منابع

Introduction

1. R. Byrne, "Game 21 Adjourned as Thrust and Parry Give Way to Melee," New York Times, December 20, 1990.

2. For reviews of these two "easy" topics, see M. Winklhofer, "An Avian Magnetometer," Sci 336 (2012): 991; and L. Kow and D. Pfaff, "Mapping of Neural and Signal Transduction Pathways for Lordosis in the Search for Estrogen Actions on the Central Nervous System," BBR 92 (1998): 169.

3. J. Watson, Behaviorism, 2nd ed. (New York: Norton, 1930).

4. Footnote: J. Todd and E. Morris, eds., Modern Perspectives on John B. Watson and Classical Behaviorism (Westport, CT: Greenwood Press, 1994); H. Link, The New Psych of Selling and Advertising (New York: Macmillan, 1932).

5. E. Moniz, quoted in T. Szasz, Schizophrenia: The Sacred Symbol of Psychiatry (Syracuse, NY: Syracuse University Press, 1988).

6. K. Lorenz, quoted in R. Learner, Final Solutions: Biology, Prejudice, and Genocide (University Park: Penn State Press, 1992).

7. For discussions of Lorenz's activities during the Nazi era, see B. Sax, "What is a 'Jewish Dog'? Konrad Lorenz and the Cult of Wildness," Soc and Animals 5 (1997): 3; U. Deichman, Biologists Under Hitler (Cambridge MA: Harvard University Press, 1999); and B. Müller-Hill, Murderous Science: Elimination by Scientific Selection of Jews, Gypsies, and Others, Germany 1933–1945 (Oxford, UK: Oxford University Press).

8. The Wellesley effect was first reported by Martha McClintock of the University of Chicago: M. McClintock, "Menstrual Synchrony and Suppression," Nat 229 (1971): 244. While a number of studies have replicated the Wellesley effect, some have not, as summarized in H. Wilson, "A Critical Review of Menstrual Synchrony Research," PNE 17 (1992): 565. A critique of that critique can be found in M. McClintock, "Whither Menstrual Synchrony?" ARSR 9 (1998): 77.

9. V. S. Naipaul, Among the Believers: An Islamic Journey (New York: Vintage Books, 1992). And for the definitive book on this entire field of behavioral biology, see M. Konner, The Tangled Wing: Biological Constraints on the Human Spirit (New York: Henry Holt, 2003). This is the finest book in existence on the biology of human social behavior—subtle, nuanced, nondogmatic, and wonderfully written—by the anthropologist/physician Mel Konner. To my vast good fortune, Konner was my academic adviser and mentor when I was an undergraduate, and he has had the greatest intellectual impact on me of anyone in my life. Those who know Mel will recognize his intellectual imprint on every page of this book.

Chapter 1: The Behavior

1. Footnote: F. Gervasi. The Life and Times of Menachem Begin. (New York: Putnam, 2009).

2. For good reviews of these distinctions, see K. Miczek et al., "Neurosteroids, GABAA Receptors, and Escalated Aggressive Behavior," Horm Behav 44 (2003): 242; and S. Motta et al., "Dissecting the Brain's Fear System Reveals That the Hypothalamus Is Critical for Responding in Subordinate Conspecific Intruders," PNAS 106 (2009): 4870.

3. A small, disheartening literature concerns ex-child soldiers and

منابع 📙 ۳

participants in genocides who are able to hold back their symptoms of post-traumatic stress disorder through acts of cruelty: R. Weierstall et al., "When Combat Prevents PTSD Symptoms: Results from a Survey with Former Child Soldiers in Northern Uganda," BMC Psychiatry 12 (2012): 41; R. Weierstall et al., "The Thrill of Being Violent as an Antidote to Posttraumatic Stress Disorder in Rwandese Genocide Perpetrators," Eur J Psychotraumatology 2 (2011): 6345; V. Nell, "Cruelty's Rewards: The Gratifications of Perpetrators and Spectators," BBS 29 (2006): 211; T. Elbert et al., "Fascination Violence: On Mind and Brain of Man Hunters," Eur Arch Psychiatry and Clin Nsci 260 (2010): S100.

4. B. Oakley et al., Pathological Altruism (Oxford: Oxford University Press, 2011).

5. L. MacFarquhar, "The Kindest Cut," New Yorker, July 27, 2009, p. 38.

6. Footnote: For a lengthy overview of Munchausen syndrome by proxy, see R. Sapolsky, "Nursery Crimes," in Monkeyluv and Other Essays on Our Lives as Animals (New York: Simon and Schuster/Scribner, 2005).

7. J. King et al., "Doing the Right Thing: A Common Neural Circuit for Appropriate Violent or Compassion Behavior," NeuroImage 30 (2006): 1069.

Chapter 2: One Second Before

1. For a summary of MacLean's findings and thinking, see P. MacLean, The Triune Brain in Evolution (New York: Springer, 1990).

2. A. Damasio, Descartes' Error: Emotion, Reason, and the Human Brain (New York: Putnam, 1994; Penguin, 2005).

3. W. Nauta, "The Problem of the Frontal Lobe: A Reinterpretation," J Psychiatric Res 8 (1971): 167; W. Nauta and M. Feirtag, "The Organization of the Brain," Sci Am 241 (1979): 88.

4. R. Nelson and B. Trainor, "Neural Mechanisms of Aggression," Nat Rev Nsci 8 (2007): 536.

5. For more on the effects of amygdala damage in humans, see A. Young

et al., "Face Processing Impairments After Amygdalotomy," Brain 118 (1995): 15; H. Narabayashi et al., "Stereotaxic Amygdalotomy for Behavior Disorders," Arch Neurol 9 (1963): 1; V. Balasubramaniam and T. Kanaka, "Amygdalotomy and Hypothalamotomy: A Comparative Study," Confinia Neurologia 37 (1975): 195; R. Heimburger et al., "Stereotaxic Amygdalotomy for Epilepsy with Aggressive Behavior," JAMA 198 (1966): 741; B. Ramamurthi, "Stereotactic Operation in Behavior Disorders: Amygdalotomy and Hypothalamotomy," Acta Neurochirurgica (Wien) 44 (1988): 152; G. Lee et al., "Clinical and Physiological Effects of Stereotaxic Bilateral Amygdalotomy for Intractable Aggression," J Neuropsychiatry and Clin Nsci 10 (1998): 413; E. Hitchcock and V. Cairns, "Amygdalotomy," Postgraduate Med J 49 (1973): 894; and M. Mpakopoulou et al., "Stereotactic Amygdalotomy in the Management of Severe Aggressive Behavioral Disorders," Neurosurgical Focus 25 (2008): E6.

6. Some papers touching on the political controversies surrounding amygdalotomies: V. Mark et al., "Role of Brain Disease in Riots and Urban Violence," JAMA 201 (1967): 217; P. Breggin, "Psychosurgery for Political Purposes," Duquesne Law Rev 13 (1975): 841; E. Valenstein, Great and Desperate Cures: The Rise and Decline of Psychosurgery and Other Radical Treatments for Mental Illness (New York: Basic Books 2010).

7. C. Holden, "Fuss over a Terrorist's Brain," Sci 298 (2002): 1551.

8. D. Eagleman, "The Brain on Trial," Atlantic, June 7, 2011; G. Lavergne, A Sniper in the Tower (Denton: University of North Texas Press, 1997);
H. Hylton, "Texas Sniper's Brother John Whitman Shot," Palm Beach Post, July 5, 1973, p. A1.

9. For a great review of the role of aggression in fear, see the superb J. LeDoux, The Emotional Brain: The Mysterious Underpinnings of Emotional Life (New York: Simon and Schuster, 1998).

10. N. Kalin et al., "The Role of the Central Nucleus of the Amygdala in Mediating Fear and Anxiety in the Primate," J Nsci 24 (2004): 5506; T.

منابع 📙 ۵

Hare et al., "Contributions of Amygdala and Striatal Activity in Emotion Regulation," BP 57 (2005): 624; D. Zald, "The Human Amygdala and the Emotional Evaluation of Sensory Stimuli," Brain Res Rev 41 (2003): 88.

11. D. Mobbs et al., "When Fear Is Near: Threat Imminence Elicits Prefrontal-Periaqueductal Gray Shifts in Humans," Sci 317 (2007): 1079.

12. G. Berns, "Neurobiological Substrates of Dread," Sci 312 (2006): 754. Additional papers pertinent to the role of the human amygdala in fear: R. Adolphs et al., "Impaired Recognition of Emotion in Facial Expressions Following Bilateral Damage to the Human Amygdala," Nat 372 (1994): 669; A. Young et al., "Face Processing Impairments After Amygdalotomy," Brain 118 (1995): 15; J. Feinstein et al., "The Human Amygdala and the Induction and Experience of Fear," Curr Biol 21 (2011): 34; A. Bechara et al., "Double Dissociation of Conditioning and Declarative Knowledge Relative to the Amygdala and Hippocampus in Humans," Sci 269 (1995): 1115.

13. A. Gilboa et al., "Functional Connectivity of the Prefrontal Cortex and the Amygdala in PTSD," BP 55 (2004): 263.

14. M. Hsu et al., "Neural Systems Responding to Degrees of Uncertainty in Human Decision- Making," Sci 310 (2006): 1680; J. Rilling et al., "The Neural Correlates of Mate Competition in Dominant Male Rhesus Macaques," BP 56 (2004): 364.

15. C. Zink et al., "Know Your Place: Neural Processing of Social Hierarchy in Humans," Neuron 58 (2008): 273; M. Freitas-Ferrari et al., "Neuroimaging in Social Anxiety Disorder: A Systematic Review of the Literature," Prog Neuro-Psychopharmacology and Biol Psychiatry 34 (2010): 565.

16. G. Berns et al., "Neurobiological Correlates of Social Conformity and Independence During Mental Rotation," BP 58 (2005): 245.

17. K. Tye et al., "Amygdala Circuitry Mediating Reversible and Bidirectional Control of Anxiety," Nat 471 (2011): 358; S. Kim et al., "Differing

Neural Pathways Assemble a Behavioural State from Separable Features in Anxiety," Nat 496 (2013): 219.

18. J. Ipser et al., "Meta-analysis of Functional Brain Imaging in Specific Phobia," Psychiatry and Clin Nsci 67 (2013): 311; U. Lueken, "Neural Substrates of Defensive Reactivity in Two Subtypes of Specific Phobia," SCAN 9 (2013): 11; A. Del Casale et al., "Functional Neuroimaging in Specific Phobia," Psychiatry Res 202 (2012): 181; J. Feinstein et al., "Fear and Panic in Humans with Bilateral Amygdala Damage," Nat Nsci 16 (2013): 270.

19. M. Cook and S. Mineka, "Selective Associations in the Observational Conditioning of Fear in Rhesus Monkeys," J Exp Psych and Animal Behav Processes 16 (1990): 372; S. Mineka and M. Cook, "Immunization Against the Observational Conditioning of Snake Fear in Rhesus Monkeys," J Abnormal Psych 95 (1986): 307.

20. S. Rodrigues et al., "Molecular Mechanisms Underlying Emotional Learning and Memory in the Lateral Amygdala," Neuron 44 (2004): 75; J. Johansen et al., "Optical Activation of Lateral Amygdala Pyramidal Cells Instructs Associative Fear Learning," PNAS 107 (2010): 12692; S. Rodrigues et al., "The Influence of Stress Hormones on Fear Circuitry," Ann Rev of Nsci, 32 (2009): 289; S. Rumpel et al., "Postsynaptic Receptor Trafficking Underlying a Form of Associative Learning," Sci 308 (2005): 83. Other work in this area: C. Herry et al., "Switching On and Off Fear by Distinct Neuronal Circuits," Nat 454 (2008): 600; S. Maren and G. Quirk, "Neuronal Signaling of Fear Memory," Nat Rev Nsci 5 (2004): 844; S. Wolff et al., "Amygdala Interneuron Subtypes Control Fear Learning Through Disinhibition," Nat 509 (2014): 453; R. LaLumiere, "Optogenetic Dissection of Amygdala Functioning," Front Behav Nsci 8 (2014): 1.

21. T. Amano et al., "Synaptic Correlates of Fear Extinction in the Amygdala," Nat Nsci 13 (2010): 489; M. Milad and G. Quirk, "Neurons in Medial Prefrontal Cortex Signal Memory for Fear Extinction," Nat 420

منابع 📙 ۷

(2002): 70; E. Phelps et al., "Extinction Learning in Humans: Role of the Amygdala and vmPFC," Neuron 43 (2004): 897; S. Ciocchi et al., "Encoding of Conditioned Fear in Central Amygdala Inhibitory Circuits," Nat 468 (2010): 277; W. Haubensak et al., "Genetic Dissection of an Amygdala Microcircuit That Gates Conditioned Fear," Nat 468 (2010): 270.

22. K. Gospic et al., "Limbic Justice: Amygdala Involvement in Immediate Rejections in the Ultimatum Game," PLoS ONE 9 (2011): e1001054; B. De Martino et al., "Frames, Biases, and Rational Decision-Making in the Human Brain," Sci 313 (2006): 684; A. Bechara et al., "Role of the Amygdala in Decision-Making," ANYAS 985 (2003): 356; B. De Martino et al., "Amygdala Damage Eliminates Monetary Loss Aversion," PNAS 107 (2010): 3788; J. Van Honk et al., "Generous Economic Investments After Basolateral Amygdala Damage," PNAS 110 (2013): 2506.

23. R. Adolphs et al., "The Human Amygdala in Social Judgment," Nat 393 (1998): 470

24. D. Zald, "The Human Amygdala and the Emotional Evaluation of Sensory Stimuli," Brain Res Rev 41 (2003): 88; C. Saper, "Animal Behavior: The Nexus of Sex and Violence," Nat 470 (2011): 179; D. Lin et al., "Functional Identification of an Aggression Locus in Mouse Hypothalamus," Nat 470 (2011): 221; M. Baxter and E. Murray, "The Amygdala and Reward," Nat Rev Nsci 3 (2002): 563. Some other realms where positive stimuli activate the amygdala: S. Aalto et al., "Neuroanatomical Substrate of amusement and Sadness: A PET Activation Study Using Film Stimuli," Neuroreport 13 (2002): 67–73; T. Uwano et al., "Neuronal Responsiveness to Various Sensory Stimuli, and Associative Learning in the Rat Amygdala," Nsci 68 (1995): 339; K. Tye and P. Janak, "Amygdala Neurons Differentially Encode Motivation and Reinforcement," | Nsci 27 (2007): 3937; G. Schoenbaum et al., "Orbitofrontal Cortex and Basolateral Amygdala Encode Expected Outcomes During Learning," Nat Nsci 1 (1998): 155; I. Aharon et al., "Beautiful Faces Have Variable Reward Value: fMRI and Behavioral Evidence," Neuron 32 (2001): 537.

25. P. Janak and K. Tye, "From Circuits to Behavior in the Amygdala," Nat 517 (2015): 284.

26. J. LeDoux, "Coming to Terms with Fear," PNAS 111 (2014): 2871; J. LeDoux, "The Amygdala," Curr Biol 17 (2007): R868; K. Tully et al., "Norepinephrine Enables the Induction of Associative LTP at Thalamo-Amygdala Synapses," PNAS 104 (2007): 14146.

27. T. Rizvi et al., "Connections Between the Central Nucleus of the Amygdala and the Midbrain Periaqueductal Gray: Topography and Reciprocity," J Comp Neurol 303 (1991): 121; E. Kim et al., "Dorsal Periaqueductal Gray-Amygdala Pathway Conveys Both Innate and Learned Fear Responses in Rats," PNAS 110 (2013): 14795; C. Del-Ben and F. Graeff, "Panic Disorder: Is the PAG Involved?" Neural Plasticity 2009 (2009): 108135; P. Petrovic et al., "Context Dependent Amygdala Deactivation During Pain," Neuroimage 13 (2001): S457; J. Johnson et al., "Neural Substrates for Expectation-Modulated Fear Learning in the Amygdala and Periaqueductal Gray," Nat Nsci 13 (2010): 979; W. Yoshida et al., "Uncertainty Increases Pain: Evidence for a Novel Mechanism of Pain Modulation Involving the Periaqueductal Gray," J Nsci 33 (2013): 5638.

28. T. Heatherton, "Neuroscience of Self and Self-Regulation," Ann Rev of Psych 62 (2011): 363; K. Krendl et al., "The Good, the Bad, and the Ugly: An fMRI Investigation of the Functional Anatomic Correlates of Stigma," Soc Nsci 1 (2006): 5; F. Sambataro et al., "Preferential Responses in Amygdala and Insula During Presentation of Facial Contempt and Disgust," Eur J Nsci 24, (2006): 2355.

29. X. Liu et al., "Optogenetic Stimulation of a Hippocampal Engram Activates Fear Memory Recall," Nat 484 (2012): 381; T. Seidenbecher et al., "Amygdalar and Hippocampal Theta Rhythm Synchronization During Fear Memory Retrieval," Sci 301 (2003): 846; R. Redondo et al., "Bidirectional Switch of the Valence Associated with a Hippocampal Contextual Memory Engram," Nat 513 (2014): 426; E. Kirby et al., "Basolateral Amygdala Regulation of Adult Hippocampal Neurogenesis

and Fear-Related Activation of Newborn Neurons," Mol Psychiatry 17 (2012): 527.

30. A. Gozzi, "A Neural Switch for Active and Passive Fear," Neuron 67 (2010): 656.

31. G. Aston-Jones and J. Cohen, "Adaptive Gain and the Role of the Locus Coeruleus-Norepinephrine System in Optimal Performance," J Comp Neurol 493 (2005): 99; M. Carter et al., "Tuning Arousal with Optogenetic Modulation of Locus Coeruleus Neurons,"Nat Nsci 13 (2010): 1526.

32. D. Blanchard et al., "Lesions of Structures Showing FOS Expression to Cat Presentation: Effects on Responsivity to a Cat, Cat Odor, and Non-predator Threat," Nsci Biobehav Rev 29 (2005): 1243.

33. G. Holstege, "Brain Activation During Human Male Ejaculation," J Nsci 23 (2003): 9185; H. Lee et al., "Scalable Control of Mounting and Attack by Ers1+ Neurons in the Ventromedial Hypothalamus," Nat 509 (2014): 627; D. Anderson, "Optogenetics, Sex, and Violence in the Brain: Implications for Psychiatry," BP 71 (2012): 1081.

34. K Blair, "Neuroimaging of Psychopathy and Antisocial Behavior: A Targeted Review," Curr Psychiatry Rep 12 (2010): 76; K. Kiehl, The Psychopath Whisperer: The Nature of Those Without Conscience (Woodland Hills, CA: Crown Books, 2014); M. Koenigs et al., "Investigating the Neural Correlates of Psychopathy: A Critical Review," Mol Psychiatry 16 (2011): 792.

35. A particularly nice consideration of impulsivity and the frontal cortex: J. Dalley et al., "Impulsivity, Compulsivity, and Top-Down Cognitive Control," Neuron 69 (2011): 680.

36. J. Rilling and T. Insel, "The Primate Neocortex in Comparative Perspective Using MRI," J Hum Evol 37 (1999): 191; R. Barton and C. Venditti, "Human Frontal Lobes Are Not Relatively Large," PNAS 110 (2013): 9001; Y. Zhang et al., "Accelerated Recruitment of New Brain Development Genes into the Human Genome," PLoS Biol 9 (2011):

e1001179; G. Miller, "New Clues About What Makes the Human Brain Special," Sci 330 (2010): 1167; K. Semendeferi et al., "Humans and Great Apes Share a Large Frontal Cortex," Nat Nsci 5 (2002): 272; P. Schoenemann, "Evolution of the Size and Functional Areas of the Human Brain," Ann Rev of Anthropology 35 (2006): 379.

37. J. Allman et al., "The von Economo Neurons in the Frontoinsular and Anterior Cingulate Cortex," ANYAS 1225 (2011): 59; C. Butti et al., "Von Economo Neurons: Clinical and Evolutionary Perspectives," Cortex 49 (2013): 312; H. Evrard et al., "Von Economo Neurons in the Anterior Insula of the Macaque Monkey," Neuron 74 (2012): 482.

38. E. Miller and J. Cohen, "An Integrative Theory of Prefrontal Cortex Function," Ann Rev of Nsci 24 (2001): 167.

39. V. Mante et al., "Context-Dependent Computation by Recurrent Dynamics in Prefrontal Cortex," Nat 503 (2013): 78. Some more examples of frontal cortical involvement in task switching: S. Bunge, "How We Use Rules to Select Actions: A Review of Evidence from Cognitive Neuroscience," SCAN 4 (2004): 564; E. Crone et al., "Evidence for Separable Neural Processes Underlying Flexible Rule Use," Cerebral Cortex 16 (2005): 475; R. Passingham et al., "Specialisation Within the Prefrontal Cortex: The Ventral Prefrontal Cortex and Associative Learning," Exp Brain Res 133 (2000): 103; D. Liu et al., "Medial Prefrontal Activity During Delay Period Contributes to Learning of a Working Memory Task," Sci 346 (2014): 458; 1983, starring Robert De Niro, Diane Keaton, and the young Brad Pitt in his film debut, as the sixth frontocortical neuron from the left.

40. J. Baldo et al., "Memory Performance on the California Verbal Learning Test-II: Findings from Patients with Focal Frontal Lesions," J the Int Neuropsychological Soc 8 (2002): 539.

41. D. Freedman, "Categorical Representation of Visual Stimuli in the Primate Prefrontal Cortex," Sci 291 (2001): 312. More examples of categorical coding: D. McNamee et al., "Category-Dependent and Category-In-

dependent Goal-Value Codes in Human Ventromedial Prefrontal Cortex," Nat Nsci 16 (2013): 479. R. Schmidt et al., "Canceling Actions Involves a Race Between Basal Ganglia Pathways," Nat Nsci 16 (2013): 1118.

42. M. Histed et al., "Learning Subtracts in the Primate Prefrontal Cortex and Striatum: Sustained Activity Related to Successful Actions," Neuron 63 (2004): 244. For a nice example of the frontal cortex having to keep track of a rule, see D. Crowe et al., "Prefrontal Neurons Transmit Signals to Parietal Neurons That Reflect Executive Control of Cognition," Nat Nsci 16 (2013): 1484.

43. M. Rigotti et al., "The Importance of Mixed Selectivity in Complex Cognitive Tasks," Nat 497 (2013): 585; J. Cromer et al., "Representation of Multiple, Independent Categories in the Primate Prefrontal Cortex," Neuron 66 (2010): 796; M. Cole et al., "Global Connectivity of Prefrontal Cortex Predicts Cognitive Control and Intelligence," J Nsci 32 (2012): 8988.

44. L. Grossman et al., "Accelerated Evolution of the Electron Transport Chain in Anthropoid Primates," Trends in Genetics 20 (2004): 578.

45. J. W. De Fockert et al., "The Role of Working Memory in Visual Selective Attention," Sci 291 (2001): 1803; K. Vohs et al., "Making Choices Impairs Subsequent Self-Control: A Limited- Resource Account of Decision Making, Self-Regulation, and Active Initiative," JPSP 94 (2008): 883; K. Watanabe and S. Funahashi, "Neural Mechanisms of Dual-Task Interference and Cognitive Capacity Limitation in the Prefrontal Cortex," Nat Nsci 17 (2014): 601.

46. N. Meand et al., "Too Tired to Tell the Truth: Self-Control Resource Depletion and Dishonesty," JESP 45 (2009): 594; M. Hagger et al., "Ego Depletion and the Strength Model of Self-Control: A Meta-analysis," Psych Bull 136 (2010): 495; C. DeWall et al., "Depletion Makes the Heart Grow Less Helpful: Helping as a Function of Self-Regulatory Energy and Genetic Relatedness," PSPB 34 (2008): 1653; W. Hofmann et al., "And Deplete Us Not into Temptation: Automatic Attitudes, Dietary Restraint, and Self-Regulatory Resources as Determinants of Eating Behavior," JESP 43 (2007): 497.

47. Footnote: M. Inzlicht and S. Marcora, "The Central Governor Model of Exercise Regulation Teaches Us Precious Little About the Nature of Mental Fatigue and Self-Control Failure," Front Psych 7 (2016): 656.

48. J. Fuster, "The Prefrontal Cortex—an Update: Time Is of the Essence," Neuron 30 (2001): 319.

49. K. Yoshida et al., "Social Error Monitoring in Macaque Frontal Cortex," Nat Nsci 15 (2012): 1307; T. Behrens et al., "Associative Learning of Social Value," Nat 456 (2008): 245

50. R. Dunbar, "The Social Brain Meets Neuroimaging," TICS 16 (2011): 101; K. Bickart et al., "Intrinsic Amygdala-Cortical Functional Connectivity Predicts Social Network Size in Humans" J Nsci 32 (2012): 14729; K. Bickart, "Amygdala Volume and Social Network Size in Humans," Nat Nsci 14 (2010): 163; R. Kanai et al., "Online Social Network Size Is Reflected in Human Brain Structure," Proc Royal Soc B 279 (2012): 1327; F. Amici et al., "Fission-Fusion Dynamics, Behavioral Flexibility, and Inhibitory Control in Primates," Curr Biol 18 (2008): 1415. For a similar finding in corvids, see A. Bond et al., "Serial Reversal Learning and the Evolution of Behavioral Flexibility in Three Species of North American Corvids (Gymnorhinus cyanocephalus, Nucifraga columbiana, Aphelocoma californica)," JCP 121 (2007): 372.

51. P. Lewis et al., "Ventromedial Prefrontal Volume Predicts Understanding of Others and Social Network Size," Neuroimage 57 (2011): 1624; J. Sallet et al., "Social Network Size Affects Neural Circuits in Macaques," Sci 334 (2011): 697.

52. J. Harlow, "Recovery from the Passage of an Iron Bar Through the Head," Publication of the Massachusetts Med Soc 2 (1868): 327; H. Damasio et al., "The Return of Phineas Gage: Clues About the Brain from the Skull of a Famous Patient," Sci 264 (1994): 1102; P. Ratiu and I. Talos, "The Tale of Phineas Gage, Digitally Remastered," NEJM 351

منابع 📙 ۱۳

(2004): e21; J. Van Horn et al., "Mapping Connectivity Damage in the Case of Phineas Gage," PLoS ONE 7 (2012): e37454; M. Macmillan, An Odd Kind of Fame: Stories of Phineas Gage (Cambridge, MA: MIT Press, 2000); J. Jackson, "Frontis. and Nos. 949–51," in A Descriptive Catalog of the Warren Anatomical Museum, reproduced in Macmillan, An Odd Kind of Fame. The photographs of Gage come from J. Wilgus and B. Wilgus, "Face to Face with Phineas Gage," J the History of the Nsci 18 (2009): 340.

53. W. Seeley et al., "Early Frontotemporal Dementia Targets Neurons Unique to Apes and Humans," Annals of Neurol 60 (2006): 660; R. Levenson and B. Miller, "Loss of Cells, Loss of Self: Frontotemporal Lobar Degeneration and Human Emotion," Curr Dir Psych Sci 16 (2008): 289.

54. U. Voss et al., "Induction of Self Awareness in Dreams Through Frontal Low Curr Stimulation of Gamma Activity," Nat Nsci 17 (2014): 810; J. Georgiadis et al., "Regional Cerebral Blood Flow Changes Associated with Clitorally Induced Orgasm in Healthy Women," Eur J Nsci 24 (2006): 3305.

55. A. Glenn et al., "Antisocial Personality Disorder: A Current Review," Curr Psychiatry Rep 15 (2013): 427; N. Anderson and K. Kiehl, "The Psychopath Magnetized: Insights from Brain Imaging," TICS 16 (2012): 52; L. Mansnerus, "Damaged Brains and the Death Penalty," New York Times, July 21, 2001, p. B9; M. Brower and B. Price, "Neuropsychiatry of Frontal Lobe Dysfunction in Violent and Criminal Behaviour: A Critical Review," J Neurol, Neurosurgery & Psychiatry 71 (2001): 720.

56. J. Greene et al., "The Neural Bases of Cognitive Conflict and Control in Moral Judgment," Neuron 44 (2004): 389; S. McClure et al., "Separate Neural Systems Value Immediate and Delayed Monetary Rewards," Sci 306 (2004): 503.

57. A. Barbey et al., "Dorsolateral Prefrontal Contributions to Human Intelligence," Neuropsychologia 51 (2013): 1361.

58. D. Knock et al., "Diminishing Reciprocal Fairness by Disrupting the Right Prefrontal Cortex," Sci 314 (2006): 829.

59. D. Mobbs et al., "A Key Role for Similarity in Vicarious Reward," Sci 324 (2009): 900; P. Janata et al., "The Cortical Topography of Tonal Structures Underlying Western Music," Sci 298 (2002): 2167; M. Balter, "Study of Music and the Mind Hits a High Note in Montreal," Sci 315 (2007): 758.

60. J. Saver and A. Damasio, "Preserved Access and Processing of Social Knowledge in a Patient with Acquired Sociopathy Due to Ventromedial Frontal Damage," Neuropsychologia 29 (1991): 1241; M. Donoso et al., "Foundations of Human Reasoning in the Prefrontal Cortex," Sci 344 (2014): 1481; T. Hare, "Exploiting and Exploring the Options," Sci 344 (2014): 1446; T. Baumgartner et al., "Dorsolateral and Ventromedial Prefrontal Cortex Orchestrate Normative Choice," Nat Nsci 14 (2011): 1468; A. Bechara, "The Role of Emotion in Decision-Making: Evidence from Neurological Patients with Orbitofrontal Damage," Brain and Cog 55 (2004): 30.

61. A. Damasio, The Feeling of What Happens: Body and Emotion in the Making of Consciousness (Boston: Harcourt, 1999).

62. M. Koenigs et al., "Damage to the Prefrontal Cortex Increases Utilitarian Moral Judgments," Nat 446 (2007): 865; B. Thomas et al., "Harming Kin to Save Strangers: Further Evidence for Abnormally Utilitarian Moral Judgments After Ventromedial Prefrontal Damage," J Cog Nsci 23 (2011): 2186

63. A. Bechara et al., "Deciding Advantageously Before Knowing the Advantageous Strategy," Sci 275 (1997): 1293; A. Bechara et al., "Insensitivity to Future Consequences Following Damage to Human Prefrontal Cortex," Cog 50 (1994): 7.

64. L. Young et al., "Damage to Ventromedial Prefrontal Cortex Impairs Judgment of Harmful Intent," Neuron 25 (2010): 845.

65. C. Limb and A. Braun, "Neural Substrates of Spontaneous Musical Performance: An fMRI Study of Jazz Improvisation," PLoS ONE 3 (2008): e1679; C. Salzman and S. Fusi, "Emotion, Cognition, and Mental State Representation in Amygdala and Prefrontal Cortex," Ann Rev of Nsci 33 (2010): 173.

66. J. Greene et al., "An fMRI Investigation of Emotional Engagement in Moral Judgment," Sci 293 (2001): 2105; J. Greene et al., "The Neural Bases of Cognitive Conflict and Control in Moral Judgment," Neuron 44 (2004): 389–400; J. Greene, Moral Tribes: Emotion, Reason, and the Gap Between Us and Them (New York: Penguin, 2013).

67. J. Peters et al., "Induction of Fear Extinction with Hippocampal-Infralimbic BDNF," Sci 328 (2010): 1288; M. Milad and G. Quirk, "Neurons in Medial Prefrontal Cortex Signal Memory for Fear Extinction," Nat 420 (2002): 70; M. Milad and G. Quirk, "Fear Extinction as a Model for Translational Neuroscience: Ten Years of Progress," Ann Rev of Psych 63 (2012): 129; C. Lai et al., "Opposite Effects of Fear Conditioning and Extinction on Dendritic Spine Remodeling," Nat 483 (2012): 87. Some recent work suggests involvement of both the ventral mPFC and the basomedial amygdala in this process: A. Adhikari et al., "Basomedial Amygdala Mediates Top-Down Control of Anxiety and Fear," Nat 527 (2016): 179.

68. K. Ochsner et al., "Rethinking Feelings: An fMRI Study of the Cognitive Regulation of Emotion," J Cog Nsci 14 (2002): 1215; G. Sheppes and J. Gross, "Is Timing Everything? Temporal Considerations in Emotion Regulation," PSPR 15 (2011): 319; G. Sheppes and Z. Levin, "Emotion Regulation Choice: Selecting Between Cognitive Regulation Strategies to Control Emotion," Front Human Neurosci 7 (2013): 179; J. Gross, "Antecedent- and Response-Focused Emotion Regulation: Divergent Consequences for Experience, Expression, and Physiology," JPSP 74 (1998): 224; J. Gross, "Emotion Regulation: Affective, Cognitive, and Social Consequences," Psychophysiology 39 (2002): 281; K. Ochsner and J. Gross, "The Cognitive Control of Emotion," TICS 9 (2005): 242.

69. M. Lieberman et al., "The Neural Correlates of Placebo Effects: A Disruption Account," NeuroImage 22 (2004): 447; P. Petrovic et al., "Placebo and Opioid Analgesia: Imaging a Shared Neuronal Network," Sci 295 (2002): 1737.

70. J. Beck, Cognitive Behavior Therapy, 2nd edition (New York: Guilford Press, 2011); P. Goldin et al., "Cognitive Reappraisal Self-Efficacy Mediates the Effects of Individual Cognitive-Behavioral Therapy for Social Anxiety Disorder," J Consulting Clin Psych 80 (2012): 1034.

71. A. Bechara et al., "Failure to Respond Autonomically to Anticipated Future Outcomes Following Damage to Prefrontal Cortex," Cerebral Cortex 6 (1996): 215; C. Martin et al., "The Effects of Vagus Nerve Stimulation on Decision-Making," Cortex 40 (2004): 605.

72. G. Bodenhausen et al., "Negative Affect and Social Judgment: The Differential Impact of Anger and Sadness," Eur J Soc Psych 24 (1994): 45; A. Sanfey et al., "The Neural Basis of Economic Decision-Making in the Ultimatum Game," Sci 300 (2003): 1755; K. Gospic et al., "Limbic Justice: Amygdala Involvement in Immediate Rejections in the Ultimatum Game," PLoS ONE 9 (2011): e1001054.

73. D. Wegner, "How to Think, Say, or Do Precisely the Worst Thing on Any Occasion," Sci 325 (2009): 58.

74. R. Davidson and S. Begley, The Emotional Life of Your Brain (New York: Hudson Street Press, 2011); A. Tomarken and R. Davidson, "Frontal Brain Activation in Repressors and Nonrepressors," J Abnormal Psych 103 (1994): 339.

75. A. Ito et al., "The Contribution of the Dorsolateral Prefrontal Cortex to the Preparation for Deception and Truth-Telling," Brain Res 1464 (2012): 43; S. Spence et al., "A Cognitive Neurobiological Account of Deception: Evidence from Functional Neuroimaging," Philosophical Transactions of the Royal Soc London Series B 359 (2004): 1755; I. Karton and T. Bachmann, "Effect of Prefrontal Transcranial Magnetic

Stimulation on Spontaneous Truth-Telling," BBR 225 (2011): 209; Y. Yang et al., "Prefrontal White Matter in Pathological Liars," Brit J Psychiatry 187 (2005): 320.

76. D. Carr and S. Sesack, "Projections from the Rat Prefrontal Cortex to the Ventral Tegmental Area: Target Specificity in the Synaptic Associations with Mesoaccumbens and Mesocortical Neurons," J Nsci 20 (2000): 3864; M. Stefani and B. Moghaddam, "Rule Learning and Reward Contingency Are Associated with Dissociable Patterns of Dopamine Activation in the Rat Prefrontal Cortex, Nucleus Accumbens, and Dorsal Striatum," J Nsci 26 (2006): 8810.

77. T. Danjo et al., "Aversive Behavior Induced by Optogenetic Inactivation of Ventral Tegmental Area Dopamine Neurons Is Mediated by Dopamine D2 Receptors in the Nucleus Accumbens," PNAS 111 (2014): 6455; N. Schwartz et al., "Decreased Motivation During Chronic Pain Requires Long-Term Depression in the Nucleus Accumbens," Nat 345 (2014): 535.

78. J. Cloutier et al., "Are Attractive People Rewarding? Sex Differences in the Neural Substrates of Facial Attractiveness," J Cog Nsci 20 (2008): 941; K. Demos et al., "Dietary Restraint Violations Influence Reward Responses in Nucleus Accumbens and Amygdala," J Cog Nsci 23 (2011): 1952.

79. Footnote: R. Deaner et al., "Monkeys Pay per View: Adaptive Valuation of Social Images by Rhesus Macaques," Curr Biol 15 (2005): 543.

80. V. Salimpoor et al., "Interactions Between the Nucleus Accumbens and Auditory Cortices Predicts Music Reward Value," Sci 340 (2013): 216; G. Berns and S. Moore, "A Neural Predictor of Cultural Popularity," J Consumer Psych 22 (2012): 154; S. Erk et al., "Cultural Objects Modulate Reward Circuitry," Neuroreport 13 (2002): 2499.

81. A. Sanfey et al., "The Neural Basis of Economic Decision-Making in the Ultimatum Game," Sci 300 (2003): 1755. Also see J. Moll et al.,

"Human Front-Mesolimbic Networks Guide Decisions About Charitable Donation," PNAS 103 (2006): 15623; W. Harbaugh et al., "Neural Responses to Taxation and Voluntary Giving Reveal Motives for Charitable Donations," Sci 316 (2007): 1622.

82. D. De Quervain et al., "The Neural Basis of Altruistic Punishment," Sci 305 (2004): 1254; B. Knutson, "Sweet Revenge?" Sci 305 (2004): 1246.

83. M. Delgado et al., "Understanding Overbidding: Using the Neural Circuitry of Reward to Design Economic Auctions," Sci 321 (2008): 1849; E. Maskin, "Can Neural Data Improve Economics?" Sci 321 (2008): 1788.

84. H. Takahasi et al., "When Your Gain Is My Pain and Your Pain Is My Gain: Neural Correlates of Envy and Schadenfreude," Sci 323 (2009): 890; K. Fliessbach et al., "Social Comparison Affects Reward-Related Brain Activity in the Human Ventral Striatum," Sci 318 (2007): 1305.

85. W. Schultz, "Dopamine Signals for Reward Value and Risk: Basic and Recent Data," Behav and Brain Functions 6 (2010): 24.

86. J. Cooper et al., "Available Alternative Incentives Modulate Anticipatory Nucleus Accumbens Activation," SCAN 4 (2009): 409; D. Levy and P. Glimcher, "Comparing Apples and Oranges: Using Reward-Specific and Reward-General Subjective Value Representation in the Brain," J Nsci 31 (2011): 14693.

87. P. Tobler et al., "Adaptive Coding of Reward Value by Dopamine Neurons," Sci 307 (2005): 1642.

88. W. Schultz, "Dopamine Signals for Reward Value and Risk: Basic and Recent Data," Behav and Brain Functions 6 (2010): 24; J. Cohen et al., "Neuron-Type-Specific Signals for Reward and Punishment in the Central Tegmental Area," Nat 482 (2012): 85; J. Hollerman and W. Schultz, "Dopamine Neurons Report an Error in the Temporal Prediction of Reward During Learning," Nat Nsci 1 (1998): 304; A. Brooks et al., "From

Bad to Worse: Striatal Coding of the Relative Value of Painful Decisions," Front Nsci 4 (2010): 1.

89. B. Knutson et al., "Neural Predictors of Purchases," Neuron 53 (2007): 147.

90. P. Sterling, "Principles of Allostasis: Optimal Design, Predictive Regulation, Pathophysiology and Rational Therapeutics," in Allostasis, Homeostasis, and the Costs of Adaptation, ed. J. Schulkin (Cambridge, MA: MIT Press, 2004).

91. B. Knutson et al., "Anticipation of Increasing Monetary Reward Selectively Recruits Nucleus Accumbens," J Nsci 21 (2001): RC159.

92. G. Stuber et al., "Reward-Predictive Cues Enhance Excitatory Synaptic Strength onto Midbrain Dopamine Neurons," Sci 321 (2008): 1690; A. Luo et al., "Linking Context with Reward: A Functional Circuit from Hippocampal CA3 to Ventral Tegmental Area," Sci 33 (2011): 353; J. O'Doherty, "Reward Representations and Reward-Related Learning in the Human Brain: Insights from Neuroimaging," Curr Opinions in Neurobiol 14 (2004): 769; M. Cador et al., "Involvement of the Amygdala in Stimulus-Reward Associations: Interaction with the Ventral Striatum," Nsci 30 (1989): 77; J. Britt et al., "Synaptic and Behavioral Profile of Multiple Glutamatergic Inputs to the Nucleus Accumbens," Neuron 76 (2012): 790; G. Stuber et al., "Optogenetic Modulation of Neural Circuits That Underlie Reward Seeking," BP 71 (2012): 1061; F. Ambroggi et al., "Basolateral Amygdala Neurons Facilitate Reward-Seeking Behavior by Exciting Nucleus Accumbens Neurons," Neuron 59 (2008): 648.

93. S. Hyman et al., "Neural Mechanisms of Addiction: The Role of Reward-Related Learning and Memory," Ann Rev of Nsci 29 (2006): 565; B. Lee et al., "Maturation of Silent Synapses in Amygdala-Accumbens Projection Contributes to Incubation of Cocaine Craving," Nat Nsci 16 (2013): 1644. For a consideration of compulsive behaviors as a sort of addiction: S. Rauch and W. Carlezon, "Illuminating the Neural Circuitry of Compulsive Behaviors," Sci 340 (2013): 1174; S. Ahmari et al.,

"Repeated Cortico-Striatal Stimulation Generates Persistent OCD-like Behavior," Sci 340 (2013): 1234; E. Burguiere et al., "Optogenetic Stimulation of Lateral Orbitofronto-Striatal Pathway Suppresses Compulsive Behaviors," Sci 340 (2013): 1243.

94. S. Flagel et al., "A Selective Role for Dopamine in Stimulus-Reward Learning," Nat 469 (2011): 53; K. Burke et al., "The Role of the Orbitofrontal Cortex in the Pursuit of Happiness and More Specific Rewards," Nat 454 (2008): 340.

95. P. Tobler et al., "Adaptive Coding of Reward Value by Dopamine Neurons," Sci 307 (2005): 1642; C. Fiorillo et al., "Discrete Coding of Reward Probability and Uncertainty by Dopamine Neurons," Sci 299 (2003): 1898.

96. B. Knutson et al., "Distributed Neural Representation of Expected Value," J Nsci 25 (2005): 4806; M. Stefani and B. Moghaddam, "Rule Learning and Reward Contingency Are Associated with Dissociable Patterns of Dopamine Activation in the Rat Prefrontal Cortex, Nucleus Accumbens, and Dorsal Striatum," J Nsci 26 (2006): 8810.

97. R. Habib and M. Dixon, "Neurobehavioral Evidence for the "Near-Miss" Effect in Pathological Gamblers," J the Exp Analysis of Behav 93 (2010): 313; M. Hsu et al., "Neural Systems Responding to Degrees of Uncertainty in Human Decision-Making," Sci 310 (2006): 1680.

98. A. Braun et al., "Dorsal Striatal Dopamine Depletion Impairs Both Allocentric and Egocentric Navigation in Rats," Neurobiol of Learning and Memory 97 (2012): 402; J. Salamone, "Dopamine, Effort, and Decision Making," Behavioral Nsci 123 (2009): 463; I. Whishaw and S. Dunnett, "Dopamine Depletion, Stimulation or Blockade in the Rat Disrupts Spatial Navigation and Locomotion Dependent upon Beacon or Distal Cues," BBR 18 (1985): 11; J. Salamone and M. Correa, "The Mysterious Motivational Functions of Mesolimbic Dopamine," Neuron 76 (2012): 470; H. Tsai et al., "Phasic Firing in Dopaminergic Neurons Is Sufficient for Behavioral Conditioning," Sci 324 (2009): 1080; P. Phillips

et al., "Sub-second Dopamine Release Promotes Cocaine Seeking," Nat 422 (2003): 614; M. Pessiglione et al., "Dopamine-Dependent Prediction Errors Underpin Reward-Seeking Behavior in Humans," Nat 442 (2008): 1042.

99. Footnote: M. Numan and D. Stoltzenberg, "Medial Preoptic Area Interactions with Dopamine Neural systems in the Control of the Onset and Maintenance of Maternal Behavior in Rats," Front Neuroendo 30 (2009): 46.

100. S. McClue et al., "Separate Neural Systems Value Immediate and Delayed Monetary Rewards," Sci 306 (2004): 503; J. Jennings et al., "Distinct Extended Amygdala Circuits for Divergent Motivational States," Nat 496 (2013): 224.

101. M. Howe et al., "Prolonged Dopamine Signaling in Striatum Signals Proximity and Value of Distant Rewards," Nat 500 (2013): 575; Y. Niv, "Dopamine Ramps Up," Nat 500 (2013): 533.

102. W. Schultz, "Subjective Neuronal Coding of Reward: Temporal Value Discounting and Risk," Eur J Nsci 31 (2010): 2124; S. Kobayashi and W. Schultz, "Influence of Reward Delays on Responses of Dopamine Neurons," J Nsci 28 (2008): 7837; S. Kim et al., "Prefrontal Coding of Temporally Discounted Values During Intertemporal Choice," Neuron 59 (2008): 161; M. Roesch and C. Olson, "Neuronal Activity in Orbitofrontal Cortex Reflects the Value of Time," J Neurophysiology 94 (2005): 2457; M. Bermudez and W. Schultz, "Timing in Reward and Decision Processes," Philosophical Trans of the Royal Soc of London B 369 (2014): 20120468; B. Figner et al., "Lateral Prefrontal Cortex and Self-Control in Intertemporal Choice," Nat Nsci 13 (2010): 538; K. Jimura et al., "Impulsivity and Self-Control During Intertemporal Decision Making Linked to the Neural Dynamics of Reward Value Representation," J Nsci 33 (2013): 344; S. McClure et al., "Time Discounting for Primary Rewards," J Nsci 27, 5796.

103. K. Ballard and B. Knutson, "Dissociable Neural Representations

of Future Reward Magnitude and Delay During Temporal Discounting," Neuroimage 45 (2009): 143.

104. A. Lak et al., "Dopamine Prediction Error Responses Integrate Subjective Value from Different Reward Dimensions," PNAS 111 (2014): 2343.

