

یادداشت‌ها و منابع کتاب عادت‌های اتمی

جیمز کلیر – ترجمه هادی بهمنی

IN THIS SECTION, I have included a detailed list of notes, references, and citations for each chapter in the book. I trust that most readers will find this list to be sufficient. However, I also realize that scientific literature changes over time and the references for this book may need to be updated. Furthermore, I fully expect that I have made a mistake somewhere in this book—either in attributing an idea to the wrong person or not giving credit to someone where it is due. (If you believe this to be the case, please email me at james@jamesclear.com so I can fix the issue as soon as possible.)

لیست منابع و یادداشت‌ها در لینک زیر به‌روزرسانی می‌شود:

atomichabits.com/endnotes.

مقدمه

We all deal with setbacks: What about luck, you might ask? Luck matters, certainly.

Habits are not the only thing that influence your success, but they are probably the most important factor that is within your control. And the only self-improvement strategy that makes any sense is to focus on what you can control.

The entrepreneur and investor Naval Ravikant: Naval Ravikant (@naval), “To write a great book, you must first become the book,” Twitter, May 15, 2018, <https://twitter.com/naval/status/996460948029362176>.

“stimulus, response, reward”: B. F. Skinner, *The Behavior of Organisms* (New York: Appleton-Century-Crofts, 1938).

“cue, routine, reward”: Charles Duhigg, *The Power of Habit: Why We Do What We Do in Life and Business* (New York: Random House, 2014).

فصل ۱

just a single gold medal at the Olympic Games: Matt Slater, “How GB Cycling Went from Tragic to Magic,” BBC Sport, April 14, 2008, <http://news.bbc.co.uk/sport2/hi/olympics/cycling/7534073.stm>.

the Tour de France: Tom Fordyce, “Tour de France 2017: Is Chris Froome Britain’s Least Loved Great Sportsman?” BBC Sport, July 23, 2017, <https://www.bbc.com/sport/cycling/40692045>.

one of the top bike manufacturers in Europe refused to sell bikes: Richard Moore, *Mastermind: How Dave Brailsford Reinvented the Wheel* (Glasgow: BackPage Press, 2013).

“The whole principle came from the idea”: Matt Slater, “Olympics Cycling: Marginal Gains Underpin Team GB Dominance,” BBC, August 8, 2012, <https://www.bbc.com/sport/olympics/19174302>.

Brailsford and his coaches began by making small adjustments: Tim Harford, “Marginal Gains Matter but Gamechangers Transform,” Tim Harford, April 2017, <http://timharford.com/2017/04/marginal-gains-matter-but-gamechangers-transform>.

they even painted the inside of the team truck white: Eben Harrell, “How 1% Performance Improvements Led to Olympic Gold,” *Harvard Business Review*, October 30, 2015, <https://hbr.org/2015/10/how-1-performance-improvements-led-to-olympic-gold>; Kevin Clark, “How a Cycling Team Turned the Falcons Into NFC Champions,” *The Ringer*, September 12, 2017, <https://www.theringer.com/nfl/2017/9/12/16293216/atlanta-falcons-thomas-dimitroff-cycling-team-sky>.

Just five years after Brailsford took over: Technically, the British riders won 57 percent of the road and track cycling medals at the 2008 Olympics. Fourteen gold medals were available in road and track cycling events. The Brits won eight of them.

the Brits raised the bar: “World and Olympic Records Set at the 2012 Summer Olympics,” Wikipedia, December 8, 2017, https://en.wikipedia.org/wiki/World_and_Olympic_records_set_at_the_2012_Summer_Olympics#Cycling.

Bradley Wiggins became the first British cyclist: Andrew Longmore, “Bradley Wiggins,” *Encyclopaedia Britannica*, <https://www.britannica.com/biography/Bradley-Wiggins>, last modified April 21, 2018.

