

Index

- abstract rules, 26, 28–29
abstract thought: and frontopolar cortex, 91–99; hierarchies of, 264; and knowledge, 242; and parietal lobe, 62
abuse, childhood, 179, 191, 201–2
ACC. *See* anterior cingulate cortex (ACC)
actors, 129
adaptability, of working memory, 13–14
addiction, 138, 139–40
ADHD (attention deficit hyperactivity disorder), 183, 184
adolescence, 169, 183
Adolphs, Ralph, 113, 165, 169
adrenaline, 120
aesthetic perception, 239–42
affective style, 114–17, 155, 185
aggression: and ADHD, 183; definition of, 182; and MAO A, 200–203; neurobiological bases, 180; and serotonin, 197–99, 201; and shame/humiliation, 204–5; and testosterone, 199
AI (artificial intelligence) programs, 42, 52, 56, 246–47, 259. *See also* computers and computer modeling
alcohol abuse, 118
alcoholics, 199
Alexander, Garrett, 17
Allman, John, 175
altruism, 212
American Ground (Langewiesche), 46
amygdala: emotional reappraisals, 151, 153; fear regulation, 147–48; gender differences, 123; location of, xii; and love, 142; role of, 109–10; during sexual arousal, 124; social brain system, 76
The Anatomy of Melancholy (Burton), 102
Anderson, Steven, 102–3, 164–65, 174, 177
anger, 113, 127–30
animals, classification of, 70–71
anorexia, 39
anterior cingulate cortex (ACC): and attachment, 208–9; computer modeling of, 40–45, 253, 268; conflict, 41–45, 60, 160; cooperation, 212; emotional reappraisals, 152; fear regulation, 147; and intelligence, 81; location of, xi; love, 142; lying, 211; memory, 131; mistakes, 169; moral judgments, 217; pain, 149, 150; and personality, 159–60; role of, 39–40; Theory of Mind, 174; trauma to, 170–71
anterior insula, 217
anterior paracingulate cortex, 173
anterior PFC: abstract thought, 264; art, 244; consciousness, 98; creativity, 228; emotions, 145; reasoning, 94; spontaneously occurring thoughts, 100; verbal processing, 232; working memory, 91, 92
anticipation, 24
antisocial personality disorder (APD): case examples, 187–89, 205–8; nature vs. nurture, 177; in patients with PFC defects, 180, 208–10; PFC function of those with, 193–95
anxiety, 119, 126, 147, 148
arbitrary relationships, 25, 30
architects, Goel's ill-structured planning problem, 50–58
Aristotle, 107, 241
artificial intelligence (AI) programs, 42, 52, 56, 246–47, 259. *See also* computers and computer modeling
artists, 220, 225
art perception and appreciation, 239–45
Aspen Neurobehavioral Conference, 180
attachment theory, 208–9
attention: and anxiety, 119; cocktail party effect, 82–85; computer modeling of, 38–45, 253; and emotions, 154, 157–58; forms of, 19–20; Stroop test, 36–45; of violent offenders, 183–84

- attention deficit hyperactivity disorder (ADHD), 183, 184
- attention deficit problems, 37, 39
- autonomic nervous system, 109
- Bacon, Francis, 69
- Baddeley, Alan, 12
- Balleine, Bernard, 139
- Barbas, Helen, 108–9, 147
- Bartels, Andreas, 142, 143
- basal ganglia (BG), xii, 258–68
- BAS (Behavioral Approach System), 115–16, 119, 145, 155, 158–59
- Base Instincts* (Pincus), 179–80
- Baumeister, Roy, 83
- Beauregard, Mario, 122–23, 129–30, 144, 145
- beauty, 240–42
- Bechara, Antoine, 119
- Belichick, Bill, 56–57
- beliefs, 62–68, 173
- Bergvall, Asa, 183–84
- Berridge, Kent, 135–40
- betrayal, 212–13
- biases, 249–52
- bilingualism, 89–90
- biofeedback, 115
- bipolar disorder, 227–28
- BIS (Behavioral Inhibition System), 115–16, 119, 145, 155, 159
- “Blame the Victim” experiment, 87–89
- Blumberg, Hilary, 228
- body language, 166