105. V. Noreika et al., "Timing Deficits in Attention-Deficit/Hyperactivity Disorder (ADHD): Evidence from Neurocognitive and Neuroimaging Studies," Neuropsychologia 51 (2013): 235; A. Pine et al., "Dopamine, Time, and Impulsivity in Humans," J Nsci 30 (2010): 8888; W. Schultz, "Potential Vulnerabilities of Neuronal Reward, Risk, and Decision Mechanisms to Addictive Drugs," Neuron 69 (2011): 603.

106. G. Brown et al., "Aggression in Humans Correlates with Cerebrospinal Fluid Amine Metabolites," Psychiatry Res 1 (1979): 131; M. Linnoila et al., "Low Cerebrospinal Fluid 5-Hydroxyindoleacetic Acid Concentration Differentiates Impulsive from Nonimpulsive Violent Behavior," Life Sci 33 (1983): 2609; P. Stevenson and K. Schildberger, "Mechanisms of Experience Dependent Control of Aggression in Crickets," Curr Opinion in Neurobiol 23 (2013): 318; P. Fong and A. Ford, "The Biological Effects of Antidepressants on the Molluscs and Crustaceans: A Review," Aquatic Toxicology 151 (2014): 4.

107. M. Linnoila et al., "Low Cerebrospinal Fluid 5-Hydroxyindoleacetic Acid Concentration Differentiates Impulsive from Nonimpulsive Violent Behavior," Life Sci 33 (1983): 2609; J. Higley et al., "Excessive Mortality in Young Free-Ranging Male Nonhuman Primates with Low Cerebrospinal Fluid 5-Hydroxyindoleacetic Acid Concentrations," AGP 53 (1996): 537; M. Åsberg et al., "5-HIAA in the Cerebrospinal Fluid: A Biochemical Suicide Predictor?" AGP 33 (1976): 1193; M. Bortolato et al., "The Role of the Serotonergic System at the Interface of Aggression and Suicide," Nsci 236 (2013): 160.

108. H. Clarke et al., "Cognitive Inflexibility After Prefrontal Serotonin Depletion," Sci 304 (2004): 878; R. Wood et al., "Effects of Tryptophan Depletion on the Performance of an Iterated PD Game in Healthy

Adults," Neuropsychopharmacology 1 (2006): 1075.

109. J. Dalley and J. Roiser, "Dopamine, Serotonin and Impulsivity," Nsci 215 (2012): 42; P. Redgrave and R. Horrell, "Potentiation of Central Reward by Localized Perfusion of Acetylcholine and 5- Hydroxytrypt-amine," Nat 262 (1976): 305; A. Harrison and A. Markou, "Serotonergic Manipulations Both Potentiate and Reduce Brain Stimulation Reward in Rats: Involvement of Serotonin-1A Receptors," JPET 297 (2001): 316.

110. A. Duke, "Revisiting the Serotonin-Aggression Relation in Humans: A Meta-analysis," Psych Bull 139 (2013): 1148.

111. A. Gopnik, "The New Neuro-Skeptics," New Yorker, September 9, 2013.

112. C. Bukach et al., "Beyond Faces and Modularity: The Power of an Expertise Framework," TICS 10 (2006): 159.

Chapter 3: Seconds to Minutes Before

1. Abusive mothering and antibehaviorist results: D. Maestripieri et al., "Neurobiological Characteristics of Rhesus Macaque Abusive Mothers and Their Relation to Social and Maternal Behavior," Nsci Biobehav Rev 29 (2005): 51; R. Sullivan et al., "Ontogeny of Infant Fear Learning and the Amygdala," in Cognitive Neuroscience IV, ed. M. Gazzaniga (Cambridge, MA: MIT Press, 2009), 889.

2. Pandas' voices: B. Charlton et al., "Vocal Discrimination of Potential Mates by Female Giant Pandas (Ailuropoda melanoleuca)," Biol Lett 5 (2009): 597. Women's voices: G. Bryant and M. Haselton, "Vocal Cues of Ovulation in Human Females," Biol Lett 5 (2009): 12; Footnote: J. Knight, "When Robots Go Wild," Nat 434 (2005): 954.

3. Footnote: H. Herzog, Some We Love, Some We Hate, Some We Eat: Why It's So Hard to Think Straight About Animals (New York: Harper, 2010).

4. Vibrational communication: P. Hill, Vibrational Communication in

Animals (Cambridge, MA: Harvard University Press, 2008). Jamming bats: A. Corcoran and W. Conner, "Bats Jamming Bats: Food Competition Through Sonar Interference," Sci 346 (2014): 745. Tickling rats: J. Panksepp, "Beyond a Joke: From Animal Laughter to Human Joy?" Sci 308 (2005): 62.

5. A review concerning how there is a continuum between subliminal sensory information and information that is sensed but considered to be irrelevant: T. Marteau et al., "Changing Human Behavior to Prevent Disease: The Importance of Targeting Automatic Processes," Sci 337 (2012): 1492.

6. Potato chips: M. Zampini and C. Spence, "Assessing the Role of Sound in the Perception of Food and Drink," Chemical Senses 3 (2010): 57. K. Edwards, "The Interplay of Affect and Cognition in Attitude Formation and Change," JPSP 59 (1990): 212.

7. An excellent review on the subject: J. Kubota et al. "The Neuroscience of Race," Nat Nsci 15 (2012): 940; for a good review of the entire subject, see: D. Ariely, Predictably Irrational: The Hidden Forces That Shape Our Decisions (New York HarperCollins, 2008).

8. T. Ito and G. J. Urland, "Race and Gender on the Brain: Electrocortical Measures of Attention to the Race and Gender of Multiply Categorizable Individuals," JPSP 85 (2003): 616. For a good review of how implicit attitudes are studied, see B. Nosek et al., "Implicit Social Cognition: From Measures to Mechanisms," TICS 15 (2011): 152.

9. A. Olsson et al., "The Role of Social Groups in the Persistence of Learned Fear," Sci 309 (2005): 785.

10. J. Richeson et al., "An fMRI Investigation of the Impact of Interracial Contact on Executive Function," Nat Nsci 6 (2003): 1323; K. Knutson et al., "Why Do Interracial Interactions Impair Executive Function? A Resource Depletion Account," TICS 10 (2007): 915; K. Knutson et al., "Neural Correlates of Automatic Beliefs About Gender and Race," Hu-

man Brain Mapping 28 (2007): 915.

11. N. Kanwisher et al., "The Fusiform Face Area: A Module in Human Extrastriate Cortex Specialized for Face Perception," J Nsci 17 (1997): 4302; J. Sergent et al., "Functional Neuroanatomy of Face and Object Processing: A Positron Emission Tomography Study," Brain 115 (1992): 15; A. Golby et al., "Differential Responses in the Fusiform Region to Same-Race and Other-Race Faces," Nat Nsci 4 (2001): 845; A. J. Hart et al., "Differential Response in the Human Amygdala to Racial Outgroup Versus Ingroup Face Stimuli," Neuroreport 11 (2000): 2351.

12. K. Shutts and K. Kinzler, "An Ambiguous-Race Illusion in Children's Face Memory," Psych Sci 18 (2007): 763; D. Maner et al., "Functional Projection: How Fundamental Social Motives Can Bias Interpersonal Perception," JPSP 88 (2005): 63; K. Hugenberg and G. Bodenhausen, "Facing Prejudice: Implicit Prejudice and the Perception of Facial Threat," Psych Sci (2003): 640; J. Van Bavel et al., "The Neural Substrates of In-group Bias: A Functional Magnetic Resonance Imaging Investigation," Psych Sci 19 (2008): 1131; J. Van Bavel and W. Cunningham, "Self-Categorization with a Novel Mixed-Race Group Moderates Automatic Social and Racial Biases," PSPB 35 (2009): 321.

13. A. Avenanti et al., "Racial Bias Reduces Empathic Sensorimotor Resonance with Other-Race Pain," Curr Biol 20 (2010): 1018; V. Mathur et al., "Neural Basis of Extraordinary Empathy and Altruistic Motivation," Neuroimage 51 (2010): 1468–75.

14. J. Correll et al., "Event-Related Potentials and the Decision to Shoot: The Role of Threat Perception and Cognitive Control," JESP 42 (2006): 120.

15. J. Eberhardt et al., "See Black: Race, Crime, and Visual Processing," JPSP 87 (2004): 876; I. Blair et al., "The Influence of Afrocentric Facial Features in Criminal Sentencing," Psych Sci 15 (2004): 674; M. Brown et al., "The Effects of Eyeglasses and Race on Juror Decisions Involving a Violent Crime," AMFP 26 (2008): 25. **16**. J. LeDoux, "Emotion: Clues from the Brain," Ann Rev of Psych 46 (1995): 209.

17. T. Ito and G. Urland, "Race and Gender on the Brain: Electrocortical Measures of Attention to the Race and Gender of Multiply Categorizable Individuals," JPSP 85 (2003): 616; N. Rule et al., "Perceptions of Dominance Following Glimpses of Faces and Bodies," Perception 41 (2012): 687; C. Zink et al., "Know Your Place: Neural Processing of Social Hierarchy in Humans," Neuron 58 (2008): 273.

18. T. Tsukiura and R. Cabeza, "Shared Brain Activity for Aesthetic and Moral Judgments: Implications for the Beauty-Is-Good Stereotype," SCAN 6 (2011): 138.

19. H. Aviezer et al., "Body Cues, Not Facial Expressions, Discriminate Between Intense Positive and Negative Emotions," Sci 338 (2012); 1225; C. Bobst and J. Lobmaier, "Men's Preference for the Ovulating Female Is Triggered by Subtle Face Shape Differences," Horm Behav 62 (2012): 413; N. Rule and N. Ambady, "Democrats and Republicans Can Be Differentiated from Their Faces," PLoS ONE 5 (2010): e8733; N. Rule et al., "Flustered and Faithful: Embarrassment as a Signal of Prosociality," JPSP 102 (2012): 81; N. Rule et al., "On the Perception of Religious Group Membership from Faces," PLoS ONE 5 (2010): e14241.

20. P. Whalen et al., "Human Amygdala Responsivity to Masked Fearful Eye Whites," Sci 306 (2004): 2061.

21. Footnote: R. Hill and R. Barton, "Red Enhances Human Performance in Contests," Nat 435 (2005): 293; M. Attrill et al., "Red Shirt Colour Is Associated with Long-Term Team Success in English Football," JSS 26 (2008): 577; M. Platti et al., "The Red Mist? Red Shirts, Success and Team Sports," JSS 15 (2012): 1209; A. Ilie et al., "Better to Be Red Than Blue in Virtual Competition," CyberPsychology & Behav 11 (2008): 375; M. Garcia-Rubio et al., "Does a Red Shirt Improve Sporting Performance? Evidence from Spanish Football," AEL 18 (2011): 1001; C. Rowe et al., "Sporting Contests: Seeing Red? Putting Sportswear in Context,"

Nat 437 (2005): E10.

22. D. Francey and R. Bergmuller, "Images of Eyes Enhance Investments in a Real-Life Public Good," PLoS ONE 7 (2012): e37397; M. Bateson et al., "Cues of Being Watched Enhance Cooperation in a Real-World Setting," Biol Lett 2 (2006): 412; K. Haley and D. Fessler, "Nobody's Watching? Subtle Cues Affect Generosity in an Anonymous Economic Game," EHB 3 (2005): 245; T. Burnham and B. Hare, "Engineering Human Cooperation," Hum Nat 18 (2007): 88; M. Rigdon et al., "Minimal Social Cues in the Dictator Game," JEP 30 (2009): 358.

23. C. Forbes et al., "Negative Stereotype Activation Alters Interaction Between Neural Correlates of Arousal, Inhibition and Cognitive Control," SCAN 7 (2011): 771.

24. C. Steele, Whistling Vivaldi and Other Clues to How Stereotypes Affect Us (New York: Norton, 2010).

25. L. Mujica-Parodi et al., "Chemosensory Cues to Conspecific Emotional Stress Activate Amygdala in Humans," PLoS ONE 4 (2009): e6415; W. Zhou and D. Chen, "Fear-Related Chemosignals Modulate Recognition of Fear in Ambiguous Facial Expressions," Psych Sci 20 (2009): 177; A. Prehn et al., "Chemosensory Anxiety Signals Augment the Startle Reflex in Humans," Nsci Letters 394 (2006): 127.

26. H. Critchley and N. Harrison, "Visceral Influences on Brain and Behavior," Neuron 77 (2013): 624; D. Carney et al., "Power Posing Brief Nonverbal Displays Affect Neuroendocrine Levels and Risk Tolerance," Psych Sci 21 (2010): 1363. Some related findings: A. Hennenlotter et al., "The Link Between Facial Feedback and Neural Activity Within Central Circuitries of Emotion: New Insights from Botulinum Toxin–Induced Denervation of Frown Muscles," Cerebral Cortex 19 (2009): 357; J. Davis, "The Effects of BOTOX Injections on Emotional Experience," Emotion 10 (2010): 433.

27. L. Berkowitz, "Pain and Aggression: Some Findings and Implica-

tions," Motivation and Emotion 17 (1993): 277.

28. M. Gailliot et al., "Self-Control Relies on Glucose as a Limited Energy Source: Willpower Is More Than a Metaphor," JPSP 92 (2007): 325–36; N. Mead et al.. "Too Tired to Tell the Truth: Self- Control Resource Depletion and Dishonesty," JESP 45 (2009): 594; C. DeWall et al., "Depletion Makes the Heart Grow Less Helpful: Helping as a Function of Self-Regulatory Energy and Genetic Relatedness," PSPB 34 (2008): 1653; B. Briers et al., "Hungry for Money: The Desire for Caloric Resources Increases the Desire for Financial Resources and Vice Versa," Psych Sci 17 (2006): 939; C. DeWall et al., "Sweetened Blood Cools Hot Tempers: Physiological Self-Control and Aggression," Aggressive Behav 37 (2011): 73; D. Benton, "Hypoglycemia and Aggression: A Review," Int J Nsci 41 (1988): 163; B. Bushman et al., "Low Glucose Relates to Greater Aggression in Married Couples," PNAS USA 111 (2014): 6254. For a reinterpretation of this literature as being about motivation for self-control rather than capacity for it, see M. Inzlicht et al., "Why Self-Control Seems (But May Not Be) Limited," TICS 18 (2014): 127.

29. V. Liberman et al., "The Name of the Game: Predictive Power of Reputations Versus Situational Labels in Determining Prisoner's Dilemma Game Moves," PSPB 30 (2004): 1175; A. Kay and L. Ross, "The Perceptual Push: The Interplay of Implicit Cues and Explicit Situational Construals on Behavioral Intensions in the Prisoner's Dilemma," JESP 39 (2003): 634.

30. Footnote: E. Hall et al., "A Rose by Any Other Name? The Consequences of Subtyping 'African- Americans' from 'Blacks," JESP 56 (2015): 183.

31. Footnote: K. Jung et al., "Female Hurricanes Are Deadlier Than Male Hurricanes. PNAS 111 (2014): 8782.

32. A. Tversky and D. Kahneman, "Rationale Choice and the Framing of Decisions," J Business 59 (1986): S251; also see: J. Bargh et al., "Priming In-group Favoritism: The Impact of Normative Scripts in the Minimal

Group Paradigm," JESP 37 (2001): 316; C. Zogmaister et al., "The Impact of Loyalty and Equality on Implicit Ingroup Favoritism," Group Processes & Intergroup Relations 11 (2008): 493.

33. J. Christensen and A. Gomila, "Moral Dilemmas in Cognitive Neuroscience of Moral Decision- Making: A Principled Review," Nsci Biobehav Rev 36 (2012): 1249; L. Petrinovich and P. O'Neill, "Influence of Wording and Framing Effects on Moral Intuitions," Ethology and Sociobiology 17 (1996): 145; R. O'Hara et al., "Wording Effects in Moral Judgments," Judgment and Decision Making 5 (2010): 547; R. Zahn et al., "The Neural Basis of Human Social Values: Evidence from Functional MRI," Cerebral Cortex 19 (2009): 276.

34. D. Butz et al., "Liberty and Justice for All? Implications of Exposure to the U.S. Flag for Intergroup Relations," PSPB 33 (2007): 396; M. Levine et al., "Identity and Emergency Intervention: How Social Group Membership and Inclusiveness of Group Boundaries Shape Helping Behavior," PSPB 31 (2005): 443; R. Enos, "Causal Effect of Intergroup Contact on Exclusionary Attitudes," PNAS 111 (2014): 3699.

35. M. Shih et al., "Stereotype Susceptibility: Identity Salience and Shifts in Quantitative Performance," Psych Sci 10 (1999): 80.

36. P. Fischer et al., "The Bystander-Effect: A Meta-analytic Review on Bystander Intervention in Dangerous and Non-dangerous Emergencies," Psych Bull 137 (2011): 517.

37. B. Pawlowski et al., "Sex Differences in Everyday Risk-Taking Behavior in Humans," Evolutionary Psych 6 (2008): 29; B. Knutson et al., "Nucleus Accumbens Activation Mediates the Influence of Reward Cues on Financial Risk Taking," Neuroreport 26 (2008): 509; V. Griskevicius et al., "Blatant Benevolence and Conspicuous Consumption: When Romantic Motives Elicit Strategic Costly Signals," JPSP 93 (2007): 85; L. Chang et al., "The Face That Launched a Thousand Ships: The Mating-Warring Association in Men," PSPB 37 (2011): 976; S. Ainsworth and J. Maner, "Sex Begets Violence: Mating Motives, Social Dominance,

and Physical Aggression in Men," JPSP 103 (2012): 819; W. Iredale et al., "Showing Off in Humans: Male Generosity as a Mating Signal," Evolutionary Psych 6 (2008): 386; M. Van Vugt and W. Iredale, "Men Behaving Nicely: Public Goods as Peacock Tails," Brit J Psych 104 (2013): 3.

38. J. Q. Wilson and G. Kelling, "Broken Windows," Atlantic Monthly, March 1982, p. 29.

39. K. Keizer et al., "The Spreading of Disorder," Sci 322 (2008): 1681.

40. For some nice examples of how the frontal cortex can direct the nature and focus of sensory processing, see G. Gregoriou et al., "Lesions of Prefrontal Cortex Reduce Attentional Modulation of Neuronal Responses and Synchrony in V4," Nat Nsci 17 (2014): 1003; S. Zhang et al., "Long-Range and Local Circuits for Top-Down Modulation of Visual Cortex Processing," Sci 345 (2014): 660; and T. Zanto et al., "Causal Role of the Prefrontal Cortex in Top-Down Modulation of Visual Processing and Working Memory," Nat Nsci 14 (2011): 656.

41. R. Adolphs et al., "A Mechanism for Impaired Fear Recognition After Amygdala Damage," Nat 433 (2005): 68.

42. M. Dadds et al., "Reduced Eye Gaze Explains Fear Blindness in Childhood Psychopathic Traits," J the Am Academy of Child and Adolescent Psychiatry 47 (2008): 4; M. Dadds et al., "Attention to the Eyes and Fear-Recognition Deficits in Child Psychopathy," Brit J Psychiatry 189 (2006): 280.

43. For an introduction to this cross-cultural literature, see R. Nisbett et al., "Culture and Systems of Thought: Holistic Versus Analytic Cognition," Psych Rev 108 (2001): 291; T. Hedden et al., "Cultural Influences on Neural Substrates of Attentional Control," Psych Sci 19 (2008): 12; J. Chiao, "Cultural Neuroscience: A Once and Future Discipline," Prog in Brain Res 178 (2009): 287; and H. Chua et al., "Cultural Variation in Eye Movements During Scene Perception," PNAS 102 (2005): 12629.

Chapter 4: Hours to Days Before

1. Chemical castration as generally effective for obsessive paraphiliacs: F. Berlin, "Chemical Castration' for Sex Offenders," NEJM 336 (1997): 1030. Lack of effectiveness in "hostile" rapists: K. Peters, "Chemical Castration: An Alternative to Incarceration," Duquesne University Law Rev 31 (1992): 307. Broad conclusion that it doesn't work particularly well: P. Fagan, "Pedophilia," JAMA 288 (2002): 2458. I thank Arielle Lasky for excellent assistance with this research subject.

2. For examples of the lack of correlation in a primate species, see M. Arlet et al., "Social Factors Increase Fecal Testosterone Levels in Wild Male Gray-Cheeked Mangabeys (Lophocebus albigena)," Horm Behav 59 (2011): 605; J. Archer, "Testosterone and Human Aggression: An Evaluation of the Challenge Hypothesis," Nsci Biobehav Rev 30 (2006): 319; the quote is **here**.

3. J. Oberlander and L. Henderson, "The Sturm und Drang of Anabolic Steroid Use: Angst, Anxiety, and Aggression," TINS 35 (2012): 382; R. Agis-Balboa et al., "Enhanced Fear Responses in Mice Treated with Anabolic Androgenic Steroids," Neuroreport 22 (2009); 617.

4. E. Hermans, et al., "Testosterone Administration Reduces Empathetic Behavior: A Facial Mimicry Study," PNE 31 (2006): 859; J. Honk et al., "Testosterone Administration Impairs Cognitive Empathy in Women Depending on Second-to-Fourth Digit Ratio," PNAS 108 (2011): 3448; P. Bos et al., "Testosterone Decreases Trust in Socially Naive Humans," PNAS 107 (2010): 9991; P. Bos et al., "The Neural Mechanisms by Which Testosterone Acts on Interpersonal Trust," Neuroimage 2 (2012): 730; P. Mehta and J. Beer, "Neural Mechanisms of the Testosterone-Aggression Relation: The Role of the Orbitofrontal Cortex," J Cog Nsci 22 (2009): 2357.

5. L. Tsai and R. Sapolsky, "Rapid Stimulatory Effects of Testosterone upon Myotubule Metabolism and Hexose Transport, as Assessed by Silicon Microphysiometry," Aggressive Behav 22 (1996): 357; C. Rutte et al., "What Sets the Odds of Winning and Losing?" TIEE 21 (2006) 16. Confidence and persistence: A. Boissy and M. Bouissou, "Effects of Androgen Treatment on Behavioral and Physiological Responses of Heifers to Fear-Eliciting Situations," Horm Behav 28 (1994): 66; R. Andrew and L. Rogers, "Testosterone, Search Behaviour and Persistence," Nat 237 (1972): 343; J. Archer, "Testosterone and Persistence in Mice," Animal Behav 25 (1977): 479; M. Fuxjager et al., "Winning Territorial Disputes Selectively Enhances Androgen Sensitivity in Neural Pathways Related to Motivation and Social Aggression," PNAS 107 (2010): 12393. Human sports: M. Elias, "Serum Cortisol, Testosterone, and Testosterone-Binding Globulin Responses to Competitive Fighting in Human Males," Aggressive Behav 7 (1981): 215; A. Booth et al., "Testosterone, and Winning and Losing in Human Competition," Horm Behav 23 (1989): 556; J. Carré and S. Putnam, "Watching a Previous Victory Produces an Increase in Testosterone Among Elite Hockey Players," PNE 35 (2010): 475; A. Mazur et al., "Testosterone and Chess Competition," Soc Psych Quarterly 55 (1992): 70; J. Coates and J. Herbert, "Endogenous Steroids and Financial Risk Taking on a London Trading Floor," PNAS 105 (2008): 616.

6. N. Wright et al., "Testosterone Disrupts Human Collaboration by Increasing Egocentric Choices," Proc Royal Soc B (2012): 2275.

7. P. Mehta and J. Beer, "Neural Mechanisms of the Testosterone-Aggression Relation: The Role of Orbitofrontal Cortex," J Cog Nsci 22 (2010): 2357; G. van Wingen et al., "Testosterone Reduces Amygdala–Orbitofrontal Cortex Coupling," PNE 35 (2010): 105; P. Bos and E. Hermans et al., "The Neural Mechanisms by Which Testosterone Acts on Interpersonal Trust," Neuroimage 2 (2012): 730.

8. Testosterone decreasing fear and anxiety in rodents: C. Eisenegger et al., "The Role of Testosterone in Social Interaction," TICS 15 (2011): 263. Testosterone lessens the stress response: V. Viau, "Functional Cross-Talk Between the Hypothalamic- Pituitary-Gonadal and -Adrenal Axes," J Neuroendocrinology 14 (2002): 506. Testosterone reduces the

startle response in humans: J. van Honk et al., "Testosterone Reduces Unconscious Fear But Not Consciously Experienced Anxiety: Implications for the Disorders of Fear and Anxiety," BP 58 (2005): 218; E. J. Hermans et al., "A Single Administration of Testosterone Reduces Fear-Potentiated Startle in Humans," BP 59 (2006): 872.

9. General reviews: R. Woods, "Reinforcing Aspects of Androgens," Physiology & Behav 83 (2004): 279; A. DiMeo and R. Wood, "Circulating Androgens Enhance Sensitivity to Testosterone Self- Administration in Male Hamsters," Pharmacology, Biochemistry & Behav 79 (2004): 383; M. Packard et al., "Rewarding Affective Properties of Intra–Nucleus Accumbens Injections of Testosterone," Behav Nsci 111 (1997): 219.

10. A. N. Dimeo and R. I. Wood, "ICV Testosterone Induces Fos in Male Syrian Hamster Brain," PNE 31 (2006): 237; M. Packard et al., "Rewarding Affective Properties of Intra–Nucleus Accumbens Injections of Testosterone," Behav Nsci 111 (1997): 219; M. Packard et al., "Expression of Testosterone Conditioned Place Preference Is Blocked by Peripheral or Intra-accumbens Injection of Alpha-flupenthixol," Horm Behav 34 (1998) 39; M. Fuxjager et al., "Winning Territorial Disputes Selectively Enhances Androgen Sensitivity in Neural Pathways Related to Motivation and Social Aggression," PNAS 107 (2010): 12393; A. Lacreuse et al., "Testosterone May Increase Selective Attention to Threat in Young Male Macaques," Horm Behav 58 (2010): 854.

11. A. Dixson and J. Herbert, "Testosterone, Aggressive Behavior and Dominance Rank in Captive Adult Male Talapoin Monkeys (Miopithecus talapoin)," Physiology & Behav 18 (1977): 539.

12. E. Hermans et al., "Exogenous Testosterone Enhances Responsiveness to Social Threat in the Neural Circuitry of Social Aggression in Humans," BP 63 (2008): 263; J. van Honk et al., "A Single Administration of Testosterone Induces Cardiac Accelerative Responses to Angry Faces in Healthy Young Women," Behav Nsci 115 (2001): 238; R. Ronay and A. Galinsky, "Lex Talionis: Testosterone and the Law of Retaliation," JESP 47 (2011): 702; P. Mehta and J. Beer, "Neural Mechanisms of the Testosterone-Aggression Relation: The Role of Orbitofrontal Cortex," J Cog Nsci 22 (2010): 2357; P. Bos et al., "Testosterone Decreases Trust in Socially Naive Humans," PNAS 107 (2010): 9991.

13. K. Kendrick and R. Drewett, "Testosterone Reduces Refractory Period of Stria Terminalis Neurons in the Rat Brain," Sci 204 (1979): 877; K. Kendrick, "Inputs to Testosterone-Sensitive Stria Terminalis Neurones in the Rat Brain and the Effects of Castration," J Physiology 323 (1982): 437; K. Kendrick, "The Effect of Castration on Stria Terminalis Neurone Absolute Refractory Periods Using Different Antidromic Stimulation Loci," Brain Res 248 (1982): 174; K. Kendrick, "Electrophysiological Effects of Testosterone on the Medial Preoptic-Anterior Hypothalamus of the Rat," J Endo 96 (1983): 35; E. Hermans et al., "Exogenous Testosterone Enhances Responsiveness to Social Threat in the Neural Circuitry of Social Aggression in Humans," BP 63 (2008): 263.

14. J. Wingfield et al., "The 'Challenge Hypothesis': Theoretical Implications for Patterns of Testosterone Secretion, Mating Systems, and Breeding Strategies," Am Naturalist 136 (1990): 829.

15. J. Archer, "Sex Differences in Aggression in Real-World Settings: A Meta-analytic Review," Rev of General Psych 8 (2004): 291.

16. J. Wingfield, et al., "Avoiding the 'Costs' of Testosterone: Ecological Bases of Hormone-Behavior Interactions," Brain, Behav and Evolution 57 (2001): 239; M. Sobolewski et al., "Female Parity, Male Aggression, and the Challenge Hypothesis in Wild Chimpanzees," Primates 54 (2013): 81; R. Sapolsky, "The Physiology of Dominance in Stable Versus Unstable Social Hierarchies," in Primate Social Conflict, ed. W. Mason and S. Mendoza (New York: SUNY Press, 1993), p. 171. P. Bernhardt et al., "Testosterone Changes During Vicarious Experiences of Winning and Losing Among Fans at Sporting Events," Physiology & Behav 65 (1998): 59.

17. M. Muller and R. Wrangham, "Dominance, Aggression and Testos-

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terone in Wild Chimpanzees: A Test of the 'Challenge' Hypothesis," Animal Behav 67 (2004): 113; J. Archer, "Testosterone and Human Aggression: An Evaluation of the Challenge Hypothesis," Nsci Biobehav Rev 30 (2006): 319.

18. Footnote: L. Gettler et al., "Longitudinal Evidence That Fatherhood Decreases Testosterone in Human Males," PNAS 108 (2011): 16194. S. Van Anders et al., "Baby Cries and Nurturance Affect Testosterone in Men," Horm Behav 61 (2012): 31. J. Mascaro et al., "Testicular Volume is Inversely Correlated with Nurturing-Related Brain Activity in Human Fathers," PNAS 110 (2013): 15746. In some primates, timing is such that males are doing some degree of paternal care of offspring at the same time as doing the male-male competition thing to enhance their future reproductive success. Things get complicated here in that the paternalism and the competition should have opposite effects on testosterone levels. In the one study of this, groin trumped paternalism—testosterone levels were elevated. P. Onyango et al., "Testosterone Positively Associated with Both Male Mating Effort and Paternal Behavior in Savanna Baboons (Papio cynocephalus)," Horm Behav 63 (2012): 430.

19. J. Higley et al., "CSF Testosterone and 5-HIAA Correlate with Different Types of Aggressive Behaviors," BP 40 (1996): 1067.

20. C. Eisenegger et al., "Prejudice and Truth About the Effect of Testosterone on Human Bargaining Behaviour," Nat 463 (2010): 356.

21. M. Wibral et al., "Testosterone Administration Reduces Lying in Men," PLoS ONE 7 (2012): e46774. Also see: J. Van Honk et al., "New Evidence on Testosterone and Cooperation," Nat 485 (2012): E4.

22. Some reviews: O. Bosch and I. Neumann, "Both Oxytocin and Vasopressin Are Mediators of Maternal Care and Aggression in Rodents: From Central Release to Sites of Action," Horm Behav 61 (2012): 293; R. Feldman, "Oxytocin and Social Affiliation in Humans," Horm Behav 61 (2012): 380; A. Marsh et al., "The Influence of Oxytocin Administration on Responses to Infant Faces and Potential Moderation by

OXTR Genotype," Psychopharmacology (Berlin) 24 (2012): 469; M. J. Bakermans-Kranenburg and M. H. van Ijzendoorn, "Oxytocin Receptor (OXTR) and Serotonin Transporter (5-HTT) Genes Associated with Observed Parenting," SCAN 3 (2008): 128. The hypothalamic pathway that differs by sex: N. Scott et al., "A Sexually Dimorphic Hypothalamic Circuit Controls Maternal Care and Oxytocin Secretion," Nat 525 (2016): 519.

23. Footnote: D. Huber et al., "Vasopressin and Oxytocin Excite Distinct Neuronal Populations in the Central Amygdala," Sci 308 (2005): 245; D. Viviani and R. Stoop, "Opposite Effects of Oxytocin and Vasopressin on the Emotional Expression of the Fear Response," Prog Brain Res 170 (2008): 207.

24. Y. Kozorovitskiy et al., "Fatherhood Affects Dendritic Spines and Vasopressin V1a Receptors in the Primate Prefrontal Cortex," Nat Nsci 9 (2006): 1094; Z. Wang et al., "Role of Septal Vasopressin Innervation in Paternal Behavior in Prairie Voles," PNAS 91 (1994): 400.

25. A. Smith et al., "Manipulation of the Oxytocin System Alters Social Behavior and Attraction in Pair-Bonding Primates, Callithrix penicillata," Horm Behav 57 (2010): 255; M. Jarcho et al., "Intransal VP Affects Pair Bonding and Peripheral Gene Expression in Male Callicebus cupreus," Genes, Brain and Behav 10 (2011): 375; C. Snowdon, "Variation in Oxytocin Is Related to Variation in Affiliative Behavior in Monogamous, Pairbonded Tamarins," Horm Behav 58 (2010); 614.

26. Z. Donaldson and L. Young, "Oxytocin, Vasopressin, and the Neurogenetics of Sociality," Sci 322 (2008): 900; E. Hammock and L. Young, "Microsatellite Instability Generates Diversity in Brain and Sociobehavioral Traits," Sci 308 (2005): 1630; L. Young et al., "Increased Affiliative Response to Vasopressin in Mice Expressing the V1a Receptor from a Monogamous Vole," Nat 400 (1999): 766; M. Lim et al., "Enhanced Partner Preference in a Promiscuous Species by Manipulating the Expression of a Single Gene," Nat 429 (2004): 754.

27. E. Hammock and L. Young, "Microsatellite Instability Generates Diversity in Brain and Sociobehavioral Traits," Sci 308 (2005): 1630.

28. I. Schneiderman et al., "Oxytocin at the First Stages of Romantic Attachment: Relations to Couples' Interactive Reciprocity," PNE 37 (2012): 1277.

29. B. Ditzen, et al., "Intranasal Oxytocin Increases Positive Communication and Reduces Cortisol Levels During Couple Conflict," BP 65 (2009): 728; D. Scheele et al., "Oxytocin Modulates Social Distance Between Males and Females," J Nsci 32 (2012): 16074; H. Walum et al., "Genetic Variation in the Vasopressin Receptor 1a Gene Associates with Pair-Bonding Behavior in Humans," PNAS 105 (2008): 14153; H. Walum et al., "Variation in the Oxytocin Receptor Gene Is Associated with Pair-Bonding and Social Behavior," BP 71 (2012): 419.

30. M. Nagasawa et al., "Oxytocin-Gaze Positive Loop and the Coevolution of Human-Dog Bonds," Sci 348 (2015): 333.

31. M. Yoshida, et al., "Evidence That Oxytocin Exerts Anxiolytic Effects via Oxytocin Receptor Expressed in Serotonergic Neurons in Mice," J Nsci 29 (2009): 2259. Oxytocin working in the amygdala: D. Viviani et al., "Oxytocin Selectively Gates Fear Responses Through Distinct Outputs from the Central Nucleus," Sci 333 (2011): 104; H. Knobloch et al., "Evoked Axonal Oxytocin Release in the Central Amygdala Attenuates Fear Response," Neuron 73 (2012): 553; S. Rodrigues et al., "Oxytocin Receptor Genetic Variation Relates to Empathy and Stress Reactivity in Humans," PNAS 106 (2009): 21437; M. Bakermans-Kranenburg and M. van Ijzendoorn, "Oxytocin Receptor (OXTR) and Serotonin Transporter (5-HTT) Genes Associated with Observed Parenting," SCAN 3 (2008): 128; G. Domes et al., "Oxytocin Attenuates Amygdala Responses to Emotional Faces Regardless of Valence," BP 62 (2007):1187; P. Kirsch, "Oxytocin Modulates Neural Circuitry for Social Cognition and Fear in Humans," J Nsci 25 (2005): 11489; I. Labuschagne et al., "Oxytocin Attenuates Amygdala Reactivity to Fear in Generalized Social Anxiety

Disorder," Neuropsychopharmacology 35 (2010): 2403; M. Heinrichs et al., "Social Support and Oxytocin Interact to Suppress Cortisol and Subjective Responses to Psychosocial Stress," BP 54 (2003): 1389; K. Uvnas-Moberg, "Oxytocin May Mediate the Benefits of Positive Social Interaction and Emotions," PNE 23 (1998): 819. Carter quoted in P. S. Churchland and P. Winkielman, "Modulating Social Behavior with Oxytocin: How Does It Work? What Does It Mean?" Horm Behav 61 (2012): 392. Oxytocin effects on aggression: M. Dhakar et al., "Heightened Aggressive Behavior in Mice with Lifelong Versus Postweaning Knockout of the Oxytocin Receptor," Horm Behav 62 (2012): 86; J. Winslow et al., "Infant Vocalization, Adult Aggression, and Fear Behavior of an Oxytocin Null Mutant Mouse," Horm Behav 37 (2005): 145.

32. M. Kosfeld et al., "Oxytocin Increases Trust in Humans," Nat 435 (2005): 673; A. Damasio, "Brain Trust," Nat 435 (2005): 571; S. Israel et al., "The Oxytocin Receptor (OXTR) Contributes to Prosocial Fund Allocations in the Dictator Game and the Social Value Orientations Task," PLoS ONE 4 (2009): e5535; P. Zak et al., "Oxytocin Is Associated with Human Trustworthiness," Horm Behav 48 (2005): 522; T. Baumgartner et al., "Oxytocin Shapes the Neural Circuitry of Trust and Trust Adaptation in Humans," Neuron 58 (2008): 639; A. Theodoridou et al., "Oxytocin and Social Perception: Oxytocin Increases Perceived Facial Trustworthiness and Attractiveness," Horm Behav 56 (2009): 128. A failure of replication: C. Apicella et al., "No Association Between Oxytocin Receptor (OXTR) Gene Polymorphisms and Experimentally Elicited Social Preferences," PLoS ONE 5 (2010): e11153. Turning the other cheek: J. Filling et al., "Effects of Intranasal Oxytocin and Vasopressin on Cooperative Behavior and Associated Brain Activity in Men," PNE 37 (2012): 447.

33. A. Marsh et al., "Oxytocin Improves Specific Recognition of Positive Facial Expressions," Psychopharmacology (Berlin) 209 (2010): 225; C. Unkelbach, et al., "Oxytocin Selectively Facilitates Recognition of Positive Sex and Relationship Words," Psych Sci 19 (2008): 102; J. Barraza

et al., "Oxytocin Infusion Increases Charitable Donations Regardless of Monetary Resources," Horm Behav 60 (2011): 148; A. Kogan et al., "Thin-Slice Study of the Oxytocin Receptor Gene and the Evaluation and Expression of the Prosocial Disposition," PNAS 108 (2011): 19189; H. Tost et al., "A Common Allele in the Oxytocin Receptor Gene (OXTR) Impacts Prosocial Temperament and Human Hypothalamic-Limbic Structure and Function," PNAS 107 (2010): 13936; R. Hurlemann et al., "Oxytocin Enhances Amygdala-Dependent, Socially Reinforced Learning and Emotional Empathy in Humans," J Nsci 30 (2010): 4999.

34. P. Zak et al., "Oxytocin Is Associated with Human Trustworthiness," Horm Behav 48 (2005): 522; J. Holt-Lunstad et al., "Influence of a 'Warm Touch' Support Enhancement Intervention Among Married Couples on Ambulatory Blood Pressure, Oxytocin, Alpha Amylase, and Cortisol," Psychosomatic Med 70 (2008): 976; V. Morhenn et al., "Monetary Sacrifice Among Strangers Is Mediated by Endogenous Oxytocin Release After Physical Contact," EHB 29 (2008): 375; C. Crockford et al., "Urinary Oxytocin and Social Bonding in Related and Unrelated Wild Chimpanzees," Proc Royal Soc B 280 (2013): 20122765.

35. Z. Donaldson and L. Young, "Oxytocin, Vasopressin, and the Neurogenetics of Sociality," Sci 322 (2008): 900; A. Guastella et al., "Oxytocin Increases Gaze to the Eye Region of Human Faces," BP 63 (2008): 3; M. Gamer et al., "Different Amygdala Subregions Mediate Valence-Related and Attentional Effects of Oxytocin in Humans," PNAS 107 (2010): 9400; C. Zink et al., "Vasopressin Modulates Social Recognition–Related Activity in the Left Temporoparietal Junction in Humans," Translational Psychiatry 1 (2011): e3; G. Domes et al., "Oxytocin Improves 'Mind-Reading' in Humans," BP 61 (2007): 731–33; U. Rimmele et al., "Oxytocin Makes a Face in Memory More Familiar," J Nsci 29 (2009): 38; M. Fischer-Shofty et al., "Oxytocin Facilitates Accurate Perception of Competition in Men and Kinship in Women," SCAN (2012).

36. C. Sauer et al., "Effects of a Common Variant in the CD38 Gene on Social Processing in an Oxytocin Challenge Study: Possible Links to

Autism," Neuropsychopharmacology 37 (2012): 1474.

37. E. Hammock and L. Young, "Oxytocin, Vasopressin and Pair Bonding: Implications for Autism," Philosophical Transactions of the Royal Soc of London B 361 (2006): 2187; A. Meyer-Lindenberg et al., "Oxytocin and Vasopressin in the Human Brain: Social Neuropeptides for Translational Medicine," Nat Rev Nsci 12 (2011): 524; H. Yamasue et al., "Integrative Approaches Utilizing Oxytocin to Enhance Prosocial Behavior: From Animal and Human Social Behavior to Autistic Social Dysfunction," J Nsci 32 (2012): 14109.

38. Reviewed in A. Graustella and C. MacLeod, "A Critical Review of the Influence of Oxytocin Nasal Spray on Social Cognition in Humans: Evidence and Future Directions," Horm Behav 61 (2012): 410.

39. J. Bartz et al., "Social Effects of Oxytocin in Humans: Context and Person Matter," TICS 15 (2011): 301

40. G. Domes et al., "Effects of Intranasal Oxytocin on Emotional Face Processing in Women," PNE 35 (2010): 83; G. De Vries, "Sex Differences in Vasopressin and Oxytocin Innervation in the Brain," Prog Brain Res 170 (2008): 17; J. Bartz et al., "Effects of Oxytocin on Recollections of Maternal Care and Closeness," PNAS 14 (2010): 107.

41. M. Mikolajczak et al., "Oxytocin Not Only Increases Trust When Money Is at Stake, but Also When Confidential Information Is in the Balance," BP 85 (2010): 182.

42. H. Kim et al., "Culture, Distress, and Oxytocin Receptor Polymorphism (OXTR) Interact to Influence Emotional Support Seeking," PNAS 107 (2010): 15717.

43. O. Bosch and I. Neumann, "Both Oxytocin and Vasopressin Are Mediators of Maternal Care and Aggression in Rodents: From Central Release to Sites of Action," Horm Behav 61 (2012): 293.

44. C. Ferris and M. Potegal, "Vasopressin Receptor Blockade in the Anterior Hypothalamus Suppresses Aggression in Hamsters," Physiology

& Behav 44 (1988): 235; H. Albers, "The Regulation of Social Recognition, Social Communication and Aggression: Vasopressin in the Social Behavior Neural Network," Horm Behav 61 (2012): 283; A. Johansson et al., "Alcohol and Aggressive Behavior in Men: Moderating Effects of Oxytocin Receptor Gene (OXTR) Polymorphisms," Genes, Brain and Behav 11 (2012): 214; J. Winslow and T. Insel, "Social Status in Pairs of Male Squirrel Monkeys Determines the Behavioral Response to Central Oxytocin Administration," J Nsci 11 (1991): 2032; J. Winslow et al., "A Role for Central Vasopressin in Pair Bonding in Monogamous Prairie Voles," Nat 365 (1993): 545.

45. T. Baumgartner et al., "Oxytocin Shapes the Neural Circuitry of Trust and Trust Adaptation in Humans," Neuron 58 (2008): 639; C. Declerk et al., "Oxytocin and Cooperation Under Conditions of Uncertainty: The Modulating Role of Incentives and Social Information," Horm Behav 57 (2010): 368; S. Shamay-Tsoory et al., "Intranasal Administration of Oxytocin Increases Envy and Schadenfreude (Gloating)," BP 66 (2009): 864.

46. C. de Dreu, "Oxytocin Modulates Cooperation Within and Competition Between Groups: An Integrative Review and Research Agenda," Horm Behav 61 (2012): 419; C. de Dreu et al., "The Neuropeptide Oxytocin Regulates Parochial Altruism in Intergroup Conflict Among Humans," Sci 328 (2011): 1408.

47. C. de Dreu et al., "Oxytocin Promotes Human Ethnocentrism," PNAS 108 (2011): 1262.

48. Footnote: S. Motta et al., "Ventral Premammillary Nucleus as a Critical Sensory Relay to the Maternal Aggression Network," PNAS 110 (2013): 14438.

49. J. Lonstein and S. Gammie, "Sensory, Hormonal, and Neural Control of Maternal Aggression in Laboratory Rodents," Nsci Biobehav Rev 26 (2002): 869; S. Parmigiani et al., "Selection, Evolution of Behavior and Animal Models in Behavioral Neuroscience," Nsci Biobehav Rev 23

(1999): 957.

50. R. Gandelman and N. Simon, "Postpartum Fighting in the Rat: Nipple Development and the Presence of Young," Behav and Neural Biol 29 (1980): 350; M. Erskine et al., "Intraspecific Fighting During Late Pregnancy and Lactation in Rats and Effects of Litter Removal," Behav Biol 23 (1978): 206; K. Flannelly and E. Kemble, "The Effect of Pup Presence and Intruder Behavior on Maternal Aggression in Rats," Bull of the Psychonomic Soc 25 (1988): 133.

51. B. Derntl et al., "Association of Menstrual Cycle Phase with the Core Components of Empathy," Horm Behav 63 (2013): 97. For a good review see C. Bodo and E. Rissman, "New Roles for Estrogen Receptor Beta in Behavior and Neuroendocrinology," Front Neuroendocrinology 27 (2006): 217.

52. D. Reddy, "Neurosteroids: Endogenous Role in the Human Brain and Therapeutic Potentials," Prog Brain Res 186 (2010): 113; F. De Sousa et al., "Progesterone and Maternal Aggressive Behavior in Rats," Behavioural Brain Res 212 (2010): 84; G. Pinna et al., "Neurosteroid Biosynthesis Regulates Sexually Dimorphic Fear and Aggressive Behavior in Mice," Neurochemical Res 33 (2008): 1990; K. Miczek et al., "Neurosteroids, GABAA Receptors, and Escalated Aggressive Behavior," Horm Behav 44 (2003): 242.

53. S. Hrdy, "The 'One Animal in All Creation About Which Man Knows the Least," Philosophical Transactions of the Royal Soc B 368 (2013): 20130072.

54. The spillover idea is aired in E. Ketterson et al., "Testosterone in Females: Mediator of Adaptive Traits, Constraint on Sexual Dimorphism, or Both?" Am Naturalist 166 (2005): 585.

