NOTES

The page numbers for the notes that appeared in the print version of this title are not in your e-book. Please use the search function on your e-reading device to search for the relevant passages documented or discussed.

Introduction

1. Crum, A.J., and Langer, E.J. (2007). Mind-set matters: Exercise and the placebo effect. *Psychological Science*, *18*(2), 165–71.
2. Sharpless, B.A., and Barber, J.P. (2011). Lifetime prevalence rates of sleep paralysis: A systematic review. *Sleep Medicine Reviews*, *15*(5), 311–15.
3. For a fascinating and in-depth discussion of the many factors that contributed to the Hmong deaths in the USA, see Adler, S.R. (2011). *Sleep Paralysis: Night-mares, Nocebos, and the Mind-Body Connection*. New Brunswick, NJ: Rutgers University Press.
4. Zheng, J., Zheng, D., Su, T., and Cheng, J. (2018). Sudden unexplained nocturnal death syndrome: The hundred years' enigma. *Journal of the American Heart Association*, *7*(5), e007837.
5. Alia Crum described the implications of mindsets at the World Economic Forum in January 2018: https://sparq.stanford.edu/sparq-health-director-crum-discusses-mindsets-world-economic-forum-video.

Chapter 1: The Prediction Machine

1. These descriptions of the drone attacks are indebted to Shackle, S. (2020, December 1). The mystery of the Gatwick drone. *Guardian*. https://www.theguardian.com/uk-news/2020/dec/01/the-mystery-of-the-gatwick-drone. See also Jarvis, J. (2018, December 23). Gatwick drone latest. *Evening Standard*. https://www.standard.co.uk/news/uk/gatwick-drone-latest-police-say-it-is-a-possibility-there-was-never-a-drone-a4024626.html.
2. The term "prediction machine" was introduced by Professor Andy Clark (2016) in his book *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*. Oxford: Oxford University Press. Others refer to it as the "prediction engine"—but for clarity and consistency, I shall use Clark's term throughout.
3. Von Helmholtz, H. (1925). *Treatise on Physiological Optics*, vol. 3, ed. James P.C. Southall, 1–37. Birmingham, AL: Optical Society of America. "It may often be rather hard to say how much of our apperceptions (Anschuuuwen) as derived by the sense of sight is due directly to sensation, and how much of them, on the other hand, is due to experience and training." See also Meyering, T.C. (1989). *Helmholtz's Theory of Unconscious Inferences.* In: T.C. Meyering (Ed.). *Historical Roots of Cognitive Science*, 181–208. Dordrecht: Springer.
4. Foa, M. (2015). *Georges Seurat: The Art of Vision*, 21. New Haven, CT: Yale University Press.
5. For an in-depth discussion of predictive coding and its many implications, see Clark, A. (2016). *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*. Oxford: Oxford University Press; Hohwy, J. (2013). *The Predictive Mind*. Oxford: Oxford University Press. See also De Lange, F.P., Heilbron, M., and Kok, P. (2018). How do expectations shape perception? *Trends in Cognitive Sciences*, *22*(9), 764–79; O'Callaghan, C., Kveraga, K., Shine, J.M., Adams Jr, R.B., and Bar, M. (2017). Predictions penetrate perception: Converging insights from brain, behaviour and disorder. *Consciousness and Cognition*, *47*, 63–74.
6. Barrett, L.F. (2017). *How Emotions Are Made: The Secret Life of the Brain*, 60. London: Pan Macmillan.
7. Fenske, M.J., Aminoff, E., Gronau, N., and Bar, M. (2006). Top-down facilitation of visual object recognition: Object-based and context-based contributions. *Progress in Brain Research*, *155*, 3–21.
8. Bar, M., Kassam, K.S., Ghuman, A.S., Boshyan, J., Schmid, A.M., Dale, A.M.,… and Halgren, E. (2006). Top-down facilitation of visual recognition. *Proceedings of the National Academy of Sciences*, *103*(2), 449–54.
9. Madrigal, A. (2014, May 5). Things you cannot unsee. *Atlantic*. https://www.theatlantic.com/technology/archive/2014/05/10-things-you-cant-unsee-and-what-that-says-about-your-brain/361335.
10. Brugger, P., and Brugger, S. (1993). The Easter bunny in October: Is it disguised as a duck? *Perceptual and Motor Skills*, *76*(2), 577–78. See the following for a discussion of this paper's interpretation in light of modern theories of predictive processing: Seriès, P., and Seitz, A. (2013). Learning what to expect (in visual perception). *Frontiers in Human Neuroscience*, *7*, 668.
11. Liu, J., Li, J., Feng, L., Li, L., Tian, J., and Lee, K. (2014). Seeing Jesus in toast: Neural and behavioral correlates of face pareidolia. *Cortex*, *53*, 60–77. See also Aru, J., Tulver, K., and Bachmann, T. (2018). It's all in your head: Expectations create illusory perception in a dual-task setup. *Consciousness and Cognition*, *65*, 197–208; Barik, K., Jones, R., Bhattacharya, J., and Saha, G. (2019). Investigating the influence of prior expectation in face pareidolia using spatial pattern. In Tanveer M., and Pachori R. (Eds.). *Machine Intelligence and Signal Analysis*, 437–51. Singapore: Springer.
12. Merckelbach, H., and van de Ven, V. (2001). Another White Christmas: Fantasy proneness and reports of 'hallucinatory experiences' in undergraduate students. *Journal of Behavior Therapy and*

Experimental Psychiatry, *32*(3), 137–44; Crowe, S.F., Barot, J., Caldow, S., D'Aspromonte, J., Dell'Orso, J., Di Clemente, A.,… and Sapega, S. (2011). The effect of caffeine and stress on auditory hallucinations in a non-clinical sample. *Personality and Individual Differences*, *50*(5), 626–30.

13. As noted above, when we hallucinate something, the brain activity is very similar to the responses to actual physical images. Summerfield, C., Egner, T., Mangels, J., and Hirsch, J. (2006). Mistaking a house for a face: Neural correlates of misperception in healthy humans. *Cerebral Cortex*, *16*(4), 500–508.
14. These details come from Huntford, R. (2000). *Scott and Amundsen: Their Race to the South Pole*, 567. London: Abacus.
15. Hartley-Parkinson, R. (2019, April 17). Mum claims she can see Jesus in flames of Notre Dame Cathedral. *Metro.* https://metro.co.uk/2019/04/17/mum-claims-can-see-jesus-flames-notre-dame-cathedral-9225760.
16. Dunning, D., and Balcetis, E. (2013). Wishful seeing: How preferences shape visual perception. *Current Directions in Psychological Science*, *22*(1), 33–37. See also Balcetis, E. (2014). Wishful seeing. https://thepsychologist.bps.org.uk/volume-27/january-2014/wishful-seeing.
17. Greene, B. (2017). How does consciousness happen? https://blog.ted.com/how-does-consciousness-happen-anil-seth-speaks-at-ted2017.
18. https://rarediseases.org/rare-diseases/fnd/.
19. This case study is described in detail in the following paper: Yeo, J.M., Carson, A., and Stone, J. (2019). Seeing again: Treatment of functional visual loss. *Practical Neurology*, *19*(2), 168–72. Enormous thanks to Jon Stone for clarifying some details.
20. For a description of this kind of process, see Pezzulo, G. (2013). Why do you fear the bogeyman? An embodied predictive coding model of perceptual inference. *Cognitive, Affective, and Behavioral Neuroscience*, *14*(3), 902–11.
21. Teachman, B.A., Stefanucci, J.K., Clerkin, E.M., Cody, M.W., and Proffitt, D.R. (2008). A new mode of fear expression: Perceptual bias in height fear. *Emotion*, *8*(2), 296–301.
22. Vasey, M.W., Vilensky, M.R., Heath, J.H., Harbaugh, C.N., Buffington, A.G., and Fazio, R.H. (2012). It was as big as my head, I swear! Biased spider size estimation in spider phobia. *Journal of Anxiety Disorders*, *26*(1), 20–24; Basanovic, J., Dean, L., Riskind, J.H., and MacLeod, C. (2019). High spider-fearful and low spider-fearful individuals differentially perceive the speed of approaching, but not receding, spider stimuli. *Cognitive Therapy and Research*, *43*(2), 514–21.
23. Jolij, J., and Meurs, M. (2011). Music alters visual perception. *PLoS One*, *6*(4), e18861.
    See also Siegel, E.H., Wormwood, J.B., Quigley, K.S., and Barrett, L.F. (2018). Seeing what you feel: Affect drives visual perception of structurally neutral faces. *Psychological Science*, *29*(4), 496–503; Wormwood, J.B., Siegel, E.H., Kopec, J., Quigley, K.S., and Barrett, L.F. (2019). You are what I feel: A test of the affective realism hypothesis. *Emotion*, *19*(5), 788–98. "The present findings are consistent with recent empirical work demonstrating that one's affective state may influence how positive or negative a neutral target face looks to the perceiver in a very literal way (Siegel et al., 2018): neutral faces were perceived as looking more smiling when presented concurrent with suppressed affectively positive stimuli and as looking more scowling when presented concurrent with suppressed affectively negative stimuli." Otten, M., Seth, A.K., and Pinto, Y. (2017). A social Bayesian brain: How social knowledge can shape visual perception. *Brain and Cognition*, *112*, 69–77. O'Callaghan, C., Kveraga, K., Shine, J.M., Adams Jr, R.B., and Bar, M. (2016). Convergent evidence for top-down effects from the "predictive brain." *Behavioral and Brain Sciences*, *39*, e254.
24. Bangee, M., Harris, R.A., Bridges, N., Rotenberg, K.J., and Qualter, P. (2014). Loneliness and attention to social threat in young adults: Findings from an eye tracker study. *Personality and*

Individual Differences, *63*, 16–23.
25. Prinstein, M. (2018). *The Popularity Illusion*, Kindle edition, location 2110. London: Ebury.
26. See the following for a summary of these perceptual effects, their implications for issues like anxiety and depression, and the potential treatment: Herz, N., Baror, S., and Bar, M. (2020). Overarching states of mind. *Trends in Cognitive Sciences*, *24*(3), 184–99; Kube, T., Schwarting, R., Rozenkrantz, L., Glombiewski, J.A., and Rief, W. (2020). Distorted cognitive processes in major depression: A predictive processing perspective. *Biological Psychiatry*, *87*(5), 388–98; Sussman, T.J., Jin, J., and Mohanty, A. (2016). Top-down and bottom-up factors in threat-related perception and attention in anxiety. *Biological Psychology*, *121*(Pt B), 160–72.
27. Shiban, Y., Fruth, M.B., Pauli, P., Kinateder, M., Reichenberger, J., and Mühlberger, A. (2016). Treatment effect on biases in size estimation in spider phobia. *Biological Psychology*, *121*(Pt B), 146–52.
28. Dennis, T.A., and O'Toole, L.J. (2014). Mental health on the go: Effects of a gamified attention-bias modification mobile application in trait-anxious adults. *Clinical Psychological Science*, *2*(5), 576–90; Mogg, K., and Bradley, B.P. (2016). Anxiety and attention to threat: Cognitive mechanisms and treatment with attention bias modification. *Behaviour Research and Therapy*, *87*, 76–108; Kress, L., and Aue, T. (2019). Learning to look at the bright side of life: Attention bias modification training enhances optimism bias. *Frontiers in Human Neuroscience*, *13*, 222; Kuckertz, J.M., Schofield, C.A., Clerkin, E.M., Primack, J., Boettcher, H., Weisberg, R.B.,… and Beard, C. (2019). Attentional bias modification for social anxiety disorder: What do patients think and why does it matter? *Behavioural and Cognitive Psychotherapy*, *47*(1), 16–38; Abado, E., Aue, T., and Okon-Singer, H. (2020). The missing pieces of the puzzle: A review on the interactive nature of a-priori expectancies and attention bias toward threat. *Brain Sciences*, *10*(10), 745; Jones, E.B., and Sharpe, L. (2017). Cognitive bias modification: A review of meta-analyses. *Journal of Affective Disorders*, *223*, 175–83; Gober, C. D., Lazarov, A., and Bar-Haim, Y. (2021). From cognitive targets to symptom reduction: Overview of attention and interpretation bias modification research. *Evidence-Based Mental Health*, *24*(1), 42–46.
29. See the following for a thorough description of gustatory expectation effects and their relation to predictive coding: Piqueras-Fiszman, B., and Spence, C. (2015). Sensory expectations based on product-extrinsic food cues: An interdisciplinary review of the empirical evidence and theoretical accounts. *Food Quality and Preference*, *40*, 165–79.
30. Spence, C., and Piqueras-Fiszman, B. (2014). *The Perfect Meal: The Multisensory Science of Food and Dining*. Chichester: John Wiley and Sons.
31. Lee, L., Frederick, S., and Ariely, D. (2006). Try it, you'll like it: The influence of expectation, consumption, and revelation on preferences for beer. *Psychological Science*, *17*(12), 1054–58.
32. Plassmann, H., O'Doherty, J., Shiv, B., and Rangel, A. (2008). Marketing actions can modulate neural representations of experienced pleasantness. *Proceedings of the National Academy of Sciences*, *105*(3), 1050–54.
33. Clark, A. (2016). *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*, 55–56. Oxford: Oxford University Press.
34. Grabenhorst, F., Rolls, E.T., and Bilderbeck, A. (2007). How cognition modulates affective responses to taste and flavor: Top-down influences on the orbitofrontal and pregenual cingulate cortices. *Cerebral Cortex*, *18*(7), 1549–59.
35. Herz, R.S., and von Clef, J. (2001). The influence of verbal labeling on the perception of odors: Evidence for olfactory illusions? *Perception*, *30*(3), 381–91.
36. Fuller, T. (2013, December 3). A love letter to a smelly fruit. *New York Times*. https://www.nytimes.com/2013/12/08/travel/a-love-letter-to-a-smelly-fruit.html.
37. Amar, M., Ariely, D., Bar-Hillel, M., Carmon, Z., and Ofir, C. (2011). *Brand Names Act Like*

Marketing Placebos. Available at http://www.ratio.huji.ac.il/sites/default/files/publications/dp566.pdf.

38. Langer, E., Djikic, M., Pirson, M., Madenci, A., and Donohue, R. (2010). Believing is seeing: Using mindlessness (mindfully) to improve visual acuity. *Psychological Science*, *21*(5), 661–66. See also Pirson, M., Ie, A., and Langer, E. (2012). Seeing what we know, knowing what we see: Challenging the limits of visual acuity. *Journal of Adult Development*, *19*(2), 59–65. Some may argue that the differences in visual acuity are merely "imagined." For an elegant experiment demonstrating that top-down processing can produce *objectively* sharper vision, see Lupyan, G. (2017). Objective effects of knowledge on visual perception. *Journal of Experimental Psychology: Human Perception and Performance*, *43*(4), 794.

Chapter 2: A Pious Fraud

1. Blease, C., Annoni, M., and Hutchinson, P. (2018). Editors' introduction to special section on meaning response and the placebo effect. *Perspectives in Biology and Medicine*, *61*(3), 349–52. See also letter from Thomas Jefferson to Caspar Wistar, June 21, 1807. Available at: http://memory.loc.gov/service/mss/mtj/mtj1/038/038_0687_0692.pdf.
2. Raglin, J., Szabo, A., Lindheimer, J.B., and Beedie, C. (2020). Understanding placebo and nocebo effects in the context of sport: A psychological perspective. *European Journal of Sport Science*, *20*(3), 293–301; Aronson, J. (1999). Please, please me. *BMJ*, *318*(7185), 716; Kaptchuk, T.J. (1998). Powerful placebo: The dark side of the randomised controlled trial. *Lancet*, *351*(9117), 1722–25; De Craen, A.J., Kaptchuk, T.J., Tijssen, J.G., and Kleij- nen, J. (1999). Placebos and placebo effects in medicine: Historical overview. *Journal of the Royal Society of Medicine*, *92*(10), 511–15.
3. Details of Beecher's wartime experiments, and his overall influence in medicine, can be found in the following: Beecher, H.K. (1946). Pain in men wounded in battle. *Annals of Surgery*, *123*(1), 96–105; Benedetti, F. (2016). Beecher as clinical investigator: Pain and the placebo effect. *Perspectives in Biology and Medicine*, *59*(1), 37–45; Gross, L. (2017). Putting placebos to the test. *PLoS Biology*, *15*(2), e2001998; Evans, D. (2003). *Placebo*. London: HarperCollins; Best, M., and Neuhauser, D. (2010). Henry K. Beecher: Pain, belief and truth at the bedside. The powerful placebo, ethical research and anaesthesia safety. *BMJ Quality and Safety*, *19*(5), 466–68.
4. Colloca, L. (2019). The placebo effect in pain therapies. *Annual Review of Pharmacology and Toxicology 59*, 191–211.
5. https://www.apdaparkinson.org/article/the-placebo-effect-in-clinical-trials-in-parkinsons-disease.
6. Lidstone, S.C., Schulzer, M., Dinelle, K., Mak, E., Sossi, V., Ruth, T.J.,… and Stoessl, A.J. (2010). Effects of expectation on placebo-induced dopamine release in Parkinson disease. *Archives of General Psychiatry*, *67*(8), 857–65; Quattrone, A., Barbagallo, G., Cerasa, A., and Stoessl, A.J. (2018). Neurobiology of placebo effect in Parkinson's disease: What we have learned and where we are going. *Movement Disorders*, *33*(8), 1213–27.
7. Vits, S., Cesko, E., Benson, S., Rueckert, A., Hillen, U., Schadendorf, D., and Schedlowski, M. (2013). Cognitive factors mediate placebo responses in patients with house dust mite allergy. *PLoS One*, *8*(11), e79576. It's worth noting that various factors may influence the placebo responses here, including the patient's existing beliefs and the attitude of the physician. See Howe, L.C., Goyer, J.P., and Crum, A.J. (2017). Harnessing the placebo effect: Exploring the influence of physician characteristics on placebo response. *Health Psychology*, *36*(11), 1074–82; Leibowitz, K.A., Hardebeck, E.J., Goyer, J.P., and Crum, A.J. (2019). The role of patient beliefs in open-label placebo effects. *Health Psychology*, *38*(7), 613–22; Darragh, M., Chang, J.W., Booth, R.J., and Consedine, N.S. (2015). The placebo effect in inflammatory skin reactions: The influence of verbal suggestion on itch and weal size. *Journal of Psychosomatic Research*, *78*(5), 489–94; Pfaar, O., Agache, I., Bergmann, K.C., Bindslev-Jensen, C., Bousquet, J., Creticos, P.S.,… and Frew, A.J. (2020). Placebo effects in allergen immunotherapy: An EAACI Task Force Position Paper. *Allergy*, *76*(3), 629–47.
8. Kemeny, M.E., Rosenwasser, L.J., Panettieri, R.A., Rose, R.M., Berg-Smith, S.M., and Kline, J.N. (2007). Placebo response in asthma: A robust and objective phenomenon. *Journal of Allergy and Clinical Immunology*, *119*(6), 1375–81. Placebos seem to have very large effects on patients' subjective distress, but the differences can also be noted in objective measures of their breathing. See Luc, F., Prieur, E., Whitmore, G.A., Gibson, P.G., Vandemheen, K.L., and Aaron, S.D. (2019). Placebo effects in clinical trials evaluating patients with uncontrolled persistent asthma. *Annals of the American Thoracic Society*, *16*(9), 1124–30.