- Botvinick, Matt, 44
- Bowlby, John, 208
- Brady, Tom, 56–57
- brain injuries. *See* traumatic brain injuries
- brain mapping: of aggressive/violent persons, 186–97; creativity, 228; musical tones, 237–38; of musicians, 235–36; of persons with personality problems, 184–86; used in court sentencing hearings, 203–4
- brain stem, 109, 135, 146, 258
- Braver, Todd: computer modeling, 247, 254, 259, 263–64, 267; emotions, 107–8, 155–59; frontopolar cortex’s role in reasoning, 91–93; intelligence, 80–81; Stroop test, 41
- Brenner, David, 75
- BrightHouse Neurostrategies Group, 161
- Broca’s area, 73, 97
- Brodmann, Korbinian, 8–9
- Brodmann areas (BAs), 8–9
- Brower, Montgomery, 182, 184, 195–97, 203–4, 205–10
- Brunner, Harm, 200
- Buchsbaum, Monte, 186, 203
- Buddhist monks, 145–46
- Burgess, Paul, 2
- Burroughs, William, 247
- Burton, Mike, 46–47
- Burton, Richard, 127
- Burton, Robert, 102
- Cabanac, Michel, 134
- Camerer, Colin, 160–61
- Camille, Nathalie, 132–33
- Caminacules experiment, 70–71
- Canli, Turhan, 108
- Casey, Kenneth, 149
- Caspi, Avshalom, 201
- category making, 26–30, 71
- caudate, xii
- Cela-Conde, Camilo, 239–42
- central sulcus, xii
- cerebellum, 81
- cerebral cortex, xii
- children: ability to read emotions of others, 169; abuse of, 179, 191, 201–2; cognitive behavior training, 195; cognitive control development, 83–84, 89–90; MAO A variants in, 201–2; prefrontal trauma in, 163–65; Theory of Mind, 172–73
- chimpanzees, 3–4, 177, 214
- chocolate, 140–42
- Christoff, Kalina, 93–101
- classical conditioning, 254
- A Clockwork Orange*, 163, 176–77
- cocktail party effect, 82–85
- cognition, distinction from emotions, 218
- cognitive control, 84–85, 89–90
- cognitive dissonance, 129
- Cohen, Jonathan: computer modeling, 247–53, 255, 256, 257, 258, 264, 265, 266, 267, 268; emotional regulation, 147; moral judgments, 213–14; Stroop test, 37, 38, 39, 40–45
- collateral sulcus, 167
- computers and computer modeling: abstract thought, 264; basal ganglia simulation, 258–68; biasing capability, 249–52; dopamine signals, 253–58; early programs, 52; emotions, 263–64; hippocampus, 265–67; humans’ uneasiness with, 246–47; as model for human brain, 247–49; Stroop test, 38–45
- conceptualization, 61
- conduct disorders, 184
- conflict, 36–45, 60, 160
- connectionist computer monitoring, 38, 248–49, 263

- consciousness: and ACC, 45; and amygdala, 109–10; and frontopolar cortex, 98–99, 139
- conservatism, 67
- Conway, Andrew, 82–84
- cooperation, 212
- corpus callosum, 187, 231
- counterfactual thinking, 85–89, 132–33
- Cramer, Jim, 126
- creativity: and bipolar disorder, 227–28; brain hemispheric bias, 229–33; and dopamine, 226; and frontotemporal dementia, 226–27; and intelligence, 228–29; and latent inhibition, 225–26; and traumatic brain injury, 221–25
- criminal offenders: culpability of death row inmates, 178; Raine's brain imaging studies, 186–97
- Crying Baby dilemma, 216–17
- CSI: New York*, 68–69
- cultural conditioning, 123
- cultural differences, 167
- Dahmer, Jeffrey, 192
- Damasio, Antonio, 102, 105, 110, 119, 163
- Davidson, Richard: brain mapping of persons with personality problems, 184–85; emotional style, 114, 116; hemispheric asymmetry, 145–46; meditation, 112, 146; phobics, 125; rational thinking and emotion, 153
- death row inmates, 178
- decision making, 72–73, 133, 162
- deductive reasoning, 58–68, 69
- de Gelder, Beatrice, 166
- delayed-response experiments, 3–4, 14–15, 17–18
