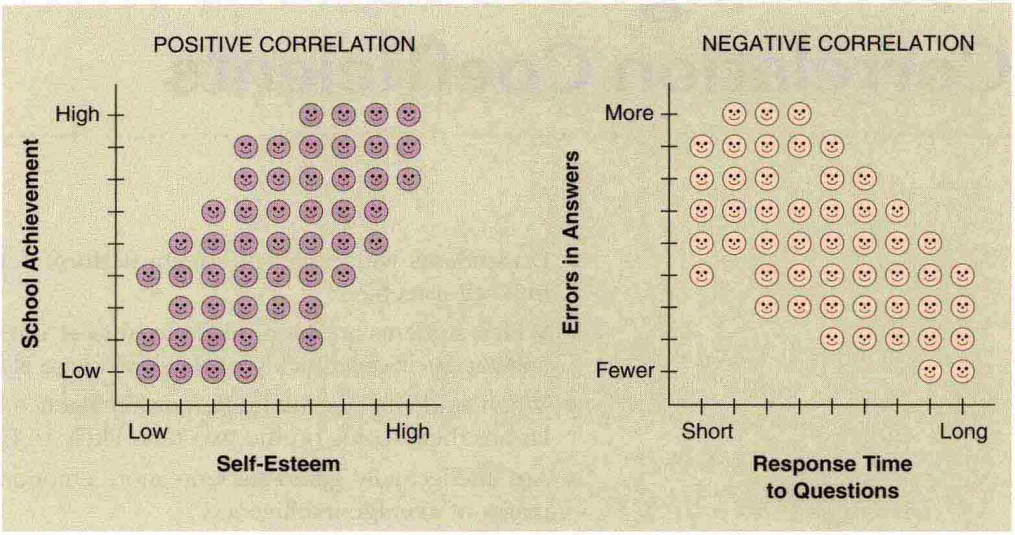
A correlation coefficient is a number between −1 and +1; most correlation coefficients are decimals (either positive or negative) somewhere between these two extremes. A correlation coefficient for two variables tells us about both the direction and the strength of the association between those variables:

1. *Direction.* The direction of the association is indicated by the *sign* of the correlation coefficient—in other words, by whether the number is positive or negative. A positive number indicates a *positive correlation:* As one variable increases, the other variable also increases. For example, there is a positive correlation between self-esteem and school achievement: Students with higher self-esteem achieve at higher levels (e.g., Marsh, Gerlach, Trautwein, Lüdtke, & Brettschneider, 2007). In contrast, a negative number indicates a *negative correlation:* As one variable increases, the other variable decreases instead. For example, there is a negative correlation between speed and accuracy in answering questions: Students who take longer to answer questions tend to make fewer errors in answering them (e.g., Shipman & Shipman, 1985). Figure A.1 graphically depicts each of these relationships.

2. *Strength.* The strength of the association is indicated by the *size* of the correlation coefficient. A number close to either +1 or −1 (e.g., +.89 or −.76) indicates a *strong* correlation: The two variables are closely related, so that knowing the level of one variable allows us to predict the level of the other variable with some accuracy. For example, we often find a strong relationship between two intelligence tests taken within a short time. Students tend to get similar scores on both tests, especially if the tests cover similar kinds of content (e.g., McGrew, Flanagan, Zeith, & Vanderwood, 1997). In contrast, a number close to 0 (e.g., +.15 or −.22) indicates a *weak* correlation: Knowing the level of one variable allows us to predict the level of the other variable but not with much accuracy. For example, there is a weak association

correlation coefficient Statistic that indicates the strength and direction of an association between two variables.

