OXFORD

FIFTH EDITION

COGNITION

DANIEL SMILEK • SCOTT SINNETT • ALAN KINGSTONE

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Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
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Oxford University Press in the UK and in certain other countries.

Published in Canada by
Oxford University Press
8 Sampson Mews, Suite 204,
Don Mills, Ontario M3C 0H5 Canada

www.oupcanada.com

Third Edition published in 2007
Fourth Edition published in 2010

Library and Archives Canada Cataloguing in Publication
Smilek, Daniel, 1974–
Cognition / Daniel Smilek, Scott Sinnett & Alan Kingstone. — 5th ed.

Includes bibliographical references and index.
ISBN 978–0–19–544749–1

1. Cognition—Textbooks. 2. Cognitive psychology—Textbooks.
I. Sinnett, Scott II. Kingstone, Alan, 1941– III. Title.

BF311.B45 2013 153 C2012-906483-1

Cover image © Digital Storm/Shutterstock

This book is printed on permanent (acid-free) paper ♾ which
contains a minimum of 10% post-consumer waste.

Printed and bound in the United States of America.

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From the Publisher

What do we know, and how do we know it? What is the relation between the mind and the brain? How does memory work? What is intelligence? How do we learn language, acquire concepts, solve problems?

These are just a few of the fundamental questions that frame this fifth edition of *Cognition:* the essential text for introductory courses in cognitive psychology.

Building on the strengths of the previous edition, in which Alan Kingstone and Daniel Smilek joined John Benjafield to update and expand his original text, this fifth edition has the significant benefit of Scott Sinnett's contributions. While preserving the clear, straightforward style, fascinating research examples, and easy-to-navigate organization of the earlier editions, the new three-author team presents a wealth of up-to-date information and research, useful learning tools, and student-oriented examples, including (for the first time) case studies that highlight key issues in each chapter. The result is a well-rounded, current, and comprehensive text that is both accessible to students and a pleasure to teach from.

***Cognition*, fifth edition, retains all the hallmarks of previous editions:**

- Broad, balanced treatment of major theories and controversies;
- Clear, focused writing that makes even the most difficult concepts accessible without oversimplification;
- Historical perspectives on key issues and phenomena; and
- Abundant citations of both classic and current research from Canada and around the world.

Highlights of the Fifth Edition

- **New** case studies open each chapter with an account of a real-world situation that illustrates one or more of the concepts to be explored in the text that follows.

Case Study Head Office

Let's take a moment to think about our heads and all they do for us. First of all, the head houses the nose and mouth, both of which are crucial to life itself. For the purposes of cognitive psychology, however, eyes and ears are equally important, for they are what enable us to see and hear the world around us. The simple fact that the head is centred at the top of the body means that it is ideally situated for the reception of information from the environment, which ultimately leads to perception and behaviour. These are all fairly obvious observations. Less obvious, perhaps, is the significance of the fact that your head is hard—really hard. Why is that so important? Your brain knows why: because it is the star of the show that is your life, and it needs all the protection it can get.

Although it accounts for only about 2 per cent of your body weight, your brain manages to claim about 20 per cent of all the blood supply in your body. If you didn't have a brain you wouldn't have a thought, and without thought there is no cognition. Yet we often take the brain for granted—at least until something goes wrong.

You may know someone whose life has been changed profoundly because of a brain disease or injury. If not, you almost certainly know of some prominent person who has suffered a brain injury, whether as a result of a stroke, a tumour, or some kind of trauma. For instance, consider the boxer Muhammad Ali. One of the most famous athletes in the world, as a fighter he would "float like a butterfly and sting like a bee" (to borrow his own phrase), and he commanded as much respect for his quick intelligence and verbal skills as for his abilities in the ring. Now this most beloved and dignified man is barely able to move or speak. Or consider Ronald Reagan and Margaret Thatcher, the two most powerful people in the Western world in the 1980s (Figure 2.1). By the time of his death in 2004, Reagan had lived with Alzheimer's disease for a decade, and today Thatcher as well is said to be battling dementia.