55. C. Voigt and W. Goymann, "Sex-Role Reversal Is Reflected in the Brain of African Black Coucals (Centropus grillii)," Developmental Neurobiol 67 (2007): 1560; M. Peterson et al., "Testosterone Affects

Neural Gene Expression Differently in Male and Female Juncos: A Role for Hormones in Mediating Sexual Dimorphism and Conflict," PLoS ONE 8 (2013): e61784.

56. A. Pusey and K. Schroepfer-Walker, "Female Competition in Chimpanzees," Philosophical Transactions of the Royal Soc B 368 (2013): 20130077.

57. J. French et al., "The Influence of Androgenic Steroid Hormones on Female Aggression in 'Atypical' Mammals," Philosophical Transactions of the Royal Soc B 368 (2013): 20130084; L. Frank et al., "Fatal Sibling Aggression, Precocial Development, and Androgens in Neonatal Spotted Hyenas," Sci 252 (1991): 702; S. Glickman et al., "Androstenedione May Organize or Activate Sex- Reversed Traits in Female Spotted Hyenas," PNAS 84 (1987): 3444.

58. W. Goymann et al., "Androgens and the Role of Female 'Hyperaggressiveness' in Spotted Hyenas," Horm Behav 39 (2001): 83; S. Fenstemaker et al., "A Sex Difference in the Hypothalamus of the Spotted Hyena," Nat Nsci 2 (1999): 943; G. Rosen et al., "Distribution of Vasopressin in the Forebrain of Spotted Hyenas," J Comp Neurol 498 (2006): 80.

59. P. Chambers and J. Hearn, "Peripheral Plasma Levels of Progesterone, Oestradiol-17β, Oestrone, Testosterone, Androstenedione and Chorionic Gonadotrophin During Pregnancy in the Marmoset Monkey, Callithrix jacchus," J Reproduction Fertility 56 (1979): 23; C. Drea, "Endocrine Correlates of Pregnancy in the Ring-Tailed Lemur (Lemur catta): Implications for the Masculinization of Daughters," Horm Behav 59 (2011): 417; M. Holmes et al., "Social Status and Sex Independently Influence Androgen Receptor Expression in the Eusocial Naked Mole-Rat Brain," Horm Behav 54 (2008): 278; L. Koren et al., "Elevated Testosterone Levels and Social Ranks in Female Rock Hyrax," Horm Behav 49 (2006): 470; C. Kraus et al., "High Maternal Androstenedione Levels During Pregnancy in a Small Precocial Mammal with Female Genital Masculinisation" (Max Planck Institute for Demographic Research Working Paper WP 2008-017, April 2008); C. Kraus et al., "Spacing Behaviour and Its Implications for the Mating System of a Precocial Small Mammal: An Almost Asocial Cavy Cavia magna," Animal Behav 66 (2003): 225; L. Koren and E. Geffen, "Androgens and Social Status in Female Rock Hyraxes," Animal Behav 77 (2009): 233.

60. Footnote: DHEA and local generation of steroids within neurons: K. Soma et al., "Novel Mechanisms for Neuroendocrine Regulation of Aggression," Front Neuroendocrinology 29 (2008): 476; K. Schmidt et al., "Neurosteroids, Immunosteroids, and the Balkanization of Endo," General and Comp Endo 157 (2008): 266; D. Pradhan et al., "Aggressive Interactions Rapidly Increase Androgen Synthesis in the Brain During the Non-breeding Season," Horm Behav 57 (2010): 381.

61. T. Johnson, "Premenstrual Syndrome as a Western Culture-Specific Disorder," Culture, Med and Psychiatry 11 (1987): 337; L. Cosgrove and B. Riddle, "Constructions of Femininity and Experiences of Menstrual Distress," Women & Health 38 (2003): 37.

62. For the quote in the text, see M. Rodin, "The Social Construction of Premenstrual Syndrome," Soc Sci & Med 35 (1992); 49. For the quote in the footnote, see: A. Kleinman, "Depression, Somaticization, and the New 'Cross-Cultural Psychiatry," Social Science Med 11 (1977): 3.

63. H. Rupp et al., "Neural Activation in the Orbitofrontal Cortex in Response to Male Faces Increases During Follicular Phase," Horm Behav 56 (2009): 66. Mareckova K. et al. "Hormonal Contraceptives, Menstrual Cycle and Brain Response to Faces. SCAN 9 (2012): 191.

64. A. Rapkin et al., "Menstrual Cycle and Social Behavior in Vervet Monkeys," PNE 20 (1995): 289; E. García-Castells et al., "Changes in Social Dynamics Associated to the Menstrual Cycle in the Vervet Monkey (Cercopithecus aethiops)," Boletín de Estudios Médicos y Biológicos 37 (1989): 11; G. Mallow, "The Relationship Between Aggressive Behavior and Menstrual Cycle Stage in Female Rhesus Monkeys (Macaca mulatta)," Horm Behav 15 (1981): 259; G. Hausfater and B. Skoblic, منابع 📙 ۴۵

"Perimenstrual Behavior Changes Among Female Yellow Baboons: Some Similarities to Premenstrual Syndrome (PMS) in Women," Animal Behav 9 (1985): 165.

65. K. Dalton, "School Girls' Behavior and Menstruation," Brit Med J 2 (1960): 1647; K. Dalton, "Menstruation and Crime," Brit Med J 2 (1961): 1752; K. Dalton, "Cyclical Criminal Acts in Premenstrual Syndrome," Lancet 2 (1980): 1070.

66. P. Easteal, "Women and Crime: Premenstrual Issues," Trends and Issues in Crime and Criminal Justice 31 (1991): 1–8; J. Chrisler and P. Caplan, "The Strange Case of Dr. Jekyll and Ms. Hyde: How PMS Became a Cultural Phenomenon and a Psychiatric Disorder," Ann Rev of Sex Res 13 (2002): 274.

67. For a general review, see R. Sapolsky, Why Zebras Don't Get Ulcers: A Guide to Stress, Stress- Related Diseases and Coping, 3rd ed. (New York: Henry Holt, 2004).

68. R. Sapolsky "Stress and the Brain: Individual Variability and the Inverted-U," Nat Nsci 25 (2015): 1344.

69. K. Roelofs et al., "The Effects of Social Stress and Cortisol Responses on the Preconscious Selective Attention to Social Threat," BP 75 (2007): 1; K. Tully et al., "Norepinephrine Enables the Induction of Associative Long-Term Potentiation at Thalamo-Amygdala Synapses," PNAS 104 (2007): 14146; P. Putman et al., "Cortisol Administration Acutely Reduces Threat-Selective Spatial Attention in Healthy Young Men," Physiology & Behav 99 (2010): 294; K. Bertsch et al., "Exogenous Cortisol Facilitates Responses to Social Threat Under High Provocation," Horm Behav 59 (2011): 428.

70. J. Rosenkranz et al., "Chronic Stress Causes Amygdala Hyperexcitability in Rodents," BP 67 (2010): 1128; S. Duvarci and D. Pare, "Glucocorticoids Enhance the Excitability of Principle Basolateral Amygdala Neurons," J Nsci 27 (2007): 4482; A. Kavushansky and G. Richter-Levin, "Effects of Stress and Corticosterone on Activity and Plasticity in the Amygdala," J Nsci Res 84 (2006): 1580; A. Kavushansky et al., "Activity and Plasticity in the CA1, the Dentate Gyrus, and the Amygdala Following Controllable Versus Uncontrollable Water Stress," Hippocampus 16 (2006): 35; P. Rodríguez Manzanares et al., "Previous Stress Facilitates Fear Memory, Attenuates GABAergic Inhibition, and Increases Synaptic Plasticity in the Rat Basolateral Amygdala," J Nsci 25 (2005): 8725; H. Lakshminarasimhan and S. Chattarji, "Stress Leads to Contrasting Effects on the Levels of Brain Derived Neurotrophic Factor in the Hippocampus and Amygdala," PLoS ONE 7 (2012): e30481; S. Ghosh et al., "Functional Connectivity from the Amygdala to the Hippocampus Grows Stronger After Stress," J Nsci 33 (2013): 7234.

71. B. Kolber et al., "Central Amygdala Glucocorticoid Receptor Action Promotes Fear-Associated CRH Activation and Conditioning," PNAS 105 (2008): 12004; S. Rodrigues et al., "The Influence of Stress Hormones on Fear Circuitry," Ann Rev Nsci 32 (2009): 289; L. Shin and I. Liberzon, "The Neurocircuitry of Fear, Stress, and Anxiety Disorders," Neuropsychopharmacology 35, no. 1 (January 2010): 169.

72. M. Milad and G. Quirk, "Neurons in Medial Prefrontal Cortex Signal Memory for Fear Extinction," Nat 420 (2002): 70; E. Phelps et al., "Extinction Learning in Humans: Role of the Amygdala and vmPFC," Neuron 43 (2004): 897; J. Bremner et al., "Neural Correlates of Exposure to Traumatic Pictures and Sound in Vietnam Combat Veterans With and Without Posttraumatic Stress Disorder: A Positron Emission Tomography Study," BP 45 (1999) 806; D. Knox et al., "Single Prolonged Stress Disrupts Retention of Extinguished Fear in Rats," Learning & Memory 19 (2012): 43; M. Schmidt et al., "Stress-Induced Metaplasticity: From Synapses to Behavior," Nsci 250 (2013): 112; J. Pruessner et al., "Deactivation of the Limbic System During Acute Psychosocial Stress: Evidence from Positron Emission Tomography and Functional Magnetic Reso-

nance Imaging Studies," BP 63 (2008): 234.

73. A. Young et al., "The Effects of Chronic Administration of Hydrocortisone on Cognitive Function in Normal Male Volunteers," Psychopharmacology (Berlin) 145 (1999): 260; A. Barsegyan et al., "Glucocorticoids in the Prefrontal Cortex Enhance Memory Consolidation and Impair Working Memory by a Common Neural Mechanism," PNAS 107 (2010): 16655; A. Arnsten et al., "Neuromodulation of Thought: Flexibilities and Vulnerabilities in Prefrontal Cortical Network Synapses," Neuron 76 (2012): 223; B. Roozendaal et al., "The Basolateral Amygdala Interacts with the Medial Prefrontal Cortex in Regulating Glucocorticoid Effects on Working Memory Impairment," J Nsci 24 (2004): 1385; C. Liston et al., "Psychosocial Stress Reversibly Disrupts Prefrontal Processing and Attentional Control," PNAS 106 (2008): 912.

74. E. Dias-Ferreira et al., "Chronic Stress Causes Frontostriatal Reorganization and Affects Decision- Making," Sci 325 (2009): 621; D. Lyons et al., "Stress-Level Cortisol Treatment Impairs Inhibitory Control of Behavior in Monkeys," J Nsci 20 (2000): 7816; J. Kim et al., "Amygdala Is Critical for Stress-Induced Modulation of Hippocampal Long-Term Potentiation and Learning," J Nsci 21 (2001): 5222; L. Schwabe and O. Wolf, "Stress Prompts Habit Behavior in Humans," J Nsci 29 (2009): 7191; L. Schwabe and O. Wolf, "Socially Evaluated Cold Pressor Stress After Instrumental Learning Favors Habits over Goal-Directed Action," PNE 35 (2010): 977; L. Schwabe and O. Wolf, "Stress-Induced Modulation of Instrumental Behavior: From Goal-Directed to Habitual Control of Action," BBR 219 (2011): 321; L. Schwabe and O. Wolf, "Stress Modulates the Engagement of Multiple Memory Systems in Classification Learning," J Nsci 32 (2012): 11042; L. Schwabe et al., "Simultaneous Glucocorticoid and Noradrenergic Activity Disrupts the Neural Basis of Goal- Directed Action in the Human Brain," J Nsci 32 (2012): 10146.

75. V. Venkatraman et al., "Sleep Deprivation Biases the Neural Mechanisms Underlying Economic Preferences," J Nsci 31 (2011): 3712; M. Brand et al., "Decision-Making Deficits of Korsakoff Patients in a New

Gambling Task with Explicit Rules: Associations with Executive Functions," Neuropsychology 19 (2005): 267; E. Masicampo and R. Baumeister, "Toward a Physiology of Dual- Process Reasoning and Judgment: Lemonade, Willpower, and Expensive Rule-Based Analysis," Psych Sci 19 (2008): 255.

76. S. Preston et al., "Effects of Anticipatory Stress on Decision-Making in a Gambling Task," Behav Nsci 121 (2007): 257; R. van den Bos et al., "Stress and Decision-Making in Humans: Performance Is Related to Cortisol Reactivity, Albeit Differently in Men and Women," PNE 34 (2009): 1449; N. Lighthall et al., "Acute Stress Increases Sex Differences in Risk Seeking in the Balloon Analogue Risk Task," PLoS ONE 4 (2009): e6002; N. Lighthall et al., "Gender Differences in Reward-Related Decision Processing Under Stress," SCAN 7, no. 4 (April 2012): 476–84; P. Putman et al., "Exogenous Cortisol Acutely Influences Motivated Decision Making in Healthy Young Men," Psychopharmacology 208 (2010): 257; P. Putman et al., "Cortisol Administration Acutely Reduces Threat-Selective Spatial Attention in Healthy Young Men," Physiology & Behav 99 (2010): 294; K. Starcke et al., "Anticipatory Stress Influences Decision Making Under Explicit Risk Conditions," Behav Nsci 122 (2008): 1352.

77. E. Mikics et al., "Genomic and Non-genomic Effects of Glucocorticoids on Aggressive Behavior in Male Rats," PNE 29 (2004): 618; D. Hayden-Hixson and C. Ferris, "Steroid-Specific Regulation of Agonistic Responding in the Anterior Hypothalamus of Male Hamsters," Physiology & Behav 50 (1991): 793; A. Poole and P. Brain, "Effects of Adrenalectomy and Treatments with ACTH and Glucocorticoids on Isolation-Induced Aggressive Behavior in Male Albino Mice," Prog Brain Res 41 (1974): 465; E. Mikics et al., "The Effect of Glucocorticoids on Aggressiveness in Established Colonies of Rats," PNE 32 (2007): 160; R. Böhnke et al., "Exogenous Cortisol Enhances Aggressive Behavior in Females, but Not in Males," PNE 35 (2010): 1034; K. Bertsch et al., "Exogenous Cortisol Facilitates Responses to Social Threat Under High

Provocation," Horm Behav 59 (2011): 428.

78. S. Levine et al., "The PNE of Stress: A Psychobiological Perspective," in Psychoneuroendocrinology, ed. S. Levine and R. Brush (New York: Academic Press, 1988), p. 181; R. Sapolsky and J. Ray, "Styles of Dominance and Their Physiological Correlates Among Wild Baboons," Am J Primat l8 (1989): l; J. C. Ray and R. Sapolsky, "Styles of Male Social Behavior and Their Endocrine Correlates Among High-Ranking Baboons," Am J Primat 28 (1992): 231; C. E. Virgin and R. Sapolsky, "Styles of Male Social Behavior and Their Endocrine Correlates Among Low-Ranking Baboons," Am J Primat 42 (1997): 25.

79. D. Card and G. Dahl, "Family Violence and Football: The Effect of Unexpected Emotional Cues on Violent Behavior," Quarterly J Economics 126 (2011): 103.

80. Footnote: For a study concerning the neurobiology of how stress makes healthy habits harder to maintain, see C. Cifani et al., "Medial Prefrontal Cortex Neuronal Activation and Synaptic Alterations After Stress-Induced Reinstatement of Palatable Food Seeking: A Study Using c-fos-GFP Transgenic Female Rats," J Nsci 32 (2012): 8480.

81. K. Starcke et al., "Does Everyday Stress Alter Moral Decision-Making?" PNE 36 (2011): 210; F. Youssef et al., "Stress Alters Personal Moral Decision Making," PNE 37 (2012): 491.

82. D. Langford et al., "Social Modulation of Pain as Evidence for Empathy in Mice," Sci 312 (2006): 1967.

83. S. Taylor et al., "Biobehavioral Responses to Stress in Females: Tendand-Befriend, Not Fight-or- Flight," Psych Rev 107 (2000): 411.

84. B. Bushman, "Human Aggression While Under the Influence of Alcohol and Other Drugs: An Integrative Research Review," Curr Dir Psych Sci 2 (1993): 148; L. Zhang et al., "The Nexus Between Alcohol and Violent Crime," Alcoholism: Clin and Exp Res 21 (1997): 1264; K. Graham and P. West, "Alcohol and Crime: Examining the Link," in International Handbook of Alcohol Dependence and Problems, ed. N. Heather, T. J. Peters, and T. Stockwell (New York: John Wiley & Sons, 2001); I. Quadros et al., "Individual Vulnerability to Escalated Aggressive Behavior by a Low Dose of Alcohol: Decreased Serotonin Receptor mRNA in the Prefrontal Cortex of Male Mice," Genes, Brain and Behav 9 (2010): 110; A. Johansson et al., "Alcohol and Aggressive Behavior in Men: Moderating Effects of Oxytocin Receptor Gene (OXTR) Polymorphisms," Genes, Brain and Behav 11 (2012): 214.

Chapter 5: Days to Months Before

1. D. O. Hebb, The Organization of Behaviour (Hoboken, NJ: John Wiley & Sons, 1949).

2. General reviews: R. Nicoll and K. Roche, "Long-Term Potentiation: Peeling the Onion," Neuropharmacology 74 (2013): 18; J. MacDonald et al., "Hippocampal Long-Term Synaptic Plasticity and Signal Amplification of NMDA Receptors," Critical Rev in Neurobiol 18 (2006): 71.

3. T. Sigurdsson et al., "Long-Term Potentiation in the Amygdala: A Cellular Mechanism of Fear Learning and Memory," Neuropharmacology 52 (2007): 215; J. Kim and M. Jung, "Neural Circuits and Mechanisms Involved in Pavlovian Fear Conditioning: A Critical Review," Nsci Biobehav Rev 30 (2006): 188; M. Wolf, "LTP May Trigger Addiction," Mol Interventions 3 (2003): 248; M. Wolf et al., "Psychomotor Stimulants and Neuronal Plasticity," Neuropharmacology 47, supp. 1 (2004): 61.

4. M. Foy et al., "17beta-estradiol Enhances NMDA Receptor-Mediated EPSPs and Long-Term Potentiation," J Neurophysiology 81 (1999): 925; Y. Lin et al., "Oxytocin Promotes Long-Term Potentiation by Enhancing Epidermal Growth Factor Receptor-Mediated Local Translation of Protein Kinase M ζ ," J Nsci 32 (2012): 15476; K. Tomizawa et al., "Oxytocin Improves Long- Lasting Spatial Memory During Motherhood Through MAP Kinase Cascade," Nat Nsci 6 (2003): 384; V. Skucas et al., "Testosterone Depletion in Adult Male Rats Increases Mossy Fiber Transmis-

sion, LTP, and Sprouting in Area CA3 of Hippocampus," J Nsci 33 (2013): 2338; W. Timmermans et al., "Stress and Excitatory Synapses: From Health to Disease," Nsci 248 (2013): 626.

5. S. Rodrigues et al., "The Influence of Stress Hormones on Fear Circuitry," Ann Rev Nsci 32 (2009): 289; X. Xu and Z. Zhang, "Effects of Estradiol Benzoate on Learning-Memory Behavior and Synaptic Structure in Ovariectomized Mice," Life Sci 79 (2006): 1553; C. Rocher et al., "Acute Stress-Induced Changes in Hippocampal/Prefrontal Circuits in Rats: Effects of Antidepressants," Cerebral Cortex 14 (2004): 224.

6. A. Holtmaat and K. Svoboda, "Experience-Dependent Structural Synaptic Plasticity in the Mammalian Brain," Nat Rev Nsci 10 (2009): 647; C. Woolley et al., "Naturally Occurring Fluctuation in Dendritic Spine Density on Adult Hippocampal Pyramidal Neurons," J Nsci 10 (1990): 4035; W. Kelsch et al., "Watching Synaptogenesis in the Adult Brain," Ann Rev of Nsci 33 (2010): 131.

7. B. Leuner and T. Shors, "Stress, Anxiety, and Dendritic Spines: What Are the Connections?" Nsci 251 (2013): 108; Y. Chen et al., "Correlated Memory Defects and Hippocampal Dendritic Spine Loss After Acute Stress Involve Corticotropin-Releasing Hormone Signaling," PNAS 107 (2010): 13123.

8. J. Cerqueira et al., "Morphological Correlates of Corticosteroid-Induced Changes in Prefrontal Cortex Dependent Behaviours," J Nsci 25 (2005): 7792; A. Izquierdo et al., "Brief Uncontrollable Stress Causes Dendritic Retraction in Infralimbic Cortex and Resistance to Fear Extinction in Mice," J Nsci 26 (2006): 5733; C. Liston et al., "Stress-Induced Alterations in Prefrontal Cortical Dendritic Morphology Predict Selective Impairments in Perceptual Attentional Set Shifting," J Nsci 26 (2006): 7870; J. Radley, "Repeated Stress Induces Dendritic Spine Loss in the Rat Medial Prefrontal Cortex," Cerebral Cortex 16 (2006): 313; A. Arnsten, "Stress Signaling Pathways That Impair Prefrontal Cortex Structure and Function," Nat Rev Nsci 10 (2009): 410; C. Sandi and M. Loscertales, "Opposite Effects on NCAM Expression in the Rat Frontal Cortex Induced by Acute vs. Chronic Corticosterone Treatments," Brain Res 828 (1999): 127; C. Wellman, "Dendritic Reorganization in Pyramidal Neurons in Medial Prefrontal Cortex After Chronic Corticosterone Administration," J Neurobiol 49 (2001): 245; D. Knox et al., "Single Prolonged Stress Decreases Glutamate, Glutamine, and Creatine Concentrations in the Rat Medial Prefrontal Cortex," Nsci Lett 480 (2010): 16.

9. E. Dias-Ferreira et al., "Chronic Stress Causes Frontostriatal Reorganization and Affects Decision- Making," Sci 325 (2009): 621; M. Fuchikiami et al., "Epigenetic Regulation of BDNF Gene in Response to Stress," Psychiatry Investigation 7 (2010): 251.

10. R. Mitra and R. Sapolsky, "Acute Corticosterone Treatment Is Sufficient to Induce Anxiety and Amygdaloid Dendritic Hypertrophy," PNAS 105 (2008): 5573; A. Vyas et al., "Chronic Stress Induces Contrasting Patterns of Dendritic Remodeling in Hippocampal and Amygdaloid Neurons," J Nsci 22 (2002): 6810; S. Bennur et al., "Stress-Induced Spine Loss in the Medial Amygdala Is Mediated by Tissue-Plasminogen Activator," Nsci 144 (2006): 8; A. Govindarajan et al., "Transgenic Brain-Derived Neurotrophic Factor Expression Causes Both Anxiogenic and Antidepressant Effects," PNAS 103 (2006): 13208. Expansion of the BNST: A. Vyas et al., "Effects of Chronic Stress on Dendritic Arborization in the Central and Extended Amygdala," Brain Res 965 (2003): 290; J. Pego et al., "Dissociation of the Morphological Correlates of Stress-Induced Anxiety and Fear," Eur J Nsci 27 (2008): 1503.

11. A. Magarinos and B. McEwen, "Stress-Induced Atrophy of Apical Dendrites of Hippocampal CA3c Neurons: Involvement of Glucocorticoid Secretion and Excitatory Amino Acid Receptors," Nsci 69 (1995): 89; A. Magarinos et al., "Chronic Psychosocial Stress Causes Apical Dendritic Atrophy of Hippocampal CA3 Pyramidal Neurons in Subordinate Tree Shrews," J Nsci 16 (1996): 3534; B. Eadie et al., "Voluntary Exercise Alters the Cytoarchitecture of the Adult Dentate Gyrus by Increasing Cellular Proliferation, Dendritic Complexity, and Spine Density," J Comp

Neurol 486 (2005): 39.

12. M. Khan et al., "Estrogen Regulation of Spine Density and Excitatory Synapses in Rat Prefrontal and Somatosensory Cerebral Cortex," Steroids 78 (2013): 614; B. McEwen, "Estrogen Actions Throughout the Brain," Recent Prog Hormone Res 57 (2002): 357; B. Leuner and E. Gould, "Structural Plasticity and Hippocampal Function," Ann Rev Psych 61 (2010): 111.

13. R. Hamilton et al., "Alexia for Braille Following Bilateral Occipital Stroke in an Early Blind Woman," Neuroreport 11 (2000): 237; E. Striem-Amit et al., "Reading with Sounds: Sensory Substitution Selectively Activates the Visual Word Form Area in the Blind," Neuron 76 (2012): 640.

14. S. Florence et al., "Large-Scale Sprouting of Cortical Connections After Peripheral Injury in Adult Macague Monkeys," Sci 282 (1998): 1117; C. Darian-Smith and C. Gilbert, "Axonal Sprouting Accompanies Functional Reorganization in Adult Cat Striate Cortex," Nat 368 (1994): 737; M. Kossut and S. Juliano, "Anatomical Correlates of Representational Map Reorganization Induced by Partial Vibrissectomy in the Barrel Cortex of Adult Mice," Nsci 92 (1999): 807; L. Merabet and A. Bascual-Leone, "Neural Reorganization Following Sensory Loss: The Opportunity of Change," Nat Rev Nsci 11 (2010): 44; A. Pascual-Leone et al., "The Plastic Human Brain Cortex," Ann Rev Nsci 28 (2005): 377; B. Becker et al., "Fear Processing and Social Networking in the Absence of a Functional Amygdala," BP 72 (2012): 70; L. Colgin, "Understanding Memory Through Hippocampal Remapping," TINS 31 (2008): 469; V. Ramirez-Amaya et al., "Spatial Longterm Memory Is Related to Mossy Fiber Synaptogenesis," | Nsci 21 (2001): 7340; M. Holahan et al., "Spatial Learning Induces Presynaptic Structural Remodeling in the Hippocampal Mossy Fiber System of Two Rat Strains," Hippocampus 16 (2006): 560; I. Galimberti et al., "Long-Term Rearrangements of Hippocampal Mossy Fiber Terminal Connectivity in the Adult Regulated by Experience," Neuron 50 (2006): 749; V. De Paola et al., "Cell Type-Specific Structural plasticity of Axonal Branches and Boutons in the Adult Neocortex," Neuron 49 (2006): 861; H. Nishiyama et al., "Axonal Motility and Its Modulation by Activity Are Branch-Type Specific in the Intact Adult Cerebellum," Neuron 56 (2007): 472.

15. C. Pantev and S. Herholz, "Plasticity of the Human Auditory Cortex Related to Musical Training," Nsci Biobehav Rev 35 (2011): 2140.

16. A. Pascual-Leone, "Reorganization of Cortical Motor Outputs in the Acquisition of New Motor Skills," in Recent Advances in Clin Neurophysiology, ed. J. Kinura and H. Shibasaki (Amsterdam: Elsevier Science, 1996), pp. 304–8.

17. C. Xerri et al., "Alterations of the Cortical Representation of the Rat Ventrum Induced by Nursing Behavior," J Nsci 14 (1994): 171; B. Draganski et al., "Neuroplasticity: Changes in Grey Matter Induced by Training," Nat 427 (2004): 311.

18. J. Altman and G. Das, "Autoradiographic and Histological Evidence of Postnatal Hippocampal Neurogenesis in Rats," J Comp Neurol 124 (1965): 319.

19. M. Kaplan, "Environmental Complexity Stimulates Visual Cortex Neurogenesis: Death of a Dogma and a Research Career," TINS 24 (2001): 617.

20. S. Goldman and F. Nottebohm, "Neuronal Production, Migration, and Differentiation in a Vocal Control Nucleus of the Adult Female Canary Brain," PNAS 80 (1983): 2390; J. Paton and F. Nottebohm, "Neurons Generated in the Adult Brain Are Recruited into Functional Circuits," Sci 225 (1984): 4666; F. Nottebohm, "Neuronal Replacement in Adult Brain," ANYAS 457 (1985): 143. For a great history of the entire neurogenesis saga, see M. Specter, "How the Songs of Canaries Upset a Fundamental Principle of Science," New Yorker, July 23, 2001.

21. D. Kornack and P. Rakic, "Continuation of Neurogenesis in the Hippocampus of the Adult Macaque Monkey," PNAS 96 (1999): 5768.

22. G. Ming and H. Song, "Adult Neurogenesis in the Mammalian Central Nervous System," Ann Rev Nsci 28 (2005): 223. Rate of neuron replacement in the hippocampus: G. Kempermann et al., "More Hippocampal Neurons in Adult Mice Living in an Enriched Environment," Nat 386 (1997): 493; H. Cameron and R. McKay, "Adult Neurogenesis Produces a Large Pool of New Granule Cells in the Dentate Gyrus," J Comp Neurol 435 (2001): 406. Demonstration in humans: P. Eriksson et al., "Neurogenesis in the Adult Human Hippocampus," Nat Med 4 (1998): 1313. Modulators of neurogenesis: C. Mirescu et al., "Sleep Deprivation Inhibits Adult Neurogenesis in the Hippocampus by Elevating Glucocorticoids." PNAS 103 (2006): 19170. The role of new neurons in cognition: W. Deng et al., "New Neurons and New Memories: How Does Adult Hippocampal Neurogenesis Affect Learning and Memory?" Nat Rev Nsci 11 (2010): 339; T. Shors et al., "Neurogenesis in the Adult Rat Is Involved in the Formation of Trace Memories," Nat 410 (2001): 372; T. Shors et al., "Neurogenesis May Relate to Some But Not All Types of Hippocampal-Dependent Learning," Hippocampus 12 (2002): 578.

23. Footnote regarding running, glucocorticoids and neurogenesis: S. Droste et al., "Effects of Long- Term Voluntary Exercise on the Mouse Hypothalamic-Pituitary-Adrenocortical Axis," Endo 144 (2003): 3012; H. van Praag et al., "Running Enhances Neurogenesis, Learning, and Long-Term Potentiation in Mice," PNAS 96 (1999): 13427; G. Kempermann, "New Neurons for 'Survival of the Fittest," Nat Rev Nsci 13 (2012): 727.

24. L. Santarelli et al., "Requirement of Hippocampal Neurogenesis for the Behavioral Effects of Antidepressants," Sci 301 (2003): 80.

25. J. Altmann, "The Discovery of Adult Mammalian Neurogenesis," in Neurogenesis in the Adult Brain I, ed. T. Seki, K. Sawamoto, J. Parent, and A. Alvarez-Buylla (New York: Springer-Verlag, 2011).

26. C. Lord et al., "Hippocampal Volumes Are Larger in Postmenopausal Women Using Estrogen Therapy Compared to Past Users, Never Users

and Men: A Possible Window of Opportunity Effect," Neurobiol of Aging 29 (2008): 95; R. Sapolsky, "Glucocorticoids and Hippocampal Atrophy in Neuropsychiatric Disorders," AGP 57 (2000): 925; A. Mutso et al., "Abnormalities in Hippocampal Functioning with Persistent Pain," J Nsci 32 (2012): 5747; J. Pruessner et al., "Stress Regulation in the Central Nervous System: Evidence from Structural and Functional Neuroimaging Studies in Human Populations," PNE 35 (2010): 179; J. Kuo et al., "Amygdala Volume in Combat-Exposed Veterans With and Without Posttraumatic Stress Disorder: A Cross-sectional Study," AGP 69 (2012): 1080.

27. E. Maguire et al., "Navigation-Related Structural Change in the Hippocampi of Taxi Drivers," PNAS 97 (2000): 4398; K. Woollett and E. Maguire, "Acquiring "the Knowledge" of London's Layout Drives Structural Brain Changes," Curr Biol 21 (2011): 2109. For an interesting discussion of why you need a bigger hippocampus to become a cab driver in London, revolving around the notoriously difficult licensing exam, see J. Rosen, "The Knowledge, London's Legendary Taxi- Driver Test, Puts Up a Fight in the Age of GPS," New York Times Magazine, November 10, 2014.

28. S. Mangiavacchi et al., "Long-Term Behavioral and Neurochemical Effects of Chronic Stress Exposure in Rats," J Neurochemistry 79 (2001): 1113; J. van Honk et al., "Baseline Salivary Cortisol Levels and Preconscious Selective Attention for Treat: A Pilot Study," PNE 23 (1998): 741; M. Fuxjager et al., "Winning Territorial Disputes Selectively Enhances Androgen Sensitivity in Neural Pathways Related to Motivation and Social Aggression," PNAS 107 (2010): 12393; I. McKenzie et al., "Motor Skill Learning Requires Active Central Myelination," Sci 346 (2014): 318; M. Bechler and C. ffrench-Constant, "A New Wrap for Neuronal Activity?" Sci 344 (2014): 480; E. Gibson et al., "Neuronal Activity Promotes Oligodendrogenesis and Adaptive Myelination in the Mammalian Brain," Sci 344 (2014): 487; J. Radley et al., "Reversibility of Apical Dendritic Retraction in the Rat Medial Prefrontal Cortex Following Repeated Stress," Exp Neurol 196 (2005): 199; E. Bloss et al.,

"Interactive Effects of Stress and Aging on Structural Plasticity in the Prefrontal Cortex," J Nsci 30 (2010): 6726.

29. N. Doidge, The Brain That Changes Itself: Stories of Personal Triumph from the Front of Brain Science (New York: Penguin, 2007); S. Begley, Train Your Mind, Change Your Brain: How a New Science Reveals Our Extraordinary Potential to Transform Ourselves (New York: Ballantine Books, 2007); J. Arden, Rewire Your Brain: Think Your Way to a Better Life (New York: Wiley, 2010).

Chapter 6: Adolescence; or, Dude, Where's My Frontal Cortex?

1. R. Knickmeyer et al., "A Structural MRI Study of Human Brain Development from Birth to 2 Years," J Nsci 28 (2008): 12176.

2. M. Bucholtz, "Youth and Cultural Practice," Ann Rev Anthropology 31 (2002): 525; S. Choudhury, "Culturing the Adolescent Brain: What Can Neuroscience Learn from Anthropology?" SCAN 5 (2010): 159. Footnote: T. James, "The Age of Majority," Am J Legal History 4 (1960): 22; R. Brett, "Contribution for Children and Political Violence," in Child Soldiering: Questions and Challenges for Health Professionals (WHO Global Report on Violence), 2000, p. 1; C. MacMullin and M. Loughry, "Investigating Psychosocial Adjustment of Former Child Soldiers in Sierra Leone and Uganda," J Refugee Studies 17 (2004): 472. 3. J. Giedd, "The Teen Brain: Insights from Neuroimaging," J Adolescent Health 42 (2008): 335. Demonstration of increased intrinsic connectivity of PFC neurons during adolescence in monkeys: X. Zhou et al., "Age-Dependent Changes in Prefrontal Intrinsic Connectivity," PNAS 111 (2014): 3853; T. Singer, "The Neuronal Basis and Ontogeny of Empathy and Mind Reading: Review of Literature and Implications for Future Research," Nsci Biobehav Rev 30 (2006): 855; P. Shaw et al., "Intellectual Ability and Cortical Development in Children and Adolescents," Nat 440 (2006): 676.

4. D. Yurelun-Todd, "Emotional and Cognitive Changes During Adolescence," Curr Opinion in Neurobiol 17 (2007): 251; B. Luna et al., "Maturation of Widely Distributed Brain Function Subserves Cognitive Development," Neuroimage 13 (2001): 786; B. Schlaggar et al., "Functional Neuroanatomical Differences Between Adults and School-Age Children in the Processing of Single Words," Sci 296 (2002): 1476.

5. A. Wang et al., "Developmental Changes in the Neural Basis of Interpreting Communicative Intent," SCAN 1 (2006): 107.

6. T. Paus et al., "Maturation of White Matter in the Human Brain: A Review of Magnetic Resonance Studies," Brain Res Bull 54 (2001): 255; A. Raznahan et al., "Patterns of Coordinated Anatomical Change in Human Cortical Development: A Longitudinal Neuroimaging Study of Maturational Coupling," Neuron 72 (2011): 873; N. Strang et al., "Developmental Changes in Adolescents' Neural Response to Challenge," Developmental Cog Nsci 1 (2011): 560.

7. C. Masten et al., "Neural Correlates of Social Exclusion During Adolescence: Understanding the Distress of Peer Rejection," SCAN (2009): 143.

8. J. Perrin et al., "Growth of White Matter in the Adolescent Brain: Role of Testosterone and Androgen Receptor," J Nsci 28 (2008): 9519; T. Paus et al., "Sexual Dimorphism in the Adolescent Brain: Role of Testosterone and Androgen Receptor in Global and Local Volumes of Grey and White Matter," Horm Behav 57 (2010): 63; A. Arnsten and R. Shansky, "Adolescence: Vulnerable Period for Stress-Induced PFC Function?" ANYAS 102 (2006): 143; W. Moore et al., "Facing Puberty: Associations Between Pubertal Development and Neural Responses to Affective Facial Displays," SCAN 7 (2012): 35; R. Dahl, "Adolescent Brain Development: A Period of Vulnerabilities and Opportunities," ANYAS 1021 (2004): 1

9. R. Rosenfield, "Clinical Review: Adolescent Anovulation: Maturational Mechanisms and Implications," J Clin Endo and Metabolism 98 (2013): 3572.

10. D. Yurelun-Todd, "Emotional and Cognitive Changes During Adolescence," Curr Opinion in Neurobiol 17 (2007): 251; B. Schlaggar et al., "Functional Neuroanatomical Differences Between Adults and School-Age Children in the Processing of Single Words," Sci 296 (2002): 1476.

11. W. Moore et al., "Facing Puberty: Associations Between Pubertal Development and Neural Responses to Affective Facial Displays," SCAN 7 (2012): 35.

12. D. Gee et al., "A Developmental Shift from Positive to Negative Connectivity in Human Amygdala-Prefrontal Circuitry," J Nsci 33 (2013): 4584.

13. K. McRae et al., "Association Between Trait Emotional Awareness and Dorsal Anterior Cingulate Activity During Emotion Is Arousal-Dependent," Neuroimage 41 (2008): 648; W. Killgore et al., "Sex-Specific Developmental Changes in Amygdala Responses to Affective Faces," Neuroreport 12 (2001): 427; W. Killgore and D. Yurgelun-Todd, "Unconscious Processing of Facial Affect in Children and Adolescents," Soc Nsci 2 (2007): 28; T. Hare et al., "Biological Substrates of Emotional Reactivity and Regulation in Adolescence During an Emotional Go-Nogo Task," BP 63 (2008): 927; T. Wager et al., "Prefrontal-Subcortical Pathways Mediating Successful Emotion Regulation," Neuron 25 (2008): 1037; T. Hare et al., "Self-Control in Decision-Making Involves Modulation of the vmPFC Valuation System," Sci 324 (2009): 646; C. Masten et al., "Neural Correlates of Social Exclusion During Adolescence: Understanding the Distress of Peer Rejection," SCAN 4 (2009): 143.; Footnote: Shulman et al., "Sex Differences in the Developmental Trajectories of Impulse Control and Sensation-Seeking from Early Adolescence to Early Adulthood," J Youth and Adolescence 44 (2013): 1

14. G. Laviola et al., "Risk-Taking Behavior in Adolescent Mice: Psychobiological Determinants and Early Epigenetic Influence," Nsci Biobehav Rev 27 (2003): 19; V. Reyna and F. Farley, "Risk and Rationality in Adolescent Decision Making: Implications for Theory, Practice, and

Public Policy," Psych Sci in the Public Interest 7 (2006): 1; L. Steinberg, "Risk Taking in Adolescence: New Perspectives from Brain and Behavioral Science," Curr Dir Psych Res 16 (2007): 55; L. Steinberg, Age of Opportunity: Lessons from the New Science of Adolescence (New York: Houghton Mifflin, 2014); C. Moutsiana et al., "Human Development of the Ability to Learn from Bad News," PNAS 110 (2013): 16396.

15. Reviewed in A. R. Smith et al., "The Role of the Anterior Insula in Adolescent Decision Making," Developmental Nsci 36 (2014): 196.

16. Footnote: Shulman et al., "Sex Differences in the Developmental Trajectories of Impulse Control and Sensation-Seeking from Early Adolescence to Early Adulthood," J Youth and Adolescence 44 (2013): 1.

17. R. Sapolsky, "Open Season," New Yorker, March 30, 1998, p. 57.

18. D. Rosenberg and D. Lewis, "Changes in the Dopaminergic Innervation of Monkey Prefrontal Cortex During Late Postnatal Development: A Tyrosine Hydroxylase Immunohistochemical Study," BP 36 (1994): 272.

19. B. Knutson et al., "FMRI Visualization of Brain Activity During a Monetary Incentive Delay Task," Neuroimage 12 (2000): 20; E. Barkley-Levenson and A. Galvan, "Neural Representation of Expected Value in the Adolescent Brain," PNAS 111 (2014): 1646; S. Schneider et al., "Risk Taking and the Adolescent Reward System: A Potential Common Link to Substance Abuse," Am J Psychiatry 169 (2012): 39; S. Burnett et al., "Development During Adolescence of the Neural Processing of Social Emotion," J Cog Nsci 21 (2008): 1; J. Bjork et al., "Developmental Differences in Posterior Mesofrontal Cortex Recruitment by Risky Rewards," J Nsci 27 (2007): 4839; J. Bjork et al., "Incentive-Elicited Brain Activation in Adolescents: Similarities and Differences from Young Adults," J Nsci 25 (2004): 1793; S. Blakemore et al., "Adolescent Development of the Neural Circuitry for Thinking About Intentions," SCAN 2 (2007): 130.

20. A. Galvan et al., "Earlier Development of the Accumbens Relative to

Orbitofrontal Cortex Might Underlie Risk-Taking Behavior in Adolescents," J Nsci 26 (2006): 6885 (this is also the source of the figure in the text). A demonstration of dopaminergic response to different reward sizes as more linear and accurate in adults: J. Vaidya et al., "Neural Sensitivity to Absolute and Relative Anticipated Reward in Adolescents," PLoS ONE 8 (2013): e58708.

21. A. R. Smith et al., "Age Differences in the Impact of Peers on Adolescents' and Adults' Neural Response to Reward," Developmental Cog Nsci 11 (2015): 75; J. Chein et al., "Peers Increase Adolescent Risk Taking by Enhancing Activity in the Brain's Reward Circuitry," Developmental Sci 14 (2011): F1; M. Gardner and L. Steinberg, "Peer Influence on Risk Taking, Risk Preference, and Risky Decision Making in Adolescence and Adulthood: An Experimental Study," Developmental Psych 41 (2005): 625; L. Steinberg, "A Social Neuroscience Perspective on Adolescent Risk- Taking," Developmental Rev 28 (2008): 78; M. Grosbras et al., "Neural Mechanisms of Resistance to Peer Influence in Early Adolescence," J Nsci 27 (2007): 8040; A. Weigard et al., "Effects of Anonymous Peer Observation on Adolescents' Preference for Immediate Rewards," Developmental Science 17 (2014): 71.

22. M. Madden et al., "Teens, Social Media, and Privacy," Pew Research Center, May 23, 2013, www.pewinternet.org/Reports/2013/Teens-Social-Media-And-Privacy/Summary-of-Findings.aspx.

23. A. Guyer et al., "Amygdala and Ventrolateral Prefrontal Cortex Function During Anticipated Peer Evaluation in Pediatric Social Anxiety," AGP 65 (2008): 1303; A. Guyer et al., "Probing the Neural Correlates of Anticipated Peer Evaluation in Adolescence," Child Development 80 (2009): 1000; B. Gunther Moor et al., "Do You Like Me? Neural Correlates of Social Evaluation and Developmental Trajectories," Soc Nsci 5 (2010): 461.

24. N. Eisenberger et al., "Does Rejection Hurt? An fMRI Study of Social Exclusion," Sci 302 (2003): 290; N. Eisenberger, "The Pain of Social

Disconnection: Examining the Shared Neural Underpinnings of Physical and Social Pain," Nat Rev Nsci 3 (2012): 421.

25. C. Sebastian et al., "Development Influences on the Neural Bases of Responses to Social Rejection: Implications of Social Neuroscience for Education," NeuroImage 57 (2011): 686; C. Masten et al., "Neural Correlates of Social Exclusion During Adolescence: Understanding the Distress of Peer Rejection," SCAN 4 (2009): 143; J. Pfeifer and S. Blakemore, "Adolescent Social Cognitive and Affective Neuroscience: Past, Present, and Future," SCAN 7 (2012): 1.

26. J. Pfeifer et al., "Entering Adolescence: Resistance to Peer Influence, Risky Behavior, and Neural Changes in Emotion Reactivity," Neuron 69 (2011): 1029; L. Steinberg and K. Monahan, "Age Differences in Resistance to Peer Influence," Developmental Psych 43 (2007): 1531; M. Grosbras et al., "Neural Mechanisms of Resistance to Peer Influence in Early Adolescence," J Nsci 27 (2007): 8040.

27. I. Almas et al., "Fairness and the Development of Inequality Acceptance," Sci 328 (2010): 1176.

28. J. Decety and K. Michalska, "Neurodevelopmental Changes in the Circuits Underlying Empathy and Sympathy from Childhood to Adulthood," Developmental Sci 13 (2010): 886.

29. N. Eisenberg et al., "The Relations of Emotionality and Regulation to Dispositional and Situational Empathy-Related Responding," JPSP 66 (1994): 776; J. Decety et al., "The Developmental Neuroscience of Moral Sensitivity," Emotion Rev 3 (2011): 305.

30. E. Finger et al., "Disrupted Reinforcement Signaling in the Orbitofrontal Cortex and Caudate in Youths with Conduct Disorder or Oppositional Defiant Disorder and a High Level of Psychopathic Traits," Am J Psychiatry 168 (2011): 152; A. Marsh et al., "Reduced Amygdala-Orbitofrontal Connectivity During Moral Judgments in Youths with Disruptive Behavior Disorders and Psychopathic Traits," Psychiatry Res 194

(2011): 279.

31. L. Steinberg, "The Influence of Neuroscience on US Supreme Court Decisions About Adolescents' Criminal Culpability," Nat Rev Nsci 14 (2013): 513.