- Dennett, Daniel, 111
- depression, 39, 128
- developmental coordination disorders, 184
- de Waal, Frans, 214
- Diamond, Adele, 89–90
- Dickinson, Anthony, 139
- Dolan, Raymond, 63, 70, 73, 153
- dopamine: and brain's reward system, 136, 137–38, 158; computer modeling, 253–58, 262; and creativity, 226; happiness, 131; and learning, 253–56; and love, 143; in men during sexual activity, 124; in Parkinson's disease patients, 263
- dorsolateral PFC: abstract thought, 264; aesthetic perception, 240, 242; art, 244; computer modeling, 263–64; emotional reappraisals, 152–53; function of, 261; gender differences, 124; happiness, 131; location of, xi; moral judgments, 217; music, 235; overeating experiment, 141; pain, 149, 150; political advertising experiment, 162; trauma patients, 171; vs. ventrolateral PFC, 31
- dorsomedial PFC, 173, 174
- drug abuse, 183, 193, 203
- drugs, serotonin reuptake inhibitors (SSRIs), 144, 197
- Dunbar, Kevin, 38
- Duncan, John, 77, 78–79, 80
- EEG technology, 112, 114, 116, 117, 145–46
- Emory University, 134, 161
- emotions: ability to read others', 166, 169, 170–71; affective style, 114–17, 155; and attention, 154, 157–58; vs. cognition, 218; computer models, 263–64; definition of, 110; gender differences, 122–25; hemispheric asymmetry, 111–14, 116–17, 145–46; and lateral PFC, 65–66, 155–56; limbic system, 45; and moral judgments, 214; neural pathways, 108–10; and orbitofrontal cortex, 96–97, 109, 110, 113, 133; reappraisals of, 151–53; and reason, 65–66, 107–8, 153–60; regulation of, 144–49, 151–53, 163–65; role of, 153–54; of trauma patients, 102–7, 133, 169–72; and ventromedial PFC, 65–66, 96–97, 102–7, 117–19; and working memory, 154–55. *See also specific emotion*
- empathy, 168–69, 210
- empowerment, 128
- endorphins, 136
- Engle, Randall, 82
- enkephalins, 136
- Epstein, Russell, 243–45
- errors: and ACC, 42–45; Rabbitt effect, 43–44
- euphoria, 142
- extroversion, 159
- Eysenck, Hans, 241
- facial expressions, 166
- fairness, 128–29
- faith, 68
- false beliefs, 173
- family background, 190–92
- fatigue, 37
- fear, 113, 117, 125–27, 147–49, 166
- First Book of Aphorisms* (Bacon), 69
- Flaherty, Alice, 109
- fMRI (functional magnetic resonance imaging): emotions, 114, 129, 155; intelligence, 80; vs. PET technology, 117; reasoning, 59; verbal processing, 232; working memory, 36

- Footbridge dilemma, 214–15
 Frank, Michael, 262–63
 Frank, Thomas, 67
 free will, 20–21, 145
 Frith, Christopher and Uta, 173
 frontal lobe, diagram of, xii
 frontoinsula cortex, 175
 frontopolar cortex (FPC) (Brodmann area 10), 91–99, 164, 261. *See also* anterior PFC
 frontotemporal dementia (FTD), 226–27
 fruit flies, 177
 Fuster, Joaquin, 5–6, 17, 19–20
- Gab Lab, 152, 232
 Gabrieli, John: and Christoff, 93; creativity, 229–33; emotional reappraisals, 151; intelligence, 77; metacognition, 95; resting state, 99; working memory, 36
 Gallagher, Helen, 173
 gambling, 119, 127, 132–33, 197–98
 game theory, 173–74
 gating mechanisms, 256–58
 Gelder, Beatrice de, 166
 gender differences, in emotions, 122–25
 genetic memory, 29
 g (general) intelligence, 77–81, 82, 89–90
 Gilligan, James, 204–5
 globus pallidus, xii
 glucose metabolism, 187, 192
 Goel, Vinod: deductive reasoning experiments, 59–61, 63–64; hemispheric distinctions, 233; ill-structured planning experiment, 49–58; inductive reasoning, 69, 70–71; jokes, experiments with, 73–76
 Goldinger, Stephen, 85, 86, 87–89
 Goldman, David, 199, 200
 Goldman-Rakic, Patricia, 1, 5, 10, 12–17