Virtually everyone who has ever taken an introductory psychology course will know the name of Phineas Gage, a young railroad foreman who in 1848 survived an explosion that drove an iron bar through his head. Although he suffered bouts of depression and epileptic seizures following the accident, his cognitive abilities seemed remarkably unaffected. As amazing as the Gage story is, it appears to have been replicated in Brazil in August 2012. Eduardo Leite was working on a construction site when a falling 1.8-metre iron bar pierced his hard hat, entered his skull, and came out between his eyes (see Figure 2.2). The surgery to remove the bar took five hours. Although it is still too soon to be certain, doctors report that Leite shows few if any cognitive deficits.

FIGURE 2.1 Muhammad Ali, Ronald Reagan, and Margaret Thatcher

Case Study Wrap-Up

We began this chapter by considering how easy it is to take the brain for granted, even though it is indispensable to all thought and behaviour. The life-altering consequences of brain injury were recently driven home by the case of Congresswoman Giffords, who survived a bullet in the head but then faced significant difficulties in understanding and producing speech. Based on what you have read in this chapter, which side of her brain do you think was injured?

We have considered three convergent lines of evidence suggesting that the injury must have been in the left hemisphere: brain lesion studies (e.g., the research conducted by Broca and Wernicke), surgical intervention (e.g., the split-brain work of Sperry and colleagues), and the fMRI studies involving healthy individuals. In fact, it was the left hemisphere of Giffords' brain that was damaged.

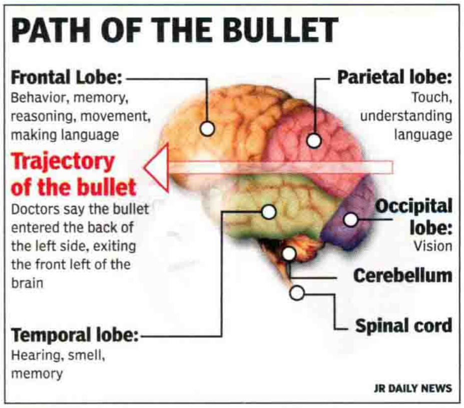

FIGURE 2.17 Lesions in left hemisphere of Gabrielle Giffords' brain

From: "Brave Gabby Gives Thumbs Up To Doctors" by Richard Huff and Corky Siemaszko (01/11/11). © Daily News, L.P. (New York). Used with permission.

- **New** case-study "wrap-ups" at the end of each chapter revisit those cases in the light of the chapter discussion.

- **New** four-colour, single-column design includes dozens of new illustrations.

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Flashbulb memories: Terrorist attacks on the World Trade Center, New York City

FIGURE 5.5

other tests designed to measure additional aspects of the flashbulb phenomenon, such as the intensity of the emotion felt when the events were recalled. They then divided the 54 participants into three groups of 18 each and re-tested each group once. The first group was tested one week later; the second, six weeks later; and the third, 32 weeks later. The major variable of interest was the consistency of the account given at the three different intervals. For example, if a participant said on 12 September that "Fred" was with him when the event occurred and later said that "Alice" was with him, but not "Fred," that response was scored as inconsistent. Each participant's recall was given a consistency score based on the number of details consistently recalled, as well as an inconsistency score. Figure 5.6 shows the change in consistency and inconsistency scores as a function of time. Notice that both flashbulb and everyday memories show a decline in consistency and an increase in inconsistency. Although the flashbulb memories had more emotion associated with them, in terms of their actual content they were certainly no more accurate than "ordinary" memories. However, participants erroneously believed that their flashbulb memories were more accurate than their "ordinary" memories. Talarico and Rubin concluded that although a flashbulb event "reliably enhances memory characteristics such as vividness and confidence," people should not put that much faith "in the accuracy of their flashbulb memories" (2003, p. 460).