9. Al-Lamee, R., Thompson, D., Dehbi, H.M., Sen, S., Tang, K., Davies, J.,… and Nijjer, S.S. (2018). Percutaneous coronary intervention in stable angina (ORBITA): A double-blind, randomised controlled trial. *Lancet*, *391*(10115), 31–40.
10. Horwitz, R.I., Viscoli, C.M., Donaldson, R.M., Murray, C.J., Ransohoff, D.F., Berkman, L.,… and Sindelar, J. (1990). Treatment adherence and risk of death after a myocardial infarction. *Lancet*, *336*(8714), 542–45; for a discussion, see Brown, W.A. (1998). Harnessing the placebo effect. *Hospital Practice*, *33*(7), 107–16.
11. See, for instance, Simpson, S.H., Eurich, D.T., Majumdar, S.R., Padwal, R.S., Tsuyuki, R.T., Varney, J., and Johnson, J.A. (2006). A meta-analysis of the association between adherence to drug therapy and mortality. *BMJ*, *333*(7557), 15; Pressman, A., Avins, A.L., Neuhaus, J., Ackerson, L., and Rudd, P. (2012). Adherence to placebo and mortality in the Beta Blocker Evaluation of Survival Trial (BEST). *Contemporary Clinical Trials*, *33*(3), 492–98.
12. This argument has been proposed by numerous scientists. See Moerman, D.E. (2002). *Meaning, Medicine, and the "Placebo Effect,"* 116–21. Cambridge: Cambridge University Press; Chewning, B. (2006). The healthy adherer and the placebo effect. *BMJ*, *333*(7557), 18; Wilson, I.B. (2010). Adherence, placebo effects, and mortality. *Journal of General Internal Medicine*, *25*(12), 1270–72; Yue, Z., Cai, C., Ai-Fang, Y., Feng-Min, T., Li, C., and Bin, W. (2014). The effect of placebo adherence on reducing cardiovascular mortality: A meta-analysis. *Clinical Research in Cardiology*, *103*(3), 229–35.
13. The preceding three paragraphs synthesize various explanations for the placebo effect, including Petrie, K.J., and Rief, W. (2019). Psychobiological mechanisms of placebo and nocebo effects: Pathways to improve treatments and reduce side effects. *Annual Review of Psychology*, *70*, 599–625; Colloca, L., and Barsky, A.J. (2020). Placebo and nocebo effects. *New England Journal of Medicine*, *382*(6), 554–61; Colagiuri, B., Schenk, L.A., Kessler, M.D., Dorsey, S.G., and Colloca, L. (2015). The placebo effect: From concepts to genes. *Neuroscience*, *307*, 171–90; Ongaro, G., and Kaptchuk, T.J. (2019). Symptom perception, placebo effects, and the Bayesian brain. *Pain*, *160*(1), 1; Koban, L., Jepma, M., López-Solà, M., and Wager, T.D. (2019). Different brain networks mediate the effects of social and conditioned expectations on pain. *Nature Communications*, *10*(1), 1–13; Miller, F.G., Colloca, L., and Kaptchuk, T.J. (2009). The placebo effect: Illness and interpersonal healing. *Perspectives in Biology and Medicine*, *52*(4), 518; Trimmer, P.C., Marshall, J.A., Fromhage, L., McNamara, J.M., and Houston, A.I. (2013). Understanding the placebo effect from an evolutionary perspective. *Evolution and Human Behavior*, *34*(1), 8–15; Meissner, K. (2011). The placebo effect and the autonomic nervous system: Evidence for an intimate relationship. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *366*(1572), 1808–17.
14. Crum, A.J., Phillips, D.J., Goyer, J.P., Akinola, M., and Higgins, E.T. (2016). Transforming water: Social influence moderates psychological, physiological, and functional response to a placebo product. *PLoS One*, *11*(11), e0167121. See also https://sparq.stanford.edu/director-crum-publishes-intriguing-study-placebo-effects.
15. Ho, J.T., Krummenacher, P., Lesur, M.R., and Lenggenhager, B. (2020). Real bodies not required? Placebo analgesia and pain perception in immersive virtual and augmented reality. *bioRxiv*. https://www.biorxiv.org/content/10.1101/2020.12.18.423276v1.abstract.
16. Buckalew, L.W., and Ross, S. (1981). Relationship of perceptual characteristics to efficacy of placebos. *Psychological Reports*, *49*(3), 955–61.
17. Faasse, K., and Martin, L.R. (2018). The power of labeling in nocebo effects. *International Review of Neurobiology*, *139*, 379–406.
18. Faasse, K., Martin, L.R., Grey, A., Gamble, G., and Petrie, K.J. (2016). Impact of brand or generic labeling on medication effectiveness and side effects. *Health Psychology*, *35*(2), 187.

19. Walach, H., and Jonas, W.B. (2004). Placebo research: The evidence base for harnessing self-healing capacities. *Journal of Alternative and Complementary Medicine*, *10* (Supplement 1), S-103.
20. Howe, L.C., Goyer, J.P., and Crum, A.J. (2017). Harnessing the placebo effect: Exploring the influence of physician characteristics on placebo response. *Health Psychology*, *36*(11), 1074.
21. Howick, J., Bishop, F.L., Heneghan, C., Wolstenholme, J., Stevens, S., Hobbs, F.R., and Lewith, G. (2013). Placebo use in the United Kingdom: Results from a national survey of primary care practitioners. *PLoS One*, *8*(3), e58247.
22. Silberman, S. (2009). Placebos are getting more effective. Drug makers are desperate to know why. *Wired Magazine*, *17*, 1–8.
23. Walsh, B.T., Seidman, S.N., Sysko, R., and Gould, M. (2002). Placebo response in studies of major depression: Variable, substantial, and growing. *JAMA*, *287*(14), 1840–47; Dunlop, B. W., Thase, M.E., Wun, C.C., Fayyad, R., Guico-Pabia, C.J., Musgnung, J., and Ninan, P.T. (2012). A meta-analysis of factors impacting detection of antidepressant efficacy in clinical trials: The importance of academic sites. *Neuropsychopharmacology*, *37*(13), 2830–36.
24. Tuttle, A.H., Tohyama, S., Ramsay, T., Kimmelman, J., Schweinhardt, P., Bennett, G.J., and Mogil, J.S. (2015). Increasing placebo responses over time in US clinical trials of neuropathic pain. *Pain*, *156*(12), 2616–26. For a breakdown of the statistics, see Marchant, J. (2015). Strong placebo response thwarts painkiller trials. *Nature News*. doi: 10.1038/nature.2015.18511.
25. Bennett, G.J. (2018). Does the word "placebo" evoke a placebo response? *Pain*, *159*(10), 1928–31.
26. Beecher, H.K. (1955). The powerful placebo. *Journal of the American Medical Association*, *159*(17), 1602–6. (The emphasis, within the quote, is my own.)
27. For evidence that an explanation can heighten the effects of open-label placebos, see Locher, C., Nascimento, A.F., Kirsch, I., Kossowsky, J., Meyer, A., and Gaab, J. (2017). Is the rationale more important than deception? A randomized controlled trial of open-label placebo analgesia. *Pain*, *158*(12), 2320–28; Wei, H., Zhou, L., Zhang, H., Chen, J., Lu, X., and Hu, L. (2018). The influence of expectation on nondeceptive placebo and nocebo effects. *Pain Research and Management*. doi: 10.1155/2018/8459429.
28. Carvalho, C., Caetano, J.M., Cunha, L., Rebouta, P., Kaptchuk, T.J., and Kirsch, I. (2016). Open-label placebo treatment in chronic low back pain: A randomized controlled trial. *Pain*, *157*(12), 2766.
29. Carvalho, C., Pais, M., Cunha, L., Rebouta, P., Kaptchuk, T.J., and Kirsch, I. (2020). Open-label placebo for chronic low back pain: A 5-year follow-up. *Pain*, *162* (5), 1521–27.
30. Kaptchuk, T.J., and Miller, F.G. (2018). Open label placebo: Can honestly prescribed placebos evoke meaningful therapeutic benefits? *BMJ*, *363*, k3889. doi: 10.1136/bmj.k3889.
31. Schaefer, M., Sahin, T., and Berstecher, B. (2018). Why do open-label placebos work? A randomized controlled trial of an open-label placebo induction with and without extended information about the placebo effect in allergic rhinitis. *PLoS One*, *13*(3), e0192758.
32. Bernstein, M.H., Magill, M., Beaudoin, F.L., Becker, S.J., and Rich, J.D. (2018). Harnessing the placebo effect: A promising method for curbing the opioid crisis? *Addiction*, *113*(11), 2144–45.
33. CDC, Opioid data analysis and resources, https://www.cdc.gov/drugoverdose/data/analysis.html.
34. Morales-Quezada, L., Mesia-Toledo, I., Estudillo-Guerra, A., O'Connor, K.C., Schneider, J.C., Sohn, D.J.,… and Zafonte, R. (2020). Conditioning open-label placebo: A pilot pharmacobehavioral approach for opioid dose reduction and pain control. *Pain Reports*, *5*(4). See also Flowers, K.M., Patton, M.E., Hruschak, V.J., Fields, K.G., Schwartz, E., Zeballos, J.,… and Schreiber, K.L. (2021). Conditioned open-label placebo for opioid reduction after spine surgery: A randomized controlled trial. *Pain*, *162*(6), 1828–39.
35. Laferton, J.A., Mora, M.S., Auer, C.J., Moosdorf, R., and Rief, W. (2013). Enhancing the efficacy of heart surgery by optimizing patients' preoperative expectations: Study protocol of a randomized

controlled trial. *American Heart Journal*, *165*(1), 1–7. See the following for a more elaborate description of the theory behind these kinds of interventions: Doering, B.K., Glombiewski, J.A., and Rief, W. (2018). Expectation-focused psychotherapy to improve clinical outcomes. *International Review of Neurobiology*, *138*, 257–70.

36. Auer, C.J., Laferton, J.A., Shedden-Mora, M. C., Salzmann, S., Moosdorf, R., and Rief, W. (2017). Optimizing preoperative expectations leads to a shorter length of hospital stay in CABG patients: Further results of the randomized controlled PSY-HEART trial. *Journal of Psychosomatic Research*, *97*, 82–89.
37. Rief, W., Shedden-Mora, M.C., Laferton, J.A., Auer, C., Petrie, K.J., Salzmann, S.,… and Moosdorf, R. (2017). Preoperative optimization of patient expectations improves long-term outcome in heart surgery patients: Results of the randomized controlled PSY-HEART trial. *BMC Medicine*, *15*(1), 1–13.
38. For further evidence of the potential for people's expectations to shape the success of surgical procedures, see Auer, C.J., Glombiewski, J.A., Doering, B.K., Winkler, A., Laferton, J.A., Broadbent, E., and Rief, W. (2016). Patients' expectations predict surgery outcomes: A meta-analysis. *International Journal of Behavioral Medicine*, *23*(1), 49–62; Kube, T., Glombiewski, J.A., and Rief, W. (2018). Using different expectation mechanisms to optimize treatment of patients with medical conditions: A systematic review. *Psychosomatic Medicine*, *80*(6), 535–43; Van Der Meij, E., Anema, J.R., Leclercq, W.K., Bongers, M.Y., Consten, E.C., Koops, S.E.S.,… and Huirne, J.A. (2018). Personalised perioperative care by e-health after intermediate-grade abdominal surgery: A multicentre, single-blind, randomised, placebo-controlled trial. *Lancet*, *392*(10141), 51–59; Laferton, J.A., Oeltjen, L., Neubauer, K., Ebert, D.D., and Munder, T. (2020). The effects of patients' expectations on surgery outcome in total hip and knee arthroplasty: A prognostic factor meta-analysis. *Health Psychology Review*. doi: 10.1080/17437199.2020.1854051.
39. Akroyd, A., Gunn, K.N., Rankin, S., Douglas, M., Kleinstäuber, M., Rief, W., and Petrie, K.J. (2020). Optimizing patient expectations to improve therapeutic response to medical treatment: A randomized controlled trial of iron infusion therapy. *British Journal of Health Psychology*, *25*(3), 639–51.
40. Leibowitz, K.A., Hardebeck, E.J., Goyer, J.P., and Crum, A.J. (2018). Physician assurance reduces patient symptoms in US adults: An experimental study. *Journal of General Internal Medicine*, *33*(12), 2051–52.
41. Rakel, D., Barrett, B., Zhang, Z., Hoeft, T., Chewning, B., Marchand, L., and Scheder, J. (2011). Perception of empathy in the therapeutic encounter: Effects on the common cold. *Patient Education and Counseling*, *85*(3), 390–97.

Chapter 3: Do No Harm

1. Rose, R. (1956). *Living Magic: The Realities Underlying the Psychical Practices and Beliefs of Australian Aborigines*, 28–47. New York: Rand McNally.
2. See also Cannon, W.B. (1942). "Voodoo" death. *American Anthropologist*, *44*(2), 169–81; Benson, H. (1997). The nocebo effect: History and physiology. *Preventive Medicine*, *26*(5), 612–15; Byard, R. (1988). Traditional medicine of aboriginal Australia. *CMAJ: Canadian Medical Association Journal*, *139*(8), 792. For a discussion of alternative explanations of these deaths: Lester, D. (2009). Voodoo death. *OMEGA: Journal of Death and Dying*, *59*(1), 1–18.
3. For a summary of medical theories of voodoo death, see Samuels, M.A. (2007). "Voodoo" death revisited: The modern lessons of neurocardiology. *Cleveland Clinic Journal of Medicine*, *74*(Suppl 1), S8–S16; Morse, D.R., Martin, J., and Moshonov, J. (1991). Psychosomatically induced death relative to stress, hypnosis, mind control, and voodoo: Review and possible mechanisms. *Stress Medicine*, *7*(4), 213–32.
4. Meador, C.K. (1992). Hex death: Voodoo magic or persuasion? *Southern Medical Journal*, *85*(3), 244–47.
5. Milton, G.W. (1973). Self-willed death or the bone-pointing syndrome. *Lancet*, *301*(7817), 1435–36. For many similar accounts, see Benson, H. (1997). The nocebo effect: History and physiology. *Preventive Medicine*, *26*(5), 612–15.
6. The potential link between the nocebo effect and voodoo death is very widely recognized. See, for example, Edwards, I.R., Graedon, J., and Graedon, T. (2010). Placebo harm. *Drug Safety*, *33*(6), 439–41; Benedetti, F. (2013). Placebo and the new physiology of the doctor–patient relationship. *Physiological Reviews*, *93*(3), 1207–46; Cheyne, J.A., and Pennycook, G. (2013). Sleep paralysis postepisode distress: Modeling potential effects of episode characteristics, general psychological distress, beliefs, and cognitive style. *Clinical Psychological Science*, *1*(2), 135–48.
7. Mackenzie, J.N. (1886). The production of the so-called "rose cold" by means of an artificial rose, with remarks and historical notes. *American Journal of the Medical Sciences*, *91*(181), 45. While this is based on a single anecdote, modern research shows that the mere expectation of a hay fever attack can indeed bring about symptoms in sufferers: Besedovsky, L., Benischke, M., Fischer, J., Yazdi, A.S., and Born, J. (2020). Human sleep consolidates allergic responses conditioned to the environmental context of an allergen exposure. *Proceedings of the National Academy of Sciences*, *117*(20), 10983–88. See also Jewett, D.L., Fein, G., and Greenberg, M.H. (1990). A double-blind study of symptom provocation to determine food sensitivity. *New England Journal of Medicine*, *323*(7), 429–33.
8. Beecher, H.K. (1955). The powerful placebo. *Journal of the American Medical Association*, *159*(17), 1602–6.
9. Howick, J., Webster, R., Kirby, N., and Hood, K. (2018). Rapid overview of systematic reviews of nocebo effects reported by patients taking placebos in clinical trials. *Trials*, *19*(1), 1–8; see also Mahr, A., Golmard, C., Pham, E., Iordache, L., Deville, L., and Faure, P. (2017). Types, frequencies, and burden of nonspecific adverse events of drugs: Analysis of randomized placebo-controlled clinical trials. *Pharmacoepidemiology and Drug Safety*, *26*(7), 731–41.
10. https://www.nhs.uk/medicines/finasteride.
11. Mondaini, N., Gontero, P., Giubilei, G., Lombardi, G., Cai, T., Gavazzi, A., and Bartoletti, R. (2007). Finasteride 5 mg and sexual side effects: How many of these are related to a nocebo phenomenon? *Journal of Sexual Medicine*, *4*(6), 1708–12.
12. Myers, M.G., Cairns, J.A., and Singer, J. (1987). The consent form as a possible cause of side effects. *Clinical Pharmacology and Therapeutics*, *42*(3), 250–53.
13. Varelmann, D., Pancaro, C., Cappiello, E.C., and Camann, W.R. (2010). Nocebo-induced

hyperalgesia during local anesthetic injection. *Anesthesia and Analgesia*, *110*(3), 868–70.
14. Tinnermann, A., Geuter, S., Sprenger, C., Finsterbusch, J., and Büchel, C. (2017). Interactions between brain and spinal cord mediate value effects in nocebo hyperalgesia. *Science*, *358*(6359), 105–8.
15. Aslaksen, P.M., Zwarg, M.L., Eilertsen, H.-I. H., Gorecka, M.M., and Bjørkedal, E. (2015). Opposite effects of the same drug. *Pain*, *156*(1), 39–46; Flaten, M.A., Simonsen, T., and Olsen, H. (1999). Drug-related information generates placebo and nocebo responses that modify the drug response. *Psychosomatic Medicine*, *61*(2), 250–55.
16. Scott, D.J., Stohler, C.S., Egnatuk, C.M., Wang, H., Koeppe, R.A., and Zubieta, J.K. (2008). Placebo and nocebo effects are defined by opposite opioid and dopaminergic responses. *Archives of General Psychiatry*, *65*(2), 220–31.
17. Enck, P., Benedetti, F., and Schedlowski, M. (2008). New insights into the placebo and nocebo responses. *Neuron*, *59*(2), 195–206.
18. Planès, S., Villier, C., and Mallaret, M. (2016). The nocebo effect of drugs. *Pharmacology Research and Perspectives*, *4*(2), e00208; Liccardi, G., Senna, G., Russo, M., Bonadonna, P., Crivellaro, M., Dama, A.,… and Passalacqua, G. (2004). Evaluation of the nocebo effect during oral challenge in patients with adverse drug reactions. *Journal of Investigational Allergology and Clinical Immunology 14*(2), 104–7.
19. Faasse, K., Cundy, T., Gamble, G., and Petrie, K.J. (2013). The effect of an apparent change to a branded or generic medication on drug effectiveness and side effects. *Psychosomatic Medicine*, *75*(1), 90–96.
20. Faasse, K., Cundy, T., and Petrie, K.J. (2009). Thyroxine: Anatomy of a health scare. *BMJ*, *339*, b5613. doi: 10.1136/bmj.b5613. See also Faasse, K., Cundy, T., Gamble, G., and Petrie, K.J. (2013). The effect of an apparent change to a branded or generic medication on drug effectiveness and side effects. *Psychosomatic Medicine*, *75*(1), 90–96; MacKrill, K., and Petrie, K.J. (2018). What is associated with increased side effects and lower perceived efficacy following switching to a generic medicine? A New Zealand cross-sectional patient survey. *BMJ Open*, *8*(10), e023667. For a full analysis, see Faasse, K., and Martin, L.R. (2018). The power of labeling in nocebo effects. *International Review of Neurobiology*, *139*, 379–406.
21. Blasini, M., Corsi, N., Klinger, R., and Colloca, L. (2017). Nocebo and pain: An overview of the psychoneurobiological mechanisms. *Pain Reports*, *2*(2).
22. Sciama, Y. (2017, September 27). France brings back a phased-out drug after patients rebel against its replacement. *Science*. https://www.sciencemag.org/news/2017/09/france-brings-back-phased-out-drug-after-patients-rebel-against-its-replacement.
23. Rippon, G. (2019). *The Gendered Brain*, 29. London: Bodley Head; Ruble, D.N. (1977). Premenstrual symptoms: A reinterpretation. *Science*, *197*(4300), 291–92.
24. Horing, B., Weimer, K., Schrade, D., Muth, E.R., Scisco, J.L., Enck, P., and Klosterhalfen, S. (2013). Reduction of motion sickness with an enhanced placebo instruction: An experimental study with healthy participants. *Psychosomatic Medicine*, *75*(5), 497–504; Eden, D., and Zuk, Y. (1995). Seasickness as a self-fulfilling prophecy: Raising self-efficacy to boost performance at sea. *Journal of Applied Psychology*, *80*(5), 628.
25. Ferrari, R., Obelieniene, D., Darlington, P., Gervais, R., and Green, P. (2002). Laypersons' expectation of the sequelae of whiplash injury: A cross-cultural comparative study between Canada and Lithuania. *Medical Science Monitor*, *8*(11), CR728–CR734; Buchbinder, R., and Jolley, D. (2005). Effects of a media campaign on back beliefs is sustained three years after its cessation. *Spine*, *30*(11), 1323–30; Polich, G., Iaccarino, M.A., Kaptchuk, T.J., Morales-Quezada, L., and Zafonte, R. (2020). Nocebo effects in concussion: Is all that is told beneficial? *American Journal of Physical Medicine and Rehabilitation*, *99*(1), 71–80.