Chris Froome won: Karen Sparks, “Chris Froome,” *Encyclopaedia Britannica*, <https://www.britannica.com/biography/Chris-Froome>, last modified October 23, 2017.

During the ten-year span from 2007 to 2017: “Medals won by the Great Britain Cycling Team at world championships, Olympic Games and Paralympic Games since 2000,” British Cycling, https://www.britishcycling.org.uk/gbcyclingteam/article/Gbrst_gb-cyclingteam-GB-Cycling-Team-Medal-History—0?c=EN#K0dWAPjq84CV8Wzw.99, accessed June 8, 2018.

you’ll end up thirty-seven times better: Jason Shen, an entrepreneur and writer, received an early look at this book. After reading this chapter, he remarked: “If the gains were linear, you’d predict to be 3.65x better off. But because it is exponential, the improvement is actually 10x greater.” April 3, 2018.

Habits are the compound interest: Many people have noted how habits multiply over time. Here are some of my favorite articles and books on the subject: Leo Babauta, “The Power of Habit Investments,” Zen Habits, January 28, 2013, <https://zenhabits.net/bank>; Morgan Housel, “The Freakishly Strong Base,” Collaborative Fund, October 31, 2017, <http://www.collaborativefund.com/blog/the-freakishly-strong-base>; Darren Hardy, *The Compound Effect* (New York: Vanguard Press, 2012).

Accomplishing one extra task: As Sam Altman says, “A small productivity gain, compounded over 50 years, is worth a lot.” “Productivity,” Sam Altman. April 10, 2018, <http://blog.samaltman.com/productivity>.

Habits are a double-edged sword: I'd like to credit Jason Hreha with originally describing habits to me in this way. Jason Hreha (@jhreha), "They're a double edged sword," Twitter, February 21, 2018, <https://twitter.com/jhreha/status/966430907371433984>.

The more tasks you can handle without thinking: Michael (@mmay3r), "The foundation of productivity is habits. The more you do automatically, the more you're subsequently freed to do. This effect compounds," Twitter, April 10, 2018, <https://twitter.com/mmay3r/status/983837519274889216>.

each book you read not only teaches: This idea—that learning new ideas increases the value of your old ideas—is something I first heard about from Patrick O'Shaughnessy, who writes, "This is why knowledge compounds. Old stuff that was a 4/10 in value can become a 10/10, unlocked by another book in the future." <http://investorfieldguide.com/reading-tweet-storm>.

Cancer spends 80 percent of its life undetectable: "How to Live a Longer, Higher Quality Life, with Peter Attia, M.D.," Investor's Field Guide, March 7, 2017, <http://investorfieldguide.com/attia>.

The San Antonio Spurs: Matt Moore, "NBA Finals: A Rock, Hammer and Cracking of Spurs' Majesty in Game 7," CBS Sports, June 21, 2013, <https://www.cbssports.com/nba/news/nba-finals-a-rock-hammer-and-cracking-of-spurs-majesty-in-game-7>.

Inspiration for [this drawing](#) came from a tweet titled "Deception of linear vs exponential" by @MlichaelW. May 19, 2018. <https://twitter.com/MlichaelW/status/997878086132817920>.

The seed of every habit: This paragraph was inspired by a quote from Mr. Mircea, an account on Twitter, who wrote, "each habit began its life as a single decision." <https://twitter.com/mistermircea>.

the goal cannot be what differentiates the winners from the losers: Hat tip to CrossFit coach Ben Bergeron for inspiring this quote during a conversation I had with him on February 28, 2017.

You fall to the level of your systems: This line was inspired by the following quote from Archilochus: "We don't rise to the level of our expectations, we fall to the level of our training."

فصل ۲

You can imagine them like the layers of an onion: Hat tip to Simon Sinek. His “Golden Circle” framework is similar in design, but discusses different topics. For more, see Simon Sinek, *Start with Why: How Great Leaders Inspire Everyone to Take Action* (London: Portfolio/Penguin, 2013), 37.