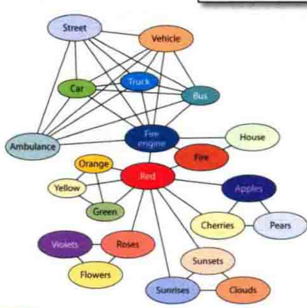

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FIGURE 6.10 Fragment of a semantic network

From: Collins, A.M., and & Loftus, E.F. (1975). A spreading-activation theory of semantic processing. *Psychological Review*, 82, 407–428. Copyright 1975 by the American Psychological Association.

Kvavilashvili and Mandler (2004) reported on diary and questionnaire studies designed to probe the mind-popping phenomenon. Kvavilashvili kept two diaries of her semantic "mind pops" for 19 and 18 weeks, when she was 35 and 37 years old, respectively. She logged a total of 428 memories, which tended to be either words (e.g., *rummage*) or images (e.g., *a view of a road and a small church in Cardiff*). She had no episodic information accompanying these involuntary semantic memories. Most of the mind pops occurred while she was engaged in routine activities not requiring a lot of attention, and at first they appeared unrelated to the current activity. However, Kvavilashvili was often able to retrospectively find cues that had triggered the memories without her awareness. For example, one pop-up was *Itchy and Scratchy*, the names of two characters from *The Simpsons* television show. Kvavilashvili noticed she was scratching her back when the pop-up occurred. Examples like this suggest that involuntary semantic memories are primed by events of which we are typically unaware.

Kvavilashvili and Mandler's (2004) study shows how their ecologically valid research complements and extends laboratory work. We will return to the effect of ongoing activations on the way we think in Chapters 10 and 12, on problem-solving and creativity.

Working memory
The system that allows for the temporary storage and manipulation of information that is necessary for various cognitive activities.

Working Memory

The concept of **working memory** has been at the centre of Alan Baddeley's (1986, 1989, 2000a, 2001, 2002a, 2002b; Baddeley & Hitch, 1974; N. Morris & Jones, 1990; Parkin & Hunkin, 2001) influential research program. Working memory "involves the temporary storage and manipulation of information that is assumed to be necessary

Enhanced Pedagogy

- More text boxes are now included in every chapter:

- **"Cognition in Action"** boxes connect text discussions with real-life examples.

COGNITION IN ACTION BOX 9.2 Deficits in Reading

Reading is an integral part of human communication. This has become even more true with the advent of blogs, text messaging, and text-based forums such as Twitter. What are the processes that underlie reading? A simple model of word reading is shown in Figure 9.10. According to this model, when a reader sees a printed word, he or she processes it as a complete unit and compares it to a mental dictionary (also known as a "lexicon") that contains all the words he or she knows. Once a match is made, the reader recognizes the word and is able to utter it.

Although this simple model seems reasonable, studies of people with **dyslexia**—individuals who have trouble reading printed text for reasons other than poor instruction or problems with seeing or speaking—suggest that it is not the whole story. Consider, for instance, people with a subtype of dyslexia known as **surface dyslexia**. They have trouble pronouncing irregular words such as *yacht* (see Castles & Coltheart, 1993). People with surface dyslexia cannot match a word to a mental dictionary to come up with the right pronunciation. Instead, they have to sound out the word letter-by-letter using a set of rules that convert graphemes (letter shapes) to phonemes (sounds); they then stitch the sounds together when uttering the word. This means that people with surface dyslexia use a different pathway when reading, one that involves translating letters to sounds (see Figure 9.11). Because surface dyslexics can string words together letter-by-letter, they are able to read non-words such as *blast*, even though they have never seen them before (see Castles & Coltheart, 1993).

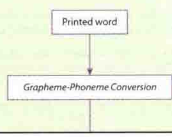
Thus it is not always the case that reading involves access to a mental dictionary, as our simple model suggests. Nevertheless, that model is supported by another subtype of dyslexia known as **phonological dyslexia**. People with this deficit cannot read letter-by-letter and can read only by comparing the letter strings to words in their mental dictionaries (see Castles & Coltheart, 1993). Phonological dyslexics can read irregular words by accessing their mental dictionary but are unable to properly read non-words that they have never seen before, since those non-words are not in their dictionaries.

