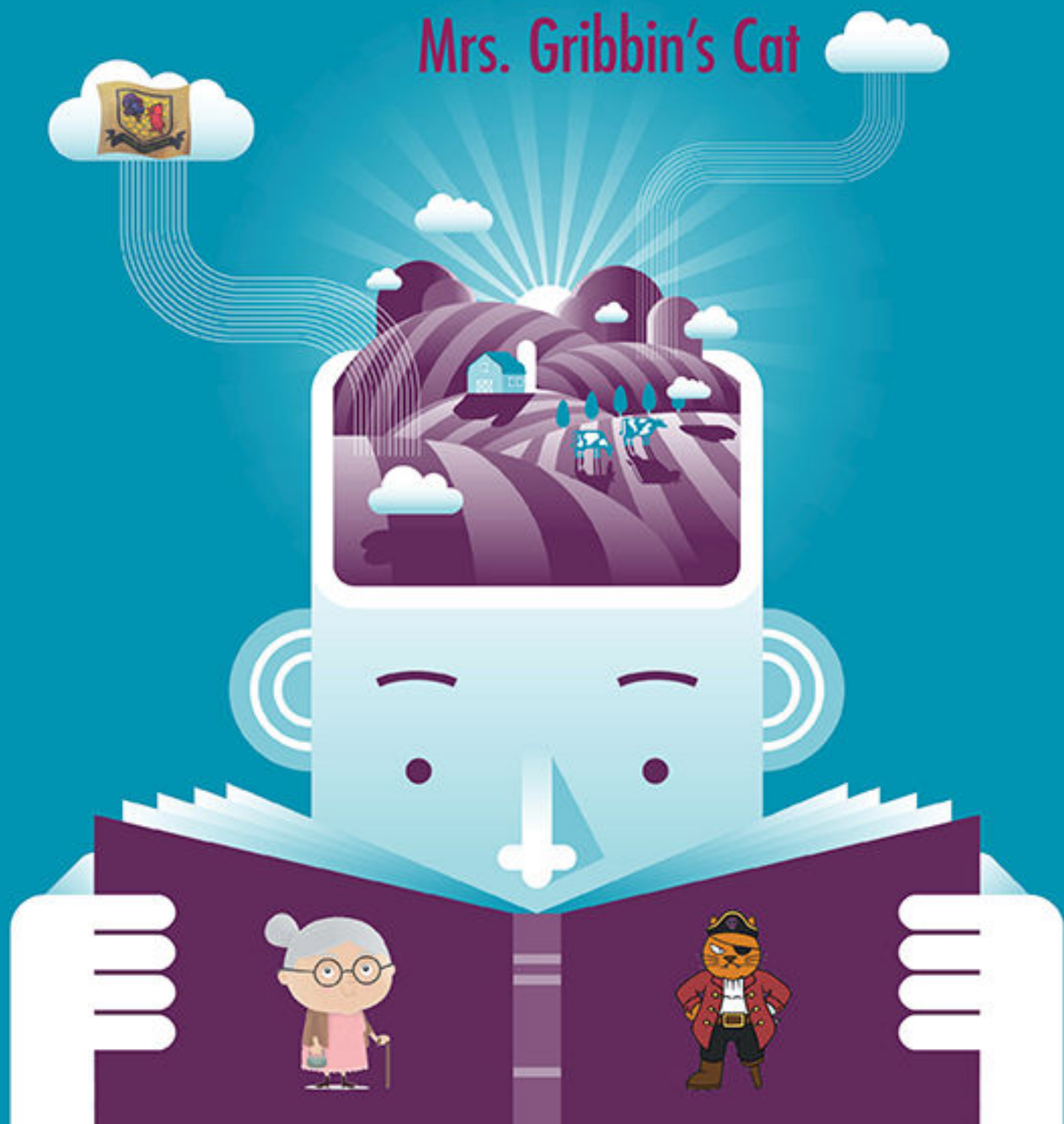


GUY R. LEFRANÇOIS

SEVENTH EDITION

Theories of HUMAN LEARNING

Mrs. Gribbin's Cat



Theories of Human Learning Mrs. Gribbin's Cat Seventh Edition

Both a serious academic text and an intriguing story, this seventh edition reflects a significant update in research, theory, and applications in all areas. It presents a comprehensive view of the historical development of learning theories from behaviorist through to cognitive models. The chapters also cover memory, motivation, social learning, machine learning, and artificial intelligence.