I resolved to stop chewing my nails: The quotes used in this section are presented as a conversation for reading clarity, but were originally written by Clark. See: Brian Clark, “The Powerful Psychological Boost that Helps You Make and Break Habits,” Further, November 14, 2017, <https://further.net/pride-habits>.

Research has shown that once a person: Christopher J. Bryan et al., “Motivating Voter Turnout by Invoking the Self,” *Proceedings of the National Academy of Sciences* 108, no. 31 (2011): 12653–12656.

There is internal pressure: Leon Festinger, *A Theory of Cognitive Dissonance* (Stanford, CA: Stanford University Press, 1957).

Your identity is literally your “repeated beingness”: Technically, *identidem* is a word belonging to the Late Latin language. Also, thanks to Tamar Shippony, a reader of jamesclear.com, who originally told me about the etymology of the word *identity*, which she looked up in the American Heritage Dictionary.

We change bit by bit: This is another reason atomic habits are such an effective form of change. If you change your identity too quickly and become someone radically different overnight, then you feel as if you lose your sense of self. But if you update and expand your identity gradually, you will find yourself reborn into someone totally new and yet still familiar. Slowly—habit by habit, vote by vote—you become accustomed to your new identity. Atomic habits and gradual improvement are the keys to identity change without identity loss.

فصل ۳

Edward Thorndike conducted an experiment: Peter Gray, *Psychology*, 6th ed. (New York: Worth, 2011), 108–109.

“by some simple act, such as pulling at a loop of cord”: Edward L. Thorndike, “Animal Intelligence: An Experimental Study of the Associative Processes in Animals,” *Psychological Review: Monograph Supplements* 2, no. 4 (1898), doi:10.1037/h0092987.

“behaviors followed by satisfying consequences”: This is an abbreviated version of the original quote from Thorndike, which reads: “responses that produce a satisfying effect in a particular situation become more likely to occur again in that situation, and responses that produce a discomforting effect become less likely to occur again in that situation.” For more, see Peter Gray, *Psychology*, 6th ed. (New York: Worth, 2011), 108–109.

Neurological activity in the brain is high: Charles Duhigg, *The Power of Habit: Why We Do What We Do in Life and Business* (New York: Random House, 2014), 15; Ann M. Graybiel, “Network-Level Neuroplasticity in Cortico-Basal Ganglia Pathways,” *Parkinsonism and Related Disorders* 10, no. 5 (2004), doi:10.1016/j.parkreldis.2004.03.007.

“Habits are, simply, reliable solutions”: Jason Hreha, “Why Our Conscious Minds Are Suckers for Novelty,” *Revue*, <https://www.getrevue.co/profile/jason/issues/why-our-conscious-minds-are-suckers-for-novelty-54131>, accessed June 8, 2018.

As habits are created: John R. Anderson, “Acquisition of Cognitive Skill,” *Psychological Review* 89, no. 4 (1982), doi:10.1037/0033-295X.89.4.369.

the brain remembers the past: Shahram Heshmat, “Why Do We Remember Certain Things, But Forget Others,” *Psychology Today*, October 8, 2015, <https://www.psychologytoday.com/us/blog/science-choice/201510/why-do-we-remember-certain-things-forget-others>.

the conscious mind is the bottleneck: William H. Gladstones, Michael A. Regan, and Robert B. Lee, “Division of Attention: The Single-Channel Hypothesis Revisited,” *Quarterly Journal of Experimental Psychology Section A* 41, no. 1 (1989), doi:10.1080/14640748908402350.

the conscious mind likes to pawn off tasks: Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2015).

Habits reduce cognitive load: John R. Anderson, “Acquisition of Cognitive Skill,” *Psychological Review* 89, no. 4 (1982), doi:10.1037/0033-295X.89.4.369.