32. Roper v. Simmons, 543 U.S. 551 (2005).

33. J. Sallet et al, "Social Network Size Affects Neural Circuits in Macaques," Sci 334 (2011): 697.

Chapter 7: Back to the Crib, Back to the Womb

1. P. Yakovlev and A. Lecours, "The Myelogenetic Cycles of Regional Maturation of the Brain," in Regional Development of the Brain in Early Life, ed. A. Minkowski (Oxford: Blackwell, 1967); H. Kinney et al., "Sequence of Central Nervous System Myelination in Human Infancy: II. Patterns of Myelination in Autopsied Infants," J Neuropathology & Exp Neurol 47 (1988): 217; S. Deoni et al., "Mapping Infant Brain Myelination with MRI," J Nsci 31 (2011): 784; N. Baumann and D. Pham- Dinh, "Biology of Oligodendrocyte and Myelin in the Mammalian CNS," Physiological Rev 81 (2001): 871.

2. Demonstration of the predictive power of degree of connectivity: N. Dosenbach et al., "Prediction of Individual Brain Maturity Using fMRI," Sci 329 (2010): 1358.

3. N. Uesaka et al., "Retrograde Semaphorin Signaling Regulates Synapse Elimination in the Developing Mouse Brain," Sci 344 (2014): 1020; R. C. Paolicelli et al., "Synaptic Pruning by Microglia Is Necessary for Normal Brain Development," Sci 333 (2011): 1456; R. Buss et al., "Adaptive Roles of Programmed Cell Death During Nervous System Development," Ann Rev of Nsci 29 (2006): 1; D. Nijhawan et al., "Apoptosis in Neural Development and Disease," Ann Rev of Nsci 23 (2000): 73; C. Kuan et al., "Mechanisms of Programmed Cell Death in the Developing Brain," TINS 23 (2000): 291. **4**. J. Piaget, Main Trends in Psychology (London: George Allen & Unwin, 1973); J. Piaget, The Language and Thought of the Child (New York: Psychology Press, 1979).

5. Other realms of stage development: R. Selman et al., "Interpersonal Awareness in Children: Toward an Integration of Developmental and Clinical Child Psychology," Am J Orthopsychiatry 47 (1977): 264; T. Singer, "The Neuronal Basis and Ontogeny of Empathy and Mind Reading: Review of Literature and Implications for Future Research," Nsci Biobehav Rev 30 (2006): 855.

6. S. Baron-Cohen, "Precursors to a Theory of Mind: Understanding Attention in Others," in Natural Theories of Mind: Evolution, Development and Simulation of Everyday Mindreading, ed. A. Whiten (Oxford: Basil Blackwell, 1991); J. Topal et al., "Differential Sensitivity to Human Communication in Dogs, Wolves, and Human Infants," Sci 325 (2009): 1269; G. Lakatos et al., "A Comparative Approach to Dogs' (Canis familiaris) and Human Infants' Comprehension of Various Forms of Pointing Gestures," Animal Cog 12 (2009): 621 J. Kaminski et al., "Domestic Dogs are Sensitive to a Human's Perspective," Behaviour 146 (2009): 979.

7. S. Baron-Cohen et al., "Does the Autistic Child Have a 'Theory of Mind'?" Cog 21 (2985): 37.

8. L. Young et al., "Disruption of the Right Temporal Lobe Function with TMS Reduces the Role of Beliefs in Moral Judgments," PNAS 107 (2009): 6753; Y. Moriguchi et al., "Changes of Brain Activity in the Neural Substrates for Theory of Mind During Childhood and Adolescence," Psychiatry and Clin Nsci 61 (2007): 355; A. Saitovitch et al., "Social Cognition and the Superior Temporal Sulcus: Implications in Autism," Rev of Neurol (Paris) 168 (2012): 762; P. Shaw et al., "The Impact of Early and Late Damage to the Human Amygdala on "Theory of Mind' Reasoning," Brain 127 (2004): 1535.

9. B. Sodian and S. Kristen, "Theory of Mind During Infancy and Early Childhood Across Cultures, Development of," Int Encyclopedia of the

Soc & Behav Sci (Amsterdam: Elsevier, 2015), p. 268.

10. S. Nichols, "Experimental Philosophy and the Problem of Free Will," Sci 331 (2011): 1401.

11. D. Premack and G. Woodruff, "Does the Chimpanzee Have a Theory of Mind?" BBS 1 (1978): 515. Evidence against: D. Povinelli and J. Vonk, "Chimpanzee Minds: Suspiciously Human?" TICS 7 (2003): 157. Evidence for: B. Hare et al., "Do Chimpanzees Know What Conspecifics Know and Do Not Know?" Animal Behav 61 (2001): 139. Footnote: L. Santo Let al., "Rhesus Monkeys (Macaca mulatta) Know What Others Can and Cannot Hear," Animal Behav 71 (2006): 1175.

12. J. Decety et al., "The Contribution of Emotion and Cognition to Moral Sensitivity: A Neurodevelopmental Study," Cerebral Cortex 22 (2011): 209.

13. J. Decety et al., "Who Caused the Pain? An fMRI Investigation of Empathy and Intentionality in Children," Neuropsychologia 46 (2008): 2607; J. Decety et al., "The Contribution of Emotion and Cognition to Moral Sensitivity: A Neurodevelopmental Study," Cerebral Cortex 22 (2012): 209; J. Decety and K. Michalska, "Neurodevelopmental Changes in the Circuits Underlying Empathy and Sympathy from Childhood to Adulthood," Developmental Sci 13 (2010): 886.

14. J. Decety et al., "The Contribution of Emotion and Cognition to Moral Sensitivity: A Neurodevelopmental Study," Cerebral Cortex 22 (2012): 209; N. Eisenberg et al., "The Relations of Emotionality and Regulation to Dispositional and Situational Empathy-Related Responding," JPSP 66 (1994): 776.

15. P. Blake et al., "The Ontogeny of Fairness in Seven Societies," Nat 528 (2016): 258.

16. I. Almas et al., "Fairness and the Development of Inequality Acceptance," Sci 328 (2010): 1176; E. Fehr et al., "Egalitarianism in Young Children," Nat 454 (2008): 1079; K. Olson et al., "Children's Responses

to Group-Based Inequalities: Perpetuation and Rectification," Soc Cog 29 (2011): 270; M. Killen, "Children's Social and Moral Reasoning About Exclusion," Curr Dir Psych Sci 16 (2007): 32.

17. D. Garz, Lawrence Kohlberg: An Introduction (Cologne, Germany: Barbara Budrich, 2009).

18. C. Gilligan, In a Different Voice: Psychological Theory and Women's Development (Cambridge, MA: Harvard University Press, 1982).

19. N. Eisenberg, "Emotion, Regulation, and Moral Development," Ann Rev of Psych 51 (2000): 665; J. Hamlin et al., "Social Evaluation by Preverbal Infants," Nat 450 (2007): 557; M. Hoffman, Empathy and Moral Development: Implications for Caring and Justice (Cambridge: Cambridge University Press, 2001).

20. W. Mischel et al., "Cognitive and Attentional Mechanisms in Delay of Gratification," JPSP 21 (1972): 204; W. Mischel, The Marshmallow Test: Understanding Self-Control and How to Master It (New York: Bantam Books, 2014); K. McRae et al., "The Development of Emotion Regulation: An fMRI Study of Cognitive Reappraisal in Children, Adolescents and Young Adults," SCAN 7 (2012): 11; H. Palmeri and R. N. Aslin, "Rational Snacking: Young Children's Decision-Making on the Marshmallow Task is Moderated by Beliefs About Environmental Reliability," Cog 126 (2013): 109.

21. B. J. Casey et al., "From the Cover: Behavioral and Neural Correlates of Delay of Gratification 40 Years Later," PNAS 108 (2011): 14998; N. Eisenberg et al., "Contemporaneous and Longitudinal Prediction of Children's Social Functioning from Regulation and Emotionality," Child Development 68 (1997): 642; N. Eisenberg et al., "The Relations of Regulation and Emotionality to Resiliency and Competent Social Functioning in Elementary School Children," Child Development 68 (1997): 295.

22. L. Holt, The Care and Feeding of Children (NY: Appleton-Century, 1894). This book went through fifteen editions between 1894 and 1915.

23. For a history of hospitalism, see R. Sapolsky, "How the Other Half Heals," Discover, April 1998, p. 46.

24. J. Bowlby Attachment and Loss, vol. 1, Attachment (New York: Basic Books, 1969); J. Bowlby, Attachment and Loss, vol. 2, Separation (London: Hogarth Press, 1973); J. Bowlby, Attachment and Loss, vol. 3, Loss: Sadness & Depression (London: Hogarth Press, 1980).

25. D. Blum, Love at Goon Park: Harry Harlow and the Science of Affection (New York: Perseus, 2002). This is the source of the Harlow quote.

26. R. Rosenfeld, "The Case of the Unsolved Crime Decline," Sci Am, February 2004, p. 82; J. Donohue III and S. Levitt, "The Impact of Legalized Abortion on Crime," Quarterly J Economics 116 (2001): 379. Raine et al., "Birth Complications Combined with Early Maternal Rejection at Age 1 Year Predispose to Violent Crime at Age 18 Years," AGP 51 (1994): 984; Footnote: J. Bowlby, "Forty-four Juvenile Thieves: Their Characters and Home-Life," Int J Psychoanalysis 25 (1944): 107.

27. G. Barr et al., "Transitions in Infant Learning Are Modulated by Dopamine in the Amygdala," Nat Nsci 12 (2009): 1367; R. Sullivan et al., "Good Memories of Bad Events," Nat 407 (2000): 38; S. Moriceau et al., "Dual Circuitry for Odor-Shock Conditioning During Infancy: Corticosterone Switches Between Fear and Attraction via Amygdala," J Nsci 26 (2006): 6737; R. Sapolsky, "Any Kind of Mother in a Storm," Nat Nsci 12 (2009): 1355.

28. R. Sapolsky and M. Meaney, "Maturation of the Adrenocortical Stress Response: Neuroendocrine Control Mechanisms and the Stress Hyporesponsive Period," Brain Res Rev 11 (1986): 65.

29. L. M. Renner and K. S. Slack, "Intimate Partner Violence and Child Maltreatment: Understanding Intra- and Intergenerational Connections," Child Abuse & Neglect 30 (2006): 599.

30. D. Maestripieri, "Early Experience Affects the Intergenerational Transmission of Infant Abuse in Rhesus Monkeys," PNAS 102 (2005): 9726. **31**. C. Hammen et al., "Depression and Sensitization to Stressors Among Young Women as a Function of Childhood Adversity," J Consulting Clin Psych 68 (2000): 782; E. McCrory et al., "The Link Between Child Abuse and Psychopathology: A Review of Neurobiological and Genetic Research," J the Royal Soc of Med 105 (2012): 151; K. Lalor and R. McElvaney, "Child Sexual Abuse, Links to Later Sexual Exploitation/ High-Risk Sexual Behavior, and Prevention/Treatment Programs," Trauma Violence & Abuse 11 (2010): 159; Y. Dvir et al., "Childhood Maltreatment, Emotional Dysregulation, and Psychiatric Comorbidities," Harvard Rev of Psychiatry 22 (2014): 149; E. Mezzacappa et al., "Child Abuse and Performance Task Assessments of Executive Functions in Boys," J Child Psych and Psychiatry 42 (2001): 1041; M. Wichers et al., "Transition from Stress Sensitivity to a Depressive State: Longitudinal Twin Study," Brit J Psychiatry 195 (2009): 498.

32. C. Heim et al., "Pituitary-Adrenal and Autonomic Responses to Stress in Women After Sexual and Physical Abuse in Childhood," JAMA 284 (2000): 592; E. Binder et al., "Association of FKBP5 Polymorphisms and Childhood Abuse with Risk of Posttraumatic Stress Disorder Symptoms in Adults," JAMA 299 (2008): 1291; C. Heim et al., "The Dexamethasone/Corticotropin-Releasing Factor Test in Men with Major Depression: Role of Childhood Trauma," BP 63 (2008): 398; R. Lee et al., "Childhood Trauma and Personality Disorder: Positive Correlation with Adult CSF Corticotropin-Releasing Factor Concentrations," Am J Psychiatry 162 (2005): 995; R. J. Lee et al., "CSF Corticotropin-Releasing Factor in Personality Disorder: Relationship with Self-Reported Parental Care," Neuropsychopharmacology 31: (2006): 2289; L. Carpenter et al., "Cerebrospinal Fluid Corticotropin-Releasing Factor and Perceived Early-Life Stress in Depressed Patients and Healthy Control Subjects," Neuropsychopharmacology 29 (2004): 777; T. Rinne et al., "Hyperresponsiveness of Hypothalamic-Pituitary-Adrenal Axis to Combined Dexamethasone/Corticotropin-Releasing Hormone Challenge in Female Borderline Personality Disorder Subjects with a History of

Sustained Childhood Abuse," BP 52 (2002): 1102; P. McGowan et al., "Epigenetic Regulation of the Glucocorticoid Receptor in Human Brain Associates with Childhood Abuse," Nat Nsci 12 (2009): 342; M. Toth et al., "Post-weaning Social Isolation Induces Abnormal Forms of Aggression in Conjunction with Increased Glucocorticoid and Autonomic Stress Responses," Horm Behav 60 (2011): 28.

33. S. Lupien et al., "Effects of Stress Throughout the Lifespan on the Brain, Behaviour and Cognition," Nat Rev Nsci 10 (2009): 434; V. Carrion et al., "Stress Predicts Brain Changes in Children: A Pilot Longitudinal Study on Youth Stress, Posttraumatic Stress Disorder, and the Hippocampus," Pediatrics 119 (2007): 509; F. L. Woon and D. W. Hedges, "Hippocampal and Amygdala Volumes in Children and Adults with Childhood Maltreatment–Related Posttraumatic Stress Disorder: A Meta-analysis," Hippocampus 18 (2008): 729.

34. S. J. Lupien et al., "Effects of Stress Throughout the Lifespan on the Brain, Behaviour and Cognition," Nat Rev Nsci 10 (2009): 434; D. Hackman et al., "Socioeconomic Status and the Brain: Mechanistic Insights from Human and Animal Research," Nat Rev Nsci 11 (2010): 651; M. Sheridan et al., "The Impact of Social Disparity on Prefrontal Function in Childhood," PLoS ONE 7 (2012): e35744; J. L. Hanson et al., "Structural Variations in Prefrontal Cortex Mediate the Relationship Between Early Childhood Stress and Spatial Working Memory," J Nsci 32 (2012): 7917; M. Sweitzer et al., "Polymorphic Variation in the Dopamine D4 Receptor Predicts Delay Discounting as a Function of Childhood Socioeconomic Status: Evidence for Differential Susceptibility," SCAN 8 (2013): 499; E. Tucker-Drob et al., "Emergence of a Gene X Socioeconomic Status Interaction on Infant Mental Ability Between 10 Months and 2 Years," Psych Sci 22 (2011): 125; I. Liberzon et al., "Childhood Poverty Alters Emotional Regulation in Adulthood," SCAN 10 (2015): 1596; K. G. Noble et al., "Family Income, Parental Education and Brain Structure in Children and Adolescents," Nat Nsci 18 (2015): 773.

35. Footnote: R. Nevin, "Understanding International Crime Trends:

The Legacy of Preschool Lead Exposure," Environmental Res 104 (2007): 315.

36. Reviewed in R. Sapolsky, Why Zebras Don't Get Ulcers: A Guide to Stress, Stress-Related Diseases and Coping, 3rd ed. (New York: Holt, 2004). Baboon equivalent: P. O. Onyango et al., "Persistence of Maternal Effects in Baboons: Mother's Dominance Rank at Son's Conception Predicts Stress Hormone Levels in Subadult Males," Horm Behav 54 (2008): 319.

37. F. L. Woon and D. W. Hedges, "Hippocampal and Amygdala Volumes in Children and Adults with Childhood Maltreatment–Related Posttraumatic Stress Disorder: A Meta-analysis," Hippocampus 18 (2008): 729; D. Gee et al., "Early Developmental Emergence of Human Amygdala-PFC Connectivity After Maternal Deprivation," PNAS 110 (2013): 15638; A. K. Olsavsky et al., "Indiscriminate Amygdala Response to Mothers and Strangers After Early Maternal Deprivation," BP 74 (2013): 853.

38. L. M. Oswald et al., "History of Childhood Adversity Is Positively Associated with Ventral Striatal Dopamine Responses to Amphetamine," Psychopharmacology (Berlin) 23 (2014): 2417; E. Hensleigh and L. M. Pritchard, "Maternal Separation Increases Methamphetamine-Induced Damage in the Striatum in Male, But Not Female Rats," BBS 295 (2014): 3; A. N. Karkhanis et al., "Social Isolation Rearing Increases Nucleus Accumbens Dopamine and Norepinephrine Responses to Acute Ethanol in Adulthood," Alcohol: Clin Exp Res 38 (2014): 2770.

39. C. Anacker et al., "Early Life Adversity and the Epigenetic Programming of Hypothalamic- Pituitary-Adrenal Function," Dialogues in Clin Nsci 16 (2014): 321.

40. S. L. Buka et al., "Youth Exposure to Violence: Prevalence, Risks, and Consequences," Am J Orthopsychiatry 71 (2001): 298; M. B. Selner-O'Hagan et al., "Assessing Exposure to Violence in Urban Youth," J Child Psych and Psychiatry 39 (1998): 215; P. T. Sharkey et al., "The Effect of Local Violence on Children's Attention and Impulse Control,"

Am J Public Health 102 (2012):

2287; J. B. Bingenheimer et al., "Firearm Violence Exposure and Serious Violent Behavior," Sci 308 (2005): 1323. Footnote: I. Shaley et al., "Exposure to Violence During Childhood Is Associated with Telomere Erosion from 5 to 10 Years of Age: A Longitudinal Study," Mol Psychiatry 18 (2013): 576.

41. For a particularly good review, see L. Huesmann and L. Taylor, "The Role of Media Violence in Violent Behavior," Ann Rev of Public Health 27 (2006): 393. See also J. D. Johnson et al., "Differential Gender Effects of Exposure to Rap Music on African American Adolescents' Acceptance of Teen Dating Violence," Sex Roles 33 (1995): 597; J. Johnson et al., "Television Viewing and Aggressive Behavior During Adolescence and Adulthood," Sci 295 (2002): 2468; J. Savage and C. Yancey, "The Effects of Media Violence Exposure on Criminal Aggression: A Meta- analysis," Criminal Justice and Behav 35 (2008): 772; C. Anderson et al., "Violent Video Game Effects on Aggression, Empathy, and Prosocial Behavior in Eastern and Western Countries: A Meta- analytic Review," Psych Bull 136, 151; C. J. Ferguson, "Evidence for Publication Bias in Video Game Violence Effects Literature: A Meta-analytic Review," Aggression and Violent Behavior 12 (2007): 470; C. Ferguson, "The Good, the Bad and the Ugly: A Meta-analytic Review of Positive and Negative Effects of Violent Video Games," Psychiatric Quarterly 78 (2007): 309.

42. W. Copeland et al., "Adult Psychiatric Outcomes of Bullying and Being Bullied by Peers in Childhood and Adolescence," JAMA Psychiatry 70 (2013): 419; S. Woods and E. White, "The Association Between Bullying Behaviour, Arousal Levels and Behaviour Problems," J Adolescence 28 (2005): 381; D. Jolliffe and D. P. Farrington, "Examining the Relationship Between Low Empathy and Bullying," Aggressive Behav 32 (2006): 540; G. Gini, "Social Cognition and Moral Cognition in Bullying: What's Wrong?" Aggressive Behav 32 (2006): 528; S. Shakoor et al., "A Prospective Longitudinal Study of Children's Theory of Mind and Adolescent Involvement in Bullying," J Child Psych and Psychiatry 53

(2012): 254.

43. J. D. Unenever, "Bullies, Aggressive Victims, and Victims: Are They Distinct Groups?" Aggressive Behav 31 (2005): 153; D. P. Farrington and M. M. Tofi, "Bullying as a Predictor of Offending, Violence and Later Life Outcomes," Criminal Behaviour and Mental Health 21 (2011): 90; M. Tofi et al., "The Predictive Efficiency of School Bullying Versus Later Offending: A Systematic/Meta- analytic Review of Longitudinal Studies," Criminal Behaviour and Mental Health 21 (2011): 80; T. R. Nansel et al., "Cross-National Consistency in the Relationship Between Bullying Behaviors and Psychosocial Adjustment," Arch Pediatrics & Adolescent Med 158 (2004): 730; J. A. Stein et al., "Adolescent Male Bullies, Victims, and Bully-Victims: A Comparison of Psychosocial and Behavioral Characteristics," J Pediatric Psych 32 (2007): 273; P. W. Jansen et al., "Prevalence of Bullying and Victimization Among Children in Early Elementary School: Do Family and School Neighbourhood Socioeconomic Status Matter?" BMC Public Health 12 (2012): 494; A. Sourander et al., "What Is the Early Adulthood Outcome of Boys Who Bully or Are Bullied in Childhood? The Finnish 'From a Boy to a Man' Study," Pediatrics 120 (August 2007): 397; A. Sourander et al., "Childhood Bullies and Victims and Their Risk of Criminality in Late Adolescence," Arch Pediatrics & Adolescent Med 161 (2007): 546; C. Winsper et al., "Involvement in Bullying and Suicide-Related Behavior at 11 Years: A Prospective Birth Cohort Study," J the Am Academy of Child and Adolescent Psychiatry 51 (2012): 271; F. Elgar et al., "Income Inequality and School Bullying: Multilevel Study of Adolescents in 37 Countries," J Adolescent Health 45 (2009): 351.

44. G. M. Glew et al., "Bullying, Psychosocial Adjustment, and Academic Performance in Elementary School," Arch Pediatrics & Adolescent Med 159 (2005): 1026.

45. K. Appleyard et al., "When More Is Not Better: The Role of Cumulative Risk in Child Behavior Outcomes," J Child Psych and Psychiatry 46 (2005): 235.

46. M. Sheridan et al., "Variation in Neural Development as a Result of Exposure to Institutionalization Early in Childhood," PNAS 109 (2012): 12927; M. Carlson and F. Earis, "Psychological and Neuroendocrinological Sequelae of Early Social Deprivation in Institutionalized Children in Romania," ANYAS 15 (1997): 419; N. Tottenham, "Human Amygdala Development in the Absence of Species-Expected Caregiving," Developmental Psychobiology 54 (2012): 598; M. A. Mehta et al., "Amygdala, Hippocampal and Corpus Callosum Size Following Severe Early Institutional Deprivation: The English and Romanian Adoptees Study Pilot," J Child Psych and Psychiatry 50 (2009): 943; N. Tottenham et al., "Prolonged Institutional Rearing Is Associated with Atypically Large Amygdala Volume and Difficulties in Emotion Regulation," Developmental Sci 13 (2010): 46; M. M. Loman et al., "The Effect of Early Deprivation on Executive Attention in Middle Childhood," J Child Psych and Psychiatry 54 (2012): 37; T. Eluvathingal et al., "Abnormal Brain Connectivity in Children After Early Severe Socioemotional Deprivation: A Diffusion Tensor Imaging Study," Pediatrics 117 (2006): 2093; H. T. Chugani et al., "Local Brain Functional Activity Following Early Deprivation: A Study of Postinstitutionalized Romanian Orphans," Neuroimage 14 (2001): 1290.

47. Her idea is nicely summarized in M. Small, Our Babies, Ourselves (New York: Anchor Books, 1999).

48. H. Arendt, The Origins of Totalitarianism (New York: Harcourt 1951); T. Adorno et al., The Authoritarian Personality (New York: Harper & Row, 1950).

49. D. Baumrind, "Child Care Practices Anteceding Three Patterns of Preschool Behavior," Genetic Psych Monographs 75 (1967): 43.

50. E. E. Maccoby and J. A. Martin, "Socialization in the Context of the Family: Parent-Child Interaction," in Handbook of Child Psychology, ed. P. Mussen (New York: Wiley, 1983).

51. J. R. Harris, The Nurture Assumption: Why Children Turn Out the

Way They Do (New York: Simon

& Schuster, 1998).

52. J. Huizinga, Homo Ludens: A Study of the Play-Element in Culture (London: Routledge & Kegan Paul, 1938); A. Berghänel et al., "Loco-motor Play Drives Motor Skill Acquisition at the Expense of Growth: A Life History Trade-off," Sci Advances 1 (2015): 1; J. Panksepp and W. W. Beatty, "Social Deprivation and Play in Rats," Behav and Neural Biol 39 (1980): 197; M. Bekoff and J. A. Byers, Animal Play: Evolutionary, Comparative, and Ecological Perspectives (Cambridge: Cambridge University Press, 1998); M. Spinka et al., "Mammalian Play: Training for the Unexpected," Quarterly Rev of Biol 76 (2001): 141.

53. S. M. Pellis, "Sex Differences in Play Fighting Revisited: Traditional and Nontraditional Mechanisms of Sexual Differentiation in Rats," Arch Sexual Behav 31 (2002): 17; B. Knutson et al., "Ultrasonic Vocalizations as Indices of Affective States in Rats," Psych Bull 128 (2002): 961; Y. Delville et al., "Development of Aggression," in Biology of Aggression, ed. R. Nelson (Oxford: Oxford University Press, 2005).

54. J. Tsai, "Ideal Affect: Cultural Causes and Behavioral Consequences," Perspectives on Psych Sci 2 (2007): 242; S. Kitayama and A. Uskul, "Culture, Mind, and the Brain: Current Evidence and Future Directions," Ann Rev of Psych 62 (2011): 419.

55. C. Kobayashi et al., "Cultural and Linguistic Influence on Neural Bases of 'Theory of Mind': An fMRI Study with Japanese Bilinguals," Brain and Language 98 (2006): 210; C. Lewis et al., "Social Influences on False Belief Access: Specific Sibling Influences or General Apprenticeship?" Child Development 67 (1996): 2930; J. Perner et al., "Theory of Mind Is Contagious: You Catch It from Your Sibs," Child Development 65 (1994): 1228; D. Liu et al., "Theory of Mind Development in Chinese Children: A Meta-analysis of False-Belief Understanding Across Cultures and Languages," Developmental Psych 44 (2008): 523.

56. C. Anderson et al., "Violent Video Game Effects on Aggression, Empathy, and Prosocial Behavior in Eastern and Western Countries: A Meta-analytic Review," Psych Bull 136 (2010): 151.

57. R. E. Nisbett and D. Cohen, Culture of Honor: The Psychology of Violence in the South (Boulder, CO: Westview Press, 1996).

58. A. Kusserow, "De-homogenizing American Individualism: Socializing Hard and Soft Individualism in Manhattan and Queens," Ethos 27 (1999): 210.

59. S. Ullal-Gupta et al., "Linking Prenatal Experience to the Emerging Musical Mind," Front Systems Nsci 3 (2013): 48.

60. A. DeCasper and W. Fifer, "Of Human Bonding: Newborns Prefer Their Mothers' Voices," Sci 6 (1980): 208; A. J. DeCasper and P. A. Prescott, "Human Newborns' Perception of Male Voices: Preference, Discrimination, and Reinforcing Value," Developmental Psychobiology 17 (1984): 481; B. Mampe et al., "Newborns' Cry Melody Is Shaped by Their Native Language," Curr Biol 19 (2009): 1994; A. DeCasper and M. Spence, "Prenatal Maternal Speech Influences Newborns' Perception of Speech Sounds," Infant Behav and Development 9 (1986): 133.

61. J. P. Lecanuet et al., "Fetal Perception and Discrimination of Speech Stimuli: Demonstration by Cardiac Reactivity: Preliminary Results," Comptes rendus de l'Académie des sciences III 305 (1987): 161; J. P. Lecanuet et al., "Fetal Discrimination of Low-Pitched Musical Notes," Developmental Psychobiology 36 (2000): 29; C. Granier-Deferre et al., "A Melodic Contour Repeatedly Experienced by Human Near-Term Fetuses Elicits a Profound Cardiac Reaction One Month After Birth," PLoS ONE 23 (2011): e17304.

62. G. Kolata, "Studying Learning in the Womb," Sci 225 (1984): 302; A. J. DeCasper and M. J. Spence, "Prenatal Maternal Speech Influences Newborns' Perception of Speech Sounds," Infant Behav and Development 9 (1986): 133. **63**. P. Y. Wang et al., "Müllerian Inhibiting Substance Contributes to Sex-Linked Biases in the Brain and Behavior," PNAS 106 (2009): 7203; S. Baron-Cohen et al., "Sex Differences in the Brain: Implications for Explaining Autism," Sci 310 (2005): 819.

64. R. Goy and B. McEwen, Sexual Differentiation of the Brain (Cambridge, MA: MIT Press, 1980).

65. J. Money, "Sex Hormones and Other Variables in Human Eroticism," in Sex and Internal Secretions, ed. W. C. Young, 3rd ed. (Baltimore: Williams and Wilkins, 1963), p. 138.

66. G. M. Alexander and M. Hines, "Sex Differences in Response to Children's Toys in Nonhuman Primates (Cercopithecus aethiops sabaeus)," EHB 23 (2002): 467. (This is the source of the figure in the text). J. M. Hassett et al., "Sex Differences in Rhesus Monkey Toy Preferences Parallel Those of Children," Horm Behav 54 (2008): 359.

67. K. Wallen and J. M. Hassett, "Sexual Differentiation of Behavior in Monkeys: Role of Prenatal Hormones," J Neuroendocrinology 21 (2009): 421; J. Thornton et al., "Effects of Prenatal Androgens on Rhesus Monkeys: A Model System to Explore the Organizational Hypothesis in Primates," Horm Behav 55 (2009): 633.

68. M. Hines, Brain Gender (New York: Oxford University Press, 2004); G. A. Mathews et al., "Personality and Congenital Adrenal Hyperplasia: Possible Effects of Prenatal Androgen Exposure," Horm Behav 55 (2009): 285; R. W. Dittmann et al., "Congenital Adrenal Hyperplasia. I: Gender- Related Behavior and Attitudes in Female Patients and Sisters," PNE 15 (1990): 401; A. Nordenstrom et al., "Sex-Typed Toy Play Correlates with the Degree of Prenatal Androgen Exposure Assessed by CYP21 Genotype in Girls with Congenital Adrenal Hyperplasia," J Clin Endo and Metabolism 87 (2002): 5119; V. L. Pasterski et al., "Increased Aggression and Activity Level in 3- to 11-Year-Old Girls with Congenital Adrenal Hyperplasia," Horm Behav 52 (2007): 368.

69. C. A. Quigley et al., "Androgen Receptor Defects: Historical, Clinical, and Molecular Perspectives," Endocrine Rev 16 (1995): 271; N. P. Mongan et al., "Androgen Insensitivity Syndrome," Best Practice & Res: Clin Endo & Metabolism 29 (2015): 569.

70. F. Brunner et al., "Body and Gender Experience in Persons with Complete Androgen Insensitivity Syndrome," Zeitschrift für Sexualforschung 25 (2012): 26; F. Brunner et al., "Gender Role, Gender Identity and Sexual Orientation in CAIS ('XY-Women') Compared with Subfertile and Infertile 46,XX Women," J Sex Res 2 (2015): 1; D. G. Zuloaga et al., "The Role of Androgen Receptors in the Masculinization of Brain and Behavior: What We've Learned from the Testicular Feminization Mutation," Horm Behav 53 (2008): 613; H. F. L. Meyer-Bahlburg, "Gender Outcome in 46,XY Complete Androgen Insensitivity Syndrome: Comment on T'Sjoen et al.," Arch Sexual Behav 39 (2010): 1221; G. T'Sjoen et al., "Male Gender Identity in Complete Androgen Insensitivity Syndrome," Arch Sexual Behav 40 (2011): 635.

71. J. Hönekopp et al., "2nd to 4th Digit Length Ratio (2D:4D) and Adult Sex Hormone Levels: New Data and a Meta-analytic Review," PNE 32 (2007): 313.

72. Findings from males regarding aggression and assertiveness: C. Joyce et al., "2nd to 4th Digit Ratio Confirms Aggressive Tendencies in Patients with Boxers Fractures," Injury 44 (2013): 1636; M. Butovskaya et al., "Digit Ratio (2D:4D), Aggression, and Dominance in the Hadza and the Datoga of Tanzania," Am J Human Biology 27 (2015): 620; ADHD and autism: D. McFadden et al., "Physiological Evidence of Hypermasculination in Boys with the Inattentive Subtype of ADHD," Clinical Neurosci Res 5 (2005): 233; M. Martel et al., "Masculinized Finger-Length Ratios of Boys, but Not Girls, Are Associated with Attention- Deficit/Hyperactivity Disorder," Behavioral Neuroscience 122 (2008): 273; J. Manning et al., "The 2nd to 4th Digit Ratio and Autism," Development Medicine Child Neurology 43 (2001): 160. Depression and anxiety: A. Bailey et al., "Depression in Men Is Associated with

More Feminine Finger Length Ratios," Pers Individ Diff 39 (2005): 829; M. Evardone et al., "Anxiety, Sex-linked Behavior, and Digit Ratios," Arch Sex Behav. 38 (2009): 442–55. Dominance: N. Neave et al., "Second to Fourth Digit Ratio, Testosterone and Perceived Male Dominance," Proc Royal Society B 270 (2003): 2167. Handwriting: J. Beech et al., "Do Differences in Sex Hormones Affect Handwriting Style? Evidence from Digit Ratio and Sex Role Identity as Determinants of the Sex of Handwriting," Pers Individ Diff 39 (2005): 459. Sexual orientation: K. Hirashi et al., "The Second to Fourth Digit Ratio in a Japanese Twin Sample: Heritability, Prenatal Hormone Transfer, and Association with Sexual Orientation," Arch Sex Behav 41 (2012): 711; A. Churchill et al., "The Effects of Sex, Ethnicity, and Sexual Orientation on Self-Measured Digit Ratio," Arch Sex Behav 36 (2007): 251. Findings from females regarding autism: J. Manning et al., "The 2nd to 4th Digit Ratio and Autism," Dev Med Child Neurol 43 (2001): 160. Anorexia: S. Quinton et al., "The 2nd to 4th Digit Ratio and Eating Disorder Diagnosis in Women," Pers Individ Diff 51 (2011): 402. Handedness: B. Fink et al., "2nd to 4th Digit Ratio and Hand Skill in Austrian Children," Biol Psychology 67 (2004): 375. Sexual orientation and sexual behavior: T. Grimbos et al., "Sexual Orientation and the 2nd to 4th Finger Length Ratio: A Meta-Analysis in Men and Women," Behav Neurosci 124 (2010): 278; W. Brown et al., "Differences in Finger Length Ratios Between Self-Identified 'Butch' and 'Femme' Lesbians," Arch Sex Behav 31 (2002): 123.

73. Footnote: A. Lamminmaki et al., "Testosterone Measured in Infancy Predicts Subsequent Sex- Typed Behavior in Boys and in Girls," Horm Behav 61 (2012): 611; G. Alexander and J. Saenz, "Early Androgens, Activity Levels and Toy Choices of Children in the Second Year of Life," Horm Behav 62 (2012): 500.

74. B. Heijmans et al., "Persistent Epigenetic Differences Associated with Prenatal Exposure to Famine in Humans," PNAS 105 (2008): 17046.

75. For a great review, see D. Moore, The Developing Genome: An Intro-

duction to Behavioral Genetics. (Oxford: Oxford University Press, 2015).

76. Weaver et al., "Epigenetic Programming by Maternal Behavior," Nature Neurosci 7 (2004): 847; R. Sapolsky, "Mothering Style and Methylation," Nature Neurosci 7 (2004): 791; D. Francis et al., "Nongenomic Transmission Across Generations of Maternal Behavior and Stress Response in the Rat," Science 286 (2004): 1155.

77. N. Provencal et al., "The Signature of Maternal Rearing in the Methylome in Rhesus Macague Prefrontal Cortex and T Cells," J Neurosci 32 (20120: 15626; T. L. Roth et al., "Lasting Epigenetic Influence of Early-Life Adversity on the BDNF Gene," BP 65 (2009): 760; E. C. Braithwaite et al., "Maternal Prenatal Depressive Symptoms Predict Infant NR3C1 1F and BDNF IV DNA Methylation," Epigenetics 10 (2015): 408; C. Murgatroyd et al., "Dynamic DNA Methylation Programs Persistent Adverse Effects of Early-Life Stress," Nat Nsci 12 (2009): 1559; M. J. Meaney and M. Szyf, "Environmental Programming of Stress Responses Through DNA Methylation: Life at the Interface Between a Dynamic Environment and a Fixed Genome," Dialogues in Clin Neuroscience 7 (2005): 103; P. O. McGowan et al., "Broad Epigenetic Signature of Maternal Care in the Brain of Adult Rats," PLoS ONE 6 (2011): e14739; D. Liu et al., "Maternal Care, Hippocampal Glucocorticoid Receptors, and Hypothalamic-Pituitary-Adrenal Responses to Stress," Sci 277 (1997): 1659; T. Oberlander et al., "Prenatal Exposure to Maternal Depression, Neonatal Methylation of Human Glucocorticoid Receptor Gene (NR3C1) and Infant Cortisol Stress Responses," Epigenetics 3 (2008): 97; F. A. Champagne, "Epigenetic Mechanisms and the Transgenerational Effects of Maternal Care," Front Neuroendocrinology 29 (2008): 386; J. P. Curley et al., "Transgenerational Effects of Impaired Maternal Care on Behaviour of Offspring and Grandoffspring," Animal Behav 75 (2008): 1551; J. P. Curley et al., "Social Enrichment During Postnatal Development Induces Transgenerational Effects on Emotional and Reproductive Behavior in Mice," Front Behav Nsci 3 (2009): 1; F. A. Champagne, "Maternal Imprints and the Origins of Variation,"

Horm Behav 60 (2011): 4; F. A. Champagne and J. P. Curley, "Epigenetic Mechanisms Mediating the Long-Term Effects of Maternal Care on Development," Nsci Biobehav Rev 33 (2009): 593; F. A. Champagne et al., "Maternal Care Associated with Methylation of the Estrogen Receptor- alpha1b Promoter and Estrogen Receptor-Alpha Expression in the Medial Preoptic Area of Female Offspring," Endo 147 (2006): 2909; F. A. Champagne and J. P. Curley, "How Social Experiences Influence the Brain," Curr Opinion in Neurobiol 15 (2005): 704.

Chapter 8: Back to When You Were Just a Fertilized Egg

1. Footnote: E. Suhay and T. Jayaratne, "Does Biology Justify Ideology? The Politics of Genetic Attribution," Public Opinion Quarterly (2012): doi:10.1093/poq/nfs049. See also M. Katz, "The Biological Inferiority of the Undeserving Poor," Social Work and Soc 11 (2013): 1.

2. E. Uhlmann et al., "Blood Is Thicker: Moral Spillover Effects Based on Kinship," Cog 124 (2012): 239.

3. E. Pennisi, "ENCODE Project Writes Eulogy for Junk DNA," Sci 337 (2012): 1159.

4. M. Bastepe, "The GNAS Locus: Quintessential Complex Gene Encoding Gsa, XLas, and Other Imprinted Transcripts," Curr Genomics 8 (2007): 398.

5. Y. Gilad et al., "Expression Profiling in Primates Reveals a Rapid Evolution of Human Transcription Factors," Nat 440 (2006): 242.

6. D. Moore, The Developing Genome: An Introduction to Behavioral Genetics (Oxford: Oxford University Press, 2015); H. Wang et al., "Histone Deacetylase Inhibitors Facilitate Partner Preference Formation in Female Prairie Voles," Nat Nsci 16 (2013): 919.

7. I. Weaver et al., "Epigenetic Programming by Maternal Behavior," Nat Nsci 7 (2004): 847.

8. Y. Wei et al., "Paternally Induced Transgenerational Inheritance of

Susceptibility to Diabetes in Mammals," PNAS 111 (2014): 1873; M. Anway et al., "Epigenetic Transgenerational Actions of Endocrine Disruptors and Male Fertility," Sci 308 (2005): 1466; K. Siklenka et al., "Disruption of Histone Methylation in Developing Sperm Impairs Offspring Health Transgenerationally," Sci 350 (2016): 651. For the controversy, see J. Kaiser, "The Epigenetics Heretic," Sci 343 (2014): 361.

9. E. Jablonka and M. Lamb, Epigenetic Inheritance and Evolution: The Lamarckian Dimension (Oxford: Oxford University Press, 1995).

10. E. T. Wang et al., "Alternative Isoform Regulation in Human Tissue Transcriptomes," Nat 456 (2008): 470; Q. Pan et al., "Deep Surveying of Alternative Splicing Complexity in the Human Transcriptome by High-Throughput Sequencing," Nat Gen, 40 (2008): 1413.

11. A. Muotri et al., "Somatic Mosaicism in Neuronal Precursor Cells Mediated by L1 Retrotransposition," Nat 435 (2005): 903; P. Perrat et al., "Transposition-Driven Genomic Heterogeneity in the Drosophila Brain," Sci 340 (2013): 91; G. Vogel, "Do Jumping Genes Spawn Diversity?" Sci 332 (2011): 300; J. Baillie et al., "Somatic Retrotransposition Alters the Genetic Landscape of the Human Brain," Nat 479 (2011): 534.

12. A. Eldar and M. Elowitz, "Functional Roles for Noise in Genetic Circuits," Nat 467 (2010): 167; C. Finch and T. Kirkwood, Chance, Development, and Aging (Oxford: Oxford University Press, 2000).

13. Some of the early, classic adoption studies: L. L. Heston, "Psychiatric Disorders in Foster Home Reared Children of Schizophrenic Mothers," Brit J Psychiatry 112 (1966): 819; S. Kety et al., "Mental Illness in the Biological and Adoptive Families of Adopted Schizophrenics," Am J Psychiatry 128 (1971): 302; D. Rosenthal et al., "The Adopted-Away Offspring of Schizophrenics," Am J Psychiatry 128 (1971): 307.

14. For an extraordinary example of a mix-up of babies shortly after birth, and the implications, see S. Dominus, "The Mixed-Up Brothers of Bogotá," New York Times Magazine, July 9, 2015, www.nytimes.

com/2015/07/12/magazine/the-mixed-up-brothers-of-bogota.html.

15. R. Ebstein et al., "Genetics of Human Social Behavior," Neuron 65 (2008): 831; S. Eisen et al., "Familial Influence on Gambling Behavior: An Analysis of 3359 Twin Pairs," Addiction 93 (1988): 1375. Footnote: W. Hopkins et al., "Chimpanzee Intelligence Is Heritable," Curr Biol 24 (2014): 1649.

16. T. Bouchard and M. McGue, "Genetic and Environmental Influences on Human Psychological Differences," J Neurobiol 54 (2003): 4; D. Cesarini et al., "Heritability of Cooperative Behavior in the Trust Game," PNAS 105 (2008): 3721; S. Zhong et al., "The Heritability of Attitude Toward Economic Risk," Twin Res and Hum Genetics 12 (2009): 103; D. Cesarini et al., "Genetic Variation in Financial Decision-Making," J the Eur Economic Association 7 (2010): 617.

17. K. Verweij et al., "Shared Aetiology of Risky Sexual Behaviour and Adolescent Misconduct: Genetic and Environmental Influences," Genes, Brain and Behav 8 (2009): 107; K. Verweij et al., "Genetic and Environmental Influences on Individual Differences in Attitudes Toward Homosexuality: An Australian Twin Study," Behav Genetics 38 (2008): 257.

18. K. Verweij et al., "Evidence for Genetic Variation in Human Mate Preferences for Sexually Dimorphic Physical Traits. PLoS ONE 7 (2012): e49294; K. Smith et al., "Biology, Ideology and Epistemology: How Do We Know Political Attitudes Are Inherited and Why Should We Care?" Am J Political Sci 56 (2012): 17; K. Arceneaux et al., "The Genetic Basis of Political Sophistication," Twin Res and Hum Genetics 15 (2012): 34; J. Fowler and D. Schreiber, "Biology, Politics, and the Emerging Science of Human Nature," Sci 322 (2008): 912.

19. J. Ray et al., "Heritability of Dental Fear," J Dental Res 89 (2010): 297; G. Miller et al., "The Heritability and Genetic Correlates of Mobile Phone Use: Twin Study of Consumer Behavior," Twin Res and Hum Genetics 15 (2012): 97.

20. L. Littvay et al., "Sense of Control and Voting: A Genetically-Driven Relationship," Soc Sci Quarterly 92 (2011): 1236; J. Harris, The Nurture Assumption: Why Children Turn Out the Way They Do (NY: Free Press, 2009); A. Seroczynski et al., "Etiology of the Impulsivity/Aggression Relationship: Genes or Environment?" Psychiatry Res 86 (1999): 41; E. Coccaro et al., "Heritability of Aggression and Irritability: A Twin Study of the Buss-Durkee Aggression Scales in Adult Male Subjects," BP 41 (1997): 273.

21. E. Hayden, "Taboo Genetics," Nat 502 (2013): 26.

22. Some strong criticisms of twin and adoption approaches: R. Rose, "Genes and Human Behavior," Ann Rev Psych 467 (1995): 625; J. Joseph, "Twin Studies in Psychiatry and Psychology: Science or Pseudoscience?" Psychiatric Quarterly 73 (2002): 71; K. Richardson and S. Norgate, "The Equal Environments Assumption of Classical Twin Studies May Not Hold," Brit J Educational Psych 75 (2005): 339; R. Fosse et al., "A Critical Assessment of the Equal-Environment Assumption of the Twin Method for Schizophrenia," Front Psychiatry 6 (2015): 62; A. V. Horwitz et al., "Rethinking Twins and Environments: Possible Social Sources for Assumed Genetic Influences in Twin Research," J Health and Soc Behav 44 (2003): 111.