The author's highly entertaining style clarifies concepts, emphasizes practical applications, and presents a thought-provoking, narrator-based commentary. The stage is given to Mrs. Gribbin and her swashbuckling cat, who both lighten things up and supply much-needed detail. These two help to explore the importance of technology for simulating human cognitive processes and engage with current models of memory. They investigate developments in, and applications of, brain-based research and plunge into models in motivation theory, to name but a few of the adventures they embark upon in this textbook.

Guy R. Lefrançois is Honorary Professor in the Department of Educational Psychology at the University of Alberta, Canada. He has published over 50 titles, including a number of best-selling textbooks in their respective fields.

Theories of Human Learning

Mrs. Gribbin's Cat

Seventh Edition

Guy R. Lefrançois

University of Alberta



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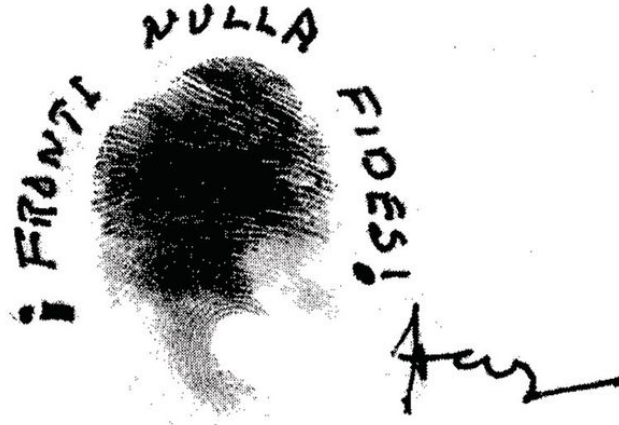
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This book is dedicated to my grandmother, Emerilda Francœur, who taught me things I would never otherwise have known, with an honorable mention to Mrs. Gribbin's feline, Schrödinger.



(Editor's Note: This is Mrs. Gribbin's motto, thumbprint, seal, and signature – all of which she insisted are necessary to make a document true and binding. In English, this Latin motto – *fronti nulla fides* – means, more or less, “you can’t judge a book by its cover.”)

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Appleton-Century-Crofts.

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A cumulative recording showing the responses of an untrained (naïve) rat on a continuous schedule of reinforcement. From *The Behavior of Organisms: An Experimental Analysis*, p. 67, by B. F. Skinner. Copyright © 1938 by Appleton-Century-Crofts. Reprinted courtesy of the B.F. Skinner Foundation.

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A cumulative recording showing four typical extinction curves. From *The Behavior of Organisms: An Experimental*

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A cumulative recording showing initial extinction over a one-hour period (left half of the graph) and spontaneous recovery of the rat's bar-pressing responses over a second one-hour period. From *The Behavior of Organisms: An Experimental Analysis*, p. 67, by B. F. Skinner. Copyright © 1938 by Appleton-Century-Crofts. Reprinted courtesy of the B.F. Skinner Foundation.

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Idealized graphs showing the effects of fixed interval and random ratio schedules of reinforcement on rate of responding. From Lefrançois, G. R. (2016). *Psychology: The Human Puzzle* (2nd ed.). San Diego, CA: Bridgepoint Education. Fig. 5.8. Used by permission.

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Schematic representation of a coding system. From Lefrançois, G. R. (2018). *Psychology for Teaching* (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 6.2. Used by permission.

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Experimental procedures devised by Piaget to determine the presence or absence of the understanding of conservation in each of a variety of different areas such as volume, number, length, and liquid quantity. Adapted from Lefrançois, G. R.

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A test of a child's understanding of seriation. Adapted from Lefrançois, G. R. (2018). *Psychology: The Human Puzzle* (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 4.9. Used by permission.

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A widely used model of human memory. From Lefrançois, G. R. (2016). *Psychology: The Human Puzzle* (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 6.1. Used by permission.

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Proportion of nonsense syllables recalled correctly when subjects were given no time for rehearsal, compared with those allowed to rehearse for 3 seconds. From Peterson, L. R. & Peterson, M. J. (1959) "Short-term retention of individual verbal items," In the *Journal of Experimental Psychology*, vol. 58, p. 197. Copyright © 1959 by the American Psychological Association. Reprinted by permission of the American Psychological Association.

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A representation of Baddeley's model of working memory. Adapted from Lefrançois, G. R. (2016). *Psychology: The*

Human Puzzle (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 6.3. Used by permission.

8.5

Accuracy of memory for recent and distant odors. Based on “Very Long-Term Memory for Odors: Retention of Odor-Name Associations,” by W. P. Goldman and J. G. Seamon, 1992. In the *American Journal of Psychology*, 105, pp. 549–563 (Table 1, p. 553). © 1992 by the Board of Trustees of the University of Illinois. Reprinted by permission of University of Illinois Press.

