

Neuromarketing for Dummies

References and Notes for Readers

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Part I. The Brave New World of Neuromarketing

Chapter 1. What Neuromarketing Is and Isn't

7: Zombie consumers. David Lewis has a different take on the concept of consumers' "zombie minds" in his new book *Impulse*. Lewis, David. *Impulse: Why We Do What We Do Without Knowing Why We Do It*. Belknap Press, 2013.

Defining Neuromarketing

9: Neuroscience is not the only brain science that underlies neuromarketing. For an expansive definition of neuromarketing similar to our own, see Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18, and Barden, Phil. *Decoded: The Science Behind Why We*

Buy. Wiley, 2013. A rationale for naming social psychology, as opposed to cognitive psychology or psychology more generally, can be found in Bargh, John A., and Ezequiel Morsella. "The unconscious mind." *Perspectives on psychological science* 3.1 (2008): 73-79.

10: Brain or mind? Nonconscious, unconscious, or subconscious? There is a huge and fascinating literature on these topics that we were unable to address in N4D. On the question of consciousness, see Chalmers, David. *The Conscious Mind*. Oxford University Press, 1996. An interesting typology of different varieties of consciousness can be found in Dehaene, Stanislas, et al. "Conscious, preconscious, and subliminal processing: a testable taxonomy." *Trends in cognitive sciences* 10.5 (2006): 204-211.

Understanding the New Scientific Foundations of Neuromarketing

11: Cognitive miser. This term has a long history in psychology. It is derived from Herbert Simon's concept of *bounded rationality* (see Simon, Herbert. *Models of Man*. Wiley, 1957), which was further developed by James March and others (see March, James. *A Primer on Decision Making: How Decisions Happen*. Free Press, 1994). This work, in turn, was a key foundation for Daniel Kahneman's and Amos Tversky's development of behavioral economics (see Kahneman, Daniel. "Maps of bounded rationality: Psychology for behavioral economics." *The American economic review* 93.5 (2003): 1449-1475). Kahneman's work, described in Chapters 2, 8, and 24, is a central pillar underlying neuromarketing today.

The rest of this section is a high-level overview of Part II of N4D, Chapters 5-8.

Exploring Where Marketers Are Using Neuromarketing Today

12-14: This section of Chapter 1 is a high-level summary of Part III of N4D, Chapters 9-14.

Explaining How Neuromarketing Measures Consumer Responses

14-16: This section of Chapter 1 is a high-level summary of Part IV of N4D, Chapters 15-18.

Succeeding with Neuromarketing Studies

16-17: This section of Chapter 1 is a high-level summary of Part V of N4D, Chapters 19-22.

Chapter 2. What We Know Now that We Didn't Know Then

21: This chapter is a summary and interpretation of all the material covered in Part II, The Essence of Neuromarketing: The Nonconscious Mind of the Consumer. Additional references and sources are included in the sections below for Chapters 5-8.

How We Used to Think about Consumers

22: Mr. Spock goes shopping. This list of attributes covers most of what is called the rational economic actor in economics. This model is well-described in our "For Dummies" sister volume: Amthor, Frank, *Behavioral Economics for Dummies*. Wiley, 2012.

23: The AIDA model. An excellent depiction of the AIDA model, its variants, and its history, is found in Heath, Robert, *Seducing the Subconscious: The Psychology of Emotional Influence in Advertising*. Wiley-Blackwell, 2012. Chapter 1, "The Persuasion Model."

24: The bedrock of traditional market research techniques. These 3 “workhorses” of market research are discussed in detail in Chapter 15.

25: Traditional market researchers tend to see these problems as fixable. See, for example, Trei, Lisa. “Social science researcher to overhaul survey methodology with \$2 million grant.” *Stanford News Service*, September 27, 2006.

25: People don’t actually know what they know. The classic reference is Nisbett, Richard E., and Timothy D. Wilson. “Telling more than we can know: Verbal reports on mental processes.” *Psychological review* 84.3 (1977): 231-259.

How People Really See and Interpret the World

This section draws upon a vast literature on nonconscious and conscious brain processes, including decision making. We can only mention a small slice of references here.

26: A simplified version of this new model. An excellent and thorough depiction of this model can be found in Baars, Bernard and Nicole Gage. *Fundamentals of Cognitive Neuroscience: A Beginner’s Guide*. Academic Press, 2013.

27: Our nonconscious perceptual processes not only intervene in the formation of impressions, but also fill in a lot of details that we don’t actually perceive directly. This example is taken from Mlodinow, Leonard. *Subliminal: How Your Unconscious Mind Rules Your Behavior*. Random House, 2012. Chapter 2, “Senses Plus Mind Equals Reality.” On the rapidity of impression formation and conceptualization, see Greene, Michelle R., and Aude Oliva. “The briefest of glances The time course of natural scene understanding.” *Psychological Science* 20.4 (2009): 464-472.

28: The process of forming concepts is quite complicated and far from obvious. For an overview of this process, see Kahneman, Daniel. “Maps of bounded rationality: Psychology for behavioral economics.” *The American economic review* 93.5 (2003): 1449-1475, especially the discussion of “natural assessments” on p. 1453. Ascribing meaning *and value* implies that evaluation and judgment are parts of this process, which means, in turn, that our brains are literally incapable of recognizing something without evaluating it. See Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, especially Chapter 4, “The Associative Machine.”

28: Facilitation. Probably we should have used the term we use elsewhere in the book, *associative activation*, in this paragraph. The two terms refer to the same process. See Eimer, Martin, and Friederike Schlaghecken. “Response facilitation and inhibition in subliminal priming.” *Biological psychology* 64.1-2 (2003): 7-26. See also Winkielman, Piotr, and John T. Cacioppo. “Mind at ease puts a smile on the face: psychophysiological evidence that processing facilitation elicits positive affect.” *Journal of personality and social psychology* 81.6 (2001): 989.

29: Natural assessment. Kahneman, Daniel. “Maps of bounded rationality: Psychology for behavioral economics.” *The American economic review* 93.5 (2003): 1453. See also Duckworth, Kimberly L., et al. “The automatic evaluation of novel stimuli.” *Psychological science* 13.6 (2002): 513-519.

30: Deliberation is much more likely to be devoted to justifying an evaluation rather than creating it. For an example of rationalization in survey research from the political world, see Rahn, Wendy M., Jon A. Krosnick, and Marijke Breuning. "Rationalization and derivation processes in survey studies of political candidate evaluation." *American Journal of Political Science* (1994): 582-600. For a theoretical account, see Lodge, Milton, and Charles Taber. "The rationalizing voter: Unconscious thought in political information processing." *Available at SSRN 1077972* (2007). One of the original studies in this area was de Camp Wilson, Timothy, and Richard E. Nisbett. "The accuracy of verbal reports about the effects of stimuli on evaluations and behavior." *Social Psychology* (1978): 118-131.

31: Habits depend on highly developed conceptual connections that immediately trigger expressions. On habits and consumer behavior, see Wood, Wendy, and David T. Neal. "The habitual consumer." *Journal of Consumer Psychology* 19.4 (2009): 579.

32: The mismatch between verbal expressions and actual mental processes. Nisbett, Richard E., and Timothy D. Wilson. "Telling more than we can know: Verbal reports on mental processes." *Psychological review* 84.3 (1977): 231-259.

32: Confabulation. Discussed in Mlodinow, *Subliminal*, p. 190:

The term "confabulation" often signifies the replacement of a gap in one's memory by a falsification that one believes to be true. But we also confabulate to fill in gaps in our knowledge about our feelings. We all have those tendencies. We ask ourselves or our friends questions like "Why do you drive that car?" or "Why do you like that guy?" or "Why did you laugh at that joke?" Research suggests that we think we know the answers to such questions, but really we often don't. When asked to explain ourselves, we engage in a search for truth that may feel like a kind of introspection. But though we think we know what we are feeling, we often know neither the content nor the unconscious origins of that content. And so we come up with plausible explanations that are untrue or only partly accurate, and we believe them. Scientists who study such errors have noticed that they are not haphazard. They are regular and systematic. And they have their basis in a repository of social, emotional, and cultural information we all share.

See also Haidt, Jonathan. "The emotional dog and its rational tail: a social intuitionist approach to moral judgment." *Psychological review* 108.4 (2001): 814.

33: Gerard Tellis has tracked a metric called *elasticity of advertising*. Sethuraman, Raj, Gerard J. Tellis, and Richard A. Briesch. "How well does advertising work? Generalizations from meta-analysis of brand advertising elasticities." *Journal of Marketing Research* 48.3 (2011): 457-471. See also Tellis, Gerard J. "Advertising's role in capitalist markets: what do we know and where do we go from here?." *Journal of Advertising Research-New York-* 45.2 (2005): 162, And Tellis, Gerard J. "Generalizations About Advertising Effectiveness In Markets." *Journal of Advertising Research* (2009).

Replacing the Rational Consumer Model with the Intuitive Consumer Model

35: It makes sense to consider retiring the rational consumer and replacing it with the much more realistic *intuitive consumer model*. Our "intuitive consumer" model is an

amalgam of a wide body of research on consumer psychology and decision making. Some excellent starting points are Fitzsimons, Gavan J., et al. "Non-conscious influences on consumer choice." *Marketing Letters* 13.3 (2002): 269-279; Chartrand, Tanya L. "The Role of Conscious Awareness in Consumer Behavior." *Journal of Consumer Psychology* 15.3 (2005): 203-210; Fitzsimons, Gráinne M., Tanya L. Chartrand, and Gavan J. Fitzsimons. "Automatic effects of brand exposure on motivated behavior: how apple makes you "think different"." *Journal of Consumer Research* 35.1 (2008): 21-35; Chartrand, Tanya L., et al. "Nonconscious goals and consumer choice." *Journal of Consumer Research* 35.2 (2008): 189-201.

Chapter 3. Putting Neuromarketing to Work

Chapter 3 is a condensed summary of all the material covered in Part III, Neuromarketing in Action.

Building Better Brands with Neuromarketing

37-41: For citations and references, see Chapter 9.

Designing Better Products and Packages with Neuromarketing

41-45: For citations and references, see Chapter 10.

Creating Effective Ads with Neuromarketing

45-48: For citations and references, see Chapter 11

Understanding the Mind of the Shopper with Neuromarketing

48-51: For citations and references, see Chapter 12.

Appealing to Brains Online with Neuromarketing

51-55: For citations and references, see Chapter 13.

Producing Compelling Entertainment with Neuromarketing

55-58: For citations and references, see Chapter 14.

Chapter 4. Why Neuromarketing Matters

Potential Dangers of Neuromarketing

60: As far back as 1957, when Vance Packard published his best seller. The most recent edition of Packard's classic is Packard, Vance. *The Hidden Persuaders*. Ig Publishing, 2007, with a useful introduction by Mark Crispin Miller.

61: A big concern of some commentators is that neuromarketing is a kind of mind-reading technology. For an example of this concern, see the website of the Consumer Alert public advocacy group, <http://bit.ly/Qiee6>. For a more recent example of this style of critique, see Goetzl, David, "Neuromarketing Could Face Legal Hurdles," MediaPost Blogs, April 23, 2013, <http://bit.ly/15VinGo>.

61: What neuromarketing technologies can say with some precision is that, at a moment in time, a person is exhibiting certain *physical states* that tend to be associated with certain *mental states*. Just as a reminder, this statement needs to be bracketed by the caveats presented in the discussion of *reverse inference* in Chapter 19.

62: Privacy, on the other hand, is an important concern. This issue is discussed in detail in Chapter 22. See Murphy, Emily R., Judy Illes, and Peter B. Reiner. "Neuroethics of neuromarketing." *Journal of Consumer Behaviour* 7.4-5 (2008): 293-302.

63: The popular press loves the “buy button” metaphor. See, for example, Wells, Melanie, “In Search of the Buy Button,” September 1, 2003, *Forbes Online*, <http://onforb.es/awDYoF>; and Frazier, Mya, “Hidden Persuasion or Junk Science?” *Ad Age*, September 10, 2007, <http://bit.ly/11Wz03h>.

63: There is no “buy button” in the brain. Perhaps the most telling evidence against the “buy button” hypothesis is the discovery of nonconscious processes that appear to get activated to resist persuasive messaging, even in its most subtle and unobtrusive forms. See Laran, Juliano, Amy N. Dalton, and Eduardo B. Andrade. "The Curious Case of Behavioral Backlash: Why Brands Produce Priming Effects and Slogans Produce Reverse Priming Effects." *Journal of Consumer Research* 37.6 (2011): 999-1014. Similar results are described by Roger Dooley in his blog: Dooley, Roger, “Don’t Buy’ Button Located in Brain,” *Neuromarketing Blog*, August 27, 2007, <http://bit.ly/bB5PQD>, referencing Swaminathan, Nikhil, “Impulse Stopping: When the Mind Exercises 'Free Won't',” *Scientific American*, August 22, 2007, <http://bit.ly/fBkinr>. This topic is covered in more detail in Chapter 8.

63: As the novelist William Gibson has famously observed. Gibson’s great quote about the future being unevenly distributed is from "The Science in Science Fiction" on *Talk of the Nation*, NPR (30 November 1999, at time 11:55).

64: Critics are wrong when they view neuromarketing as a weapon that can be used only by marketers to erode consumers’ ability to control temptations. On the applicability of brain science research to the problem of temptation, see Jimura, Koji, Maria S. Chushak, and Todd S. Braver. "Impulsivity and Self-Control during Intertemporal Decision Making Linked to the Neural Dynamics of Reward Value Representation." *The Journal of Neuroscience* 33.1 (2013): 344-357; Baumeister, Roy F. and John Tierney, *Willpower: Rediscovering the Greatest Human Strength*. Penguin Books, 2012.

Potential Benefits of Neuromarketing

66: A brain science subfield called neurodesign. This topic is taken up in Chapter 10.

66: Rory Sutherland. Sutherland’s popular TED talk on the value of intangible value, “Life lessons from an ad man,” can be found at <http://bit.ly/QozoZ>.

Learning to Live with Neuromarketing: The New Realities

68: Consumers aren’t helpless. This theme is taken up in several blog posts in our Intuitive Consumer Blog at <http://intuitiveconsumer.com/blog>. On built-in resistance to persuasion, see Knowles, Eric S., and Jay A. Linn, eds. *Resistance and persuasion*. Psychology Press, 2004. On tactics for countering marketing deception, see Boush, David M., Marian Friestad, and Peter

Wright. *Deception in the marketplace: The psychology of deceptive persuasion and consumer self-protection*. CRC Press, 2009.

Part II. The Essence of Neuromarketing: The Nonconscious Mind of the Consumer

Chapter 5. The Intuitive Consumer: Nonconscious Processes Underlying Consumer Behavior

The Intuitive Consumer Is a Cognitive Miser

74: The average brain takes up only about 3 percent of a person's body weight but consumes about 20 percent of the calories a person takes in every day. See Mink, Jonathan W., Robert J. Blumenschine, and David B. Adams. "Ratio of central nervous system to body metabolism in vertebrates: its constancy and functional basis." *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology* 241.3 (1981): R203-R212; Raichle, Marcus E., and Debra A. Gusnard. "Appraising the brain's energy budget." *Proceedings of the National Academy of Sciences* 99.16 (2002): 10237-10239.

75: Lazy control. See the discussion in Kahneman, *Thinking, Fast and Slow*, Chapter 3, "The Lazy Controller."

75: Ego depletion. Examples of Baumeister's work on temptation, willpower, and ego depletion: Baumeister, Roy F. "Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior." *Journal of Consumer Research* 28.4 (2002): 670-676; Baumeister, Roy F. "Ego depletion and self-control failure: An energy model of the self's executive function." *Self and Identity* 1.2 (2002): 129-136; Hofmann, Wilhelm, et al. "Everyday temptations: An experience sampling study of desire, conflict, and self-control." *Journal of Personality and Social Psychology* 102.6 (2012): 1318.

75: The blue coffee mug example. Hawkins, Jeff and Sandra Blakeslee, *On Intelligence*. St. Martins Griffin, 2005 pp 86-87.

76: Your mind doesn't passively observe the world; it proactively predicts what it expects to see. Bar, Moshe, and Mital Neta. "The proactive brain: Using rudimentary information to make predictive judgments." *Journal of Consumer Behaviour* 7.4-5 (2008): 319-330; Bar, Moshe. "The proactive brain: memory for predictions." *Philosophical Transactions of the Royal Society B: Biological Sciences* 364.1521 (2009): 1235-1243; Clark, Andy. "Whatever next? Predictive brains, situated agents, and the future of cognitive science." *Behav. Brain Sci* (2012): 1-86.

76: The brain tends to approach novelty with caution. See Hung, Wei-Ken, and Lin-Lin Chen. "Effects of novelty and its dimensions on aesthetic preference in product design." *International Journal of Design* 6.2 (2012): 81-90. The unfamiliarity of novel stimuli is an automatic trigger of bottom-up attention, which is more sensitive to negative than positive

emotional stimuli, see Carretié, Luis, et al. "Automatic attention to emotional stimuli: neural correlates." *Human brain mapping* 22.4 (2004): 290-299.

From Kahneman, *Thinking, Fast and Slow*, p. 67:

To survive in a frequently dangerous world, an organism should react cautiously to a novel stimulus, with withdrawal and fear. Survival prospects are poor for an animal that is not suspicious of novelty. However, it is also adaptive for the initial caution to fade if the stimulus is actually safe.

77: Social psychologists have discovered that familiarity itself breeds positive feelings. Reber, Rolf, Norbert Schwarz, and Piotr Winkielman. "Processing fluency and aesthetic pleasure: is beauty in the perceiver's processing experience?." *Personality and social psychology review* 8.4 (2004): 364-382; Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, Chapter 5, "Cognitive Ease." A very interesting discussion of familiarity and trademark law is provided by Bradford, Laura R. *Trademark dilution and emotion*. George Mason University School of Law, 2009. An excerpt (copiously footnoted):

Familiarity operates on many levels to increase certainty and reduce effort. To a certain extent, the positive feelings generated by viewing a familiar mark are independent of any larger associative network of stored factual information about the brand. In low involvement situations, consumers do not want to take the time to consult branches of memory for specific brand attributes; they want to know immediately whether they "like" the choice. (p. 33)

On familiarity and perceived truth, see Weaver, Kimberlee, et al. "Inferring the popularity of an opinion from its familiarity: a repetitive voice can sound like a chorus." *Journal of personality and social psychology* 92.5 (2007): 821. From Kahneman, *Thinking, Fast and Slow*, p. 62:

A reliable way to make people believe in falsehoods is frequent repetition, because familiarity is not easily distinguished from truth.

77: Consumers are generally unaware of the mere exposure effect. Zajonc, Robert B. "Feeling and thinking: Preferences need no inferences." *American psychologist* 35.2 (1980): 151; Janiszewski, Chris. "Preattentive mere exposure effects." *Journal of Consumer Research* (1993): 376-392; Zajonc, Robert B. "Mere exposure: A gateway to the subliminal." *Current directions in psychological science* 10.6 (2001): 224-228; Monahan, Jennifer L., Sheila T. Murphy, and Robert B. Zajonc. "Subliminal mere exposure: Specific, general, and diffuse effects." *Psychological Science* 11.6 (2000): 462-466;.

77: Liking does not increase with repetition forever. Cox, Dena, and Anthony D. Cox. "Beyond first impressions: The effects of repeated exposure on consumer liking of visually complex and simple product designs." *Journal of the Academy of Marketing Science* 30.2 (2002): 119-130; Small, Dana M., et al. "Changes in brain activity related to eating chocolate from pleasure to aversion." *Brain* 124.9 (2001): 1720-1733.

78: Processing fluency can have powerful effects on people's judgments and decisions. A concise and accessible introduction to processing fluency is Song, Hyunjin, and Norbert Schwarz. "If it's easy to read, it's easy to do, pretty, good, and true." *Psychologist* 23.2

(2010): 108-111. Applications of processing fluency in market research include: Lee, Angela Y., and Jennifer L. Aaker. "Bringing the frame into focus: the influence of regulatory fit on processing fluency and persuasion." *Journal of personality and social psychology* 86.2 (2004): 205; Lee, Angela, and Aparna Labroo. "The effect of conceptual and perceptual fluency on brand evaluation." Available at SSRN 967768 (2003). A recent book-length treatment of processing fluency is Unkelbach, Christian, and Rainer Greifeneder, eds. *The Experience of Thinking: How the Fluency of Mental Processes Influences Cognition and Behaviour*. Psychology Press, 2013.

78: Effects of processing fluency on perceptions and evaluations. For a general overview of the processing fluency literature, see Oppenheimer, Daniel M. "The secret life of fluency." *Trends in cognitive sciences* 12.6 (2008): 237-241.

- **Familiarity and liking.** Winkielman, Piotr, et al. "The hedonic marking of processing fluency: Implications for evaluative judgment." *The psychology of evaluation: Affective processes in cognition and emotion* (2003): 189-217; Monin, Benoît. "The warm glow heuristic: when liking leads to familiarity." *Journal of personality and social psychology* 85.6 (2003): 1035; Donahue, John. "A True Authoritarian Type: How Fonts Can Facilitate Positive Opinions for Powerful Groups." Available at SSRN 2156989 (2012).
- **Truth.** Reber, Rolf, and Norbert Schwarz. "Effects of perceptual fluency on judgments of truth." *Consciousness and cognition* 8.3 (1999): 338-342; Winkielman, Piotr, et al. "Fluency of consistency: When thoughts fit nicely and flow smoothly." *Cognitive consistency: A fundamental principle in social cognition* (2012): 89-111; Schwarz, Norbert, et al. "Metacognitive experiences and the intricacies of setting people straight: Implications for debiasing and public information campaigns." *Advances in experimental social psychology* 39 (2007): 127-161.
- **Beauty.** Reber, Rolf, Norbert Schwarz, and Piotr Winkielman. "Processing fluency and aesthetic pleasure: is beauty in the perceiver's processing experience?." *Personality and social psychology review* 8.4 (2004): 364-382; Winkielman, Piotr, et al. "Prototypes are attractive because they are easy on the mind." *Psychological Science* 17.9 (2006): 799-806.
- **Risk.** Song, Hyunjin, and Norbert Schwarz. "If It's Difficult to Pronounce, It Must Be Risky Fluency, Familiarity, and Risk Perception." *Psychological Science* 20.2 (2009): 135-138; Alter, Adam L., and Daniel M. Oppenheimer. "Predicting short-term stock fluctuations by using processing fluency." *Proceedings of the National Academy of Sciences* 103.24 (2006): 9369-9372.
- **Scrutiny and learning.** Song, Hyunjin, and Norbert Schwarz. "Fluency and the detection of misleading questions: Low processing fluency attenuates the Moses illusion." *Social Cognition* 26.6 (2008): 791-799; Diemand-Yauman, Connor, Daniel M. Oppenheimer, and Erikka B. Vaughan. "Fortune favors the Bold and the Italicized: Effects of disfluency on educational outcomes." *Cognition* 118.1 (2011): 111-115; Song, Hyunjin, and Norbert Schwarz. "If It's Hard to Read, It's Hard to Do Processing Fluency Affects Effort Prediction and Motivation." *Psychological Science* 19.10 (2008): 986-988.

The Nonconscious Anchors Us in the Moment

80: Brain activities below the level of conscious awareness are now seen as a complex behavioral guidance system. Bargh, John A., and Ezequiel Morsella. "The unconscious mind." *Perspectives on psychological science* 3.1 (2008): 73-79; Bargh, John A., and Ezequiel Morsella. "Unconscious behavioral guidance systems." *Then a miracle occurs: focusing*

on behavior in social psychological theory and research. Oxford University Press, New York (2009): 89-118.