Feelings of pleasure and disappointment: Antonio R. Damasio, *The Strange Order of Things: Life, Feeling, and the Making of Cultures* (New York: Pantheon Books, 2018); Lisa Feldman Barrett, *How Emotions Are Made* (London: Pan Books, 2018).

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The psychologist Gary Klein: I originally heard about this story from Daniel Kahneman, but it was confirmed by Gary Klein in an email on March 30, 2017. Klein also covers the story in his own book, which uses slightly different quotes: Gary A. Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT Press, 1998), 43–44.

military analysts can identify which blip on a radar screen: Gary A. Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT Press, 1998), 38–40.

Museum curators have been known to discern: The story of the Getty kouros, covered in Malcolm Gladwell's book *Blink*, is a famous example. The sculpture, initially believed to be from ancient Greece, was purchased for \$10 million. The controversy surrounding the sculpture happened later when one expert identified it as a forgery upon first glance.

Experienced radiologists can look at a brain scan: Siddhartha Mukherjee, "The Algorithm Will See You Now," *New Yorker*, April 3, 2017, <https://www.newyorker.com/magazine/2017/04/03/ai-versus-md>.

The human brain is a prediction machine: The German physician Hermann von Helmholtz developed the idea of the brain being a "prediction machine."

the clerk swiped the customer's actual credit card: Helix van Boron, "What's the Dumbest Thing You've Done While Your Brain Is on Autopilot," Reddit, August 21, 2017, https://www.reddit.com/r/AskReddit/comments/6v1t91/whats_the_dumbest_thing_youve_done_while_your/dlxa5y9.

she kept asking coworkers if they had washed their hands: SwordOfTheLlama, "What Strange Habits Have You Picked Up from Your Line of Work," Reddit, January 4, 2016,

https://www.reddit.com/r/AskReddit/comments/3zckq6/what_strange_habits_have_you_picked_up_from_your/cyl3nta.

story of a man who had spent years working as a lifeguard: SwearImaChick, “What Strange Habits Have You Picked Up from Your Line of Work,” Reddit, January 4, 2016,

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“Until you make the unconscious conscious”: Although this quote by Jung is popular, I had trouble tracking down the original source. It’s probably a paraphrase of this passage: “The psychological rule says that when an inner situation is not made conscious, it happens outside, as fate. That is to say, when the individual remains undivided and does not become conscious of his inner opposite, the world must perforce act out the conflict and be torn into opposing halves.” For more, see C. G. Jung, *Aion: Researches into the Phenomenology of the Self* (Princeton, NJ: Princeton University Press, 1959), 71.

Pointing-and-Calling reduces errors: Alice Gordenker, “JR Gestures,” *Japan Times*, October 21, 2008,

<https://www.japantimes.co.jp/news/2008/10/21/reference/jr-gestures/#.WvIG49Mvzu1>.

The MTA subway system in New York City: Allan Richarz, “Why Japan’s Rail Workers Can’t Stop Pointing at Things,” *Atlas Obscura*, March 29, 2017,

<https://www.atlasobscura.com/articles/pointing-and-calling-japan-trains>.

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researchers in Great Britain began working: Sarah Milne, Sheina Orbell, and Paschal Sheeran, “Combining Motivational and Volitional Interventions to Promote Exercise Participation: Protection Motivation Theory and Implementation Intentions,” *British Journal of Health Psychology* 7 (May 2002): 163–184.

implementation intentions are effective: Peter Gollwitzer and Paschal Sheeran, “Implementation Intentions and Goal Achievement: A Meta-Analysis of Effects and Processes,” *Advances in Experimental Social Psychology* 38 (2006): 69–119.

writing down the exact time and date of when you will get a flu shot: Katherine L.