23. Work of some of the most prominent defenders of the approaches: Kenneth Kendler: K. S. Kendler, "Twin Studies of Psychiatric Illness: An Update," AGP 58 (2001): 1005; K. S. Kendler et al., "A Test of the Equal-Environment Assumption in Twin Studies of Psychiatric Illness," Behav Genetics 23 (1993): 21; K. S. Kendler and C. O. Gardner Jr., "Twin Studies of Adult Psychiatric and Substance Dependence Disorders: Are They Biased by Differences in the Environmental Experiences of Monozygotic and Dizygotic Twins in Childhood and Adolescence?" Psych Med 8 (1998): 625; K. S. Kendler et al., "A Novel Sibling-Based Design to Quantify Genetic and Shared Environmental Effects: Application to Drug Abuse, Alcohol Use Disorder and Criminal Behavior," Psych Med 46 (2016): 1639; K. S. Kendler et al., "Genetic and Familial Environmental Influences on the Risk for Drug Abuse: A National Swedish Adoption Study," AGP 69 (2012): 690; K. S. Kendler et al., "Tobacco Consumption in Swedish Twins Reared Apart and Reared Together," AGP 57 (2000): 886. Thomas Bouchard: Y. Hur and T. Bouchard, "Genetic Influences on Perceptions of Childhood Family Environment: A Reared Apart Twin Study," Child Development 66 (1995): 330; M. McGue and T. J. Bouchard, "Genetic and Environmental Determinants of Information Processing and Special Mental Abilities: A Twin Analysis," in Advances in the Psychology of Hum Intelligence, ed. R. J. Sternberg, vol. 5 (Hillsdale, NJ: Erlbaum, 1989), pp. 7–45; T. J. Bouchard et al., "Sources of Human Psychological Differences: The Minnesota Study of Twins Reared Apart," Sci 250 (1990): 223. Robert Plomin: R. Plomin et al., Behavioral Genetics, 5th ed. (New York: Worth, 2008); K. Hardy-Brown et al., "Selective Placement of Adopted Children: Prevalence and Effects," J Child Psych and Psychiatry 21 (1980) 143; N. L. Pedersen et al., "Genetic and Environmental Influences for Type A-Like Measures and Related Traits: A Study of Twins Reared Apart and Twins Reared Together," Psychosomatic Med 51 (1989): 428; N. L. Pedersen et al., "Neuroticism, Extraversion, and Related Traits in Adult Twins Reared Apart and Reared Together," JPSP 55 (1988): 950. Also: E. Coccaro et al., "Heritability of Aggression and Irritability: A Twin Study of the Buss-Durkee Aggression Scales in Adult Male Subjects," BP 41 (1997): 273; A. Bjorklund et al., "The Origins of Intergenerational Associations: Lessons from Swedish Adoption Data," Quarterly J Economics 121 (2006): 999; E. P. Gunderson et al., "Twins of Mistaken Zygosity (TOMZ): Evidence for Genetic Contributions to Dietary Patterns and Physiologic Traits," Twin Res and Hum Genetics 9 (2006): 540; B. N. Sánchez et al., "A Latent Variable Approach to Study Gene- Environment Interactions in the Presence of Multiple Correlated Exposures," Biometrics 68 (2012): 466.

24. Evidence that chorionic status is a meaningful variable: M. Melnick et al., "The Effects of Chorion Type on Variation in IQ in the NCPP Twin Population," Am J Hum Genetics 30 (1978): 425; N. Jacobs et

al., "Heritability Estimates of Intelligence in Twins: Effect of Chorion Type," Behav Genetics 31 (2001): 209; M. Melnick et al., "The Effects of Chorion Type on Variation in IQ in the NCPP Twin Population," Am J Hum Genetics 30 (1978): 425; R. J. Rose et al., "Placentation Effects on Cognitive Resemblance of Adult Monozygotes," in Twin Research 3: Epidemiological and Clinical Studies, ed. L. Gedda et al. (New York: Alan R. Liss, 1981), p. 35; K. Beekmans et al., "Relating Type of Placentation to Later Intellectual Development in Monozygotic (MZ) Twins (Abstract)," Behav Genetics 23 (1993): 547; M. Carlier et al., "Manual Performance and Laterality in Twins of Known Chorion Type," Behav Genetics 26 (1996): 409. Mixed findings: L. Gutknecht et al. "Long-Term Effect of Placental Type on Anthropometrical and Psychological Traits Among Monozygotic Twins: A Follow Up Study," Twin Res 2 (1999): 212; D. K. Sokol et al., "Intrapair Differences in Personality and Cognitive Ability Among Young Monozygotic Twins Distinguished by Chorion Type," Behav Genetics 25 (1996): 457; A. C. Bogle et al., "Replication of Asymmetry of a-b Ridge Count and Behavioral Discordance in Monozygotic Twins," Behav Genetics 24 (1994): 65; J. O. Davis et al., "Prenatal Development of Monozygotic Twins and Concordance for Schizophrenia," Schizophrenia Bull 21 (1995): 357. Evidence against: Y. M. Hur, "Effects of the Chorion Type on Prosocial Behavior in Young South Korean Twins," Twin Res and Hum Genetics 10 (2007): 773; M. C. Wichers et al., "Chorion Type and Twin Similarity for Child Psychiatric Symptoms," AGP 59 (2002): 562; P. Welch et al., "Placental Type and Bayley Mental Development Scores in 18 Month Old Twins," in Twin Research: Psychology and Methodology, ed. L. Gedda et al. (New York: Alan R Liss, 1978), pp. 34–41. Quote from: C. A. Prescott et al., "Chorion Type as a Possible Influence on the Results and Interpretation of Twin Study Data," Twin Res 2 (1999): 244.

25. R. Simon and H. Alstein, Adoption, Race and Identity: From Infancy to Young Adulthood (New Brunswick, NJ: Transaction Publishers, 2002); Child Welfare League of America, Standards of Excellence:

Standards of Excellence for Adoption Services, rev. ed. (Washington, DC: Child Welfare League of America, 2000); M. Bohman, Adopted Children and Their Families: A Follow-up Study of Adopted Children, Their Background, Environment and Adjustment (Stockholm: Proprius, 1970).

26. L. J. Kamin and A. S. Goldberger, "Twin Studies in Behavioral Research: A Skeptical View," Theoretical Population Biol 61 (2002): 83.

27. M. Stoolmiller, "Correcting Estimates of Shared Environmental Variance for Range Restriction in Adoption Studies Using a Truncated Multivariate Normal Model," Behav Gen 28 (1998) 429; M. Stoolmiller, "Implications of Restricted Range of Family Environments for Estimates of Heritability and Nonshared Environment in Behavior-Genetic Adoption Studies," Psych Bull 125 (1999): 392; M. McGue et al., "The Environments of Adopted and Non-adopted Youth: Evidence on Range Restriction from the Sibling Interaction and Behavior Study (SIBS)," Behav Gen 37 (2007): 449.

28. R. Ebstein et al., "Genetics of Human Social Behavior," Neuron 65 (2008): 831.

29. This example comes from N. Block, "How Heritability Misleads About Race," Cog 56 (1995): 99– 128.

30. D. Moore, The Dependent Gene: The Fallacy of "Nature Versus Nurture" (NY: Holt, 2001); M. Ridley, Nature via Nurture (New York: HarperCollins, 2003); A. Tenesa and C. Haley, "The Heritability of Human Disease: Estimation, Uses and Abuses," Nat Rev Genetics 14 (2013): 139; P. Schonemann, "On Models and Muddles of Heritability," Genetica 99 (1997): 97.

31. T. Bouchard and M. McGue, "Genetic and Environmental Influences on Human Psychological Differences," J Neurobiol 54 (2003): 4.

32. L. E. Duncan and M. C. Keller, "A Critical Review of the First 10 Years of Candidate Gene-by- Environment Interaction Research in Psychiatry," Am J Psychiatry 168 (2011): 1041; S. Manuck and J. McCaffery,

"Gene-Environment Interaction," Ann Rev of Psych 65 (2014): 41.

33. A. Caspi et al., "Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5- HTT Gene," Sci 297 (2002): 851.

34. A. Caspi et al., "Moderation of Breastfeeding Effects on the IQ by Genetic Variation in Fatty Acid Metabolism," PNAS 104 (2007): 18860; B. K. Lipska and D. R. Weinberger, "Genetic Variation in Vulnerability to the Behavioral Effects of Neonatal Hippocampal Damage in Rats," PNAS 92 (1995): 8906.

35. J. Crabbe et al., "Genetics of Mouse Behavior: Interactions with Laboratory Environment," Sci 284 (1999): 1670.

36. A nice example of a dual environment hit: N. P. Daskalakis et al., "The Three-Hit Concept of Vulnerability and Resilience: Toward Understanding Adaptation to Early-Life Adversity Outcome," PNE 38 (2013): 1858.

37. E. Turkheimer et al., "Socioeconomic Status Modifies Heritability of IQ in Young Children," Psych Sci 14 (2003): 623; E. M. Tucker-Drob et al., "Emergence of a Gene x Socioeconomic Status Interaction on Infant Mental Ability Between 10 Months and 2 Years," Psych Sci 22 (2010): 125; M. Rhemtulla and E. M. Tucker-Drob, "Gene-by-Socioeconomic Status Interaction on School Readiness," Behav Genetics 42 (2012): 549; D. Reiss et al., "How Genes and the Social Environment Moderate Each Other," Am J Public Health 103 (2013): S111; S. A. Hart et al., "Expanding the Environment: Gene × School-Level SES Interaction on Reading Comprehension," J Child Psych and Psychiatry 54 (2013): 1047; J. R. Koopmans et al., "The Influence of Religion on Alcohol Use Initiation: Evidence for Genotype × Environment Interaction," Behav Genetics 29 (1999): 445.

38. S. Nielsen et al., "Prevalence of Alcohol Problems Among AdultSomatic Inpatients of a Copenhagen Hospital," Alcohol and Alcoholism29 (1994): 583; S. Manuck et al., "Aggression and Anger-Related Traits

Associated with a Polymorphism of the Tryptophan Hydroxylase Gene," BP 45 (1999): 603; J. Hennig et al., "Two Types of Aggression Are Differentially Related to Serotonergic Activity and the A779C TPH Polymorphism," Behav Nsci 119 (2005): 16; A. Strobel et al., "Allelic Variation in 5-HT1A Receptor Expression Is Associated with Anxiety- and Depression-Related Personality Traits," | Neural Transmission 110 (2003): 1445; R. Parsey et al., "Effects of Sex, Age, and Aggressive Traits in Man on Brain Serotonin 5-HT1A Receptor Binding Potential Measured by PET Using [C-11]WAY-100635," Brain Res 954 (2002): 173; A. Benko et al., "Significant Association Between the C(-1019)G Functional Polymorphism of the HTR1A Gene and Impulsivity," Am J Med Genetics, Part B, Neuropsychiatric Genetics 153 (2010): 592, M. Soyka et al., "Association of 5-HT1B Receptor Gene and Antisocial Behavior and Alcoholism," | Neural Transmission 111 (2004): 101; L. Bevilacqua et al., "A Population-Specific HTR2B Stop Codon Predisposes to Severe Impulsivity," Nat 468 (2010): 1061; C. A. Ficks and I. D. Waldman, "Candidate Genes for Aggression and Antisocial Behavior: A Meta-analysis of Association Studies of the 5HTTLPR and MAOA-uVNTR," Behav Genetics 44 (2014): 427; I. Craig and K. Halton, "Genetics of Human Aggressive Behavior," Hum Genetics 126 (2009): 101.

39. H. Brunner et al., "Abnormal Behavior Associated with a Point Mutation in the Structural Gene for Monoamine Oxidase A," Sci 262 (1993): 578; H. G. Brunner et al., "X-Linked Borderline Mental Retardation with Prominent Behavioral Disturbance: Phenotype, Genetic Localization, and Evidence for Disturbed Monoamine Metabolism," Am J Hum Genetics 52 (1993): 1032.

40. O. Cases et al., "Aggressive Behavior and Altered Amounts of Brain Serotonin and Norepinephrine in Mice Lacking MAOA," Sci 268 (1995): 1763; J. J. Kim et al., "Selective Enhancement of Emotional, but Not Motor, Learning in Monoamine Oxidase A–Deficient Mice," PNAS 94 (1997): 5929.

41. J. Buckholtz and A. Meyer-Lindenberg, "MAOA and the Neurogenetic

Architecture of Human Aggression," TINS 31 (2008): 120; A. Meyer-Lindenberg et al., "Neural Mechanisms of Genetic Risk for Impulsivity and Violence in Humans," PNAS 103 (2006): 6269; J. Fan et al., "Mapping the Genetic Variation of Executive Attention onto Brain Activity," PNAS 100 (2003): 7406; L. Passamonti et al., "Monoamine Oxidase-A Genetic Variations Influence Brain Activity Associated with Inhibitory Control: New Insight into the Neural Correlates of Impulsivity," BP 59 (2006): 334; N. Eisenberger et al., "Understanding Genetic Risk for Aggression: Clues from the Brain's Response to Social Exclusion," BP 61 (2007): 1100.

42. O. Cases et al., "Aggressive Behaviour and Altered Amounts of Brain Serotonin and Norepinephrine in Mice Lacking MAOA," Sci 268 (1995): 1763; J. S. Fowler et al., "Evidence That Brain MAO A Activity Does Not Correspond to MAO A Genotype in Healthy Male Subjects," BP 62 (2007): 355.

43. The "warrior gene" in the science literature: C. Holden, "Parsing the Genetics of Behavior," Sci 322 (2008): 892; D. Eccles et al., "A Unique Demographic History Exists for the MAO-A Gene in Polynesians," J Hum Genetics 57 (2012): 294; E. Feresin, "Lighter Sentence for Murder with 'Bad Genes," Nat News (30 October, 2009); P. Hunter, "The Psycho Gene," EMBO Rep 11 (2010): 667. Criticism of the scientists in the Mao-ri study for overselling the significance of their finding: D. Wensley and M. King, "Scientific Responsibility for the Dissemination and Interpretation of Genetic Research: Lessons from the 'Warrior Gene' Controversy," J Med Ethics 34 (2008): 507; S. Halwani and D. Krupp, "The Genetic Defense: The Impact of Genetics on the Concept of Criminal Responsibility," Health Law J 12 (2004): 35.

44. A. Caspi et al., "Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5- HTT Gene," Sci 297 (2002): 851.

45. J. Buckholtz and A. Meyer-Lindenberg, "MAOA and the Neurogenetic Architecture of Human Aggression," TINS 31 (2008): 120.

46. J. Kim-Cohen et al., "MAOA, Maltreatment, and Gene Environment

Interaction Predicting Children's Mental Health: New Evidence and a Meta-analysis," Mol Psychiatry 11 (2006): 903; A. Byrd and S. Manuck, "MAOA, Childhood Maltreatment and Antisocial Behavior: Meta-analvsis of a Gene-Environment Interaction," BP 75 (2013): 9; G. Frazzetto et al., "Early Trauma and Increased Risk for Physical Aggression During Adulthood: The Moderating Role of MAOA Genotype," PLoS ONE 2 (2007): e486; C. Widom and L. Brzustowicz, "MAOA and the 'Cycle of Violence': Childhood Abuse and Neglect, MAOA Genotype, and Risk for Violent and Antisocial Behavior," BP 60 (2006): 684; R. McDermott et al., "MAOA and Aggression: A Gene-Environment Interaction in Two Populations," J Conflict Resolution 1 (2013): 1043; T. Newman et al., "Monoamine Oxidase A Gene Promoter Variation and Rearing Experience Influences Aggressive Behavior in Rhesus Monkeys," BP 57 (2005): 167; X. Ou et al., "Glucocorticoid and Androgen Activation of Monoamine Oxidase A Is Regulated Differently by R1 and Sp1," J Biol Chemistry 281 (2006): 21512. Replication: D. L. Foley et al., "Childhood Adversity, Monoamine Oxidase A Genotype, and Risk for Conduct Disorder," AGP 61 (2004): 738; D. M. Fergusson et al., "MAOA, Abuse Exposure and Antisocial Behaviour: 30-Year Longitudinal Study," Brit J Psychiatry 198 (2011): 457. Weaker effect in girls: E. C. Prom-Wormley et al., "Monoamine Oxidase A and Childhood Adversity as Risk Factors for Conduct Disorder in Females," Psych Med 39 (2009): 579. Replicates for whites but not blacks: C. S. Widom and L. M. Brzustowicz, "MAOA and the 'Cycle of Violence': Childhood Abuse and Neglect, MAOA Genotype, and Risk for Violent and Antisocial Behavior," BP 60 (2006): 684. Failure of replication: D. Huizinga et al., "Childhood Maltreatment, Subsequent Antisocial Behavior, and the Role of Monoamine Oxidase A Genotype," BP 60 (2006): 677; S. Young et al., "Interaction Between MAO-A Genotype and Maltreatment in the Risk for Conduct Disorder: Failure to Confirm in Adolescent Patients," Am J Psychiatry 163 (2006): 1019.

47. R. Sjoberg et al., "A Non-additive Interaction of a Functional MAO-A

VNTR and Testosterone Predicts Antisocial Behavior," Neuropsychopharmacology 33 (2008): 425; R. McDermott et al., "Monoamine Oxidase A Gene (MAOA) Predicts Behavioral Aggression Following Provocation," PNAS 106 (2009): 2118; D. Gallardo-Pujol et al., "MAOA Genotype, Social Exclusion and Aggression: An Experimental Test of a Gene-Environment Interaction," Genes, Brain and Behav 12 (2013): 140; A. Reif et al., "Nature and Nurture Predispose to Violent Behavior: Serotonergic Genes and Adverse Childhood Environment," Neuropsychopharmacology 32 (2007): 2375.

48. A. Rivera et al., "Cellular Localization and Distribution of Dopamine D4 Receptors in the Rat Cerebral Cortex and Their Relationship with the Cortical Dopaminergic and Noradrenergic Nerve Terminal Networks," Nsci 155 (2008): 997; O. Schoots and H. Van Tol, "The Human Dopamine D4 Receptor Repeat Sequences Modulate Expression," Pharmacogenomics J 3 (2003): 343; C. Broeckhoven and S. Gestel, "Genetics of Personality: Are We Making Progress? Mol Psychiatry 8 (2003): 840; M. R. Munafò et al., "Association of the Dopamine D4 Receptor (DRD4) Gene and Approach-Related Personality Traits: Meta-analysis and New Data," BP 63 (2007): 197; R. Ebstein et al., "Dopamine D4 Receptor (D4DR) Exon III Polymorphism Associated with the Human Personality Trait of Novelty Seeking," Nat Genetics 12 (1996): 78; J. Carpenter et al., "Dopamine Receptor Genes Predict Risk Preferences, Time Preferences, and Related Economic Choices," J Risk and Uncertainty 42 (2011): 233; J. Garcia et al., "Associations Between Dopamine D4 Receptor Gene Variation with Both Infidelity and Sexual Promiscuity," PLoS ONE 5 (2010): e14162; D. Li et al., "Meta-analysis Shows Significant Association Between Dopamine System Genes and Attention Deficit Hyperactivity Disorder (ADHD)," Human Mol Genetics 15 (2006): 2276; L. Ray et al., "The Dopamine D4 Receptor (DRD4) Gene Exon III Polymorphism, Problematic Alcohol Use and Novelty Seeking: Direct and Mediated Genetic Effects," Addiction Biol 14 (2008): 238; A. Dreber et al., "The 7R Polymorphism in the Dopamine Receptor D4 Gene (DRD4) Is Associated with Financial Risk-Taking in Men," EHB 30 (2009): 85; D. Eisenberg et al., "Polymorphisms in the Dopamine D4 and D2 Receptor Genes and Reproductive and Sexual Behaviors," Evolutionary Psych 5 (2007): 696; A. N. Kluger et al., "A Meta-analysis of the Association Between DRD4 Polymorphism and Novelty Seeking," Mol Psychiatry 7 (2002): 712; S. Zhong et al., "Dopamine D4 Receptor Gene Associated with Fairness Preference in Ultimatum Game," PLoS ONE 5 (2010): e13765.

49. M. Bakermans-Kranenburg and M. van Ijzendoorn, "Differential Susceptibility to Rearing Environment Depending on Dopamine-Related Genes: New Evidence and a Meta-analysis," Development Psychopathology 23 (2011): 39; J. Sasaki et al., "Religion Priming Differentially Increases Prosocial Behavior Among Variants of the Dopamine D4 Receptor (DRD4) Gene," SCAN 8 (2013): 209; M. Sweitzer et al., "Polymorphic Variation in the Dopamine D4 Receptor Predicts Delay Discounting as a Function of Childhood Socioeconomic Status: Evidence for Differential Susceptibility," SCAN 8 (2013): 499.

50. F. Chang et al., "The World-wide Distribution of Allele Frequencies at the Human Dopamine D4 Receptor Locus," Hum Genetics 98 (1996): 91; C. Chen et al., "Population Migration and the Variation of Dopamine D4 Receptor (DRD4) Allele Frequencies Around the Globe," EHB 20 (1999): 309.

51. M. Reuter and J. Hennig, "Association of the Functional Catechol-O-Methyltransferase VAL158MET Polymorphism with the Personality Trait of Extraversion," Neuroreport 16 (2005): 1135; T. Lancaster et al., "COMT val158met Predicts Reward Responsiveness in Humans," Genes, Brain and Behav 11 (2012): 986; A. Caspi et al., "A Replicated Molecular-Genetic Basis for Subtyping Antisocial Behavior in ADHD," AGP 65 (2007): 203; N. Perroud et al., "COMT but Not Serotonin-Related Genes Modulates the Influence of Childhood Abuse on Anger Traits," Genes, Brain and Behav 9 (2010): 193. COMT variants also associated with cognitive end points: F. Papaleo et al., "Genetic Dissection of the Role of Catechol-O-Methyltransferase in Cognition and Stress Reactivity

in Mice," J Nsci 28 (2008): 8709; F. Papaleo et al., "Effects of Sex and COMT Genotype on Environmentally Modulated Cognitive Control in Mice," PNAS 109 (2012): 20160; F. Papaleo et al., "Epistatic Interaction of COMT and DTNBP1 Modulates Prefrontal Function in Mice and in Humans," Mol Psychiatry 19 (2013): 311.

52. D. Enter et al., "Dopamine Transporter Polymorphisms Affect Social Approach-Avoidance Tendencies," Genes, Brain and Behav 11 (2012): 671; G. Guo et al., "Dopamine Transporter, Gender, and Number of Sexual Partners Among Young Adults," Eur J Hum Genetics 15 (2007): 279; S. Lee et al., "Association of Maternal Dopamine Transporter Genotype with Negative Parenting: Evidence for Gene X Environment Interaction with Child Disruptive Behavior," Mol Psychiatry 15 (2010): 548 M. van Ijzendoorn et al., "Dopamine System Genes Associated with Parenting in the Context of Daily Hassles," Genes, Brain and Behav 7 (2008): 403.

53. D. Gothelf et al., "Biological Effects of Catechol-O-Methyltransferase Haplotypes and Psychosis Risk in 22q11.2 Deletion Syndrome," BP 75 (2013): 406.

54. M. Dadds et al., "Polymorphisms in the Oxytocin Receptor Gene Are Associated with the Development of Psychopathy," Development Psychopathology 26 (2014): 21; A. Malik et al., "The Role of Oxytocin and Oxytocin Receptor Gene Variants in Childhood-Onset Aggression," Genes, Brain and Behav 11 (2012): 545; H. Walum et al., "Variation in the Oxytocin Receptor Gene Is Associated with Pair-Bonding and Social Behavior," BP 71 (2012): 419.

55. S. Rajender et al., "Reduced CAG Repeats Length in Androgen Receptor Gene Is Associated with Violent Criminal Behavior," Int J Legal Med 122 (2008): 367; D. Cheng et al., "Association Study of Androgen Receptor CAG Repeat Polymorphism and Male Violent Criminal Activity," PNE 31 (2006): 548; A. Raznahan et al., "Longitudinally Mapping the Influence of Sex and Androgen Signaling on the Dynamics of Human Cortical Maturation in Adolescence," PNAS 107 (2010): 16988;

H. Vermeersch et al., "Testosterone, Androgen Receptor Gene CAG Repeat Length, Mood and Behaviour in Adolescent Males," Eur J Endo 163 (2010): 319; S. Manuck et al., "Salivary Testosterone and a Trinucleotide (CAG) Length Polymorphism in the Androgen Receptor Gene Predict Amygdala Reactivity in Men," PNE 35 (2010): 94; J. Roney et al., "Androgen Receptor Gene Sequence and Basal Cortisol Concentrations Predict Men's Hormonal Responses to Potential Mates," Proc Royal Soc B 277 (2010): 57.

56. D. Comings et al., "Multivariate Analysis of Associations of 42 Genes in ADHD, ODD and Conduct Disorder," Clin Genetics 58 (2000): 31; Z. Prichard et al., "Association of Polymorphisms of the Estrogen Receptor Gene with Anxiety-Related Traits in Children and Adolescents: A Longitudinal Study," Am J Med Genetics 114 (2002): 169; H. Tiemeier et al., "Estrogen Receptor Alpha Gene Polymorphisms and Anxiety Disorder in an Elderly Population," Mol Psychiatry 10 (2005): 806; D. Crews et al., "Litter Environment Affects Behavior and Brain Metabolic Activity of Adult Knockout Mice," Front Behav Nsci 3 (2009): 1.

57. R. Bogdan et al., "Mineralocorticoid Receptor Iso/Val (rs5522) Genotype Moderates the Association Between Previous Childhood Emotional Neglect and Amygdala Reactivity," Am J Psychiatry 169 (2012): 515; L. Bevilacqua et al., "Interaction Between FKBP5 and Childhood Trauma and Risk of Aggressive Behavior," AGP 69 (2012): 62; E. Binder et al., JAMA 299 (2008): 1291; M. White et al., "FKBP5 and Emotional Neglect Interact to Predict Individual Differences in Amygdala Reactivity," Genes, Brain and Behav 11 (2012): 869.

58. L. Schmidt et al., "Evidence for a Gene-Gene Interaction in Predicting Children's Behavior Problems: Association of Serotonin Transporter Short and Dopamine Receptor D4 Long Genotypes with Internalizing and Externalizing Behaviors in Typically Developing 7-Year-Olds," Developmental Psychopathology 19 (2007): 1105; M. Nobile et al., "Socioeconomic Status Mediates the Genetic Contribution of the Dopamine Receptor D4 and Serotonin Transporter Linked Promoter Region

Repeat Polymorphisms to Externalization in Preadolescence," Developmental Psychopathology 19 (2007): 1147.

59. M. J. Arranz et al., "Meta-analysis of Studies on Genetic Variation in 5-HT2A Receptors and Clozapine Response," Schizophrenia Res 32 (1998): 93.

60. H. Lango Allen, et al., "Hundreds of Variants Clustered in Genomic Loci and Biological Pathways Affect Human Height," Nat 467 (2010): 832.

61. E. Speliotes et al., "Association Analyses of 249,796 Individuals Reveal 18 New Loci Associated with Body Mass Index," Nat Genetics 42 (2010): 937; J. Perry et al., "Parent-of-Origin-Specific Allelic Associations Among 106 Genomic Loci for Age at Menarche," Nat 514 (2014): 92; S. Ripke et al., "Biological Insights from 108 Schizophrenia-Associated Genetic Loci," Nat 511 (2014): 421; F. Flint and M. Munafo, "Genesis of a Complex Disease," Nat 511 (2014): 412; J. Tennessen et al., "Evolution and Functional Impact of Rare Coding Variation from Deep Sequencing of Human Exomes," Sci 337 (2012): 64; F. Casals and J. Bertranpetit, "Human Genetic Variation, Shared and Private," Sci 337 (2012): 39.

62. C. Rietveld et al., "GWAS of 126,559 Individuals Identifies Genetic Variants Associated with Educational Attainment," Sci 340 (2013): 1467; J. Flint and M. Munafo, "Herit-Ability," Sci 340 (2013): 1416.

63. S. Cole et al., "Social Regulation of Gene Expression in Human Leukocytes," Genome Biol 8 (2007): R189.

64. C. Chabris et al., "The Fourth Law of Behavior Genetics," Curr Dir Psych Sci 24 (2015): 304; K. Haddley et al., "Behavioral Genetics of the Serotonin Transporter," Curr Topics in Behav Nsci 503 (2012): 503; F. S. Neves et al., "Is the Serotonin Transporter Polymorphism (5-HTTLPR) a Potential Marker for Suicidal Behavior in Bipolar Disorder Patients?" J Affective Disorders 125 (2010): 98; T. Y. Wang et al., "Bipolar: Gender-Specific Association of the SLC6A4 and DRD2 Gene Variants in Bipolar Disorder," Int J Neuropsychopharmacology 17 (2014): 211; P. R. Moya et al., "Common and Rare Alleles of the Serotonin Transporter Gene, SLC6A4, Associated with Tourette's Disorder," Movement Disorders 28 (2013): 1263.

65. E. Turkheimer, "Three Laws of Behavior Genetics and What They Mean," Curr Dir Psych Sci 9 (2000): 160.

Chapter 9: Centuries to Millennia Before

1. L. Guiso et al., "Culture, Gender, and Math," Sci 320 (2008): 1164.

2. R. Fisman and E. Miguel, "Corruption, Norms, and Legal Enforcement: Evidence from Diplomatic Parking Tickets," J Political Economics 115 (2007): 1020; M. Gelfand et al., "Differences Between Tight and Loose Cultures: A 33-Nation Study," Sci 332 (2011): 1100; A. Alesina et al., "On the Origins of Gender Roles: Women and the Plough," Quarterly J Economics 128 (2013): 469.

3. For a good discussion of this, see A. Norenzayan, "Explaining Human Behavioral Diversity," Sci 332 (2011): 1041.

4. E. Tylor. Primitive Culture (1871; repr. New York: J. P. Putnam's Sons, 1920).

5. A. Whitten "Incipient Tradition in Wild Chimpanzees," Nat 514 (2014): 178; R. O'Malley et al., "The Cultured Chimpanzee: Nonsense or Breakthrough?" J Curr Anthropology 53 (2012): 650; J. Mercador et al., "4,300-Year-Old Chimpanzee Sites and the Origins of Percussive Stone Technology," PNAS 104 (2007): 3043; E. van Leeuwen et al., "A Group-Specific Arbitrary Tradition in Chimpanzees (Pan troglodytes)," Animal Cog 17 (2014): 1421.

6. J. Mann et al., "Why Do Dolphins Carry Sponges?" PLoS ONE 3 (2008): e3868; M. Krutzen et al., "Cultural Transmission of Tool Use in Bottlenose Dolphins," PNAS 102 (2005): 8939; M. Möglich and G.

Alpert, "Stone Dropping by Conomyrma bicolor (Hymenoptera: Formicidae): A New Technique of Interference Competition," Behav Ecology and Sociobiology 2 (1979): 105.

7. M. Pagel, "Adapted to Culture," Nat 482 (2012): 297; C. Kluckhohn et al., Culture: A Critical Review of Concepts and Definitions (Chicago: University of Chicago Press, 1952); C. Geertz, The Interpretation of Cultures (New York: Basic Books, 1973).

8. D. Brown, Human Universals (New York: McGraw-Hill, 1991); D. Smail, On Deep History and the Brain (Oakland: University of California Press, 2008).

9. U.S. Central Intelligence Agency, "Life Expectancy at Birth," in The World Factbook, https://cia.gov/library/publications/the-world-factbook/rankorder/2102rank.html; W. Lutz and S. Scherbov, Global Age-Specific Literacy Projections Model (GALP): Rationale, Methodology and Software (Montreal: UNESCO Institute for Statistics Adult Education and Literacy Statistics Programme, 2006), www.uis.unesco. org/Library/Documents/GALP2006_en.pdf; U.S. Central Intelligence Agency, "Infant Mortality Rate," in The World Factbook, https://cia.gov/library/publications/the-world-factbook/rankorder/2091rank. html; International Monetary Fund, World Economic Outlook Database, October 2015.

10. Homicide: United Nations Office on Drugs and Crime, Global Study on Homicide 2013 (April 2014); K. Devries, "The Global Prevalence of Intimate Partner Violence Against Women," Sci 340 (2013): 1527. Rape data: NationMaster, "Rape Rate: Countries Compared," www.nationmaster.com/country- info/stats/Crime/Rape-rate; L. Melhado, "Rates of Sexual Violence are High in Democratic Republic of the Congo," Int Perspectives on Sexual and Reproductive Health 36 (2010): 210; K. Johnson et al., "Association of Sexual Violence and Human Rights Violations with Physical and Mental Health in Territories of the Eastern Democratic Republic of the Congo," JAMA 304 (2010): 553. Bullying data: F. Elgar et al., "Income Inequality and School Bullying: Multilevel Study of Adolescents in 37 Countries," J Adolescent Health 45 (2009): 351.

11. B. Snyder, "The Ten Best Countries for Women," Fortune, October 27, 2014, http://fortune.com/2014/10/27/best-countries-for-women/. The Global Gender Gap Report was first published in 2006 by the World Economic Forum. Inter-Parliamentary Union, "Women in National Parliaments," IPU.org, August 1, 2016, www.ipu.org/wmn-e/classif. htm; U.S. Central Intelligence Agency, "Maternal Mortality Rate," in The World Factbook, https://cia.gov/library/publications/the- world-factbook/rankorder/2223rank.html.

12. Gallup Poll International, "Do You Feel Loved?" February 2013; J. Henrich et al., "The Weirdest People in the World? BBS 33 (2010): 61; M. Morris et al. "Culture, Norms and Obligations: Cross- National Differences in Patterns of Interpersonal Norms and Felt Olibgations Toward Coworkers," The Practice of Social Influence in Multiple Cultures 84107 (2001).

13. H. Markus and S. Kitayama, "Culture and Self: Implications for Cognition, Emotion, and Motivation," Psych Rev 98 (1991): 224; S. Kitayama and A. Uskul, "Culture, Mind, and the Brain: Current Evidence and Future Directions," Ann Rev of Psych 62 (2011): 419; J. Sui and S. Han, "Self- Construal Priming Modulates Neural Substrates of Self-Awareness," Psych Sci 18 (2007): 861; B. Park et al., "Neural Evidence for Cultural Differences in the Valuation of Positive Facial Expressions," SCAN 11 (2016): 243.

14. H. Katchadourian, Guilt: The Bite of Conscience (Palo Alto, CA: Stanford General Books, 2011); J. Jacquet, Is Shame Necessary? New Uses for an Old Tool (New York: Pantheon, 2015); B. Cheon et al., "Cultural Influences on Neural Basis of Intergroup Empathy," Neuroimage 57 (2011): 642; A. Cuddy et al., "Stereotype Content Model Across Cultures: Towards Universal Similarities and Some Differences," Brit J Soc Psych 48 (2009): 1.

15. R. Nisbett, The Geography of Thought: How Asians and Westerners

Think Differently ... And Why (New York: Free Press, 2003).

16. T. Hedden et al., "Cultural Influences on Neural Substrates of Attentional Control," Psych Sci 19 (2008): 12; S. Han and G. Northoff, "Culture-Sensitive Neural Substrates of Human Cognition: A Transcultural Neuroimaging Approach," Nat Rev Nsci 9 (2008): 646; T. Masuda and R. E. Nisbett, "Attending Holistically vs. Analytically: Comparing the Context Sensitivity of Japanese and Americans," JPSP 81 (2001): 922.

17. J. Chiao, "Cultural Neuroscience: A Once and Future Discipline," Prog Brain Res 178 (2009): 287.

18. Nisbett, The Geography of Thought; Y. Ogihara et al., "Are Common Names Becoming Less Common? The Rise in Uniqueness and Individualism in Japan," Front Psych 6 (2015): 1490.

19. A. Mesoudi et al., "How Do People Become W.E.I.R.D.? Migration Reveals the Cultural Transmission Mechanisms Underlying Variation in Psychological Processes," PLoS ONE 11 (2016): e0147162.

20. A. Terrazas and J. Batalova, Frequently Requested Statistics on Immigrants in the United States (Migration Policy Institute, 2009); J. DeParle, "Global Migration: A World Ever More on the Move," New York Times, June 25, 2010; Pew Research Center, "Second-Generation Americans: A Portrait of the Adult Children of Immigrants," February 7, 2013, www.pewsocialtrends.org/2013/02/07/second-generation-americans/.

21. J. Lansing, "Balinese 'Water temples' and the Management of Irrigation," Am Anthropology 89 (1987): 326.

22. T. Talhelm et al., "Large-Scale Psychological Differences Within China Explained by Rice Versus Wheat Agriculture," Sci 344 (2014): 603.

23. A. Uskul et al., "Ecocultural Basis of Cognition: Farmers and Fishermen Are More Holistic than Herders," PNAS 105 (2008): 8552.

24. Z. Dershowitz, "Jewish Subcultural Patterns and Psychological Dif-

ferentiation," Int J Psych 6 (1971): 223.

25. H. Harpending and G. Cochran, "In Our Genes," PNAS 99 (2002): 10; F. Chang et al., "The World- wide Distribution of Allele Frequencies at the Human Dopamine D4 Receptor Locus," Hum Genetics 98 (1996): 891; K. Kidd et al., "An Historical Perspective on 'The World-wide Distribution of Allele Frequencies at the Human Dopamine D4 Receptor Locus," Hum Genetics 133 (2014): 431; C. Chen et al., "Population Migration and the Variation of Dopamine D4 Receptor (DRD4) Allele Frequencies Around the Globe," EHB 20 (1999): 309.

26. C. Ember and M. Ember, "Warfare, Aggression, and Resource Problems: Cross-Cultural Codes," Behav Sci Res 26 (1992): 169; R. Textor, "Cross Cultural Summary: Human Relations Area Files" (1967); H. People and F. Marlowe, "Subsistence and the Evolution of Religion," Hum Nat 23 (2012): 253.

27. R. McMahon, Homicide in Pre-famine and Famine Ireland (Liverpool, UK: Liverpool University Press, 2013).

28. R. Nisbett and D. Cohen, Culture of Honor: The Psychology of Violence in the South (Boulder, CO: Westview Press, 1996).

29. W. Borneman, Polk: The Man Who Transformed the Presidency and America (New York: Random House, 2008); B. Wyatt-Brown, Southern Honor: Ethics and Behavior in the Old South (Oxford: Oxford University Press, 1982).

30. F. Stewart, Honor (Chicago: University of Chicago Press, 1994).

31. D. Fischer, Albion's Seed (Oxford: Oxford University Press, 1989).

32. P. Chesler, "Are Honor Killings Simply Domestic Violence?" Middle East Quarterly, Spring 2009, pp. 61–69, www.meforum.org/2067/ are-honor-killings-simply-domestic-violence.

33. M. Borgerhoff Mulder et al., "Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies," Sci 326

(2009): 682.

34. P. Turchin, War and Peace and War: The Rise and Fall of Empires (NY: Penguin Press, 2006); D. Rogers et al., "The Spread of Inequality," PLoS ONE 6 (2011): e24683.

35. R. Wilkinson, Mind the Gap: Hierarchies, Health and Human Evolution (London: Weidenfeld and Nicolson, 2000).

36. F. Elgar et al., "Income Inequality, Trust and Homicide in 33 Countries," Eur J Public Health 21, 241; F. Elgar et al., "Income Inequality and School Bullying: Multilevel Study of Adolescents in 37 Countries," J Adolescent Health 45 (2009): 351; B. Herrmann et al., "Antisocial Punishment Across Societies," Sci 319 (2008): 1362.

37. F. Durante et al., "Nations' Income Inequality Predicts Ambivalence in Stereotype Content: How Societies Mind the Gap," Brit J Soc Psych 52 (2012): 726.

38. N. Adler et al., "Relationship of Subjective and Objective Social Status with Psychological and Physiological Functioning: Preliminary Data in Healthy White Women," Health Psych 19 (2000): 586; N. Adler and J. Ostrove, "SES and Health: What We Know and What We Don't," ANYAS 896 (1999): 3; I. Kawachi et al., "Crime: Social Disorganization and Relative Deprivation," Soc Sci and Med 48 (1999): 719; I. Kawachi and B. Kennedy, The Health of Nations: Why Inequality Is Harmful to Your Health (New York: New Press, 2002); J. Lynch et al., "Income Inequality, the Psychosocial Environment, and Health: Comparisons of Wealthy Nations," Lancet 358 (2001): 194; G. A. Kaplan et al., "Inequality in Income and Mortality in the United States: Analysis of Mortality and Potential Pathways," Brit Med J 312 (1996): 999; J. R. Dunn et al., "Income Distribution, Public Services Expenditures, and All Cause Mortality in US States," | Epidemiology and Community Health 59 (2005): 768; C. R. Ronzio et al., "The Politics of Preventable Deaths: Local Spending, Income Inequality, and Premature Mortality in US Cities," J Epidemiology and Community Health 58 (2004): 175.

39. R. Evans et al., Why Are Some People Healthy and Others Not? The Determinants of Health of Populations (New York: Aldine de Gruyter, 1994).

40. D. Chon, "The Impact of Population Heterogeneity and Income Inequality on Homicide Rates: A Cross-National Assessment," Int J Offender Therapy and Comp Criminology 56 (2012): 730; F. J. Elgar and N. Aitken, "Income Inequality, Trust and Homicide in 33 Countries," Eur J Public Health 21 (2010): 241; C. Hsieh and M. Pugh, "Poverty, Income Inequality, and Violent Crime: A Meta- analysis of Recent Aggregate Data Studies," Criminal Justice Rev 18 (1993): 182; M. Daly et al., "Income Inequality and Homicide Rates in Canada and the United States," Canadian J Criminology 32 (2001): 219.

41. K. A. DeCellesa and M. I. Norton, "Physical and Situational Inequality on Airplanes Predicts Air Rage," PNAS 113 (2016): 5588.

42. M. Balter, "Why Settle Down? The Mystery of Communities," Sci 282 (1998): 1442; P. Richerson, "Group Size Determines Cultural Complexity," Nat 503 (2013): 351; M. Derex et al., "Experimental Evidence for the Influence of Group Size on Cultural Complexity," Nat 503 (2013): 389; A. Gibbons, "How We Tamed Ourselves—and Became Modern," Sci 346 (2014): 405.

43. F. Lederbogen et al., "City Living and Urban Upbringing Affect Neural Social Stress Processing in Humans," Nat 474 (2011): 498; D. P. Kennedy and R. Adolphs, "Stress and the City," Nat 474 (2011): 452; A. Abbott, "City Living Marks the Brain," Nat 474 (2011): 429.

44. J. Henrich et al., "Markets, Religion, Community Size, and the Evolution of Fairness and Punishment," Sci 327 (2010): 1480; Footnote: B. Maheer, "Good Gaming," Nat 531 (2016): 568.

45. A. Norenzayan, Big Gods: How Religions Transformed Cooperation and Conflict (Princeton, NJ: Princeton University Press, 2015).

46. L. R. Florizno et al., "Differences Between Tight and Loose Cultures:

A 33-Nation Study," Sci 332 (2011): 1100.

47. J. B. Calhoun, "Population Density and Social Pathology," Sci Am 306 (1962): 139; E. Ramsden, "From Rodent Utopia to Urban Hell: Population, Pathology, and the Crowded Rats of NIMH," Isis 102 (2011): 659; J. L. Freedman et al., "Environmental Determinants of Behavioral Contagion," Basic and Applied Soc Psych 1 (1980): 155; O. Galle et al., "Population Density and Pathology: What Are the Relations for Man?" Sci 176 (1972): 23.

48. A. Parkes, "The Future of Fertility Control," in J. Meade, ed., Biological Aspects of Social Problems (NY: Springer, 1965).

49. M. Lim et al., "Global Pattern Formation and Ethnic/Cultural Violence," Sci 317 (2007): 1540; A. Rutherford et al., "Good Fences: The Importance of Setting Boundaries for Peaceful Coexistence," PLoS ONE 9 (2014): e95660.

50. Florizno et al., "Differences Between Tight and Loose."

51. The following papers examine the effects of normal weather fluctuations, extremes of weather, and global warming on a variety of social end points: J. Brashares et al., "Wildlife Decline and Social Conflict," Sci 345 (2014): 376; S. M. Hsiang et al., "Civil Conflicts Are Associated with the Global Climate," Nat 476 (2011): 438; A. Solow, "Climate for Conflict," Nat 476 (2011): 406; S. Schiermeier, "Climate Cycles Drive Civil War," Nat 476 (2011): 406; E. Miguel et al., "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," | Political Economy 112 (2004): 725; M. Burke et al., "Warming Increases Risk of Civil War in Africa," PNAS 106 (2009): 20670; J. P. Sandholt and K. S. Gleditsch, "Rain, Growth, and Civil War: The Importance of Location," Defence and Peace Economics 20 (2009): 359; H. Buhaug, "Climate Not to Blame for African Civil Wars," PNAS 107 (2010): 16477; D. D. Zhang et al., "Global Climate Change, War and Population Decline in Recent Human History," PNAS 104 (2007): 19214; R. S. J. Tol and S. Wagner, "Climate Change and Violent Conflict in Europe over the Last Millennium,"

Climatic Change 99 (2009): 65; A. Solow, "A Call for Peace on Climate and Conflict," Nat 497 (2013): 179; J. Bohannon, "Study Links Climate Change and Violence, Battle Ensues," Sci 341 (2013): 444; S. M. Hsiang et al., "Quantifying the Influence of Climate on Human Conflict," Sci 341 (2013): 1212.

52. R. Sapolsky, "Endocrine and Behavioral Correlates of Drought in the Wild Baboon," Am J Primat 11 (1986): 217.

53. J. Bohannon, "Study Links Climate Change and Violence, Battle Ensues," Sci 341 (2013): 444.

54. E. Culotta, "On the Origins of Religion," Sci 326 (2009): 784 (this is the source of the quote); C. A. Botero et al., "The Ecology of Religious Beliefs," PNAS 111 (2014): 16784; A. Shariff and A. Norenzayan, "God Is Watching You: Priming God Concepts Increases Prosocial Behavior in an Anonymous Economic Game," Psych Science 18 (2007): 803; R. Wright, The Evolution of God (Boston, MA: Little, Brown, 2009).

55. L. Keeley, War Before Civilization: The Myth of the Peaceful Savage (Oxford: Oxford University Press, 1996).

56. S. Pinker, The Better Angels of Our Nature: Why Violence Has Declined (New York: Penguin, 2011).

57. G. Milner, "Nineteenth-Century Arrow Wounds and Perceptions of Prehistoric Warfare," Am Antiquity 70 (2005): 144.

58. See this entire volume: D. Fry, War, Peace, and Human Nature: The Convergence of Evolutionary and Cultural Views (Oxford: Oxford University Press, 2015). In particular, see these chapters in it: R. Ferguson, "Pinker's List: Exaggerating Prehistoric War Mortality," p. 112; R. Sussman "Why the Legend of the Killer Ape Never Dies: The Enduring Power of Cultural Beliefs to Distort Our View of Human Nature," p. 92; and R. Kelly, "From the Peaceful to the Warlike: Ethnographic and Archeological Insights into Hunter-Gatherer Warfare and Homicide," p. 151.

59. F. Wendorf, The Prehistory of Nubia (Dallas: Southern Methodist

University Press, 1968).

60. R. A. Marlar et al., "Biochemical Evidence of Cannibalism at a Prehistoric Puebloan Site in Southwestern Colorado," Nat 407 (2000): 74; M. Balter, "Did Neandertals Dine In?" Sci 326 (2009): 1057.