81: Our nonconscious anchors us in the moment. Bargh, John A., and Ezequiel Morsella. "Unconscious behavioral guidance systems." *Then a miracle occurs: focusing on behavior in social psychological theory and research*. Oxford University Press, New York (2009): 89-118.

81: Our brains avoid conscious decisions when they can. See Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, especially Chapter 3, "The Lazy Controller." See also Garbarino, Ellen C., and Julie A. Edell. "Cognitive effort, affect, and choice." *Journal of Consumer Research* 24.2 (1997): 147-158; Shiv, Baba, and Alexander Fedorikhin. "Heart and mind in conflict: The interplay of affect and cognition in consumer decision making." *Journal of consumer Research* 26.3 (1999): 278-292; Siemer, Matthias, and Rainer Reisenzein. "Effects of mood on evaluative judgements: Influence of reduced processing capacity and mood salience." *Cognition & Emotion* 12.6 (1998): 783-805.

82: Priming and associative activation. See the excellent introduction in Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, Chapter 4, "The Associative Machine." Also, An interesting study of associative activation (also called *spreading activation*) of political concepts is found in Erisen, Cengiz, Milton Lodge, and Charles S. Taber. "Affective contagion in effortful political thinking." *Political Psychology* (2013).

83: Research on priming has exploded over the last decade. Studies referenced in this list:

- **Backpack:** Kay, Aaron C., et al. "Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice." *Organizational Behavior and Human Decision Processes* 95.1 (2004): 83-96.
- **Candy bars:** Fishbach, Ayelet, Ronald S. Friedman, and Arie W. Kruglanski. "Leading us not into temptation: Momentary allurements elicit overriding goal activation." *Journal of personality and social psychology* 84.2 (2003): 296.
- **Old age:** Bargh, John A., Mark Chen, and Lara Burrows. "Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action." *Journal of personality and social psychology* 71.2 (1996): 230.
- **Money:** Vohs, Kathleen D., Nicole L. Mead, and Miranda R. Goode. "The psychological consequences of money." *science* 314.5802 (2006): 1154-1156.
- **Cleanliness:** Holland, Rob W., Merel Hendriks, and Henk Aarts. "Smells Like Clean Spirit Nonconscious Effects of Scent on Cognition and Behavior." *Psychological Science* 16.9 (2005): 689-693.
- **Significant others:** Fitzsimons, Grainne M., and John A. Bargh. "Thinking of you: nonconscious pursuit of interpersonal goals associated with relationship partners." *Journal of personality and social psychology* 84.1 (2003): 148.
- **Brands:** Fitzsimons, Grainne M., Tanya L. Chartrand, and Gavan J. Fitzsimons. "Automatic effects of brand exposure on motivated behavior: how apple makes you "think different"." *Journal of Consumer Research* 35.1 (2008): 21-35.

84: Ads, displays, and brands are primes. On ads, see Harris, Jennifer L., John A. Bargh, and Kelly D. Brownell. "Priming effects of television food advertising on eating behavior." *Health Psychology* 28.4 (2009): 404. On brands, Janiszewski, Chris. "Preattentive mere exposure

effects." *Journal of Consumer Research* (1993): 376-392. On in-store displays and environmental cues in general, Berger, Jonah, and Gráinne Fitzsimons. "Dogs on the street, pumas on your feet: How cues in the environment influence product evaluation and choice." *Journal of Marketing Research* 45.1 (2008): 1-14.

84: Associative priming vs. motivational priming. Associative priming is also called *trait priming* or *perceptual priming*. We are here following Chartrand, Tanya L., et al. "Nonconscious goals and consumer choice." *Journal of Consumer Research* 35.2 (2008): 189-201. Unlike motivational priming effects, perceptual/associative priming effects are relatively short-lived and decrease over time: Higgins, E. Tory, John A. Bargh, and Wendy J. Lombardi. "Nature of priming effects on categorization." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 11.1 (1985): 59. See also Sela, Aner, and Baba Shiv. "Unraveling priming: When does the same prime activate a goal versus a trait?." *Journal of Consumer Research* 36.3 (2009): 418-433.

85: Two conditions need to be in place for motivational, goal-based priming to work. Custers, Ruud, and Henk Aarts. "Beyond priming effects: The role of positive affect and discrepancies in implicit processes of motivation and goal pursuit." *European review of social psychology* 16.1 (2005): 257-300.

- **Current state to goal state gap:** Aarts, Henk, Ap Dijksterhuis, and Peter Vries. "On the psychology of drinking: Being thirsty and perceptually ready." *British Journal of Psychology* 92.4 (2001): 631-642; Winkielman, Piotr, Kent C. Berridge, and Julia L. Wilbarger. "Unconscious affective reactions to masked happy versus angry faces influence consumption behavior and judgments of value." *Personality and Social Psychology Bulletin* 31.1 (2005): 121-135.
- **Positive feelings toward the goal:** Custers, Ruud, and Henk Aarts. "Positive affect as implicit motivator: on the nonconscious operation of behavioral goals." *Journal of personality and social psychology* 89.2 (2005): 129; Strahan, Erin J., Steven J. Spencer, and Mark P. Zanna. "Subliminal priming and persuasion: Striking while the iron is hot." *Journal of Experimental Social Psychology* 38.6 (2002): 556-568; Ferguson, Melissa J., and John A. Bargh. "Liking is for doing: the effects of goal pursuit on automatic evaluation." *Journal of personality and social psychology* 87.5 (2004): 557; Dijksterhuis, Ap, et al. "The unconscious consumer: Effects of environment on consumer behavior." *Journal of Consumer Psychology* 15.3 (2005): 193-202. See also Laran, Juliano, Chris Janiszewski, and Marcus Cunha Jr. "Context-Dependent Effects of Goal Primes." *Journal of Consumer Research* 35.4 (2008): 653-667, at .. 654:

... although goal primes are quite pervasive, there are situations in which goal primes do not exert an influence on behavior. ... social primes influence the likelihood of selecting a beer/wine voucher over a tea/coffee voucher, but only for people who regularly drink. Thus, goal primes can influence only permissible behaviors. ... thirst primes are effective for people who are thirsty, but not for people who are hydrated. Thus, internal physiological states seem to moderate whether a goal prime can exert an influence.

85: Reverse priming effects. See Laran, Juliano, Amy N. Dalton, and Eduardo B. Andrade. "The Curious Case of Behavioral Backlash: Why Brands Produce Priming Effects and Slogans Produce Reverse Priming Effects." *Journal of Consumer Research* 37.6 (2011): 999-1014.

Rather than being defenseless, we find that consumers exhibit automatic responses that reflect their perceptions of the persuasion intent of different marketing tactics, even when these perceptions are not salient [consciously perceived].

86: Growing literature on correction goals. Most early research on correction goals assumed correction required a conscious perception of bias in a persuasion attempt for correct goals to be activated. More recent research suggests that the process can occur nonconsciously and automatically as well. Glaser, Jack, and Mahzarin R. Banaji. "When fair is foul and foul is fair: reverse priming in automatic evaluation." *Journal of personality and social psychology* 77.4 (1999): 669; Fitzsimons, Gavan J., and Donald R. Lehmann. "Reactance to recommendations: When unsolicited advice yields contrary responses." *Marketing Science* 23.1 (2004): 82-94. Papiés, Esther K., and Petra Hamstra. "Goal priming and eating behavior: enhancing self-regulation by environmental cues." *Health Psychology* 29.4 (2010): 384.

So, What's the Conscious Mind Good For, Anyway?

87: Research has documented that effects like priming and processing fluency tend to go away when people are made aware of them. See, e.g., Laran, Juliano, Chris Janiszewski, and Marcus Cunha Jr. "Context-Dependent Effects of Goal Primes." *Journal of Consumer Research* 35.4 (2008): 653-667, at .. 654:

... a goal prime can increase performance on a task, but only when there is no conscious monitoring of task performance. Conscious monitoring appears to activate and/or prioritize competing goals that can negate the influence of the goal prime.

87: Our view of ourselves and our motivations is like a jigsaw puzzle with most of the pieces missing. The full quote from Mlodinow, *Subliminal*, p. 29:

We all make personal, financial, and business decisions, confident that we have properly weighed all the important factors and acted accordingly— and that we know how we came to those decisions. But we are aware of only our conscious influences, and so have only partial information. As a result, our view of ourselves and our motivations, and of society, is like a jigsaw puzzle with most of the pieces missing. We fill in blanks and make guesses, but the truth about us is far more complex and subtle than that which can be understood as the straightforward calculation of conscious and rational minds.

88: What the conscious brain does well, and the nonconscious brain does extremely poorly, is thinking about the past and planning for the future. Bargh, John A., and Ezequiel Morsella. "The unconscious mind." *Perspectives on psychological science* 3.1 (2008): 73-79; Schacter, Daniel L., and Donna Rose Addis. "The cognitive neuroscience of constructive memory: remembering the past and imagining the future." *Philosophical Transactions of the Royal Society B: Biological Sciences* 362.1481 (2007): 773-786; Baumeister, Roy F., and E. J. Masicampo. "Conscious thought is for facilitating social and cultural interactions: How mental simulations serve the animal–culture interface." *Psychological review* 117.3 (2010): 945.

The Three Master Variables of Neuromarketing Research

Each of these variables receives a more thorough treatment in Chapter 6, "The Central Role of Emotions in Consumer Response." This section summarizes those discussions.

89: Attention. For an accessible overview, see Baars, Bernard J., and Nicole M. Gage. *Cognition, brain, and consciousness: Introduction to cognitive neuroscience*. Academic Press, 2010, Chapter 8, “The Brain Is Conscious.”

Selective attention implies a selection among possible conscious events. When we make an attentional selection, we expect to become conscious of what we've chosen to experience.

90: Emotion. Excellent general treatments of emotions in marketing include Poels, Karolien, and Siegfried Dewitte. "How to capture the heart? Reviewing 20 years of emotion measurement in advertising." (2006); Cohen, Joel B., Michel T. Pham, and Eduardo B. Andrade. "The nature and role of affect in consumer behavior." *Handbook of consumer psychology*(2008): 297-348; Andrade, Eduardo, et al. "Emotions and Consumer Behavior." *Berkeley Scientific Journal* 15.1 (2012).

91: Memory. On memory in advertising, a good starting point is Percy, Larry. "Advertising and the seven sins of memory." *International journal of Advertising* 23 (2004): 413-427. There is an excellent introductory chapter on memory in Schacter, Daniel, Daniel Gilbert, and Daniel Wegner, *Psychology*, Worth Publishers, 2nd Edition, 2010, Chapter 6, “Memory”.

Chapter 6. The Central Role of Emotions in Consumer Response

93: Antonio Damasio published a book. Damasio, Antonio. *Descartes' error: Emotion, reason, and the human brain*. Penguin. com, 2005.

Understanding Nonconscious Emotional "Markers"

94: Consumers short on time, bombarded by information, and faced with barely distinguishable product alternatives rely on easily accessible emotional reactions to make shopping decisions. See Bradford, “Trademark dilution and emotion”, p. 28:

Humans have limited cognitive resources and so allocate them judiciously. In this respect, people have been described as “cognitive misers” who will expend only the effort required to make a satisfactory, rather than optimal, decision. Because emotional responses arise automatically, consumers short on time, motivation, or information often rely on positive or negative “emotional” impulses as the least costly route to making a decision.

95: Brain scientists believe nonconscious and conscious emotions operate together. Baumeister reference is from 2007, not 2009. Baumeister, Roy F., et al. "How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation." *Personality and Social Psychology Review* 11.2 (2007): 167-203.

96: Although the issue hasn't been resolved conclusively, current evidence tends to support the dimensional view of emotion. Mauss, Iris B., and Michael D. Robinson. "Measures of emotion: A review." *Cognition and emotion* 23.2 (2009): 209-237.

96: Embodied cognition. These examples and others are discussed in Niedenthal, Paula M., et al. "Embodiment in attitudes, social perception, and emotion." *Personality and social psychology review* 9.3 (2005): 184-211 and Niedenthal, Paula M. "Embodying emotion." *Science* 316.5827 (2007): 1002-1005; Winkielman, Piotr, Paula M. Niedenthal, and Lindsay Oberman. "The embodied emotional mind." *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches* (2008): 263-288.

97: Mimicry and imitation. Lakin, Jessica L., et al. "The chameleon effect as social glue: Evidence for the evolutionary significance of nonconscious mimicry." *Journal of nonverbal behavior* 27.3 (2003): 145-162; Chartrand, Tanya L., and Valerie E. Jefferis. "Consequences of automatic goal pursuit and the case of nonconscious mimicry." *Social judgments: Implicit and explicit processes* (2003): 290-305; Chartrand, Tanya L., and Rick van Baaren. "Human mimicry." *Advances in experimental social psychology* 41 (2009): 219-274; Tanner, Robin J., et al. "Of chameleons and consumption: The impact of mimicry on choice and preferences." *Journal of Consumer Research* 34.6 (2008): 754-766.

97: The brain is also an excellent simulation machine. Gilbert, Daniel T., and Timothy D. Wilson. "Prospection: experiencing the future." *Science* 317.5843 (2007): 1351-1354; Bar, Moshe. "The proactive brain: using analogies and associations to generate predictions." *Trends in cognitive sciences* 11.7 (2007): 280-289; Bar, Moshe. "The proactive brain: memory for predictions." *Philosophical Transactions of the Royal Society B: Biological Sciences* 364.1521 (2009): 1235-1243.

98: According to Baumeister and colleagues, the purpose of conscious emotions is to command attention and stimulate learning. Baumeister, Roy F., et al. "How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation." *Personality and Social Psychology Review* 11.2 (2007): 167-203, at 172:

Conscious emotion commands attention and stimulates analysis, learning, and adaptation, often occurring in the aftermath of behavior and its outcomes. It may occasionally have a direct effect on behavior (for good or ill), but directly driving behavior is not its main function.

98: Emotions also have an important signaling function. See Paul Ekman's work on facial expressions as emotional signals, e.g., Ekman, Paul. "An argument for basic emotions." *Cognition & Emotion* 6.3-4 (1992): 169-200.

99: Emotions provide an efficient shortcut to consumer decision making. This is key element in Damasio's *somatic marker* hypothesis and Zajonc's *mere exposure* theory. See Zajonc, R. "On the primacy of affect." *American Psychologist* 39 (1984): 117-123; Schwarz, Norbert. "Emotion, cognition, and decision making." *Cognition & Emotion* 14.4 (2000): 433-440; Slovic, Paul, et al. "The affect heuristic." *European Journal of Operational Research* 177.3 (2007): 1333-1352; Shiv, Baba, and Alexander Fedorikhin. "Heart and mind in conflict: The interplay of affect and cognition in consumer decision making." *Journal of consumer Research* 26.3 (1999): 278-292; Custers, Ruud, and Henk Aarts. "Positive affect as implicit motivator: on the nonconscious operation of behavioral goals." *Journal of personality and social psychology* 89.2 (2005): 129.

Emotions and Attention

99: It isn't possible to pay attention without being *aware* that you're paying attention. See Kahneman, Thinking, Fast and Slow, pp. 23-24:

The often-used phrase "pay attention" is apt: you dispose of a limited budget of attention that you can allocate to activities, and if you try to go beyond your budget, you will fail. It is the mark of effortful activities that they interfere with each other, which is why it is difficult or impossible to conduct several at once.

For a somewhat contrary perspective on the question of attention and consciousness, see Koch, Christof, and Naotsugu Tsuchiya. "Attention and consciousness: two distinct brain processes." *Trends in cognitive sciences* 11.1 (2007): 16-22.

100: Research shows that our brains respond quite similarly to things that are truly familiar and things that are mistaken to be familiar. Winkielman, Piotr, et al. "The hedonic marking of processing fluency: Implications for evaluative judgment." *The psychology of evaluation: Affective processes in cognition and emotion* (2003): 189-217.

100: Increasing arousal attracts attention, but it also narrows attention. Mather, Mara, and Matthew R. Sutherland. "Arousal-biased competition in perception and memory." *Perspectives on Psychological Science* 6.2 (2011): 114-133; Fenske, Mark J., and Jane E. Raymond. "Affective influences of selective attention." *Current Directions in Psychological Science* 15.6 (2006): 312-316. See also Gable, Philip A., and Eddie Harmon-Jones. "Approach-motivated positive affect reduces breadth of attention." *Psychological Science* 19.5 (2008): 476-482; Gable, Philip, and Eddie Harmon-Jones. "The Blues Broaden, but the Nasty Narrows Attentional Consequences of Negative Affects Low and High in Motivational Intensity." *Psychological Science* 21.2 (2010): 211-215.

101: Low attention processing model. This model is discussed in detail in Chapter 11. For an overview and historical perspective, see Heath, Robert, and Paul Feldwick. "Fifty years using the wrong model of advertising." *International journal of market research* 50.1 (2008): 29.

Emotions and Memory

102: In one study, people were shown an image of a woman bicyclist lying on the ground, bleeding from a head injury. Christianson, Sven-Åke, et al. "Eye fixations and memory for emotional events." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 17.4 (1991): 693.

102: Studies of *flashbulb memories*. Hirst, William, et al. "Long-term memory for the terrorist attack of September 11: flashbulb memories, event memories, and the factors that influence their retention." *Journal of Experimental Psychology: General* 138.2 (2009): 161.

102: Psychologists at two New York universities performed an intriguing study to better understand why memories of events like 9/11 tend to diverge over time. Coman, Alin, David Manier, and William Hirst. "Forgetting the Unforgettable Through Conversation Socially Shared Retrieval-Induced Forgetting of September 11 Memories." *Psychological Science* 20.5 (2009): 627-633.

103: Memories are like photos stored on a computer hard disk. Full quote from Mlodinow, *Subliminal*, pp. 66-67:

Our process of remembering can be said to be analogous to the way computers store images, except that our memories have the added complexity that the memory data we store changes over time In computers, to save storage space, images are often highly “compressed,” meaning that only certain key attributes of the original image are kept; this technique can reduce the file size from megabytes to kilobytes. When the image is viewed, the computer predicts, from the limited information in the compressed file, what the original image looked like. If we view a small “thumbnail”-sized image made from a highly compressed data file, it usually looks very much like the original. But if we blow the image up, if we look closely at the details, we see many errors— blocks and bands of solid color where the software guessed wrong and the missing details were incorrectly filled in.

103: In psychology labs, scientists have successfully induced almost any kind of false memory in their unsuspecting experimental subjects. The “Bugs Bunny at Disneyland” study is reported in Braun, Kathryn A., Rhiannon Ellis, and Elizabeth F. Loftus. “Make my memory: How advertising can change our memories of the past.” *Psychology & Marketing* 19.1 (2002): 1-23.

104: Human memory didn’t evolve for perfect remembering; it evolved for acting and surviving in an uncertain world. See Mlodinow, *Subliminal*, p. 63:

Though human memory is subject to the distortion of memory reconstruction, if those subliminal distortions had proved seriously detrimental to our ancestors’ survival, our memory system, or perhaps our species, would not have survived. Though our memory system is far from perfect, it is, in most situations, exactly what evolution requires: it is good enough. In fact, in the big picture, human memory is wonderfully efficient and accurate — sufficient to have enabled our ancestors to generally recognize the creatures they should avoid and those they should hunt down, where the best trout streams are, and the safest way back to camp.

Chapter 7. New Understandings of Consumer Goals and Motivation

Looking at How Goals Drive Us

105: A goal is something you want to achieve plus some kind of plan you have for getting there. “Goals can be conceptualized as mental representations of desired end-states that include the means through which to attain those states.” Bargh, John A., and Ezequiel Morsella. “Unconscious behavioral guidance systems.” *Then a miracle occurs: focusing on behavior in social psychological theory and research*. Oxford University Press, New York (2009): 89-118.

106: The emergence of a new science of motivation over the last two decades. See Shah, James Y., and Wendy L. Gardner, eds. *Handbook of motivation science*. Guilford Press,

2008; Moskowitz, Gordon B., and Heidi Grant, eds. *The psychology of goals*. Guilford Press, 2009

106: These scientists and their colleagues have shown that goals can be activated, pursued, and even achieved, completely outside our conscious awareness. See Bargh, John A., et al. "The automated will: nonconscious activation and pursuit of behavioral goals." *Journal of personality and social psychology* 81.6 (2001): 1014.

106: The parts of the brain that get activated when we consciously monitor and control our pursuit of goals is different from the parts that actually run the goal pursuit "program" itself. See Bargh and Morsella, "Unconscious behavioral guidance systems":

That a goal can operate independently of conscious awareness of its operation implies the existence of a dissociation between the executive control structures in the brain responsible for 'running' that goal's 'program' and those that enable conscious awareness of the goal pursuit. Recent cognitive neuroscience research has confirmed that distinct anatomical structures support the operating goal program, on the one hand, and the knowledge of its operation (i.e., consciously-held intentions) on the other. As one review concluded, aspects of the processing of conscious intentions appear to be represented in the prefrontal and premotor cortex, but it is the parietal cortex that houses the representation used to guide action.

Reference is to Frith, Chris D., Sarah-Jayne Blakemore, and Daniel M. Wolpert. "Explaining the symptoms of schizophrenia: abnormalities in the awareness of action." *Brain Research Reviews* 31.2 (2000): 357-363. An interesting model linking nonconscious and conscious goal pursuit is found in Aarts, Henk, Ruud Custers, and Hans Marien. "Priming and authorship ascription: when nonconscious goals turn into conscious experiences of self-agency." *Journal of personality and social psychology* 96.5 (2009): 967.

107: Goals can be distinguished from other mental states by a set of predictable behaviors that are unique to them. See Chartrand, Tanya L., et al. "Nonconscious goals and consumer choice." *Journal of Consumer Research* 35.2 (2008): 189-201; Laran, Juliano. "The influence of information processing goal pursuit on postdecision affect and behavioral intentions." *Journal of personality and social psychology* 98.1 (2010): 16.

107: The most surprising finding from nonconscious goal research is that we pursue nonconscious goals with exactly the same set of accompanying behaviors that are observed in conscious goal pursuit. See Chartrand, Tanya L., and John A. Bargh. "Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions." *Journal of Personality and Social Psychology* 71.3 (1996): 464.

107: Brain scientists explain the similarity between conscious and nonconscious goal pursuit in terms of evolutionary development. Bargh, John A., and Ezequiel Morsella. "The unconscious mind." *Perspectives on psychological science* 3.1 (2008): 73-79. See also Bargh, John A., and Ezequiel Morsella. "Unconscious behavioral guidance systems." *Then a miracle occurs: focusing on behavior in social psychological theory and research*. Oxford University Press, New York (2009): 89-118:

Preferences and feelings are unconscious guides to appropriate behavior. A tight connection between immediate, unconscious evaluation and appropriate (approach versus avoidance) actional tendencies is found throughout the animal kingdom; even single-celled paramecia have them (Schneirla, 1959). These “guides” do not arise out of thin air, however. Our present preferences are derived from those that served adaptive ends in the past. Knowledge gained at a lower level of blind selection, the short-cuts and other “good tricks” (Dennett, 1995) that consistently worked over our long-term evolutionary past, are fed upwards as a starting point— appearing as a priori knowledge, the source of which we are unaware. Campbell (1974) called these “shortcut processes” because they save us from having to figure out, each of us individually from scratch, what are the good and helpful things and which are the dangerous.