Milkman, John Beshears, James J. Choi, David Laibson, and Brigitte C. Madrian, "Using Implementation Intentions Prompts to Enhance Influenza Vaccination Rates," *Proceedings of the National Academy of Sciences* 108, no. 26 (June 2011): 10415–10420.

recording the time of your colonoscopy appointment: Katherine L. Milkman, John

Beshears, James J. Choi, David Laibson, and Brigitte C. Madrian, "Planning Prompts as a Means of Increasing Preventive Screening Rates," *Preventive Medicine* 56, no. 1 (January 2013): 92–93.

voter turnout increases: David W. Nickerson and Todd Rogers, "Do You Have a Voting

Plan? Implementation Intentions, Voter Turnout, and Organic Plan Making," *Psychological Science* 21, no. 2 (2010): 194–199.

Other successful government programs: "Policymakers around the World Are

Embracing Behavioural Science," *The Economist*, May 18, 2017,

<https://www.economist.com/news/international/21722163-experimental-iterative-data-driven-approach-gaining-ground-policymakers-around>.

people who make a specific plan for when and where: Edwin Locke and Gary Latham,

"Building a Practically Useful Theory of Goal Setting and Task Motivation: A 35-Year Odyssey," *American Psychologist* 57, no. 9 (2002): 705–717, doi:10.1037//0003-066x.57.9.705.

hope is usually higher: Hengchen Dai, Katherine L. Milkman, and Jason Riis, "The Fresh

Start Effect: Temporal Landmarks Motivate Aspirational Behavior," *PsycEXTRA Dataset*, 2014, doi:10.1037/e513702014-058.

writer Jason Zweig noted: Jason Zweig, "Elevate Your Financial IQ: A Value Packed

Discussion with Jason Zweig," interview by Shane Parrish, *The Knowledge Project*, Farnam Street, audio, <https://www.fs.blog/2015/10/jason-zweig-knowledge-project>.

many ways to use implementation intentions: For the term *habit stacking*, I am

indebted to S. J. Scott, who wrote a book by the same name. From what I understand, his concept is slightly different, but I like the term and thought it appropriate to use in this chapter. Previous writers such as Courtney Carver and Julien Smith have also used the term *habit stacking*, but in different contexts.

The French philosopher Denis Diderot: "Denis Diderot," *New World Encyclopedia*,

http://www.newworldencyclopedia.org/entry/Denis_Diderot, last modified October 26, 2017.

acquired a scarlet robe: *Encyclopædia Britannica*, vol. 8 (1911), s.v. “Denis Diderot.”

Diderot’s scarlet robe is frequently described as a gift from a friend. However, I could find no original source claiming it was a gift nor any mention of the friend who supplied the robe. If you happen to know any historians specializing in robe acquisitions, feel free to point them my way so we can clarify the mystery of the source of Diderot’s famous scarlet robe.

“no more coordination, no more unity, no more beauty”: Denis Diderot, “Regrets for My Old Dressing Gown,” trans. Mitchell Abidor, 2005, <https://www.marxists.org/reference/archive/diderot/1769/regrets.htm>.

The Diderot Effect states: Juliet Schor, *The Overspent American: Why We Want What We Don’t Need* (New York: HarperPerennial, 1999).

which was created by BJ Fogg: In this chapter, I used the term *habit stacking* to refer to linking a new habit to an old one. For this idea, I give credit to BJ Fogg. In his work, Fogg uses the term *anchoring* to describe this approach because your old habit acts as an “anchor” that keeps the new one in place. No matter what term you prefer, I believe it is a very effective strategy. You can learn more about Fogg’s work and his Tiny Habits Method at <https://www.tinyhabits.com>.

“One in, one out”: Dev Basu (@devbasu), “Have a one-in-one-out policy when buying things,” Twitter, February 11, 2018, <https://twitter.com/devbasu/status/962778141965000704>.