 Goldstein, Kurt, 5
 Grafman, Jordan, 49
 Gray, Jeremy: emotions, 110, 114, 115, 154–59; intelligence, 80–81; neuromarketing, 162; Theory of Mind, 174–75
 gray matter, 194, 195
 Greene, Graham, 68
 Greene, Joshua, 64, 213–14, 216, 217, 218–19
 guided activation hypothesis, 249–52
Guilt by Reason of Insanity (Lewis), 178–79
 Gur, Ruben and Raquel, 124
- Hadjikhani, Nouchine, 166
 Handey, Jack, 75, 76
 happiness, 117, 129–32, 144–45
 Hare, Robert, 188
 Harmon-Jones, Eddie, 128–29
 Harris, Robert Alton, 191–92
 Hasson, Uri, 167
 Hazen, Cindy, 143
 Hedden, Trey, 176
 hedonic psychology, 130
 hemispheric asymmetry, 111–14, 116–17, 155–56, 229–33. *See also* left PFC system; right PFC system
 hierarchical thought, 90–93
 hippocampus, 71, 76, 124, 244, 265–67
 Hitch, Graham J., 12
 Holden, Ken, 46–47
 Holstege, Gert, 124
 homunculus, 7–8, 20, 253, 268
 humiliation, 204–5
 humor, 73–76
 hypothalamus, 109, 123, 147
 hypotheses, 70
- Iacobini, Marco, 161, 162
 Ilari, Beatriz, 234
 illusions, 243
 impulsivity, 184, 185, 187–88
 inductive reasoning, 68–73
 infants, musical discrimination, 234
 inference, 71
 inferior temporal cortex (ITC), 28
 information processing, 6, 42, 56, 62, 108, 264
 Ingvar, David, 18
 inhibition: and attention, 19; computer modeling, 253; and creativity, 225–26; definition of, 39; development in children, 89–90; dorsolateral PFC's role, 141
 injuries. *See* traumatic brain injuries
 insula, 168
 intelligence: in children, 89–90; and counterfactual thinking, 85–89; and creativity, 228–29; forms of, 77–78, 89; g factor, 77–81, 82, 89–90; and inhibitory control, 19; and personality, 158–59; and prefrontal cortex, 77–81; and working memory, 82–85
 International Affective Picture System, 112
 introspection, 90–93
 introversion, 159
 intuition, 64
 Iowa Gambling Task, 119
 Iowa Rating Scales of Personality Change, 103
 ITC (inferior temporal cortex), 28
- Jacobsen, Carlyle, 3–4, 38
 James, William, 62

- Janata, Petr, 236, 237, 238
 jokes, 73–76
 Jones, Edward G., 9–10
 Jost, John, 67
 juries, 86–87
- Kabat-Zinn, Jon, 146
 Kahneman, Daniel, 130
 Kant, Immanuel, 218–19
 Keynes, John Maynard, 176
 Kierkegaard, Søren, 68
 Knutson, Brian, 213
 Koechlin, Etienne, 91
 Kosslyn, Stephen, 80
 Kravitz, Edward, 177
 Kurzweil, Ray, 246
- Lakoff, George, 162
 Langewiesche, William, 46
 Langleben, Daniel, 211
 language, 58–59, 60, 232–33
 latent inhibition, 225–26
 lateral PFC: and attention, 40; decision making, 127; emotions, 65–66, 155–56; integration of emotion and cognition, 155–56; intelligence, 78–79, 81; neurons in, 25, 26, 30; pain, 149; reasoning, 64–65, 71; role of, 31; verbal tasks, 79
 lateral transformations, 53
 laughter, 74
 Leabra, 260
 learned helplessness, 128
 learning, 23, 253–56, 262, 266
 “left brain,” 229–30
 left orbital PFC, 76
 left PFC system: anger, 128; cognitive dissonance, 129; emotions, 111, 113, 116, 153; language processing, 232–33; music, 235; pain, 149; reasoning, 61, 62; role of, 231–33
 left temporal lobe, 74
 legal issues, 203–10
 Le Vay, Simon, 143
 Lewis, Dorothy Otnow, 178–79, 187, 210
 liberalism, 67
 liking pathway, 135–37, 138, 139
 limbic system, 45
 lobotomy, 2–3, 4
 logical thinking, 58–68
 long-term memory, 13, 28–29, 100, 131–32
 loss aversion, 126
 love, 142–44
 Lund University, 228
 Luria, Alexander Romanovich, 5
 lying, 211–12
- M2C, 43
 machines. *See* computers and computer modeling
 magnetoencephalography (MEG), 239
 Mangan, Bruce, 245