FIGURE A.1 Each "face" in these two graphs represents 1 student in a group of 50 students. The location of the face tells the extent to which a student is high or low on the two characteristics indicated. There is a *positive correlation* between self-esteem and school achievement: Students with higher self-esteem tend to achieve at higher levels. There is a *negative correlation* between the length of time it takes for students to respond to questions and the number of errors in their answers: Students who take longer to answer questions tend to have fewer errors in their responses.



between intellectual giftedness and emotional adjustment: In general, students with higher IQ scores show greater emotional maturity than students with lower scores (e.g., Janos & Robinson, 1985), but many students are exceptions to this rule. Correlations in the middle range (e.g., those in the .40s and .50s—either positive or negative) indicate a *moderate* correlation.

As teachers, we will often encounter correlation coefficients in research articles in our professional books and journals. For instance, we might read that students' visual–spatial thinking ability is positively correlated with their success in a mathematics class or that there's a negative correlation between class size and students' achievement test scores. Whenever we see such evidence of correlation, we must remember one very important point: *Correlation does not necessarily indicate causation.* For example, we cannot say that visual–spatial thinking ability specifically *leads to* greater mathematical ability, nor can we say that large class size specifically *interferes with* classroom achievement. Each of these italicized phrases implies a causal relationship between two variables that doesn't necessarily exist. As indicated in Chapter 1, only carefully designed experimental studies enable us to draw conclusions about the extent to which one thing causes or influences another.

Many calculators are now programmed to compute correlation coefficients. Computing a correlation coefficient by hand is somewhat complicated but certainly not impossible. If you are interested in learning more, you can find the formula in most introductory statistics textbooks. You can also find it on many Internet websites by using a search engine such as Google or Yahoo!

APPENDIX B

Determining Reliability and Predictive Validity

If you have read Appendix A, you have already learned something about **correlation coefficients**: statistics that indicate the strength and direction of an association between two variables. A correlation coefficient is always a number between −1 and +1. A coefficient close to either +1 or −1 (e.g., +.89 or −.76) indicates a strong correlation, whereas a number close to 0 (e.g., +.15 or −.22) indicates a weak correlation. A *positive* coefficient (i.e., one preceded by either a plus sign or no sign at all) indicates a positive association: As one variable increases, the other variable also increases. A negative coefficient (i.e., one preceded by a minus sign) indicates a negative association: As one variable increases, the other variable *decreases*.

Psychologists sometimes use correlation coefficients to determine the reliability and predictive validity of an assessment instrument.

Determining Reliability

The **reliability** of a test or other assessment instrument is the extent to which it yields consistent information about the knowledge, skills, or characteristics we are trying to assess. To mathematically calculate the reliability of an assessment instrument, we begin by getting two scores on the same instrument for the same group of students. We can get these two sets of scores in at least three different ways, with each approach giving us a somewhat different angle on the instrument's reliability.

If we use the same instrument to assess students on two different occasions (as Ms. Fowler does in the "Fowl Play" exercise in Chapter 14), we get information about **test–retest reliability**, the extent to which the instrument yields similar results over a short time interval. If we ask two or more people to judge students' performance (i.e., to grade the same set of essays, rate the same gymnastic performance, etc.), we get information about **scorer reliability**, the extent to which different people agree in their judgments of students' performance. If we compute two or more subscores for different items on the same instrument and look at how similar those subscores are, we get information about **internal consistency reliability**, the extent to which different parts of the instrument all measure the same characteristic.

Once we have two sets of scores for a single group of students, we can determine how similar the two sets are by computing a correlation coefficient; in this case, it's more frequently called a *reliability coefficient*. A reliability coefficient typically ranges from 0 to +1.[1] A number close to +1 indicates high reliability: The two sets of test scores are very similar. Although a perfect reliability coefficient of 1.00 is rare, many standardized achievement and ability tests have reliabilities of .90 or above,

correlation coefficient Statistic that indicates the strength and direction of an association between two variables.

reliability Extent to which an assessment yields consistent information about the knowledge, skills, or characteristics being assessed.

test–retest reliability Extent to which a particular assessment instrument yields similar results over a short time interval.

scorer reliability Extent to which different people agree in their judgments of students' performance on an assessment; sometimes called *interrater reliability*.

internal consistency reliability Extent to which different parts of an assessment instrument all measure the same characteristic.