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choose products not because of what they are: Multiple research studies have shown that the mere sight of food can make us feel hungry even when we don’t have actual physiological hunger. According to one researcher, “dietary behaviors are, in large part, the consequence of automatic responses to contextual food cues.” For more, see D. A. Cohen and S. H. Babey, “Contextual Influences on Eating Behaviours: Heuristic Processing and Dietary Choices,” *Obesity Reviews* 13, no. 9 (2012), doi:10.1111/j.1467-789x.2012.01001.x; and Andrew J. Hill,

Lynn D. Magson, and John E. Blundell, "Hunger and Palatability: Tracking Ratings of Subjective Experience Before, during and after the Consumption of Preferred and Less Preferred Food," *Appetite* 5, no. 4 (1984), doi:10.1016/s0195-6663(84)80008-2.

Behavior is a function of the Person in their Environment: Kurt Lewin, *Principles of Topological Psychology* (New York: McGraw-Hill, 1936).

Suggestion Impulse Buying: Hawkins Stern, "The Significance of Impulse Buying Today," *Journal of Marketing* 26, no. 2 (1962), doi:10.2307/1248439.

45 percent of Coca-Cola sales: Michael Moss, "Nudged to the Produce Aisle by a Look in the Mirror," *New York Times*, August 27, 2013, https://www.nytimes.com/2013/08/28/dining/wooing-us-down-the-produce-aisle.html?_r=0.

People drink Bud Light because: The more exposure people have to food, the more likely they are to purchase it and eat it. T. Burgoine et al., "Associations between Exposure to Takeaway Food Outlets, Takeaway Food Consumption, and Body Weight in Cambridgeshire, UK: Population Based, Cross Sectional Study," *British Medical Journal* 348, no. 5 (2014), doi:10.1136/bmj.g1464.

The human body has about eleven million sensory receptors: Timothy D. Wilson, *Strangers to Ourselves: Discovering the Adaptive Unconscious* (Cambridge, MA: Belknap Press, 2004), 24.

half of the brain's resources are used on vision: B. R. Sheth et al., "Orientation Maps of Subjective Contours in Visual Cortex," *Science* 274, no. 5295 (1996), doi:10.1126/science.274.5295.2110.

When their energy use was obvious and easy to track: This story was told to Donella Meadows at a conference in Kollekolle, Denmark, in 1973. For more, see Donella Meadows and Diana Wright, *Thinking in Systems: A Primer* (White River Junction, VT: Chelsea Green, 2015), 109.

the stickers cut bathroom cleaning costs: The actual estimate was 8 percent, but given the variables used, anywhere between 5 percent and 10 percent savings annually is a reasonable guess. Blake Evans-Pritchard, "Aiming to Reduce Cleaning Costs," *Works That Work*, Winter 2013, <https://worksthatwork.com/1/urinal-fly>.

sleeping . . . was the only action that happened in that room: "Techniques involving stimulus control have even been successfully used to help people with

insomnia. In short, those who had trouble falling asleep were told to only go to their room and lie in their bed when they were tired. If they couldn't fall asleep, they were told to get up and change rooms. Strange advice, but over time, researchers found that by associating the bed with 'It's time to go to sleep' and not with other activities (reading a book, just lying there, etc.), participants were eventually able to quickly fall asleep due to the repeated process: it became almost automatic to fall asleep in their bed because a successful trigger had been created." For more, see Charles M. Morin et al., "Psychological and Behavioral Treatment of Insomnia: Update of the Recent Evidence (1998–2004)," *Sleep* 29, no. 11 (2006), doi:10.1093/sleep/29.11.1398; and Gregory Ciotti, "The Best Way to Change Your Habits? Control Your Environment," Sparring Mind, <https://www.sparringmind.com/changing-habits>.