109-110: Researchers have identified several types of primes that appear to be particularly good at triggering goal pursuit in natural settings. References for each of these examples can be found in Chartrand, Tanya L., Amy N. Dalton, and Ciara Michelle Cheng. "The antecedents and consequences of nonconscious goal pursuit." *Handbook of motivation science* (2007): 342-355.

Having Goals We're Not Aware Of

112: Studies have consistently shown that product preferences can be significantly changed under the influence of different activated goals. Bettman, James R., Mary Frances Luce, and John W. Payne. "Constructive consumer choice processes." *Journal of consumer research* 25.3 (1998): 187-217; Laran, Juliano, and Chris Janiszewski. "Behavioral consistency and inconsistency in the resolution of goal conflict." *Journal of Consumer Research* 35.6 (2009): 967-984.

112: In another study that primed thrift and prestige goals. Chartrand, Tanya L., et al. "Nonconscious goals and consumer choice." *Journal of Consumer Research* 35.2 (2008): 189-201.

113: One study (also discussed in Chapter 5) found a reverse priming effect on shopping intentions. Laran, Juliano, Amy N. Dalton, and Eduardo B. Andrade. "The Curious Case of Behavioral Backlash: Why Brands Produce Priming Effects and Slogans Produce Reverse Priming Effects." *Journal of Consumer Research* 37.6 (2011): 999-1014. See also Glaser, Jack, and Mahzarin R. Banaji. "When fair is foul and foul is fair: reverse priming in automatic evaluation." *Journal of personality and social psychology* 77.4 (1999): 669.

115: Studies show that when you fail to achieve a goal you didn't even know you were pursuing, you feel bad. Chartrand, Tanya L. "Mystery moods and perplexing performance: Consequences of succeeding and failing at a nonconscious goal." *Manuscript submitted for publication* (2001); Leander, N. P., S. G. Moore, and T. L. Chartrand. "Mystery moods: Their origins and consequences." *The psychology of goals* (2009): 480-504.

Consumer Motivation, Goal Seeking, and Goal Attainment

116: Approach and avoidance are the two directions of the motivational dimension of emotion. For an introduction to the vast literature on approach and avoidance in motivated action, see Harmon-Jones, Eddie, and Philip A. Gable. "Incorporating motivational intensity and direction into the study of emotions: Implications for brain mechanisms of emotion and

cognition-emotion interactions." *Netherlands Journal of Psychology* 64.4 (2008): 132-142.
Approach-avoidance *motivation* is different from emotional *valence* (positive-negative affect):
Carver, Charles S., and Eddie Harmon-Jones. "Anger is an approach-related affect: evidence and
implications." *Psychological bulletin* 135.2 (2009): 183.

116: A recent shopping study by neuromarketing vendor Sands Research. This research has not been published in a peer-reviewed journal, but a detailed account has been presented by Steve Sands in several forums, including the 2012 NMSBA World Conference in Amsterdam, The Netherlands: <http://bit.ly/188k5Yo>. The study is also described here: <http://bit.ly/1adoQoo>.

116: This finding, which replicates similar results in academic research, illustrates how quickly and how strongly nonconscious forces can motivate a consumer toward a decision. Milosavljevic, Mili, Christof Koch, and Antonio Rangel. "Consumers can make decisions in as little as a third of a second." *Judgment and Decision Making* 6.6 (2011): 520-530
Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18-36.

117: A substantial body of evidence has demonstrated that conscious goal pursuit depletes willpower, the common name for the "fuel" that drives motivated behavior. Baumeister, Roy F., and John Tierney. Willpower: Rediscovering the greatest human strength. Penguin. com, 2011; Gailliot, Matthew T., et al. "Self-control relies on glucose as a limited energy source: willpower is more than a metaphor." *Journal of personality and social psychology* 92.2 (2007): 325; Baumeister, Roy F., and Kathleen D. Vohs. "Willpower, choice, and self-control." *Time and decision: Economic and psychological perspectives on intertemporal choice* (2003): 201-216.

117: Recent studies have extended this finding to nonconscious goal pursuit. Vohs, Kathleen D., Roy F. Baumeister, and Natalie J. Ciarocco. "Self-regulation and self-presentation: regulatory resource depletion impairs impression management and effortful self-presentation depletes regulatory resources." *Journal of personality and social psychology* 88.4 (2005): 632; Muraven, Mark, and Roy F. Baumeister. "Self-regulation and depletion of limited resources: Does self-control resemble a muscle?." *Psychological bulletin* 126.2 (2000): 247.

117: Much consumer behavior is simply habitual. Wood, Wendy, and David T. Neal. "The habitual consumer." *Journal of Consumer Psychology* 19.4 (2009): 579-592; Neal, David T., et al. "The Pull of the Past When Do Habits Persist Despite Conflict With Motives?." *Personality and Social Psychology Bulletin* 37.11 (2011): 1428-1437.

Chapter 8. Why We Buy the Things We Buy

How People Make Decisions

120: But much of the time, consumers don't act rationally and logically. This is a key premise of the whole behavioral economics tradition. Among the earliest observers of the discrepancy between rational actor expectations and actual economic behavior was Herbert Simon, who introduced the idea of "satisficing" as an alternative to rational calculation. See Simon, Herbert A. "Theories of bounded rationality." *Decision and organization* 1 (1972): 161-176;

Simon, Herbert A. "Rational decision making in business organizations." *The American economic review* 69.4 (1979): 493-513.

121: Dual process theories of mental activity. Evans, Jonathan St BT. "In two minds: dual-process accounts of reasoning." *Trends in cognitive sciences* 7.10 (2003): 454-459; Evans, Jonathan St BT. "Dual-processing accounts of reasoning, judgment, and social cognition." *Annu. Rev. Psychol.* 59 (2008): 255-278; Samson, Alain, and Benjamin G. Voyer. "Two minds, three ways: dual system and dual process models in consumer psychology." *AMS review* 2.2-4 (2012): 48-71. Kahneman's use of "System 1" vs. "System 2" terminology is derived from Stanovich, Keith E., and Richard F. West. "Individual differences in reasoning: Implications for the rationality debate?." *Behavioral and brain sciences* 23.5 (2000): 645-665.

121: Spontaneity and accessibility. See Kahneman, Daniel. "Maps of bounded rationality: Psychology for behavioral economics." *The American economic review* 93.5 (2003): 1449-1475:

A defining property of intuitive thoughts is that they come to mind spontaneously, like percepts. The technical term for the ease with which mental contents come to mind is accessibility (E. Tory Higgins, 1996). To understand intuition, we must understand why some thoughts are accessible and others are not. (p. 1452)

Highly accessible features will influence decisions, while features of low accessibility will be largely ignored. (p. 1459)

121: Effortlessness and natural assessments. According to Kahneman, "natural assessments" are routinely evaluated as part of perception and comprehension (impression formation and meaning determination in the language of our simple model of cognition) and are therefore always accessible. Kahneman, Daniel, and Shane Frederick. "Representativeness revisited: Attribute substitution in intuitive judgment." *Heuristics and biases: The psychology of intuitive judgment* (2002): 49-81:

Some attributes are permanent candidates for the heuristic role because they are routinely evaluated as part of perception and comprehension, and therefore always accessible (Tversky and Kahneman, 1983). These natural assessments include physical properties such as size and distance, and more abstract properties such as similarity (e.g., Tversky and Kahneman, 1983), cognitive fluency in perception and memory (e.g., Jacoby and Dallas, 1991; Schwarz and Vaughn, Chapter 5 this volume; Tversky and Kahneman, 1973), causal propensity (Kahneman and Varey, 1990; Heider, 1944; Michotte, 1963), surprisingness (Kahneman and Miller, 1986), affective valence (e.g., Bargh, 1997; Cacioppo, Priester, and Berntson, 1993; Kahneman, Ritov and Schkade, 1999; Slovic et al., this volume; Zajonc, 1980), and mood (Schwarz and Clore, 1983). Other attributes are accessible only if they have been recently evoked or primed (see, e.g., Bargh et al., 1986; Higgins and Brendl, 1995).

122: Emotional valence is a natural assessment. See Kihlstrom, John F., et al. "The emotional unconscious." *Cognition and emotion* (2000): 30-86, <http://bit.ly/19rtdro>; Berridge, Kent, and Piotr Winkielman. "What is an unconscious emotion? (The case for unconscious 'liking')." *Cognition & Emotion* 17.2 (2003): 181-211; Winkielman, Piotr, and Kent C. Berridge. "Unconscious emotion." *Current Directions in Psychological Science* 13.3 (2004): 120-123.

122: Motivational approach-avoidance is a natural assessment. See Bargh, John A. *The automaticity of everyday life*. Lawrence Erlbaum Associates Publishers, 1997; Hofmann, Wilhelm, Malte Friese, and Tobias Gschwendner. "Men on the "pull": Automatic approach-avoidance tendencies and sexual interest behavior." *Social Psychology* 40.2 (2009): 73.

122: Ambiguity and uncertainty are suppressed in System 1. See Kahneman, *Thinking, Fast and Slow*, Chapter 7, "A Machine for Jumping to Conclusions."

System 1 does not keep track of alternatives that it rejects, or even of the fact that there were alternatives. Conscious doubt is not in the repertoire of System 1; it requires maintaining incompatible interpretations in mind at the same time, which demands mental effort. Uncertainty and doubt are the domain of System 2. (p. 80)

122: An important quality of System 2 processes is that they're single-threaded. See Kahneman, Daniel. *Thinking, Fast and Slow* (p. 451):

Attempting to perform several tasks at once may run into difficulties of several kinds. For example, it is physically impossible to say two different things at exactly the same time, and it may be easier to combine an auditory and a visual task than to combine two visual or two auditory tasks. ... With practice, people's ability to multitask in specific ways may improve. However, the wide variety of very different tasks that interfere with each other supports the existence of a general resource of attention or effort that is necessary in many tasks.

122: System 2 monitors and sometimes overrides the activities of System 1. See Kahneman, Daniel, and Shane Frederick. "A model of heuristic judgment." *The Cambridge handbook of thinking and reasoning* (2005): 267-293:

In the particular dual-process model we assume, system 1 quickly proposes intuitive answers to judgment problems as they arise, and system 2 monitors the quality of these proposals, which it may endorse, correct, or override. The judgments that are eventually expressed are called intuitive if they retain the hypothesized initial proposal with little modification. (pp. 267-268)

123: Two types of implicit decisions are discussed in the academic literature on choices and behavior. This dichotomy is based on the discussion in Chartrand, Tanya L. "The role of conscious awareness in consumer behavior." *Journal of Consumer Psychology* 15.3 (2005): 203-210. Chartrand uses this simple model to talk about different types of automaticity (nonconscious influences) in consumer decision making:

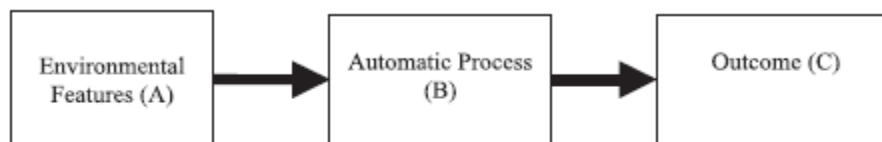


FIGURE 1 Model of Automatic Processes.

Essentially all consumer decisions involve lack of awareness of intervening automatic processes (B). *Reflexive implicit decisions* also involve lack of awareness of the outcome (C), which is unlikely when the outcome is a product purchase. *Intuitive implicit decisions* involve awareness of the outcome (C), but the consumer may be unaware of both the environmental features influencing their decision (A) as well as the intervening automatic processes (B).

124: Somatic markers and decision making (sidebar). Damasio's model of decision making is presented in Damasio, Antonio R. *Looking for Spinoza: Joy, sorrow and the feeling brain*. Random House, 2004. This graphic is a slightly modified version of Figure 4.2, p. 149. See also Bechara, Antoine, and Antonio R. Damasio. "The somatic marker hypothesis: A neural theory of economic decision." *Games and economic behavior* 52.2 (2005): 336-372.

125: In the traditional rational consumer model, emotions and intuition are often viewed as obstacles to making rational decisions. The historical roots of this approach are found in the "Irrational Weigher" view in advertising research, which argued that emotional advertising manipulated consumers into overvaluing branded goods. See Brown Jr, Ralph S. "Advertising and the Public Interest: Legal Protection of Trade Symbols." *Yale LJ* 57 (1947): 1165. Today, this view is enshrined in the beliefs of consumer advocacy groups who view advertising as using emotions to lead consumers astray. An example is Ralph Nader's Consumer Alter group, <http://bit.ly/Qiee6>.

Why Consumer Decisions Aren't Rational

127: An example of the fragility of preferences and choices. The referenced "green pen" study is Berger, Jonah, and Gráinne Fitzsimons. "Dogs on the street, pumas on your feet: How cues in the environment influence product evaluation and choice." *Journal of Marketing Research* 45.1 (2008): 1-14.

127-128: Examples of judgment heuristics:

- **Loss aversion.** On stock trading, see Haigh, Michael S., and John A. List. "Do professional traders exhibit myopic loss aversion? An experimental analysis." *The Journal of Finance* 60.1 (2005): 523-534; Thaler, Richard H., ed. *Advances in behavioral finance*. Vol. 2. Princeton University Press, 2005.
- **Anchoring.** On price anchoring, see Northcraft, Gregory B., and Margaret A. Neale. "Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions." *Organizational behavior and human decision processes* 39.1 (1987): 84-97.
- **Framing.** This effect is particularly relevant in the political realm. See Schaffner, Brian F., and Patrick J. Sellers, eds. *Winning with words: the origins and impact of political framing*. Routledge, 2009.
- **Default bias.** The organ donation example is discussed in Amir, On, et al. "Psychology, behavioral economics, and public policy." *Marketing Letters* 16.3-4 (2005): 443-454.
- **Affect heuristic.** See Slovic, Paul, et al. "The affect heuristic." *European Journal of Operational Research* 177.3 (2007): 1333-1352.
- **Endowment effect.** The classic coffee mug study is reported in Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. "Experimental tests of the endowment effect and the Coase theorem." *Journal of political Economy* (1990): 1325-1348.

129: As aids to judgment, heuristics are particularly influential in the non-conscious attribution of value. See Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, especially Appendix B., a reprint of Kahneman, Daniel, and Amos Tversky. "Choices, values, and frames." *American psychologist* 39.4 (1984): 341.

The Limits of Persuasive Messaging in Consumer Decision Making

131: Six principles of persuasion (sidebar). Cialdini, Robert B. *Influence*. HarperCollins, 2009.

132: Brain science research paints a picture of priming (not attention) as the primary mechanism by which advertising influences us. For a specific example, see Harris, Jennifer L., John A. Bargh, and Kelly D. Brownell. "Priming effects of television food advertising on eating behavior." *Health Psychology* 28.4 (2009): 404:

Advertising for food and beverages communicates potentially powerful food consumption cues, including images of attractive models eating, snacking at nonmeal times, and positive emotions linked to food consumption We propose that the messages presented in TV food advertising similarly have the power to act as real-world primes and lead to corresponding eating behaviors. Given the types of foods and consumption benefits typically promoted in food advertising, what is primed is usually snacking on unhealthy foods and beverages

127: Here are some examples using the anchoring heuristic:

- **In an experiment conducted in a convenience store.** Described in Ariely, Dan, and Michael I. Norton. "Conceptual consumption." *Annual review of psychology* 60 (2009): 475-499; originally reported in Lee, Leonard, and Dan Ariely. "Shopping goals, goal concreteness, and conditional promotions." *Journal of Consumer Research* 33.1 (2006): 60-70.
- **In fast-food restaurants.** Not surprisingly, no fast food restaurant company will admit to using this strategy, but see Chandon, Pierre, and Brian Wansink. "Is Food Marketing Making Us Fat? A Multi-Disciplinary Review." *Foundations and Trends® in Marketing* 5.3 (2010): 113-196.
- **In pricing.** For a wide-ranging overview see Poundstone, William. *Priceless: The myth of fair value (and how to take advantage of it)*. Macmillan, 2010.
- **Warehouse stores.** Exposure to high priced items at the front of the store can be observed in visits to any Costco. The suggestion that this practice is meant to trigger an anchoring effect is made by Lehrer at <http://bit.ly/RDsNaP>.

134: Evidence from hundreds of nonconscious processing experiments supports the conclusion that System 2 override is necessary to counteract the effects of System 1 heuristics. This phenomenon is discussed in detail in Kahneman, Daniel, and Shane Frederick. "Representativeness revisited: Attribute substitution in intuitive judgment." *Heuristics and biases: The psychology of intuitive judgment* (2002): 49-81, especially in "Section 2: The Supervision of Intuitive Judgments:"

although priming typically increases the weight of that variable on judgment (a system 1 effect), this does not occur if the prime is a sufficiently explicit reminder that brings the self-critical operations of system 2 into play. (p. 273)

135: Habits don't require supporting goals or intentions to be activated. Neal, David T., et al. "Do habits depend on goals? Perceived versus actual role of goals in habit performance." *Manuscript under Review, University of Southern California* (2009); Duhigg, Charles. *The power of habit: why we do what we do in life and business*. Vol. 34. No. 10. Random House Digital, Inc., 2012.

135: Research on habits reveals that about 45 percent of people's day-to-day activities is repeated almost daily, usually in the same physical location. Wood, Wendy, and David T. Neal. "The habitual consumer." *Journal of Consumer Psychology* 19.4 (2009): 579-592.

136: Ehrenberg suggested that advertising is mainly a vehicle for reinforcing brand awareness and favorability. Ehrenberg, Andrew SC. "Repetitive advertising and the consumer." *Journal of advertising research* 40.06 (2000): 39-48.

Part III. Neuromarketing in Action

Chapter 9. Brands on the Brain

Brands Are About Connections

140: Studies have shown that children recognize hundreds of brands by the time they're 3 years old. On early acquisition of brand knowledge, see McAlister, Anna R., and T. Bettina Cornwell. "Children's brand symbolism understanding: Links to theory of mind and executive functioning." *Psychology & Marketing* 27.3 (2010): 203-228; Ellis, Andrew W., Selina J. Holmes, and Richard L. Wright. "Age of acquisition and the recognition of brand names: On the importance of being early." *Journal of Consumer Psychology* 20.1 (2010): 43-52; Fischer, Paul M., et al. "Brand logo recognition by children aged 3 to 6 years." *JAMA: the journal of the American Medical Association* 266.22 (1991): 3145-3148. The claim that "by the time they are 36 months old, American children recognize an average of 100 brand logos" is attributed to Dr. Allen Kanner, child psychologist at the Wright Institute, Berkeley, CA.

140: Brands exist in memory. An excellent introduction to the relationship between brands and memory is Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18-36.

141: Brands and memory (sidebar). This model of different forms of long-term memory is derived from an excellent overview of brain and memory facts from the Canadian Institute of Health Research at <http://bit.ly/cqplwe>. See also Schacter, Daniel, Daniel T. Gilbert, Daniel M. Wegner, *Psychology*, Worth Publishers, 2007, Chapter 5, "Memory."

142: Brand equity is the value a company realizes from a product with a memorable brand name and positive, strong brand associations. See Aaker, David A. *Managing brand equity*. SimonandSchuster.com, 2009. In the *indirect route* to advertising effectiveness model described in Chapter 11, increasing brand equity is the primary aim of advertising. See

Plassmann, Hilke, et al. "What can advertisers learn from neuroscience?." *International Journal of Advertising: The Quarterly Review of Marketing Communications* (2007):

The collection of brand memories can be described as what marketing researchers have labelled 'brand equity' – the asset created by good marketing. This is to a large extent what consumers have in their heads about the brand (Aaker 1991, 1996; Keller 1993). Keller and Lehmann (2003, p. 28) define brand memories as 'everything that exists in the minds of customers with respect to a brand (e.g. thoughts, feelings, experiences, images, perceptions, beliefs, and attitudes).' This mindset influences consumers' purchasing decisions and, across a broad group of customers, it affects the market performance of the company. (p. 153)

143: Some researchers call this the placebo effect of brand expectations on product experience. Ariely, Dan, and Michael I. Norton. "Conceptual consumption." *Annual review of psychology* 60 (2009): 475-499; Ariely, Dan, and Gregory S. Berns. "Neuromarketing: the hope and hype of neuroimaging in business." *Nature Reviews Neuroscience* 11.4 (2010): 284-292.

143-144: The classic neuromarketing demonstration of this effect was conducted by a team of Baylor University researchers in 2004. McClure, Samuel M., et al. "Neural correlates of behavioral preference for culturally familiar drinks." *Neuron* 44.2 (2004): 379-387.

How Brands Impact Our Brains

145: Ariely and Norton on "conceptual consumption." Ariely, Dan, and Michael I. Norton. "Conceptual consumption." *Annual review of psychology* 60 (2009): 475-499.

145: Changing their terminology just a bit. Ariely and Norton use the term "fit" rather than values for the fourth category. We thought values (what one is fitting to) was a little easier to understand.

146: Apple brand and creativity (sidebar). Fitzsimons, Gráinne M., Tanya L. Chartrand, and Gavan J. Fitzsimons. "Automatic effects of brand exposure on motivated behavior: how apple makes you "think different"." *Journal of Consumer Research* 35.1 (2008): 21-35. For a similar effect with both positive and negative consequences, see Brasel, S. Adam, and James Gips. "Red Bull "Gives You Wings" for better or worse: A double-edged impact of brand exposure on consumer performance." *Journal of Consumer Psychology* 21.1 (2011): 57-64.

148: Brands build connections in memory through the implicit memory process called conditioning. The specific type of conditioning that connects positive emotional responses to unconditioned stimuli is called *evaluative conditioning* or *affective conditioning*. See De Houwer, Jan, Sarah Thomas, and Frank Baeyens. "Association learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning." *Psychological bulletin* 127.6 (2001): 853; De Houwer, Jan. "Conditioning as a source of liking: there is nothing simple about it." *The Social Psychology of Consumer Behavior* (2008). See also Walther, Eva, et al. "Changing likes and dislikes through the back door: The US-revaluation effect." *Cognition and Emotion* 23.5 (2009): 889-917; Walther, Eva, Rebecca Weil, and Jessica Düsing. "The role of evaluative conditioning in attitude formation." *Current Directions in Psychological Science* 20.3 (2011): 192-196.

148: Brain science research provides us with a number of guidelines that can be used to optimize the chances that a conditioned learning process is occurring. These examples are based on Steidl, Peter. *Neurobranding*. CreateSpace, 2012.

Why Leading Brands Are So Hard to Displace

150: Researchers have shown that a strong brand may even benefit from the advertising and promotions of lesser-known brands. See Hoeffler, Steve, and Kevin Lane Keller. "The marketing advantages of strong brands." *The Journal of Brand Management* 10.6 (2003): 421-445. See also Muthukrishnan, Anaimalai V. "Decision ambiguity and incumbent brand advantage." *Journal of Consumer Research* (1995): 98-109.

151: For leading brands, a top goal is to encourage habitual buying and avoid doing anything that may disrupt established buying habits that favor the leading brand. The four bulleted strategies are derived from Steidl, Peter. *Neurobranding*. CreateSpace, 2012.

152: Product innovation expert Jean-Marie Dru. See Dru, Jean-Marie. *Beyond disruption: Changing the rules in the marketplace*. Wiley, 2002.