[1]A negative coefficient is possible but would be obtained only when an *inverse* relationship between the two sets of scores exists—that is, when students who get the highest scores one time get the lowest scores the other time and vice versa. Such an outcome is highly unlikely.

reflecting a high degree of consistency in the scores they yield. As reliability coefficients decrease, they indicate more error in the assessment results—error due to temporary and, in most cases, irrelevant factors. Publishers of standardized achievement and ability tests typically calculate and report reliability coefficients for the various scores and subscores that the tests yield.

Estimating Error in Assessment Results A reliability coefficient tells us, in general, the degree to which temporary errors contribute to fluctuations in students' assessment results. But how much error is apt to be present in a *single* score? In other words, how close is a particular student's score to what it really should be?

A number known as the **standard error of measurement (SEM)** allows us to estimate how close or far off the score might be. The standard error of measurement is calculated from the reliability coefficient; you can find details by searching "calculating standard error of measurement" through a search engine such as Google or Yahoo! (Be careful *not* to click on sites that address standard error of the *mean*, which is a statistic used for an entirely different purpose.)

Let's look at a concrete example. Imagine that Susan takes an academic achievement test known as the Basic Skills Test (BST). Imagine, too, that with her current level of reading ability, Susan should ideally get a score of 40 on the BST Reading subtest. Susan's ideal score of 40 is her **true score**: This is what she would theoretically get if we could measure her reading achievement with complete accuracy. But Susan misinterprets a few test items, answering them incorrectly when, in fact, she knows the correct answers, so she actually gets a score of only 37. Because we cannot see inside Susan's head, we have no way of determining what her true score is; we know only that she's earned a 37 on the test. To estimate the amount of error in her score, we consult the BST test manual to find the standard error of measurement for the Reading subtest: 5 points. We can then guess that Susan's true score probably lies somewhere within a range that is one SEM to either side of her test score: 37 ± 5, or between 32 and 42.

Because almost any assessment score includes a certain amount of error, assessment results are sometimes reported not as specific scores but as a range, or **confidence interval**, extending 1 SEM to either side of the actual test score. By reporting confidence intervals along with specific test scores, we communicate an important point about the tests we give: Any test score has some error associated with it. Figure B.1 shows how we might report Susan's scores on the Reading and other subtests of the BST. Notice that the confidence intervals for the different subtests are different lengths, because each subtest has a different standard error of measurement.

When we use a single SEM to determine the confidence interval, there is a 68% chance that the student's true score lies within that interval. If we instead use 2 SEMs to determine the interval (e.g., for Susan's reading score, such an interval would be 27 to 47), we can be 95% confident that the true score lies within it.[2]

If two or more test scores come from the same test battery (and therefore involve the same norm group), we can use the 68% confidence intervals for the scores to make meaningful comparisons. Overlapping confidence intervals for any two subtests indicate that the student has performed equally well in the two areas. But if the intervals show no overlap, we can reasonably conclude that the student has done appreciably better in one area than the other. Using this approach with Susan's BST scores, we can conclude that Susan has performed best on the math and science subtests, less well on the social studies subtest, and least well on the reading and spelling subtests. We would *not* say that she has done better in science than in math or that she has done better in reading than in spelling, because the confidence intervals overlap for those two pairs of scores.

standard error of measurement (SEM) Statistic estimating the amount of error in a test score or other assessment result.

true score Hypothetical score a student would obtain if an assessment measured a characteristic or ability with complete accuracy.

confidence interval Range around an assessment score reflecting the amount of error that is likely to be affecting the score's accuracy.

[2]If you have some knowledge of descriptive statistics, it may help you to know that the SEM is the standard deviation for the hypothetical distribution of all possible scores that a student with a particular true score might get.