 MAO A (monoamin oxidase A), 200–203
 marketing, 160–62
 Mathiesen, Birgit Bork, 104–6
 McClelland, Jay, 38
 McGivern, Robert, 169
 McVeigh, Timothy, 192–93
 media, 178
 medial PFC: emotional reappraisals, 151; emotions, 96–97, 109, 110, 113, 123, 129; fear regulation, 147–48; location of, xi; moral judgments, 215, 216, 217; music, 238; Theory of Mind, 174. *See also* ventromedial PFC
 meditation, 112, 145–47
 MEG (magnetoencephalography), 239
 memory: of future, 18–19, 39, 117, 264–65; long-term, 13, 28–29, 100, 131–32; retrieval of, 131–32; spatial, 35. *See also* working memory
 men: creativity, 228–29; emotions, 122–25; MAO A in, 200–201; response to attractiveness, 238
 meningioma, 48
 mental illness, 178, 225
 mental models, 62
 metacognition, 93–99
 metaphors, 233, 243–44
 Michelangelo, 243
 midbrain, 124, 136, 149, 189
 midsolateral PFC, 33–36
 military personnel, 4–5, 120–22
 Mill, John Stuart, 218
 Miller, Bruce, 226–27
 Miller, Earl, 21–30, 96, 249, 250, 254–55
 Miller, Neal, 115
 Milner, Brenda, 5
 Minsky, Marvin, 90
 mistakes, 168–69
 Moeller, Gerard, 198–99
 Moffitt, Terrie, 201
 Moll, Jorge, 211
 monkeys, experiments with: delayed-response experiments, 3–4, 14–15, 17–18; and rules, 98; working memory, 14–15, 17–18, 22–30
 monoamine oxidase A (MAO A), 200–203
 mood: and cognition, 156–57; regulation of, 144–47
 moral values and dilemmas, 211–19
 Morgan, Charles “Andy,” 120

- Moskovitch, Morris, 101
 Mozart, Wolfgang Amadeus, 220–21
 MRI (magnetic resonance imaging), 5, 31, 53, 124, 130, 177, 195
 multitasking, 2, 11–12
 Munakata, Yuko, 259
 music, 234–38
 musicians, 16
 Muybridge, Eadweard, 221–24
- Nash, John, 221
 National Institutes of Health (NIH), 47–48
 Nauta, Walle, 1
 negative emotions, 117–19
 neocortex, 260
 neuroaesthetics, 239
 neuromarketing, 160–62
 neurons: emotions, 108–10; working memory, 14–15, 18, 21, 22–23, 24, 25, 26, 28, 30
 neuropeptide Y (NPY), 120–22
 neuropsychology, 51
 Newell, Allen, 56
 Newman, Tim, 200
 9/11/01, 46–47, 161–62
 nocebos, 150
 norepinephrine, 158, 198, 267
 Noveck, Ira, 61, 62
 novels, function of, 244
 nucleus accumbens (NAC), xii, 136–37
 numbers, 30
- obsessive-compulsive disorder or behavior, 39, 190
 occipital lobe, xii, 79, 166, 240
 Ochsner, Kevin, 151–53
 Ohnishi, Takashi, 235
 omega-3 fatty acids, 198
 opioids, 136
 orbitofrontal cortex (OFC): computer model, 263–64; emotions, 96–97, 109, 113, 133; gender differences in size, 124; inductive reasoning, 71–73; location of, xi; memory retrieval, 131; and reward significance, 140–41; and serotonin, 197–98; social-emotional function, 165; social norms, 76; trauma patients, 133, 170–71, 206–8, 223–24; and violence, 192
 orbitofrontal PFC: emotions, 110, 127; frontoinsular cortex of, 175; humor, 75; liking, 135, 137; music, 235; pain, 150; trauma to, 19, 206, 221
 O'Reilly, Randall, 92–93, 249, 255, 258–68
Othello, 173
- Owen, Adrian, 34–35, 72, 79, 127
- pain, 149–50, 168
 parallel processing, 42, 231
 parietal lobe, xii, 59–60, 62, 173, 240
 Parkinson's disease patients, 263
 PCC. *See* posterior cingulate cortex (PCC)
 perception-action cycle, 20–21
 personality: ACC's role in, 160; affective style, 114–17, 155; and aggression/violence, 201; and creativity, 228; and happiness, 130; and intelligence, 158–59; resilience to stress, 119–22; traumatic brain injury patients, 103; and ventromedial prefrontal cortex activity, 117–19
 personal preferences, 134–40
 Pessoa, Luiz, 167
 Peterson, Jordan, 225–26