152: An example is provided in the dog food category. The "We're for Dogs" campaign is analyzed in Steidl, *Neurobranding*, pp. 71-73:

At a time when brands were primarily competing at the product level by offering additional vitamins or minerals, larger chunks, or flavors and textures that dogs prefer, and so forth, Pedigree launched the 'We're for Dogs' campaign, a very simple proposition packaged up in a beautiful and often touching campaign.

Later extensions brought us a program that aimed at getting homeless dogs adopted, refreshing the positioning and giving it new credibility. In this case, Pedigree lifted the brand from competing at the product level to competing at the level of 'love and belonging,' as shown in Maslow's pyramid. (p. 74)

Using Neuromarketing to Test Brands

153: Most brand-equity measures depend in large part on accounting metrics such as market share, relative price, and lifetime customer value. See Keller, Kevin Lane, M. G. Parameswaran, and Isaac Jacob. *Strategic brand management: Building, measuring, and managing brand equity*. Pearson Education India, 2011.

154: Neuromarketing provides several ways to measure brand associations. An excellent discussion linking branding issues to neuromarketing methodologies is Plassmann, Hilke, et al. "What can advertisers learn from neuroscience?." *International Journal of Advertising: The Quarterly Review of Marketing Communications* (2007). Another useful general source is Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18-36.

156: Neuroscientists have found that relative activation of certain brain-wave frequencies in the left and right frontal areas of the brain are reliable indicators of approach and avoidance motivation. Harmon-Jones, Eddie, and Philip A. Gable. "Incorporating motivational intensity and direction into the study of emotions: Implications for

brain mechanisms of emotion and cognition-emotion interactions." *Netherlands Journal of Psychology* 64.4 (2008): 132-142; Gable, Philip, and Eddie Harmon-Jones. "The motivational dimensional model of affect: Implications for breadth of attention, memory, and cognitive categorisation." *Cognition and Emotion* 24.2 (2010): 322-337.

Chapter 10. Creating Products and Packages That Please Consumers' Brains

How New Products Get Noticed

158: For a product or package to get noticed, brain science tells us that it must find a "sweet spot" between novelty and familiarity. See Hung, Wei-Ken, and Lin-Lin Chen. "Effects of novelty and its dimensions on aesthetic preference in product design." *International Journal of Design* 6.2 (2012): 81-90; Hekkert, Paul, Dirk Snelders, and Piet CW Wieringen. "'Most advanced, yet acceptable': typicality and novelty as joint predictors of aesthetic preference in industrial design." *British Journal of Psychology* 94.1 (2003): 111-124.

In deference to this tradeoff, many product designers subscribe to the MAYA Principle – Most Advanced Yet Acceptable – to identify aesthetically optimal design alternatives. The principle is attributed to Raymond Loewy, American industrial designer.

158: Figure 10-1: the spectrum from novelty to familiarity. This graphic represents relationships hypothesized by the authors, not presented or tested in any specific research study.

159: A new product enhances its ability to stand out among more familiar competitors in its category if it can do two things. On attracting involuntary bottom-up attention, see Wolfe, Jeremy M., and Todd S. Horowitz. "What attributes guide the deployment of visual attention and how do they do it?." *Nature Reviews Neuroscience* 5.6 (2004): 495-501; Wolfe, Jeremy M., et al. "Segmentation of objects from backgrounds in visual search tasks." *Vision research* 42.28 (2002): 2985-3004. On signaling goals, see Steidl, Peter. *Neurobranding*. CreateSpace, 2012, especially Chapters 9-10.

159: At a nonconscious level, products, brands, and other cues in the shopping environment can all trigger nonconscious goal pursuit. See Chartrand, Tanya L., et al. "Nonconscious goals and consumer choice." *Journal of Consumer Research* 35.2 (2008): 189-201.

160: Marketers use the term *learned codes* to describe these associations. Steidl, Peter. *Neurobranding*. CreateSpace, 2012, pp. 94-96.

161: Research has shown that consumers even prefer to have meaningless categories (such as A, B, and C) than no categories at all. Mogilner, Cassie, Tamar Rudnick, and Sheena S. Iyengar. "The mere categorization effect: How the presence of categories increases choosers' perceptions of assortment variety and outcome satisfaction." *Journal of Consumer Research* 35.2 (2008): 202-215.

161: Research suggests that consumers' implicit reactions to the category in which a product resides can impact their emotional response to the product itself. Coupey,

Eloise, Julie R. Irwin, and John W. Payne. "Product category familiarity and preference construction." *Journal of Consumer Research* 24.4 (1998): 459-468.

161: Product contagion. See Morales, Andrea C., and Gavan J. Fitzsimons. "Product contagion: Changing consumer evaluations through physical contact with "disgusting" products." *Journal of Marketing Research* (2007): 272-283.

161: The connections that get accessed automatically by our nonconscious brains are not governed by logical if-then rules; they emerge from unexamined associations and attributions that we might find laughable if we evaluated them consciously. These *attributions* are thus often *misattributions*. See, for example, Coulter, Keith S., and Patricia A. Norberg. "The effects of physical distance between regular and sale prices on numerical difference perceptions." *Journal of Consumer Psychology* 19.2 (2009): 144-157. As summarized in Kahneman, *Thinking, Fast and Slow*, p. 80:

System 1 is not prone to doubt. It suppresses ambiguity and spontaneously constructs stories that are as coherent as possible. Unless the message is immediately negated, the associations that it evokes will spread as if the message were true. System 2 is capable of doubt, because it can maintain incompatible possibilities at the same time.

162: Micro-valence analysis. Lebrecht, Sophie, et al. "Micro-valences: perceiving affective valence in everyday objects." *Frontiers in psychology* 3 (2012); Lebrecht, Sophie, and Michael Tarr. "Defining an object's micro-valence through implicit measures." *Journal of Vision* 10.7 (2010): 966-966.

162-163: The Italian "gadget" company Alessi. Alessi's whimsical designs of everyday things can be seen at <http://www.alessi.com/en/catalogue>.

Neurodesign of Everyday Things

164: A neuroscience subfield called *neurodesign*, the study of common design elements of physical objects that people tend to view as beautiful, aesthetically pleasing, and attractive. Neurodesign is often viewed as a subfield of a more inclusive field of study called *neuroaesthetics*. See Cinzia, Di Dio, and Gallese Vittorio. "Neuroaesthetics: a review." *Current opinion in neurobiology* 19.6 (2009): 682-687; Nadal, Marcos, and Marcus T. Pearce. "The Copenhagen Neuroaesthetics conference: Prospects and pitfalls for an emerging field." *Brain and cognition* 76.1 (2011): 172-183. An excellent overview of design principles, many based on brain science findings, is Lidwell, William, Kritina Holden, and Jill Butler. *Universal Principles of Design: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Tech Through Design [25 Additional Design Principles]*. Rockport publishers, 2010.

165: Researchers at Harvard Medical School showed that humans have an innate preference for curved objects compared to pointy objects. Bar, Moshe, and Mital Neta. "Humans prefer curved visual objects." *Psychological science* 17.8 (2006): 645-648.

165-166: A series of studies led by Rolf Reber, Norbert Schwartz, and Piotr Winkielman. Reber, Rolf, Norbert Schwarz, and Piotr Winkielman. "Processing fluency and aesthetic pleasure: is beauty in the perceiver's processing experience?." *Personality and social*

psychology review 8.4 (2004): 364-382; Reber, Rolf, Piotr Winkielman, and Norbert Schwarz. "Effects of perceptual fluency on affective judgments." *Psychological science* 9.1 (1998): 45-48; Winkielman, Piotr, et al. "Affective and Cognitive Consequences of Visual Fluency: When Seeing is Easy on the Mind." *Visual Persuasion* (2000); Winkielman, Piotr, et al. "Prototypes are attractive because they are easy on the mind." *Psychological Science* 17.9 (2006): 799-806.

166: Figure-ground contrast should be more helpful for processing objects when they're viewed for short periods of time, but not so much when they're viewed for longer periods. Reber, Rolf, and Norbert Schwarz. "The hot fringes of consciousness: Perceptual fluency and affect." *Consciousness & emotion* 2.2 (2002): 223-231; summarized in Reber, Rolf, Norbert Schwarz, and Piotr Winkielman. "Processing fluency and aesthetic pleasure: is beauty in the perceiver's processing experience?." *Personality and social psychology review* 8.4 (2004): 364-382. p. 8.

166: Repeated exposure and the mere exposure effect. See Reber, Schwarz, and Winkielman, "Processing fluency and aesthetic pleasure", p. 9:

*Previously seen stimuli differ from novel stimuli with regard to at least three fluency-related parameters. First, familiar stimuli are processed faster than novel stimuli Second, familiar stimuli elicit less attentional orienting than novel stimuli Third, familiar stimuli have more organized processing dynamics than novel stimuli Based on such findings, several researchers suggested that **perceptual fluency is central to the mere exposure effect** and provided evidence consistent with this account*

167: Researchers have found that fluency has a more powerful impact on liking when its source is unknown and the experience of fluent processing comes as a surprise. Schwarz, Norbert. "Meta-cognitive experiences in consumer judgment and decision making." *Journal of Consumer Psychology, September* (2004), cited in Reber, Schwarz, and Winkielman, "Processing fluency and aesthetic pleasure", p. 12; Hansen, Jochim, and Michaela Wänke. "Fluency in context: Discrepancy makes processing experiences informative." *The Experience of Thinking: How the Fluency of Mental Processes Influences Cognition and Behaviour* (2013): 70.

168: How good design can translate into exceptional performance in the marketplace. Hertenstein, Julie H., Marjorie B. Platt, and Robert W. Veryzer. "The Impact of Industrial Design Effectiveness on Corporate Financial Performance*." *Journal of Product Innovation Management* 22.1 (2005): 3-21.

168: An especially painful case occurred in 2009 for the orange juice brand Tropicana. The Tropicana debacle was covered extensively in the press and blogs at the time. See <http://buswk.co/RfWl>, <http://bit.ly/8RQWV>, <http://bit.ly/1bYJO35>. An interesting discussion of why the new packaging failed is provided in Barden, Phil. *Decoded: The Science Behind why We Buy*. John Wiley & Sons, 2013, pp. 94-96

Neuromarketing and New Product Innovation

169: More than 80 percent of new products fail. Failure rates vary dramatically from product category to category, but overall, failure rates remain unacceptably high. For early efforts to check the statistics, see Crawford, C. Merle. "Marketing research and the new product failure

rate." *The Journal of Marketing* (1977): 51-61; Crawford, C. Merle. "New product failure rates: a reprise." *Research Management* 30.4 (1987): 20-24. According to a July 2013 study by Nielsen, only 1 in 200 product innovations achieve "breakthrough success," defined as \$50 million in sales in year one and sustains 90 percent of that level in year two. (<http://bit.ly/15mOCPX>).

170: Here are some classic examples of successful products that never would've seen the light of day if someone hadn't chosen to ignore the dismal focus group results. For more examples, see Gianfranco Zaccai, "Why Focus Groups Kill Innovation, from the Designer Behind Swiffer," *Fast Company*, October 18, 2012, <http://bit.ly/WDSOYH>. The Aeron chair example is analyzed in depth in Gladwell, Malcolm. *Blink: The power of thinking without thinking*. Hachette Digital, Inc., 2007.

171: Researchers studying the relationship between novelty and liking in product design have identified a path out of the apparent dilemma — moderate levels of innovation tied to recognizable elements of familiarity. Hung, Wei-Ken, and Lin-Lin Chen. "Effects of novelty and its dimensions on aesthetic preference in product design." *International Journal of Design* 6.2 (2012): 81-90; Hekkert, Paul, Dirk Snelders, and Piet CW Wieringen. "'Most advanced, yet acceptable': typicality and novelty as joint predictors of aesthetic preference in industrial design." *British Journal of Psychology* 94.1 (2003): 111-124.

171: In a 2012 study in the *International Journal of Design*. Hung, Wei-Ken, and Lin-Lin Chen. "Effects of novelty and its dimensions on aesthetic preference in product design." *International Journal of Design* 6.2 (2012): 81-90.

Using Neuromarketing to Test Product and Package Designs

173: Eye tracking records three main types of eye movement data. An excellent summary of eye tracking metrics is Poole, A., and L. J. Ball. "Encyclopedia of Human Computer Interaction, chapter Eye Tracking in Human-Computer Interaction and Usability Research: Current Status and Future Prospects." *Information Science Reference* (2006).

173: Eye-tracking data is critically dependent on the task that the viewer is performing. For a representative study of online visual search depends on task (in this case, an information foraging task vs. a page recognition task), see Buscher, Georg, Edward Cutrell, and Meredith Ringel Morris. "What do you see when you're surfing?: using eye tracking to predict salient regions of web pages." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, 2009. For a more general account, see Janiszewski, Chris. "The influence of display characteristics on visual exploratory search behavior." *Journal of Consumer Research* 25.3 (1998): 290-301.

174: Researchers have found, for example, that people will scan a package much differently when asked "How attractive is this package?" than when asked "How likely would you be to buy this product?" Observed in eye-tracking results in client research conducted at Lucid Systems, Inc., a neuromarketing research firm, in 2008-2009.

174: Forced choice testing. An example of this methodology is presented in Ewing, Tom and Bob Pankauskas, "Research in a World Without Questions," paper presented at ESOMAR World Congress, Madrid, 2012, "Online Pack Testing Game," p. 15. See also Dhar, Ravi, and Itamar

Simonson. "The effect of forced choice on choice." *Journal of Marketing Research* (2003): 146-160.

Chapter 11. Advertising Effectiveness

Two Views of How Advertising Works

176: Direct vs. indirect routes to advertising effectiveness. The indirect route model (also called the two-stage view of advertising) is examined from a neuroscience perspective in Plassmann, Hilke, et al. "What can advertisers learn from neuroscience?." *International Journal of Advertising: The Quarterly Review of Marketing Communications* (2007).

177: Numerous studies have shown that the direct path can work, and does work, in a wide variety of circumstances. Vakratsas, Demetrios, and Tim Ambler. "How advertising works: what do we really know?." *The Journal of Marketing* (1999): 26-43. Based on an extensive literature review, Vakratsas and Ambler conclude that "cognition" (aka rational, informational) variables are more important for "high involvement" goods, that is, goods a consumer is motivated to pay attention to.

177: People pay little attention to most TV advertising. This finding is discussed in detail in Heath, Robert. *Seducing the subconscious: The psychology of emotional influence in advertising*. Wiley. com, 2012:

As early as the 1980s it had been shown that between 20% and 40% of us were leaving the room when an ad breaks came on (Soley 1984) and by the 1990s two-thirds were doing some other activity when watching television (Clancey 1994). By 1994, half of us actively disliked TV advertising (Mittal 1994), and nowadays almost everyone fast-forwards through the ads in previously recorded material (Goetzel 2006). We may love watching TV programs, and even love watching TV programs about ads, but we much prefer chatting to the family, making tea, checking our e-mails, and petting the dog to watching the real thing. (p. 40)

See also Pringle, Hamish. *Brand immortality: how brands can live long and prosper*. Kogan Page, 2008.

177: Some issues with the direct-route model:

- **People are usually unable to recall specific aspects of an ad.** Lodish, Leonard M., et al. "How TV advertising works: A meta-analysis of 389 real world split cable TV advertising experiments." *Journal of Marketing Research* (1995): 125-139. In a publicized 2011 study by Microsoft Advertising and Nielsen IAG that compared TV and online ad recall across 900+ ads for 400+ products over a 1½ year period, viewers recalled only 28% of brands advertised on TV and only 21% of TV ad messages (<http://bit.ly/nbklkq>).
- **People have built-in resistance to advertising claims.** See Friestad, Marian, and Peter Wright. "The persuasion knowledge model: How people cope with persuasion attempts." *Journal of consumer research* (1994): 1-31; Heath, Robert, and Paul Feldwick. "Fifty years using the wrong model of advertising." *International journal of market research* 50.1 (2008): 29; Sagarin, Brad J., et al. "Dispelling the illusion of

- invulnerability: The motivations and mechanisms of resistance to persuasion." *Journal of Personality and Social Psychology* 83.3 (2002): 526; Wegener, Duane T., et al. "Multiple routes to resisting attitude change." *Resistance and persuasion* (2004): 13-38.
- **When shopping, people usually don't incorporate ad claims into their decision making.** Shopping decisions tend to be more situationally or habitually determined than planned based on previous exposure to ad claims. See Lynch, John G. "Memory and decision making." *Handbook of consumer behavior* (1991): 1-49; Alba, Joseph W., and J. Wesley Hutchinson. "Knowledge calibration: What consumers know and what they think they know." *Journal of Consumer Research* 27.2 (2000): 123-156.
 - **On average, advertising does not have a large impact on sales.** Tellis, Gerard J. "Advertising's role in capitalist markets: what do we know and where do we go from here?." *Journal of Advertising Research* 45.2 (2005): 162; Koslow, Scott, and Gerard J. Tellis. "What Scanner-Panel Data Tell Us about Advertising: A Detective Story with a Dark Twist." *Journal of Advertising Research* 51.1 (2011): 87-100.

178: When consumers are more likely to process ads with attention and conscious evaluation. These conditions are derived from the "central route" of the elaboration likelihood model of persuasion developed by Petty and Cacioppo. See Petty, Richard E., and John T. Cacioppo. "The elaboration likelihood model of persuasion." *Communication and Persuasion*. Springer New York, 1986. 1-24. For an analysis of direct response advertising effectiveness, see Tellis, Gerard, et al. "Modeling the microeffects of television advertising: Which ad works, when, where, for how long, and why?." *Marketing Science* 24.3 (2005).

178: In an influential study published in 1995 by John Philip Jones (sidebar). Originally published in 1995, the latest edition is Jones, John Philip. *When ads work: new proof that advertising triggers sales*. ME Sharpe, 2007.

179: Ads improve brand equity through conditioning. Specifically, the mechanism is called *evaluative conditioning* or *affective conditioning*. See Sweldens, Steven, Stijn M.J. Van Osselaer, and Chris Janiszewski. "Evaluative conditioning procedures and the resilience of conditioned brand attitudes." *Journal of Consumer Research* 37.3 (2010): 473-489; De Houwer, Jan. "Conditioning as a source of liking: there is nothing simple about it." *The Social Psychology of Consumer Behavior* (2008); Baker, William E. "When can affective conditioning and mere exposure directly influence brand choice?." *Journal of Advertising* 28.4 (1999): 31-46. For incidental exposure more generally, see Ferraro, Rosellina, James R. Bettman, and Tanya L. Chartrand. "The power of strangers: The effect of incidental consumer brand encounters on brand choice." *Journal of Consumer Research* 35.5 (2009): 729-741. For a more general neuroscience perspective on conditioning, see O'Doherty, John P., et al. "Predictive neural coding of reward preference involves dissociable responses in human ventral midbrain and ventral striatum." *Neuron* 49.1 (2006): 157-166.

179: Research has shown when the indirect route tends to work best. Derived from several sources, including Heath, Robert. "How the best ads work." *Admap*, April (2002): 40-42; Vakratsas, Demetrios, and Tim Ambler. "How advertising works: what do we really know?." *The Journal of Marketing* (1999): 26-43.

Driving the Direct Route to Advertising Effectiveness

181: High attention vs. low attention. See Heath, Robert. *Seducing the subconscious: The psychology of emotional influence in advertising*. Wiley.com, 2012.

182: Our default response to any ad that grabs our attention is just as likely to be negative as positive. According to Friestad and Wright's influential *persuasion knowledge model*, consumers maintain a mental schema regarding marketers' persuasion attempts. When consumers are confronted with what they believe to be a marketing attempt, they process the information differently than if they did not recognize the attempt as persuasive: they scrutinize it more carefully, argue with the message, and effectively change the meaning of the message. Friestad, Marian, and Peter Wright. "The persuasion knowledge model: How people cope with persuasion attempts." *Journal of consumer research* (1994): 1-31; McCarty, John A. "Product placement: The nature of the practice and potential avenues of inquiry." *The psychology of entertainment media: Blurring the lines between entertainment and persuasion* (2004): 45-61; Lowrey, Tina M., L. J. Shrum, and John A. McCarty. "The future of television advertising." *Marketing communication: New approaches, technologies, and styles* (2005): 113-132.

183: Ad recall evolved into a kind of surrogate measure for ad effectiveness. See Heath, Robert, and Paul Feldwick. "Fifty years using the wrong model of advertising." *International journal of market research* 50.1 (2008): 29:

At the moment, advertising research focuses mostly on what can be directly verified. Awareness and recall can be verified by asking the respondent to confirm what they have learned. But, on another level, it is patently the case that people also learn and are influenced by things they forget, possibly in toto to a greater extent than things they remember. So research has to stop focusing on what people remember and start focusing on how they behave. Increased preference for or favourability towards brands is, after all, what advertising's true objective is, not recall. (p. 52)

183: A large body of studies, by both academics and practitioners, has found very little relationship between ad recall and sales or market share. Relevant research is reviewed in Heath and Feldwick, "Fifty years using the wrong model of advertising." For an alternative view, see Mehta, Abhilasha, and Scott C. Purvis. "Reconsidering recall and emotion in advertising." *Journal of Advertising Research* 46.1 (2006): 49.

Taking the Indirect Route to Advertising Effectiveness

184: An influential early study published by Stuart Shapiro and colleagues in 1997. Shapiro, Stewart, Deborah J. MacInnis, and Susan E. Heckler. "The effects of incidental ad exposure on the formation of consideration sets." *Journal of consumer research* 24.1 (1997): 94-104.

185: Research using the Institute of Practitioners in Advertising (IPA) database to test advertising effectiveness. Binet, Les, and Peter Field. *Marketing in the Era of Accountability: Identifying the Marketing Practices and Metrics that Truly Increase Profitability*. No. 2. World Advertising Research Center, 2007.

185: Technically, this is the process of *affective conditioning*, which is different from *classical conditioning*. See Baker, William E. "When can affective conditioning and mere exposure directly influence brand choice?." *Journal of Advertising* 28.4 (1999): 31-46; Clore, Gerald L., and Simone Schnall. "The Influence of Affect on Attitude." (2005), in D. Albarracín, B. T. Johnson, & M. P., Zanna (Eds.), *Handbook of attitudes* (pp. 437-489). Mahwah: Erlbaum; Hermans, Dirk, Frank Baeyens, and Paul Eelen. "On the acquisition and activation of evaluative information in memory: The study of evaluative learning and affective priming combined." *The psychology of evaluation: Affective processes in cognition and emotion* (2003): 139-168.

186: Attention may actually inhibit nonconscious conditioning, because it triggers (nonconscious) correction goals and (conscious) counter-arguing in the mind of the viewer. Friestad and Wright "The persuasion knowledge model: How people cope with persuasion attempts"; Laran, Juliano, Amy N. Dalton, and Eduardo B. Andrade. "The Curious Case of Behavioral Backlash: Why Brands Produce Priming Effects and Slogans Produce Reverse Priming Effects." *Journal of Consumer Research* 37.6 (2011): 999-1014.

186: Implicit memory creates associations at two levels: perceptual and conceptual. Shapiro, Stewart. "When an ad's influence is beyond our conscious control: Perceptual and conceptual fluency effects caused by incidental ad exposure." *Journal of consumer research* 26.1 (1999): 16-36; Shapiro, Stewart, and H. Shanker Krishnan. "Memory-based measures for assessing advertising effects: a comparison of explicit and implicit memory effects." *Journal of advertising* 30.3 (2001): 1-13.