26. Whittaker, R., Kemp, S., and House, A. (2007). Illness perceptions and outcome in mild head injury: A longitudinal study. *Journal of Neurology, Neurosurgery and Psychiatry*, *78*(6), 644–46. See also Hou, R., Moss-Morris, R., Peveler, R., Mogg, K., Bradley, B. P., and Belli, A. (2012). When a minor head injury results in enduring symptoms: A prospective investigation of risk factors for postconcussional syndrome after mild traumatic brain injury. *Journal of Neurology, Neurosurgery and Psychiatry*, *83*(2), 217–23.
27. Polich, G., Iaccarino, M.A., Kaptchuk, T.J., Morales-Quezada, L., and Zafonte, R. (2020). Nocebo effects in concussion: Is all that is told beneficial? *American Journal of Physical Medicine and Rehabilitation*, *99*(1), 71–80.
28. Reeves, R.R., Ladner, M.E., Hart, R.H., and Burke, R.S. (2007). Nocebo effects with antidepressant clinical drug trial placebos. *General Hospital Psychiatry*, *29*(3), 275–77.
29. Usichenko, T.I., Hacker, H., and Hesse, T. (2016). Nocebo effect of informed consent: Circulatory collapse before elective caesarean section. *International Journal of Obstetric Anesthesia*, *27*, 95–96.
30. Samuels, M.A. (2007). Voodoo death revisited: The modern lessons of neurocardiology. *Cleveland Clinic Journal of Medicine*, *74* (Suppl 1), S8–S16. See also Amanzio, M., Howick, J., Bartoli, M., Cipriani, G.E., and Kong, J. (2020). How do nocebo phenomena provide a theoretical framework for the COVID–19 pandemic? *Frontiers in Psychology*, *11*, 589884.
31. Eaker, E.D., Pinsky, J., and Castelli, W.P. (1992). Myocardial infarction and coronary death among women: Psychosocial predictors from a 20-year follow-up of women in the Framingham Study. *American Journal of Epidemiology*, *135*(8), 854–64. See also Olshansky, B. (2007). Placebo and nocebo in cardiovascular health: Implications for healthcare, research, and the doctor-patient relationship. *Journal of the American College of Cardiology*, *49*(4), 415–21.
32. Barefoot, J.C., Brummett, B.H., Williams, R.B., Siegler, I.C., Helms, M.J., Boyle, S.H.,… and Mark, D.B. (2011). Recovery expectations and long-term prognosis of patients with coronary heart disease. *Archives of Internal Medicine*, *171*(10), 929–35.
33. Carey, I.M., Shah, S.M., DeWilde, S., Harris, T., Victor, C.R., and Cook, D.G. (2014). Increased risk of acute cardiovascular events after partner bereavement: A matched cohort study. *JAMA Internal Medicine*, *174*(4), 598–605.
34. Shimizu, M., and Pelham, B.W. (2008). Postponing a date with the grim reaper: Ceremonial events and mortality. *Basic and Applied Social Psychology*, *30*(1), 36–45; Wilches-Gutiérrez, J.L., Arenas-Monreal, L., Paulo-Maya, A., Peláez-Ballestas, I., and Idrovo, A.J. (2012). A "beautiful death": Mortality, death, and holidays in a Mexican municipality. *Social Science and Medicine*, *74*(5), 775–82; Ajdacic-Gross, V., Knöpfli, D., Landolt, K., Gostynski, M., Engelter, S.T., Lyrer, P.A.,… and Rössler, W. (2012). Death has a preference for birthdays: An analysis of death time series. *Annals of Epidemiology*, *22*(8), 603–6; Kelly, G.E., and Kelleher, C.C. (2018). Happy birthday? An observational study. *Journal of Epidemioliogy and Community Health*, *72*(12), 1168–72. See also Phillips, D.P., and Feldman, K.A. (1973). A dip in deaths before ceremonial occasions: Some new relationships between social integration and mortality. *American Sociological Review*, *38*(6), 678–96; Byers, B., Zeller, R.A., and Byers, P.Y. (1991). Birthdate and mortality: An evaluation of the death-dip/death-rise phenomenon. *Sociological Focus*, *24*(1), 13–28; Phillips, D.P., Van Voorhees, C.A., and Ruth, T.E. (1992). The birthday: Lifeline or deadline? *Psychosomatic Medicine*, *54*(5), 532–42.
35. National Constitution Center. (2020). Three presidents die on July 4th: Just a coincidence? https://constitutioncenter.org/blog/three-presidents-die-on-july-4th-just-a-coincidence.
36. See the following for a broad discussion of all these phenomena: Ray, O. (2004). How the mind hurts and heals the body. *American Psychologist*, *59*(1), 29.
37. Pan, Y., Kinitz, T., Stapic, M., and Nestoriuc, Y. (2019). Minimizing drug adverse events by

informing about the nocebo effect: An experimental study. *Frontiers in Psychiatry*, *10*, 504.
38. Howick, J. (2020). Unethical informed consent caused by overlooking poorly measured nocebo effects. *Journal of Medical Ethics*. doi: 10.1136/medethics-2019–105903; see also Colloca, L. (2017). Tell me the truth and I will not be harmed: Informed consents and nocebo effects. *American Journal of Bioethics*, *17*(6), 46–48.
39. Faasse, K., Huynh, A., Pearson, S., Geers, A.L., Helfer, S.G., and Colagiuri, B. (2019). The influence of side effect information framing on nocebo effects. *Annals of Behavioral Medicine*, *53*(7), 621–29.
40. James, L.K., and Till, S.J. (2016). Potential mechanisms for IgG4 inhibition of immediate hypersensitivity reactions. *Current Allergy and Asthma Reports*, *16*(3), 1–7; Couzin-Frankel, J. (2018, October 18). A revolutionary treatment for allergies to peanuts and other foods is going mainstream. *Science*. https://www.sciencemag.org/news/2018/10/revolutionary-treatment-allergies-peanuts-and-other-foods-going-mainstream-do-benefits.
41. Howe, L.C., Leibowitz, K.A., Perry, M.A., Bitler, J.M., Block, W., Kaptchuk, T.J.,… and Crum, A.J. (2019). Changing patient mindsets about non-life-threatening symptoms during oral immunotherapy: A randomized clinical trial. *Journal of Allergy and Clinical Immunology: In Practice*, *7*(5), 1550–59; Positive mindset about side effects of peanut-allergy treatment improves outcomes. (2019, February 5), Stanford Medicine News Center. https://med.stanford.edu/news/all-news/2019/02/positive-mindset-about-side-effects-of-peanut-allergy-treatment.html. See the following for a broader discussion of these mindset effects and their therapeutic potential: Leibowitz, K.A., Howe, L.C., and Crum, A.J. (2021). Changing mindsets about side effects. *BMJ Open*, *11*(2), e040134.
42. For evidence of pain catastrophizing's effects on opioid signaling, see King, C.D., Goodin, B., Kindler, L.L., Caudle, R.M., Edwards, R.R., Gravenstein, N.,… and Fillingim, R.B. (2013). Reduction of conditioned pain modulation in humans by naltrexone: An exploratory study of the effects of pain catastrophizing. *Journal of Behavioral Medicine*, *36*(3), 315–27; Vögtle, E., Barke, A., and Kröner-Herwig, B. (2013). Nocebo hyperalgesia induced by social observational learning. *Pain*, *154*(8), 1427–33.
43. Granot, M., and Ferber, S.G. (2005). The roles of pain catastrophizing and anxiety in the prediction of postoperative pain intensity: A prospective study. *Clinical Journal of Pain*, *21*(5), 439–45; Witvrouw, E., Pattyn, E., Almqvist, K.F., Crombez, G., Accoe, C., Cambier, D., and Verdonk, R. (2009). Catastrophic thinking about pain as a predictor of length of hospital stay after total knee arthroplasty: A prospective study. *Knee Surgery, Sports Traumatology, Arthroscopy*, *17*(10), 1189–94.
44. Drahovzal, D.N., Stewart, S.H., and Sullivan, M.J. (2006). Tendency to catastrophize somatic sensations: Pain catastrophizing and anxiety sensitivity in predicting headache. *Cognitive Behaviour Therapy*, *35*(4), 226–35; Mortazavi Nasiri, F.S., Pakdaman, S., Dehghani, M., and Togha, M. (2017). The relationship between pain catastrophizing and headache-related disability: The mediating role of pain intensity. *Japanese Psychological Research*, *59*(4), 266–74; Martinez-Calderon, J., Jensen, M.P., Morales-Asencio, J.M., and Luque-Suarez, A. (2019). Pain catastrophizing and function in individuals with chronic musculoskeletal pain. *Clinical Journal of Pain*, *35*(3), 279–93.
45. Darnall, B.D., and Colloca, L. (2018). Optimizing placebo and minimizing nocebo to reduce pain, catastrophizing, and opioid use: A review of the science and an evidence-informed clinical toolkit. *International Review of Neurobiology*, *139*, 129–57.
46. Ibid.
47. Seng, E.K. (2018). Using cognitive behavioral therapy techniques to treat migraine. *Journal of Health Service Psychology*, *44*(2), 68–73.

48. Ehde, D.M., and Jensen, M.P. (2004). Feasibility of a cognitive restructuring intervention for treatment of chronic pain in persons with disabilities. *Rehabilitation Psychology*, *49*(3), 254.
49. Lumley, M.A., and Schubiner, H. (2019). Psychological therapy for centralized pain: An integrative assessment and treatment model. *Psychosomatic Medicine*, *81*(2), 114–24.
50. Ibid. Similar results can be found for people with auto-immune disorders: Karademas, E.C., Dimitraki, G., Papastefanakis, E., Ktistaki, G., Repa, A., Gergianaki, I.,… and Simos, P. (2018). Emotion regulation contributes to the well-being of patients with autoimmune diseases through illness-related emotions: A prospective study. *Journal of Health Psychology*, *25*(13–14), 2096–2105; Nahman-Averbuch, H., Schneider, V.J., Chamberlin, L.A., Van Diest, A.M.K., Peugh, J.L., Lee, G.R.,… and King, C.D. (2021). Identification of neural and psychophysical predictors of headache reduction after cognitive behavioral therapy in adolescents with migraine. *Pain, 162 (2),* 372–81.
51. Adamczyk, A.K., Ligeza, T.S., and Wyczesany, M. (2020). The dynamics of pain reappraisal: The joint contribution of cognitive change and mental load. *Cognitive, Affective, and Behavioral Neuroscience*, *20*(2), 276–93.
52. De Peuter, S., Lemaigre, V., Van Diest, I., and Van den Bergh, O. (2008). Illness-specific catastrophic thinking and over-perception in asthma. *Health Psychology*, *27*(1), 93.
53. Brown, R.L., Shahane, A. D., Chen, M.A., and Fagundes, C.P. (2020). Cognitive reappraisal and nasal cytokine production following experimental rhinovirus infection. *Brain, Behavior, and Immunity-Health*, *1*, 100012.
54. Dekker, R.L., Moser, D.K., Peden, A.R., and Lennie, T.A. (2012). Cognitive therapy improves three-month outcomes in hospitalized patients with heart failure. *Journal of Cardiac Failure*, *18*(1), 10–20. See the following for the proposed physiological and behavioral mechanisms: Celano, C.M., Villegas, A.C., Albanese, A.M., Gaggin, H.K., and Huffman, J.C. (2018). Depression and anxiety in heart failure: A review. *Harvard Review of Psychiatry*, *26*(4), 175.

Chapter 4: The Origins of Mass Hysteria

1. Escola encerra devido a alergis. (2006, May 18). *CM*. https://www.cmjornal.pt/portugal/detalhe/escola-encerra-devido-a-alergias; Televírus volta a atacar. (2006, May 18). *CM*. https://www.cmjornal.pt/portugal/detalhe/televirus-volta-a-atacar.
2. Bartholomew, R.E., Wessely, S., and Rubin, G.J. (2012). Mass psychogenic illness and the social network: Is it changing the pattern of outbreaks? *Journal of the Royal Society of Medicine*, *105*(12), 509–12.
3. Kilner, J.M., Friston, K.J., and Frith, C.D. (2007). Predictive coding: An account of the mirror neuron system. *Cognitive Processing*, *8*(3), 159–66.
4. See Di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V., and Rizzolatti, G. (1992). Understanding motor events: A neurophysiological study. *Experimental Brain Research*, *91*(1), 176–80; Lametti, D. (2009, June 9). Mirroring behavior. *Scientific American*.
5. Bentivoglio, L. (2012, August 27). Rizzolatti: "Ecco perchè i sentimenti sono contagiosi." *La Repubblica*. https://parma.repubblica.it/cronaca/2012/08/27/news/rizzolatti_ecco_perch_i_sentimenti_sono_cont 41547512.
6. Bastiaansen, J.A., Thioux, M., and Keysers, C. (2009). Evidence for mirror systems in emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1528), 2391–404.
7. Much of the research discussed in this section is covered in the following review paper: Hatfield, E., Carpenter, M., and Rapson, R.L. (2014). Emotional contagion as a precursor to collective emotions. In C. von Scheve and M. Salmela (Eds.). *Collective Emotions: Perspectives from Psychology, Philosophy, and Sociology*, 108–22. Oxford: Oxford University Press. For additional details, see Laird, J.D., Alibozak, T., Davainis, D., Deignan, K., Fontanella, K., Hong, J.,… and Pacheco, C. (1994). Individual differences in the effects of spontaneous mimicry on emotional contagion. *Motivation and Emotion*, *18*(3), 231–47; Carsten, T., Desmet, C., Krebs, R.M., and Brass, M. (2018). Pupillary contagion is independent of the emotional expression of the face. *Emotion*, *19*(8), 1343–52.
8. Likowski, K.U., Mühlberger, A., Gerdes, A., Wieser, M.J., Pauli, P., and Weyers, P. (2012). Facial mimicry and the mirror neuron system: Simultaneous acquisition of facial electromyography and functional magnetic resonance imaging. *Frontiers in Human Neuroscience*, *6*, 214.
9. Neal, D.T., and Chartrand, T.L. (2011). Embodied emotion perception: Amplifying and dampening facial feedback modulates emotion perception accuracy. *Social Psychological and Personality Science*, *2*(6), 673–78. For a recent replication, see Borgomaneri, S., Bolloni, C., Sessa, P., and Avenanti, A. (2020). Blocking facial mimicry affects recognition of facial and body expressions. *PLoS One*, *15*(2), e0229364; See also the following meta-analysis, which confirms the subtle effect of facial feedback on participants' emotions: Coles, N. A., Larsen, J. T., and Lench, H.C. (2019). A meta-analysis of the facial feedback literature: Effects of facial feedback on emotional experience are small and variable. *Psychological Bulletin*, *145*(6), 610.
10. Havas, D.A., Glenberg, A.M., and Rinck, M. (2007). Emotion simulation during language comprehension. *Psychonomic Bulletin and Review*, *14*(3), 436–41; Foroni, F., and Semin, G.R. (2009). Language that puts you in touch with your bodily feelings: The multimodal responsiveness of affective expressions. *Psychological Science*, *20*(8), 974–80.
11. Rizzolatti, G., Fogassi, L., and Gallese, V. (2006). Mirrors in the mind. *Scientific American*, *295*(5), 54–61.
12. Christakis, N.A., and Fowler, J.H. (2009). *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives*, 50–52. New York: Little, Brown Spark.
13. Faasse, K., and Petrie, K.J. (2016). From me to you: The effect of social modeling on treatment

outcomes. *Current Directions in Psychological Science*, *25*(6), 438–43.
14. Mazzoni, G., Foan, L., Hyland, M.E., and Kirsch, I. 2010. The effects of observation and gender on psychogenic symptoms. *Health Psychology*, *29*, 181–85; Lorber, W., Mazzoni, G., and Kirsch, I. (2007). Illness by suggestion: Expectancy, modeling, and gender in the production of psychosomatic symptoms. *Annals of Behavioral Medicine*, *33*(1), 112–16.
15. Broderick, J.E., Kaplan-Liss, E., and Bass, E. (2011). Experimental induction of psychogenic illness in the context of a medical event and media exposure. *American Journal of Disaster Medicine*, *6*(3), 163.
16. Ditto, B., Byrne, N., Holly, C., and Balegh, S. (2014). Social contagion of vasovagal reactions in the blood collection clinic: A possible example of mass psychogenic illness. *Health Psychology*, *33*(7), 639.
17. Faasse, K., Yeom, B., Parkes, B., Kearney, J., and Petrie, K.J. (2018). The influence of social modeling, gender, and empathy on treatment side effects. *Annals of Behavioral Medicine*, *52*(7), 560–70.
18. Colloca, L., and Benedetti, F. (2009). Placebo analgesia induced by social observational learning. *Pain*, *144*(1–2), 28–34; Świder, K., and Bąbel, P. (2013). The effect of the sex of a model on nocebo hyperalgesia induced by social observational learning. *Pain*, *154*(8), 1312–17.
19. Benedetti, F., Durando, J., and Vighetti, S. (2014). Nocebo and placebo modulation of hypobaric hypoxia headache involves the cyclooxygenase-prostaglandins pathway. *Pain*, *155*(5), 921–28.
20. Caporael, L.R. (1976). Ergotism: The Satan loosed in Salem? *Science*, *192*(4234), 21–26.
21. Hatfield, E., Carpenter, M., and Rapson, R.L. (2014). Emotional contagion as a precursor to collective emotions. In C. von Scheve and M. Salmela (Eds.). *Collective Emotions: Perspectives from Psychology, Philosophy, and Sociology*, 108–22. Oxford: Oxford University Press. Some further details (including the true location of the mill) come from Baloh, R.W., and Bartholomew, R.E. (2020). A short history of spider, insect, and worm scares. In *Havana Syndrome: Mass Psychogenic Illness and the Real Story Behind the Embassy Mystery and Hysteria*, 151–66. Cham, Switzerland: Copernicus.
22. Baloh, R.W., and Bartholomew, R.E. (2020). A short history of spider, insect, and worm scares. In *Havana Syndrome: Mass Psychogenic Illness and the Real Story Behind the Embassy Mystery and Hysteria*, 151–66. Cham, Switzerland: Copernicus.
23. Talbot, M. (2002, June 2). Hysteria hysteria. *New York Times Magazine*. https://www.nytimes.com/2002/06/02/magazine/hysteria-hysteria.html.
24. Koran, L., and Oppmann, P. (2018, March 2). US embassy in Cuba to reduce staff indefinitely after "health attacks." CNN. https://edition.cnn.com/2018/03/02/politics/us-embassy-cuba-staff-reductions-attacks/index.html.
25. See the following for a full argument of Havana syndrome's psychogenic origins: Baloh, R.W., and Bartholomew, R.E. (2020). *Havana Syndrome: Mass Psychogenic Illness and the Real Story Behind the Embassy Mystery and Hysteria*. Cham, Switzerland: Copernicus. See also Stone, R. (2018). Sonic attack or mass paranoia. *Science*, doi:10.1126/science .aau5386; Hitt, J. (2019, January 6). The real story behind the Havana embassy mystery. *Vanity Fair*. https://www.vanityfair.com/news/2019/01/the-real-story-behind-the-havana-embassy-mystery; Leighton, T.G. (2018). Ultrasound in air—Guidelines, applications, public exposures, and claims of attacks in Cuba and China. *Journal of the Acoustical Society of America*, *144*(4), 2473–89; Bartholomew, R.E., and Baloh, R.W. (2020). Challenging the diagnosis of "Havana Syndrome" as a novel clinical entity. *Journal of the Royal Society of Medicine*, *113*(1), 7–11. The possibility that psychogenic contagion was amplifying and prolonging symptoms is discussed in National Academies of Sciences, Engineering, and Medicine (2020). *An Assessment of Illness in US Government Employees and Their Families at Overseas Embassies*. Although this report raises the

possibility of a real weapon, other scientists remain unconvinced: see Vergano, D. (2020, December 7). Scientists are slamming a report saying microwave attacks could have caused "Havana syndrome" in US diplomats. BuzzFeed. https://www.buzzfeednews.com/article/danvergano/microwave-attacks-havana-syndrome-diplomats.