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A model of memory. From Lefrançois, G. R. (2016). *Psychology: The Human Puzzle (2nd ed.)*. San Diego, CA: Bridgepoint Education, Fig. 6.5. Used by permission.

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& McDaniel, M. A. (2014). *Making it stick: The science of successful learning*. Cambridge, Mass.: The Belknap Press of Harvard University Press.

9.1

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The drive-reduction model of motivation. From Lefrançois, G. R. (2018). *Psychology for Teaching* (2nd ed.). San Diego, CA: Bridgepoint Education, Figure 8.4. Used by permission.

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The hierarchy is shown in the form of a pyramid depicting lowest-level needs, such as the need for food and drink, at the bottom. From Maslow, Abraham H.; Frager, Robert D.; Fadiman, James. *MOTIVATION AND PERSONALITY*, 3rd EDITION©1987. Printed and Electronically reproduced by permission of Pearson Education, Inc., New York: New York.

9.5

The Yerkes–Dodson law describes the relationship between behavioral performance and arousal level.

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Everyone experiences conflicts (cognitive dissonance) between beliefs or desires and reality. From Lefrançois, G. R. (2016).

Psychology: The Human Puzzle (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 8.5. Used by permission.

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Four important possible attributions for success and failure. From Lefrançois, G. R. (2018). *Psychology for Teaching* (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 8.6. Used by permission.

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Relations between causal attributions and feelings associated with success and failure. Based on Bernard Weiner, “The Role of Affect in Rational (Attributional) Approaches to Human Motivation.” In *Educational Researcher*, July/August 1980, pp. 4–11. Copyright © 1980. American Educational Research Association, Washington, D.C. Used by permission.

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Keller’s ARCS model of instruction design suggests ways in which teachers can design instruction to foster and maintain high levels of motivation among learners. From Lefrançois G. R. (2020). *Of Learning and Assessment* (2nd ed.). San Diego, CA: Bridgepoint Education, Fig. 3.9. Used by permission.

10.1

The four processes involved in observational learning. From A. Bandura, *Social Learning Theory*, © 1977, p. 23. Reprinted by permission of Prentice Hall, Inc., Englewood Cliffs, NJ.

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Some of the results from Bandura, Ross, and Ross's study of children's interactions with a Bobo doll following exposure to models interacting aggressively or nonaggressively with the doll. From Lefrançois, G. R. (2018). *Psychology for Teaching* (2nd Ed.). San Diego, CA: Bridgepoint Education, Fig. 5.12. Used by permission.

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Bandura's notion of triadic reciprocal determinism. From Lefrançois, G. R. (2016). *Psychology: The Human Puzzle*. San Diego, CA: Bridgepoint Education, Fig. 5.12. Used by permission.

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3.1

Edward Lee Thorndike (1874–1949)

3.2

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Burrhus Frederic Skinner (1904–1990)

6.1

Donald Olding Hebb (1904–1985)

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Edward Chace Tolman (1886–1959).

6.3

Kurt Koffka (1886–1941), Wolfgang Köhler (1887–1967), and Max Wertheimer (1880–1943).

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Jerome Seymour Bruner (1915–2016).

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Jean Piaget (1896–1980).

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Albert Bandura (1925–).

Preface: Read this First...

... not just because it's at the beginning of the book but because if you don't, you might wonder what the devil is going on.

Let me get right to the point: I didn't write this book. Truth is, the first edition was a report written and given to me by Kongor, a behavioral scientist from – well, it doesn't really matter in any case. That report, published in 1972, was titled *Psychological Theories and Human Learning: Kongor's Report*.

A decade later, readers began to complain that some of what Kongor had written was imprecise, irrelevant, inaccurate, or insulting. So, I was forced to prepare a second edition by myself. It was published in 1982.

Then, almost two decades after Kongor's visit, somebody named Kro crawled out of the muddy slough in front of my bush cabin, claiming he was here to update Kongor's original report, which he did. That was the third edition: *Psychological Theories and Human Learning: Kro's Report*, published in 1995.

A few years later, an Old Man barged uninvited into my living room, insisting he had updated, corrected, polished, and absolutely perfected all previous editions. That was the fourth edition: *Theories of Human Learning: What the Old Man Said*.

Only five years after that, late one Thursday afternoon, a disheveled Old Woman rode up to me on a unicycle. "Things change. Science doesn't stand still," she muttered, "so I'm gonna give you the next edition." That was *Theories of Human Learning: What the Old Woman Said*.