61. N. Chagnon, Yanomamo: The Fierce People (NY: Holt McDougal, 1984); N. A. Chagnon, "Life Histories, Blood Revenge, and Warfare in a Tribal Population," Sci 239 (1988): 985.

62. A. Lawler, "The Battle over Violence," Sci 336 (2012): 829.

63. G. Benjamin et al., "Violence: Finding Peace," Sci 338 (2012): 327; S. Pinker, "Violence: Clarified," Sci 338 (2012): 327.

64. A. R. Ramos, "Reflecting on the Yanomami: Ethnographic Images and the Pursuit of the Exotic," Cultural Anthropology 2 (1987): 284; R. Ferguson, Yanomami Warfare: A Political History, a School for Advanced Research Resident Scholar Book (1995); E. Eakin, "How Napoleon Chagnon Became Our Most Controversial Anthropologist," New York Times Magazine, 2013, p. 13; D. Fry, Beyond War: The Human Potential for Peace (Oxford: Oxford University Press, 2009).

65. L. Glowacki and R. Wrangham, "Warfare and Reproductive Success in a Tribal Population," PNAS 112 (2015): 348. For related findings, see: J. Moore, "The Reproductive Success of Cheyenne War Chiefs: A Contrary Case to Chagnon's Yanomamo," Curr Anthropology 31 (1990): 322; S. Beckerman et al., "Life Histories, Blood Revenge and Reproductive Success Among the Waorani of Ecuador," PNAS 106 (2009): 8134.

66. The original research cited by Pinker and Fry: K. Hill and A. Hurtado, Ache Life History: The Ecology and Demography of a Foraging People (New York: Aldine de Gruyter, 1996).

67. S. Corry, "The Case of the 'Brutal Savage': Poirot or Clouseau? Why Steven Pinker, Like Jared Diamond, Is Wrong," London: Survival International website, 2013.

68. K. Lorenz, On Aggression (MFJ Books, 1997); R. Ardrey, The Territorial Imperative: A Personal Inquiry into the Animal Origins of Property and Nations (Delta Books, 1966); R. Wrangham and D. Peterson, Demonic Males: Apes and the Origin of Human Violence (Boston: Houghton Mifflin, 1996).

69. C. H. Boehm, Hierarchy in the Forest: The Evolution of Egalitarian Behavior (Cambridge, MA: Harvard University Press, 1999); K. Hawkes et al., "Hunting Income Patterns Among the Hadza: Big Game, Common Goods, Foraging Goals, and the Evolution of the Human Diet," Philosophical Transactions of the Royal Soc of London B 334 (1991): 243; B. Chapais, "The Deep Social Structure of Humankind," Sci 331 (2011): 1276; K. Hill et al., "Co-residence Patterns in Hunter-Gatherer Societies Show Unique Human Social Structure," Sci 331 (2011): 1286; K. Endicott, "Peace Foragers: The Significance of the Batek and Moriori for the Question of Innate Human Violence," in Fry, War, Peace, and Human Nature, p. 243; M. Butovskaya, "Aggression and Conflict Resolution Among the Nomadic Hadza of Tanzania as Compared with Their Pastoralist Neighbors," in Fry, War, Peace, and Human Nature, p. 278.

70. C. Apicella et al., "Social Networks and Cooperation in Hunter-Gatherers," Nat 481 (2012): 497; J. Henrich, "Hunter-Gatherer Cooperation," Nat 481 (2012): 449.

71. E. Thomas, The Harmless People (New York: Vintage Books, 1959); M. Shostak Nisa: The Life and Words of a !Kung Woman (Cambridge, MA: Harvard University Press, 2006); R. Lee, The !Kung San: Men, Women and Work in a Foraging Society (Cambridge: Cambridge University Press, 1979).

72. C. Ember, "Myths About Hunter-Gatherers," Ethnology 17 (1978): 439.

73. Ferguson 1995, op cit; Fry 2009, op cit; R. B. Lee, "Hunter-Gatherers on the Best-Seller List: Steven Pinker and the 'Bellicose School's' Treatment of Forager Violence," J Aggression, Conflict and Peace Res

6 (2014): 216; M. Guenther, "War and Peace Among Kalahari San," J Aggression, Conflict and Peace Res 6 (2014): 229; D. P. Fry and P. Soderberg, "Myths About Hunter-Gatherers Redux: Nomadic Forager War and Peace," J Aggression, Conflict and Peace Res 6 (2014): 255; R. Kelley, Warless Societies and the Evolution of War (Ann Arbor: University of Michigan Press, 2000).

74. M. M. Lahr et al., "Inter-group Violence Among Early Holocene Hunter-Gatherers of West Turkana, Kenya," Nat 529 (2016): 394.

75. C. Boehm, Moral Origins: The Evolution of Virtue, Altruism, and Shame (New York: Basic Books, 2012).

76. M. C. Stiner et al., "Cooperative Hunting and Meat Sharing 400–200 kya at Qesem Cave, Israel," PNAS 106 (2009): 13207.

77. P. Wiessner, "The Embers of Society: Firelight Talk Among the Ju/'hoansi Bushmen," PNAS 111 (2014): 14013; P. Wiessner, "Norm Enforcement Among the Ju/'hoansi Bushmen: A Case of Strong Reciprocity?" Hum Nat 16 (2004): 115.

Chapter 10: The Evolution of Behavior

1. T. Dobzhansky, "Nothing in Biology Makes Sense Except in the Light of Evolution," Am Biol Teacher 35 (1973): 125.

2. A. J. Carter and A. Q. Nguyen, "Antagonistic Pleiotropy as a Widespread Mechanism for the Maintenance of Polymorphic Disease Alleles," BMC Med Genetics 12 (2011): 160.

3. J. Gratten et al., "Life History Trade-offs at a Single Locus Maintain Sexually Selected Genetic Variation," Nat 502 (2013): 93.

4. A. Brown, The Darwin Wars: The Scientific Battle for the Soul of Man (New York: Touchstone/Simon and Schuster, 1999).

5. V. C. Wynne-Edwards, Evolution Through Group Selection (London: Blackwell Science, 1986).

6. W. D. Hamilton, "The Genetical Evolution of Social Behavior," J Theoretical Biol 7 (1964): 1; G. C. Williams, Adaptation and Natural Selection (Princeton, NJ: Princeton University Press, 1966). See also: E. O. Wilson, Sociobiology: The New Synthesis (Cambridge, MA: Harvard University Press, 1975); and R. Dawkins, The Selfish Gene (Oxford: Oxford University Press, 1976).

7. S. B. Hrdy, The Langurs of Abu: Female and Male Strategies of Reproduction (Cambridge, MA: Harvard University Press, 1977).

8. Pathology argument: P. Dolhinow, "Normal Monkeys?" Am Scientist 65 (1977): 266. Just overflow of male aggression: R. Sussman et al., "Infant Killing as an Evolutionary Strategy: Reality or Myth?" Evolutionary Anthropology 3 (1995): 149.

9. Primates: G. Hausfater and S. Hrdy, Infanticide: Comparative and Evolutionary Perspectives (New York: Aldine, 1984); M. Hiraiwa-Hasegawa, "Infanticide in Primates and a Possible Case of Male- Biased Infanticide in Chimpanzees," in Animal Societies: Theories and Facts, ed. J. L. Brown and J. Kikkawa (Tokyo: Japan Scientific Societies Press, 1988), pp. 125–39; S. Hrdy, "Infanticide Among Mammals: A Review, Classification, and Examination of the Implications for the Reproductive Strategies of Females," Ethology and Sociobiology 1 (1979): 13. Rodents, lions: G. Perrigo et al., "Social Inhibition of Infanticide in Male House Mice," Ecology Ethology and Evolution 5 (1993): 181; A. Pusey and C. Packer, 1984, "Infanticide in Carnivores," in Hausfater and Hrdy, Infanticide; S. Gursky-Doyen, "Infanticide by a Male Spectral Tarsier (Tarsius spectrum)," Primates 52 (2011): 385. See also: D. Lukas and E. Huchard, "The Evolution of Infanticide by Males in Mammalian Societies," Sci 346 (2014): 841.

10. J. Berger, "Induced Abortion and Social Factors in Wild Horses," Nat 303 (1983): 59; E. Roberts et al., "A Bruce Effect in Wild Geladas," Sci 335 (2012): 1222; H. Bruce, "An Exteroceptive Block to Pregnancy in the Mouse," Nat 184 (1959): 105.

11. A. Pusey and K. Schroepfer-Walker, "Female Competition in Chimpanzees," Philosophical Transactions of the Royal Soc of London B 368 (2013): 1471.

12. D. Fossey, "Infanticide in Mountain Gorillas (Gorilla gorilla beringei) with Comparative Notes on Chimpanzees," in Hausfater and Hrdy, Infanticide.

13. L. Fairbanks, "Reciprocal Benefits of Allomothering for Female Vervet Monkeys," Animal Behav 40 (1990): 553.

14. V. Baglione et al., "Kin Selection in Cooperative Alliances of Carrion Crows," Sci 300 (2003): 1947.

15. J. Buchan et al., "True Paternal Care in a Multi-male Primate Society," Nat 425 (2003): 179.

16. D. Cheney and R. Seyfarth, How Monkeys See the World: Inside the Mind of Another Species (Chicago: University of Chicago Press, 1992).

17. D. Cheney and R. Seyfarth, "Recognition of Other Individuals' Social Relationships by Female Baboons," Animal Behav 58 (1999): 67; R. Wittig et al., "Kin-Mediated Reconciliation Substitutes for Direct Reconciliation in Female Baboons," Proc Royal Soc B 274 (2007): 1109.

18. T. Bergman et al., "Hierarchical Classification by Rank and Kinship in Baboons," Sci 203 (2003): 1234.

19. H. Fisher and H. Hoekstra, "Competition Drives Cooperation Among Closely Related Sperm of Deer Mice," Nat 463 (2010): 801.

20. J. Hoogland, "Nepotism and Alarm Calling in the Black-Tailed Prairie Dog (Cynomys ludovicianus)," Animal Behav 31 (1983): 472; G. Schaller, The Serengeti Lion: A Study of Predator- Prey Relations (Chicago: University of Chicago Press, 1972); P. Sherman, "Recognition Systems," in Behavioural Ecology, ed. J. R. Krebs and N. B. Davies (Oxford: Blackwell Scientific, 1997); C. Packer et al., "A Molecular Genetic Analysis of Kinship and Cooperation in African Lions," Nat 351 (1991): 6327; A. Pusey and C. Packer, "Non-offspring Nursing in Social Carnivores: Minimizing the Costs," Behav Ecology 5 (1994): 362.

21. Footnote: G. Alvarez et al., "The Role of Inbreeding in the Extinction of a Europrean Royal Dynasty," PLoS ONE 4 (2009): e5174.

22. Theoretical model: B. Bengtsson, "Avoiding Inbreeding: At What Cost?" J Theoretical Biol 73 (1978): 439.

23. Insects: S. Robinson et al., "Preference for Related Mates in the Fruit Fly, Drosophila melanogaster," Animal Behav 84 (2012): 1169. Lizards: M. Richard et al., "Optimal Level of Inbreeding in the Common Lizard," Proc Royal Soc of London B 276 (2009): 2779. Fish, and related parents invested more in rearing: T. Thünken et al., "Active Inbreeding in a Cichlid Fish and Its Adaptive Significance," Curr Biol 17 (2007): 225. Numerous birds: P. Bateson, "Preferences for Cousins in Japanese Quail," Nat 295 (1982): 236; L. Cohen and D. Dearborn, "Great Frigatebirds, Fregata minor, Choose Mates That Are Genetically Similar," Animal Behav 68 (2004): 1129; N. Burley et al., "Social Preference of Zebra Finches for Siblings, Cousins and Non-kin," Animal Behav 39 (1990): 775. Birds sneaking outside monogamy: O. Kleven et al., "Extrapair Mating Between Relatives in the Barn Swallow: A Role for Kin Selection?" Biol Lett 1 (2005): 389; C. Wang and X. Lu, "Female Ground Tits Prefer Relatives as Extra-pair Partners: Driven by Kin-Selection?" Mol Ecology 20 (2011): 2851. I assume that no one on earth is ever going to read this sentence, so if you do, I'd love to hear from you, in order to congratulate you on your extraordinarily thorough reading habitssapolsky@stanford.edu. Rodents: S. Sommer, "Major Histocompatibility Complex and Mate Choice in a Monogamous Rodent," Behav Ecology and Sociobiology 58 (2005): 181; C. Barnard and J. Fitzsimons, "Kin Recognition and Mate Choice in Mice: The Effects of Kinship, Familiarity and Interference on Intersexual Selection," Animal Behav 36 (1988): 1078; M. Peacock and A. Smith, "Nonrandom Mating in Pikas Ochotona princeps: Evidence for Inbreeding Between Individuals of Intermediate Relatedness," Mol Ecology 6 (1997): 801.

24. A. Helgason et al., "An Association Between the Kinship and Fertility of Human Couples," Sci 319 (2008): 813: S. Jacob et al., "Paternally Inherited HLA Alleles Are Associated with Women's Choice of Male Odor," Nat Genetics 30 (2002): 175.

25. T. Shingo et al., "Pregnancy-Stimulated Neurogenesis in the Adult Female Forebrain Mediated by Prolactin," Sci 299 (2003): 117; C. Larsen and D. Grattan, "Prolactin, Neurogenesis, and Maternal Behaviors," Brain, Behav and Immunity 26 (2012): 201.

26. W. D. Hamilton, "The Genetical Evolution of Social Behaviour," J Theoretical Biol 7 (1964): 1.

27. S. West and A. Gardner, "Altruism, Spite and Greenbeards," Sci 327 (2010): 1341.

28. S. Smukalla et al., "FLO1 Is a Variable Green Beard Gene That Drives Biofilm-like Cooperation in Budding Yeast," Cell 135 (2008): 726; E. Queller et al., "Single-Gene Greenbeard Effects in the Social Amoeba Dictyostelium discoideum," Sci 299 (2003): 105.

29. B. Kerr et al., "Local Dispersal Promotes Biodiversity in a Real-Life Game of Rock-Paper- Scissors," Nat 418 (2002): 171; J. Nahum et al., "Evolution of Restraint in a Structured Rock-Paper- Scissors Community," PNAS 108 (2011): 10831.

30. G. Wilkinson, "Reciprocal Altruism in Bats and Other Mammals," Ethology and Sociobiology 9 (1988): 85; G. Wilkinson, "Reciprocal Food Sharing in the Vampire Bat," Nat 308 (1984): 181.

31. W. D. Hamilton, "Geometry for the Selfish Herd," J Theoretical Biol 31 (1971): 295.

32. R. Trivers, "The Evolution of Reciprocal Altruism," Quarterly Rev of Biol 46 (1971): 35.

33. R. Seyfarth and D. Cheney, "Grooming, Alliances and Reciprocal Altruism in Vervet Monkeys," Nat 308 (1984): 541.

34. R. Axelrod and W. D. Hamilton, "The Evolution of Cooperation," Sci 211 (1981): 1390.

35. M. Nowak and K. Sigmund, "Tit for Tat in Heterogeneous Populations," Nat 355 (1992): 250; R. Boyd, "Mistakes Allow Evolutionary Stability in the Repeated Prisoner's Dilemma Game," J Theoretical Biol 136 (1989): 4756.

36. Nowak and R. Highfield, SuperCooperators: Altruism, Evolution, and Why We Need Each Other to Succeed (New York: Simon & Schuster, 2012). Footnote: Nowak and K. Sigmund, "A Strategy of Win-Stay, Lose-Shift that Outperforms Tit-for-Tat in the Prisoner's Dilemma Game," Nat 364 (1993): 56.

37. E. Fischer, "The Relationship Between Mating System and Simultaneous Hermaphroditism in the Coral Reef Fish, Hypoplectrus nigricans (Serranidae)," Animal Behav 28 (1980): 620.

38. M. Milinski, "Tit for Tat in Sticklebacks and the Evolution of Cooperation," Nat 325 (1987): 433.

39. C. Packer et al., "Egalitarianism in Female African Lions," Sci 293 (2001): 690; M. Scantlebury et al., "Energetics Reveals Physiologically Distinct Castes in a Eusocial Mammal," Nat 440 (2006): 795; R. Heinsohn and C. Packer, "Complex Cooperative Strategies in Group-Territorial African Lions," Sci 269 (1995): 1260.

40. R. Trivers, "Parent-Offspring Conflict," Am Zoologist 14 (1974): 249.

41. D. Maestripieri, "Parent-Offspring Conflict in Primates," Int J Primat 23 (2002): 923.

42. D. Haig, "Genetic Conflicts in Human Pregnancy," Quartery Rev of Biol 68 (1993): 495; R. Sapolsky, "The War Between Men and Women," Discover, May 1999, p. 56.

43. S. J. Gould, "Caring Groups and Selfish Genes," in The Panda's Thumb: More Reflections in Natural History (London: Penguin Books,

1990), p. 72.

44. S. Okasha, Evolution and the Levels of Selection (Oxford: Clarendon Press, 2006).

45. P. Bijma et al., "Multilevel Selection 1: Quantitative Genetics of Inheritance and Response to Selection," Genetics 175 (2007): 277. A similar example to the chickens, in spiders: J. Pruitt and C. Goodnight, "Site-Specific Group Selection Drives Locally Adapted Group Compositions," Nat 514 (2014): 359.

46. S. Bowles, "Conflict: Altruism's Midwife," Nat 456 (2008): 326.

47. D. S. Wilson and E. O. Wilson, "Rethinking the Theoretical Foundation of Sociobiology," Quarterly Rev of Biol 82 (2008): 327.

48. F. de Waal, Our Inner Ape (NY: Penguin, 2005); I. Parker, "Swingers: Bonobos Are Celebrated as Peace-Loving, Matriarchal, and Sexually Liberated. Are They?" New Yorker, July 30, 2007, p. 48; R. Wrangham and D. Peterson, Demonic Males: Apes and the Origins of Human Violence (NY: Houghton Mifflin, 1996); R. Wrangham et al., "Comparative Rates of Violence in Chimpanzees and Humans," Primates 47 (2006): 14.

49. D. Falk et al., "Brain Shape in Human Microcephalics and Homo floresiensis," PNAS 104 (2007): 2513. The opposite view: M. Henneberg et al., "Evolved Developmental Homeostasis Disturbed in LB1 from Flores, Indonesia, Denotes Down Syndrome and Not Diagnostic Traits of the Invalid Species Homo floresiensis," PNAS 111 (2014): 11967.

50. K. Prufer et al., "The Bonobo Genome Compared with the Chimpanzee and Human Genomes," Nat 486 (2012): 527; W. Enard et al., "Intraand Interspecific Variation in Primate Gene Expression Patterns," Sci 296 (2002): 340.

51. D. Barash and J. Lipton, The Myth of Monogamy: Fidelity and Infidelity in Animals and People (New York: Henry Holt, 2002); B. Chapais, Primeval Kinship: How Pair-Bonding Gave Birth to Human Society (Cambridge, MA: Harvard University Press).

52. T. Zerjal et al., "The Genetic Legacy of the Mongols," Am J Hum Genetics 72 (2003): 713.

53. M. Daly and M. Wilson, "Evolutionary Social Psychology and Family Homicide," Sci 242 (1988): 519. Replication: V. Weekes-Shackelford and T. K. Shackelford, "Methods of Filicide: Stepparents and Genetic Parents Kill Differently," Violence and Victims 19 (2004): 75. Swedish failures of replication: H. Temrin et al., "Step-Parents and Infanticide: New Data Contradict Evolutionary Predictions," Proc Royal Soc B 267 (2000): 943; M. Van Ijzendoorn et al., "Elevated Risk of Child Maltreatment in Families with Stepparents but Not with Adoptive Parents," Child Maltreatment 14 (2009): 369.; J. Nordlund and H. Temrin, "Do Characteristics of Parental Child Homicide in Sweden Fit Evolutionary Predictions?" Ethology 113 (2007): 1029.

54. K. Hill et al., "Co-residence Patterns in Hunter-Gatherer Societies Show Unique Human Social Structure," Sci 331 (2011): 1286.

55. R. Topolski et al., "Choosing Between the Emotional Dog and the Rational Pal: A Moral Dilemma with a Tail," Anthrozoös 26 (2013): 253.

56. B. Thomas et al., "Harming Kin to Save Strangers: Further Evidence for Abnormally Utilitarian Moral Judgments After Ventromedial Prefrontal Damage," J Cog Nsci 23 (2011): 2186.

57. R. Sapolsky, "Would You Break That Law for Your Family?" Los Angeles Times, November 17, 2013.

58. J. Persico, My Enemy, My Brother: Men and Days of Gettysburg (Cambridge, MA: Da Capo Press, 1996).

59. R. MacMahon, Homicide in Pre-famine and Famine Ireland (Liverpool, UK: Liverpool University Press, 2014). Cheeseburger murder: J. Berlinger and T. Marco, "Man Kills Brother in Argument over Cheeseburger, Police Say," CNN.com, May 9, 2016, www.cnn. com/2016/05/08/us/man-allegedly- kills-brother-over-cheeseburger/index.html.

60. Footnote: "MP Comes to the Aid of 5 Year Old Girl at Risk of Being Sold," Kenya Daily Nation, October 13, 2014, www.nation.co.ke/vid-eo/-/1951480/2484684/-/gditgq/-/index.html.

61. S. Friedman and P. Resnick, "Child Murder by Mothers: Patterns and Prevention," World Psychiatry 6 (2007): 137; S. West, et al., "Fathers Who Kill Their Children: An Analysis of the Literature," J Forensic Sci 54 (2009): 463; S. B. Hrdy, Mother Nature: A History of Mothers, Infants and Natural Selection (New York: Pantheon, 1999).

62. J. Shepher, "Mate Selection Among Second Generation Kibbutz Adolescents and Adults: Incest Avoidance and Negative Imprinting," Arch Sexual Behav 1 (1971): 293; A. Wolf, Sexual Attraction and Childhood Association: A Chinese Brief for Edward Westermarck (Palo Alto, CA: Stanford University Press, 1995).

63. K. Hill et al., "Co-residence Patterns in Hunter-Gatherer Societies Show Unique Human Social Structure," Sci 331 (2011): 1286.

64. N. Eldredge and S. J. Gould, "Punctuated Equilibria: An Alternative to Phyletic Gradualism," in Models in Paleobiology, ed. T. J. M. Schopf (San Francisco: Freeman Cooper, 1972), p. 82.

65. J. Goldman, "Man's New Best Friend? A Forgotten Russian Experiment in Fox Domestication," Sci Am, September 2010; D. Belyaev and L. Trut, "Behaviour and Reproductive Function of Animals. II: Correlated Changes Under Breeding for Tameness," Bull Moscow Soc of Naturalists B Series (in Russian) 69 (1964): 5.

66. S. Sternthal, "Moscow's Stray Dogs," Financial Times, January 16, 2010.

67. Footnote: M. Carneiro et al., "Rabbit Genome Analysis Reveals a Polygenic Basis for Phenotypic Change During Domestication," Sci 345 (2014): 1074.

68. S. Fisher and M. Ridley, "Culture, Genes, and the Human Revolution," Sci 340 (2013) 929; D. Swallow, "Genetics of Lactase Persistence and Lactose Intolerance," Ann Rev of Genetics 37 (2003): 197; J. Troelsen, "Adult-Type Hypolactasia and Regulation of Lactase Expression," Biochimica et Biophysica Acta 1723 (2005): 19.

69. N. Mekel-Bobrov et al., "Ongoing Adaptive Evolution of ASPM, a Brain Size Determinant in Homo sapiens," Sci 309 (2005): 1720.

70. J. Weiner, The Beak of the Finch: A Story of Evolution in Our Time (New York: Knopf, 1994); J. Neel, "Diabetes Mellitus: A 'Thrifty' Genotype Rendered Detrimental by 'Progress'?" Am J Hum Genetics 14 (1962): 353; J. Diamond, "Sweet Death," Natural History, February 1992. American versus Mexican Pimas: P. Kopelman, "Obesity as a Medical Problem," Nat 404 (2000): 635. Genes identified: C. Ezzell, "Fat Times for Obesity Research," J NIH Research 7 (1995): 39; C. Holden, "Race and Medicine," Sci 302 (2003): 594; J. Diamond, "The Double Puzzle of Diabetes," Nat 423 (2003): 599.

71. E. Pennisi, "The Man Who Bottled Evolution," Sci 342 (2013): 790.

72. S. J. Gould and N. Eldredge, "Punctuated Equilibria: The Tempo and Mode of Evolution Reconsidered," Paleobiology 3 (1977): 115.

73. P. W. Andrews et al., "Adaptationism—How to Carry Out an Exaptationist Program," BBS 25 (2002): 489; S. J. Gould and E. S. Vrba, "Exaptation—a Missing Term in the Science of Form," Paleobiology 8 (1982): 4; A. Figueredo and S. Berry, "Just Not So Stories': Exaptations, Spandrels, and Constraints," BBS 25 (2002): 517; J. Roney and D. Maestripieri, "The Importance of Comparative and Phylogenetic Analyses in the Study of Adaptation," BBS 25 (2002): 525.

74. A. Brown, The Darwin Wars: The Scientific Battle for the Soul of Man (New York: Touchstone/Simon and Schuster, 1999).

75. S. J. Gould and R. Lewontin, "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme," Proc Royal Soc of London B 205 (1979): 581.

76. D. Barash and J. Lipton, "How the Scientist Got His Ideas," Chronicle

of Higher Education, January 3, 2010.

Chapter 11: Us Versus Them

1. D. Hofstede, Planet of the Apes: An Unofficial Companion (Toronto: ECW Press, 2001).

2. T. A. Ito and G. R. Urland, "Race and Gender on the Brain: Electrocortical Measures of Attention to the Race and Gender of Multiply Categorizable Individuals," JPSP 85 (2003): 616; T. Ito and B. Bartholow, "The Neural Correlates of Race," TICS 13 (2009): 524.

3. A. Greenwald et al., "Measuring Individual Differences in Implicit Cognition: The Implicit Association Test," JPSP 74 (1998): 1464.

4. N. Mahajan et al., "The Evolution of Intergroup Bias: Perceptions and Attitudes in Rhesus Macaques," JPSP 100 (2011): 387.

5. H. Tajfel, "Social Psychology of Intergroup Relations," Ann Rev of Psych 33 (1982): 1; H. Tajfel, "Experiments in Intergroup Discrimination," Sci Am 223 (1970): 96.

6. E. Losin et al., "Own-Gender Imitation Activates the Brain's Reward Circuitry," SCAN 7 (2012): 804; B. C. Müller et al., "Prosocial Consequences of Imitation," Psych Rep 110 (2012): 891.

7. S. B. Flagel et al., "A Selective Role for Dopamine in Stimulus-Reward Learning," Nat 469 (2011): 53–57.

8. A. S. Baron and M. R. Banaji, "The Development of Implicit Attitudes: Evidence of Race Evaluations from Ages 6, 10, and Adulthood," Psych Sci 17 (2006): 53; F. E. Aboud, Children and Prejudice (New York: Blackwell, 1988); R. S. Bigler et al., "Social Categorization and the Formation of Intergroup Attitudes in Children," Child Development 68 (1997): 530; L. A. Hirschfeld, "Natural Assumptions: Race, Essence and Taxonomies of Human Kinds," Soc Res 65 (1998): 331; R. S. Bigler et al., "Developmental Intergroup Theory: Explaining and Reducing Children's Social Stereotyping and Prejudice," Curr Dir Psych Sci 16 (2007): 162; P. Bronson and A. Merryman, "See Baby Discriminate," Newsweek, September 14, 2009, p. 53 (from their book, Nurture Shock).

9. K. D. Kinzler et al., "The Native Language of Social Cognition," PNAS 104 (2007); 12577; S. Sangrigoli and S. De Schonen, "Recognition of Own-Race and Other-Race Faces by Three-Month- Old Infants," J Child Psych and Psychiatry 45 (2004): 1219.

10. S. Sangrigoli et al., "Reversibility of the Other-Race Effect in Face Recognition During Childhood," Psych Sci 16 (2005): 440.

11. R. Bigler and L. Liben, "Developmental Intergroup Theory: Explaining and Reducing Children's Social Stereotyping and Prejudice," Curr Dir Psych Sci 16 (2007): 162.

12. A. J. Cuddy et al., "Stereotype Content Model Across Cultures: Towards Universal Similarities and Some Differences," Brit J Soc Psych 48 (2009): 1; H. Bernhard et al., "Parochial Altruism in Humans," Nat 442 (2006): 912.

13. M. Levine et al., "Self-Categorization and Bystander Non-intervention: Two Experimental Studies," J Applied Soc Psych 32 (2002): 1452; J. M. Engelmann and E. Hermann, "Chimpanzees Trust Their Friends," Curr Biol 26 (2016): 252.

14. M. Levine et al., "Identity and Emergency Intervention: How Social Group Membership and Inclusiveness of Group Boundaries Shape Helping Behavior," PSPB 31 (2005): 443.

15. H. A. Hornstein et al., "Effects of Sentiment and Completion of a Helping Act on Observer Helping: A Case for Socially Mediated Zeigar-nik Effects," JPSP 17 (1971): 107.

16. L. Gaertner and C. Insko, "Intergroup Discrimination in the Minimal Group Paradigm: Categorization, Reciprocation, or Fear?" JPSP 79 (2000): 77; T. Wildschut et al., "Intragroup Social Influence and Intergroup Competition," JPSP 82 (2002): 975; C. A. Insko et al., "Interindividual- Intergroup Discontinuity as a Function of Trust and Categoriza-

tion: The Paradox of Expected Cooperation," JPSP 88 (2005): 365.

17. M. Cikara et al., "Us Versus Them: Social Identity Shapes Neural Responses to Intergroup Competition and Harm," Psych Sci 22 (2011): 306; E. R. de Bruijn et al., "When Errors Are Rewarding," J Nsci 29 (2009): 12183; J. J. Van Bavel et al., "Modulation of the Fusiform Face Area Following Minimal Exposure to Motivationally Relevant Faces: Evidence of In-group Enhancement (Not Out-group Disregard)," J Cog Nsci 223 (2011): 3343. Footnote: M. Cikar et al., "Their Pain Gives Us Pleasure: How Intergroup Dynamics Shape Empathic Failures and Counter-empathic Responses," JESP 55 (2014) 110.

18. T. Singer et al., "Empathic Neural Responses Are Modulated by the Perceived Fairness of Others," Nat 439 (2006): 466; H. Takahashi et al., "When Your Gain Is My Pain and Your Pain Is My Gain: Neural Correlates of Envy and Schadenfreude," Sci 323 (2009): 937.

19. G. Hertel and N. L. Kerr, "Priming In-group Favoritism: The Impact of Normative Scripts in the Minimal Group Paradigm," JESP 37 (2001): 316.

20. J. N. Gutsell and M. Inzlicht, "Intergroup Differences in the Sharing of Emotive States: Neural Evidence of an Empathy Gap," SCAN 7 (2012): 596; J. Y. Chiao et al., "Cultural Specificity in Amygdala Response to Fear Faces," J Cog Nsci 20 (2008): 2167.

21. P. K. Piff et al., "Me Against We: In-group Transgression, Collective Shame, and In-group- Directed Hostility," Cog & Emotion 26 (2012): 634.

22. W. Barrett, "Thug Life: The Shocking Secret History of Harold Giuliani, the Mayor's Ex-Convict Dad," Village Voice, 5 July, 2000; D. Strober and G. Strober, Giuliani: Flawed or Flawless? (New York: Wiley, 2007).

23. Footnote: J. A. Lukas, "Judge Hoffman Is Taunted at Trial of the Chicago 7 After Silencing Defense Counsel," New York Times, February 6, 1970.

24. S. Svonkin, Jews Against Prejudice: American Jews and the Fight for Civil Liberties (New York: Columbia University Press, 1997). Footnote:

A. Zahr, "I Refuse to Condemn," Civil Arab, January 9, 2015, www.civilarab.com/i-refuse-to-condemn/.

25. D. A. Stanley et al., "Implicit Race Attitudes Predict Trustworthiness Judgments and Economic Trust Decisions," PNAS 108 (2011): 7710; Y. Dunham, "An Angry = Outgroup Effect," JESP 47 (2011): 668; D. Maner et al., "Functional Projection: How Fundamental Social Motives Can Bias Interpersonal Perception," IPSP 88 (2005): 63; K. Hugenberg and G. Bodenhausen, "Facing Prejudice: Implicit Prejudice and the Perception of Facial Threat," Psych Sci 14 (2003): 640; A. Rattan et al., "Race and the Fragility of the Legal Distinction Between Juveniles and Adults," PLoS ONE 7 (2012): e36680; Y. J. Xiao and J. J. Van Bavel, "See Your Friends Close and Your Enemies Closer: Social Identity and Identity Threat Shape the Representation of Physical Distance," PSPB 38 (2012): 959; B. Reiek et al., "Intergroup Threat and Outgroup Attitudes: A Meta-analytic Review," PSPR 10 (2006): 336; H. A. Korn, et al., "Neurolaw: Differential Brain Activity for Black and White Faces Predicts Damage Awards in Hypothetical Employment Discrimination Cases," Soc Nsci 7 (2012): 398. Activation of insula when interacting with outgroup in game: J. Rilling et al., "Social Cognitive Neural Networks During Ingroup and Out-group Interactions," NeuroImage 41 (2008): 1447.

26. P. Rozin et al., "From Oral to Moral," Science 323 (2009): 1179.

27. G. Hodson and K. Costello, "Interpersonal Disgust, Ideological Orientations, and Dehumanization as Predictors of Intergroup Attitudes," Psych Sci 18 (2007):691.

28. G. Hodson et al., "A Joke Is Just a Joke (Except When It Isn't): Cavalier Humor Beliefs Facilitate the Expression of Group Dominance Motives," JPSP 99 (2010): 460.

29. D. Berreby, Us and Them: The Science of Identity (Chicago: University of Chicago Press, 2008).

30. Leyens et al., "The Emotional Side of Prejudice: The Attribution of

Secondary Emotions to Ingroups and Outgroups," PSPR 4 (2000): 186; K. Wailoo, Pain: A Political History (Baltimore: Johns Hopkins University Press, 2014).

31. J. T. Jost and O. Hunyad, "Antecedents and Consequences of System-Justifying Ideologies," Curr Dir Psych Sci 14 (2005): 260; G. E. Newman and P. Bloom, "Physical Contact Influences How Much People Pay at Celebrity Auctions," PNAS 111 (2013): 3705.

32. J. Greenberg et al., "Evidence for Terror Management II: The Effects of Mortality Salience on Reactions to Those Who Threaten or Bolster the Cultural Worldview," JPSP 58 (1990): 308.

33. J. Haidt, "The Emotional Dog and Its Rational Tail: A Social Intuitionist Approach to Moral Judgment," Psych Rev 108 (2001): 814; J. Haidt, The Righteous Mind: Why Good People Are Divided by Politics and Religion (New York: Pantheon Books, 2012).

34. Berreby, Us and Them.

35. W. Cunningham et al., "Implicit and Explicit Ethnocentrism: Revisiting the Ideologies of Prejudice," PSPB 30 (2004): 1332.

36. Footnote: M. J. Wood et al., "Dead and Alive: Beliefs in Contradictory Conspiracy Theories," Social Psych and Personality Sci 3 (2012): 767.

37. C. Zogmaister et al., "The Impact of Loyalty and Equality on Implicit Ingroup Favoritism," Group Processes & Intergroup Relations 11 (2008): 493.

38. C. D. Navarrete et al., "Race Bias Tracks Conception Risk Across the Menstrual Cycle," Psych Sci 20 (2009): 661. C. Navarrete et al., "Fertility and Race Perception Predict Voter Preference for Barack Obama," EHB 31 (2010): 391.

39. G. E. Newman and P. Bloom, "Physical Contact Influences How Much People Pay at Celebrity Auctions," PNAS 111 (2013): 3705; R. Sapolsky, "Magical Thinking and the Stain of Madoff's Sweater," Wall Street Journal, July 12, 2014.

40. Footnote: S. Boria, Animals in the Third Reich: Pets, Scapegoats, and the Holocaust (Providence, RI: Yogh and Thorn Books, 2000).

41. A. Rutland and R. Brown, "Stereotypes as Justification for Prior Intergroup Discrimination: Studies of Scottish National Stereotyping," Eur J Soc Psych 31 (2001): 127.

42. C. S. Crandall et al., "Stereotypes as Justifications of Prejudice," PSPB 37 (2011): 1488.

43. R. Niebuhr, The Nature and Destiny of Man, vol. 1 (London: Nisbet, 1941); B. P. Meier and V. B. Hinsz, "A Comparison of Human Aggression Committed by Groups and Individuals: An Interindividual Intergroup Discontinuity," JESP 40 (2004): 551; T. Wildschut et al., "Beyond the Group Mind: A Quantitative Review of the Interindividual-Intergroup Discontinuity Effect," Psych Bull 129 (2003): 698.

44. T. Cohen et al., "Group morality and Intergroup Relation: Cross-Cultural and Experimental Evidence," PSPB 32 (2006): 1559; T. Wildschut et al., "Intragroup Social Influence and Intergroup Competition," JPSP 82 (2002): 975.

45. S. Bowles, "Conflict: Altruism's Midwife," Nat 456 (2008): 326.

46. M. Shih et al., "Stereotype Susceptibility: Identity Salience and Shifts in Quantitative Performance," Psych Sci 10 (1999): 80; T. Harada et al., "Dynamic Social Power Modulates Neural Basis of Math Calculation," Front Hum Nsci 6 (2012): 350; J. Van Bavel and W. Cunningham, "Self-Categorization with a Novel Mixed-Race Group Moderates Automatic Social and Racial Biases," PSPB 35 (2009): 321; G. Bohner et al., "Situational Flexibility of In-group-Related Attitudes: A Single Category IAT Study of People with Dual National Identity," Group Processes & Intergroup Relations 11 (2008): 301.

47. N. Jablonski, Skin: A Natural History (Oakland, CA: University of California Press, 2006): A. Gibbons, "Shedding Light on Skin Color," Sci

346 (2014): 934.

48. R. Hahn, "Why Race Is Differentially Classified on U.S. Birth and Infant Death Certificates: An Examination of Two Hypotheses," Epidemiology 10 (1999): 108.

49. C. D. Navarrete et al., "Fear Extinction to an Out-group Face: The Role of Target Gender," Psych Sci 20 (2009): 155; J. P. Mitchell et al., "Contextual Variations in Implicit Evaluation," J Exp Psych: General 132 (2003): 455; this latter paper is the one involving politicians versus athletes.

50. R. Kurzban et al., "Can Race Be Erased? Coalitional Computation and Social Categorization," PNAS 98 (2001): 15387.

51. M. E. Wheeler and S. T. Fiske, "Controlling Racial Prejudice: Social-Cognitive Goals Affect Amygdala and Stereotype Activation," Psych Sci 16 (2005): 56; J. P. Mitchell et al., "The Link Between Social Cognition and Self-Referential Thought in the Medial Prefrontal Cortex," J Cog Nsci 17 (2005): 1306.

52. M. A. Halleran, The Better Angels of Our Nature: Freemasonry in the American Civil War (Tuscaloosa AL: : University of Alabama Press, 2010).

53. T. Kennealy, The Great Shame: And the Triumph of the Irish in the English-Speaking World (New York: Anchor Books, 2000).

54. Patrick Leigh Fermor obituary, Daily Telegraph (London), June, 11, 2011. For footage of the reunion with Kreipe, see "Η ΑΠΑΓΩΓΗ ΤΟΥ ΣΤΡΑΤΗΓΟΥ ΚΡΑΙΠΕ," uploaded by Idomeneas Kanakakis on October 21, 2010, www.youtube.com/watch?v=8zlUhJwddFU. For a documentary about the kidnapping and journey, see "The Abduction of Gengeral Kreipe.avi," uploaded by Nico Mastorakis on February 25, 2012, www. youtube.com/watch?v=vN1qrghgCqI.

55. E. Krusemark and W. Li, "Do All Threats Work the Same Way? Divergent Effects of Fear and Disgust on Sensory Perception and Attention," J

Nsci 31 (2011): 3429.

56. Footnote: M. Plitt et al., "Are Corporations People Too? The Neural Correlates of Moral Judgments About Companies and Individuals," Social Nsci 10 (2015): 113.

57. S. Fiske et al., "A Model of (Often Mixed) Stereotype Content: Competence and Warmth Respectively Follow from Perceived Status and Competition," JPSP 82 (2002): 878; L. T. Harris and S. T. Fiske, "Dehumanizing the Lowest of the Low: Neuroimaging Responses to Extreme Out- groups," Psych Sci 17 (2006): 847; L. T. Harris and S. T. Fiske, "Social Groups That Elicit Disgust Are Differentially Processed in mPFC," SCAN 2 (2007): 45. Also see: S. Morrison et al., "The Neuroscience of Group Membership," Neuropsychologia 50 (2012): 2114.

58. T. Ashworth, Trench Warfare: 1914–1918 (London: Pan Books, 1980).

59. K. B. Clark and M. P. Clark, "Racial Identification and Preference Among Negro Children," in Readings in Social Psychology, ed. E. L. Hartley (New York: Holt, Rinehart, and Winston, 1947); K. Clark and C. Mamie, "The Negro Child in the American Social Order," J Negro Education 19 (1950): 341; J. Jost et al., "A Decade of System Justification Theory: Accumulated Evidence of Conscious and Unconscious Bolstering of the Status Quo," Political Psych 25 (2004): 881; J. Jost et al., "Non-conscious Forms of System Justification: Implicit and Behavioral Preferences for Higher Status Groups," JESP 38 (2002): 586.

60. S. Lehrman, "The Implicit Prejudice," Sci Am 294 (2006): 32.

61. K. Kawakami et al., "Mispredicting Affective and Behavioral Responses to Racism," Sci 323 (2009): 276; B. Nosek, "Implicit-Explicit Relations," Curr Dir Psych Sci 16 (2007): 65; L. Rudman and R. Ashmore, "Discrimination and the Implicit Association Test," Group Processes & Intergroup Relations 10 (2007): 359; J. Dovidio et al., "Implicit and Explicit Prejudice and Interracial Interaction," JPSP 82 (2002): 62. For an additional

approach to uncovering implicit biases, see I. Blair, "The Malleability of Automatic Stereotypes and Prejudice," PSPR 6 (2002): 242.

62. W. Cunningham et al., "Separable Neural Components in the Processing of Black and White Faces," Psych Sci 15 (2004): 806; W. A. Cunningham et al., "Neural Correlates of Evaluation Associated with Promotion and Prevention Regulatory Focus," Cog, Affective & Behav Nsci 5 (2005): 202; K. M. Knutso et al., "Neural Correlates of Automatic Beliefs About Gender and Race," Hum Brain Mapping 28 (2007): 915.

63. B. K. Payne, "Conceptualizing Control in Social Cognition: How Executive Functioning Modulates the Expression of Automatic Stereotyping," JPSP 89 (2005): 488.

64. J. Dovidio et al., "Why Can't We Just Get Along? Interpersonal Biases and Interracial Distrust," Cultural Diversity & Ethnic Minority Psych 8 (2002): 88.

65. J. Richeson et al., "An fMRI Investigation of the Impact of Interracial Contact on Executive Function," Nat Nsci 12 (2003): 1323; J. Richeson and J. Shelton, "Negotiating Interracial Interactions: Cost, Consequences, and Possibilities," Curr Dir Psych Sci 16 (2007): 316.

66. J. N. Shelton et al., "Expecting to Be the Target of Prejudice: Implications for Interethnic Interactions," PSPB 31 (2005): 1189.

67. P. M. Herr, "Consequences of Priming: Judgment and Behavior," JPSP 51 (1986): 1106; N. Dasgupta and A. Greenwald, "On the Malleability of Automatic Attitudes: Combating Automatic Prejudice with Images of Admired and Disliked Individuals," JPSP 81 (2001): 800.

68. W. A. Cunningham et al., "Rapid Social Perception Is Flexible: Approach and Avoidance Motivational States Shape P100 Responses to Other-Race Faces," Front Hum Nsci 6 (2012): 140.

69. A. D. Galinsky and G. B. Moskowitz, "Perspective-Taking: Decreasing Stereotype Expression, Stereotype Accessibility, and In-group Favoritism," JPSP 78 (2000): 708; I. Blair et al., "Imagining Stereotypes Away: The Moderation of Implicit Stereotypes Through Mental Imagery," JPSP 81 (2001): 828; T. J. Allen et al., "Social Context and the Self-Regulation of Implicit Bias," Group Processes & Intergroup Relations 13 (2010): 137; J. Fehr and K. Sassenberg, "Willing and Able: How Internal Motivation and Failure Help to Overcome Prejudice," Group Processes & Intergroup Relations 13 (2010): 167.

70. C. Macrae et al., "The Dissection of Selection in Person Perception: Inhibitory Processes in Social Stereotyping," JPSP 69 (1995): 397.

71. T. Pettigrew and L. A. Tropp, "A Meta-analytic Test of Intergroup Contact Theory," JPSP 90 (2006): 751.

72. A. Rutherford et al., "Good Fences: The Importance of Setting Boundaries for Peaceful Coexistence," PLoS ONE 9 (2014): e95660; L. G. Babbitt and S. R. Sommers, "Framing Matters: Contextual Influences on Interracial Interaction Outcomes," PSPB 37 (2011): 1233.

73. M. J. Williams and J. L. Eberhardt, "Biological Conceptions of Race and the Motivation to Cross Racial Boundaries," JPSP 94 (2008): 1033.

74. G. Hodson et al., "A Joke Is Just a Joke (Except When It Isn't): Cavalier Humor Beliefs Facilitate the Expression of Group Dominance Motives," JPSP 99 (2010): 460; F. Pratto and M. Shih, "Social Dominance Orientation and Group Context in Implicit Group Prejudice," Psych Sci 11 (2000): 515; F. Pratto et al., "Social Dominance Orientation and the Legitimization of Inequality Across Cultures," J Cross-Cultural Psych 31 (2000); 369; F. Durante et al., "Nations' Income Inequality Predicts Ambivalence in Stereotype Content: How Societies Mind the Gap," Brit J Soc Psych 52 (2012): 726; A. C. Kay and J. T. Jost, "Complementary Justice: Effects of 'Poor but Happy' and 'Poor but Honest' Stereotype Exemplars on System Justification and Implicit Activation of the Justice Motive," JPSP 85 (2003): 823; A Kay, et al., "Victim Derogation and Victim Enhancement as Alternate Routes to System Justification," Psych Sci 16 (2005): 240.