26. Entous, A., and Anderson, J.L. (2018, November 9). The mystery of the Havana syndrome. *New Yorker*. https://www.newyorker.com/magazine/2018/11/19/the-mystery-of-the-havana-syndrome.
27. Cited in Baloh, R.W., and Bartholomew, R.E. (2020). *Havana Syndrome: Mass Psychogenic Illness and the Real Story Behind the Embassy Mystery and Hysteria*, 21. Cham, Switzerland: Copernicus.
28. The telephone as a cause of ear troubles. (1889). *British Medical Journal*, *2*(1499), 671–72.
29. Rubin, G.J., Burns, M., and Wessely, S. (2014). Possible psychological mechanisms for "wind turbine syndrome": On the windmills of your mind. *Noise and Health*, *16*(69), 116.
30. Andrianome, S., De Seze, R., Braun, A., and Selmaoui, B. (2018). Descriptive self-reporting survey of people with idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF): Similarities and comparisons with previous studies. *Journal of Public Health*, *26*(4), 461–73.
31. Rubin, G.J., Hahn, G., Everitt, B.S., Cleare, A.J., and Wessely, S. (2006). Are some people sensitive to mobile phone signals? Within participants double blind randomised provocation study. *British Medical Journal*, *332*(7546), 886–91.
32. Verrender, A., Loughran, S.P., Dalecki, A., Freudenstein, F., and Croft, R.J. (2018). Can explicit suggestions about the harmfulness of EMF exposure exacerbate a nocebo response in healthy controls? *Environmental Research*, *166*, 409–17.
33. Nyhan, B., and Reifler, J. (2015). Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information. *Vaccine*, *33*(3), 459–64.
34. Nichol, K.L., Margolis, K.L., Lind, A., Murdoch, M., McFadden, R., Hauge, M.,… and Drake, M. (1996). Side effects associated with influenza vaccination in healthy working adults: A randomized, placebo-controlled trial. *Archives of Internal Medicine*, *156*(14), 1546–50; World Health Organization (2012). Information sheet: Observed rate of vaccine reactions: influenza vaccine. https://www.who.int/vaccine_safety/initiative/tools/Influenza_Vaccine_rates_information_sheet.pdf ua=1.
35. CDC. Misconceptions about seasonal flu and flu vaccines. https://www.cdc.gov/flu/prevent/misconceptions.htm.
36. World Health Organization. (2012). Information sheet: Observed rate of vaccine reactions: influenza vaccine. https://www.who.int/vaccine_safety/initiative/tools/Influenza_Vaccine_rates_information_sheet.pdf ua=1; Tosh, P.K., Boyce, T.G., and Poland, G.A. (2008). Flu myths: Dispelling the myths associated with live attenuated influenza vaccine. *Mayo Clinic Proceedings 83*(1), 77–84.
37. Huang, W.T., Hsu, C.C., Lee, P.I., and Chuang, J.H. (2010). Mass psychogenic illness in nationwide in-school vaccination for pandemic influenza A (H1N1) 2009, Taiwan, November 2009–January 2010. *Eurosurveillance*, *15*(21), 19575.
38. Simas, C., Munoz, N., Arregoces, L., and Larson, H.J. (2019). HPV vaccine confidence and cases of mass psychogenic illness following immunization in Carmen de Bolivar, Colombia. *Human Vaccines and Immunotherapeutics*, *15*(1), 163–66.
39. Matthews, A., Herrett, E., Gasparrini, A., Van Staa, T., Goldacre, B., Smeeth, L., and Bhaskaran, K. (2016). Impact of statin related media coverage on use of statins: Interrupted time series analysis with UK primary care data. *BMJ*, *353*, *i*3283. doi: 10.1136/bmj.i3283.

40. See, for example, Rogers, L. (2015, November 3). Crippled by statins. *Daily Mail*. https://www.dailymail.co.uk/health/article-3300937/Crippled-statins-Cholesterol-busting-drugs-left-David-wheelchair-doctors-insisted-taking-them.html.
41. Finegold, J.A., Manisty, C.H., Goldacre, B., Barron, A.J., and Francis, D. P. (2014). What proportion of symptomatic side effects in patients taking statins are genuinely caused by the drug? Systematic review of randomized placebo-controlled trials to aid individual patient choice. *European Journal of Preventive Cardiology*, *21*(4), 464–74.
42. Newman, C.B., Preiss, D., Tobert, J.A., Jacobson, T.A., Page, R.L., Goldstein, L.B.,… and Duell, P.B. (2019). Statin safety and associated adverse events: A scientific statement from the American Heart Association. *Arteriosclerosis, Thrombosis, and Vascular Biology*, *39*(2), e38–e81.
43. Khan, S., Holbrook, A., and Shah, B.R. (2018). Does Googling lead to statin intolerance? *International Journal of Cardiology*, *262*, 25–27.
44. Singh, P., Arora, A., Strand, T.A., Leffler, D.A., Catassi, C., Green, P.H.,… and Makharia, G.K. (2018). Global prevalence of celiac disease: Systematic review and meta-analysis. *Clinical Gastroenterology and Hepatology*, *16*(6), 823–36.
45. https://www.nhs.uk/conditions/coeliac-disease.
46. Cianferoni, A. (2016). Wheat allergy: Diagnosis and management. *Journal of Asthma and Allergy*, *9*, 13.
47. Servick, K. (2018, May). The war on gluten. *Science*. https://www.sciencemag.org/news/2018/05/what-s-really-behind-gluten-sensitivity.
48. Molina-Infante, J., and Carroccio, A. (2017). Suspected nonceliac gluten sensitivity confirmed in few patients after gluten challenge in double-blind, placebo-controlled trials. *Clinical Gastroenterology and Hepatology*, *15*(3), 339–48. See the following for a separate meta-analysis showing a large nocebo effect: Lionetti, E., Pulvirenti, A., Vallorani, M., Catassi, G., Verma, A. K., Gatti, S., and Catassi, C. (2017). Re-challenge studies in non-celiac gluten sensitivity: A systematic review and meta-analysis. *Frontiers in Physiology*, *8*, 621. The role of expectation in gluten sensitivity is described in the following: Petrie, K.J., and Rief, W. (2019). Psychobiological mechanisms of placebo and nocebo effects: Pathways to improve treatments and reduce side effects. *Annual Review of Psychology*, *70*, 599–625.
    The following link contains the British Nutrition Foundation's interpretation of the study: https://www.nutrition.org.uk/bnfevents/events/252-nutritionscience/researchspotlight/1043–2017issue3.html.
49. Croall, I.D., Trott, N., Rej, A., Aziz, I., O'Brien, D.J., George, H.A.,… and Hadjivassiliou, M. (2019). A population survey of dietary attitudes towards gluten. *Nutrients*, *11*(6), 1276.
50. Unalp-Arida, A., Ruhl, C.E., Brantner, T.L., Everhart, J.E., and Murray, J.A. (2017). Less hidden celiac disease but increased gluten avoidance without a diagnosis in the United States: Findings from the National Health and Nutrition Examination Surveys from 2009 to 2014. *Mayo Clinic Proceedings 92*(1), 30–38; Cabrera-Chávez, F., Dezar, G.V., Islas-Zamorano, A.P., Espinoza-Alderete, J.G., Vergara-Jiménez, M.J., Magaña-Ordorica, D., and Ontiveros, N. (2017). Prevalence of self-reported gluten sensitivity and adherence to a gluten-free diet in Argentinian adult population. *Nutrients*, *9*(1), 81.
51. Crichton, F., Dodd, G., Schmid, G., Gamble, G., and Petrie, K.J. (2014). Can expectations produce symptoms from infrasound associated with wind turbines? *Health Psychology*, *33*(4), 360; Crichton, F., Chapman, S., Cundy, T., and Petrie, K.J. (2014). The link between health complaints and wind turbines: Support for the nocebo expectations hypothesis. *Frontiers in Public Health*, *2*, 220.
52. Crichton, F., and Petrie, K.J. (2015). Health complaints and wind turbines: The efficacy of explaining the nocebo response to reduce symptom reporting. *Environmental Research*, *140*, 449–

55.

53. Framing can also help. See, for instance, Mao, A., Barnes, K., Sharpe, L., Geers, A.L., Helfer, S.G., Faasse, K., and Colagiuri, B. (2021). Using positive attribute framing to attenuate nocebo side effects: A cybersickness study. *Annals of Behavioral Medicine*. doi: 10.1093/abm/kaaa115.

Chapter 5: Faster, Stronger, Fitter

1. Voet, W. (2001). *Breaking the Chain*, 104. London: Yellow Jersey.
2. Bannister, R. (2014). *Twin Tracks: The Autobiography*, Kindle edition, location 828. London: Robson Press.
3. https://olympics.com/tokyo-2020/en/news/amp/eliud-kipchoge-s-unstoppable-marathon-mindset-the-olympics-and-world-records.
4. Gonzalez, R. (2019, October 14). How Eliud Kipchoge pulled off his epic, sub-2-hour marathon. *Wired*. https://www.wired.com/story/how-eliud-kipchoge-pulled-off-his-epic-sub-2-hour-marathon.
5. Giulio, C.D., Daniele, F., and Tipton, C.M. (2006). Angelo Mosso and muscular fatigue: 116 years after the first Congress of Physiologists: IUPS commemoration. *Advances in Physiology Education*, *30*(2), 51–57.
6. Noakes, T.D. (2012). Fatigue is a brain-derived emotion that regulates the exercise behavior to ensure the protection of whole body homeostasis. *Frontiers in Physiology*, *3*, 82.
7. Cairns, S. P. (2006). Lactic acid and exercise performance. *Sports Medicine*, *36*(4), 279–91. See also https://www.livescience.com/lactic-acid.html.
8. Corbett, J., Barwood, M.J., Ouzounoglou, A., Thelwell, R., and Dicks, M. (2012). Influence of competition on performance and pacing during cycling exercise. *Medicine and Science in Sports and Exercise*, *44*(3), 509–15.
9. Marcora, S.M., Staiano, W., and Manning, V. (2009). Mental fatigue impairs physical performance in humans. *Journal of Applied Physiology*, *106*(3), 857–64.
10. For a thorough discussion of the traditional model of fatigue, and the need to separate the psychological sense of effort from the physiological changes, see Noakes, T.D. (2012).The Central Governor Model in 2012: Eight new papers deepen our understanding of the regulation of human exercise performance. *British Journal of Sports Medicine*, *46*, 1–3. There has been controversy over the exact formulation of the psychobiological theory of fatigue, though the description in the text describes the common features. See Venhorst, A., Micklewright, D., and Noakes, T.D. (2018). Towards a three-dimensional framework of centrally regulated and goal-directed exercise behaviour: A narrative review. *British Journal of Sports Medicine*, *52*(15), 957–66.
11. For some direct evidence of this part of the process, see Piedimonte, A., Benedetti, F., and Carlino, E. (2015). Placebo-induced decrease in fatigue: Evidence for a central action on the preparatory phase of movement. *European Journal of Neuroscience*, *41*(4), 492–97.
12. Morton, R.H. (2009). Deception by manipulating the clock calibration influences cycle ergometer endurance time in males. *Journal of Science and Medicine in Sport*, *12*, 332–37.
13. Stone, M., Thomas, K., Wilkinson, M., Jones, A., St. Clair Gibson, A., and Thompson, K. (2012). Effects of deception on exercise performance: Implications for determinants of fatigue in humans. *Medicine and Science in Sports and Exercise*, *44*(3), 534–41.
14. Castle, P.C., Maxwell, N., Allchorn, A., Mauger, A.R., and White, D.K. (2012). Deception of ambient and body core temperature improves self paced cycling in hot, humid conditions. *European Journal of Applied Physiology*, *112*(1), 377–85.
15. Iodice, P., Porciello, G., Bufalari, I., Barca, L., and Pezzulo, G. (2019). An interoceptive illusion of effort induced by false heart-rate feedback. *Proceedings of the National Academy of Sciences*, *116*(28), 13897–902.
16. McMorris, T., Barwood, M., and Corbett, J. (2018). Central fatigue theory and endurance exercise: Toward an interoceptive model. *Neuroscience and Biobehavioral Reviews*, *93*, 93–107; Holgado, D., and Sanabria, D. (2020). Does self-paced exercise depend on executive processing? A narrative review of the current evidence. *International Review of Sport and Exercise Psychology*, 1–24; Hyland-Monks, R., Cronin, L., McNaughton, L., and Marchant, D. (2018). The role of executive

function in the self-regulation of endurance performance: A critical review. In *Progress in Brain Research, 240*, 353–70.
17. Broelz, E.K., Wolf, S., Schneeweiss, P., Niess, A.M., Enck, P., and Weimer, K. (2018). Increasing effort without noticing: A randomized controlled pilot study about the ergogenic placebo effect in endurance athletes and the role of supplement salience. *PLoS One*, *13*(6), e0198388.
18. Pollo, A., Carlino, E., and Benedetti, F. (2008). The top-down influence of ergogenic placebos on muscle work and fatigue. *European Journal of Neuroscience*, *28*(2), 379–88.
19. Hurst, P., Schipof-Godart, L., Szabo, A., Raglin, J., Hettinga, F., Roelands, B.,… and Beedie, C. (2020). The placebo and nocebo effect on sports performance: A systematic review. *European Journal of Sport Science*, *20*(3), 279–92.
20. Ibid.
21. Montes, J., Wulf, G., and Navalta, J.W. (2018). Maximal aerobic capacity can be increased by enhancing performers' expectancies. *Journal of Sports Medicine and Physical Fitness*, *58*(5), 744–49.
22. Stoate, I., Wulf, G., and Lewthwaite, R. (2012). Enhanced expectancies improve movement efficiency in runners. *Journal of Sports Sciences*, *30*(8), 815–23.
23. Turnwald, B.P., Goyer, J.P., Boles, D.Z., Silder, A., Delp, S.L., and Crum, A.J. (2019). Learning one's genetic risk changes physiology independent of actual genetic risk. *Nature Human Behaviour*, *3*(1), 48–56.
24. Saito, T., Barreto, G., Saunders, B., and Gualano, B. (2020). Is open-label placebo a new ergogenic aid? A commentary on existing studies and guidelines for future research. *Sports Medicine*, *50*(7), 1231–32. See also Broelz, E.K., Wolf, S., Schneeweiss, P., Niess, A.M., Enck, P., and Weimer, K. (2018). Increasing effort without noticing: A randomized controlled pilot study about the ergogenic placebo effect in endurance athletes and the role of supplement salience. *PLoS One*, *13*(6), e0198388.
25. Giles, G.E., Cantelon, J.A., Eddy, M.D., Brunyé, T.T., Urry, H.L., Taylor, H.A.,… and Kanarek, R.B. (2018). Cognitive reappraisal reduces perceived exertion during endurance exercise. *Motivation and Emotion*, *42*(4), 482–96. Some of the advice given here is based on an interview with Giles, and my own experience of practicing cognitive reappraisal. For another example of cognitive reappraisal, see Arthur, T.G., Wilson, M.R., Moore, L.J., Wylie, L.J., and Vine, S.J. (2019). Examining the effect of challenge and threat states on endurance exercise capabilities. *Psychology of Sport and Exercise*, *44*, 51–59. And see the following for a discussion of emotional intelligence and its relation to the psychological basis of fatigue: Rubaltelli, E., Agnoli, S., and Leo, I. (2018). Emotional intelligence impact on half marathon finish times. *Personality and Individual Differences*, *128*, 107–12.
26. Orvidas, K., Burnette, J.L., and Russell, V.M. (2018). Mindsets applied to fitness: Growth beliefs predict exercise efficacy, value and frequency. *Psychology of Sport and Exercise*, *36*, 156–61.
27. Morris, J.N., Heady, J.A., Raffle, P.A.B., Roberts, C.G., and Parks, J.W. (1953). Coronary heart-disease and physical activity of work. *Lancet*, *262*(6796), 1111–20; Kuper, S. (2009, September 12). The man who invented exercise. *Financial Times*. https://www.ft.com/content/e6ff90ea-9da2-11de-9f4a-00144feabdc0; Paffenbarger Jr., R.S., Blair, S.N., and Lee, I.M. (2001). A history of physical activity, cardiovascular health and longevity: The scientific contributions of Jeremy N. Morris, DSc, DPH, FRCP. *International Journal of Epidemiology*, *30*(5), 1184–92.
28. Source: https://sites.google.com/site/compendiumofphysicalactivities/home. See also Wilson, C. (2010). The truth about exercise. *New Scientist*, *205*(2742), 34–37.
29. Patterson, R., Webb, E., Millett, C., and Laverty, A.A. (2018). Physical activity accrued as part of public transport use in England. *Journal of Public Health*, *41(2)*, 222–30.
30. Crum, A.J., and Langer, E.J. (2007). Mind-set matters: Exercise and the placebo effect.

Psychological Science, *18*(2), 165–71.

31. Zahrt, O.H., and Crum, A.J. (2017). Perceived physical activity and mortality: Evidence from three nationally representative US samples. *Health Psychology*, *36*(11), 1017. A similar study, looking at people's health complaints: Baceviciene, M., Jankauskiene, R., and Emeljanovas, A. (2019). Self-perception of physical activity and fitness is related to lower psychosomatic health symptoms in adolescents with unhealthy lifestyles. *BMC Public Health*, *19*(1), 980.
32. Lindheimer, J.B., O'Connor, P.J., and Dishman, R.K. (2015). Quantifying the placebo effect in psychological outcomes of exercise training: A meta-analysis of randomized trials. *Sports Medicine*, *45*(5), 693–711; Jones, M.D., Valenzuela, T., Booth, J., Taylor, J.L., and Barry, B.K. (2017). Explicit education about exercise-induced hypoalgesia influences pain responses to acute exercise in healthy adults: A randomized controlled trial. *Journal of Pain*, *18*(11), 1409–16; Vaegter, H.B., Thinggaard, P., Madsen, C.H., Hasenbring, M., and Thorlund, J.B. (2020). Power of words: Influence of preexercise information on hypoalgesia after exercise-randomized controlled trial. *Medicine and Science in Sports and Exercise*, *52*(11), 2373–79.
33. Zahrt, O.H., and Crum, A.J. (2019). Effects of physical activity recommendations on mindset, behavior and perceived health. *Preventive Medicine Reports*, 101027.
34. Wen, C.P., Wai, J.P.M., Tsai, M.K., Yang, Y.C., Cheng, T.Y.D., Lee, M.C.,… and Wu, X. (2011). Minimum amount of physical activity for reduced mortality and extended life expectancy: A prospective cohort study. *Lancet*, *378*(9798), 1244–53. See also Curfman, G. (2015, December 8). Exercise: You may need less than you think. https://www.health.harvard.edu/blog/how-much-exercise-do-you-really-need-less-than-you-think-201512088770.
35. Prichard, I., Kavanagh, E., Mulgrew, K.E., Lim, M.S., and Tiggemann, M. (2020). The effect of Instagram #fitspiration images on young women's mood, body image, and exercise behaviour. *Body Image*, *33*, 1–6. See also Robinson, L., Prichard, I., Nikolaidis, A., Drummond, C., Drummond, M., and Tiggemann, M. (2017). Idealised media images: The effect of fitspiration imagery on body satisfaction and exercise behaviour. *Body Image*, *22*, 65–71.
36. Phelps, M., with Abrahamson, A. (2008). *No Limits: The Will to Succeed*, 8. New York: Free Press. Cited in Moran, A., Campbell, M., Holmes, P., and MacIntyre, T. (2012). Mental imagery, action observation and skill learning. In N.J. Hodges and A.M. Williams (Eds.). *Skill Acquisition in Sport: Research, Theory and Practice*, 94. London: Routledge.
37. Moran, A., Campbell, M., Holmes, P., and MacIntyre, T. (2012). Mental imagery, action observation and skill learning. In N.J. Hodges and A.M. Williams (Eds.). *Skill Acquisition in Sport: Research, Theory and Practice*, 94. London: Routledge.