I thought that would be it. But no. In the middle of one of those sleepless nights when I worried they might be closing in, I received this message sent to my anonymous email address: "Outstanding new edition is ready," it said. "Come get it at the Palladium. Come alone. DO NOT BRING YOUR FRIENDS! (You know who!)." I went, met some guy who said he was a Professor, and ended up with the sixth

edition (*Theories of Human Learning: What the Professor Said*) ... and more trouble I didn't need.

No matter where I hide, they find me. A few weeks ago, my phone rang in the middle of the night. Startled out of a weird dream about small donkeys, I staggered out of bed and fumbled around in the darkness, but by the time I found the phone, it had stopped ringing.

In the morning, I saw that a voicemail message had been left. That's where this all starts.

The voicemail, which I have kept because publishers (and readers) are often skeptical, barked in what sounded like a disgruntled woman's voice: "That learning book is completely out of date and lots of it is dead wrong and misleading so if you want to fix it, and you're still on the loose, be at Willy's Social House next Monday after dark." That's all it said, except for the very end which is where the voice laughs, sort of a cackling, croaking sound, and says that maybe I should wear a disguise even when it's dark. I don't need one any more, with the facial hair and everything.

It was a damp, gloomy night, that Monday, and when I didn't immediately see anyone near Willy's, I thought I might have been lured here, finally trapped, and I turned to flee. But then an old lady rose from the shadows and when I asked was it her who had called and who was she, she hesitated for an awkward time and then said yes, she was nobody else than she who had called and that if I needed to name her, Mrs. Gribbin would be okay, but she didn't sound convinced.^{[1](#)}

Mrs. Gribbin brought me this manuscript. I wrote only this preface, the epilogue, some footnotes, and a few little bits here and there (always in italics). The rest, organized into 12 chapters, is what she read from a really battered old manuscript, often throwing in her own explanations and examples. She insisted that I record her words as she read them and that I also make handwritten notes. "For future generations," she said when I asked why.

I changed nothing of what she wrote; I am just a lowly clerk. When she spoke "off the record," she insisted that the recorder be turned off. If what she said in those circumstances seemed important, I put what I could remember or what I could decipher from my handwritten notes into footnotes.

Old lady Gribbin wanted it made perfectly clear that although she spoke all these words as she told me this book, they were certainly not all her words and thoughts. She asked that I explain very carefully that this is a revision – an updating and a correcting of the first six editions. She grumbled that many of the words and examples in this seventh edition are left over from those primitive earlier editions and that she could have done better if she had time to start from scratch.

The few comments I have permitted myself in this seventh edition serve only to tell something of this old lady, Mrs. Gribbin – to describe where she was and what she was doing at this moment or that. Very rarely, I asked questions. Sometimes, she responded; mostly, she didn't. When she did, I included what I remembered of her replies – but always only in footnotes.

What's New in the Seventh Edition?

This seventh edition is a survey and interpretation of some of the important theories and findings in the psychology of learning. It includes a detailed examination of the main behavioristic and cognitive theories and an appraisal of each, together with a discussion of its most important practical applications, especially in education. Also, it looks at the most recent and useful models of memory, motivation, social/cognitive learning, and current brain-based research, and it explores recent and rapidly changing progress in the field of machine learning and artificial intelligence. Like its predecessors, this edition continues to emphasize relevance and practical implications of topics, clarity of presentation, and maintenance of high interest. The seventh edition reflects a significant updating of research, theory, and applications in all areas, including:

- highlighting recent developments in, and applications of, brain-based research;
- describing newer models in motivation theory and their implications;
- summarizing current models of memory and related implications for theories of learning;
- exploring the importance of technology for simulating human cognitive processes and suggesting new models of learning;

- examining the effects of *screen violence* on children and adults; and
- looking at what machines capable of deep learning and artificially intelligent behaviors might mean for the future.

There is also a tidbit of information about Schrödinger, a unique cat.

The book is written primarily for students of human learning, teachers, counselors, social workers, industrial psychologists, nurses, social psychologists, quantum physicists, numismatists, physicians, lawyers, dentists, engineers, housewives, spelunkers, farmers, judges, philatelists, fishermen, tree planters, glass blowers, plasma physicists, vagabonds, poets, stockbrokers, philosophers, retired types, environmental activists, grandmothers, and all others – more or less in that order.