Dyslexia
An impairment in the ability to read that is distinct from difficulties resulting from poor instruction or problems with seeing or speaking.

Surface dyslexia
A form of dyslexia affecting only the ability to recognize words as entire units; the ability to read words letter-by-letter remains intact.

Phonological dyslexia
A form of dyslexia affecting only the ability to read letter-by-letter; the ability to recognize words as entire units remains intact.

FIGURE 9.10 A simple model of word reading



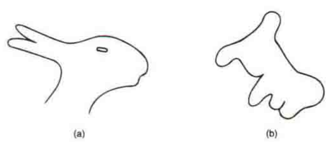


FIGURE 7.15 The duck/rabbit and chef/dog stimuli

From: Chambers, D., & Reisberg, D. (1985). Can mental images be ambiguous? *Journal of Experimen[tal] Psychology: Human Perception and Performance, 11*, 317–328. Copyright 1985 by the American Psy[chological] Association.

COGNITION IN ACTION BOX 8.2 Do Experts Embody Information Differently?

Have you ever tried to learn a difficult skill such as shooting a puck or serving a tennis ball? If you have, you most likely had a friend, parent, or coach who gave you a visual demonstration of what you were supposed to do. Seeing a motor action performed correctly seems to have an effect on how well you perform it yourself. Indeed, many amateur athletes consciously try to emulate professional players or Olympic champions. This is a clever strategy, as a growing body of evidence suggests that action and perception are intimately linked. It seems that perceiving a particular motor action, or even just an object that could be acted upon, such as a puck or a ball, leads to activation in premotor areas of the brain, as if you were somehow preparing to perform a related action.

For example, imagine that you are looking at a frying pan with the handle facing to the right. If you were asked to press a key in response to some feature of the pan (e.g., its colour or size), you would be faster if you delivered your response with your right hand than with your left, presumably because the handle was facing to the right and activated a right-hand grasping response; this would be the case even if you were left-handed (Tucker & Ellis, 1998). It's important to note that the direction of the handle has nothing to do with a task involving colour or size. Nevertheless, response times are faster with the hand that the handle is pointing towards. This type of embodiment has been observed across a variety of experimental paradigms, stimuli, and even species: non-human animals also show embodiment effects (see, for example, Bach & Tipper, 2006; Beilock & Holt, 2007; Dipelligrino et al., 1992).

You might wonder how the link between perception and action plays out with experts in different types of motor skills (e.g., highly skilled athletes or dancers). Do they have a stronger embodiment response to motor actions in their expert repertoire than to actions they are less familiar with? Is part of becoming an expert related to an ability to more deeply embody action that is involved in that domain of expertise? To address this question, Calvo-Merino and colleagues (2005, 2006) explored how expert ballet and capoeira dancers responded to dancers performing skilled moves that they either would perform themselves or would only see performed by other dancers (e.g., a capoeira dancer watching a ballet dancer or a female dancer watching a male-specific move). Measurement of the viewers' brain activity, using fMRI, revealed more activity in response to motor actions that the experts had been trained to perform than to actions that they did not perform themselves. These results suggest that motor expertise can modulate how we perceive action.

Watching professional sports will not make you a professional athlete. Even so, aspiring athletes should probably watch the experts as closely as they can.

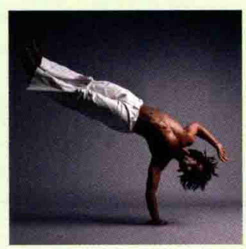


FIGURE 8.4 Capoeira

Barsalou (1983) showed that goal-derived categories have a graded structure. In one experiment, participants were asked to judge items in terms of how well they exemplified a particular category. For example, consider the concept *ways to escape being killed by the mob*. How well do each of the following fit in that category?