    See also Slimani, M., Tod, D., Chaabene, H., Miarka, B., and Chamari, K. (2016). Effects of mental imagery on muscular strength in healthy and patient participants: A systematic review. *Journal of Sports Science and Medicine*, *15*(3), 434.
38. Yao, W.X., Ranganathan, V.K., Allexandre, D., Siemionow, V., and Yue, G.H. (2013). Kinesthetic imagery training of forceful muscle contractions increases brain signal and muscle strength. *Frontiers in Human Neuroscience*, *7*, 561. See the following for a comparison of physical and mental practice, and various combinations of both styles of training: Reiser, M., Büsch, D., and Munzert, J. (2011). Strength gains by motor imagery with different ratios of physical to mental practice. *Frontiers in Psychology*, *2*, 194.
39. While this has been the view for many decades, the latest evidence suggests that the size of our muscles and muscular strength are largely independent. Loenneke, J.P., Buckner, S.L., Dankel, S.J., and Abe, T. (2019). Exercise-induced changes in muscle size do not contribute to exercise-induced changes in muscle strength. *Sports Medicine*, *49*(7), 987–91.
40. Ridderinkhof, K.R., and Brass, M. (2015). How kinesthetic motor imagery works: A predictive-processing theory of visualization in sports and motor expertise. *Journal of Physiology—Paris*,

109(1–3), 53–63. See the following for a discussion of its relation to the psychobiological model of exercise: Slimani, M., Tod, D., Chaabene, H., Miarka, B., and Chamari, K. (2016). Effects of mental imagery on muscular strength in healthy and patient participants: A systematic review. *Journal of Sports Science and Medicine*, *15*(3), 434.

41. Lebon, F., Collet, C., and Guillot, A. (2010). Benefits of motor imagery training on muscle strength. *Journal of Strength and Conditioning Research*, *24*(6), 1680–87.
42. Clark, B.C., Mahato, N.K., Nakazawa, M., Law, T.D., and Thomas, J.S. (2014). The power of the mind: The cortex as a critical determinant of muscle strength/weakness. *Journal of Neurophysiology*, *112*(12), 3219–26.
43. See, for example, Najafabadi, M.G., Memari, A.H., Kordi, R., Shayestehfar, M., and Eshghi, M.A. (2017). Mental training can improve physical activity behavior in adolescent girls. *Journal of Sport and Health Science*, *6*(3), 327–32; Cooke, L.M., Duncan, L.R., Deck, S.J., Hall, C.R., and Rodgers, W.M. (2020). An examination of changes in exercise identity during a mental imagery intervention for female exercise initiates. *International Journal of Sport and Exercise Psychology*, *18*(4), 534–50; Robin, N., Toussaint, L., Coudevylle, G.R., Ruart, S., Hue, O., and Sinnapah, S. (2018). Text messages promoting mental imagery increase self-reported physical activity in older adults: A randomized controlled study. *Journal of Aging and Physical Activity*, *26*(3), 462–70.
44. Newcomb, A. (2012, August 1). Super strength: Daughter rescues dad trapped under car. ABC News. https://abcnews.go.com/US/superhero-woman-lifts-car-off-dad/story?id=16907591#.UMay9Hfeba4. See also Hadhazy, A. (2016, May 2). How it's possible for an ordinary person to lift a car. BBC Future. https://www.bbc.com/future/article/20160501-how-its-possible-for-an-ordinary-person-to-lift-a-car.
45. Oregon man pinned under 3,000-pound tractor saved by teen daughters. (2013, April 11). Fox News. https://www.foxnews.com/us/oregon-man-pinned-under-3000-pound-tractor-saved-by-teen-daughters; Septuagenarian superhero? Man lifts car off son-in-law. (2013, July 22). NPR. https://www.npr.org/2013/07/22/204444515/septuagenarian-superhero-man-lifts-car-off-son-in-law.
46. Liptak, A. (2015, August 30). The Incredible Hulk was inspired by a woman saving her baby. *Gizmodo*. https://io9.gizmodo.com/the-incredible-hulk-was-inspired-by-a-woman-saving-her-1727562968.
47. Evans, D.R., Boggero, I.A., and Segerstrom, S.C. (2016). The nature of self-regulatory fatigue and "ego depletion": Lessons from physical fatigue. *Personality and Social Psychology Review*, *20*(4), 291–310.

Chapter 6: The Food Paradox

1. Calorie content: avocado toast (501 cal); smoothie (209 cal); tuna niçoise salad (455 cal); orange juice (105 cal); chicken and asparagus braise (480 cal); fruit-and-nut granola bar (279 cal). Sources: www.bbcgood.food.com, www.pret.co.uk.
2. Calorie content: croissant (291 cal); hot chocolate (260 cal); spaghetti alla puttanesca (495 cal), and fruit salad (111 cal); fish pie (455 cal) and salad (20 cal); two mini donuts (110 cal). Sources: www.pret.co.uk, www.bbcgoodfood.com, www.sainsburys.co.uk.
3. In the discussion of Henry Molaison's life that follows, I am indebted to Corkin, S. (2014). *Permanent Present Tense*. London: Penguin.
4. Ibid., 210.
5. For descriptions of this experiment and its implications for the role of memory in appetite, see Rozin, P., Dow, S., Moscovitch, M., and Rajaram, S. (1998). What causes humans to begin and end a meal? A role for memory for what has been eaten, as evidenced by a study of multiple meal eating in amnesic patients. *Psychological Science*, *9*(5), 392–96; and Higgs, S. (2005). Memory and its role in appetite regulation. *Physiology and Behavior*, *85*(1), 67–72.
6. Berthoud, H.R. (2008). Vagal and hormonal gut-brain communication: From satiation to satisfaction. *Neurogastroenterology and Motility*, *20*, 64–72.
7. Desai, A.J., Dong, M., Harikumar, K.G., and Miller, L.J. (2016). Cholecystokinin-induced satiety, a key gut servomechanism that is affected by the membrane microenvironment of this receptor. *International Journal of Obesity Supplements*, *6*(1), S22–S27.
8. Martin, A.A., Davidson, T.L., and McCrory, M.A. (2018). Deficits in episodic memory are related to uncontrolled eating in a sample of healthy adults. *Appetite*, *124*, 33–42.
9. Higgs, S. (2002). Memory for recent eating and its influence on subsequent food intake. *Appetite*, *39*(2), 159–66. Higgs has also found that the effect of memory depends on someone's overall level of inhibition. See Higgs, S., Williamson, A.C., and Attwood, A.S. (2008). Recall of recent lunch and its effect on subsequent snack intake. *Physiology and Behavior*, *94*(3), 454–62.
10. Brunstrom, J.M., Burn, J.F., Sell, N.R., Collingwood, J.M., Rogers, P.J., Wilkinson, L.L.,… and Ferriday, D. (2012). Episodic memory and appetite regulation in humans. *PLoS One*, *7*(12), e50707.
11. Brown, S.D., Duncan, J., Crabtree, D., Powell, D., Hudson, M., and Allan, J.L. (2020). We are what we (think we) eat: The effect of expected satiety on subsequent calorie consumption. *Appetite*, 152, 104717.
12. Higgs, S., and Woodward, M. (2009). Television watching during lunch increases afternoon snack intake of young women. *Appetite*, *52*(1), 39–43; Higgs, S. (2015). Manipulations of attention during eating and their effects on later snack intake. *Appetite*, *92*, 287–94. See the following for a review of these findings: Higgs, S., and Spetter, M.S. (2018). Cognitive control of eating: The role of memory in appetite and weight gain. *Current Obesity Reports*, *7*(1), 50–59.
13. Brunstrom, J.M., Brown, S., Hinton, E.C., Rogers, P.J., and Fay, S.H. (2011). "Expected satiety" changes hunger and fullness in the inter-meal interval. *Appetite*, *56*(2), 310–15.
14. Vadiveloo, M., Morwitz, V., and Chandon, P. (2013). The interplay of health claims and taste importance on food consumption and self-reported satiety. *Appetite*, *71*, 349–56.
15. Finkelstein, S.R., and Fishbach, A. (2010). When healthy food makes you hungry. *Journal of Consumer Research*, *37*(3), 357–67.
16. Abizaid, A., and Horvath, T.L. (2012). Ghrelin and the central regulation of feeding and energy balance. *Indian Journal of Endocrinology and Metabolism*, *16* (Suppl 3), S617.
17. Crum, A.J., Corbin, W.R., Brownell, K.D., and Salovey, P. (2011). Mind over milkshakes: Mindsets, not just nutrients, determine ghrelin response. *Health Psychology*, *30*(4), 424.

See the following for a peer commentary on the results and their potential implications for weight management: Tomiyama, A.J., and Mann, T. (2011). Commentary on Crum, Corbin, Brownell, and Salovey (2011). *Health Psychology*, *30*(4), 430–31.

18. I spoke to Alia Crum for the following article: Robson, D. (2018). Mind over matter. *New Scientist*, *239*(3192), 28–32.
19. Veldhuizen, M.G., Nachtigal, D.J., Flammer, L.J., de Araujo, I.E., and Small, D.M. (2013). Verbal descriptors influence hypothalamic response to low-calorie drinks. *Molecular Metabolism*, *2*(3), 270–80.
20. Cassady, B.A., Considine, R.V., and Mattes, R.D. (2012). Beverage consumption, appetite, and energy intake: What did you expect? *American Journal of Clinical Nutrition*, *95*(3), 587–93.
21. Yeomans, M.R., Re, R., Wickham, M., Lundholm, H., and Chambers, L. (2016). Beyond expectations: The physiological basis of sensory enhancement of satiety. *International Journal of Obesity*, *40*(11), 1693–98; Zhu, Y., Hsu, W.H., and Hollis, J.H. (2013). The impact of food viscosity on eating rate, subjective appetite, glycemic response and gastric emptying rate. *PLoS One*, *8*(6), e67482.
22. Hallberg, L., Björn-Rasmussen, E., Rossander, L., and Suwanik, R. (1977). Iron absorption from Southeast Asian diets. II. Role of various factors that might explain low absorption. *American Journal of Clinical Nutrition*, *30*(4), 539–48.
23. Björn-Rasmussen, E., Halberg, L., Magnusson, B., Rossander, L., Svanberg, B., and Arvidsson, B. (1976). Measurement of iron absorption from composite meals. *American Journal of Clinical Nutrition*, *29*(7), 772–78; Hallberg, L., Björn-Rasmussen, E., Rossander, L., and Suwanik, R. (1977). Iron absorption from Southeast Asian diets. II. Role of various factors that might explain low absorption. *American Journal of Clinical Nutrition*, *30*(4), 539–48. For a more recent analysis of these results, see Satter, E. (2007). Eating competence: Definition and evidence for the Satter Eating Competence model. *Journal of Nutrition Education and Behavior*, *39*(5), S142–S153.
24. Todes, Daniel P. (2014, November 21). Ivan Pavlov in 22 surprising facts. https://blog.oup.com/2014/11/ivan-pavlov-surprising-facts.
25. Jonas, W.B., Crawford, C., Colloca, L., Kaptchuk, T.J., Moseley, B., Miller, F.G.,… and Meissner, K. (2015). To what extent are surgery and invasive procedures effective beyond a placebo response? A systematic review with meta-analysis of randomised, sham controlled trials. *BMJ Open*, *5*(12), e009655.
26. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
27. Carels, R.A., Harper, J., and Konrad, K. (2006). Qualitative perceptions and caloric estimations of healthy and unhealthy foods by behavioral weight loss participants. *Appetite*, *46*(2), 199–206.
28. Suher, J., Raghunathan, R., and Hoyer, W.D. (2016). Eating healthy or feeling empty? How the "healthy = less filling" intuition influences satiety. *Journal of the Association for Consumer Research*, *1*(1), 26–40.
29. Briers, B., Huh, Y.E., Chan, E., and Mukhopadhyay, A. (2020). The unhealthy = tasty belief is associated with BMI through reduced consumption of vegetables: A cross-national and mediational analysis. *Appetite*, *150*, 104639. See also Cooremans, K., Geuens, M., and Pandelaere, M. (2017). Cross-national investigation of the drivers of obesity: Re-assessment of past findings and avenues for the future. *Appetite*, *114*, 360–67.
30. Raghunathan, R., Naylor, R.W., and Hoyer, W.D. (2006). The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products. *Journal of Marketing*, *70*(4), 170–84.
31. Turnwald, B.P., Jurafsky, D., Conner, A., and Crum, A.J. (2017). Reading between the menu lines: Are restaurants' descriptions of "healthy" foods unappealing? *Health Psychology*, *36*(11), 1034.
32. Turnwald, B.P., Boles, D.Z., and Crum, A.J. (2017). Association between indulgent descriptions

and vegetable consumption: Twisted carrots and dynamite beets. *JAMA Internal Medicine*, *177*(8), 1216–18; Turnwald, B.P., Bertoldo, J.D., Perry, M.A., Policastro, P., Timmons, M., Bosso, C.,… and Gardner, C.D. (2019). Increasing vegetable intake by emphasizing tasty and enjoyable attributes: A randomized controlled multisite intervention for taste-focused labeling. *Psychological Science*, *30*(11), 1603–15.

33. Fay, S.H., Hinton, E.C., Rogers, P.J., and Brunstrom, J.M. (2011). Product labelling can confer sustained increases in expected and actual satiety. *Appetite*, *57*(2), 557.
34. Cheon, B.K., and Hong, Y.Y. (2017). Mere experience of low subjective socioeconomic status stimulates appetite and food intake. *Proceedings of the National Academy of Sciences*, *114*(1), 72–77.
35. Sim, A.Y., Lim, E.X., Leow, M.K., and Cheon, B.K. (2018). Low subjective socioeconomic status stimulates orexigenic hormone ghrelin: A randomised trial. *Psychoneuroendocrinology*, *89*, 103–12.
36. Brunstrom, J.M., Brown, S., Hinton, E.C., Rogers, P.J., and Fay, S.H. (2011). "Expected satiety" changes hunger and fullness in the inter-meal interval. *Appetite*, *56*(2), 310–15.
37. https://www.health.harvard.edu/staying-healthy/the-hidden-dangers-of-protein-powders.
38. Mandel, N., and Brannon, D. (2017). Sugar, perceived healthfulness, and satiety: When does a sugary preload lead people to eat more? *Appetite*, *114*, 338–49.
39. Yeomans, M.R. (2015). Cued satiety: How consumer expectations modify responses to ingested nutrients. *Nutrition Bulletin*, *40*(2), 100–3.
40. Kuijer, R.G., and Boyce, J.A. (2014). Chocolate cake. Guilt or celebration? Associations with healthy eating attitudes, perceived behavioural control, intentions and weight loss. *Appetite*, *74*, 48–54.
41. Cornil, Y., and Chandon, P. (2016). Pleasure as a substitute for size: How multisensory imagery can make people happier with smaller food portions. *Journal of Marketing Research*, *53*(5), 847–64. The following paper found a similar effect with food writing—the richer the description of a cake, the less people wanted to eat, and the more satisfied they felt after eating it: Policastro, P., Harris, C., and Chapman, G. (2019). Tasting with your eyes: Sensory description substitutes for portion size. *Appetite*, *139*, 42–49.
42. Morewedge, C.K., Huh, Y.E., and Vosgerau, J. (2010). Thought for food: Imagined consumption reduces actual consumption. *Science*, *330*(6010), 1530–33.
43. There is even evidence that the anticipation of food can alter the ghrelin suppression, after eating: Ott, V., Friedrich, M., Zemlin, J., Lehnert, H., Schultes, B., Born, J., and Hallschmid, M. (2012). Meal anticipation potentiates postprandial ghrelin suppression in humans. *Psychoneuroendocrinology*, *37*(7), 1096–100.
44. Bosworth, M.L., Ferriday, D., Lai, S.H.S., Godinot, N., Martin, N., Martin, A.A.,… and Brunstrom, J.M. (2016). Eating slowly increases satiety and promotes memory of a larger portion size during the inter-meal interval. *Appetite*, *100*(101), 225.
45. Raghunathan, R., Naylor, R.W., and Hoyer, W.D. (2006). The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products. *Journal of Marketing*, *70*(4), 170–84.
46. Briers, B., Huh, Y.E., Chan, E., and Mukhopadhyay, A. (2020). The unhealthy = tasty belief is associated with BMI through reduced consumption of vegetables: A cross-national and mediational analysis. *Appetite*, *150*, 104639.
47. Werle, C.O., Trendel, O., and Ardito, G. (2013). Unhealthy food is not tastier for everybody: The "healthy = tasty" French intuition. *Food Quality and Preference*, *28*(1), 116–21.
48. Rozin, P., Kabnick, K., Pete, E., Fischler, C., and Shields, C. (2003). The ecology of eating: Smaller portion sizes in France than in the United States help explain the French paradox.

Psychological Science, *14*(5), 450–54.
49. World Health Organization. (2014). *Global Status Report on Noncommunicable Diseases 2014*.
50. Rozin, P., Fischler, C., Imada, S., Sarubin, A., and Wrzesniewski, A. (1999). Attitudes to food and the role of food in life in the USA, Japan, Flemish Belgium and France: Possible implications for the diet-health debate. *Appetite*, *33*(2), 163–80.