186: Implicit memory has some extraordinary properties. Based on the discussion in Heath, *Seducing the subconscious: The psychology of emotional influence in advertising*, pp. 68-71. See also Schacter, Daniel L. *Searching for memory: The brain, the mind, and the past*. Basic Books, 1996; Kihlstrom, John F., et al. "The emotional unconscious." *Cognition and emotion*(2000): 30-86, <http://bit.ly/19rtdro>.

Using Neuromarketing to Test Advertising

187: Eye tracking: fixations per second (fps) has been found to be sensitive to cognitive load. See Kahneman, *Thinking, Fast and Slow*, Chapter 2, "Attention and Effort"; Rayner, Keith. "Eye movements in reading and information processing: 20 years of research." *Psychological bulletin* 124.3 (1998): 372.

187: Decreasing alpha wave activity over the frontal brain areas and attention. See Klimesch, W., et al. "Induced alpha band power changes in the human EEG and attention." *Neuroscience letters* 244.2 (1998): 73-76; Sauseng, P., et al. "A shift of visual spatial attention is selectively associated with human EEG alpha activity." *European Journal of Neuroscience* 22.11 (2005): 2917-2926; Klimesch, Wolfgang. "EEG alpha and theta oscillations reflect cognitive and memory performance: a review and analysis." *Brain research reviews* 29.2 (1999): 169-195.

188: Three techniques are commonly used by neuromarketers to measure emotional responses to advertising. These techniques are discussed in more detail in Chapters 16 and 17.

Chapter 12. The Shopping Brain and In-Store Marketing

Understanding the Mind of the Shopper

191: The human brain is, in many ways, optimized by evolution to be good at navigating through space to acquire objects in its environment. Kruger, Daniel, and Dreyson Byker. "Evolved foraging psychology underlies sex differences in shopping experiences and behaviors." *Journal of Social, Evolutionary, and Cultural Psychology* 3.4 (2009): 315-327. From the abstract:

Compared to men, women relied more on object oriented navigation strategies and scored higher on skills and behaviors associated with gathering, the degree to which shopping is seen as recreational, the degree to which shopping is a social activity, and the tendency to see new locations as opportunities for shopping. Men scored higher on skills and behaviors thought to be associated with hunting. Most effect sizes were moderate or strong. These results suggest that shopping experiences and behaviors are influenced by sexually divergent adaptations for gathering and hunting.

192: Shopping is the modern equivalent of hunting and gathering. For an application of this insight to online shopping, see Stenstrom, E. R. I. C., et al. "Online hunting and gathering: an evolutionary perspective on sex differences in website preferences and navigation." *Professional Communication, IEEE Transactions on* 51.2 (2008): 155-168.

192-193: Shopping and the five senses:

- **Sight:** See Atalay, A. Selin, H. Onur Bodur, and Dina Rasolofarison. "Shining in the center: central gaze cascade effect on product choice." *Journal of consumer research* 39.4 (2012): 848-866; Meyers-Levy, Joan, and Rui Juliet Zhu. "Perhaps the Store Made You Purchase It." *Marketing and Consumer Psychology Series* (2007): 193.
- **Touch:** The weight, texture, and hardness of touched objects can impact our later judgment, see Ackerman, Joshua M., Christopher C. Nocera, and John A. Bargh. "Incidental haptic sensations influence social judgments and decisions." *Science* 328.5986 (2010): 1712-1715.
- **Taste:** Plassmann, Hilke, et al. "Marketing actions can modulate neural representations of experienced pleasantness." *Proceedings of the National Academy of Sciences* 105.3 (2008): 1050-1054. Taste test responses are highly sensitive to extrinsic factors, such as store environment, perceived price, brand attitudes, and familiarity, Collins-Dodd, Colleen, and Tara Lindley. "Store brands and retail differentiation: the influence of store image and store brand attitude on store own brand perceptions." *Journal of Retailing and Consumer services* 10.6 (2003): 345-352; Richardson, Paul, Arun K. Jain, and Alan Dick. "The influence of store aesthetics on evaluation of private label brands." *Journal of Product & Brand Management* 5.1 (1996): 19-28; McClure, Samuel M., et al. "Neural correlates of behavioral preference for culturally familiar drinks." *Neuron* 44.2 (2004): 379-387.
- **Smell:** See Spangenberg, Eric R., Ayn E. Crowley, and Pamela W. Henderson. "Improving the store environment: do olfactory cues affect evaluations and behaviors?." *The Journal of Marketing* (1996): 67-80. A good summary of scent research can be found at <http://lat.ms/SRqPK>. Reactions to smells are also heavily influenced by expectations, see Herz, R. S., and J. Von Clef. "The influence of verbal labeling on the perception of odors: Evidence for olfactory illusions?." *Perception* 30.3 (2001): 381-391; de Araujo,

- Ivan E., et al. "Cognitive modulation of olfactory processing." *Neuron* 46.4 (2005): 671-679.
- **Sound:** One of the few book-length treatments of sounds in a retail environment is Treasure, Julian. *Sound business*. Management Books 2000 Limited, 2011. See also Yalch, Richard F., and Eric R. Spangenberg. "The effects of music in a retail setting on real and perceived shopping times." *Journal of business Research* 49.2 (2000): 139-147; Spangenberg, Eric R., Bianca Grohmann, and David E. Sprott. "It's beginning to smell (and sound) a lot like Christmas: the interactive effects of ambient scent and music in a retail setting." *Journal of Business Research* 58.11 (2005): 1583-1589; Garlin, Francine V., and Katherine Owen. "Setting the tone with the tune: A meta-analytic review of the effects of background music in retail settings." *Journal of Business Research* 59.6 (2006): 755-764.

194: When doing the shopping, the shopper is likely pursuing his or her largely nonconsciously. See Dijksterhuis, Ap, et al. "The unconscious consumer: Effects of environment on consumer behavior." *Journal of Consumer Psychology* 15.3 (2005): 193-202; Wood, Wendy, and David T. Neal. "The habitual consumer." *Journal of Consumer Psychology* 19.4 (2009): 579-592.

194: When going shopping, the shopper is more likely to pursue conscious goals. See Petty, Richard E., and John T. Cacioppo. "The elaboration likelihood model of persuasion." *Communication and Persuasion*. Springer New York, 1986. 1-24; Verplanken, Bas, and Wendy Wood. "Interventions to break and create consumer habits." *Journal of Public Policy & Marketing* (2006): 90-103.

195: Studies of the reward circuitry in the human brain show that when pleasure is delivered in an unpredictable manner, it creates a greater sense of reward. Schultz, Wolfram. "Predictive reward signal of dopamine neurons." *Journal of neurophysiology* 80.1 (1998): 1-27.

195: Neuromarketing opens up the possibility of brain-based segmentation, which might be called neurographic. The term *neurographic segmentation* is a neologism coined by the authors to describe segmentation based on neural propensities.

196: BIS/BAS systems. Carver, Charles S., and Teri L. White. "Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales." *Journal of personality and social psychology* 67.2 (1994): 319.

196: Regulatory focus, promotion vs. prevention. Higgins, E. Tory. "Promotion and prevention: Regulatory focus as a motivational principle." *Advances in experimental social psychology* 30 (1998): 1-46.

195-197: Pain of paying. Rick, Scott I., Cynthia E. Cryder, and George Loewenstein. "Tightwads and spendthrifts." *Journal of Consumer Research* 34.6 (2008): 767-782.

Addendum. Another trait distinction that could have significant effects on shopping and consumer behavior is *rational vs. intuitive thinking styles*. See Witteman, Cilia, et al. "Assessing rational and intuitive thinking styles." *European Journal of Psychological Assessment* 25.1 (2009): 39-47.

Making Stores More Brain-Friendly

197: Finding, choosing, paying. This model was created by the authors.

198: Shopping researchers provide a number of ways to track consumers moving through a store. A shopper tracking system using cell phones, called *Footpath*, is available from a company called Path Intelligence and is described in a Wired.com article from November 28, 2011: <http://bit.ly/11SnJ71>. See also Clifford, Stephanie. "Attention, Shoppers: Store is Tracking Your Cell," *New York Times*, July 14, 2013, online at <http://nyti.ms/16DewOo>.

198: As shoppers navigate the store, displays and imagery act as primes. On priming in retail environments, see Dhar, Ravi. "The Irrational Consumer: Four Secrets to Engaging Shoppers," *The Huffington Post*, February 16, 2012, online at <http://huff.to/AjyJJZ>. See also Allenby, Greg M., and James L. Ginter. "The effects of in-store displays and feature advertising on consideration sets." *International Journal of Research in Marketing* 12.1 (1995): 67-80.

199-200: Some strategies to simplify choice in a shopping situation:

- **Minimize choice:** Iyengar, Sheena S., and Mark R. Lepper. "When choice is demotivating: Can one desire too much of a good thing?." *Journal of personality and social psychology* 79.6 (2000): 995.
- **Play with pricing:** Poundstone, William. *Priceless: The myth of fair value (and how to take advantage of it)*. Macmillan, 2010; Adaval, Rashmi, and Robert S. Wyer Jr. "Conscious and nonconscious comparisons with price anchors: effects on willingness to pay for related and unrelated products." *Journal of Marketing Research* 48.2 (2011): 355-365; Nunes, Joseph C., and Peter Boatwright. "Incidental prices and their effect on willingness to pay." *Journal of Marketing Research* (2004): 457-466.
- **Increase shopping momentum:** Dhar, Ravi, Joel Huber, and Uzma Khan. "The shopping momentum effect." *Journal of Marketing Research* (2007): 370-378.
- **Categorize:** Mogilner, Cassie, Tamar Rudnick, and Sheena S. Iyengar. "The mere categorization effect: How the presence of categories increases choosers' perceptions of assortment variety and outcome satisfaction." *Journal of Consumer Research* 35.2 (2008): 202-215.
- **Provide decoy items:** Ariely, Dan, and Thomas S. Wallsten. "Seeking subjective dominance in multidimensional space: An explanation of the asymmetric dominance effect." *Organizational Behavior and Human Decision Processes* 63.3 (1995): 223-232; Ariely, Dan. *Predictably irrational, revised and expanded edition: The hidden forces that shape our decisions*. HarperCollins, 2009, Chapter 1.

200: Retailers have discovered several tactics for minimizing the pain of paying. See Rick, Scott I., Cynthia E. Cryder, and George Loewenstein. "Tightwads and spendthrifts." *Journal of Consumer Research* 34.6 (2008): 767-782; Loewenstein, George, and Ted O'Donoghue. "'We Can Do This the Easy Way or the Hard Way': Negative Emotions, Self-Regulation, and the Law." *The University of Chicago Law Review* (2006): 183-206, Part IV, "The Pain of Paying."

Using Neuromarketing to Test Shopping Environments

201: "Noisy signal" problems in EEG and biometric measurement. See Picton, T. W., et al. "Guidelines for using human event-related potentials to study cognition: Recording standards and publication criteria." *Psychophysiology* 37.2 (2000): 127-152; Luck, Steven J. *An*

introduction to the event-related potential technique. MIT Press. (2005); Nunez, Paul L. *Electric fields of the brain: the neurophysics of EEG*. Oxford University Press, 2006.

202: Viewing video shopping experiences can closely replicate the mental states and behavioral responses we would experience in a real-world shopping situation. See Ambler, Tim, et al. "Salience and choice: neural correlates of shopping decisions." *Psychology & Marketing* 21.4 (2004): 247-261; Hesslow, Germund. "Conscious thought as simulation of behaviour and perception." *Trends in cognitive sciences* 6.6 (2002): 242-247; Decety, Jean, and Julie Grèzes. "The power of simulation: imagining one's own and other's behavior." *Brain research* 1079.1 (2006): 4-14; Wagner, Dylan D., et al. "Spontaneous action representation in smokers when watching movie characters smoke." *The Journal of Neuroscience* 31.3 (2011): 894-898.

Chapter 13. When Consumers' Brains Go Online

Going Online: Something New for the Old Brain

203-204: People's brains are much more active when they go online than when they're relaxing in front of their TVs. For cognitive activation when engaged in online activities, see Small, G. W., et al. "Your brain on Google: patterns of cerebral activation during internet searching." *The American journal of geriatric psychiatry: official journal of the American Association for Geriatric Psychiatry* 17.2 (2009): 116; Smart, Paul. "Cognition and the Web." *Network-Enabled Cognition: The Contribution of Social and Technological Networks to Human Cognition* (2010). Smart lists a number of ways that online activity increases cognitive load and engagement (p. 7, bullets added):

There are a number of ways in which hypermedia environments may increase a user's cognitive load.

- *Firstly, ... users may need to decide whether or not to follow a link whenever it is encountered in a text.*
- *Secondly, the mere presence of links, indicated as they are by a variety of visual cues (e.g. a change in font), may impose visual processing demands that are simply not seen in conventional, non-linked textual resources.*
- *Thirdly, individual nodes in a hypermedia environment, such as the World Wide Web, typically feature a variety of textual and non-textual elements. More often than not, individual pages on the Web are composed of a confusing mish-mash of multi-media components, many of which are semantically unrelated to the main content of the page. Page animations, adverts, sidebars, inline videos, pop-up boxes, image rollovers, complex menu navigation systems and all manner of decorative gee-gaws present the user with a plethora of opportunities for distraction that simply do not exist in the context of a conventional printed book.*
- *Finally, if the user does decide to follow a link, they are presented with the additional task of integrating information between the source and destination node. In the case where the content of the destination node is semantically-unrelated to the content of the source node, the reader experiences a disruption in narrative continuity that, in all likelihood, increases demands on working memory.*

The passive nature of TV viewing was first described and measured by Herbert Krugman in the 1960s and 70s, see Krugman, Herbert E. "Brain wave measures of media involvement." *Journal of Advertising Research* 11.1 (1971): 3-9. More recently, the argument that TV is a passive, low involvement medium has been taken up by Robert Heath, see Heath, Robert, David Brandt, and Agnes Nairn. "Brand relationships: Strengthened by emotion, weakened by attention." *Journal of Advertising Research*, 46.4 (2006): 410.

Understanding How Online Marketing Is Different

204: Importance of interactivity. Shrum, L. J., Tina M. Lowrey, and Yuping Liu. "Emerging issues in advertising research." *The SAGE Handbook of Media Processes and Effects* (2009): 299-312.

205: Importance of consumer control. Ariely, Dan. "Controlling the information flow: Effects on consumers' decision making and preferences." *Journal of Consumer Research* 27.2 (2000): 233-248.

205: Researchers have actually found a more complicated relationship between interaction and advertising effectiveness. Liu, Yuping, and L. J. Shrum. "A dual-process model of interactivity effects." *Journal of Advertising* 38.2 (2009): 53-68.

205: A similar mixed picture has been found for the degree of control provided by a web page. Ariely, Dan. "Controlling the information flow: Effects on consumers' decision making and preferences." *Journal of Consumer Research* 27.2 (2000): 233-248; Crutzen, Rik, Dianne Cyr, and Nanne K. de Vries. "The Role of User Control in Adherence to and Knowledge Gained from a Website: Randomized Comparison Between a Tunneled Version and a Freedom-of-Choice Version." *Journal of Medical Internet Research* 14.2 (2012); Bright, Laura Frances. *Consumer control and customization in online environments: an investigation into the psychology of consumer choice and its impact on media enjoyment, attitude and behavioral intention*. ProQuest, 2008.

206: Advertising alignment with online tasks and goals. See Hotchkiss, Gordon. "Aligned intent: A different ad engagement metric." *Out of My Gord* blog, November 26, 2009, <http://bit.ly/166XwVG>.

206: Search ads remain the most popular form of online advertising. See eMarketer, "US Digital Ad Spending to Top \$37 Billion in 2012 as Market Consolidates," September 20, 2012, online at <http://bit.ly/Qzdegt>: "Search continues to be the leading digital ad spending format, although its share will begin to drop this year as the shares of rich media, sponsorships and video increase."

207: Guidelines for increasing the persuasive power of landing pages have been developed by web designers. See Middendorf, Wouter. "Designing Perceptual Persuasion," Johnny Holland blog, February 22, 2012, <http://bit.ly/wzE2go>. Maurits Kaptein has proposed targeting online consumers by identifying their preferred persuasion models (e.g., scarcity, reciprocity, authority, etc., based on Cialdini's six principles of persuasion), and then presenting them with ads using that approach. See Kaptein, Maurits, "Persuasion Profiling: Attending to Individual Differences," Johnny Holland blog, January 9, 2012, <http://bit.ly/zOuHYy>; Kaptein,

Maurits, and Dean Eckles. "Selecting effective means to any end: Futures and ethics of persuasion profiling." *Persuasive technology*. Springer Berlin Heidelberg, 2010. 82-93.

Building the Perfect Website

208: Bottom-up attention and visual saliency. Milosavljevic, Milica, et al. "Relative visual saliency differences induce sizable bias in consumer choice." *Journal of Consumer Psychology* 22.1 (2012): 67-74.

208: Some companies now provide software that can identify the salient elements of a web page. A recent example is Eye2D2 (<http://www.eye2d2.com/>). For the science underlying this approach, see Milosavljevic, Milica, and Moran Cerf. "First attention then intention." *International Journal of Advertising* 27.3 (2008): 381-398.

208: Bottom-up attention generates a saliency map of regions on the web page that are worth scanning. See Itti, Laurent, Christof Koch, and Ernst Niebur. "A model of saliency-based visual attention for rapid scene analysis." *Pattern Analysis and Machine Intelligence, IEEE Transactions on* 20.11 (1998): 1254-1259; Itti, Laurent, G. Rees, and J. K. Tsotsos. "Models of bottom-up attention and saliency." *Neurobiology of attention* 582 (2005).

209: Our goals make a difference for where we look. See Rayner, Keith, Brett Miller, and Caren M. Rotello. "Eye movements when looking at print advertisements: The goal of the viewer matters." *Applied Cognitive Psychology* 22.5 (2008): 697-707; Pieters, Rik, and Michel Wedel. "Goal control of attention to advertising: The Yarus implication." *Journal of Consumer Research* 34.2 (2007): 224-233. In an immersive virtual reality environment, Rothkopf, Constantin A., Dana H. Ballard, and Mary M. Hayhoe. "Task and context determine where you look." *Journal of Vision* 7.14 (2007).

209: The more time people spend looking at an item, the more likely they are to choose it. Glaholt, Mackenzie G., Mei-Chun Wu, and Eyal M. Reingold. "Evidence for top-down control of eye movements during visual decision making." *Journal of Vision* 10.5 (2010); Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18-36; Reutskaja, Elena, et al. "Search dynamics in consumer choice under time pressure: An eye-tracking study." *The American Economic Review* 101.2 (2011): 900-926.

210: Peripheral vision is biologically tuned to be sensitive to movement around the edges of our visual field. McKee, Suzanne P., and Ken Nakayama. "The detection of motion in the peripheral visual field." *Vision research* 24.1 (1984): 25-32; Poggel, Dorothe A., Hans Strasburger, and Manfred MacKeben. "Cueing attention by relative motion in the periphery of the visual field." *Perception - London* 36.7 (2007): 955.

210: Ads not aligned with intent, but centrally located, resulted in lower purchase intent scores. Results are reported in Hotchkiss, Gordon. "How our brains engage with online ads." *Out of My Gord* blog, January 6, 2010, <http://bit.ly/17hXokc>.

211: "Unconscious Processing in Web Advertising." Yoo, Chan Yun. "Unconscious processing of Web advertising: Effects on implicit memory, attitude toward the brand, and consideration set." *Journal of Interactive Marketing* 22.2 (2008): 2-18.

Satisfying (Almost) All Our Needs Online

213: People approach searching for information online in a manner very similar to how animals forage for food in the wild. Pirolli, Peter, and Stuart Card. "Information foraging in information access environments." *Proceedings of the SIGCHI conference on Human factors in computing systems*. ACM Press/Addison-Wesley Publishing Co., 1995; Pirolli, Peter, and Stuart K. Card. "Information foraging models of browsers for very large document spaces." *Proceedings of the working conference on Advanced visual interfaces*. ACM, 1998.

214: Talking about ourselves to others is intrinsically rewarding. Tamir, Diana I., and Jason P. Mitchell. "Disclosing information about the self is intrinsically rewarding." *Proceedings of the National Academy of Sciences* 109.21 (2012): 8038-8043.

214: Choice in the social-networking world of the future will become more mimicry than decision making. See De Choudhury, Munmun, et al. "Social synchrony: Predicting mimicry of user actions in online social media." *Computational Science and Engineering, 2009. CSE'09. International Conference on*. Vol. 4. IEEE, 2009. For the human tendency toward mimicry as a nonconscious source of behavior more generally, see Lakin, Jessica L., and Tanya L. Chartrand. "Using nonconscious behavioral mimicry to create affiliation and rapport." *Psychological science* 14.4 (2003): 334-339; Tanner, Robin J., et al. "Of chameleons and consumption: The impact of mimicry on choice and preferences." *Journal of Consumer Research* 34.6 (2008): 754-766.

214: Copying the behavior or decisions of others is a strategy that appeals to our cognitive miser brains. See Earls, Mark. *Herd: how to change mass behaviour by harnessing our true nature*. John Wiley & Sons, 2009; Bentley, R. Alexander, Mark Earls, and Michael John O'Brien. *I'll Have what She's Having: Mapping Social Behavior*. The MIT Press, 2011.

215: Excessive choice can have several implications for consumer decision making:

- **Decision avoidance:** See Dhar, Ravi, and Stephen M. Nowlis. "The effect of time pressure on consumer choice deferral." *Journal of Consumer Research* 25.4 (1999): 369-384.
- **Reliance on habits:** Duhigg, Charles. *The power of habit: why we do what we do in life and business*. Vol. 34. No. 10. Random House Digital, Inc., 2012.
- **Reliance on others:** See McFadden, Daniel L. *The new science of pleasure*. No. w18687. National Bureau of Economic Research, 2013; McFadden, Daniel. "Sociality, rationality, and the ecology of choice." *Choice Modelling the State-of-the-Art and the State-of-Practice. Proceedings from the Inaugural International Choice Modelling Conference*. 2010.
- **Decreased self-control:** See Baumeister, Roy F., and Kathleen D. Vohs. "Willpower, choice, and self-control." *Time and decision: Economic and psychological perspectives on intertemporal choice* (2003): 201-216; Baumeister, Roy F., et al. "Free will in consumer behavior: Self-control, ego depletion, and choice." *Journal of Consumer Psychology* 18.1 (2008): 4-13.
- **Greater dependence on heuristics:** See Gigerenzer, Gerd, and Wolfgang Gaissmaier. "Heuristic decision making." *Annual review of psychology* 62 (2011): 451-482.

How to Use Neuromarketing to Test Online Experiences and Marketing Effectiveness

216: Viewer intent needs to be built into ad-testing designs. Wedel, Michel, and Rick Pieters. *Eye tracking for visual marketing*. Now Publishers Inc, 2008; Simola, Jaana, et al. "The impact of salient advertisements on reading and attention on web pages." *Journal of Experimental Psychology: Applied* 17.2 (2011): 174.