CONSIDER THIS BOX 7.3 Mental Images and Real Pictures

As we noted at the beginning of this chapter, when we imagine a scene, the experience is a bit like looking at a picture. That's partly why it is so tempting to define images as mental pictures. Pinker and Finke (1980) compared the properties of images with the properties of actual pictures. Although images seem to be accurate representations of a scene as it appears from a particular viewpoint, the pictures people actually make of scenes do not always have this property. Look at the drawing at the left in Figure 7.16. There is no way that such a scene could actually be seen. The picture appears to us to be a distorted representation of an actual scene, because there is more in the picture than you could possibly see from one vantage point. The drawing at the right in Figure 7.16 more accurately represents what would actually be seen from a single vantage point. Nevertheless, many people make drawings that are more like the drawing on the left than the one on the right in Figure 7.16. How can we explain the apparent discrepancy between the accurate images we experience and the inaccurate drawings we so often produce?

There are at least three possible explanations for this discrepancy, according to Pinker and Finke. One is that even if you can accurately imagine how something will look, you may not be able to draw your image. It's not

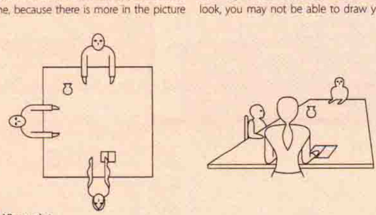


FIGURE 7.16 Viewpoint

From: Arnheim, R. (1974). *Art and visual perception: A psychology of the creative eye.* Berkeley: University of California Press, Figures 86 and 87. Copyright 1974 by the Regents of the University of California. Reprinted by permission.

continued

- **"Consider This"** boxes present thought-provoking research, past and present.

THINK TWICE
BOX 7.1

Can Anyone Become a Synesthete?

Non-synesthetes who wish they could experience synesthesia themselves often ask whether it is possible to induce the condition. If we were to train them on various letter and colour pairings, then perhaps over time they could begin to experience synesthesia. Although there is no solid evidence that such training would be effective, there is some evidence that synesthetic experiences can be induced through hypnosis. In a fascinating study reported by Cohen Kadosh and colleagues (2009), non-synesthetes were hypnotized and then told that each digit was associated with a particular colour. For instance, the digit "2" was associated with yellow and the digit "4" was associated with blue. Following the hypnotic session, these "posthypnotic suggestion" participants were interviewed and asked what they saw when they were shown a black digit. Promisingly, their responses were similar to those offered by synesthetes: they experienced the black digits they viewed as having coloured overlays. To objectively test these reports, Cohen Kadosh and colleagues (2009) showed participants brief displays of a black digit against a background that was either congruent or incongruent with the colour hypnotically associated with the digit. Participants then had to name the digit. Strikingly, the participants with the hypnotically induced synesthesia actually made many errors when the background colour of the display was congruent with the colour associated with the digit. By contrast, they made very few errors when the digit and background colour were incongruent. Apparently the digits did elicit the hypnotically induced colour associations, and as a result they stood out from the background on incongruent trials, but blended in with the background on congruent trials. These results can be seen in Figure 7.6, which shows the error rate of digit identification on congruent and incongruent trials for two participants, one of whom received a posthypnotic suggestion (PHS) and one of whom (the control) did not (No PHS). Notice that the control group made virtually no errors in either the congruent or incongruent conditions because the black letters on a coloured background were easily perceptible. So it seems that synesthesia can be hypnotically induced. Still, before you run off to get yourself hypnotically induced with synesthesia, you should know that this method would work only for the small subset of the population who are highly hypnotizable; those of us who resist hypnotic suggestions are out of luck.

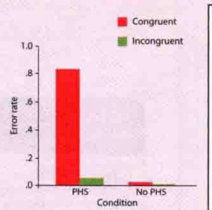


FIGURE 7.6 **The effects of hypnotically induced synesthesia**

Errors of digit identification on congruent and incongru ent trials for two groups of participants: the PHS group h synesthesia induced through posthypnotic suggestion, while the No PHS group did not receive any posthypnoti suggestion.