Chapter 7: De-stressing Stress

1. Increase of heart-disease. (1872). *British Medical Journal*, *1*(586), 317.
2. Theodore Seward starts "Don't Worry" clubs. (1898, January 17). *The Gazette* (York, PA), 3; Don't Worry circles (1897, December 19). *New York Times*, 7.
3. Seward, T. (1898). *The Don't Worry Movement: A Wave of Spiritual Emancipation* (self-published).
4. James, W. (1902). *The Varieties of Religious Experience*, 94. New York: Longman.
5. James, W. (1963). *Pragmatism, and Other Essays*, 237. New York: Washington Square Press.
6. Wallis, C., Mehrtens, R., and Thompson, D. (1983). Stress: Can we cope? *Time*, *121*(23), 48–54.
7. https://www.merriam-webster.com/dictionary/stressed-out.
8. https://www.health.harvard.edu/staying-healthy/understanding-the-stress-response. See also Burrows, V.L. (2015). The medicalization of stress: Hans Selye and the transformation of the postwar medical marketplace. Unpublished PhD thesis, City University of New York. https://academicworks.cuny.edu/gc_etds/877.
9. The preceding paragraphs are indebted to Jackson, M. (2014). *Stress, Shock, and Adaptation in the Twentieth Century*, esp. ch. 1. Rochester, NY: University of Rochester Press; Burrows, V.L. (2015). The medicalization of stress: Hans Selye and the transformation of the postwar medical marketplace. Unpublished PhD thesis, City University of New York. See the following for a modern description of the physiological and mental changes caused by threat: Mendes, W.B., and Park, J. (2014). Neurobiological concomitants of motivational states. *Advances in Motivation Science*, *1*, 233–70.
10. Jamieson, J.P., Peters, B.J., Greenwood, E.J., and Altose, A.J. (2016). Reappraising stress arousal improves performance and reduces evaluation anxiety in classroom exam situations. *Social Psychological and Personality Science*, *7*(6), 579–87.
11. Jamieson, J.P., Mendes, W.B., Blackstock, E., and Schmader, T. (2010). Turning the knots in your stomach into bows: Reappraising arousal improves performance on the GRE. *Journal of Experimental Social Psychology*, *46*(1), 208–12.
12. Jamieson, J.P., Nock, M.K., and Mendes, W.B. (2012). Mind over matter: Reappraising arousal improves cardiovascular and cognitive responses to stress. *Journal of Experimental Psychology: General*, *141*(3), 417. Further interpretation (and information on recovery): Jamieson, J.P., Mendes, W.B., and Nock, M.K. (2013). Improving acute stress responses: The power of reappraisal. *Current Directions in Psychological Science*, *22*(1), 51–56. See also Mendes, W.B., and Park, J. (2014). Neurobiological concomitants of motivational states. *Advances in Motivation Science*, *1*, 233–70; Trotman, G.P., Williams, S.E., Quinton, M.L., and van Zanten, J.J.V. (2018). Challenge and threat states: Examining cardiovascular, cognitive and affective responses to two distinct laboratory stress tasks. *International Journal of Psychophysiology*, *126*, 42–51.
13. See the following for a thorough analysis of stress appraisals, the cardiovascular responses, and the link to performance: Behnke, M., and Kaczmarek, L.D. (2018). Successful performance and cardiovascular markers of challenge and threat: A meta-analysis. *International Journal of Psychophysiology*, *130*, 73–79.
14. Crum, A.J., Salovey, P., and Achor, S. (2013). Rethinking stress: The role of mindsets in determining the stress response. *Journal of Personality and Social Psychology*, *104*(4), 716.
15. Crum, A.J., Akinola, M., Martin, A., and Fath, S. (2017). The role of stress mindset in shaping cognitive, emotional, and physiological responses to challenging and threatening stress. *Anxiety, Stress, and Coping*, *30*(4), 379–95; John-Henderson, N.A., Rheinschmidt, M.L., and Mendoza-Denton, R. (2015). Cytokine responses and math performance: The role of stereotype threat and anxiety reappraisals. *Journal of Experimental Social Psychology*, *56*, 203–6.

16. See the following for a general description of the differences between “threat” and “challenge” states: Blascovich, J., and Mendes, W.B. (2010). Social psychophysiology and embodiment. In S.T. Fiske, D.T. Gilbert, and G. Lindzey (Eds.). *The Handbook of Social Psychology* (5th ed., 194–227). New York: Wiley.
17. Crum, A.J., Akinola, M., Martin, A., and Fath, S. (2017). The role of stress mindset in shaping cognitive, emotional, and physiological responses to challenging and threatening stress. *Anxiety, Stress, and Coping*, *30*(4), 379–95.
18. Akinola, M., Fridman, I., Mor, S., Morris, M.W., and Crum, A.J. (2016). Adaptive appraisals of anxiety moderate the association between cortisol reactivity and performance in salary negotiations. *PLoS One*, *11*(12), e0167977.
19. Smith, E.N., Young, M.D., and Crum, A.J. (2020). Stress, mindsets, and success in Navy SEALs special warfare training. *Frontiers in Psychology*, *10*, 2962.
20. Beltzer, M.L., Nock, M.K., Peters, B.J., and Jamieson, J.P. (2014). Rethinking butterflies: The affective, physiological, and performance effects of reappraising arousal during social evaluation. *Emotion*, *14*(4), 761.
21. Strack, J., Lopes, P.N., and Esteves, F. (2015). Will you thrive under pressure or burn out? Linking anxiety motivation and emotional exhaustion. *Cognition and Emotion*, *29*(4), 578–91. For further examples, see Kim, J., Shin, Y., Tsukayama, E., and Park, D. (2020). Stress mindset predicts job turnover among preschool teachers. *Journal of School Psychology*, *78*, 13–22; Keech, J.J., Cole, K.L., Hagger, M.S., and Hamilton, K. (2020). The association between stress mindset and physical and psychological wellbeing: Testing a stress beliefs model in police officers. *Psychology and Health*, *35*(11), 1306–25; Casper, A., Sonnentag, S., and Tremmel, S. (2017). Mindset matters: The role of employees’ stress mindset for day-specific reactions to workload anticipation. *European Journal of Work and Organizational Psychology*, *26*(6), 798–810.
22. Keller, A., Litzelman, K., Wisk, L.E., Maddox, T., Cheng, E.R., Creswell, P.D., and Witt, W.P. (2012). Does the perception that stress affects health matter? The association with health and mortality. *Health Psychology*, *31*(5), 677. See the following for a near-exact replication of this result: Nabi, H., Kivimäki, M., Batty, G.D., Shipley, M.J., Britton, A., Brunner, E.J.,… and Singh-Manoux, A. (2013). Increased risk of coronary heart disease among individuals reporting adverse impact of stress on their health: The Whitehall II prospective cohort study. *European Heart Journal*, *34*(34), 2697–705.
23. Szabo, A., and Kocsis, Á. (2017). Psychological effects of deep-breathing: The impact of expectancy-priming. *Psychology, Health and Medicine*, *22*(5), 564–69; Cregg, D.R., and Cheavens, J.S. (2020). Gratitude interventions: Effective self-help? A meta-analysis of the impact on symptoms of depression and anxiety. *Journal of Happiness Studies*, 22, 413–45.
24. Brady, S.T., Hard, B.M., and Gross, J.J. (2018). Reappraising test anxiety increases academic performance of first-year college students. *Journal of Educational Psychology*, *110*(3), 395.
25. The advice in this section is based on the following paper: Keech, J.J., Hagger, M.S., and Hamilton, K. (2019). Changing stress mindsets with a novel imagery intervention: A randomized controlled trial. *Emotion*, *21*(1), 123–36. See also the following resources: http://socialstresslab.wixsite.com/urochester/research; https://mbl.stanford.edu/interventions/rethink-stress.
26. Jentsch, V.L., and Wolf, O.T. (2020). The impact of emotion regulation on cardiovascular, neuroendocrine and psychological stress responses. *Biological Psychology*, 107893.
27. King, B.J. (2008). *Pressure Is Privilege*, 102–3. New York: LifeTime.
28. I interviewed Mauss for the following article: Robson, D. (2018, December 18). Why the quickest route to happiness may be to do nothing. BBC Future. https://www.bbc.com/future/article/20181218-whats-the-quickest-way-to-happiness-do-nothing.

29. Mauss, I.B., Tamir, M., Anderson, C.L., and Savino, N.S. (2011). Can seeking happiness make people unhappy? Paradoxical effects of valuing happiness. *Emotion*, *11*(4), 807. For a review of further research, see Gruber, J., Mauss, I.B., and Tamir, M. (2011). A dark side of happiness? How, when, and why happiness is not always good. *Perspectives on Psychological Science*, *6*(3), 222–33.
30. McGuirk, L., Kuppens, P., Kingston, R., and Bastian, B. (2018). Does a culture of happiness increase rumination over failure? *Emotion*, *18*(5), 755.
31. Ford, B.Q., Lam, P., John, O.P., and Mauss, I.B. (2018). The psychological health benefits of accepting negative emotions and thoughts: Laboratory, diary, and longitudinal evidence. *Journal of Personality and Social Psychology*, *115*(6), 1075. See also Shallcross, A.J., Troy, A.S., Boland, M., and Mauss, I.B. (2010). Let it be: Accepting negative emotional experiences predicts decreased negative affect and depressive symptoms. *Behaviour Research and Therapy*, *48*, 921–29.
32. Luong, G., Wrzus, C., Wagner, G.G., and Riediger, M. (2016). When bad moods may not be so bad: Valuing negative affect is associated with weakened affect-health links. *Emotion*, *16*(3), 387–401.
33. Tamir, M., and Bigman, Y.E. (2018). Expectations influence how emotions shape behavior. *Emotion*, *18*(1), 15. See also Tamir, M., and Ford, B.Q. (2012). When feeling bad is expected to be good: Emotion regulation and outcome expectancies in social conflicts. *Emotion*, *12*(4), 807.
34. Ford, B.Q., and Tamir, M. (2012). When getting angry is smart: Emotional preferences and emotional intelligence. *Emotion*, *12*(4), 685; Axt, J., and Oishi, S. (2016). When unfair treatment helps performance. *Motivation and Emotion*, *40*(2), 243–57.
35. Thakral, M., Von Korff, M., McCurry, S.M., Morin, C.M., and Vitiello, M.V. (2020). Changes in dysfunctional beliefs about sleep after cognitive behavioral therapy for insomnia: A systematic literature review and meta-analysis. *Sleep Medicine Reviews*, *49*, 101230. See also Courtauld, H., Notebaert, L., Milkins, B., Kyle, S.D., and Clarke, P.J. (2017). Individuals with clinically significant insomnia symptoms are characterised by a negative sleep-related expectancy bias: Results from a cognitive-experimental assessment. *Behaviour Research and Therapy*, *95*, 71–78.
36. Lichstein, K.L. (2017). Insomnia identity. *Behaviour Research and Therapy*, *97*, 230–41.

See also Woosley, J.A., Lichstein, K.L., Taylor, D.J., Riedel, B.W., and Bush, A.J. (2016). Insomnia complaint versus sleep diary parameters: Predictions of suicidal ideation. *Suicide and Life-Threatening Behavior*, *46*(1), 88–95.

37. Draganich, C., and Erdal, K. (2014). Placebo sleep affects cognitive functioning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *40*(3), 857; Gavriloff, D., Sheaves, B., Juss, A., Espie, C.A., Miller, C.B., and Kyle, S.D. (2018). Sham sleep feedback delivered via actigraphy biases daytime symptom reports in people with insomnia: Implications for insomnia disorder and wearable devices. *Journal of Sleep Research*, *27*(6), e12726. See also Rahman, S.A., Rood, D., Trent, N., Solet, J., Langer, E.J., and Lockley, S.W. (2020). Manipulating sleep duration perception changes cognitive performance—an exploratory analysis. *Journal of Psychosomatic Research*, *132*, 109992.
38. Personal communication with Kenneth Lichstein, University of Alabama, April 26, 2018.
39. https://www.cdc.gov/mmwr/volumes/68/wr/mm6849a5.htm.
40. Espie, C.A., Broomfield, N.M., MacMahon, K.M., Macphee, L.M., and Taylor, L.M. (2006). The attention-intention-effort pathway in the development of psychophysiologic insomnia: A theoretical review. *Sleep Medicine Reviews*, *10*(4), 215–45.
41. Thakral, M., Von Korff, M., McCurry, S.M., Morin, C.M., and Vitiello, M.V. (2020). Changes in dysfunctional beliefs about sleep after cognitive behavioral therapy for insomnia: A systematic literature review and meta-analysis. *Sleep Medicine Reviews*, *49*, 101230. See also Eidelman, P., Talbot, L., Ivers, H., Bélanger, L., Morin, C.M., and Harvey, A.G. (2016). Change in dysfunctional

beliefs about sleep in behavior therapy, cognitive therapy, and cognitive-behavioral therapy for insomnia. *Behavior Therapy*, *47*(1), 102–15.

42. Selye, H. (1979). *The Stress of My Life: A Scientist's Memoirs*, 117. New York: Van Nostrand Reinhold. For more information about Selye's invention of the term "eustress," see Szabo, S., Tache, Y., and Somogyi, A. (2012). The legacy of Hans Selye and the origins of stress research: A retrospective 75 years after his landmark brief "letter" to the editor of *Nature*. *Stress*, *15*(5), 472–78.

Chapter 8: Limitless Willpower

1. Lewis, M. (2012, September 11). Obama's way. *Vanity Fair*. https://www.vanityfair.com/news/2012/10/michael-lewis-profile-barack-obama.
2. Elkins, K. (2017, January 5). Billionaires Mark Zuckerberg and John Paul DeJoria use a simple wardrobe trick to boost productivity. CNBC. https://www.cnbc.com/2017/01/05/mark-zuckerberg-and-john-paul-dejorias-simple-wardrobe-trick.html.
3. De Vita, E. (2015, February 22). Creative thinking: Why a morning routine helps conserve your brainpower. *Financial Times*. https://www.ft.com/content/3d07fcea-b37b-11e4-9449-00144feab7de.
4. Baumeister, R.F., Bratslavsky, E., Muraven, M., and Tice, D.M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, *74*(5), 1252.
5. Ibid.
6. Inzlicht, M., Berkman, E., and Elkins-Brown, N. (2016). The neuroscience of "ego depletion." In M. Inzlicht, E. Berkman, N. Elkins-Brown (Eds.). *Social Neuroscience: Biological approaches to social psychology*, 101–23. London: Routledge.
7. Baumeister, R.F., Bratslavsky, E., Muraven, M., and Tice, D.M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, *74*(5), 1252.
8. Schmeichel, B.J., Vohs, K.D., and Baumeister, R.F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology*, *85*(1), 33; Schmeichel, B.J. (2007). Attention control, memory updating, and emotion regulation temporarily reduce the capacity for executive control. *Journal of Experimental Psychology: General*, *136*(2), 241.
9. Vohs, K.D., Baumeister, R.F., Schmeichel, B.J., Twenge, J.M., Nelson, N.M., and Tice, D.M. (2014). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Motivation Science*, *1*(S), 19–42.
10. Vohs, K.D., and Faber, R.J. (2007). Spent resources: Self-regulatory resource availability affects impulse buying. *Journal of Consumer Research*, *33*(4), 537–47.
11. Baumeister, R.F. (2012). Self-control: The moral muscle. *The Psychologist*, *25*(2), 112–15. https://thepsychologist.bps.org.uk/volume-25/edition-2/self-control-%E2%80%93-moral-muscle.
12. Hofmann, W., Vohs, K.D., and Baumeister, R.F. (2012). What people desire, feel conflicted about, and try to resist in everyday life. *Psychological Science*, *23*(6), 582–88.
13. Baumeister, R.F., and Vohs, K.D. (2016). Strength model of self-regulation as limited resource: Assessment, controversies, update. *Advances in Experimental Social Psychology*, *54*, 67–127.
14. Parker, I. (2014, June 2). Inheritance. *New Yorker*. https://www.newyorker.com/magazine/2014/06/02/inheritance.
15. Sheppes, G., Catran, E., and Meiran, N. (2009). Reappraisal (but not distraction) is going to make you sweat: Physiological evidence for self-control effort. *International Journal of Psychophysiology*, *71*(2), 91–96; Wagstaff, C.R. (2014). Emotion regulation and sport performance. *Journal of Sport and Exercise Psychology*, *36*(4), 401–12.
16. See the following for a description of these PET scans, and Baumeister's own research in this area: Baumeister, R.F., and Vohs, K.D. (2016). Strength model of self-regulation as limited resource: Assessment, controversies, update. *Advances in Experimental Social Psychology*, *54*, 67–127.
17. Gailliot, M.T., Baumeister, R.F., DeWall, C.N., Maner, J.K., Plant, E.A., Tice, D.M.,… and Schmeichel, B.J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, *92*(2), 325.
18. Baumeister, R.F., and Vohs, K.D. (2016). Strength model of self-regulation as limited resource: Assessment, controversies, update. *Advances in Experimental Social Psychology*, *54*, 67–127.

19. For recent large-scale studies confirming the existence of ego depletion, see Dang, J., Liu, Y., Liu, X., and Mao, L. (2017). The ego could be depleted, providing initial exertion is depleting: A preregistered experiment of the ego depletion effect. *Social Psychology*, *48*(4), 242–45; Garrison, K. E., Finley, A.J., and Schmeichel, B. J. (2019). Ego depletion reduces attention control: Evidence from two high-powered preregistered experiments. *Personality and Social Psychology Bulletin*, *45*(5), 728–39; Dang, J., Barker, P., Baumert, A., Bentvelzen, M., Berkman, E., Buchholz, N.,… and Zinkernagel, A. (2021). A multilab replication of the ego depletion effect. *Social Psychological and Personality Science*, *12*(1), 14–24.
20. Martijn, C., Tenbült, P., Merckelbach, H., Dreezens, E., and de Vries, N.K. (2002). Getting a grip on ourselves: Challenging expectancies about loss of energy after self-control. *Social Cognition*, *20*(6), 441–60. See also Clarkson, J.J., Hirt, E.R., Jia, L., and Alexander, M.B. (2010). When perception is more than reality: The effects of perceived versus actual resource depletion on self-regulatory behavior. *Journal of Personality and Social Psychology*, *98*(1), 29. The following has a review of similar studies: Klinger, J.A., Scholer, A.A., Hui, C.M., and Molden, D.C. (2018). Effortful experiences of self-control foster lay theories that self-control is limited. *Journal of Experimental Social Psychology*, *78*, 1–13.
21. Job, V., Dweck, C.S., and Walton, G.M. (2010). Ego depletion: Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science*, *21*(11), 1686–93. See also Miller, E.M., Walton, G.M., Dweck, C.S., Job, V., Trzesniewski, K.H., and McClure, S.M. (2012). Theories of willpower affect sustained learning. *PLoS One*, *7*(6), e38680; Chow, J.T., Hui, C.M., and Lau, S. (2015). A depleted mind feels inefficacious: Ego-depletion reduces self-efficacy to exert further self-control. *European Journal of Social Psychology*, *45*(6), 754–68.
22. Bernecker, K., and Job, V. (2015). Beliefs about willpower moderate the effect of previous day demands on next day's expectations and effective goal striving. *Frontiers in Psychology*, *6*, 1496.
23. See the longitudinal study in Job, V., Dweck, C.S., and Walton, G.M. (2010). Ego depletion: Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science*, *21*(11), 1686–93. See also Job, V., Walton, G.M., Bernecker, K., and Dweck, C.S. (2015). Implicit theories about willpower predict self-regulation and grades in everyday life. *Journal of Personality and Social Psychology*, *108*(4), 637; Bernecker, K., Herrmann, M., Brandstätter, V., and Job, V. (2017). Implicit theories about willpower predict subjective well-being. *Journal of Personality*, *85*(2), 136–50.
24. Bernecker, K., and Job, V. (2015). Beliefs about willpower are related to therapy adherence and psychological adjustment in patients with type 2 diabetes. *Basic and Applied Social Psychology*, *37*(3), 188–95. For a review of these findings, see also Job, V., Sieber, V., Rothermund, K., and Nikitin, J. (2018). Age differences in implicit theories about willpower: Why older people endorse a nonlimited theory. *Psychology and Aging*, *33*(6), 940.
25. A full description of these experiments, along with hypotheses about the cultural origins of these mindsets and the effects on education, can be found in Savani, K., and Job, V. (2017). Reverse ego-depletion: Acts of self-control can improve subsequent performance in Indian cultural contexts. *Journal of Personality and Social Psychology*, *113*(4), 589.
26. Scientific evidence supports the idea that trataka can improve concentration, potentially through the expectation effects that Job and Savani have described. See Raghavendra, B.R., and Singh, P. (2016). Immediate effect of yogic visual concentration on cognitive performance. *Journal of Traditional and Complementary Medicine*, *6*(1), 34–36.
27. Descriptions of the conservation theory of ego depletion, and the evidence, can be found in Baumeister, R.F., and Vohs, K.D. (2016). Strength model of self-regulation as limited resource: Assessment, controversies, update. *Advances in Experimental Social Psychology*, *54*, 67–127.
28. Job, V., Walton, G.M., Bernecker, K., and Dweck, C.S. (2013). Beliefs about willpower determine

the impact of glucose on self-control. *Proceedings of the National Academy of Sciences*, *110*(37), 14837–42.