 Petrides, Michael, 31, 131
 PET scans, 78, 124, 137, 144
 phobics, 125–26, 148–49
 Pibram, Karl, 12
 Pincus, Jonathan, 178, 179–80, 190
 placebo effect, 149–50
 planning, 33–36, 56–57
 planum temporale (PT), 235–36
 Plato, 242–43
 pleasure, 134–37
 Plomin, Robert, 80
 Poggio, Tomaso, 26
 political advertising, 161–62
 political behavior, 67
 political ideologies, 67
 Polka, Linda, 234
 posterior cingulate cortex (PCC): moral judgments, 216, 217; overeating experiment, 141; Theory of Mind, 174
 posterior cingulate gyrus, 215, 216
 post-traumatic stress syndrome, 120
 preferences, personal, 134–40
 prefrontal cortex (PFC): activation of, 253–57; Brodmann areas, 8–9; control function, 252–53; diagram of, xi; as fractionated, 96; guided activation hypothesis, 249–52; as homogenous, 96; research history, 2–5; role of, 2, 6–7. *See also specific entries*
 Premack, David, 172
 Price, Bruce, 180–81, 182, 188, 193, 197, 202
 prisoners, 178
 Prisoner's Dilemma, 173–74, 212
 Proust, Marcel, 32, 243–44
 psychopaths, 187–90, 205–8

- public speaking, 125–26
 puns, 73
 putamen, xii
- Quirk, Gregory, 147–48
- Rabbitt effect, 43–44
 racism, 66–67, 85
 Rader, Dennis, 179–80
 Raichle, Marcus, 142–43
 Raine, Adrian, 186–97, 203
 Raven's Progressive Matrices tests, xiii, 80–81, 94
 reading, 83–84
 reality, 101
 reappraisals, of situations, 151–53
 reason: deductive reasoning, 58–68, 69; and emotions, 65–66, 107–8, 153–60; Goel's ill-structured planning problem experiments, 49–58; inductive reasoning, 68–73; introspection, 90–93; metacognition, 93–99; and moral judgments, 213–14; 9/11 example, 46–47; during resting state, 99–101; and working memory, 16
 regret, 132–33
 religion, 68
 Rescorla, Robert, 254
 resilience, 119–22, 202
 resting state, 99–101
 revenge, 213
 reward and punishment, 134–35, 140–43, 212–13, 253–56, 262
 Reynolds, Jeremy, 267
 Richeson, Jennifer, 66–67
 “right brain,” 229–30
 right PFC system: emotions, 111, 113, 116; language processing, 232–33; reasoning, 60–61, 64, 71; role of, 231–33; stress, 125
 right temporal lobe, 74
 Rilling, James, 173–74, 212
 Rock, Chris, 76
 Rolls, Edmund, 134, 140, 169–70
 rostral ACC, 173
 rostral PFC, 97–98
 rostrolateral PFC, xi, 97
 rostromedial PFC, 96–97, 132, 134, 152, 237–38
 rules, 25–30, 71, 98
 Ryle, Gilbert, 7–8
- sadness, 129–30
 sarcasm, identification of, 171–72
 SCAN Lab, 110
- Schally, Andrew, 138
 Schiavo, Terri, 58, 62
 schizophrenia, 37
 Schmidt, Gwen, 233
 Schultz, Wolfram, 253–54
Science, 77, 79
 Seger, Carol, 229–33
 selective serotonin reuptake inhibitors (SSRIs), 144, 197
 self-reflection, 93–99
 semantic jokes, 73–74
 September 11, 2001, 46–47, 161–62
 serotonin, 144–45, 197–99, 201, 267
 sexual arousal, 123–24, 137
 Shamay-Tsoory, Simone, 171
 shame, 204–5
 Shimamura, Arthur, 221–25
 Singer, Tania, 168
 sleepiness, 37
 Small, Dana, 140–41
 smokers, 113
 SOAR project, 56
 social brain, 76, 173, 174, 217
 social cognition: in brain trauma victims, 163–65, 169–72; experiments of, 166–69; neural systems, 165; PFC sub-components' roles, 169–72; plasticity of, 165; Theory of Mind, 172–75
 social norms, 75–76
 Socrates, 58
 spatial memory, 35
 spatial processing, 59–60
 spatial reasoning, 84
 spatial tasks, 157
 Spearman, Charles, 77
 Special Forces, 120–22
 spindle cells, 175
 spontaneous thought, 99–101
 Spurlack, Morgan, 141
 SSRIs (selective serotonin reuptake inhibitors), 144, 197
 Stanford, Matthew, 188–89
 Steele, Claude, 84
 Steen, Francis, 239
 Stein, Douglas, 13