Acknowledgments

Mrs. Gribbin wanted me to pass on her appreciation to about 500 different people, all of whom she said deserved emoluments, credits, applause, and many wet kisses. I said there's no room, this isn't an encyclopedia. She said okay, but you have to say thank you to the publisher (Cambridge University Press), the acquisition editor (David Repetto), the assistant editor (Emily Watton), the content managers (Rosie Crawley and Nicola Chapman) and copy editor (Gary Smith) ... your grandmother (Emerilda Francœur), the guy you borrowed the boat from, your office cleaning company – and then I said, whoa, that's enough, are you trying to get all 500 in? And she said no, but please thank the anonymous reviewers because they were so amazingly competent and clever.

The old lady Gribbin also wanted me to indicate that she's not responsible for any errors and misinterpretations that remain in this text. "If any errors creep in," she said, "it'll be the fault of reviewers, editors, and other publishing types." That, of course, is absolutely untrue. The old lady, Mrs. Gribbin, is fully responsible for any weaknesses and flaws in the book.

Guy R. Lefrançois

P.S. Many thanks to Claire, who succeeded in photographing Kro, and to Claire and Liam, who came closer than anyone to getting recognizable photos of the Old Man and the Old Woman. I took the photo of the Professor myself with my hidden, motion-activated, infrared wildlife camera. The only photo we have of Mrs. Gribbin is a screen shot from a security camera she inadvertently activated the night she apparently got lost and broke into my neighbor's kitchen (see page 455).

¹_— I still don't know if Gribbin was her real name. That's the only name she ever gave me. I mostly just thought of her as the Old Lady, but to her face I always called her Mrs. Gribbin.

Part I Science and Theory

1 Human Learning

Chapter Outline

What Mrs. Gribbin Said: This Book

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Defining Learning

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Radical Behaviorism*

*Chapter 5. Evolutionary Psychology: Learning,
Biology, and the Brain*

*Chapter 6. Transition to Modern Cognitivism:
Hebb, Tolman, and the Gestaltists*

*Chapter 7. Cognitive Theories: Bruner, Piaget,
and Vygotsky*

Chapter 8. Learning and Memory

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*Chapter 11. Machine Learning and Artificial
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Chapter 12. Analysis, Synthesis, and Integration

Applications of Learning Theories

Main Point Chapter Summary

Often a man finds a theory that explains things and he builds atop that theory, finding all the right answers ... only the basic theory is wrong. But that's the last thing he will want to admit.

Louis L'Amour, *Treasure Mountain*

Mrs. Gribbin moved into the bush cabin that very night. I tried to talk her out of it; I sometimes need a place to lay low for a few days. "Why don't you just give me the whole manuscript right now?" I asked. "Save you the trouble of reading it out to me page after page." But no, she wouldn't. She said there was stuff in it that she had to explain and we'd just do it one chapter at a time.

When I showed up in the morning she was sitting at the table, ragged yellow pages scattered everywhere. I tried to make small talk. The old lady grunted once or twice. The first intelligible thing she said was "Enough talking," as she waved a fistful of those dog-eared pages at me. "That old book of yours is hopelessly outdated and mistaken and missing all kinds of important stuff and ... never mind. Just turn on your recorder and pay attention."

I pressed the little circle at the bottom left corner of the new digital recorder that I had bought just in case. Wisely, I had read the instructions.

The old lady started to talk. I couldn't always tell for sure when she was actually reading or just talking. This is what she said.

What Mrs. Gribbin Said: This Book

This book, *she explained as she smoothed out a clutch of manuscript pages on her knees*, summarizes what psychologists know and believe about human learning. *I noticed, then, that the one-eyed cat, the one who had suddenly appeared at the bush cabin a couple of months ago and who had always been too wild to touch – only tame enough to feed if I kept my distance – had buried himself under the manuscript. Strangely, he was allowing Mrs. Gribbin to scratch his ears. Change of heart, I thought, reaching over gingerly to finally pet him. He growled and tried to bite me again. The old lady said, “That’s not nice, Schrödinger,” but her voice seemed to be saying, “Nice kitty.”*¹ Among other things, this text presents a historical view of the development of psychological theories related to human learning, *the old lady continued*. It describes the major principles and the practical applications of each theory, and it evaluates each theory’s main strengths and weaknesses.

Objectives

Tell your readers, *said Mrs. Gribbin*, that this first chapter is a bit of a preamble: It defines important terms and sets the stage for what comes later. Explain to them that after studying this chapter, they should know with stunning clarity:

- What is meant by the term *learning*.
- How theories are developed and can be evaluated.
- What terms such as *structuralism*, *functionalism*, *behaviorism*, and *cognitivism* mean.
- What the principal information-gathering methods are in psychology.
- What *placebos* and *nocebos* are and why they might be important in psychological research.