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Follow-up research revealed that 35 percent of service members: Lee N. Robins et al., “Vietnam Veterans Three Years after Vietnam: How Our Study Changed Our View of Heroin,” *American Journal on Addictions* 19, no. 3 (2010), doi:10.1111/j.1521-0391.2010.00046.x.

the creation of the Special Action Office of Drug Abuse Prevention: “Excerpts from President’s Message on Drug Abuse Control,” *New York Times*, June 18, 1971, <https://www.nytimes.com/1971/06/18/archives/excerpts-from-presidents-message-on-drug-abuse-control.html>.

nine out of ten soldiers who used heroin in Vietnam: Lee N. Robins, Darlene H. Davis, and David N. Nurco, “How Permanent Was Vietnam Drug Addiction?” *American Journal of Public Health* 64, no. 12 (suppl.) (1974), doi:10.2105/ajph.64.12_suppl.38.

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It’s easier to practice self-restraint when you don’t have to use it: “Our prototypical model of self-control is angel on one side and devil on the other, and they battle it out. . . . We tend to think of people with strong willpower as people who are able to fight this battle effectively. Actually, the people who are really good at self-control never have these battles in the first place.” For more, see Brian Resnick, “The Myth of Self-Control,” *Vox*, November 24, 2016, <https://www.vox.com/science-and-health/2016/11/3/13486940/self-control-psychology-myth>.

A habit that has been encoded in the mind is ready to be used: Wendy Wood and Dennis Runger, “Psychology of Habit,” *Annual Review of Psychology* 67, no. 1 (2016), doi:10.1146/annurev-psych-122414-033417.

The cues were still internalized: “The Biology of Motivation and Habits: Why We Drop the Ball,” *Therapist Uncensored*, 20:00, <http://www.therapistuncensored.com/biology-of-motivation-habits>, accessed June 8, 2018.

Shaming obese people with weight-loss presentations: Sarah E. Jackson, Rebecca J.

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<https://www.nationalgeographic.com/magazine/2017/09/the-addicted-brain>.

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Nearly every food in a bag: "Tweaking Tastes and Creating Cravings," *60 Minutes*,

November 27, 2011. <https://www.youtube.com/watch?v=a7Wh3uq1yTc>.

French fries . . . are a potent combination: Steven Witherly, *Why Humans Like Junk*

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in Stephan Guyenet, "Why Are Some People 'Carboholics'?" July 26, 2017,

<http://www.stephanguyenet.com/why-are-some-people-carboholics>. The

adapted version is given with permission granted in an email exchange with the author in April 2018.

The importance of dopamine: “The importance of dopamine was discovered by accident. In 1954, James Olds and Peter Milner, two neuroscientists at McGill University, decided to implant an electrode deep into the center of a rat’s brain. The precise placement of the electrode was largely happenstance; at the time, the geography of the mind remained a mystery. But Olds and Milner got lucky. They inserted the needle right next to the nucleus accumbens (NAcc), a part of the brain that generates pleasurable feelings. Whenever you eat a piece of chocolate cake, or listen to a favorite pop song, or watch your favorite team win the World Series, it is your NAcc that helps you feel so happy. But Olds and Milner quickly discovered that too much pleasure can be fatal. They placed the electrodes in several rodents’ brains and then ran a small current into each wire, making the NAccs continually excited. The scientists noticed that the rodents lost interest in everything. They stopped eating and drinking. All courtship behavior ceased. The rats would just huddle in the corners of their cages, transfixed by their bliss. Within days, all of the animals had perished. They died of thirst. For more, see Jonah Lehrer, *How We Decide* (Boston: Houghton Mifflin Harcourt, 2009).

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Habits are a dopamine-driven feedback loop: I first heard the term *dopamine-driven feedback loop* from Chamath Palihapitiya. For more, see “Chamath Palihapitiya, Founder and CEO Social Capital, on Money as an Instrument of Change,” Stanford Graduate School of Business, November 13, 2017, <https://www.youtube.com/watch?v=PMotykw0Sik>.