 stereotyping, 84–85
 Sternberg, Robert, 231
 Stewart, Jon, 75
 strategic planning and prioritization, 33–36
 stress, 119–22, 147
 striatum, 165
 Strong, Connie, 226–27
 Stroop, John Ridley, 37–38
 Stroop test, 36–45, 251
 subliminal advertising, 135

- substance abuse, 118, 183, 193, 203
 superior temporal gyrus, 237
 superior temporal sulcus (STS), 174
 syllogisms, 59–60, 61–62, 63, 65, 70
 sympathetic nervous system, 120
- temporal cortex, 29, 129
 temporal lobe, xii, 13, 59, 62, 100, 240
 testosterone, 199
 thalamic-striatal system, 242
 thalamus, xii, 123, 137
 Theory of Mind (ToM), 172–75, 208, 217
 Thomson, Godfrey, 78
 tonality, 236–38
 top-down bias, 250, 251
 Tower of Hanoi test, 51
 transcranial magnetic stimulation, 148
 transformations, 53
 traumatic brain injuries: antisocial personality traits, 182, 194–95; behavior changes and problems, 102–3, 181; children, 163–65; creativity, 221–25; deductive reasoning, 61; emotions, 102–7, 133, 169–72; fear regulation problems, 126–27, 148; Goel's ill-structured planning problem experiment, 50–58; humor appreciation, 73; impulsivity, 185–86; left vs. right hemisphere damage, 111; planning, 56–57; recall of past events, 101; shame and humiliation, 205; social-emotional thinking, 169–72; and sociopathic behavior, 187; violent behavior, 192, 203–10
 Trolley dilemma, 214–15
 tryptophan, 198–99
 TV, 84
 twin studies, 201
- UCLA (University of California, Los Angeles), political campaign ads, 161
 Ultimatum game, 173–74
 uncertainty, 41, 72
 utilitarianism, 211, 215, 216, 218–19
- valence hypothesis, 112–13, 128
 Vasari, Giorgio, 243
 ventral pallidum, 137
 ventral tegmental area (VTA), xii, 124, 253, 255
 ventrolateral PFC: learning, 23; location of, xi; memory, 31–32, 34, 92
 ventromedial PFC: and emotions, 64–66, 96–97, 102–7, 117–19; humor, 74, 76; location of, 103; memory retrieval, 131; political advertising experiment, 162; trauma, 102–7, 126–27, 171–72
 verbal tasks, 157
 vertical transformations, 53
 veterans, 182
 victims, blaming of, 87–89
 video games, 84
 Vietnam Head Injury Study, 182
 violence: in children, 195, 201–2; culpability of persons with PFC deficits, 203–10; definition of, 182; environmental influences, 179; and family background, 190–92; neurobiological bases, 177–86, 189–90, 194, 195–96; and orbitofrontal cortex (OFC), 192; prevention of, 195; Raine's brain imaging studies, 186–97; and serotonin, 197–99
 visualization, 144–45
 visual learning, 229
 VTA (ventral tegmental area), xii, 124, 253, 255
- Waal, Frans de, 214
 Wager, Tor, 150
 Wagner, Allen, 254
 Wald, Priscilla, 246–47
 wanting/desiring pathway, 137–40
 Weizmann Institute, 167
 well being, 129–32
 Wernicke, 235
What's the Matter with Kansas? (Frank), 67
 Whiten, Andrew, 165
 women: aesthetics, 240–41; emotions, 122–25, 152; MAO A in, 200–201; pain, 168; stereotyping and intellectual performance, 84; tryptophan manipulation, 199
 Woodruff, Guy, 172
 working memory: and bilingualism, 89–90; brain location, 8; capacity, 36; conflicts, 36–45; and counterfactual thinking, 85–89; and emotions, 154–55; Fuster's contributions, 17–21; Goldman-Rakic's contributions, 5, 12–17; and intelligence, 82–85; limitations, 176; Miller's contributions, 21–30; origins of concept, 12; and personality, 159; planning and prioritization, 33–36; precision-target recall, 31–32; and serotonin, 197
 worldview, 101, 228
 writers, 157
- Zald, David, 117, 118, 119, 135
 Zeki, Semir, 142, 143, 220–21, 239–40, 242–43