From: Kadosh, R.C., Henik, A., Catena, A., Walsh, V., & Fuentes, L.J (2009). Induced cross-modal synaesthetic experience without a normal neuronal connections. *Psychological Science, 20*, 258–26

- **"Think Twice"** boxes invite students to engage personally with ideas and issues raised in the chapter.

THINK TWICE
BOX 11.4

Assessing Your Own Reasoning Abilities

How good are your reasoning and decision-making skills? One popular test was developed by Frederick (2005). Known as the Cognitive Reflection Test, or CRT, it consists of the three following problems. Without looking at the answers below, try to answer them as quickly as you can.

The answers are as follows: (1) 5 cents; (2) 5 minutes; and (3) 47 days. Chances are that you missed at least one of them. Why? Although the questions look easy, they are actually the sort of "trick questions" you hope never to see on a test or exam. Each one is designed in such as way as to lead you to think of an "intuitive" answer very quickly. For instance, when answering the third question, you think about covering *half* the lake, and this immediately leads you to think it should take *half* the time. Half the patch, half the time, right? Wrong! What often gets missed is the fact that it would have taken 47 days of doubling for the patch to reach half of its final extent: on day 47 it would have been half the size that it would be on the final, 48th day.

Fredrick (2005) notes that to be successful on questions like these, you have to (a) recognize that the first answer you think of is wrong, (b) put it aside, and (c) continue to apply rigorous reasoning. This test is often used to distinguish between decision-making done by a fast, intuitive system (which in this case gives you the wrong answer), and a much slower, more effortful rational system (which in this case provides the right answer). This distinction is captured in the title of Kahneman's *Thinking Fast and Slow*, which we mentioned at the beginning of this chapter.

(1) A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents

(2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? ______ minutes

(3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? ______ days

FIGURE 11.5 **The three-question CRT**

From: Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*, 25-42.

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? In the Know: Review Questions

1. What is insight? What is responsible for its occurrence? What can be done to facilitate it?
2. What is functional fixedness? Why does it occur?
3. Outline the basic features of GPS. Use the Tower of Hanoi problem to illustrate your answer.
4. Discuss methods for studying problem-solving in science.

Key Concepts

algorithms
analysis of the situation
artificial intelligence
BACON
chunk decomposition
cognitive history of science
computational models
constraint relaxation
distributed reasoning
Einstellung effect (Luchins)
evaluation function
face valid
feeling of knowing
feeling of warmth
functional fixedness (Duncker)
General Problem Solver (GPS)
Gestalt switch
goal stack
heuristic
hints
historical accounts
insight problem
in vivo/in vitro method (Dunbar)
laboratory studies
means–end analysis
mindfulness–mindlessness (Langer)
negative transfer
observation of ongoing scientific investigations
problem space
production rules
productive thinking (Wertheimer)
progress monitoring theory
representational change theory
search tree
strong but wrong tendency
structurally blind thinking
subgoals
thinking aloud
toy problems
unexpected findings
Zeigarnik effect

- **"In the Know"** review questions at the end of each chapter allow students to test their grasp of chapter material.

- Key terms are defined at first use in a **running glossary**, and all definitions can be found in a standard glossary at the end of the text.

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The Brain as the Organ of the Mind

This chapter will introduce several different ways of investigating the relationship between the brain and behaviour. First, though, it's important to note that cognitive neuroscientists assume that the brain is composed of specific parts or **modules** (Fodor, 1983), each of which is responsible for particular cognitive operations. Whether it is completely modular is a matter of debate, and there have been differences of opinion over the number of modules that may exist (e.g., Pinker, 1997; Sperber, 2002). However, there is general agreement on the basic principle, and once we begin to speculate about how many modules there might be, it's only a short step to wondering which cognitive functions each of them might be responsible for.