75. C. Sibley and J. Duckitt, "Personality and Prejudice: A Meta-analysis and Theoretical Review," PSPR 12 (2008): 248.

76. J. Dovidio et al., "Commonality and the Complexity of 'We': Social Attitudes and Social Change.," PSPR 13 (2013): 3; E. Hehman et al., "Group Status Drives Majority and Minority Integration Preferences," Psych Sci 23 (2011): 46.

77. A demonstration that a reward shared with an in-group member activates dopaminergic reward pathways more than does the same reward shared with a stranger: J. B. Freeman and D. Fareri et al., "Social Network Modulation of Reward-Related Signals," J Nsci 32 (2012): 9045.

Chapter 12: Hierarchy, Obedience, and Resistance

1. J. Freeman et al., "The Part: Social Status Cues Shape Race Perception," PLoS ONE 6 (2011): e25107.

2. Footnote: George, "Faith and Toilets," Sci Am, November 19, 2015.

3. R. I. Dunbar and S. Shultz, "Evolution in the Social Brain," Sci 317 (2007): 1344; R. I. Dunbar, "The Social Brain Hypothesis and Its Implications for Social Evolution," Ann Hum Biol 36 (2009): 562; F. J. Pérez-Barbería et al. "Evidence for Coevolution of Sociality and Relative Brain Size in Three Orders of Mammals," Evolution 61 (2007): 2811: J. Powell et al., "Orbital Prefrontal Cortex Volume Predicts Social Network Size: An Imaging Study of Individual Differences in Humans," Proc Royal Soc B: Biol Sci 279 (2012): 2157; P. A. Lewis et al., "Ventromedial Prefrontal Volume Predicts Understanding of Others and Social Network Size," Neuroimage 57 (2011): 1624; J. L. Powell et al., "Orbital Prefrontal Cortex Volume Correlates with Social Cognitive Competence," Neuropsychologia 48 (2010): 3554; J. Lehmann and R. I. Dunbar, "Network Cohesion, Group Size and Neocortex Size in Female-Bonded Old World Primates," Proc Royal Soc B: Biol Sci 276 (2009): 4417; J. Sallet et al., "Social Network Size Affects Neural Circuits in Macagues," Sci 334 (2011): 697.

4. F. Amici et al., "Fission-Fusion Dynamics, Behavioral Flexibility, and Inhibitory Control in Primates," Curr Biol 18 (2008): 1415; A. B. Bond et al., "Serial Reversal Learning and the Evolution of Behavioral Flexibility in Three Species of North American Corvids (Gymnorhinus cyanocephalus, Nucifraga columbiana, Aphelocoma californica)," JCP 121 (2007): 372; A. Bond et al., "Social Complexity and Transitive Inference in Corvids," Animal Behav 65 (2003): 479.

5. J. Lehmann and R. I. Dunbar, "Network Cohesion, Group Size and Neocortex Size in Female- Bonded Old World Primates," Proc Royal Soc B: Biol Sci 276 (2009): 4417.

6. J. Powell et al., "Orbital Prefrontal Cortex Volume Predicts Social Network Size: An Imaging Study of Individual Differences in Humans," Proc Royal Soc B: Biol Sci 279 (2012): 2157; P. A. Lewis et al., "Ventromedial Prefrontal Volume Predicts Understanding of Others and Social Network Size," Neuroimage 57 (2011): 1624; J. L. Powell et al., "Orbital Prefrontal Cortex Volume Correlates with Social Cognitive Competence," Neuropsychologia 48 (2010): 3554; K. C. Bickart et al., "Amygdala Volume and Social Network Size in Humans," Nat Nsci 14 (2011): 163; R. Kanai et al., "Online Social Network Size Is Reflected in Human Brain Structure," Proc Royal Soc B: Biol Sci 279 (2012): 1327.

7. F. Elgar et al., "Income Inequality and School Bullying: Multilevel Study of Adolescents in 37 Countries," J Adolescent Health 45 (2009): 351.

8. E. González-Bono et al., "Testosterone, Cortisol and Mood in a Sports Team Competition," Horm Behav 35 (2009): 55; E. González-Bono et al., "Testosterone and Attribution of Successful Competition," Aggressive Behav 26 (2000): 235.

9. N. O. Rule et al., "Perceptions of Dominance Following Glimpses of Faces and Bodies," Perception 41 (2012): 687.

10. L. Thomsen et al., "Big and Mighty: Preverbal Infants Mentally Represent Social Dominance," Sci 331 (2011): 477.

11. S. V. Shepherd et al., "Social Status Gates Social Attention in Monkeys," Curr Biol 16 (2006): R119; J. Massen et al., "Ravens Notice Dominance Reversals Among Conspecifics Within and Outside Their Social Group," Nat Communications 5 (2013); 3679.

12. M. Karafin et al., "Dominance Attributions Following Damage to the Ventromedial Prefrontal Cortex," J Cog Nsci 16 (2004): 1796; L. Mah et al., "Impairment of Social Perception Associated with Lesions of the Prefrontal Cortex," Am J Psychiatry 161 (2004): 1247; T. Farrow et al., "Higher or Lower? The Functional Anatomy of Perceived Allocentric Social Hierarchies," Neuroimage 57 (2011): 1552; C. F. Zink et al., "Know Your Place: Neural Processing of Social Hierarchy in Humans," Neuron 58 (2008): 273.

13. A. A. Marsh et al., "Dominance and Submission: The Ventrolateral Prefrontal Cortex and Responses to Status Cues," J Cog Nsci 21 (2009): 713; T. Allison et al., "Social Perception from Visual Cues: Role of the STS Region," TICS 4 (2000): 267; J. B. Freeman et al., "Culture Shapes a Mesolimbic Response to Signals of Dominance and Subordination That Associates with Behavior," Neuroimage 47 (2009): 353.

14. M. Nader et al., "Social Dominance in Female Monkeys: Dopamine Receptor Function and Cocaine Reinforcement," BP 72 (2012): 414; M. P. Noonan et al., "A Neural Circuit Covarying with Social Hierarchy in Macaques," PLoS Biol 12 (2014): e1001940; F. Wang et al., "Bidirectional Control of Social Hierarchy by Synaptic Efficacy in Medial Prefrontal Cortex," Sci 334 (2011): 693.

15. M. Rushworth et al., "Are There Specialized Circuits for Social Cognition and Are They Unique to Humans?" PNAS 110 (2013): 10806.

16. For example: J. C. Beehner et al., "Testosterone Related to Age and Life-History Stages in Male Baboons and Geladas," Horm Behav 56 (2009): 472.

17. J. Brady et al., "Avoidance Behavior and the Development of Duodenal

Ulcers," J the Exp Analysis of Behav 1 (1958): 69; J. Weiss, "Effects of Coping Responses on Stress," J Comp Physiological Psych 65 (1968): 251.

18. R. Sapolsky, "The Influence of Social Hierarchy on Primate Health," Sci 308 (2005): 648; H. Uno et al., "Hippocampal Damage Associated with Prolonged and Fatal Stress in Primates," J Nsci 9 (1989): 1705; R. Sapolsky et al., "Hippocampal Damage Associated with Prolonged Glucocorticoid Exposure in Primates," J Nsci 10 (1990): 2897; See also E. Archie et al., "Social Status Predicts Wound Healing in Wild Baboons," PNAS 109 (2012): 9017.

19. R. Sapolsky, "The Physiology of Dominance in Stable Versus Unstable Social Hierarchies," in Primate Social Conflict, ed. W. Mason and S. Mendoza (New York: SUNY Press, 1993).

20. L. R. Gesquiere et al., "Life at the Top: Rank and Stress in Wild Baboons," Sci 333 (2011): 357.

21. D. Abbott et al., "Are Subordinates Always Stressed? A Comparative Analysis of Rank Differences in Cortisol Levels Among Primates," Horm Behav 43 (2003): 67.

22. R. Sapolsky and J. Ray, "Styles of Dominance and Their Physiological Correlates Among Wild Baboons," Am J Primat 18 (1989) 1; J. C. Ray and R. Sapolsky, "Styles of Male Social Behavior and Their Endocrine Correlates Among High-Ranking Baboons," Am J Primat 28 (1992): 231; C. E. Virgin and R. Sapolsky, "Styles of Male Social Behavior and Their Endocrine Correlates Among Low-Ranking Baboons," Am J Primat 42 (1997): 25.

23. J. Chiao et al., "Neural Basis of Preference for Human Social Hierarchy Versus Egalitarianism," ANYAS 1167 (2009): 174; J. Sidanius et al., "You're Inferior and Not Worth Our Concern: The Interface Between Empathy and Social Dominance Orientation," J Personality 81 (2012): 313.

24. G. Sherman et al., "Leadership Is Associated with Lower Levels of Stress," PNAS 109 (2012): 17903; R. Sapolsky, "Importance of a Sense

of Control and the Physiological Benefits of Leadership," PNAS 109 (2012): 17730.

25. N. Adler and J. Ostrove, "SES and Health: What We Know and What We Don't," ANYAS 896 (1999): 3; R. Wilkinson, Mind the Gap: Hierarchies, Health and Human Evolution (London: Weidenfeld and Nicolson, 2000); I. Kawachi and B. Kennedy, The Health of Nations: Why Inequality Is Harmful to Your Health (New York: New Press, 2002); M. Marmot, The Status Syndrome: How Social Standing Affects Our Health and Longevity (New York: Bloomsbury, 2015).

26. A. Todorov et al., "Inferences of Competence from Faces Predict Election Outcomes," Sci 308 (2005): 1623.

27. T. Tsukiura and R. Cabeza, "Shared Brain Activity for Aesthetic and Moral Judgments: Implications for the Beauty-Is-Good Stereotype," SCAN 6 (2011): 138.

28. K. Dion et al., "What Is Beautiful Is Good," JPSP 24 (1972): 285.

29. N. K. Steffens and S. A. Haslam, "Power Through 'Us': Leaders' Use of We-Referencing Language Predicts Election Victory," PLoS ONE 8 (2013): e77952.

30. B. R. Spisak et al., "Warriors and Peacekeepers: Testing a Biosocial Implicit Leadership Hypothesis of Intergroup Relations Using Masculine and Feminine Faces," PLoS ONE 7 (2012): e30399; B. R. Spisak, "The General Age of Leadership: Older-Looking Presidential Candidates Win Elections During War," PLoS ONE 7 (2012): e36945; B. R. Spisak et al., "A Face for All Seasons: Searching for Context-Specific Leadership Traits and Discovering a General Preference for Perceived Health," Front Hum Nsci 8 (2014): 792.

31. J. Antonakis and O. Dalgas, "Predicting Elections: Child's Play!" Sci 323 (2009): 1183.

32. K. Smith et al., "Linking Genetics and Political Attitudes: Reconceptualizing Political Ideology," Political Psych 32 (2011): 369.

33. G. Hodson and M. Busseri, "Bright Minds and Dark Attitudes: Lower Cognitive Ability Predicts Greater Prejudice Through Right-Wing Ideology and Low Intergroup Contact," Psych Sci 32 (2012): 187; C. Sibley and J. Duckitt, "Personality and Prejudice: A Meta-analysis and Theoretical Review," PSPR 12 (2008): 248.

34. L. Skitka et al., "Dispositions, Ideological Scripts, or Motivated Correction? Understanding Ideological Differences in Attributions for Social Problems," JPSP 83 (2002): 470; L. J. Skitka, "Ideological and Attributional Boundaries on Public Compassion: Reactions to Individuals and Communities Affected by a Natural Disaster," PSPB 25 (1999): 793; L. J. Skitka and P. E. Tetlock, "Providing Public Assistance: Cognitive and Motivational Processes Underlying Liberal and Conservative Policy Preferences," JPSP (1993): 65, 1205; G. S. Morgan et al., "When Values and Attributions Collide: Liberals' and Conservatives' Values Motivate Attributions for Alleged Misdeeds," PSPB 36 (2010): 1241; J. T. Jost and M. Krochik, "Ideological Differences in Epistemic Motivation: Implications for Attitude Structure, Depth of Information Processing, Susceptibility to Persuasion, and Stereotyping," Advances in Motivation Sci 1 (2014): 181.

35. S. Eidelman et al., "Low-Effort Thought Promotes Political Conservatism," PSPB 38 (2012): 808; H. Thórisdóttir and J. T. Jost, "Motivated Closed-Mindedness Mediates the Effect of Threat on Political Conservatism," Political Psych 32 (2011): 785.

36. B. Briers et al., "Hungry for Money: The Desire for Caloric Resources Increases the Desire for Financial Resources and Vice Versa," Psych Sci 17 (2006): 939; S. Danziger et al., "Extraneous Factors in Judicial Decisions," PNAS 108 (2011): 6889. The preceding is the source of the figure in the text. C. Schein and K. Gray, "The Unifying Moral Dyad," PSPB 41 (2015): 1147.

37. S. J. Thoma, "Estimating Gender Differences in the Comprehension and Preference of Moral Issues," Developmental Rev 6 (1986): 165; S. J. Thoma, "Research on the Defining Issues Test," in Handbook of Moral

Development, ed. M. Killen and J. Smetana (New York: Psychology Press 2006), p. 67; N. Mahwa et al., "The Distinctiveness of Moral Judgment," Educational Psych Rev 11 (1999): 361; E. Turiel, The Development of Social Knowledge: Morality and Convention (Cambridge: Cambridge University Press, 1983); N. Kuyel and R. J. Clover, "Moral Reasoning and Moral Orientation of U.S. and Turkish University Students," Psych Rep 107 (2010): 463.

38. J. Haidt, "The New Synthesis in Moral Psychology," Sci 316 (2007): 998; G. L. Baril and J. C. Wright, "Different Types of Moral Cognition: Moral Stages Versus Moral Foundations," Personality and Individual Differences 53 (2012): 468.

39. N. Shook and R. Fazio, "Political Ideology, Exploration of Novel Stimuli, and Attitude Formation," JESP 45 (2009): 995; M. D. Dodd et al., "The Political Left Rolls with the Good and the Political Right Confronts the Bad: Connecting Physiology and Cognition to Preferences," Philosophical Transactions of the Royal Soc B 640 (2012) 640; K. Bulkeley, "Dream Content and Political Ideology," Dreaming 12 (2002): 61; J. Vigil, "Political Leanings Vary with Facial Expression Processing and Psychosocial Functioning," Group Processes & Intergroup Relations 13 (2011): 547; J. Jost et al., "Political Conservatism as Motivated Social Cognition," Psych Bull 129 (2003): 339; L. Castelli and L. Carraro, "Ideology Is Related to Basic Cognitive Processes Involved in Attitude Formation," JESP 47 (2011): 1013; L. Carraro et al., "Implicit and Explicit Illusory Correlation as a Function of Political Ideology," PLoS ONE 9 (2014): e96312; J. R. Hibbing et al., "Differences in Negativity Bias Underlie Variations in Political Ideology," BBS 37 (2014): 297.

40. For an interesting analysis of the relationships among rank, stability, and risk aversion, see J. Jordan et al., "Something to Lose and Nothing to Gain: The Role of Stress in the Interactive Effect of Power and Stability on Risk Taking," Administrative Sci Quarterly 56 (2011): 530. Discussed in: J. Jost et al., "Political Conservatism as Motivated Social Cognition," Psych Bull 129 (2003): 339. **41**. P. Nail et al., "Threat Causes Liberals to Think Like Conservatives," JESP 45 (2009): 901; J. Greenberg et al., "The Causes and Consequences of the Need for Self-Esteem: A Terror Management Theory," in Public Self and Private Self, ed. R. Baumeister (New York: Springer, 1986); T. Verlag Pyszczynski et al., "A Dual Process Model of Defense Against Conscious and Unconscious Death-Related Thoughts: An Extension of Terror Management Theory," Psych Rev 106 (1999): 835.

42. J. L. Napier and J. T. Jost, "Why Are Conservatives Happier Than Liberals?" Psych Sci 19 (2008): 565.

43. J. Block and J. Block, "Nursery School Personality and Political Orientation Two Decades Later," J Res in Personality 40 (2006): 734. Also see: M. R. Tagar et al., "Heralding the Authoritarian? Orientation Toward Authority in Early Childhood," Psych Sci 25 (2014): 883; R. C. Fraley et al., "Developmental Antecedents of Political Ideology: A Longitudinal Investigation from Birth to Age 18 Years," Psych Sci 23 (2012): 1425.

44. Y. Inbar et al., "Disgusting Smells Cause Decreased Liking of Gay Men," Emotion 12 (2012): 23; T. Adams et al., "Disgust and the Politics of Sex: Exposure to a Disgusting Odorant Increases Politically Conservative Views on Sex and Decreases Support for Gay Marriage," PLoS ONE 9 (2014): e95572; H. A. Chapman and A. K. Anderson, "Things Rank and Gross in Nature: A Review and Synthesis of Moral Disgust," Psych Bull 139 (2013): 300.

45. G. Hodson and K. Costello, "Interpersonal Disgust, Ideological Orientations, and Dehumanization as Predictors of Intergroup Attitudes," Psych Sci 18 (2007): 691; K. Smith et al., "Disgust Sensitivity and the Neurophysiology of Left-Right Political Orientations," PLoS ONE 6 (2011): e2552.

46. J. Lee et al., "Emotion Regulation as the Foundation of Political Attitudes: Does Reappraisal Decrease Support for Conservative Policies?" PLoS ONE 8 (2013): e83143; M. Feinberg et al., "Gut Check: Reappraisal of Disgust Helps Explain Liberal-Conservative Differences on Issues of

Purity," Emotion 14 (2014): 513.

47. J. Haidt, The Righteous Mind: Why Good People Are Divided by Politics and Religion (New York: Pantheon, 2012); L. Kass, "The Wisdom of Repugnance: Why We Should Ban the Cloning of Human Beings," New Republic, June 2, 1997.

48. R. Kanai et al., "Political Orientations Are Correlated with Brain Structure in Young Adults," Curr Biol 21 (2011): 677; D. Schreiber et al., "Red Brain, Blue Brain: Evaluative Processes Differ in Democrats and Republicans," PLoS ONE 8 (2013): e52970; W. Ahn et al., "Nonpolitical Images Evoke Neural Predictors of Political Ideology," Curr Biol 24 (2014): 2693. For a general review, see J. Hibbing et al., "The Deeper Source of Political Conflict: Evidence from the Psychological, Cognitive, and Neurosciences," TICS 18 (2014): 111.

49. J. Settle et al., "Friendships Moderate an Association Between a Dopamine Gene Variant and Political Ideology," J Politics 72 (2010): 1189; K. Smith et al., "Linking Genetics and Political Attitudes: Reconceptualizing Political Ideology," Political Psych 32 (2011): 369; L. Buchen, "The Anatomy of Politics," Nat 490 (2012): 466. Some papers on the genetics of political orientation and involvement: Twin studies: N. G. Martin et al., "Transmission of Social Attitudes," PNAS 83 (1986): 4364; R. I. Lake et al., "Further Evidence Against the Environmental Transmission of Individual Differences in Neuroticism from a Collaborative Study of 45,850 Twins and Relatives on Two Continents," Behav Genetics 30 (2000): 223; J. R. Alford et al., "Are Political Orientations Genetically Transmitted," Am Political Sci Rev 99 (2005): 153. Genomewide linkage: P. Hatemi et al., "A Genome-wide Analysis of Liberal and Conservative Political Attitudes," J Politics 73 (2011): 1; D. Amodio et al., "Neurocognitive Correlates of Liberalism and Conservatism," Nat Nsci 10 (2007): 1246.

50. T. Kameda and R Hastie, "Herd Behavior: Its Biological, Neural, Cognitive and Social Underpinnings," in Emerging Trends in the Social

and Behavioral Sciences, ed. R. Scott and S. Kosslyn (Hoboken, NJ: Wiley and Sons, 2015); H. Kelman, "Compliance, Identification, and Internalization: Three Processes of Attitude Change," J Conflict Resolution 2 (1958): 51.

51. Footnote: B. O. McGonigle and M. Chalmers, "Are Monkeys Logical?" Nat 267 (1977): 694; D. J. Gillian, "Reasoning in the Chimpanzee: II. Transitive Inference," J Exp Psych: Animal Behav Processes 7 (1981): 87; H. Davis, "Transitive Inference in Rats (Rattus norvegicus)," J Comparative Psych 106 (1992): 342; W. Roberts and M. Phelps, "Transitive Inference in Rats: A Test of the Spatial Coding Hypothesis," Psych Sci 5 (1994): 368; L. von Fersen et al., "Transitive Inference Formation in Pigeons," J Exp Psych: Animal Behav Processes 17 (1991): 334; J. Stern et al., "Transitive Inference in Pigeons: Simplified Procedures and a Test of Value Transfer Theory," Animal Learning & Behav 23 (1995): 76; A. B. Bond et al., "Social Complexity and Transitive Inference in Corvids," Animal Behav 65 (2003): 479; L. Grosenick et al., "Fish Can Infer Social Rank by Observation Alone," Nat 445 (2007): 429.

52. C. Watson and C. Caldwell, "Neighbor Effects in Marmosets: Social Contagion of Agonism and Affiliation in Captive Callithrix jacchus," Am J Primat 72 (2010): 549; K. Baker and F. Aureli, "The Neighbor Effect: Other Groups Influence Intragroup Agonistic Behavior in Captive Chimpanzees," Am J Primat 40 (1996): 283. **53**. L. A. Dugatkin, "Animals Imitate, Too," Sci Am 283 (2000): 67.

54. K. Bonnie et al., "Spread of Arbitrary Conventions Among Chimpanzees: A Controlled Experiment," Proc Royal Soc of London B 274 (2007): 367; M. Dindo et al., "In-group Conformity Sustains Different Foraging Traditions in Capuchin Monkeys (Cebus apella)," PLoS ONE 4 (2009): e7858; D. Fragaszy and E. Visalberghi, "Socially Biased Learning in Monkeys," Learning Behav 32 (2004): 24; L. Aplin et al., "Experimentally-Induced Innovations Lead to Persistent Culture via Conformity in Wild Birds," Nat 518 (2014): 538. One study that failed to replicate the basic de Waal finding: E. Van Leeuwen et al., "Chimpanzees

(Pan troglodytes) Flexibly Adjust Their Behaviour in Order to Maximize Payoffs, Not to Conform to Majorities," PLoS ONE 8 (2013): e80945.

55. E. van de Waal et al., "Potent Social Learning and Conformity Shape a Wild Primate's Foraging Decisions," Sci 340 (2013): 483.

56. A. Shestakova et al., "Electrophysiological Precursors of Social Conformity," SCAN 8 (2013): 756

57. H. Tajfel and J. C. Turner, "The Social Identity Theory of Intergroup Behaviour," in Psychology of Intergroup Relations, ed. S. Worchel and W. G. Austin (Chicago IL: Nelson-Hall, 1986), pp. 7–24; E. A. Losin et al., "Own-Gender Imitation Activates the Brain's Reward Circuitry," SCAN 7 (2012): 804; R. Yu and S. Sun, "To Conform or Not to Conform: Spontaneous Conformity Diminishes the Sensitivity to Monetary Outcomes," PLoS ONE 28 (2013): e64530.

58. R. Huber et al., "Neural Correlates of Informational Cascades: Brain Mechanisms of Social Influence on Belief Updating," Neuroimage 249 (2010): 2687; G. Berns et al., "Neural Mechanisms of the Influence of Popularity on Adolescent Ratings of Music," BP 58 (2005): 245; M. Edelson et al., "Following the Crowd: Brain Substrates of Long-Term Memory Conformity," Sci 333 (2011): 108; H. L. Roediger and K. B. McDermott, "Remember When?" Sci 333 (2011): 47; J. Chen et al., "ERP Correlates of Social Conformity in a Line Judgment Task," BMC Nsci 13 (2012): 43; K. Izuma, "The Neural Basis of Social Influence and Attitude Change," Curr Opinion in Neurobiol 23 (2013): 456.

59. J. Zaki et al., "Social Influence Modulates the Neural Computation of Value," Psych Sci 22 (2011): 894.

60. V. Klucharev et al., "Downregulation of the Posterior Medial Frontal Cortex Prevents Social Conformity," J Nsci 31 (2011): 11934; See also: A. Shestakova et al., "Electrophysiological Precursors of Social Conformity," SCAN 8 (2013): 756; V. Klucharev et al., "Reinforcement Learning Signal Predicts Social Conformity," Neuron 61 (2009): 140. **61**. G. Berns et al., "Neurobiological Correlates of Social Conformity and Independence During Mental Rotation," BP 58 (2005): 245.

62. S. Asch, "Opinions and Social Pressure," Sci Am 193 (1955): 35; S. Asch, "Studies of Independence and Conformity: A Minority of One Against a Unanimous Majority," Psych Monographs 70 (1956): 1.

63. S. Milgram, Obedience to Authority: An Experimental View (New York: HarperCollins, 1974).

64. C. Haney et al., "Study of Prisoners and Guards in a Simulated Prison," Naval Research Rev 9 (1973): 1; C. Haney et al., "Interpersonal Dynamics in a Simulated Prison," Int J Criminology and Penology 1 (1973): 69.

65. M. Banaji, "Ordinary Prejudice," Psych Sci Agenda 8 (2001): 8.

66. Footnote: C. Hofling et al., "An Experimental Study of Nurse-Physician Relationships," J Nervous and Mental Disease 141 (1966): 171.

67. S. Fiske et al., "Why Ordinary People Torture Enemy Prisoners," Sci 306 (2004): 1482.

68. P. Zimbardo, The Lucifer Effect: Understanding How Good People Turn Evil (New York: Random House, 2007). This is also one source of the Solzhenitsyn quote.

69. Ibid.

70. G. Perry, Behind the Shock Machine: The Untold Story of the Notorious Milgram Psych Experiments (New York: New Press, 2013).

71. T. Carnahan and S. McFarland, "Revisiting the Stanford Prison Experiment: Could Participant Self- Selection Have Led to the Cruelty?" PSPB 33 (2007): 603; S. H. Lovibond et al., "Effects of Three Experimental Prison Environments on the Behavior of Non-convict Volunteer Subjects," Psychologist 14 (1979): 273.

72. S. Reiche and S. A. Haslam, "Rethinking the Psychology of Tyranny: The BBC Prison Study," Brit J Soc Psych 45 (2006): 1; S. A. Haslam and S.

D. Reicher, "When Prisoners Take Over the Prison: A Social Psychology of Resistance," PSPR 16 (2012): 154.

73. P. Zimbardo, "On Rethinking the Psychology of Tyranny: The BBC Prison Study," Brit J Soc Psych 45 (2006): 47.

74. A. Abbott, "How the Brain Responds to Orders," Nat 530 (2016): 394.

75. B. Müller-Hill, Murderous Science: Elimination by Scientific Selection of Jews, Gypsies, and Others, Germany 1933–1945 (Oxford: Oxford University Press, 1988).

76. S. Asch, "Opinions and Social Pressure," Sci Am, 193 (1955): 35.

77. R. Sapolsky, "Measures of Life," Sciences, March/April 1994, p. 10.

78. R. Watson, "Investigation into Deindividuation Using a Cross-Cultural Survey Technique," JPSP 25 (1973): 342.

79. A. Bandura et al., "Disinhibition of Aggression Through Diffusion of Responsibility and Dehumanization of Victims," J Res in Personality 9 (1975): 253.

80. L. Bègue et al., "Personality Predicts Obedience in a Milgram Paradigm," J Personality 83 (2015): 299; V. Zeigler-Hill, et al., "Neuroticism and Negative Affect Influence the Reluctance to Engage in Destructive Obedience in the Milgram Paradigm," J Soc Psych 153 (2013): 161; T. Blass, "Right- Wing Authoritarianism and Role as Predictors of Attributions About Obedience to Authority," Personality and Individual Differences 1 (1995): 99; P. Burley and J. McGuinnes, "Effects of Social Intelligence on the Milgram Paradigm," Psych Rep 40 (1977): 767.

81. A. H. Eagly and L. L. Carli, "Sex of Researchers and Sex-Typed Communications as Determinants of Sex Differences in Influenceability: A Meta-analysis of Social Influence Studies," Psych Bull 90 (1981): 1; S. Ainsworth and J. Maner, "Sex Begets Violence: Mating Motives, Social Dominance, and Physical Aggression in Men," JPSP 103 (2012): 819; H. Reitan and M. Shaw, "Group Membership, Sex-Composition of the Group, and Conformity Behavior," J Soc Psych 64 (1964): 45.

82. S. Milgram, "Nationality and Conformity," Sci Am 205 (1961): 45.

Chapter 13: Morality and Doing the Right Thing, Once You've Figured Out What That Is

1. A. Shenhav and J. D. Greene, "Moral Judgments Recruit Domain-General Valuation Mechanisms to Integrate Representations of Probability and Magnitude," Neuron 67 (2010): 667; P. N. Tobler et al., "The Role of Moral Utility in Decision Making: An Interdisciplinary Framework," Cog, Affective & Behav Nsci 8 (2008): 390; B. Harrison et al., "Neural Correlates of Moral Sensitivity in OCD," AGP 69 (2012): 741.

2. L. Young et al., "The Neural Basis of the Interaction Between Theory of Mind and Moral Judgment," PNAS 104 (2007): 8235; L. Young and R. Saxe, "Innocent Intentions: A Correlation Between Forgiveness for Accidental Harm and Neural Activity," Neuropsychologia 47 (2009): 2065; L. Young et al., "Disruption of the Right Temporoparietal Junction with TMS Reduces the Role of Beliefs in Moral Judgments," PNAS 107 (2009): 6753; L. Young and R. Saxe, "An fMRI Investigation of Spontaneous Mental State Inference for Moral Judgment," J Cog Nsci 21 (2009): 1396.

3. J. Knobe, "Intentional Action and Side Effects in Ordinary Language Analysis," 63 (2003): 190; J. Knobe, "Theory of Mind and Moral Cognition: Exploring the Connections," TICS 9 (2005): 357.

4. J. Knobe, "Theory of Mind and Moral Cognition: Exploring the Connections," TICS 9 (2005): 357.

5. P. Singer, "Sidgwick and Reflective Equilibrium," Monist 58 (1974), reprinted in Unsatisfying Human Life, ed. H. Kulse (Oxford: Blackwell, 2002).

6. J. Haidt, "The Emotional Dog and Its Rational Tail: A Social Intuitionist Approach to Moral Judgment," Psych Rev 108 (2001): 814–34; J. Haidt, "The New Synthesis in Moral Psychology," Sci 316 (2007): 996.

7. J. S. Borg et al., "Infection, Incest, and Iniquity: Investigating the Neural Correlates of Disgust and Morality," J Cog Nsci 20 (2008): 1529.

8. M. Haruno and C. D. Frith, "Activity in the Amygdala Elicited by Unfair Divisions Predicts Social Value Orientation," Nat Nsci 13 (2010): 160; C. D. Batson, "Prosocial Motivation: Is It Ever Truly Altruistic?" Advances in Exp. Soc Psych 20 (1987): 65; A. G. Sanfey et al., "The Neural Basis of Economic Decision-Making in the Ultimatum Game," Sci 300 (2003): 1755.

9. J. Van Bavel et al., "The Importance of Moral Construal: Moral Versus Non-moral Construal Elicits Faster, More Extreme, Universal Evaluations of the Same Actions," PLoS ONE 7 (2012): e48693.

10. G. Miller, "The Roots of Morality," Sci 320 (2008): 734.

11. For this entire section on rudiments of morality in young children, see the excellent P. Bloom, Just Babies: The Origins of Good and Evil (Portland, OR: Broadway Books, 2014). This source applies to the subsequent half dozen paragraphs.

12. S. F. Brosnan and F. B. M. de Waal, "Monkeys Reject Unequal Pay," Nat 425 (2003): 297.

13. F. Range et al., "The Absence of Reward Induces Inequity Aversion in Dogs," PNAS 106 (2009): 340; C. Wynne "Fair Refusal by Capuchin Monkeys," Nat 428 (2004): 140; D. Dubreuil et al., "Are Capuchin Monkeys (Cebus apella) Inequity Averse?" Proc Royal Soc of London B 273 (2006): 1223.

14. S. F. Brosnan and F. B. M. de Waal, "Evolution of Responses to (un) Fairness," Sci 346 (2014): 1251776; S. F. Brosnan et al., "Mechanisms Underlying Responses to Inequitable Outcomes in Chimpanzees, Pan troglodytes," Animal Behav 79 (2010): 1229; M. Wolkenten et al., "Inequity Responses of Monkeys Modified by Effort," PNAS 104 (2007): 18854.

15. K. Jensen et al., "Chimpanzees Are Rational Maximizers in an Ultimatum Game," Sci 318 (2007): 107; D. Proctor et al., "Chimpanzees Play the Ultimatum Game," PNAS 110 (2013): 2070. **16**. V. R. Lakshminarayanan and L. R. Santos, "Capuchin Monkeys Are Sensitive to Others' Welfare," Curr Biol 17 (2008): 21; J. M. Burkart et al., "Other-Regarding Preferences in a Non-human Primate: Common Marmosets Provision Food Altruistically," PNAS 104 (2007): 19762; J. B. Silk et al., "Chimpanzees Are Indifferent to the Welfare of Unrelated Group Members," Nat 437 (2005); 1357; K. Jensen et al., "What's in It for Me? Self-Regard Precludes Altruism and Spite in Chimpanzees," Proc Royal Soc B 273 (2006): 1013; J. Vonk et al., "Chimpanzees Do Not Take Advantage of Very Low Cost Opportunities to Deliver Food to Unrelated Group Members," Animal Behav 75 (2008): 1757.

17. F. De Waal and S. Macedo, Primates and Philosophers: How Morality Evolved (Princeton, NJ: Princeton Science Library, 2009).

18. B. Thomas et al., "Harming Kin to Save Strangers: Further Evidence for Abnormally Utilitarian Moral Judgments After Ventromedial Prefrontal Damage," J Cog Nsci 23 (2011): 2186.

19. J. Greene et al., "An fMRI Investigation of Emotional Engagement in Moral Judgment," Sci 293 (2001): 2105; J. Greene et al., "The Neural Bases of Cognitive Conflict and Control in Moral Judgment," Neuron 44 (2004): 389; J. Greene, Moral Tribes: Emotion, Reason and the Gap Between Us and Them (New York: Penguin, 2014).

20. D. Ariely, Predictably Irrational: The Hidden Forces That Shape Our Decisions (New York: Harper Perennial, 2010).

21. P. Singer, "Famine, Affluence, and Morality," Philosophy and Public Affairs 1 (1972) 229.

22. D. A. Smalia et al., "Sympathy and Callousness: The Impact of Deliberative Thought on Donations to Identifiable and Statistical Victims," Organizational Behav and Hum Decision Processes 102 (2007): 143; L. Petrinovich and P. O'Neill, "Influence of Wording and Framing Effects on Moral Intuitions," Ethology and Sociobiology 17 (1996): 145; L. Petrinovich et al., "An Empirical Study of Moral Intuitions: Toward an Evolu-

tionary Ethics," JPSP 64 (1993): 467; R. E. O'Hara et al., "Wording Effects in Moral Judgments," Judgment and Decision Making 5 (2010): 547.

23. A. Cohn et al., "Business Culture and Dishonesty in the Banking Industry," Nat 516 (2014): 86. See also M. Villeval, "Professional Identity Can Increase Dishonesty," Nat 516 (2014): 48.

24. R. Zahn et al., "The Neural Basis of Human Social Values: Evidence from Functional MRI," Cerebral Cortex 19 (2009): 276.

25. K. Starcke et al., "Does Stress Alter Everyday Moral Decision-Making?" PNE 36 (2011): 210; F. Youssef et al., "Stress Alters Personal Moral Decision Making," PNE 37 (2012): 491.

26. E. Pronin, "How We See Ourselves and How We See Others," Sci 320 (2008): 1177.

27. R. M. N. Shweder et al., "The 'Big Three' of Morality and the 'Big Three' Explanations of Suffering," in Morality and Health, ed. A. M. B. P. Rozin (Oxford: Routledge, 1997).

28. M. Shermer, The Science of Good and Evil (New York: Holt, 2004).

29. F. W. Marlowe et al., "More 'Altruistic' Punishment in Larger Societies," Sci 23 (2006): 1767; J. Henrich et al., "'Economic Man' in Cross-Cultural Perspective: Behavioral Experiments in 15 Small- Scale Societies," BBS 28 (2005): 795.

30. R. Benedict, The Chrysanthemum and the Sword (Nanjing, China: Yilin Press1946); H. Katchadourian, Guilt: The Bite of Conscience (Palo Alto, CA: Stanford General Books, 2011); J. Jacquet, Is Shame Necessary? New Uses for an Old Tool (New York: Pantheon, 2015).

31. C. Berthelsen, "College Football: 9 Enter Pleas in U.C.L.A. Parking Case," New York Times, July 29, 1999, www.nytimes.com/1999/07/29/ sports/college-football-9-enter-pleas-in-ucla-parking- case.html.

32. J. Bakan, The Corporation: The Pathological Pursuit of Profit and Power (New York: Simon & Schuster 2005).

33. Greene, Moral Tribes.

34. D. G. Rand et al., "Spontaneous Giving and Calculated Greed," Nat 489 (2012): 427.

35. S. Bowles, "Policies Designed to Self-Interested Citizens May Undermine 'The Moral Sentiments': Evidence from Economic Experiments," Sci 320 (2008): 1605; E. Fehr and B. Rockenbach, "Detrimental Effects of Sanctions on Human Altruism," Nat 422 (2003): 137.

36. M. M. Littlefield et al., "Being Asked to Tell an Unpleasant Truth About Another Person Activates Anterior Insula and Medial Prefrontal Cortex," Front Hum Nsci 9 (2015): 553; Footnote: S. Harris, Lying. Four Elephants Press, 2013. e-book.

37. For a tour of animal deception, see the following: B. C. Wheeler, "Monkeys Crying Wolf? Tufted Capuchin Monkeys Use Anti-predator Calls to Usurp Resources from Conspecifics," Proc Royal Soc B Biol Sci 276 (2009): 3013; F. Amici et al., "Variation in Withholding of Information in Three Monkey Species," Proc Royal Soc B Biol Sci 276 (2009): 3311; A. le Roux et al., "Evidence for Tactical Concealment in a Wild Primate," Nat Communications 4 (2013): 1462; A. Whiten and R. W. Byrne, "Tactical Deception in Primates," BBS 11 (1988): 233; F. de Waal, Chimpanzee Politics: Power and Sex Among Apes (Baltimore, MD: Johns Hopkins University Press, 1982); G. Woodruff and D. Premack, "Intentional Communication in the Chimpanzee: The Development of Deception," Cog 7 (1979): 333; R. W. Byrne and N. Corp, "Neocortex Size Predicts Deception Rate in Primates," Proc Royal Soc B Biol Sci 271 (2004): 693; C. A. Ristau, "Language, Cognition, and Awareness in Animals?" ANYAS 406 (1983): 170; T. Bugnyar and K. Kotrschal, "Observational Learning and the Raiding of Food Caches in Ravens, Corvus corax: Is It 'Tactical' Deception?" Animal Behav 64 (2002): 185; J. Bro-Jorgensen and W. M. Pangle, "Male Topi Antelopes Alarm Snort Deceptively to Retain Females for Mating," Am Nat 176 (2010): E33; C. Brown et al., "It Pays to Cheat: Tactical Deception in a Cephalopod So-

cial Signalling System," Biol Lett 8 (2012): 729; T. Flower, "Fork- Tailed Drongos Use Deceptive Mimicked Alarm Calls to Steal Food," Proc Royal Soc B Biol Sci 278 (2011): 1548.

38. K. G. Volz et al., "The Neural Basis of Deception in Strategic Interactions," Front Behav Nsci 9 (2015): 27.

39. Y. Yang et al., "Prefrontal White Matter in Pathological Liars," Br J Psychiatry 187 (2005): 325; Y. Yang et al., "Localisation of Increased Prefrontal White Matter in Pathological Liars," Br J Psychiatry 190 (2007):174.

40. D. D. Langleben et al., "Telling Truth from Lie in Individual Subjects with Fast Event-Related fMRI," Hum Brain Mapping 26 (2005): 262; J. M. Nunez et al., "Intentional False Responding Shares Neural Substrates with Response Conflict and Cognitive Control," Neuroimage 25 (2005): 267; G. Ganis et al., "Neural Correlates of Different Types of Deception: An fMRI Investigation," Cerebral Cortex 13 (2003): 830; K. L. Phan et al., "Neural Correlates of Telling Lies: A Functional Magnetic Resonance Imaging Study at 4 Tesla," Academic Radiology 12 (2005): 164; N. Abe et al., "Dissociable Roles of Prefrontal and Anterior Cingulate Cortices in Deception: An Integrated Review of the Literature," Neuroscientist 17 (2011): 560.

41. A. Priori et al., "Lie-Specific Involvement of Dorsolateral Prefrontal Cortex in Deception," Cerebral Cortex 18 (2008): 451; L. Zhu et al., "Damage to Dorsolateral Prefrontal Cortex Affects Tradeoffs Between Honesty and Self-Interest," Nat Nsci 17 (2014): 1319.

42. T. Baumgartner et al., "The Neural Circuitry of a Broken Promise," Neuron 64 (2009): 756.

43. Footnote: F. Sellal et al., "'Pinocchio Syndrome': A Peculiar Form of Reflex Epilepsy?" J Neurol, Neurosurgery and Psychiatry 56 (1993): 936.

44. J. D. Greene and J. M. Paxton, "Patterns of Neural Activity Associated with Honest and Dishonest Moral Decisions," PNAS 106 (2009): 12506.

45. L. Pascual et al., "How Does Morality Work in the Brain? A Functional and Structural Perspective of Moral Behavior," Front Integrative Nsci 7 (2013): 65.

46. D. G. Rand and Z. G., Epstein, "Risking Your Life Without a Second Thought: Intuitive Decision- Making and Extreme Altruism," PLoS ONE 9, no. 10 (2014): e109687; R. W. Emerson, Essays, First Series: Heroism (1841).

Chapter 14: Feeling Someone's Pain, Understanding Someone's Pain, Alleviating Someone's Pain

1. Great reads on this general topic by leading scientists in the field: D. Keltner et al., The Compassionate Instinct: The Science of Human Goodness (New York: W. W. Norton, 2010); R. Davidson and S. Begley, The Emotional Life of Your Brain (New York: Plume, 2012).

2. G. Hein et al., "The Brain's Functional Network Architecture Reveals Human Motives," Sci 351 (2016): 1074. Also see: S. Gluth and L. Fontanesi, "Wiring the Altruistic Brain," Sci 351 (2016): 1028.

3. A. Whiten et al., "Imitative Learning of Artificial Fruit Processing in Children (Homo sapiens) and Chimpanzees (Pan troglodytes)," JCP 110 (1996): 3; V. Horner and A. Whiten, "Causal Knowledge and Imitation/ Emulation Switching in Chimpanzees (Pan troglodytes) and Children (Homo sapiens)," Animal Cog 8 (2005): 164.

4. D. Jeon et al., "Observational Fear Learning Involves Affective Pain System and Ca1.2. CA2 Channels in ACC," Nat Nsci 13 (2010): 482.

5. B. L. Warren et al., "Neurobiological Sequelae of Witnessing Stressful Events in Adult Mice," BP 73 (2012): 7.

6. D. J. Langford et al., "Social Modulation of Pain as Evidence for Empathy in Mice," Sci 312 (2006): 1967.

7. M. Tomasello and V. Amrisha, "Origins of Human Cooperation and Morality," Ann Rev Psych 64 (2013): 231; D. Povinelli et al., review of Reaching into Thought: The Minds of the Great Apes, ed. A. E. Russon et

al., TICS 2 (1998): 158.

8. F. de Waal and A. van Roosmalen, "Reconciliation and Consolation Among Chimpanzees," Behav Ecology and Sociobiology 5 (1979): 55; E. Palagi and G. Cordoni, "Postconflict Third-Party Affiliation in Canis lupus: Do Wolves Share Similarities with the Great Apes?" Animal Behav 78 (2009): 979; A. Cools et al., "Canine Reconciliation and Third-Party-Initiated Postconflict Affiliation: Do Peacemaking Social Mechanisms in Dogs Rival Those of Higher Primates?" Ethology 14 (2008): 53; O. Fraser and T. Bugnyar, "Do Ravens Show Consolation? Responses to Distressed Others," PLoS ONE 5, no. 5 (2010), doi:10.1371/journal. pone.0010605; A. Seed et al., "Postconflict Third-Party Affiliation in Rooks, Corvus frugilegus," Curr Biol 2 (2006): 152; J. Plotnik and F. de Waal, "Asian Elephants (Elephas maximus) Reassure Others in Distress," Peer J 2 (2014), doi:10.7717/peerj.278; Z. Clay and F. de Waal, "Bonobos Respond to Distress in Others: Consolation Across the Age Spectrum," PLoS ONE 8 (2013): e55206.

9. J. P. Burkett et al., "Oxytocin-Dependent Consolation Behavior in Rodents," Sci 351 (2016): 375.

10. G. E. Rice and P. Gainer, "Altruism' in the Albino Rat," J Comp and Physiological Psych 55 (1962): 123; J. S. Mogil, "The Surprising Empathic Abilities of Rodents," TICS 16 (2012): 143; I. Ben-Ami Bartal et al., "Empathy and Pro-social Behavior in Rats," Sci 334 (2011): 1427–30.

11. I. B. A. Bartal et al., "Pro-social Behavior in Rats is Modulated by Social Experience," eLife 3 (2014): e01385.

12. C. Lamm et al., "Meta-analytic Evidence for Common and Distinct Neural Networks Associated with Directly Experienced Pain and Empathy for Pain," Neuroimage 54 (2011): 2492; B. C. Bernhardt and T. Singer, "The Neural Basis of Empathy," Ann Rev Nsci 35 (2012): 1.

13. A. Craig, "How Do You Feel? Interoception: The Sense of the Physiological Condition of the Body," Nat Rev Nsci 3 (2002): 655; J. Kong et al.,

"A Functional Magnetic Resonance Imaging Study on the Neural Mechanisms of Hyperalgesic Nocebo Effect," J Nsci 28 (2008): 13354.

14. B. Vogt, "Pain and Emotion Interactions in Subregions of the Cingulate Gyrus," Nat Rev Nsci 6 (2005): 533; K. Ochsner et al., "Your Pain or Mine? Common and Distinct Neural Systems Supporting the Perception of Pain in Self and Other," SCAN 3 (2008): 144; this is the source of the Ochsner quote.