Chapter 14. Entertainment Effectiveness

Why Our Brains Like Stories

220: Stories activate empathy. Johnson, Dan R. "Transportation into a story increases empathy, prosocial behavior, and perceptual bias toward fearful expressions." *Personality and Individual Differences* 52.2 (2012): 150-155; Stephens, Greg J., Lauren J. Silbert, and Uri Hasson. "Speaker-listener neural coupling underlies successful communication." *Proceedings of the National Academy of Sciences* 107.32 (2010): 14425-14430; Shamay-Tsoory, Simone G., et al. "The neural correlates of understanding the other's distress: a positron emission tomography investigation of accurate empathy." *Neuroimage* 27.2 (2005): 468-472; Kaplan, Jonas T., and Marco Iacoboni. "Getting a grip on other minds: Mirror neurons, intention understanding, and cognitive empathy." *Social neuroscience* 1.3-4 (2006): 175-183.

220: Stories let us simulate situations we haven't experienced directly. Mar, Raymond A., and Keith Oatley. "The function of fiction is the abstraction and simulation of social experience." *Perspectives on psychological science* 3.3 (2008): 173-192.

220: Stories persuade us and help us to learn. Green, Melanie C., and Timothy C. Brock. "The role of transportation in the persuasiveness of public narratives." *Journal of personality and social psychology* 79.5 (2000): 701.

220: Mirror neurons. See Rizzolatti, Giacomo, and Laila Craighero. "Mirror neuron: a neurological approach to empathy." *Neurobiology of human values*. Springer Berlin Heidelberg, 2005. 107-123; Rizzolatti, Giacomo, and Laila Craighero. "The mirror-neuron system." *Annu. Rev. Neurosci.* 27 (2004): 169-192.

220: Social psychologists call this feeling *transportation*. See Green, Melanie C., Timothy C. Brock, and Geoff F. Kaufman. "Understanding media enjoyment: The role of transportation into narrative worlds." *Communication Theory* 14.4 (2004): 311-327.

221: Research has shown that reading words about sensory experiences (smells, touch, movement) activate brain areas where those senses are processed. González, Julio, et al. "Reading *cinnamon* activates olfactory brain regions." *Neuroimage* 32.2 (2006): 906-912; Barrós-Loscertales, Alfonso, et al. "Reading *salt* activates gustatory brain regions: fMRI evidence for semantic grounding in a novel sensory modality." *Cerebral Cortex* 22.11 (2012): 2554-2563. See also Paul, Annie Murphy, "Your Brain on Fiction." *New York Times*, March 17, 2012, <http://nyti.ms/16UfQzU>.

221: Activating our memories of actual experiences as they're reflected in the story helps transport us into this imaginary world. Green, Melanie C., Jennifer Garst, and

Timothy C. Brock. "The power of fiction: Determinants and boundaries." *The psychology of entertainment media: Blurring the lines between entertainment and persuasion* (2004): 161-176.

221: Researchers have found that people who frequently read fiction display a higher degree of empathy for others. See Bal PM, Veltkamp M (2013) How Does Fiction Reading Influence Empathy? An Experimental Investigation on the Role of Emotional Transportation. PLoS ONE 8(1): e55341. doi:10.1371/journal.pone.0055341.

222: A good story carefully lays out an alternating sequence of tension and resolution. This is a fundamental principle of film editing. See Pearlman, Karen. *Cutting rhythms: Shaping the film edit*. Taylor & Francis US, 2009, especially Chapter 4, "Tension, release, and synchronization."

222: Research has shown that mirror neurons are only activated by behavior that is perceived as purposeful. See Gallese, Vittorio. "The shared manifold hypothesis. From mirror neurons to empathy." *Journal of consciousness studies* 8.5-7 (2001): 5-7; Gazzola, V., et al. "The anthropomorphic brain: the mirror neuron system responds to human and robotic actions." *Neuroimage* 35.4 (2007): 1674-1684.

223: When people aren't engaged in deliberation — as they aren't when absorbed in a story — they're less likely to process statements and claims logically. See Green, Melanie C., and Timothy C. Brock. "The role of transportation in the persuasiveness of public narratives." *Journal of personality and social psychology* 79.5 (2000): p. 702.

223: Examining winning and losing legal arguments. Mazzocco, Philip J. and Melanie C. Green. "Narrative persuasion in legal settings, What's the Story?" *The Jury Expert*, May 30, 2011, <http://bit.ly/19yhpaA>.

Neuromarketing Goes to the Movies

224: In a study published in 2008, neuroscientist Uri Hasson studied people watching excerpts from movies. Reported in Hasson, Uri, et al. "Neurocinematics: The neuroscience of film." *Projections* 2.1 (2008): 1-26.

225: Neuromarketing techniques bring a different perspective to trailer testing. For a perspective on the use of biometrics to test movie trailers, see Randall, Kevin. "How your brain can predict blockbusters," Fast Company, February 22, 2013, <http://bit.ly/14Q5wuS>.

226: There are a number of ways a trailer can activate nonconscious goals. This list is generated by the authors based on an application of priming and nonconscious goal activation principles (Chapters 5 and 7) to the kinds of associations likely to be triggered by movie trailers.

227: Movies and related entertainment experiences can influence behavior. For negative behavioral consequences of movie experiences, see Anderson, Craig A. "Effects of violent movies and trait hostility on hostile feelings and aggressive thoughts." *Aggressive Behavior* 23.3 (1997): 161-178; Bushman, Brad J., and Craig A. Anderson. "Comfortably numb: Desensitizing effects of violent media on helping others." *Psychological Science* 20.3 (2009): 273-277;

Huesmann, L. Rowell, and Laramie D. Taylor. "The role of media violence in violent behavior." *Annu. Rev. Public Health* 27 (2006): 393-415.

Product Placement in Movies, TV Shows, and Beyond

227: Global expenditures for product placement were estimated at over \$8 billion in 2012. See press release, "New PQ Media Data: Global Product Placement Spending Up 12% to \$8.3B in 2012, Driven by Expanding BRICs, Telenovela Growth & More DVRs; Faster Growth Seen Again in 2013," August 16, 2013, <http://bit.ly/1deQX4J>.

227: Over 75 percent of U.S. prime-time TV shows now using product placements, over 40 percent of U.S. homes now have digital video recorders (DVRs), which allow TV viewers to fast-forward through ads. Williams, Kaylene, et al. "Product placement effectiveness: revisited and renewed." *Journal of Management and Marketing Research* 7 (2011): 1-24.

228: A product placement is more likely to achieve this conversion if three features are present. See Law, Sharmistha, and Kathryn A. Braun-LaTour. "Product placements: How to measure their impact." *The psychology of entertainment media: Blurring the lines between entertainment and persuasion* (2004): 63-78.

229: One recent study that examined both implicit and explicit effects of product placement strongly supported the effectiveness of the practice. Yang, Moonhee, and David R. Roskos-Ewoldsen. "The Effectiveness of Brand Placements in the Movies: Levels of Placements, Explicit and Implicit Memory, and Brand-Choice Behavior." *Journal of Communication* 57.3 (2007): 469-489.

The Future of Entertainment: Immersive Games and Simulations

230: 2008, the year worldwide video-game sales first surpassed movie sales. This milestone was reported widely in the media, see <http://bit.ly/16imnUg> and <http://bit.ly/1adcnQ9>.

230: In gaming research, the term *presence* is often used to describe the immersive experience created by the game. See Ravaja, Niklas, et al. "Emotional response patterns and sense of presence during video games: Potential criterion variables for game design." *Proceedings of the third Nordic conference on Human-computer interaction*. ACM, 2004.

230: In a study comparing story-driven and non-story-driven games. Schneider, Edward F. "Death with a Story: How story impacts emotional, motivational, and physiological responses to first-person shooter video games." *Human Communication Research* 30.3 (2004): 361-375.

231: Product and brand placement within video games. See Mackay, Thomas, et al. "The effect of product placement in computer games on brand attitude and recall." *International Journal of Advertising* 28.3 (2009): 423-438; Gross, Michelle L. "Advergaming and the effects of game-product congruity." *Computers in Human Behavior* 26.6 (2010): 1259-1265; Brasel, S. Adam. "Nonconscious drivers of visual attention in interactive media environments." *Journal of Brand Management* 18.7 (2011): 473-482.

231: Researchers have reported several significant aftereffects of immersive gaming. For negative effects of violent games, see Anderson, Craig A., and Brad J. Bushman. "Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature." *Psychological science* 12.5 (2001): 353-359. For positive effects of gaming, see Green, C. Shawn, and Daphne Bavelier. "Action video game modifies visual selective attention." *Nature* 423.6939 (2003): 534-537; Green, C. Shawn, and Daphne Bavelier. "Action-video-game experience alters the spatial resolution of vision." *Psychological science* 18.1 (2007): 88-94; Green, C. S., and D. Bavelier. "Exercising your brain: a review of human brain plasticity and training-induced learning." *Psychology and aging* 23.4 (2008): 692; Achtman, R. L., C. S. Green, and D. Bavelier. "Video games as a tool to train visual skills." *Restorative neurology and neuroscience* 26.4 (2008): 435-446. See also this provocative TED Talk by Daphne Bavelier: <http://bit.ly/1eQBmGK>.

Using Neuromarketing to Test Entertainment

232: Transport, immersion, and presence are all highly emotional experiences. On measuring emotional reactions to video games, see Mandryk, Regan L., Kori M. Inkpen, and Thomas W. Calvert. "Using psychophysiological techniques to measure user experience with entertainment technologies." *Behaviour & Information Technology* 25.2 (2006): 141-158; Mandryk, Regan L., Kori M. Inkpen, and Thomas W. Calvert. "Using psychophysiological techniques to measure user experience with entertainment technologies." *Behaviour & Information Technology* 25.2 (2006): 141-158.

Part IV. Measuring Consumer Response with Neuromarketing

Chapter 15. Traditional Approaches: Why Not Just Ask People?

237: Scientists call this confabulation. See Mlodinow, Leonard. *Subliminal: How your unconscious mind rules your behavior*. Random House Digital, Inc., 2013, p. 192. The term is often used to describe pathological states of memory dysfunction, but psychiatrists have recognized the presence of confabulation in healthy individuals at least since the 1980. See Kopelman, Michael D. "Two types of confabulation." *Journal of Neurology, Neurosurgery & Psychiatry* 50.11 (1987): 1482-1487.

Understanding Why Asking Questions Is Risky Business

138: Deliberate response bias. The classic study is Furnham, Adrian. "Response bias, social desirability and dissimulation." *Personality and individual differences* 7.3 (1986): 385-400. See also McFarland, Lynn A., and Ann Marie Ryan. "Variance in faking across noncognitive measures." *Journal of Applied Psychology* 85.5 (2000): 812.

- **Agreeableness bias.** Also called *agreement bias* or *yea-saying bias*, this is often seen as a subtype of desirability bias. See Mirowsky, John, and Catherine E. Ross. "Eliminating

- defense and agreement bias from measures of the sense of control: A 2 x 2 index." *Social Psychology Quarterly* (1991): 127-145.
- **Social desirability bias.** Also called *desirability bias*. See Fisher, Robert J., and James E. Katz. "Social-desirability bias and the validity of self-reported values." *Psychology and Marketing* 17.2 (2000): 105-120; King, Maryon F., and Gordon C. Bruner. "Social desirability bias: A neglected aspect of validity testing." *Psychology & Marketing* 17.2 (2000): 79-103; Nederhof, Anton J. "Methods of coping with social desirability bias: A review." *European Journal of Social Psychology* 15.3 (1985): 263-280; Tourangeau, Roger, and Ting Yan. "Sensitive questions in surveys." *Psychological bulletin* 133.5 (2007): 859.
 - **Knowledge exposure bias.** This refers to people's reluctance to select a "don't know" or "no opinion" option in a survey or interview. Krosnick, Jon A., et al. "The impact of "no opinion" response options on data quality: Non-attitude reduction or an invitation to satisfice?." *Public Opinion Quarterly* 66.3 (2002): 371-403; Bishop, George F., Alfred J. Tuchfarber, and Robert W. Oldendick. "Opinions on fictitious issues: The pressure to answer survey questions." *Public Opinion Quarterly* 50.2 (1986): 240-250.
 - **Misinformation bias.** This is a variant of *nonresponse bias*, it occurs when people deliberately give false answers to surveys for the purpose of misleading pollsters. It is relatively unexplored in political polling research, most evidence is anecdotal.

239: Inadvertent and nonconscious response bias. A thorough treatment is Podsakoff, Philip M., et al. "Common method biases in behavioral research: a critical review of the literature and recommended remedies." *Journal of applied psychology* 88.5 (2003): 879. With regard to nonconscious response biases in consumers, a forceful critique of self-reporting methods is Graves, Philip. *Consumer.ology: The Market Research Myth, the Truth About Consumers, and the Psychology of Shopping*. Nicholas Brealey Publishing, 2010, esp. Chapter 1, "Understanding the Unconscious: Why we buy what we do but can't explain it," and Chapter 5, "The Irrelevant Consumer: Questioning questions."

- **Memory bias.** Covered in Chapter 6. See references to Mlodinow, *Subliminal*. An example of inaccurate memory impacting consumer decisions is Skurnik, Ian, et al. "How warnings about false claims become recommendations." *Journal of Consumer Research* 31.4 (2005): 713-724.
- **Emotion (and preference) access bias.** Covered in detail by Kahneman, *Thinking, Fast and Slow*. The key principle is that accessibility usually biases beliefs about accuracy. Like emotional assessments, preferences are largely constructed at the moment of evaluation, as discussed in Chapter 8. See Lichtenstein, Sarah, and Paul Slovic, eds. *The construction of preference*. Cambridge University Press, 2006.
- **Prediction bias.** The classic study is Kahneman, Daniel, and Amos Tversky. "On the psychology of prediction." *Psychological review* 80.4 (1973): 237. Overconfidence is one of the major features of prediction bias, see Dunning, David, et al. "The overconfidence effect in social prediction." *Journal of personality and social psychology* 58.4 (1990): 568.

An interesting example of the behavioral consequences of nonconsciously triggering goals by asking questions is Fitzsimons, Gavan J., Joseph C. Nunes, and Patti Williams. "License to sin: The liberating role of reporting expectations." *The Journal of consumer research* 34.1 (2007): 22. See also Chandon, Pierre, Vicki G. Morwitz, and Werner J. Reinartz. "Do intentions really predict behavior? Self-generated validity effects in survey research." *Journal of Marketing* (2005): 1-14.

239: Theory of Planned Behavior. See Ajzen, Icek, and Nicole Gilbert Cote. "Attitudes and the prediction of behavior." *Attitudes and attitude change* (2008): 289-311; Conner, Mark, and Paul Sparks. "Theory of planned behaviour and health behaviour." *Predicting health behaviour 2* (2005): 170-222.

240: Some additional guidelines that can increase the honesty and accuracy of consumer responses. These guidelines are summarized from Graves, Philip. *Consumer.ology: The Market Research Myth, the Truth About Consumers, and the Psychology of Shopping*. Nicholas Brealey Publishing, 2010; Krosnick, Jon A. "Survey research." *Annual review of psychology* 50.1 (1999): 537-567.

Introducing the Three Workhorses of Market Research

241: Interviews, focus groups, and surveys still make up about 90 percent of the research that's performed in the market research industry today. For the distribution of market research methodologies, an excellent source is the GreenBook Research Industry Trends (GRIT) survey, available at <http://bit.ly/1cW5oxK>.

242: Metaphor elicitation techniques that probe for deeper connections and motivations. Gerald Zaltman's patented Metaphor Elicitation Technique (ZMET) is a proprietary methodology provided by Olsen Zaltman Associates (<http://www.olsonzaltman.com/>). Published descriptions of the technique include Coulter, Robin A., Gerald Zaltman, and Keith S. Coulter. "Interpreting consumer perceptions of advertising: An application of the Zaltman Metaphor Elicitation Technique." *Journal of Advertising* 30.4 (2001): 1-21; Zaltman, Gerald, and Robin Higie Coulter. "Seeing the voice of the customer: Metaphor-based advertising research." *Journal of advertising research* 35.4 (1995): 35-51.

244: Risks and limitations of focus groups. For a general overview, see Morgan, David L. *Focus groups as qualitative research*. Vol. 16. Sage, 1997. See also Graves, *Consumer.ology*, esp. Chapter 7, "Understanding the Crowd: Focusing on focus groups."

- **Dominance in focus groups.** See Smithson, Janet. "Using and analysing focus groups: limitations and possibilities." *International Journal of Social Research Methodology* 3.2 (2000): 103-119.
- **Groupthink.** The classic study is Janis, Irving Lester. *Groupthink*. Boston: Houghton Mifflin, 1983. Groupthink in focus groups is discussed in Hollander, Jocelyn A. "The social contexts of focus groups." *Journal of contemporary ethnography* 33.5 (2004): 602-637. This effect is exacerbated by our natural tendency to mimic others, see Tanner, Robin J., et al. "Of chameleons and consumption: The impact of mimicry on choice and preferences." *Journal of Consumer Research* 34.6 (2008): 754-766.
- **Motivated participation.** This is a variation of the *no opinion or knowledge exposure* bias, with the added complication that the focus group participant may feel motivated to express some opinion (any opinion) because that is what is expected in the context provided.
- **False leads.** This is essentially a mistake of interpretation, not a flaw in the focus group itself. It is a function of taking motivated participation responses and treating them as representative of responses that would occur in a consumer's "natural habitat." It occurs when researchers (or observers) forget the generalizability limitations of qualitative research and falsely infer generalizability from accessibility or representativeness, a common System 1 error. From Graves, *Consumer.ology*, p. 157:

the [focus group] context, whereby a number of consumers are placed together in a room to talk about something, bears little relationship to the environment in which a consumer's response would normally occur. The artificial focus of discussing a consumer issue for a long period is a recipe for distortion and it's all too easy for that focus to miss the point entirely, either because the consumer response isn't determined at this level of mental processing, or simply because the abstract nature of the discussion means that something that seems irrelevant is glossed over.

245: People sincerely believe they're answering truthfully and accurately, but they are, in fact, providing rationalizations and guesses. Kahneman calls this the tendency to nonconsciously replace a difficult questions with a simpler question. See Kahneman, Daniel, and Shane Frederick. "Representativeness revisited: Attribute substitution in intuitive judgment." *Heuristics and biases: The psychology of intuitive judgment* (2002): 49-81:

Early research on the representativeness and availability heuristics was guided by a simple and general hypothesis: when confronted with a difficult question people often answer an easier one instead, usually without being aware of the substitution.

On mechanisms underlying *what* simpler questions get accessed, see also Cho, Hyejeung, Norbert Schwarz, and Hyunjin Song. "Images and Preferences." *Marketing and Consumer Psychology Series* (2007): 259.

Other Ways to Ask Consumers Questions

246-247: Test marketing. See Silk, Alvin J., and Glen L. Urban. "Pre-test-market evaluation of new packaged goods: A model and measurement methodology." *Journal of Marketing Research* (1978): 171-191; Allenby, Greg M., and James L. Ginter. "The effects of in-store displays and feature advertising on consideration sets." *International Journal of Research in Marketing* 12.1 (1995): 67-80.

247: Consumer panels. See Sudman, Seymour. *Consumer panels*. Marketing Classics Press, 2011.

247-248: Observational studies. See Graves, Philip. *Consumer.ology: The Market Research Myth, the Truth About Consumers, and the Psychology of Shopping*. Nicholas Brealey Publishing, 2010, esp. Chapter 4, "What consumers do: Studying behavior."

Mixing and Matching Traditional and Neuromarketing Approaches

248: For the modern market researcher, the interaction of conscious and nonconscious consumer responses should be what matters. There is a growing body of research on this important question. See, for example, Dijksterhuis, Ap, et al. "On making the right choice: The deliberation-without-attention effect." *Science* 311.5763 (2006): 1005-1007; Strick, Madelijn, Ap Dijksterhuis, and Rick B. van Baaren. "Unconscious-thought effects take place off-line, not on-line." *Psychological Science* 21.4 (2010): 484-488; Nordgren, Loran F., Maarten W. Bos, and Ap Dijksterhuis. "The best of both worlds: Integrating conscious and unconscious thought best solves complex decisions." *Journal of Experimental Social Psychology* 47.2 (2011): 509-511; Samson, Alain, and Benjamin G. Voyer. "Two minds, three ways: dual system and dual process models in consumer psychology." *AMS review* 2.2-4 (2012):

48-71; Mata, André, Mário B Ferreira, and Steven J. Sherman. "The Metacognitive Advantage of Deliberative Thinkers: A Dual-Process Perspective on Overconfidence." (2013).

Chapter 16. Neuromarketing Measures: Listening to Signals from The Body and The Brain

249: Excellent recent overviews of neuromarketing measures and metrics include Kenning, Peter, and Marc Linzmajer. "Consumer neuroscience: an overview of an emerging discipline with implications for consumer policy." *Journal für Verbraucherschutz und Lebensmittelsicherheit* 6.1 (2011): 111-125; Plassmann, Hilke, Thomas Zoëga Ramsøy, and Milica Milosavljevic. "Branding the brain: A critical review and outlook." *Journal of Consumer Psychology* 22.1 (2012): 18-36; Plassmann, Hilke, et al. "What can advertisers learn from neuroscience?." *International Journal of Advertising: The Quarterly Review of Marketing Communications* (2007); Ariely, Dan, and Gregory S. Berns. "Neuromarketing: the hope and hype of neuroimaging in business." *Nature Reviews Neuroscience* 11.4 (2010): 284-292; Kenning, Peter, and Hilke Plassmann. "NeuroEconomics: An overview from an economic perspective." *Brain Research Bulletin* 67.5 (2005): 343-354; Perrachione, Tyler K., and John R. Perrachione. "Brains and brands: developing mutually informative research in neuroscience and marketing." *Journal of Consumer Behaviour* 7.4-5 (2008): 303-318.

Understanding Where Neuromarketing Signals Originate

250: Figure 16-1. The central and peripheral nervous systems in action. This graphic depiction is adapted from a textbook illustration, © 2011 Pearson Education Inc., available online at <http://bit.ly/1dtqq3X>. Similar images are available online at <http://bit.ly/1844zKA>, <http://bit.ly/16dnUYi>, and <http://bit.ly/17KQd2F>.

252: Figure 16-2. Neuromarketing measures from the body and the brain. Created by the authors to illustrate the organization of this chapter and Chapter 17.

Capturing Signals from the Body

252: Our bodies often respond to environmental stimuli before our conscious minds have become aware that a response is taking place. This is a key element of Damasio's *somatic marker hypothesis*. See Bechara, Antoine, and Antonio R. Damasio. "The somatic marker hypothesis: A neural theory of economic decision." *Games and economic behavior* 52.2 (2005): 336-372; Bechara, Antoine, et al. "The Iowa Gambling Task and the somatic marker hypothesis: some questions and answers." *Trends in cognitive sciences* 9.4 (2005): 159-162. For an excellent overview of body responses, also called *psychophysiology*, see Cacioppo, John T., Louis G. Tassinary, and Gary Berntson, eds. *Handbook of psychophysiology*. Cambridge University Press, 2007, which covers all the signals discussed in this chapter. Another comprehensive reference text is Andreassi, John L. *Psychophysiology: Human behavior and physiological response*. 5th Edition. Lawrence Erlbaum, 2007.

253: Facial expressions, Charles Darwin and Paul Ekman. Darwin published his findings on facial expressions in Darwin, Charles. *The expression of the emotions in man and animals*. Oxford University Press, 1998, originally published in 1872. Of course this edition is edited by Paul Ekman. Ekman's research is most easily accessed in Ekman, Paul. "An argument for basic emotions." *Cognition & Emotion* 6.3-4 (1992): 169-200. See also Ekman, Paul. "Universals and

cultural differences in facial expressions of emotion." *Nebraska symposium on motivation*. University of Nebraska Press, 1971; Ekman, Paul, Robert W. Levenson, and Wallace V. Friesen. "Autonomic nervous system activity distinguishes among emotions." *Science* 221.4616 (1983): 1208-1210; Ekman, Paul, and Wallace V. Friesen. *Unmasking the face: A guide to recognizing emotions from facial clues*. ISHK, 2003.