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dopamine is released not only when you experience pleasure: Wolfram Schultz, “Neuronal Reward and Decision Signals: From Theories to Data,” *Physiological Reviews* 95, no. 3 (2015), doi:10.1152/physrev.00023.2014, fig. 8; Fran Smith, “How Science Is Unlocking the Secrets of Addiction,” *National Geographic*, September 2017, <https://www.nationalgeographic.com/magazine/2017/09/the-addicted-brain>.

whenever dopamine rises, so does your motivation: Dopamine compels you to seek, explore, and take action: “Dopamine-energized, this mesolimbic SEEKING system, arising from the ventral tegmental area (VTA), encourages foraging, exploration, investigation, curiosity, interest and expectancy. Dopamine fires each time the rat (or human) explores its environment. . . . I can look at the animal and tell when I am tickling its SEEKING system because it is exploring and sniffing.” For more, see Karin Badt, “Depressed? Your ‘SEEKING’ System Might Not Be Working: A Conversation with Neuroscientist Jaak Panksepp,” Huffington Post, December 6, 2017, http://www.huffingtonpost.com/karin-badt/depressed-your-seeking-sy_b_3616967.html.

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Of the ten people in the class, four became astronauts: Mike Massimino, “Finding the Difference Between ‘Improbable’ and ‘Impossible,’” interview by James

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By the end of the experiment, nearly 75 percent of the subjects: Follow-up studies show that if there was just one actor in the group who disagreed with the group, then the subject was far more likely to state their true belief that the lines were different lengths. When you have an opinion that dissents from the tribe, it is much easier to stand by it if you have an ally. When you need the strength to stand up to the social norm, find a partner. For more, see Solomon E. Asch, "Opinions and Social Pressure," *Scientific American* 193, no. 5 (1955), doi:10.1038/scientificamerican1155–31; and William N. Morris and Robert S. Miller, "The Effects of Consensus-Breaking and Consensus-Preempting Partners on Reduction of Conformity," *Journal of Experimental Social Psychology* 11, no. 3 (1975), doi:10.1016/s0022–1031(75)80023–0.

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Ed Latimore, a boxer and writer: Ed Latimore (@EdLatimore), "Odd realization: My focus and concentration goes up just by putting my headphones [on] while

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فصل ۱۱

In the end, they had little to show for their efforts: This story comes from page 29 of *Art & Fear* by David Bayles and Ted Orland. In an email conversation with Orland on October 18, 2016, he explained the origins of the story. "Yes, the 'ceramics story' in 'Art & Fear' is indeed true, allowing for some literary license in the retelling. Its real-world origin was as a gambit employed by photographer Jerry Uelsmann to motivate his Beginning Photography students at the University of Florida. As retold in 'Art & Fear' it faithfully captures the scene as Jerry told it to me—except I replaced photography with ceramics as the medium being explored. Admittedly, it would've been easier to retain photography as the art medium being discussed, but David Bayles (co-author) & I are both photographers ourselves, and at the time we were consciously trying to broaden the range of media being referenced in the text. The intriguing thing to me is that it hardly matters what art form was invoked—the moral of the story appears to hold equally true straight across the whole art spectrum (and even outside the arts, for that matter)." Later in that same email, Orland said, "You have our permission to reprint any or all of the 'ceramics' passage in your forthcoming book." In the end, I settled on publishing an adapted version, which combines their telling of the ceramics story with facts from the original source of Uelsmann's photography students. David Bayles and Ted Orland, *Art & Fear: Observations on the Perils (and Rewards) of Artmaking* (Santa Cruz, CA: Image Continuum Press, 1993), 29.

As Voltaire once wrote: Voltaire, *La Bégueule. Conte Moral* (1772).

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"the actions become so automatic": George Henry Lewes, *The Physiology of Common Life* (Leipzig: Tauchnitz, 1860).

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habits form based on frequency, not time: Hermann Ebbinghaus was the first person to describe learning curves in his 1885 book *Über das Gedächtnis*. Hermann Ebbinghaus, *Memory: A Contribution to Experimental Psychology* (United States: Scholar Select, 2016).

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درس‌های کوچکی از چهار قانون

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