Efforts to determine which parts of the brain are specialized for which cognitive operations go back at least as far as Franz Joseph Gall (1758–1828) and his student J.G. Spurzheim (1776–1832). Gall and Spurzheim promoted **phrenology**. Phrenological charts like the one in Figure 2.4 purport to show where various psychological functions are located in the brain. Although Gall and Spurzheim's theories are not taken seriously today their underlying premises still deserve consideration:

> Their argument reduced to three basic principles: (1) The brain is the sole organ of the mind. (2) Basic character and intellectual traits are innately determined. (3) Since there are differences in character and intellectual traits among individuals as well as differences in various intellectual capacities within a single individual, there must exist differentially developed areas in the brain, responsible for these differences! Where there is variation in *function* there must be variation in the controlling *structures*. (Krech, 1962, p. 33)

FIGURE 2.4 A phrenological chart

Modules
Different parts of the brain, each of which is responsible for particular cognitive operations.

Phrenology
The study of the shape, size, and protrusions of the cranium in an attempt to discover the relationships between parts of the brain and various mental activities and abilities.

Localization of function
The idea that there is a direct correspondence between specific cognitive functions and specific parts of the brain.

Gall and Spurzheim's method for locating functions in the brain was highly speculative. They believed that the more highly developed a function was, the larger it would be, and that the larger the function, the more clearly it would manifest itself as a protrusion on the skull. On the basis of these assumptions they reasoned that they could divine a person's strengths and weaknesses by examining the shape of his or her skull. Their theory had a powerful impact on nineteenth-century cultural practices, and many paying customers came to rely on the advice of phrenologists (Sokal, 2001). The weakness of their method is now obvious. Still, their underlying hypothesis—that specific functions are localized in specific parts of the brain—has guided much subsequent research (e.g., Gardner, 1983; Sarter, Berntson, & Cacioppo, 1996), even though not all those involved have agreed that there is a direct correspondence between specific cognitive functions and specific parts of the brain.

A landmark in the history of the **localization of function** debate was the work of Shepherd Ivory Franz (1874–1933). Franz was an expert in the technique of ablation, whereby parts of the cortex (the outer layer of the brain, which plays a significant role in cognitive functions such as memory, attention, perception, and language) of an animal are destroyed and the consequences for behaviour are observed. If functions were localized in the cortex, then the effect of ablation should depend on the area destroyed. However, this was not what his observations showed.

Franz and his student Karl Lashley (1890–1958) studied the effects of ablation of the frontal lobes in rats. Instead of opening up the animal's skull, they would make small

Supplements

Cognition, fifth edition, is supported by an outstanding array of ancillary materials for both instructors and students, all available on the companion website: **www.oupcanada.com/ Cognition5e**.

FOR THE INSTRUCTOR

- An **instructor's manual** includes comprehensive chapter overviews, topics for classroom discussion or debate, recommended readings, web links, homework assignments with sample answers, suggestions for research paper topics, and a sample syllabus.
- A **test generator** offers a comprehensive set of multiple-choice, true/false, short-answer, and essay questions, with suggested answers, for every chapter.
- **PowerPoint® slides** summarize key points from each chapter and incorporate figures, tables, and images from the textbook.