253: Ekman's Facial Action Coding System (FACS). See Ekman, Paul, and Erika L. Rosenberg, eds. *What the face reveals: Basic and applied studies of spontaneous expression using the Facial Action Coding System (FACS)*. Oxford University Press, 1997; Bartlett, Marian Stewart, et al. "Measuring facial expressions by computer image analysis." *Psychophysiology* 36.2 (1999): 253-263.

253: Automated facial expression recognition. See McDuff, Daniel, et al. "Predicting Online Media Effectiveness Based on Smile Responses Gathered Over the Internet." *IEEE Conference on Automatic Face and Gesture Recognition 2013*. 2013; Baltrusaitis, Tadas, et al. "Real-time inference of mental states from facial expressions and upper body gestures." *Automatic Face & Gesture Recognition and Workshops (FG 2011), 2011 IEEE International Conference on*. IEEE, 2011; Bettadapura, Vinay. "Face expression recognition and analysis: the state of the art." *arXiv preprint arXiv:1203.6722* (2012). For selected vendors, see <http://www.emotient.com/>, <http://www.affdex.com/>, <http://www.realeyesit.com/>, <http://nviso.ch/>.

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256: Eye blinks and attention. See Nakano, Tamami, et al. "Blink-related momentary activation of the default mode network while viewing videos." *Proceedings of the National Academy of Sciences* 110.2 (2013): 702-706; Fukuda, Kyosuke. "Eye blinks: new indices for the detection of deception." *International Journal of Psychophysiology* 40.3 (2001): 239-245; Siegle, Greg J., Naho Ichikawa, and Stuart Steinhauer. "Blink before and after you think: blinks occur prior to and following cognitive load indexed by pupillary responses." *Psychophysiology* 45.5 (2008): 679-687; Smilek, Daniel, Jonathan SA Carriere, and J. Allan Cheyne. "Out of Mind, Out of Sight Eye Blinking as Indicator and Embodiment of Mind Wandering." *Psychological Science* 21.6 (2010): 786-789.

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145-149; Andreassi, John L. *Psychophysiology: Human behavior and physiological response*. 5th Edition. Lawrence Erlbaum, 2007, Chapters 14-15, "Heart Activity and Behavior," Chapter 16, "Blood Pressure, Blood Volume, and Behavior;" Cacioppo, John T., Louis G. Tassinary, and Gary Berntson, eds. *Handbook of psychophysiology*. Cambridge University Press, 2007, Chapter 10, "Respiration."

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Capturing Signals from the Brain

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262: For example, the insular cortex activates when you think about romantic love, and it also activates when you think about your iPhone, but this does not mean you're in love with your iPhone. This inferential error is not hypothetical. See Lindstrom, Martin. "You love your iPhone. Literally." *New York Times* (2011), available here: <http://nyti.ms/17vj7WC>. Critics pounced. See Tal Yarkoni blog, "the New York Times blows it big time on brain imaging," <http://bit.ly/1czz67i>; Neurocritic blog, "Neuromarketing means never having to say you're peer reviewed (but here's your NYT op-ed space)," <http://bit.ly/136bleQ>; Russell Poldrack's blog, "NYT Op-Ed + fMRI = complete crap," <http://bit.ly/1fv2viH>.

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contexts." *Psychophysiology* 30.6 (1993): 547-558. For advanced imaging uses of EEG, see Michel, Christoph M., and Micah M. Murray. "Towards the utilization of EEG as a brain imaging tool." *Neuroimage* 61.2 (2012): 371-385; Hammond, David K., Benoit Scherrer, and Simon K. Warfield. "Cortical graph smoothing: a novel method for exploiting DWI-derived anatomical brain connectivity to improve EEG source estimation." (2013): 1-1.

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265: Steady-state topography (SST). See Mayes, A. K., et al. "Steady state visually evoked potential correlates of static and dynamic emotional face processing." *Brain topography* 22.3 (2009): 145-157; Rossiter, John R., et al. "Brain-imaging detection of visual scene encoding in long-term memory for TV commercials." *Journal of Advertising Research* 41.2 (2001): 13-22; Casey, Judy, et al. "Examining the neural correlates of choice behavior in a gambling task using

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266: Magnetoencephalography (MEG). For a rare example of MEG applied to market research, see Ambler, Tim, et al. "Salience and choice: neural correlates of shopping decisions." *Psychology & Marketing* 21.4 (2004): 247-261.

Putting Technologies in Their Proper Place

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Chapter 17. Neuromarketing on a Budget: Inexpensive Ways to Learn From Your Customers

Running Response-Time Studies

270-274: Useful discussions of response time studies in consumer research include Mast, Fred W., and Gerald Zaltman. "A behavioral window on the mind of the market: An application of the response time paradigm." *Brain research bulletin* 67.5 (2005): 422-427; Dimofte, Claudiu V. "Implicit measures of consumer cognition: A review." *Psychology & Marketing* 27.10 (2010): 921-937..

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Bulletin 31.2 (2005): 166-180; Greenwald, Anthony G., et al. "Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity." *Journal of personality and social psychology* 97.1 (2009): 17; Maison, Dominika, Anthony G. Greenwald, and Ralph H. Bruin. "Predictive validity of the Implicit Association Test in studies of brands, consumer attitudes, and behavior." *Journal of Consumer Psychology* 14.4 (2004): 405-415; Gattol, Valentin, Maria Sääksjärvi, and Claus-Christian Carbon. "Extending the Implicit Association Test (IAT): Assessing consumer attitudes based on multi-dimensional implicit associations." *PloS one* 6.1 (2011): e15849.

272: Example IAT studies:

- **Preferences for low and high calorie foods.** Bruin, Ralph. "The Implicit Association Test as a measure of implicit consumer attitudes." *Polish Psychological Bulletin* 32.1 (2001).
- **Attitudes toward popular clothes.** Steinman, Ross B., and Andrew Karpinski. "The Single Category Implicit Association Test (SC-IAT) as a measure of implicit consumer attitudes." *European Journal of Social Sciences* 7.1 (2008): 32-42.
- **Celebrity voices in advertising.** Forehand, Mark R., and Andrew Perkins. "Implicit Assimilation and Explicit Contrast: A Set/Reset Model of Response to Celebrity Voice-Overs." *Journal of Consumer Research* 32.3 (2005): 435-441.
- **Comparison of Mac and PC computer users.** Brunel, Frederic F., Brian C. Tietje, and Anthony G. Greenwald. "Is the implicit association test a valid and valuable measure of implicit consumer social cognition?." *Marketing* (2004): 4.

Leveraging Online Services to Tap Into the Wisdom of Crowds

275: Online eye tracking. There are not many academic articles yet on online (webcam-based) eye tracking. For one example, see Ferhat, Onur. "Eye-Tracking with Webcam-Based Setups: Implementation of a Real-Time System and an Analysis of Factors Affecting Performance." One interesting discussion of current limitations vs. lab-based eye tracking can be found at <http://bit.ly/15kk1HK> (be sure to read the comments).

276: Online facial expression analysis. See Den Uyl, M. J., and H. Van Kuilenburg. "The FaceReader: Online facial expression recognition." *Proc. Measuring Behaviour* (2005): 589-590; Danner, Lukas, et al. "Make a Face! Implicit and Explicit Measurement of Facial Expressions Elicited by Orange Juices Using Face Reading Technology." *Food Quality and Preference* (2013); Schultz, Randolph, et al. "Towards detecting cognitive load and emotions in usability studies using the RealEYES framework." *Usability and Internationalization. HCI and Culture*. Springer Berlin Heidelberg, 2007. 412-421. An informative press article is Randall, Kevin. "Human Lie Detector Paul Ekman Decodes the Faces of Depression, Terrorism, and Joy," *Fast Company*, December 15, 2011, <http://bit.ly/17oxob8>. For some interesting recent applications of online facial expression analysis, see Gordon, Alastair. "Facial Imaging: The "Big-Data" Solution for Emotion Research?" Gordon & McCallum, September 2, 2013, <http://bit.ly/1dIIOHI>.

276: Gamification. We are not aware of any peer-reviewed studies that incorporate gamification into online or lab-based neuromarketing experimentation. The focus of gamification in market research to date has largely been on adding game-like elements to online surveys and choice studies. See Puleston, Jon. "Online Research—Game On!: A look at how gaming techniques can transform your online research." *Shifting the Boundaries of Research*(2011): 20;

Zichermann, Gabe, and Christopher Cunningham. *Gamification by Design: Implementing game mechanics in web and mobile apps*. O'Reilly Media, Inc., 2011.

277: Gamification features. A good introduction to gamification features is Veris, Elias, "Gamification in Market Research," PowerPoint presentation available online at <http://slidesha.re/14gHAuR>. See also Deterding, Sebastian, et al. "From game design elements to gamefulness: defining gamification." *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*. ACM, 2011.

277: Gamification in forced-choice studies. The Brainjuicer study is described in Ewing, Tom and Bob Pankauskas, "Research in a World Without Questions," paper presented at ESOMAR World Congress, Madrid, 2012, "Online Pack Testing Game," p. 15.

278: Prediction markets. For an overview of the logic and execution of prediction markets, see Arrow, Kenneth J., et al. "The promise of prediction markets." *SCIENCE-NEW YORK THEN WASHINGTON*- 320.5878 (2008): 877; Wolfers, Justin, and Eric Zitzewitz. *Prediction markets*. No. w10504. National Bureau of Economic Research, 2004; Tziralis, George, and Ilias Tatsiopoulos. "Prediction markets: An extended literature review." *The journal of prediction markets* 1.1 (2012): 75-91.

279: Brainjuicer predictive market study. The Brainjuicer study using prediction markets in product innovation testing is described at <http://bit.ly/15fMpVp> and in a webinar video at <http://bit.ly/15fMNMt>.

Conducting Do-It-Yourself Behavioral Experiments

279: Microsoft has produced some interesting research on the topic of controlled experiments on the web. See Kohavi, Ron, et al. "Online experimentation at Microsoft." *Third Workshop on Data Mining Case Studies and Practice Prize*. 2009; Crook, Thomas, et al. "Seven pitfalls to avoid when running controlled experiments on the web." *Proceedings of the 15th ACM SIGKDD international conference on Knowledge discovery and data mining*. ACM, 2009; Kohavi, Ron, et al. "Controlled experiments on the web: survey and practical guide." *Data Mining and Knowledge Discovery* 18.1 (2009): 140-181; Kohavi, Ron, and Roger Longbotham. "Unexpected results in online controlled experiments." *ACM SIGKDD Explorations Newsletter* 12.2 (2011): 31-35.

280: Examples of behavioral experiments:

- **Testing background music.** See Areni, Charles S., and David Kim. "The influence of background music on shopping behavior: classical versus top-forty music in a wine store." *Advances in consumer research* 20.1 (1993): 336-340.
- **Testing choice overload.** Referenced jam choice study is Iyengar, Sheena S., and Mark R. Lepper. "When choice is demotivating: Can one desire too much of a good thing?." *Journal of personality and social psychology* 79.6 (2000): 995.
- **Testing the effect of scent in the air.** Brainjuicer experiment is described in a webinar presentation at <http://bit.ly/1e19Cl7>.
- **Testing product adjacencies.** Frito-Lay aisle design experiment and results are described at <http://bit.ly/15tsdyl>.
- **Testing product bundling.** Referenced experiment is found in Barden, Phil. *Decoded: The Science Behind why We Buy*. John Wiley & Sons, 2013, p. 120, original source,

Wansink, Brian. *Mindless eating: Why we eat more than we think*. Random House Digital, Inc., 2007.

281: Testing behavioral economics principles. Experiments testing these principles are included in references to Chapter 8, “Judgment heuristics: the way we’re wired,” above. Page reference in N4D is p. 127.

Balancing Costs and Benefits in Neuromarketing Studies

No references for this section.

Chapter 18. Picking the Right Approach for Your Research Needs

Summarizing What You Can Measure with Neuromarketing

286: Neuromarketing variables. Good overall summaries for each variable are:

- **Implicit associations.** Fazio, Russell H., and Michael A. Olson. "Implicit measures in social cognition research: Their meaning and use." *Annual review of psychology* 54.1 (2003): 297-327.
- **Priming.** Kahneman, *Thinking, Fast and Slow*, Chapter 4, “The Associative Machine;” Ochsner, Kevin N., C-Y. Peter Chiu, and Daniel L. Schacter. "Varieties of priming." *Current Opinion in Neurobiology* 4.2 (1994): 189-194.
- **Attention.** Milosavljevic, Milica, and Moran Cerf. "First attention then intention." *International Journal of Advertising* 27.3 (2008): 381-398.
- **Discrete emotions.** Mauss, Iris B., and Michael D. Robinson. "Measures of emotion: A review." *Cognition and emotion* 23.2 (2009): 209-237.
- **Emotional arousal and valence.** Mauss, Iris B., and Michael D. Robinson. "Measures of emotion: A review." *Cognition and emotion* 23.2 (2009): 209-237.
- **Approach and avoidance.** Elliot, Andrew J. "The hierarchical model of approach-avoidance motivation." *Motivation and Emotion* 30.2 (2006): 111-116.
- **Memory activation.** Schacter, Daniel L., C-Y. Peter Chiu, and Kevin N. Ochsner. "Implicit memory: A selective review." *Annual review of neuroscience* 16.1 (1993): 159-182; Shapiro, Stewart, and H. Shanker Krishnan. "Memory-based measures for assessing advertising effects: a comparison of explicit and implicit memory effects." *Journal of advertising* 30.3 (2001): 1-13.
- **Value.** Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, 2011, especially Appendix B., a reprint of Kahneman, Daniel, and Amos Tversky. "Choices, values, and frames." *American psychologist* 39.4 (1984): 341.
- **Usability.** See Hornbæk, Kasper. "Current practice in measuring usability: Challenges to usability studies and research." *International journal of human-computer studies* 64.2 (2006): 79-102; Westerman, Steve J., et al. "A multi-method approach to the assessment of web page designs." *Affective Computing and Intelligent Interaction*. Springer Berlin Heidelberg, 2007. 302-313.
- **Preference.** Winkielman, Piotr, and Kent Berridge. "Irrational wanting and subrational liking: How rudimentary motivational and affective processes shape preferences and choices." *Political Psychology* 24.4 (2003): 657-680.

- **Choice.** Fitzsimons, Gavan J., et al. "Non-conscious influences on consumer choice." *Marketing Letters* 13.3 (2002): 269-279.
- **Behavior and performance.** Ariely, Dan, and Michael I. Norton. "Conceptual consumption." *Annual review of psychology* 60 (2009): 475-499; Chartrand, Tanya L. "The role of conscious awareness in consumer behavior." *Journal of Consumer Psychology* 15.3 (2005): 203-210.

Matching Neuromarketing Approaches to Research Questions

290-292: For references for each of the approaches and methodologies listed, see:

- **Behavioral response-time studies.** See references for Chapter 17.
- **Eye tracking.** See references for Chapter 17.
- **Behavioral experiments.** See references for Chapter 17.
- **Biometrics.** See references for Chapter 16.
- **Electroencephalography (EEG).** See references for Chapter 16.
- **Functional magnetic resonance imaging:** See references for Chapter 16.

Integrating Neuromarketing and Traditional Research Approaches

294: Figure 18-1: The consumer cycle: marketing, shopping, consuming. This conceptual model was developed by the authors and is © 2013 Intuitive Consumer Insights LLC. All rights reserved.

296: Leading companies are just beginning to think about their research efforts in this holistic way. These efforts are generally not publicized due to confidentiality requirements. One example that has appeared in the press is the Disney research facility in Austin, TX. See Barnes, Brooks. "Lab Watches Web Surfers to See Which Ads Work," *New York Times*, July 26, 2009, available online at <http://nyti.ms/1a1UGAv>.

Part V. Living with Neuromarketing: Practical and Ethical Considerations

Chapter 19. Five Things You Need to Know about Neuromarketing Studies and Measures

Experimental Design: Identifying How Good Experiments Work

300-303: Experimental design. The primary source for this section is the excellent text by Cobb, George W. *Introduction to Design and Analysis of Experiments*, Springer-Verlag (1998). See also Kirk, Roger E. *Experimental design*. John Wiley & Sons, Inc., 1982; Quinn, G. Gerald Peter, and Michael J. Keough. *Experimental design and data analysis for biologists*. Cambridge University Press, 2002; Sytsma, Sid, "The basics of experimental design [a quick and non-technical guide], online at <http://bit.ly/14UdC3n>. Reviewing the most often cited studies in a given methodological area (fMRI, EEG, EMG, etc.) is often a good way to identify experimental design best practices.

301: A common problem with neuromarketing studies is self-selection bias. See Roe, Brian E., et al. "Risk-attitude selection bias in subject pools for experiments involving neuroimaging and blood samples." *Journal of Economic Psychology* 30.2 (2009): 181-189. Evidence for an absence of self-selection bias in behavioral economics experiments is presented in Cleave, Blair L., Nikos Nikiforakis, and Robert Slonim. "Is there selection bias in laboratory experiments? The case of social and risk preferences." *Experimental Economics* (2011): 1-11. Contrary evidence in support of self-selection bias is presented in Slonim, Robert, et al. "Opting-in: Participation bias in economic experiments." *Journal of Economic Behavior & Organization* (2013).

302: Sources of variability in an experiment. The classic treatment of controlling for unwanted sources of variability in experiments (and quasi-experiments) is Campbell, Donald Thomas, Julian C. Stanley, and Nathaniel Lees Gage. *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin, 1963. See also Shadish, William R., Thomas D. Cook, and Donald Thomas Campbell. *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin (2002);

302-303: Error due to chance vs. error due to bias. See the discussion in Cobb, *Introduction to Design and Analysis of Experiments*, Chapter 1, "Three sources of variability: One we want and two we don't," pp. 4-6, and "Chance error and bias compared," pp. 11-13.

303: Three rules of thumb for designing good experiments (sidebar). Adapted from the discussion in Cobb, *Introduction to Design and Analysis of Experiments*, Chapter 1, "Design in a Nutshell," p. 13.

Measurement Theory: Understanding Validity and Reliability

304: Measurement theory. An excellent introduction is Carmines, Edward G., and Richard A. Zeller, eds. *Reliability and validity assessment*. Vol. 17. Sage, 1979. For an application of measurement theory to biometric and physiological measures in market research, see Wang, Yong Jian, and Michael S. Minor. "Validity, reliability, and applicability of psychophysiological techniques in marketing research." *Psychology & Marketing* 25.2 (2008): 197-232.

304: Measuring validity. Different types of validity - *construct validity, discriminant validity, convergent validity* - are discussed in Trochim, William M. K. "Measurement Validity Types," *Research Methods Knowledge Base*, <http://bit.ly/17vQWqL>, and in most textbook on research methodology. Two classic treatments are Cronbach, Lee J., and Paul E. Meehl. "Construct validity in psychological tests." *Psychological bulletin* 52.4 (1955): 281; Peter, J. Paul. "Construct validity: a review of basic issues and marketing practices." *Journal of Marketing Research* (1981): 133-145.

305: Measuring reliability. The terms *external validity* are *predictive validity* are often used as synonyms for *reliability*. For tradeoffs between internal and external validity in different types of studies, see Roe, Brian E., and David R. Just. "Internal and external validity in economics research: Tradeoffs between experiments, field experiments, natural experiments, and field data." *American Journal of Agricultural Economics* 91.5 (2009): 1266-1271.

305: Figure 19-2: Validity, reliability, and generalizability. The "target" metaphor for the interaction of these concepts is commonly used. We adapted this figure from the Wikipedia article

on “Validity (statistics),” <http://bit.ly/15nCBsr>. Wikipedia version is © Nevit Dilmen. See also Mora, Michael. “Validity and reliability in surveys,” *Relevant Insights blog*, February 21, 2011, <http://bit.ly/19dIQCr>; Trochim, William M. K. “Reliability & Validity,” *Research Methods Knowledge Base*, <http://bit.ly/17GOolj>; Wikipedia article on “Validity (statistics),” <http://bit.ly/15nCBsr>.

305-306: The Holy Grail of measurement theory is generalizability. Using the “target” metaphor, we use the term *generalizability* to describe the result when a metric is both valid and reliable. Generalizability has also been defined as *dependability*. The classic study is Cronbach, Lee Joseph. *The dependability of behavioral measurements: Theory of generalizability for scores and profiles*. John Wiley & Sons, 1972. See also Webb, Noreen M. *Generalizability theory: A primer*. Sage, 1991; Austin, Jon R., Judy A. Siguaw, and Anna S. Mattila. “A re-examination of the generalizability of the Aaker brand personality measurement framework.” *Journal of Strategic Marketing* 11.2 (2003): 77-92.

Reverse Inference: Connecting Brain Measures to States of Mind

307: The logic of reverse inference. See Hutzler, Florian. “Reverse inference is not a fallacy per se: Cognitive processes can be inferred from functional imaging data.” *NeuroImage* (2013); Poldrack, Russell A. “Can cognitive processes be inferred from neuroimaging data?” *Trends in cognitive sciences* 10.2 (2006): 59-63; Poldrack, Russell A. “Inferring mental states from neuroimaging data: from reverse inference to large-scale decoding.” *Neuron* 72.5 (2011): 692-697.

308: The iPhone example. Lindstrom, Martin. “You love your iPhone. Literally.” *New York Times* (2011), available here: <http://nyti.ms/17vj7WC>. An excellent dissection of reverse inference errors in this Op Ed piece is provided by the Neurocritic blog, “Neuromarketing means never having to say you’re peer reviewed (but here’s your NYT op-ed space),” <http://bit.ly/136bleQ>;

Statistical Significance: Knowing When to Believe the Results

310-313: The statistics discussed in this section, with the exception of Bayesian statistics, are rudimentary and covered in appropriate detail in any introductory Statistics text or college course. Our discussion here is meant only to point out some basic examples of common-sense statistics that, surprisingly, some neuromarketing vendors still ignore.

311: The humble t-test. The t-test is covered in any introductory statistics text. See, for example, Weinberg, George H., and John A. Schumaker. “Statistics: An intuitive approach.” (1962); Rumsey, Deborah. *Statistics for dummies*. Wiley. com, 2011.

311: Analysis of variance (ANOVA): An excellent explanation of the decomposition of variance from an experiment into main, interaction, and error effects is provided in Cobb, *Introduction to Design and Analysis of Experiments*, Chapter 3, “Formal ANOVA: Decomposing the data and measuring variability, testing hypotheses and estimating true differences.” See also Gelman, Andrew. “Analysis of variance—why it is more important than ever.” *The Annals of Statistics* 33.1 (2005): 1-53.

312: Limitations of null hypothesis significance testing. See Cohen, Jacob. “The earth is round ($p < .05$).” *American psychologist* 49.12 (1994): 997; Gliner, Jeffrey A., Nancy L. Leech, and George A. Morgan. “Problems with null hypothesis significance testing (NHST): What do the textbooks say?” *The Journal of Experimental Education* 71.1 (2002): 83-92; Cumming, Geoff, et

al. "Statistical reform in psychology is anything changing?." *Psychological Science* 18.3 (2007): 230-232.