15. N. Eisenberger et al., "Does Rejection Hurt? An fMRI Study of Social Exclusion," Sci 302 (2003): 290; D. Pizzagalli, "Frontocingulate Dysfunction in Depression: Toward Biomarkers of Treatment Response," Neurophyschopharmacology 36 (2011): 183.

16. C. Lamm et al., "The Neural Substrate of Human Empathy: Effects of Perspective-Taking and Cognitive Appraisal," | Cog Nsci 19 (2007): 42; P. Jackson et al., "Empathy Examined Through the Neural Mechanisms Involved in Imagining How I Feel Versus How You Feel Pain," Neuropsychologia 44 (2006): 752; M. Saarela et al., "The Compassionate Brain: Humans Detect Intensity of Pain from Another's Face," Cerebral Cortex 17 (2007): 230; N. Eisenberg et al., "The Relations of Emotionality and Regulation to Dispositional and Situational Empathy-Related Responding," JPSP 66 (1994): 776; J. Burkett et al., "Oxytocin-Dependent Consolation Behavior in Rodents," Sci 351 (2016): 6271; M. Botvinick et al., "Viewing Facial Expressions of Pain Engages Cortical Areas Involved in the Direct Experience of Pain," Neuroimage 25 (2005): 312; C. Lamm et al., "The Neural Substrate of Human Empathy: Effects of Perspective-Taking and Cognitive Appraisal," J Cog Nsci 19 (2007): 42; C. Lamm et al., "What Are You Feeling? Using Functional Magnetic Resonance Imaging to Assess the Modulation of Sensory and Affective Responses During Empathy for Pain," PLoS ONE 2 (2007): e1292.

17. D. Jeon et al., "Observational Fear Learning Involves Affective Pain System and Ca(v)1.2 Ca2+ Channels in ACC," Nat Nsci 13 (2010): 482.

18. A. Craig, "How Do You Feel—Now? The Anterior Insula and Human Awareness," Nat Rev Nsci 10 (2009): 59; B. King-Casas et al., "The

Rupture and Repair of Cooperation in Borderline Personality Disorder," Sci 321 (2008): 806; M. H. Immordino-Yang et al., "Neural Correlates of Admiration and Compassion," PNAS 106 (2009): 8021.

19. J. Decety and K. Michalska, "Neurodevelopmental Changes in the Circuits Underlying Empathy and Sympathy from Childhood to Adulthood," Developmental Sci 13 (2009): 886; J. Decety, "The Neuroevolution of Empathy," ANYAS 1231 (2011): 35; this second reference is the source of the quote.

20. E. Brueau et al., "Distinct Roles of the 'Shared Pain' and 'Theory of Mind' Networks in Processing Others' Emotional Suffering," Neuro-psychologia 50 (2012): 219; C. Lamm et al., "How Do We Empathize with Someone Who Is Not Like Us? A Functional Magnetic Resonance Imaging Study," J Cog Nsci 22 (2010): 362; C. Keysers et al., "Somatosensation in Social Perception," Nat Rev Nsci 11 (2010): 417.

21. L. Harris and S. Fiske, "Dehumanizing the Lowest of the Low: Neuroimaging Responses to Extreme Outgroups," Psych Sci 17 (2006): 847.

22. I. Konvalinka et al., "Synchronized Arousal Between Performers and Related Spectators in a Fire- Walking Ritual," PNAS 108 (2011): 8514; Y. Cheng et al., "Love Hurts: An fMRI Study," NeuroImage 51 (2010): 923.

23. A. Avenanti et al., "Transcranial Magnetic Stimulation Highlights the Sensorimotor Side of Empathy for Pain," Nat Nsci 8 (2005): 955; X. Xu et al., "Do You Feel My Pain? Racial Group Membership Modulates Empathic Neural Responses," J Nsci 29 (2009): 8525; V. Mathur et al., "Neural Basis of Extraordinary Empathy and Altruistic Motivation," NeuroImage 51 (2010): 1468; G. Hein et al., "Neural Responses to Ingroup and Outgroup Members' Suffering Predict Individual Differences in Costly Helping," Neuron 68 (2010): 149; E. Bruneau et al., "Social Cognition in Members of Conflict Groups: Behavioural and Neural Responses in Arabs, Israelis and South Americans to Each Other's Misfortunes," Philosophical Transactions of the Royal Soc B 367 (2012): 717; E. Bruneau and R. Saxe, "Attitudes Towards the Outgroup are Predicted

by Activity in the Precuneus in Arabs and Israelis," NeuroImage 52 (2010): 1704; J. Gutsell and M. Inzlicht, "Intergroup Differences in the Sharing of Emotive States: Neural Evidence of an Empathy Gap," SCAN 10 (2011): 1093; J. Freeman et al., "The Neural Origins of Superficial and Individuated Judgments About Ingroup and Outgroup Members," Hum Brain Mapping 31 (2010): 150.

24. Footnote: K. Wailoo, Pain: A Political History (Baltimore, MD: Johns Hopkins University Press, 2014).

25. C. Oveis et al., "Compassion, Pride, and Social Intuitions of Self-Other Similarity," JPSP 98 (2010): 618; M. W. Kraus et al., "Social Class, Contextualism, and Empathic Accuracy," Psych Sci 21 (2012): 1716; J. Stellar et al., "Class and Compassion: Socioeconomic Factors Predict Responses to Suffering," Emotion 12 (2012): 449; P. Piff et al., "Higher Social Class Predicts Increased Unethical Behavior," PNAS 109 (2012): 4086.

26. J. Gutsell and M. Inzlicht, "Intergroup Differences in the Sharing of Emotive States: Neural Evidence of an Empathy Gap," SCAN 10 (2011): 1093; H. Takahasi et al., "When Your Gain Is My Pain and Your Pain Is My Gain: Neural Correlates of Envy and Schadenfreude," Sci 323 (2009): 890; T. Singer et al., "Empathic Neural Responses Are Modulated by the Perceived Fairness of Others," Nat 439 (2006): 466; S. Preston and F. de Waal, "Empathy: Its Ultimate and Proximate Bases," BBS 25 (2002): 1.

27. C. N. Dewall et al., "Depletion Makes the Heart Grow Less Helpful: Helping as a Function of Self- Regulatory Energy and Genetic Relatedness," PSPB 34 (2008): 1653. Mother Theresa is quoted in: P. Slovic, "'If I Look At the Mass, I Will Never Act': Psychic Numbing and Genocide," Judgment and Decision Making, 2 (2007): 1. The quote has been attributed to Stalin in many places, including: L Lyons, "Looseleaf Notebook," Washington Post, January 30, 1947.

28. A. Jenkins and J. Mitchell, "Medial Prefrontal Cortex Subserves Diverse Forms of Self-Reflection," Soc Nsci 6 (2011): 211.

29. G. Di Pellegrino et al., "Understanding Motor Events: A Neurophysiological Study," Exp Brain Res 91 (1992): 176; G. Rizzolatti et al., "Premotor Cortex and the Recognition of Motor Actions," Cog Brain Res 3 (1996): 131; also see: P. Ferrari et al., "Mirror Neurons Responding to the Observation of Ingestive and Communicative Mouth Actions in the Ventral Premotor Cortex," Eur J Nsci 17 (2003): 1703; G. Rizzolatti and L. Craighero, "The Mirror-Neuron System," Ann Rev Nsci 27 (2004): 169.

30. Footnote: P. Molenberghs et al., "Is the Mirror Neuron System Involved in Imitation? A Short Review and Meta-analysis," Nsci and Biobehavioral Reviews 33 (2009): 975.

31. Human MRI studies: V. Gazzola and C. Keysers, "The Observation and Execution of Actions Share Motor and Somatosensory Voxels in All Tested Subjects: Single-Subject Analyses of Unsmoothed fMRI Data," Cerebral Cortex 19 (2009): 1239; M. Iacoboni et al., "Cortical Mechanisms of Human Imitation," Sci 286 (1999): 2526. Single neuron recordings in humans: C. Keysers and V. Gazzola, "Social Neuroscience: Mirror Neurons Recorded in Humans," Curr Biol 20 (2010): R353; J. Kilner and A. Neal, "Evidence of Mirror Neurons in Human Inferior Frontal Gyrus," J Nsci 29 (2009): 10153.

32. M. Rochat et al., "The Evolution of Social Cognition: Goal Familiarity Shapes Monkeys' Action Understanding," Curr Biol 18 (2008): 227; M. Lacoboni, "Grasping the Intentions of Others with One's Own Mirror Neuron System," PLoS Biol 3 (2005): e79.

33. C. Catmur et al., "Sensorimotor Learning Configures the Human Mirror System," Curr Biol 17 (2007): 1527.

34. G. Hickok, "Eight Problems for the Mirror Neuron Theory of Action Understanding in Monkeys and Humans," J Cog Nsci 7 (2009): 1229.

35. V. Gallese and A. Goldman, "Mirror Neurons and the Simulation Theory," TICS 2 (1998): 493.

36. V. Caggiano et al., "Mirror Neurons Differentially Encode the Perip-

ersonal and Extrapersonal Space of Monkeys," Sci 324 (2009): 403.

37. V. Gallese et al., "Mirror Neurons," Perspectives on Psych Sci 6 (2011): 369.

38. A sampling of some relevant papers: L. Oberman et al., "EEG Evidence for Mirror Neuron Dysfunction in Autism Spectrum Disorders," Brain Res: Cog Brain Res 24 (2005): 190; M. Dapretto et al., "Understanding Emotions in Others: Mirror Neuron Dysfunction in Children with Autism Spectrum Disorders," Nat Nsci 9 (2006): 28; I. Dinstein et al., "A Mirror Up to Nature," Curr Biol 19 (2008): R13; A. Hamilton, "Reflecting on the Mirror Neuron System in Autism: A Systematic Review of Current Theories," Developmental Cog Nsci 3 (2013): 91.

39. G. Hickok, The Myth of Mirror Neurons: The Real Neuroscience of Communication and Cognition (New York: Norton, 2014).

40. D. Freedberg and V. Gallese, "Motion, Emotion and Empathy in Esthetic Experience," TICS 11 (2007): 197; S. Preston and F. de Waal, "Empathy: Its Ultimate and Proximate Bases," BBS 25 (2002); 1; J. Decety and P. Jackson, "The Functional Architecture of Human Empathy," Behav and Cog Nsci Rev 3 (2004): 71.

41. J. Pfeifer et al., "Mirroring Others' Emotions Relates to Empathy and Interpersonal Competence in Children," NeuroImage 39 (2008): 2076; V. Gallese, "The 'Shared Manifold' Hypothesis: From Mirror Neurons to Empathy," J Consciousness Studies 8 (2001): 33.

42. J. Kaplan and M. Iacoboni, "Getting a Grip on Other Minds: Mirror Neurons, Intention Understanding, and Cognitive Empathy," Soc Nsci 1 (2006): 175.

43. Center for Building a Culture of Empathy, "Mirror Neurons," http:// cultureofempathy.com/, no date, http://cultureofempathy.com/References/Mirror-Neurons.htm; J. Marsh, "Do Mirror Neurons Give Us Empathy?" Greater Good Newsletter, March 29, 2012; V. Ramachandran, "Mirror Neurons and Imitation Learning as the Driving Force Behind

'the Great Leap Forward' in Human Evolution," Edge, May 31, 2000.

44. Grayling is quoted in C. Jarrett, "Mirror Neurons: The Most Hyped Concept in Neuroscience?" Psychology Today, December 10, 2012, www.psychologytoday.com/blog/brain- myths/201212/mirrorneurons-the-most-hyped-concept-in-neuroscience; C. Buckley, "Why Our Hero Leapt onto the Tracks and We Might Not," New York Times, January 7, 2007.

45. All quotes are from Hickok, 2014, op cit. For some more analysis of the skepticism, see C. Jarrett, "A Calm Look at the Most Hyped Concept in Neuroscience: Mirror Neurons," Wired, December 13, 2013; D. Dobbs, "Mirror Neurons: Rock Stars or Backup Singers?" News Blog, ScientificAmerican.com, December 18, 2007; B. Thomas, "What's So Special About Mirror Neurons?" Guest Blog, ScientificAmerican.com, November 6, 2012; A. Gopnik, "Cells That Read Minds?" Slate, April 26, 2007; and "A Mirror to the World," Economist, May 12, 2005, www. economist.com/node/3960516.

46. L. Jamison, "Forum: Against Empathy," Boston Review, September 10, 2014.

47. C. Lamm et al., "The Neural Substrate of Human Empathy: Effects of Perspective-Taking and Cognitive Appraisal," J Cog Nsci 19 (2007): 42.

48. N. Eisenberg et al., "The Relations of Emotionality and Regulation to Dispositional and Situational Empathy-Related Responding," JPSP 66 (1994): 776; G. Carlo et al., "The Altruistic Personality: In What Contexts Is It Apparent?" JPSP 61 (1991): 450.

49. B. Briers et al., "Hungry for Money: The Desire for Caloric Resources Increases the Desire for Financial Resources and Vice Versa?" Psych Sci 17 (2006): 939; J. Twenge et al., "Social Exclusion Decreases Prosocial Behavior," JPSP 92 (2007): 56; L. Martin et al., "Reducing Social Stress Elicits Emotional Contagion of Pain in Mouse and Human Strangers," Curr Biol 25 (2015): 326. **50**. R. Davidson and S. Begley, The Emotional Life of Your Brain (NY: Avery, 2012); M. Ricard et al., "Mind of the Meditator," Sci Am 311 (2014): 39.

51. A. Lutz et al., "Long-Term Meditators Self-Induce High-Amplitude Gamma Synchrony During Mental Practice," PNAS 101 (2004): 16369; T. Singer and M. Ricard, eds., Caring Economics: Conversations on Altruism and Compassion, Between Scientists, Economists, and the Dalai Lama (New York: St Martin's Press, 2015); O. Klimecki et al., "Functional Neural Plasticity and Associated Changes in Positive Affect After Compassion Training," Cerebral Cortex 23 (2013): 1552.

52. P. Bloom, "Against Empathy," Boston Review, September 10, 2014; B. Oakley, Cold-Blooded Kindness (Amherst, NY: Prometheus Books, 2011); Y. Cheng et al., "Expertise Modulates the Perception of Pain in Others," Curr Biol 17 (2007): 1708; Davidson and Begley, op cit.; this is the source of the quote.

53. K. Izuma et al., "Processing of the Incentive for Social Approval in the Ventral Striatum During Charitable Donation," J Cog Nsci 22 (2010): 621; K. Izuma et al., "Processing of Social and Monetary Rewards in the Human Striatum," Neuron 58 (2008): 284; E. Dunn et al., "Spending Money on Others Promotes Happiness," Sci 319 (2008): 1687.

54. B. Purzycki et al., "Moralistic Gods, Supernatural Punishment and the Expansion of Human Sociality," Nat 530 (2016): 327.

55. L. Penner et al., "Prosocial Behavior: Multilevel Perspectives," Ann Rev Psych 56 (2005): 365.

56. W. Harbaugh et al., "Neural Responses to Taxation and Voluntary Giving Reveal Motives for

Charitable Donations," Sci 316 (2007): 1622.

57. E. Tricomi et al., "Neural Evidence for Inequality-Averse Social Preferences," Nat 463 (2010): 1089.

Chapter 15: Metaphors We Kill By

1. "Fighting and Dying for the Colors at Gettysburg," HistoryNet.com, June 7, 2007, www.historynet.com/fighting-and-dying-for-the-colorsat-gettysburg.htm.

2. The killing of Tavin Price: Brainuser1, "Mentally Challenged Teen Shot Dead for Wearing Wrong Color Shoes," EurThisNThat.com, September 22, 2016, www.eurthisnthat.com/2015/06/03/mentally-challenged-teen-shot-dead-for-wearing-wrong-color- shoes/ comment-page-1/. Irish hunger strikers: "1981 Irish Hunger Strike," Wikipedia.com, https://en.wikipedia.org/wiki/1981_Irish_hunger_ strike#First_hunger_strike. "My Way" killings: N. Onishi, "Sinatra Song Often Strikes Deadly Chord," New York Times, February 7, 2010.

3. Footnote: T. Appenzeller, "Old Masters," Nat 497 (2013): 302.

4. R. Hughes, The Shock of the New (New York: Knopf, 1991). The following reference is included in the hopes that it will make it seem like I actually read this book: M. Foucault, This Is Not a Pipe (Oakland: University of California Press, 1983).

5. T. Deacon, The Symbolic Species: The Coevolution of Language and the Brain (New York: Norton, 1997).

6. Footnote: L. Boroditsky, "How Language Shapes Thought," Sci Am, February, 2011.

7. G. Lakoff and M. Johnson, Metaphors We Live By (Chicago: University of Chicago Press, 1980); G. Lakoff, Moral Politics: What Conservatives Know That Liberals Don't (Chicago: University of Chicago Press, 1996).

8. T. Singer and C. Frith, "The Painful Side of Empathy," Nat Nsci 8 (2005): 845.

9. M. Kramer et al., "Distinct Mechanism for Antidepressant Activity by Blockade of Central Substance P Receptors," Sci 281 (1998): 1640; B. Bondy et al., "Substance P Serum Levels are Increased in Major Depres-

sion: Preliminary Results," BP 53 (2003): 538; G. S. Berns et al., "Neurobiological Substrates of Dread," Sci 312 (2006): 754.

10. H. Takahasi et al., "When Your Gain Is My Pain and Your Pain Is My Gain: Neural Correlates of Envy and Schadenfreude," Sci 323 (2009): 890.

11. P. Ekman and W. Friesen, Unmasking the Face: A Guide to Recognizing Emotions from Facial Cues (Upper Saddle River, NJ: Prentice Hall, 1975).

12. M. Hsu et al., "The Right and the Good: Distributive Justice and Neural Encoding of Equity and Efficiency," Sci 320 (2008): 1092; F. Sambataro et al., "Preferential Responses in Amygdala and Insula During Presentation of Facial Contempt and Disgust," Eur J Nsci 24 (2006): 2355; P. S. Russell and R. Giner-Sorolla, "Bodily Moral Disgust: What It Is, How It Is Different from Anger, and Why It Is an Unreasoned Emotion," Psych Bull 139 (2013): 328; H. A. Chapman and A. K. Anderson, "Things Rank and Gross in Nature: A Review and Synthesis of Moral Disgust," Psych Bull 139 (2013): 300; H. Chapman et al., "In Bad Taste: Evidence for the Oral Origins of Moral Disgust," Sci 323 (2009): 1222; P. Rozin et al., "From Oral to Moral," Sci 323 (2009): 1179.

13. C. Chan et al., "Moral Violations Reduce Oral Consumption," J Consumer Psych 24 (2014): 381; K. J. Eskine et al., "The Bitter Truth About Morality: Virtue, Not Vice, Makes a Bland Beverage Taste Nice," PLoS ONE 7 (2012): e41159.

14. E. J. Horberg et al., "Disgust and the Moralization of Purity," JPSP 97 (2009): 963.

15. K. Smith et al., "Disgust Sensitivity and the Neurophysiology of Left-Right Political Orientations," PLoS ONE 6 (2011): e2552; G. Hodson and K. Costello, "Interpersonal Disgust, Ideological Orientations, and Dehumanization as Predictors of Intergroup Attitudes," Psych Sci 18 (2007): 691; M. Landau et al., "Evidence That Self-Relevant Motives and Metaphoric Framing Interact to Influence Political and Social Attitudes," Psych Sci 20 (2009): 1421.

16. A. Sanfey et al., "The Neural Basis of Economic Decision-Making in the Ultimatum Game," Sci 300 (2003): 1755.

17. T. Wang et al., "Is Moral Beauty Different from Facial Beauty? Evidence from an fMRI Study," SCAN 10 (2015): 814.

18. S. Lee and N. Schwarz, "Washing Away Postdecisional Dissonance," Sci 328 (2010): 709.

19. S. Schnall et al., "With a Clean Conscience: Cleanliness Reduces the Severity of Moral Judgments," Psych Sci 19 (2008): 1219; K. Kaspar et al., "Hand Washing Induces a Clean Slate Effect in Moral Judgments: A Pupillometry and Eye-Tracking Study," Sci Rep 5 (2015): 10471.

20. C. B. Zhong and K. Liljenquist, "Washing Away Your Sins: Threatened Morality and Physical Cleansing," Sci 313 (2006): 1451; L. N. Harkrider et al., "Threats to Moral Identity: Testing the Effects of Incentives and Consequences of One's Actions on Moral Cleansing," Ethics & Behav 23 (2013): 133.

21. M. Schaefer et al., "Dirty Deeds and Dirty Bodies: Embodiment of the Macbeth Effect Is Mapped Topographically onto the Somatosensory Cortex," Sci Rep 5 (2015): 18051. See also C. Denke et al., "Lying and the Subsequent Desire for Toothpaste: Activity in the Somatosensory Cortex Predicts Embodiment of the Moral-Purity Metaphor," Cerebral Cortex 26 (2016): 477. A debate about these findings: D. Johnson et al., "Does Cleanliness Influence Moral Judgments? A Direct Replication of Schnall, Benton, and Harvey (2008)," Soc Psych 45 (2014): 209; J. L. Huang, "Does Cleanliness Influence Moral Judgments? Response Effort Moderates the Effect of Cleanliness Priming on Moral Judgments," Front Psych 5 (2014): 1276.

22. S. W. Lee et al., "A Cultural Look at Moral Purity: Wiping the Face Clean," Front Psych 6 (2015): 577.

23. H. Xu et al., "Washing the Guilt Away: Effects of Personal Versus Vicarious Cleansing on Guilty Feelings and Prosocial Behavior," Front

Hum Nsci 8 (2014): 97.

24. J. Ackerman et al., "Incidental Haptic Sensations Influence Social Judgments and Decisions," Sci 328 (2010): 1712; also see: M. V. Day and D. R. Bobocel, "The Weight of a Guilty Conscience: Subjective Body Weight as an Embodiment of Guilt," PLoS ONE 8 (2013): e69546.

25. L. Williams and J. Bargh, "Experiencing Physical Warmth Promotes Interpersonal Warmth," Sci 322 (2008): 606; Y. Kang et al., "Physical Temperature Effects on Trust Behavior: The Role of Insula," SCAN 6 (2010): 507.

26. B. Briers et al., "Hungry for Money: The Desire for Caloric Resources Increases the Desire for Financial Resources and Vice Versa," Psych Sci 17 (2006): 939; X. Wang and R. Dvorak, "Sweet Future: Fluctuating Blood Glucose Levels Affect Future Discounting," Psych Sci 21 (2010): 183.

27. M. Anderson, "Neural Reuse: A Fundamental Organizational Principle of the Brain," BBS 245 (2014); 245; G. Lakoff, "Mapping the Brain's Metaphor Circuitry: Metaphorical Thought in Everyday Reason," Front Hum Nsci (2014), doi:10.3389/fnhum.2014.00958.

28. P. Gourevitch, We Wish to Inform You That Tomorrow We Will Be Killed with Our Families (New York: Farrar, Straus and Giroux 2000); R. Guest, The Shackled Continent (Washington, DC: Smithsonian Books, 2004); G. Stanton, "The Rwandan Genocide: Why Early Warning Failed," J African Conflicts and Peace Studies 1 (2009) 6; R. Lemarchand, "The 1994 Rwandan Genocide," in Century of Genocide, ed. S. Totten and W. Parsons, 3rd ed. (Abingdon, UK: Routledge, 2009), p. 407.

29. S. Atran et al., "Sacred Barriers to Conflict Resolution," Sci 317 (2007): 1039.

30. Hussein quote from CNN, Nov 6, 1995.

31. D. Thornton, "Peter Robinson and Martin McGuinness Shake Hands for the First Time," Irish Central, January 18, 2010, www.irishcentral. com/news/peter-robinson-and-martin-mcguinness- shake-hands-for-

the-first-time-81957747-237681071.html.

32. J. Carlin, Playing the Enemy: Nelson Mandela and the Game That Made a Nation (New York: Penguin Press, 2008); D. Cruywagen, Brothers in War and Peace: Constand and Abraham Viljoen and the Birth of the New South Africa (Cape Town, South Africa: Zebra Press, 2014).

Chapter 16: Biology, the Criminal Justice System, and (Oh, Why Not?) Free Will

1. Innocence Project, "DNA Exonerations in the United States," www. innocenceproject.org/dna- exonerations-in-the-united-states/.

2. N. Schweitzer and M. Saks, "Neuroimage Evidence and the Insanity Defense," Behav Sci & the Law

29 (2011): 4; A. Roskies et al., "Neuroimages in Court: Less Biasing Than Feared," TICS 17 (2013): 99.

3. J. Marks, "A Neuroskeptic's Guide to Neuroethics and National Security," Am J Bioethics: Nsci 1 (2010): 4; A. Giridharadas, "India's Use of Brain Scans in Courts Dismays Critics," New York Times, September 15, 2008; A. Madrigal, "MRI Lie Detection to Get First Day in Court," Wired, March 16, 2009.

4. S. Reardon, "Smart Enough to Die?" Nat 506 (2014): 284.

5. J. Monterosso et al., "Explaining Away Responsibility: Effects of Scientific Explanation on Perceived Culpability," Ethics & Behav 15 (2005): 139; S. Aamodt, "Rise of the Neurocrats," Nat 498 (2013): 298.

6. J. Rosen, "The Brain on the Stand," New York Times Magazine, March 11, 2007.

7. Footnote: S. Lucas, "Free Will and the Anders Breivik Trial," Humanist, Sept/Oct 2012, p. 36; J. Greene and J. Cohen, "For the Law, Neuroscience Changes Nothing and Everything," Philosophical Transactions of the Royal Soc B, Biol Sci 359 (2004): 1775. **8**. D. Robinson, Wild Beasts and Idle Humours: The Insanity Defense from Antiquity to the Present (Cambridge, MA: Harvard University Press, 1996).

9. S. Kadri, The Trial: Four Thousand Years of Courtroom Drama (New York: Random House, 2006).

10. J. Quen, "An Historical View of the M'Naghten Trial," Bull of the History of Med 42 (1968): 43.

11. Both O'Connor and Scalia are quoted from their dissenting opinions in Roper v. Simmons, 545 U.S. 551 (2005).

12. L. Buchen, "Arrested Development," Nat 484 (2012): 304.

13. Rosen, "Brain on the Stand."

14. L. Mansnerus, "Damaged Brains and the Death Penalty," New York Times, July 21, 2001, p. B9; M. Brower and B. Price, "Neuropsychiatry of Frontal Lobe Dysfunction in Violent and Criminal Behaviour: A Critical Review," J Neurol, Neurosurgery and Psychiatry 71 (2001): 720.

15. M. Gazzaniga, "Free Will Is an Illusion, but You're Still Responsible for Your Actions," Chronicle of Higher Education, March 18, 2012; M. Gazzaniga, Who's in Charge? Free Will and the Science of the Brain (New York: Ecco, 2012).

16. L. Steinberg et al., "Are Adolescents Less Mature Than Adults? Minors' Access to Abortion, the Juvenile Death Penalty, and the Alleged APA 'Flip-flop," Am Psychologist 64 (2009): 583.

17. S. Morse, "Brain and Blame," Georgetown Law J 84 (1996): 527.

18. B. Libet, "Can Conscious Experience Affect Brain Activity?" J Consciousness Studies 10 (2003): 24; B. Libet et al., "Time of Conscious Intention to Act in Relation to Onset of Cerebral Activity (Readiness-Potential)," Brain 106 (1983): 623.

19. V. Ramachandran, The Tell-Tale Brain: A Neuroscientist's Quest for What Makes Us Human (NY: Norton, 2012).

20. C. Dweck, Mindset: How You Can Fulfill Your Potential (London, UK: Constable & Robinson, 2012); C. Dweck, "Motivational Processes Affecting Learning," Am Psychologist 41 (1986): 1040; S. Levy and C. Dweck, "Trait-Focused and Process-Focused Social Judgment," Soc Cog (1998); 151; C. Mueller and C. Dweck, "Intelligence Praise Can Undermine Motivation and Performance," JPSP 75 (1998): 33–52.

21. J. Cantor, "Do Pedophiles Deserve Sympathy?" CNN.com, June 21, 2012.

22. S. Morse, "Neuroscience and the Future of Personhood and Responsibility," in Constitution 3.0: Freedom and Technological Change, ed. J. Rosen and B. Wittes (Washington, DC: Brookings Institution Press, 2011); J. Rosen, "Brain on the Stand" New York Times, March 11, 2007; S. Morse, "Brain Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note," Ohio State J Criminal Law 397 (2006): 397; this is the source of the Morse quotes in the subsequent paragraphs.

23. H. Bok, "Want to Understand Free Will? Don't Look to Neuroscience," Chronicle Review, March 23, 2012.

24. Morse, "Neuroscience and the Future of Personhood"; S. Nichols, "Experimental Philosophy and the Problem of Free Will," Sci 331 (2011): 1401.

25. Morse, 2011, op cit.

26. Marvin Minsky, quoted in J. Coyne, "You Don't Have Free Will," Chronicle Review, March 23, 2012.

27. Footnote: J. Kaufman et al., "Brain-Derived Neurotrophic Factor–5-HTTLPR Gene Interactions and Environmental Modifiers of Depression in Children," BP 59 (2006): 673.

28. J. Russell, Witchcraft in the Middle Ages (Ithaca, NY: Cornell University Press, 1972).

29. D. Dennett, Elbow Room: The Varieties of Free Will Worth Wanting (Cambridge, MA: MIT Press, 1984).

30. Greene and Cohen, "For the Law, Neuroscience Changes Nothing."

31. M. Hoffman, The Punisher's Brain: The Evolution of Judge and Jury (Cambridge, MA: Cambridge University Press, 2014)

32. K. Gospic et al., "Limbic Justice: Amygdala Involvement in Immediate Rejections in the Ultimatum Game," PLoS ONE 9 (2011): e1001054; Buckholtz, "Neural Correlates of Third-Party Punishment.".

33. D. de Quervain et al., "The Neural Basis of Altruistic Punishment," Sci 305 (2004): 1254; B. Knutson, "Sweet Revenge?" Sci 305 (2004): 1246.

34. Footnote: J. Bonnefon et al., "The Social Dilemma of Autonomous Vehicles," Sci 352 (2016): 1573; J. Greene, "Our Driverless Dilemma," Sci 352 (2016): 1514.

Chapter 17: War and Peace

1. M. Fisher, "The Country Where Slavery Is Still Normal," Atlantic, June 28, 2011; C. Welzel, Freedom Rising: Human Empowerment and the Quest for Emancipation (Cambridge: Cambridge University Press, 2013).

2. S. Pinker, The Better Angels of Our Nature: Why Violence Has Declined (New York: Penguin, 2011).

3. N. Elias, The Civilizing Process: Sociogenetic and Psychogenetic Investigations, rev. ed. (Malden, MA: Blackwell, 2000); W. Yang, "Nasty, Brutish, and Long," New York, October 16, 2011.

4. S. Herman and D. Peterson, "Steven Pinker on the Alleged Decline of Violence," Int Socialist Rev, November/December, 2012.

5. R. Douthat, "Steven Pinker's History of Violence," New York Times, October 17, 2011; J. Gray, "Delusions of Peace," Prospect, October 2011;
E. Kolbert, "Peace in Our Time: Steven Pinker's History of Violence," New Yorker, October 3, 2011; T. Cowen, "Steven Pinker on Violence," Marginal Revolution, October 7, 2011.

6. C. Apicella et al., "Social Networks and Cooperation in Hunter-Gather-

ers," Nat 481 (2012): 497.

7. S. Huntington, "Democracy for the Long Haul," J Democracy 7 (1996): 3; T. Friedman, The Lexus and the Olive Tree (New York: Anchor Books, 1999).

8. L. Rhue and A. Sundararajan, "Digital Access, Political Networks and the Diffusion of Democracy," Soc Networks 36 (2014): 40.

9. M. Inzlicht et al., "Neural Markers of Religious Conviction," Psych Sci 20 (2009): 385; M. Anastasi and A. Newberg, "A Preliminary Study of the Acute Effects of Religious Ritual on Anxiety," J Alternative and Complementary Med 14 (2008): 163.

10. U. Schjoedt et al., "Reward Prayers," Nsci Letters 433 (2008): 165; N. P. Azari et al., "Neural Correlates of Religious Experience," Eur J Nsci 13 (2001): 1649; U. Schjoedt et al., "Highly Religious Participants Recruit Areas of Social Cognition in Personal Prayer," SCAN 4 (2009): 199; A. Norenzayan and W. Gervais, "The Origins of Religious Disbelief," TICS 17 (2013): 20; U. Schjoedt et al., "The Power of Charisma: Perceived Charisma Inhibits the Frontal Executive Network of Believers in Intercessory Prayer," SCAN 6 (2011): 119.

11. L. Galen, "Does Religious Belief Promote Prosociality? A Critical Examination," Psych Bull 138 (2012): 876; S. Georgianna, "Is a Religious Neighbor a Good Neighbor?" Humboldt J Soc Relations 11 (1994): 1; J. Darley and C. Batson, "From Jerusalem to Jericho: A Study of Situational and Dispositional Variables in Helping Behavior," JPSP 27 (1973): 100; L. Penner et al., "Prosocial Behavior: Multilevel Perspectives," Ann Rev Psych 56 (2005): 365.

12. C. Batson et al., Religion and the Individual: A Social-Psychological Perspective (Oxford: Oxford

University Press, 1993); D. Malhotra, "(When) Are Religious People Nicer? Religious Salience and the 'Sunday Effect' on Pro-social Behavior," Judgment and Decision Making 5 (2010): 138.

13. A. Norenzayan and A. Shariff, "The Origin and Evolution of Religious

Prosociality," Sci 422 (2008): 58.

14. A. Shariff and A. Norenzayan, "God Is Watching You: Priming God Concepts Increases Prosocial Behavior in an Anonymous Economic Game," Psych Sci 18 (2007): 803; W. Gervais, "Like a Camera in the Sky? Thinking About God Increases Public Self-Awareness and Socially Desirable Responding," JESP 48 (2012): 298. See also: I. Pichon et al., "Nonconscious Influences of Religion on Prosociality: A Priming Study," Eur J Soc Psych 37 (2007): 1032; M. Bateson et al., "Cues of Being Watched Enhance Cooperation in Real-World Setting," Biol Lett 2 (2006): 412.

15. S. Jones, "Defeating Terrorist Groups," RAND Corporation, CT-314 (testimony presented before the House Armed Services Committee, Subcommittee on Terrorism and Unconventional Threats and Capabilities), September 18, 2008; P. Shadbolt, "Karma Chameleons: What Happens When Buddhists Go to War," CNN.com, April 22, 2013.

16. J. LaBouff et al., "Differences in Attitudes Toward Outgroups in Religious and Nonreligious Contexts in a Multinational Sample: A Situational Context Priming Study," Int J for the Psych of Religion 22 (2011): 1; B. J. Bushman et al., "When God Sanctions Killing: Effect of Scriptural Violence on Aggression," Psych Sci 18 (2007): 204. This is the source of the figure in the text. H. Ledford, "Scriptural Violence Can Foster Aggression," Nat 446 (2007): 114.

17. J. Ginges et al., "Religion and Support for Suicide Attacks," Psych Sci 20 (2009): 224.

18. G. Allport, The Nature of Prejudice (Boston: Addison-Wesley, 1954).

19. T. Pettigrew and L. Tropp, "A Meta-analytic Test of Intergroup Contact Theory," JPSP 90 (2006): 751.

20. A. Al Ramiah and M. Hewstone, "Intergroup Contact as a Tool for Reducing, Resolving, and Preventing Intergroup Conflict: Evidence, Limitations, and Potential," Am Psychologist 68 (2013): 527; Y. Yablon and Y. Katz, "Internet-Based Group Relations: A High School Peace

Education Project in Israel," Educational Media Int 38 (2001): 175; L. Goette and S. Meier, "Can Integration Tame Conflicts?" Sci 334 (2011): 1356; M. Alexander and F. Christia, "Context Modularity of Human Altruism," Sci 334 (2011): 1392; M. Kalman, "Israeli/Palestinian Camps Don't Work," San Francisco Chronicle, October 19, 2008.

21. I. Beah, A Long Way Gone (New York: Sarah Crichton Books, 2007).

22. R. Weierstall et al., "Relations Among Appetitive Aggression, Post-traumatic Stress and Motives for Demobilization: A Study in Former Colombian Combatants," Conflict and Health 7 (2012): 9; N. Boothby, "What Happens When Child Soldiers Grow Up? The Mozambique Case Study," Intervention 4 (2006): 244.

23. J. Arthur, "Remember Nayirah, Witness for Kuwait?" New York Times, January 6, 1992; J. Macarthur, "Kuwaiti Gave Consistent Account of Atrocities; Retracted Testimony," New York Times, January 24, 1992; "Deception on Capitol Hill" (editorial), New York Times, January 15, 1992; T. Regan, "When Contemplating War, Beware of Babies in Incubators," Christian Science Monitor, September 6, 2002; R. Sapolsky, "Pseudokinship' and Real War," San Francisco Chronicle, March 2, 2003. For Nayirah's actual testimony, see. www.youtube.com/watch?v=LmfVs3WaE9Y.

24. E. Queller et al., "Single-Gene Greenbeard Effects in the Social Amoeba Dictyostelium discoideum," Sci 299 (2003): 105; M. Nowak, "Five Rules for the Evolution of Cooperation," Sci 314 (2006): 1560.

25. C. Camerer and E. Fehr, "When Does Economic Man Dominate Social Behavior?" Sci 311 (2006): 47; J. McNamara et al., "Variation in Behaviour Promotes Cooperation in the Prisoner's Dilemma Game," Nat 428 (2004): 745; C. Hauert and M. Doebeli, "Spatial Structure Often Inhibits the Evolution of Cooperation in the Snowdrift Game," Nat 428 (2004): 643.

26. M. Milinski et al., "Reputation Helps Solve the 'Tragedy of the Com-

mons," Nat 415 (2002): 424.

27. M. Nowak et al., "Fairness Versus Reason in the Ultimatum Game," Sci 289 (2000: 1773; G. Vogel, "The Evolution of the Golden Rule," Sci 303 (2004): 1128.

28. J. Henrich et al., "Costly Punishment Across Human Societies," Sci 312 (2006): 1767; B. Vollan and E. Olstrom, "Cooperation and the Commons," Sci 330 (2010): 923; D. Rustagi et al., "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management," Sci 330 (2010): 961.

29. S. Gachter et al., "The Long-Run Benefits of Punishment," Sci 322 (2008): 1510.

30. B. Knutson, "Sweet Revenge?" Sci 305 (2004): 1246; D. de Quervain et al., "The Neural Basis of Altruistic Punishment," Sci 305 (2004): 1254; E. Fehr and S. Gachter, "Altruistic Punishment in Humans," Nat 415 (2002): 137; E. Fehr and B. Rockenbach, "Detrimental Effects of Sanctions on Human Altruism," Nat 422 (2003): 137; C. T. Dawes et al., "Egalitarian Motives in Humans," Nat 446 (2007): 794

31. E. Fehr and U. Fischbacher, "The Nature of Human Altruism," Nat 425 (2003): 785; M. Janssen et al., "Lab Experiments for the Study of Social-Ecological Systems," Sci 328 (2010): 613; R. Boyd et al., "Coordinated Punishment of Defectors Sustains Cooperation and Can Proliferate When Rare," Sci 328 (2010): 617.

32. J. Jordan et al., "Third-Party Punishment as a Costly Signal of Trust-worthiness," Nat 530 (2016): 473.

33. A. Gneezy et al., "Shared Social Responsibility: A Field Experiment in Pay-What-You-Want Pricing and Charitable Giving," Sci 329 (2010): 325; S. DellaVigna, "Consumers Who Care," Sci 329 (2010): 287.

34. J. McNamara et al., "The Coevolution of Choosiness and Cooperation," Nat 451 (2008): 189.

35. IDASA, National Elections Survey, August 1994 (Cape Town: Institute for Democracy in South Africa, 1994); Human Science Research Council, Omnibus, May 1995 (Pretoria, South Africa: HSRC/Mark Data, 1995); B. Hamber et al., "'Telling It Like It Is . . .': Understanding the Truth and Reconciliation Commission from the Perspective of Survivors," Psych in Soc 26 (2000): 18.

36. D. Filkins, "Atonement: A Troubled Iraq Veteran Seeks Out the Family He Harmed," New Yorker, October 29, 2012; D. Margolick, Elizabeth and Hazel: Two Women of Little Rock (New Haven, CT: Yale University Press, 2011).

37. R. Fehr and M. Gelfand, "When Apologies Work: How Matching Apology Components to Victims' Self-Construals Facilitates Forgiveness," Organizational Behav and Hum Decision Processes 113 (2010): 37.

38. M. McCullough, Beyond Revenge: The Evolution of the Forgiveness Instinct (Hoboken, New Jersy: Jossey-Bass, 2008).

39. M. Berman, "'I Forgive You.' Relatives of Charleston Church Shooting Victims Address Dylann Roof," Washington Post, June 19, 2015.

40. J. Thompson-Cannino et al., Picking Cotton: Our Memoir of Injustice and Redemption (New York: St. Martin's Griff, 2010).

41. L. Toussaint et al., "Effects of Lifetime Stress Exposure on Mental and Physical Health in Young Adulthood: How Stress Degrades and Forgiveness Protects Health," J Health Psych 21 (2014): 1004; K. A. Lawler et al., "A Change of Heart: Cardiovascular Correlates of Forgiveness in Response to Interpersonal Conflict," J Behav Med 26 (2003): 373; M. C. Whited et al., "The Influence of Forgiveness and Apology on Cardiovascular Reactivity and Recovery in Response to Mental Stress," J Behav Med 33 (2010): 293; C. vanOyen Witvliet et al., "Granting Forgiveness or Harboring Grudges: Implications for Emotion, Physiology, and Health," Psych Sci 12 (2001): 117; P. A. Hannon et al., "The Soothing Effects of Forgiveness on Victims' and Perpetrators' Blood Pressure,"

Personal Relationships 19 (2011): 27; G. L. Reed and R. D. Enright, "The Effects of Forgiveness Therapy on Depression, Anxiety, and Posttraumatic Stress for Women After Spousal Emotional Abuse," J Consulting Clin Psych 74 (2006): 920.

42. D. Kahneman and J. Renshon, "Why Hawks Win," Foreign Policy, January/February 2007.

43. D. Laitin, "Confronting Violence Face to Face," Sci 320 (2008): 51.

44. D. Grossman, On Killing: The Psychological Costs of Learning to Kill in War and Society (New York: Back Bay Books, 1995).

45. M. Power, "Confessions of a Drone Warrior," GQ, October 22, 2013; J. L. Otto and B. J. Webber, "Mental Health Diagnoses and Counseling Among Pilots of Remotely Piloted Aircraft in the United States Air Force," MSMR 20 (2013): 3; J. Dao, "Drone Pilots Are Found to Get Stress Disorders Much as Those in Combat Do," New York Times, February 22, 2013.

46. J. Altmann et al., "Body Size and Fatness of Free-Living Baboons Reflect Food availability and Activity Level," Am J Primat 30 (1993): 149; J. Kemnitz et al., "Effects of Food Availability on Insulin and Lipid Levels in Free-Ranging Baboons," Am J Primat 57 (2002): 13; W. Banks et al., "Serum Leptin Levels as a Marker for a Syndrome X-Like Condition in Wild Baboons," J Clin Endo and Metabolism 88 (2003): 1234.

47. R. Tarara et al., "Tuberculosis in Wild Baboon (Papio cynocephalus) in Kenya," J Wildlife Diseases 21 (1985): 137; R. Sapolsky and J. Else, "Bovine Tuberculosis in a Wild Baboon Population: Epidemiological Aspects," J Med Primat 16 (1987): 229.

48. R. Sapolsky and L. Share, "A Pacific Culture Among Wild Baboons, Its Emergence and Transmission," PLoS Biol 2 (2004): E106; R. Sapolsky, "Culture in Animals, and a Case of a Non- human Primate Culture of Low Aggression and High Affiliation," Soc Forces 85 (2006): 217; R. Sapolsky, "Social Cultures in Non-human Primates," Curr Anthropol-

ogy 47 (2006): 641; R. Sapolsky, "A Natural History of Peace," Foreign Affairs 85 (2006): 104.

49. I. DeVore, Primate Behavior: Field Studies of Monkeys and Apes (New York: Holt, 1965).

50. A. McAvoy, "Pearl Harbor Vets Reconcile in Hawaii," Associated Press, December 6, 2006; R. Ohira, "Zenji Abe, the Enemy Who Became a Friend," Honolulu Advertiser, April 12, 2007.

51. N. Rhee, "Why US Veterans Are Returning to Vietnam," Christian Science Monitor, November 10, 2013.

52. K. Sim and M. Bilton, Remember My Lai, (PBS Video, 1989); G. Eckhardt, My Lai: An American Tragedy (Kansas City: University of Missouri—Kansas City Law Review, Summer 2000); M. Bilton and K. Sim, Four Hours in My Lai (New York: Penguin, 1993); this is the source of the Varnado Simpson quote; T. Angers, The Forgotten Hero of My Lai: The Hugh Thompson Story (Lafayette, LA: Acadian House, 1999); this is the source of the Hugh Thompson quote.

53. Footnote: M. Bilton and K. Sim, Four Hours in My Lai (NY: Penguin, 1993).

54. A. Hochschild, Bury the Chains: The British Struggle to Abolish Slavery (Basingstoke, UK: Pan Macmillan, 2005); E. Metaxas, Amazing Grace: William Wilberforce and the Heroic Campaign to End Slavery (New York: HarperOne, 2007).

55. G. Bell, Rough Notes by an Old Soldier: During Fifty Years' Service, from Ensign G. B. to Major- General C. B. (London: Day, 1867).

56. M. Seidman, "Quiet Fronts in the Spanish Civil War," libcom.org, Summer 1999; F. Robinson, Diary of the Crimean War (1856); E. Costello, The Adventures of a Soldier (1841); BiblioLife, 2013; J. Persico My Enemy, My Brother: Men and Days of Gettysburg (Cambridge, MA: Da Capo Press, 1996). **57**. S. Weintraub, Silent Night: The Story of the World War I Christmas Truce (New York: Plume Press, 2002).

58. T. Ashworth, Trench Warfare, 1914–1918: The Live and Let Live System (London: Pan Books, 1980). Live and Let Live is also analyzed in R. Axelrod, The Evolution of Cooperation (New York: Basic Books, 2006).

Behave

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