FOR THE STUDENT

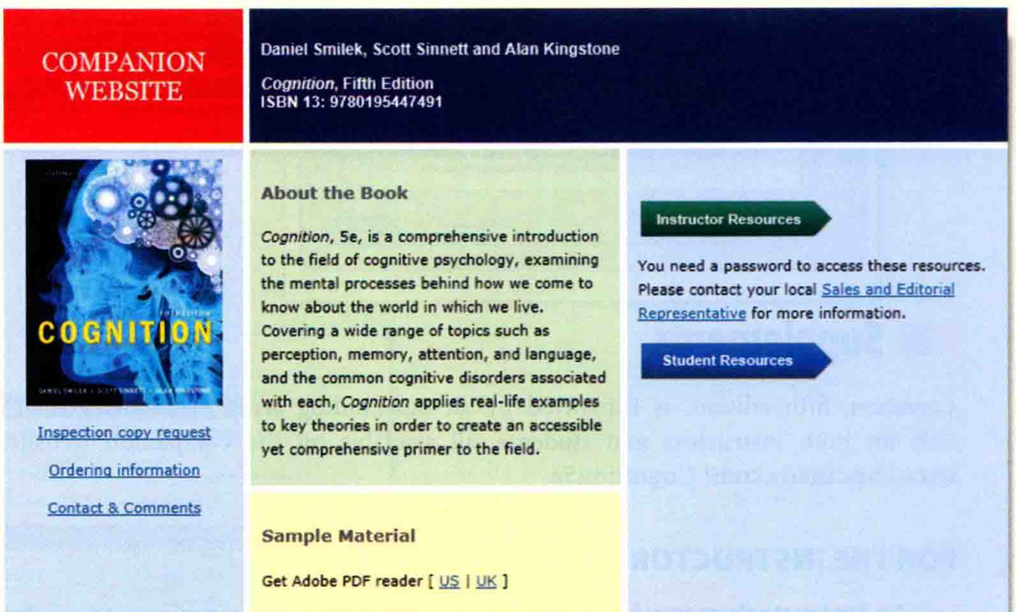
Available at **www.oupcanada.com/Cognition5e.**

The **student study guide** offers additional review questions linked to each chapter; practice quizzes, including one final examination practice quiz; an answer key for review questions and quizzes, with page references to help students find the answers in the text; key terms and definitions; chapter summaries; and study tips for mid-term and final examinations.

DISCOVERY LAB (ISBN 9780195447774)

by Carolyn Ensley, Department of Psychology, Wilfrid Laurier University

Cognition, fifth edition, is accompanied by *Discovery Lab*, which offers a wide variety of interactive experiments, exercises, and animations designed to help students understand important concepts and principles. *Discovery Lab* brings cognition topics to life by allowing students to act as researchers and test subjects and by giving them the ability to analyze and share results.



A Final Word of Thanks

We gratefully acknowledge the contributions of the following individuals whose efforts and thoughtful review comments and suggestions have helped to shape this book and its ancillaries:

Robert Cassidy, Condordia University
Todd Ferretti, Wilfrid Laurier University
Deanna Friesen, York University
Sandra Hessels, Concordia University
Dan Hufnagle, University of Calgary
Karin Humphreys, McMaster University
Jason Ivanoff, Simon Fraser University
Harvey H.C. Marmurek, University of Guelph
Patricia McMullen, Dalhousie University
Jean Paul Minda, University of Western Ontario
Penny M. Pexman, University of Calgary
Michael Picard, University of Victoria
Catherine Plowright, University of Ottawa
Gillian Rowe, University of Toronto

Preface

We could not be more excited about this fifth edition! So much of it is new and fresh. Each chapter has been carefully combed for material that was outdated or unnecessary, and new studies have been incorporated that bring readers up to speed on the latest and greatest in the study of human cognition. In addition, each chapter now has a similar format, beginning with a case study designed to whet readers' appetites and ground the issues to be discussed in the text that follows. Those familiar with the book will also notice the addition of Dr Scott Sinnett (University of Hawaii) to the authorial team, replacing John G. Benjafield, who was the sole author of the first three editions.

Acknowledgements

In fewer than four years we have managed to revise this textbook twice, and we are extraordinarily pleased with the result. We are supremely grateful to Oxford University Press in general, and to our developmental editor, Lisa Peterson, and editor, Sally Livingston, in particular. We would also like to thank the reviewers whose thoughtful comments and suggestions helped to shape this textbook.

Finally, and most importantly, we would like to thank our wives, Shelley Smilek, Cindy Sinnett, and Erica Levy, for their incredible support and encouragement. Without their efforts this book would not have been possible, and without their patience, we might all now be single.

Daniel Smilek, Scott Sinnett, and Alan Kingstone
September 2012

List of Boxes

Case Studies

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THINK TWICE

Case Study Wrap-Up

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