29. Madzharov, A., Ye, N., Morrin, M., and Block, L. (2018). The impact of coffee-like scent on expectations and performance. *Journal of Environmental Psychology*, *57*, 83–86; Denson, T.F., Jacobson, M., Von Hippel, W., Kemp, R.I., and Mak, T. (2012). Caffeine expectancies but not caffeine reduce depletion-induced aggression. *Psychology of Addictive Behaviors*, *26*(1), 140; Cropsey, K.L., Schiavon, S., Hendricks, P.S., Froelich, M., Lentowicz, I., and Fargason, R. (2017). Mixed-amphetamine salts expectancies among college students: Is stimulant induced cognitive enhancement a placebo effect? *Drug and Alcohol Dependence*, *178*, 302–9.
30. Leach, S. (2019, May 9). How the hell has Danielle Steel managed to write 179 books? *Glamour*. https://www.glamour.com/story/danielle-steel-books-interview; Jordan, T. (2018, February 2). Danielle Steel: "I know an idea is right for me when it just clicks." *New York Times*. https://www.nytimes.com/2018/02/02/books/review/danielle-steel-fall-from-grace-best-seller.html.
31. Burkeman, O. (2019, May 31). Danielle Steel works 20 hours a day, but is that to be envied? *Guardian*. https://www.theguardian.com/money/oliver-burkeman-column/2019/may/31/danielle-steel-work-20-hour-day.
32. Konze, A.K., Rivkin, W., and Schmidt, K.H. (2019). Can faith move mountains? How implicit theories about willpower moderate the adverse effect of daily emotional dissonance on ego-depletion at work and its spillover to the home-domain. *European Journal of Work and Organizational Psychology*, *28*(2), 37–149. See also the following paper for an example of the ways that ego depletion can destroy our free time: Reinecke, L., Hartmann, T., and Eden, A. (2014). The guilty couch potato: The role of ego depletion in reducing recovery through media use. *Journal of Communication*, *64*(4), 569–89.
33. Bernecker, K., and and Job, V. (2020). Too exhausted to go to bed: Implicit theories about willpower and stress predict bedtime procrastination. *British Journal of Psychology*, *111*(1), 126–47.
34. See experiment 4 in Savani, K., and Job, V. (2017). Reverse ego-depletion: Acts of self-control can improve subsequent performance in Indian cultural contexts. *Journal of Personality and Social Psychology*, *113*(4), 589.
35. Sieber, V., Flückiger, L., Mata, J., Bernecker, K., and Job, V. (2019). Autonomous goal striving promotes a nonlimited theory about willpower. *Personality and Social Psychology Bulletin*, *45*(8), 1295–307.
36. Klinger, J.A., Scholer, A.A., Hui, C.M., and Molden, D.C. (2018). Effortful experiences of self-control foster lay theories that self-control is limited. *Journal of Experimental Social Psychology*, *78*, 1–13.
37. Haimovitz, K., Dweck, C.S., and Walton, G.M. (2020). Preschoolers find ways to resist temptation after learning that willpower can be energizing. *Developmental Science*, *23*(3), e12905.
38. On Williams's ritual: Serena Williams sings *Flashdance* theme to keep her calm on court. Sky News (2015, July 12). https://www.skysports.com/tennis/news/32498/9910795/serena-williams-sings-flashdance-theme-to-keep-her-calm-on-court. On Dr. Seuss and Beethoven: Weinstein, E. (2018, April 13). Ten superstitions of writers and artists. *Paris Review*.

On Williams, Farrell, and Beyoncé: Brooks, A.W., Schroeder, J., Risen, J.L., Gino, F., Galinsky, A.D., Norton, M.I., and Schweitzer, M.E. (2016). Don't stop believing: Rituals improve performance by decreasing anxiety. *Organizational Behavior and Human Decision Processes*, *137*, 71–85. See also Hobson, N.M., Schroeder, J., Risen, J.L., Xygalatas, D., and Inzlicht, M. (2018). The psychology of rituals: An integrative review and process-based framework. *Personality and Social Psychology Review*, *22*(3), 260–84.

39. Lonsdale, C., and Tam, J.T. (2008). On the temporal and behavioural consistency of pre-

performance routines: An intra-individual analysis of elite basketball players' free throw shooting accuracy. *Journal of Sports Sciences*, *26*(3), 259–66.
40. Damisch, L., Stoberock, B., and Mussweiler, T. (2010). Keep your fingers crossed! How superstition improves performance. *Psychological Science*, *21*(7), 1014–20.
41. Friese, M., Schweizer, L., Arnoux, A., Sutter, F., and Wänke, M. (2014). Personal prayer counteracts self-control depletion. *Consciousness and Cognition*, *29*, 90–95.
42. Rounding, K., Lee, A., Jacobson, J. A., & Ji, L. J. (2012). Religion replenishes self-control. *Psychological Science*, *23*(6), 635–42.
43. Brooks, A.W., Schroeder, J., Risen, J.L., Gino, F., Galinsky, A.D., Norton, M.I., and Schweitzer, M.E. (2016). Don't stop believing: Rituals improve performance by decreasing anxiety. *Organizational Behavior and Human Decision Processes*, *137*, 71–85.
44. Tian, A.D., Schroeder, J., Häubl, G., Risen, J.L., Norton, M.I., and Gino, F. (2018). Enacting rituals to improve self-control. *Journal of Personality and Social Psychology*, *114*(6), 851.

Chapter 9: Untapped Genius

1. In the scientific literature, the school is known as Oak School, but an article in *Discover* magazine revealed the true location: Ellison, K. (2015, October 29). Being honest about the Pygmalion effect. *Discover*. https://www.discovermagazine.com/mind/being-honest-about-the-pygmalion-effect.
2. Rosenthal, R., and Jacobson, L. (1968). *Pygmalion in the Classroom: Teacher Expectation and Pupils' Intellectual Development*, 85–93. New York: Holt, Rinehart and Winston.
3. Rosenthal, R., and Jacobson, L. (1966). Teachers' expectancies: Determinants of pupils' IQ gains. *Psychological Reports*, *19*(1), 115–18.
4. See, for instance, Rudebeck, S.R., Bor, D., Ormond, A., O'Reilly, J.X., and Lee, A.C. (2012). A potential spatial working memory training task to improve both episodic memory and fluid intelligence. *PLoS One*, *7*(11), e50431.
5. Boot, W.R., Simons, D.J., Stothart, C., and Stutts, C. (2013). The pervasive problem with placebos in psychology: Why active control groups are not sufficient to rule out placebo effects. *Perspectives on Psychological Science*, *8*(4), 445–54.
6. Foroughi, C.K., Monfort, S.S., Paczynski, M., McKnight, P.E., and Greenwood, P.M. (2016). Placebo effects in cognitive training. *Proceedings of the National Academy of Sciences*, *113*(27), 7470–74.
7. See also Jaeggi, S.M., Buschkuehl, M., Shah, P., and Jonides, J. (2014). The role of individual differences in cognitive training and transfer. *Memory and Cognition*, *42*(3), 464–80; Miller, E.M., Walton, G.M., Dweck, C.S., Job, V., Trzesniewski, K.H., and McClure, S.M. (2012). Theories of willpower affect sustained learning. *PLoS One*, *7*(6), e38680.
8. Turi, Z., Bjørkedal, E., Gunkel, L., Antal, A., Paulus, W., and Mittner, M. (2018). Evidence for cognitive placebo and nocebo effects in healthy individuals. *Scientific Reports*, *8*(1), 1–14; Fassi, L., and Kadosh, R.C. (2020). Is it all in our head? When subjective beliefs about receiving an intervention are better predictors of experimental results than the intervention itself. *bioRxiv*. https://www.biorxiv.org/content/10.1101/2020.12.06.411850v1.abstract.
9. How drinking vodka makes you more creative. (2012, February 16) *The Week*. https://theweek.com/articles/478116/how-drinking-vodka-makes-more-creative.
10. Lipnicki, D.M., and Byrne, D.G. (2005). Thinking on your back: Solving anagrams faster when supine than when standing. *Cognitive Brain Research*, *24*(3), 719–22.
11. Lapp, W.M., Collins, R.L., and Izzo, C.V. (1994). On the enhancement of creativity by alcohol: Pharmacology or expectation? *American Journal of Psychology*, *107*(2), 173–206.
12. Rozenkrantz, L., Mayo, A.E., Ilan, T., Hart, Y., Noy, L., and Alon, U. (2017). Placebo can enhance creativity. *PLoS One*, *12*(9), e0182466. See also Weinberger, A.B., Iyer, H., and Green, A.E. (2016). Conscious augmentation of creative state enhances "real" creativity in open-ended analogical reasoning. *PLoS One*, e0150773.
13. Weger, U.W., and Loughnan, S. (2013). Rapid communication: Mobilizing unused resources: Using the placebo concept to enhance cognitive performance. *Quarterly Journal of Experimental Psychology*, *66*(1), 23–28.
14. Autin, F., and Croizet, J.C. (2012). Improving working memory efficiency by reframing metacognitive interpretation of task difficulty. *Journal of Experimental Psychology: General*, *141*(4), 610. See also Oyserman, D., Elmore, K., Novin, S., Fisher, O., and Smith, G.C. (2018). Guiding people to interpret their experienced difficulty as importance highlights their academic possibilities and improves their academic performance. *Frontiers in Psychology*, *9*, 781.
15. Rosenthal addresses some of the common criticisms in the following paper: Rosenthal, R. (1987). Pygmalion effects: Existence, magnitude, and social importance. *Educational Researcher*, *16*(9), 37–40. See also De Boer, H., Bosker, R.J., and van der Werf, M.P. (2010). Sustainability of teacher

expectation bias effects on long-term student performance. *Journal of Educational Psychology*, *102*(1), 168. For a modern review, see Timmermans, A.C., Rubie-Davies, C.M., and Rjosk, C. (2018) Pygmalion's 50th anniversary: The state of the art in teacher expectation research. *Educational Research and Evaluation*, *24*(3–5), 91–98.

16. Szumski, G., and Karwowski, M. (2019). Exploring the Pygmalion effect: The role of teacher expectations, academic self-concept, and class context in students' math achievement. *Contemporary Educational Psychology*, *59*, 101787. See the following for a more critical review, which nevertheless finds that self-fulfilling prophecies are meaningful (and particularly high in the military): Jussim, L. (2017). Précis of social perception and social reality: Why accuracy dominates bias and self-fulfilling prophecy. *Behavioral and Brain Sciences*, *40*, e1.
17. Sorhagen, N.S. (2013). Early teacher expectations disproportionately affect poor children's high school performance. *Journal of Educational Psychology*, *105*(2), 465.
18. Eden, D., and Shani, A.B. (1982). Pygmalion goes to boot camp: Expectancy, leadership, and trainee performance. *Journal of Applied Psychology*, *67*(2), 194.
19. The effect size of the IDF study, and the average effect size across industries, can be found in the following paper: McNatt, D.B. (2000). Ancient Pygmalion joins contemporary management: A meta-analysis of the result. *Journal of Applied Psychology*, *85*(2), 314. For a further discussion of Pygmalion effects in the workplace, see Whiteley, P., Sy, T., and Johnson, S.K. (2012). Leaders' conceptions of followers: Implications for naturally occurring Pygmalion effects. *Leadership Quarterly*, *23*(5), 822–34; and Avolio, B.J., Reichard, R.J., Hannah, S.T., Walumbwa, F.O., and Chan, A. (2009). A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *Leadership Quarterly*, *20*(5), 764–84.
20. Brophy, J.E., and Good, T.L. (1970). Teachers' communication of differential expectations for children's classroom performance: Some behavioral data. *Journal of Educational Psychology*, *61*(5), 365.
21. Rubie-Davies, C.M. (2007). Classroom interactions: Exploring the practices of high- and low-expectation teachers. *British Journal of Educational Psychology*, *77*(2), 289–306. For a comprehensive review, see Wang, S., Rubie-Davies, C.M., and Meissel, K. (2018). A systematic review of the teacher expectation literature over the past 30 years. *Educational Research and Evaluation*, *24*(3–5), 124–79.
22. Rosenthal, R., and Jacobson, L.F. (1968). Teacher expectations for the disadvantaged. *Scientific American*, *218*(4), 19–23.
23. As the following review explains, recent research shows that teacher expectations are stable over time: Timmermans, A.C., Rubie-Davies, C.M., and Rjosk, C. (2018). Pygmalion's 50th anniversary: The state of the art in teacher expectation research. *Educational Research and Evaluation*, *24*(3–5), 91–98.
24. Angelou, M. (2020). *I Know Why the Caged Bird Sings*, 83. London: Folio Society.
25. The teachers who changed Oprah's life. 1989. https://www.oprah.com/oprahshow/the-teachers-who-changed-oprahs-life/all.
26. Coughlan, S. (2016, March 8). Stephen Hawking remembers best teacher. BBC News. https://www.bbc.co.uk/news/education-35754759.
27. Talamas, S.N., Mavor, K.I., and Perrett, D.I. (2016). Blinded by beauty: Attractiveness bias and accurate perceptions of academic performance. *PLoS One*, *11*(2), e0148284. The authors make a direct connection to the expectation effect: "Perceptions of conscientiousness, intelligence and academic performance may play a vital role in the classroom environment and in the success of a child's education."
28. See, for example, Todorov, A., Mandisodza, A.N., Goren, A., and Hall, C.C. (2005). Inferences of competence from faces predict election outcomes. *Science*, *308*(5728), 1623–26; Moore, F.R.,

Filippou, D., and Perrett, D.I. (2011). Intelligence and attractiveness in the face: Beyond the attractiveness halo effect. *Journal of Evolutionary Psychology*, *9*(3), 205–17.

29. See Jæger, M.M. (2011). "A thing of beauty is a joy forever"? Returns to physical attractiveness over the life course. *Social Forces*, *89*(3), 983–1003; Frevert, T.K., and Walker, L.S. (2014). Physical attractiveness and social status. *Sociology Compass*, *8*(3), 313–23.
30. Clifford, M.M., and Walster, E. (1973). The effect of physical attractiveness on teacher expectations. *Sociology of Education*, 248–58; Bauldry, S., Shanahan, M.J., Russo, R., Roberts, B.W., and Damian, R. (2016). Attractiveness compensates for low status background in the prediction of educational attainment. *PLoS One*, *11*(6), e0155313.
31. Frieze, I.H., Olson, J.E., and Russell, J. (1991). Attractiveness and income for men and women in management. *Journal of Applied Social Psychology*, *21*(13), 1039–57. For a more in-depth discussion, see Toledano, E. (2013). May the best (looking) man win: The unconscious role of attractiveness in employment decisions. *Cornell HR Review*. http://digitalcommons.ilr.cornell.edu/chrr/48.
32. Mayew, W.J., Parsons, C.A., and Venkatachalam, M. (2013). Voice pitch and the labor market success of male chief executive officers. *Evolution and Human Behavior*, *34*(4), 243–48. Additional information, such as Skinner's earnings, comes from supplementary material attached to the paper, and an interview I conducted with William Mayew for the following video: Does the way you speak reveal how much you earn? (2018, June 5). BBC Worklife. https://www.bbc.com/worklife/article/20180605-does-the-way-you-speak-give-away-how-much-you-earn.
33. Wang, S., Rubie-Davies, C.M., and Meissel, K. (2018). A systematic review of the teacher expectation literature over the past 30 years. *Educational Research and Evaluation, 24*(3–5), 124–79; Sorhagen, N.S. (2013). Early teacher expectations disproportionately affect poor children's high school performance. *Journal of Educational Psychology*, *105*(2), 465.
34. Jamil, F.M., Larsen, R.A., and Hamre, B.K. (2018). Exploring longitudinal changes in teacher expectancy effects on children's mathematics achievement. *Journal for Research in Mathematics Education*, *49*(1), 57–90.
35. Agirdag, O. (2018). The impact of school SES composition on science achievement and achievement growth: Mediating role of teachers' teachability culture. *Educational Research and Evaluation*, *24*(3–5), 264–76.
36. There has been a debate over the importance of stereotype threat, with some failed attempts to replicate the phenomenon. Proponents, however, argue that there have been methodological issues with some of those replications, and that the evidence for the existence of stereotype threat in many high-stakes situations is robust. Bolstering this argument, a recent meta-analysis confirmed that measures to reduce stereotype threat significantly boost performance among the people who would be at risk. For further information, see Nussbaum, D. (2018, February 1). The replicability issue and stereotype threat research. *Medium*. https://medium.com/@davenuss79/the-replicability-issue-and-stereotype-threat-research-a988d6f8b080; and Liu, S., Liu, P., Wang, M., and Zhang, B. (2020). Effectiveness of stereotype threat interventions: A meta-analytic review. *Journal of Applied Psychology*. https://doi.org/10.1037/apl0000770.
37. Quoted in: Ellison, K. (2015, October 29). Being honest about the Pygmalion effect. *Discover*. https://www.discovermagazine.com/mind/being-honest-about-the-pygmalion-effect.
38. Rubie-Davies, C.M., Peterson, E.R., Sibley, C.G., and Rosenthal, R. (2015). A teacher expectation intervention: Modelling the practices of high expectation teachers. *Contemporary Educational Psychology*, *40*, 72–85. The data was re-analyzed in the following paper, which gives the 28 percent improvement quoted in this paragraph: Rubie-Davies, C.M., and Rosenthal, R. (2016). Intervening in teachers' expectations: A random effects meta-analytic approach to examining the

effectiveness of an intervention. *Learning and Individual Differences*, *50*, 83–92.
39. De Boer, H., Timmermans, A.C., and Van Der Werf, M.P. (2018). The effects of teacher expectation interventions on teachers' expectations and student achievement: Narrative review and meta-analysis. *Educational Research and Evaluation*, *24*(3–5), 180–200.
40. John-Henderson, N.A., Rheinschmidt, M.L., and Mendoza-Denton, R. (2015). Cytokine responses and math performance: The role of stereotype threat and anxiety reappraisals. *Journal of Experimental Social Psychology*, *56*, 203–6. Similar benefits can be seen for poorer students who might find examinations particularly stressful: Rozek, C.S., Ramirez, G., Fine, R.D., and Beilock, S.L. (2019). Reducing socioeconomic disparities in the STEM pipeline through student emotion regulation. *Proceedings of the National Academy of Sciences*, *116*(5), 1553–58. See also Liu, S., Liu, P., Wang, M., and Zhang, B. (2020). Effectiveness of stereotype threat interventions: A meta-analytic review. *Journal of Applied Psychology*, *106*(6), 921–49. doi: 10.1037/apl0000770.
41. The paper explicitly links it to research into expectation and stress. Brady, S.T., Reeves, S.L., Garcia, J., Purdie-Vaughns, V., Cook, J.E., Taborsky-Barba, S.,… and Cohen, G.L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. *Journal of Educational Psychology*, *108*(3), 353.
42. Martens, A., Johns, M., Greenberg, J., and Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. *Journal of Experimental Social Psychology*, *42*(2), 236–43.
43. Miyake, A., Kost-Smith, L.E., Finkelstein, N.D., Pollock, S.J., Cohen, G.L., and Ito, T.A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, *330*(6008), 1234–37. Data on the gender gap taken from graph and supplementary material available here: www.sciencemag.org/cgi/content/full/330/6008/1234/DC1.
44. Hadden, I.R., Easterbrook, M.J., Nieuwenhuis, M., Fox, K.J., and Dolan, P. (2020). Self-affirmation reduces the socioeconomic attainment gap in schools in England. *British Journal of Educational Psychology*, *90*(2), 517–36.
45. Cohen, G.L., Garcia, J., Apfel, N., and Master, A. (2006). Reducing the racial achievement gap: A social-psychological intervention. *Science*, *313*(5791), 1307–10; Cohen, G.L., Garcia, J., Purdie-Vaughns, V., Apfel, N., and Brzustoski, P. (2009). Recursive processes in self-affirmation: Intervening to close the minority achievement gap. *Science*, *324*(5925), 400–3.
46. Goyer, J.P., Garcia, J., Purdie-Vaughns, V., Binning, K.R., Cook, J.E., Reeves, S.L.,… and Cohen, G.L. (2017). Self-affirmation facilitates minority middle schoolers' progress along college trajectories. *Proceedings of the National Academy of Sciences*, *114*(29), 7594–99. See also Sherman, D.K., Hartson, K.A., Binning, K.R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., … and Cohen, G.L. (2013). Deflecting the trajectory and changing the narrative: How self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology*, *104*(4), 591. See the following for a summary of these studies on racial differences: Walton, G.M., and Wilson, T.D. (2018). Wise interventions: Psychological remedies for social and personal problems. *Psychological Review*, *125*(5), 617.
47. For a meta-analysis of self-affirmation interventions, see Liu, S., Liu, P., Wang, M., and Zhang, B. (2020). Effectiveness of stereotype threat interventions: A meta-analytic review. *Journal of Applied Psychology*. For a description of the virtuous cycle, see Cohen, G.L., and Sherman, D.K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, *65*(1), 333–71.
48. Liu, S., Liu, P., Wang, M., and Zhang, B. (2020). Effectiveness of stereotype threat interventions: A meta-analytic review. *Journal of Applied Psychology*.