312: Effect size measures, including Cohen's *d*. See Cohen, Jacob. "A power primer." *Psychological bulletin* 112.1 (1992): 155; Thalheimer, Will, and Samantha Cook. "How to calculate effect sizes from published research: A simplified methodology." *Work-Learning Research*(2002); Cumming, Geoff. *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. New York: Routledge, 2012.

312-313: Bayesian inference. A fascinating and accessible historical account of Bayesian inference is McGrayne, Sharon Bertsch. "*The Theory that Would Not Die: How Bayes' Rule Cracked the Enigma Code, Hunted Down Russian Submarines, and Emerged Triumphant from Two Centuries of Controversy*." Yale University Press, 2011. Good introductions to Bayesian statistics and data analysis include Lee, Peter M. *Bayesian statistics: an introduction*. John Wiley & Sons, 2012; Gelman, Andrew, et al. *Bayesian data analysis*. CRC press, 2003; Kruschke, John. *Doing Bayesian Data Analysis: A Tutorial Introduction with R*. Academic Press. An interesting article that ties Bayesian inference to the problem of null hypothesis significance testing is Wagenmakers, Eric-Jan. "A practical solution to the pervasive problems of *p* values." *Psychonomic bulletin & review* 14.5 (2007): 779-804.

313: Bayesian inference and decision making (sidebar). This is one of the most common illustrations of Bayesian inference. This specific example is taken from Poldrack, Russell A. "Can cognitive processes be inferred from neuroimaging data?." *Trends in cognitive sciences* 10.2 (2006): 59-63.

313: Bayes rule. We did not include the formula for Bayes Rule in the sidebar example, but it is both intuitive and mathematically simple. See the Wikipedia article, "Bayes theorem," online at <http://bit.ly/18p5WEU>.

Normative Data: Linking Findings to the Real World

314: Normalized (or standardized) data. Also called *standard scores*. The most common form of standardization is the *z-score*, computed for each observation in a sample as the raw score minus the mean of the total sample, divided by the standard deviation of the sample. A simpler form of standardization is the *percentile ranking*, which ranks a score relative to all other scores collected across multiple experiments or measurements. Normalized scores have nothing to say about *construct validity*, the extent to which a metric accurately reflects a theoretical construct of interest.

314: Normative data. For an interesting perspective on normative data in market research, see Chizever, Andrew and DJ Jefferson. "Show me the norms! Taking a closer look at the elephants in the room," Lieberman Research Worldwide POV Paper, available at <http://bit.ly/13a1eLB>. The need for normative data in neuromarketing research is similar to the need in neuropsychological diagnosis. See Mitrushina, Maura, ed. *Handbook of normative data for neuropsychological assessment*. Oxford University Press, 2005.

314: Normative database. For an example of a normative database used to validate a research vendor's metrics (not a neuromarketing vendor, unfortunately), see Blair, Margaret H., and Allan R. Kuse. "Better practices in advertising can change a cost of doing business to wise investments

in the business." *Journal of Advertising Research* 44.01 (2004): 71-89. A review of challenges facing the creation of advertising normative databases using point of sale scanner-panel data is provided by Koslow, Scott, and Gerard J. Tellis. "What Scanner-Panel Data Tell Us about Advertising: A Detective Story with a Dark Twist." *Journal of Advertising Research* 51.1 (2011): 87-100.

Chapter 20. A Pre-Flight Checklist for Successful Neuromarketing Studies

What Are Your Business Objectives for This Study?

317: Here's an ironic scenario that happens too often in neuromarketing. Strictly hypothetical, of course.

319: Here are some questions to help identify strong business objectives for your neuromarketing study. These questions are derived from the collective experience of the authors and the fellow neuromarketers with whom we share war stories.

What Hypothesis Are You Testing and What's the Best Test to Use?

319-320: The absence of a hypothesis is probably the number-one cause of client dissatisfaction with neuromarketing research. Based on the authors' experience.

320-321: Package design example. Strictly hypothetical.

321: Defining the right test to evaluate a particular hypothesis can drill down into very detailed issues quite quickly. These questions are based on the material in earlier sections of this book.

- **Aspects of the consumer experience.** From the six application areas in Part III.
- **Mental processes.** From the list in Chapter 18.
- **Attributes of the material being tested.** From the cognitive processes discussed in Part II.

Are You Testing the Right Materials?

322: Comparing visual stimuli at different resolutions introduces serious potential distortions into a neuromarketing test. This is one of the key findings of processing fluency research. Degrading the resolution of images and written text, even at consciously undetectable levels, can produce significant processing fluency effects. See Sansom-Daly, Ursula M., and Joseph P. Forgas. "Do blurred faces magnify priming effects? The interactive effects of perceptual fluency and priming on impression formation." *Social Cognition* 28.5 (2010): 630-640; Winkielman, Piotr, et al. "Affective and Cognitive Consequences of Visual Fluency: When Seeing is Easy on the Mind." *Visual Persuasion* (2000).

322: Balancing what varies between the stimuli being compared against what is controlled or held constant. This is an application of the second *rule of thumb* for designing good experiments (Chapter 19, p. 304), applied to the selection of stimuli for comparison.

323: One of the most common mistakes in neuromarketing studies is to fail to properly align hypotheses with testing materials. Authors' personal observation.

323: Maximizing the inferential power of a test. This hierarchy of inferential power is based on principles of good experimental design and the authors' experience with neuromarketing study designs.

Are You Sampling from the Right Population?

324: In an experiment, you have to identify your relevant subgroups before you run the study; you can't construct a new subgroup comparison after the data have been collected. This is a fundamental feature of experimental design, see Cobb, George W. Introduction to Design and Analysis of Experiments. *Textbooks in Mathematical Sciences* (1998).

324: Here are some subgroup comparisons that can yield interesting and relevant insights in neuromarketing studies:

- **Men versus women.** For example, see Cahill, Larry. "Why sex matters for neuroscience." *Nature Reviews Neuroscience* 7.6 (2006): 477-484; Kruger, Daniel, and Dreyson Byker. "Evolved foraging psychology underlies sex differences in shopping experiences and behaviors." *Journal of Social, Evolutionary, and Cultural Psychology* 3.4 (2009): 315-327.
- **Younger versus older.** For example, see Pollock, Joshua W., et al. "Electrophysiological evidence for adult age-related sparing and decrements in emotion perception and attention." *Frontiers in Integrative Neuroscience* 6 (2012); Jacoby, Larry L. "Ironic effects of repetition: measuring age-related differences in memory." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 25.1 (1999): 3. See also the *New Scientist* series on "The five ages of the brain," 2009, available online at <http://bit.ly/1a5rXLk>.
- **Brand loyalists versus brand agnostics.** For example, see Reimann, Martin, et al. "How we relate to brands: Psychological and neurophysiological insights into consumer-brand relationships." *Journal of Consumer Psychology* 22.1 (2012): 128-142.
- **Current consumers versus lapsed consumers.** For example, see Winchester, Maxwell, Jenni Romaniuk, and Svetlana Bogomolova. "Positive and negative brand beliefs and brand defection/uptake." *European Journal of Marketing* 42.5/6 (2008): 553-570; Bogomolova, Svetlana. "Life after death? Analyzing post-defection consumer brand equity." *Journal of Business Research* 63.11 (2010): 1135-1141.
- **Consumers from different regions or geographies.** For example, see Chiao, Joan Y., and Nalini Ambady. "Cultural neuroscience." *Handbook of cultural psychology* (2010); Ames, Daniel L., and Susan T. Fiske. "Cultural neuroscience." *Asian Journal of Social Psychology* 13.2 (2010): 72-82; Ng, Sharon, and Michael J. Houston. "Exemplars or Beliefs? The Impact of Self-View on the Nature and Relative Influence of Brand Associations." *Journal of Consumer Research* 32.4 (2006): 519-529; Yoon, Yeosun, and Zeynep Gurhan-Canli. "Cross-cultural differences in brand extension evaluations: The effect of holistic and analytical processing." *Advances in consumer research* 31 (2004): 224.
- **Consumers at different stages of involvement.** For example, see Laurent, Gilles, and Jean-Noel Kapferer. "Measuring consumer involvement profiles." *Journal of marketing research* (1985): 41-53; Richins, Marsha L., and Peter H. Bloch. "After the new wears off: The temporal context of product involvement." *Journal of Consumer*

research (1986): 280-285; Celsi, Richard L., and Jerry C. Olson. "The role of involvement in attention and comprehension processes." *Journal of consumer research* (1988): 210-224; Laroche, Michel, Marcelo Vinhal Nepomuceno, and Marie-Odile Richard. "How do involvement and product knowledge affect the relationship between intangibility and perceived risk for brands and product categories?." *Journal of Consumer Marketing* 27.3 (2010): 197-210.

How Will Your Results Change Your Business Actions?

325: In his book *The Power of Intuition*. Klein, Gary. *The power of intuition: How to use your gut feelings to make better decisions at work*. Random House Digital, Inc., 2007. In slight contrast to Klein's advice, we recommend envisioning different results for the hypothesis being tested, not overall failure of the project (the risk of which can be mitigated by following the advice in Chapters 20 and 21).

Don't Pay the Price of a Failure to Communicate

No references for this section, just good sound advice.

Chapter 21. Picking the Right Neuromarketing Partner

Knowing What You Need from a Neuromarketing Partner

328: The importance of organizational readiness cannot be underestimated, although it usually is. Two classic treatments of organizational change readiness and management are Nadler, David A. *Discontinuous Change: Leading Organizational Transformation*. Jossey-Bass, Inc. Publishers, 350 Sansome Street, San Francisco, CA 94104., 1995; Conner, Daryl R. *Managing at the speed of change: How resilient managers succeed and prosper where others fail*. Random House Digital, Inc., 2006.

Looking At Your Options

332: Strategic research partners vs. transaction service providers. A useful way to look at the business orientation of consulting firms in any field is presented in Maister, David H. *Managing the professional service firm*. Simon and Schuster, 2007. Maister identifies three basic types of consulting firms:

- **Procedural:** Firms specializing in work for which the solution or approach is well known. Execution is usually delegated to less experienced staff who use pre-established procedures to provide solutions. Also called "helping hands" consultants or (disparagingly) "order takers." The key to selling this work is its efficiency. It has the greatest leveraging potential of the three models, and so has been the focus of most business growth and adoption by larger firms.
- **Brain:** Firms specializing in work that requires a lot of creativity, utilizing professional expertise ("smarts") and innovative thinking to solve problems that are hard to specify and may not have been solved before. These firms are usually individual or boutique practices, but larger firms may harbor such practices within their larger set of services.
- **Grey hair:** Firms that also address unique and difficult-to-codify problems, but that emphasize their prior experience and knowledge about the subject matter, rather than raw creative power and innovative thinking.

Among neuromarketing vendors, the larger market research firms are likely to focus on procedural solutions that commoditize neuromarketing deliverables in a manner similar to how they provide traditional research deliverables. While they may claim to have more “strategic” consulting services, those services are often heavily dependent on their more transactional offerings. Scientist-led smaller firms tend to follow the “grey hair” model when they are based on a particular methodology, technology, or expertise associated with a single leader. Firms that follow the “brain” model are just beginning to appear. These firms are often led by a team of scientists with a range of specializations and areas of expertise. They often describe themselves as purveyors of innovative research and technology solutions and platforms that combine neuromarketing elements with other technologies and approaches.

334: After all, anyone with a Rolex and a fancy suit can call himself a consultant.

This raises the issue of accreditation or certification, a topic the neuromarketing industry has yet to address, as we note in Chapter 22.

Neuromarketing Orientations and Specializations

335-336: Neuromarketing technology specializations. This categorization of neuromarketing vendors is based on the authors’ experience and observations in the industry.

336: Table 21-1. Comparing technology specialists on complexity, turnaround, and cost. These are high level generalizations. Always speak with individual vendors directly to determine where they stand on complexity, turnaround times, and cost.

337: Integrated solution specialists are developing the expertise and breadth of experience to help with this challenge. This is a typo we missed when editing the book. It should say “Integrated solution generalists” rather than “Integrated solution specialists.”

Questions to Ask a Prospective Neuromarketing Partner

338-341: These questions are based on our own experience and several useful checklists published elsewhere, including Ariely, Dan, and Gregory S. Berns. “Neuromarketing: the hope and hype of neuroimaging in business.” *Nature Reviews Neuroscience* 11.4 (2010): 284-292, box 4, “What to look for when hiring a neuromarketing firm,” p. 7, and ESOMAR, “36 questions to help commission neuroscience research,” available online at <http://bit.ly/17G43nj>; Sands Research, “Due Diligence Checklist,” <http://bit.ly/152zf1z>.

Chapter 22. Neuromarketing Ethics, Standards, and Public Policy Implications

343: During those early days, there was a lot of hype and hokum on display, coming both from some early practitioners and some overzealous commentators. See, for example, quotes in Frazier, Mya, “Hidden Persuasion or Junk Science?” *Ad Age*, September 10, 2007, <http://bit.ly/11Wz03h>; Lindstrom, Martin. *Buyology: Truth and lies about why we buy*. Random House Digital, Inc., 2010; “Consumer Alert Asks Feds to Investigate Neuromarketing Research at Emory University,” December 17, 2003, <http://bit.ly/162Bouo>,

Doing Neuromarketing Ethically

344: Neuroethics of Neuromarketing. Murphy, Emily R., Judy Illes, and Peter B. Reiner. "Neuroethics of neuromarketing." *Journal of Consumer Behaviour* 7.4-5 (2008): 293-302.

345: Independent Review Boards. The use of IRBs by private firms is not without its problems. See Editorial, "Who watches the watchmen?" *Nature* 476:125, August 11, 2011, <http://bit.ly/17CcyBS>.

345: Several neuromarketing vendors publish statements of ethics principles on their websites. See, for example, <http://bit.ly/13kobfh>; <http://bit.ly/14nG5jN>. Vendor members of the NMSBA must agree to follow that trade organization's code of ethics, available here: <http://bit.ly/1cLM562>.

346: In the early days of neuromarketing, some vendors clearly overreached in making claims about what neuromarketing can do. In some cases, the "early days" were quite recent; see Lindstrom, Martin. "You love your iPhone. Literally." *New York Times* (2011), available here: <http://nyti.ms/17vj7WC>, and responses by neuroscientists referenced in note to p. 262).

346: Other vendors claimed they could accurately predict a consumer's "propensity to purchase" by reading his or her brain waves in a single session of watching an ad. See quotes in Frazier, Mya, "Hidden Persuasion or Junk Science?" *Ad Age*, September 10, 2007, <http://bit.ly/11Wz03h>.

346: Academic neuroscientists have been particularly critical of fMRI research in marketing and advertising that claims to identify "hot spots" in the brain. Reference is to Iacoboni, Marco, et al. "This is your brain on politics," *New York Times* op-ed article, November 11, 2011, <http://nyti.ms/1aan03O>, and response by 17 neuroscientists: "Politics and the Brain," *New York Times* letter to the editor, November 14, 2007, <http://nyti.ms/1dKsq9F>.

348: No neuromarketing vendor has yet published a peer-reviewed validation of its metrics based on normative data. To the best of our knowledge, this is still the case.

348: Four examples of academic research that validate many of the core assumptions underlying neuromarketing:

- **Astolfi and Vecchiato.** See the recently published collection of papers, Vecchiato, Giovanni, et al. *Neuroelectrical brain imaging tools for the study of the efficacy of TV advertising stimuli and their application to neuromarketing*. Springer, 2013.
- **Ravaja.** Ravaja, Niklas, Outi Somervuori, and Mikko Salminen. "Predicting purchase decision: The role of hemispheric asymmetry over the frontal cortex." *Journal of Neuroscience, Psychology, and Economics* 6.1 (2013): 1.
- **Berns and Moore.** Berns, Gregory S., et al. "Neural mechanisms of the influence of popularity on adolescent ratings of music." *Neuroimage* 49.3 (2010): 2687-2696.
- **Falk and Lieberman.** Falk, Emily B., et al. "Predicting persuasion-induced behavior change from the brain." *The Journal of Neuroscience* 30.25 (2010): 8421-8424; Falk, Emily B., et al. "Neural activity during health messaging predicts reductions in smoking above and beyond self-report." *Health Psychology* 30.2 (2011): 177; Falk, Emily B., Elliot

T. Berkman, and Matthew D. Lieberman. "From Neural Responses to Population Behavior Neural Focus Group Predicts Population-Level Media Effects." *Psychological science* 23.5 (2012): 439-445; Berkman, Elliot T., and Emily B. Falk. "Beyond Brain Mapping Using Neural Measures to Predict Real-World Outcomes." *Current Directions in Psychological Science* 22.1 (2013): 45-50.

349: Claims of superior performance with secret proprietary techniques are fading as a source of competitive advantage. See Ramsøy, Thomas. "Can you use the Emotiv scales for anything?" *Brainethics* blog, March 27, 2013, <http://bit.ly/14vgZu9>. According to Ramsøy, one to new breed of consumer neuroscience experts with a combined background in marketing, psychology, and neuroscience:

As you can guess, I am not a proponent of black boxing, particularly not in neuromarketing where we should be able to converge on the same solutions. Quite the contrary. I simply do not understand the need for secrecy among neuromarketing companies. The science is already out there, so why make up new scales? It opens up the possibility of cheating, snake oil production and what is less. Think about the strategic blunders that may be made based on erroneous and unscientific hand waving.

Moving the Industry toward "Neuro-Standards"

350: Early adopters stand in sharp contrast to mainstream buyers who tend to avoid new technologies until they're proven and adopted by most of their peers. This view of how new technology is adopted was first identified by Geoffrey Moore. See in particular Moore, Geoffrey A. *Crossing the chasm: Marketing and selling disruptive products to mainstream customers*. HarperCollins, 2002 and Moore, Geoffrey A. *Inside the tornado: strategies for developing, leveraging, and surviving hypergrowth markets*. HarperCollins e-books, 2009.

351: The first major standards effort directed at neuromarketing was launched by the ARF in 2010. For background, see Advertising Research Foundation, "Neurostandards Collaboration," <http://bit.ly/17cA0ok> and "Post Re:think 2011 Update on Neurostandards," <http://bit.ly/1aTlHsW>.

351: The experts identified several areas where they thought standards could be developed. A draft of the final report (a final version was not produced) is available here: <http://bit.ly/18HfBph>.

Understanding Legal Issues Concerning Neuromarketing

353: In 2011, the French Parliament outlawed all uses of neuroimaging for purposes other than medical or scientific research or expert testimony in court cases. See Oullier, Olivier. "Clear up this fuzzy thinking on brain scans," *Nature*, February 29, 2012, online at <http://bit.ly/17DjAGp>.

354: The more interesting question that neuromarketing has raised in legal circles is whether messages and cues we receive through nonconscious means constitute "speech" that should be protected under free speech laws. See Wilson, R., Jeannie Gaines, and Ronald Paul Hill. "Neuromarketing and consumer free will." *Journal of Consumer Affairs* 42.3 (2008): 389-410; Blitz, Marc. "Neuromarketing, Subliminal Messages and Freedom of Speech" (and associated discussion), *Neuroethics and Law Blog*, May 14, 2009,

<http://bit.ly/17DkgLU>. This discussion is highlighted in Satel, Sally and Scott O. Lilienfeld. *Brainwashed: The Seductive Appeal of Mindless Neuroscience*. Basic Books (2013). Satel and Lilienfeld reach a conclusion very similar to ours:

We do not believe that Manchurian customers will be marching down department store aisles any time soon, if ever. Consumers aren't disembodied brains milling about the Mall of America. They juggle their pocketbooks and contemplate other items they have recently bought. Purchasing is a social activity, and people are social creatures, gauging the foreseeable reaction from a spouse ("You bought what!?) and often soliciting advice from family, friends, or experts before buying. ...

In the end, a cacophony of influences impinge on us at once, some cancelling out others, some combining in novel ways, some emanating from within us, some from the external environment, and still others generated by advertisers. Our implicit unconscious processes and overt conscious capacities come together to guide us. (pp. 44-45)

Using Neuromarketing to Make Us Healthier and Wiser

355-356: Neuromarketing and public service advertising. The best examples of neuromarketing-style testing applied to public service *direct response* advertising are the Falk and Lieberman studies of smoking cessation ad campaigns referenced above, especially Falk, Emily B., et al. "Predicting persuasion-induced behavior change from the brain." *The Journal of Neuroscience* 30.25 (2010): 8421-8424; Falk, Emily B., et al. "Neural activity during health messaging predicts reductions in smoking above and beyond self-report." *Health Psychology* 30.2 (2011): 177; Falk, Emily B., Elliot T. Berkman, and Matthew D. Lieberman. "From Neural Responses to Population Behavior Neural Focus Group Predicts Population-Level Media Effects." *Psychological science* 23.5 (2012): 439-445. Another interesting perspective on the use of sadness in public service advertiser is provided by research firm Brainjuicer: see Wood, Orlando. "Using faces; measuring emotional engagement for early stage creative." *European Society for Opinion and Marketing Research* (2007), pp. 13-16.

356-357: Neuromarketing and public policy design and implementation. Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press, 2008; Ariely, Dan. *Predictably irrational, revised and expanded edition: The hidden forces that shape our decisions*. HarperCollins, 2009. Like any use of science to influence politics, "nudge" policies are not without their critics. See Brooks, David. "The Nudge Debate," New York Times, August 8, 2013, <http://nyti.ms/1fFSIGx>; Tarran, Brian. "Are 'nudge' policies pushing their luck?" *Research Live* website, February 28, 2012, <http://bit.ly/1aUfsVA>.

357-358: Neuromarketing and education. For leveraging findings about the "social brain" in education, see Lieberman, Matthew D. "Education and the social brain." *Trends in Neuroscience and Education* (2012): 1, 3-9. For an industry observer's perspective on neuromarketing and education, see Dooley, Roger. "Neuromarketing and Education." *Neuromarketing* blog, February 12, 2007, <http://bit.ly/1cQ3sTq>, commenting on this slightly tongue-in-cheek post by Kathy Sierra, "Marketing should be education, education should be marketing," February 11, 2007, <http://bit.ly/13pBI58>. See also Dooley, Roger. "Can Neuromarketing Revolutionize Education?" *Neuromarketing* blog, June 15, 2012, <http://bit.ly/17Go2x8>.

357: Processing *disfluency* also produces greater scrutiny, more attention to detail, and better memory retention. Diemand-Yauman, Connor, Daniel M. Oppenheimer, and Erikka B. Vaughan. "Fortune favors the Bold and the Italicized: Effects of disfluency on educational outcomes." *Cognition* 118.1 (2011): 111-115; Alter, Adam L., Daniel M. Oppenheimer, and Nicholas Epley. "Disfluency prompts analytic thinking—But not always greater accuracy: Response to." *Cognition* (2013); Hansen, Jochim, and Michaela Wänke. "Fluency in context: Discrepancy makes processing experiences informative." *The Experience of Thinking: How the Fluency of Mental Processes Influences Cognition and Behaviour* (2013): 70.

Part VI. The Part of Tens

Chapter 23. Ten Mistaken Beliefs about Neuromarketing

361-369: For extensive references on each of these topics, please refer to the chapters and sections in the main body of the book where they are introduced and discussed. Everything in this chapter is a summary of content presented earlier.

Chapter 24. Ten Scientific Pillars Underlying Neuromarketing

371-378: For extensive references on each of these topics, please refer to the chapters and sections in the main body of the book where they are introduced and discussed. Everything in this chapter is a summary of content presented earlier.