Chapter 10: The Super-Agers

1. Gagliardi, S. (2018, February 6). Sanremo 2018. *Huffpost*. https://www.huffingtonpost.it/entry/sanremo-2018-paddy-jones-balla-a-83-anni-e-lascia-tutti-a-bocca-aperta-questanno-sanremo-lo-vince-lei-la-vecchia-che-balla-e-come-la-scimmia-di-gabbani_it_5cc1ef3ee4b0aa856c9ea862.
2. Yaqoob, J. (2014, April 12). Simon Cowell: Controversial salsa-dancing granny can win Britain's Got Talent—and she reminds me of mum. *Mirror*. https://www.mirror.co.uk/tv/tv-news/britains-talent-paddy-nico-simon-3406432.
3. This may sound controversial, but it's the conclusion of many papers, such as Stewart, T.L., Chipperfield, J.G., Perry, R.P., and Weiner, B. (2012). Attributing illness to "old age": Consequences of a self-directed stereotype for health and mortality. *Psychology and Health*, *27*(8), 881–97.
4. The experiment is described in depth in Langer, E.J. (2009). *Counter Clockwise: Mindful Health and the Power of Possibility*. New York: Ballantine. Further details, including a discussion of future work, come from Pagnini, F., Cavalera, C., Volpato, E., Comazzi, B., Riboni, F.V., Valota, C.,… and Langer, E. (2019). Ageing as a mindset: A study protocol to rejuvenate older adults with a counterclockwise psychological intervention. *BMJ Open*, *9*(7), e030411.
5. Levy, B.R., Slade, M.D., Kunkel, S.R., and Kasl, S.V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, *83*(2), 261.
6. Levy, B.R., Zonderman, A.B., Slade, M.D., and Ferrucci, L. (2009). Age stereotypes held earlier in life predict cardiovascular events in later life. *Psychological Science*, *20*(3), 296–98.
7. Levy, B.R., Ferrucci, L., Zonderman, A.B., Slade, M.D., Troncoso, J., and Resnick, S.M. (2016). A culture-brain link: Negative age stereotypes predict Alzheimer's disease biomarkers. *Psychology and Aging*, *31*(1), 82.
8. Levy, B.R., Slade, M.D., Pietrzak, R.H., and Ferrucci, L. (2018). Positive age beliefs protect against dementia even among elders with high-risk gene. *PLoS One*, *13*(2), e0191004.
9. Levy, B.R., Slade, M.D., Kunkel, S.R., and Kasl, S.V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, *83*(2), 261.
10. Kuper, H., and Marmot, M. (2003). Intimations of mortality: Perceived age of leaving middle age as a predictor of future health outcomes within the Whitehall II study. *Age and Ageing*, *32*(2), 178–84. There is also experimental evidence for a short-term effect here: people are affected by ageist TV ads, but only if they identify as being of the same generation as the actors: Westerhof, G.J., Harink, K., Van Selm, M., Strick, M., and Van Baaren, R. (2010). Filling a missing link: The influence of portrayals of older characters in television commercials on the memory performance of older adults. *Ageing and Society*, *30*(5), 897.
11. Stephan, Y., Sutin, A.R., and Terracciano, A. (2016). Feeling older and risk of hospitalization: Evidence from three longitudinal cohorts. *Health Psychology*, *35*(6), 634; Stephan, Y., Caudroit, J., Jaconelli, A., and Terracciano, A. (2014). Subjective age and cognitive functioning: A 10-year prospective study. *American Journal of Geriatric Psychiatry*, *22*(11), 1180–87.
12. Mock, S.E., and Eibach, R.P. (2011). Aging attitudes moderate the effect of subjective age on psychological well-being: Evidence from a 10-year longitudinal study. *Psychology and Aging*, *26*(4), 979. See the following papers for an elaboration of the link between subjective aging, psychological well-being, and physical health: Stephan, Y., Chalabaev, A., Kotter-Grühn, D., and Jaconelli, A. (2013). "Feeling younger, being stronger": An experimental study of subjective age and physical functioning among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *68*(1), 1–7; Westerhof, G.J., Miche, M., Brothers, A.F., Barrett, A.E., Diehl, M., Montepare, J.M.,… and Wurm, S. (2014). The influence of subjective aging on health

and longevity: A meta-analysis of longitudinal data. *Psychology and Aging*, *29*(4), 793; Wurm, S., and Westerhof, G.J. (2015). Longitudinal research on subjective aging, health, and longevity: Current evidence and new directions for research. *Annual Review of Gerontology and Geriatrics*, *35*(1), 145–65; Terracciano, A., Stephan, Y., Aschwanden, D., Lee, J.H., Sesker, A.A., Strickhouser, J.E.,… and Sutin, A.R. (2021). Changes in subjective age during COVID-19. *Gerontologist*, *61*(1), 13–22.

13. Davies, C. (2010, January 24). Martin Amis in new row over "euthanasia booths." *Guardian*. https://www.theguardian.com/books/2010/jan/24/martin-amis-euthanasia-booths-alzheimers.
14. Martin Amis always had a fear and loathing of ageing. (2012, April 13). *Evening Standard*. https://www.standard.co.uk/news/martin-amis-always-had-a-fear-and-loathing-of-ageing-6791926.html. See also https://www.manchester.ac.uk/discover/news/writing-is-not-for-the-old-says-amis-yes-it-is-says-james.
15. Rosenbaum, R. (2012, August 31). Martin Amis contemplates evil. *Smithsonian*. https://www.smithsonianmag.com/arts-culture/martin-amis-contemplates-evil-17857756.
16. Higgins, C. (2009, January 24). Martin Amis on aging. *Guardian*. https://www.theguardian.com/books/2009/sep/29/martin-amis-the-pregnant-widow.
17. Levy, B. (2009). Stereotype embodiment: A psychosocial approach to aging. *Current Directions in Psychological Science*, *18*(6), 332–36.
18. Touron, D.R. (2015). Memory avoidance by older adults: When "old dogs" won't perform their "new tricks." *Current Directions in Psychological Science*, *24*(3), 170–76.
19. Robertson, D.A., King-Kallimanis, B.L., and Kenny, R.A. (2016). Negative perceptions of aging predict longitudinal decline in cognitive function. *Psychology and Aging*, *31*(1), 71; Jordano, M.L., and Touron, D.R. (2017). Stereotype threat as a trigger of mind-wandering in older adults. *Psychology and Aging*, *32*(3), 307.
20. Westerhof, G.J., Harink, K., Van Selm, M., Strick, M., and Van Baaren, R. (2010). Filling a missing link: The influence of portrayals of older characters in television commercials on the memory performance of older adults. *Ageing and Society*, *30*(5), 897.
21. Robertson, D.A., Savva, G.M., King-Kallimanis, B.L., and Kenny, R.A. (2015). Negative perceptions of aging and decline in walking speed: A self-fulfilling prophecy. *PLoS One*, *10*(4), e0123260.
22. Levy, B.R., and Slade, M.D. (2019). Positive views of aging reduce risk of developing later-life obesity. *Preventive Medicine Reports*, *13*, 196–98.
23. Stewart, T.L., Chipperfield, J.G., Perry, R.P., and Weiner, B. (2012). Attributing illness to "old age": Consequences of a self-directed stereotype for health and mortality. *Psychology and Health*, *27*(8), 881–97.
24. See, for instance, Levy, B.R., Ryall, A.L., Pilver, C.E., Sheridan, P.L., Wei, J.Y., and Hausdorff, J.M. (2008). Influence of African American elders' age stereotypes on their cardiovascular response to stress. *Anxiety, Stress, and Coping*, *21*(1), 85–93; Weiss, D. (2018). On the inevitability of aging: Essentialist beliefs moderate the impact of negative age stereotypes on older adults' memory performance and physiological reactivity. *Journals of Gerontology: Series B*, *73*(6), 925–33.
25. Levy, B.R., Moffat, S., Resnick, S.M., Slade, M.D., and Ferrucci, L. (2016). Buffer against cumulative stress: Positive age self-stereotypes predict lower cortisol across 30 years. *GeroPsych: The Journal of Gerontopsychology and Geriatric Psychiatry*, *29*(3), 141–46.
26. Levy, B.R., and Bavishi, A. (2018). Survival advantage mechanism: Inflammation as a mediator of positive self-perceptions of aging on longevity. *Journals of Gerontology: Series B*, *73*(3), 409–12.
27. https://www.newscientist.com/term/telomeres. See also Levitin, D. (2020) *The Changing Mind*, 325. London: Penguin Life.

28. Pietrzak, R.H., Zhu, Y., Slade, M.D., Qi, Q., Krystal, J.H., Southwick, S.M., and Levy, B.R. (2016). Negative age stereotypes' association with accelerated cellular aging: Evidence from two cohorts of older adults. *Journal of the American Geriatrics Society*, *64*(11), e228.
29. Tamman, A.J., Montalvo-Ortiz, J.L., Southwick, S.M., Krystal, J.H., Levy, B.R., and Pietrzak, R.H. (2019). Accelerated DNA methylation aging in US military veterans: Results from the National Health and Resilience in Veterans Study. *American Journal of Geriatric Psychiatry*, *27*(5), 528–32.
30. Levy, B.R., Slade, M.D., Pietrzak, R.H., and Ferrucci, L. (2018). Positive age beliefs protect against dementia even among elders with high-risk gene. *PLoS One*, *13*(2), e0191004.
31. Callaway, E. (2010, November 28). Telomerase reverses ageing process. *Nature*. doi: 10.1038/nature09603; Ledford, H. (2020). Reversal of biological clock restores vision in old mice. *Nature*, *88*(7837), 209.
32. Knechtle, B., Jastrzebski, Z., Rosemann, T., and Nikolaidis, P.T. (2019). Pacing during and physiological response after a 12-hour ultra-marathon in a 95-year-old male runner. *Frontiers in Physiology*, *9*, 1875.
33. Cited in this review paper: Lepers, R., and Stapley, P.J. (2016). Master athletes are extending the limits of human endurance. *Frontiers in Physiology*, *7*, 613.
34. Ibid.
35. Harvey-Wood, H. (2000, May 3). Obituary: Penelope Fitzgerald. *Guardian*. https://www.theguardian.com/news/2000/may/03/guardianobituaries.books.
36. Wood, J. (2014, November 17). Late bloom. *New Yorker*. https://www.newyorker.com/magazine/2014/11/24/late-bloom.
37. Sotheby's (2020). Getting to know Picasso ceramics. https://www.sothebys.com/en/articles/picasso-ceramics-7-things-you-need-to-know.
38. In pictures: Matisse's cut-outs. (2013, October 7). BBC News. https://www.bbc.co.uk/news/in-pictures-24402817.
39. Weiss, D. (2018). On the inevitability of aging: Essentialist beliefs moderate the impact of negative age stereotypes on older adults' memory performance and physiological reactivity. *Journals of Gerontology: Series B*, *73*(6), 925–33.
40. Shimizu, A. (2019, April 5). For Hiromu Inada, an 86-year-old ironman triathlete, age really is just a number. *Japan Times*: https://www.japantimes.co.jp/life/2019/04/05/lifestyle/hiromu-inada-86-year-old-ironman-triathlete-age-really-just-number.
41. (UK) Office for National Statistics (2018). Living longer: How our population is changing and why it matters. https://www.ons.gov.uk/releases/livinglongerhowourpopulationischangingandwhyitmatters.
42. https://www.who.int/news-room/fact-sheets/detail/dementia.
43. Kaeberlein, M. (2018). How healthy is the healthspan concept? *GeroScience*, *40*(4), 361–64.
44. Levy, B.R., Pilver, C., Chung, P.H., and Slade, M.D. (2014). Subliminal strengthening: Improving older individuals' physical function over time with an implicit-age-stereotype intervention. *Psychological Science*, *25*(12), 2127–35.
45. Robertson, D.A., King-Kallimanis, B.L., and Kenny, R.A. (2016). Negative perceptions of aging predict longitudinal decline in cognitive function. *Psychology and Aging*, *31*(1), 71–81.
46. Sarkisian, C.A., Prohaska, T.R., Davis, C., and Weiner, B. (2007). Pilot test of an attribution retraining intervention to raise walking levels in sedentary older adults. *Journal of the American Geriatrics Society*, *55*(11), 1842–46.
47. See, for instance, Stephan, Y., Chalabaev, A., Kotter-Grühn, D., and Jaconelli, A. (2013). "Feeling younger, being stronger": An experimental study of subjective age and physical functioning among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *68*(1),

1–7; Brothers, A., and Diehl, M. (2017). Feasibility and efficacy of the AgingPlus Program: Changing views on aging to increase physical activity. *Journal of Aging and Physical Activity*, *25*(3), 402–11; Nehrkorn-Bailey, A., Forsyth, G., Braun, B., Burke, K., and Diehl, M. (2020). Improving hand-grip strength and blood pressure in adults: Results from an AgingPLUS pilot study. *Innovation in Aging, 4* (Suppl 1), 587; Wolff, J.K., Warner, L.M., Ziegelmann, J.P., and Wurm, S. (2014). What do targeting positive views on ageing add to a physical activity intervention in older adults? Results from a randomised controlled trial. *Psychology and Health*, *29*(8), 915–32; Beyer, A.K., Wolff, J.K., Freiberger, E., and Wurm, S. (2019). Are self-perceptions of ageing modifiable? Examination of an exercise programme with vs. without a self-perceptions of ageing-intervention for older adults. *Psychology and Health*, *34*(6), 661–76.

48. I have written about this research previously: Robson, D. (2017, August 28). The amazing fertility of the older mind. BBC Future. http://www.bbc.com/future/story/20170828-the-amazing-fertility-of-the-older-mind.
49. https://www.tuttitalia.it/sardegna/73-nuoro/statistiche/popolazione-andamento-demografico.
50. Kirchgaessner, S. (2016, August 12). Ethical questions raised in search for Sardinian centenarians' secrets. *Guardian*. https://www.theguardian.com/world/2016/aug/12/ethical-questions-raised-in-search-for-sardinian-centenarians-secrets; https://www.bluezones.com/exploration/sardinia-italy.
51. Ruby, J.G., Wright, K.M., Rand, K.A., Kermany, A., Noto, K., Curtis, D.,… and Ball, C. (2018). Estimates of the heritability of human longevity are substantially inflated due to assortative mating. *Genetics*, *210*(3), 1109–24.
52. My short documentary on this subject can be found at https://www.bbc.com/reel/playlist/elixir-of-life?vpid=p08blgc4.
53. North, M.S., and Fiske, S.T. (2015). Modern attitudes toward older adults in the aging world: A cross-cultural meta-analysis. *Psychological Bulletin*, *141*(5), 993.
54. Levy, B.R. (2017). Age-stereotype paradox: Opportunity for social change. *Gerontologist*, *57* (Suppl 2), S118–S126.

Epilogue

1. Anzilotti, E. (2017, March 7). This hospital bridges traditional medicine with Hmong spirituality—and gets results. *Fast Company*. https://www.fastcompany.com/3068680/this-hospital-bridges-traditional-medicine-with-hmong-spirtuality-and-gets-results.
2. Colucci-D'Amato, L., Bonavita, V., and Di Porzio, U. (2006). The end of the central dogma of neurobiology: Stem cells and neurogenesis in adult CNS. *Neurological Sciences*, *27*(4), 266–70.
3. Schroder, H.S., Kneeland, E.T., Silverman, A.L., Beard, C., and Björgvinsson, T. (2019). Beliefs about the malleability of anxiety and general emotions and their relation to treatment outcomes in acute psychiatric treatment. *Cognitive Therapy and Research*, *43*(2), 312–23.
4. Burnette, J.L. (2010). Implicit theories of body weight: Entity beliefs can weigh you down. *Personality and Social Psychology Bulletin*, *36*(3), 410–22; Burnette, J.L., and Finkel, E.J. (2012). Buffering against weight gain following dieting setbacks: An implicit theory intervention. *Journal of Experimental Social Psychology*, *48*(3), 721–25; Burnette, J.L., Knouse, L.E., Vavra, D.T., O'Boyle, E., and Brooks, M.A. (2020). Growth mindsets and psychological distress: A meta-analysis. *Clinical Psychology Review*, *77*, 101816.
5. See the supplemental material to Yeager, D.S., Johnson, R., Spitzer, B.J., Trzesniewski, K.H., Powers, J., and Dweck, C.S. (2014). The far-reaching effects of believing people can change: Implicit theories of personality shape stress, health, and achievement during adolescence. *Journal of Personality and Social Psychology*, *106*(6), 867.
6. Kross, E., and Ayduk, O. (2017). Self-distancing: Theory, research, and current directions. *Advances in Experimental Social Psychology*, *55*, 81–136.
7. Streamer, L., Seery, M.D., Kondrak, C.L., Lamarche, V.M., and Saltsman, T.L. (2017). Not I, but she: The beneficial effects of self-distancing on challenge/threat cardiovascular responses. *Journal of Experimental Social Psychology*, *70*, 235–41.
8. Diedrich, A., Hofmann, S.G., Cuijpers, P., and Berking, M. (2016). Self-compassion enhances the efficacy of explicit cognitive reappraisal as an emotion regulation strategy in individuals with major depressive disorder. *Behaviour Research and Therapy*, *82*, 1–10.

ILLUSTRATION CREDITS

[here] (Illusion) From McCrone, J. (1991). *The ape that spoke: Language and the evolution of the human mind*. New York: William Morrow & Company.

[here] (Unresolved Picture) Courtesy of Nava Rubin. From: Ludmer, R., Dudai, Y., and Rubin, N. (2011). Uncovering camouflage: Amygdala activation predicts long-term memory of induced perceptual insight. *Neuron*, 69(5), 1002–14.

[here] (Duck/Rabbit) From *Fliegende Blätter*, October 23, 1892.

[here] (Resolved Picture) Courtesy of Nava Rubin. From: Ludmer, R., Dudai, Y., and Rubin, N. (2011). Uncovering camouflage: Amygdala activation predicts long-term memory of induced perceptual insight. *Neuron*, 69(5), 1002–14.

[here] (Change in Arm Strength) Source: Yao, W. X., Ranganathan, V. K., Allexandre, D., Siemionow, V., & Yue, G. H. (2013). Kinesthetic imagery training of forceful muscle contractions increases brain signal and muscle strength. *Frontiers in Human Neuroscience*, *7*, 561.

[here] (Hunger After "Tasty" and "Healthy" Chocolate Bars) Source: Finkelstein, S. R., & Fishbach, A. (2010). When healthy food makes you hungry. *Journal of Consumer Research*, *37*(3), 357–67.

[here] (Self-Affirmation Reduces Gender Differences in Spatial Reasoning) Source: Martens, A., Johns, M., Greenberg, J., and Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. *Journal of Experimental Social Psychology*, *42*(2), 236–43.

[here] (Self-Affirmation Reduces Gender Differences in Physics Performance) Source: Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., and Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, 330(6008), 1234–37.

[here] (The Effects of Age Beliefs on Dementia Incidence) Source: Levy, B. R., Slade, M. D., Pietrzak, R. H., & Ferrucci, L. (2018). Positive age beliefs protect against dementia even among elders with high-risk gene. *PLoS One*, 13(2), e0191004.