

## Index

- Aberle, D. F., 105  
Accumulator counting mechanism, 265  
Adaptation, 7, 18  
    conflict resolution and, 82  
    human uniqueness and, 204–214  
Addition, 255–256  
Adelson, E. H., 194  
Africa, 56–58, 112  
Agriculture, 7–8, 181  
Agta people, 91  
Aiello, L. C., 16, 59, 69  
Albazo study, 148–152, 156–159  
Albright, T. D., 194  
Alcohol, 12  
Alemu, Abesha, 149–150  
Alexander, R. D., 89, 110, 114, 220  
Algebra, 248  
Allman, J., 70  
Altruism, 94–96  
    cooperation and, 105–130  
    egalitarian syndrome and, 87–92  
    helping another in pain, 235–239  
    morals and, 85–86 (*see also* *Morals*)  
Amino acids. *See* *Genetics*  
Anatomically modern humans (AMH), 57–59  
Anderson, Linda, 227, 229  
Andrews, P., 56  
Anthropologists, 55–56, 120  
Ants, 11–12, 107  
Aoki, K., 33  
Arabic enumeration, 209  
Aristotle, 130  
Armstrong, W., 19, 29  
Art objects, 59  
Ashby, F. G., 268  
Assemblies  
    attention and, 193–197  
    behavior and, 192–193  
    response synchronization and, 190–197  
Attention, 193–197  
Auditory cortex, 185  
Aunger, R., 9  
Aureli, F., 82  
Austad, S. N., 70  
Australia, 58  
Austronesian languages, 19, 24–25  
Autism, 211  
Auto-domestication, 6–7  
Axelrod, R., 114  
  
Bacteria, 46  
Baillargeon, R., 226  
Balakrishnan, J. D., 268  
Baldwin effect, 5–6  
Balikci, A., 84  
Barkow, J. H., 12, 71  
Baron-Cohen, S., 211  
Barracuda, 28  
Barth, Fredrik, 126, 152  
Barton, M., 169  
Bechara, A., 229  
Becker, G., 106

- Bees, 107
- Behavior, xi–xii, xvi  
 affiliative, 204  
 alcohol and, 12  
 assemblies and, 192–193  
 Baldwin effect and, 5–6  
 cheaters and, 36, 85, 90–91, 114, 177  
 cognitive causal chains (CCCs) and, 152–164  
   (*see also* Cognition)  
 cooperative, 105–130, 235–241  
 dialects and, 177–178  
 dominance and, 204  
 egalitarian syndrome and, 86–92  
 functionalism and, 105–106  
 helping another in pain, 235–239  
 infantile processing and, 209–214  
 inhibitions and, 11–12, 221–225, 241–242  
 metarepresentations and, 183–190  
 morals and, 11, 82–96, 219–245 (*see also*  
   Morals)  
 mystical rituals and, 148–152, 156–159  
 natural selection and, 79–103 (*see also*  
   Natural selection)  
 numerosity and, 247–271  
 passion and, 221–225  
 political, 81–96  
 preconditional patterns and, 60–66  
 perseveration and, 225–234  
 primates and, 79–80  
 reciprocity and, 114–117, 120–125  
 response synchronization and, 192–193  
 sanctioning of, 83–86, 94–97  
 selfish, 7, 45–51, 82–97, 105–130, 135–137  
 sociobiology and, 107–109  
 tradition and, 55, 276–277
- Beise, J., 7
- Berger, Michelle, 241
- Berlin, B., 13–15
- Bernstein, Leonard, 143
- Berntson, G. G., 255
- Beynon, A. D., 62
- “Big Mistake” hypothesis, 110–111
- Binary systems, 252
- Binmore, K. G., 114, 116–117
- Binocular rivalry, 193–197
- Bipedal gait, 181
- Birds, 10, 251, 256–257
- Bismark Islands, 24, 26
- Blade technology, 57
- Blakemore, S., 176
- Blurton-Jones, N., 90, 241
- Boehm, Christopher, 6, 11, 35, 79–103, 279
- Boesch, C., 206
- Borges, Jorge Luis, 141
- Bougainville Islands, 24
- Bowles, S., 89, 91–92
- Boyd, Robert, 3, 6, 35, 176, 279  
 on cooperation, 105–132  
 on evolutionary quantum leaps, 54  
 on natural selection, 79, 84, 92, 94
- Boysen, S. T., 230, 232, 255
- Brain. *See also* Cognition  
 ancestral comparisons and, 182  
 assembly coding and, 190–197  
 binocular rivalry and, 193–197  
 conscience and, 85  
 cortex, 11, 169–172, 185–187, 193–197  
 Decade of the Brain and, 203  
 encephalization quotient and, 62, 64  
 fossil studies and, 181  
 human/primate gulf and, 181–182  
 infant abilities and, 182  
 inhibitory response and, 221–225, 241–242  
   (*see also* Morals)  
 language and, 11, 13–16 (*see also* Language)  
 mathematics and, 251–255 (*see also*  
   Mathematics)  
 memory and, 193–197, 252–253  
 modular specificity and, 12  
 motor skills and, 9–10, 15, 182–183,  
   190–197  
 natural selection and, 11  
 neural substrates and, 169–178  
 preconditional patterns and, 60–66  
 predisposition and, 15–16  
 primary visual area and, 170–172

- as repository, 12
- representational structure and, 187–190
- size and, 11–12, 16, 53–54, 61–62, 70, 169–172
- storage and, 184
- symbolic thought and, 55, 57
- theory of mind and, 11, 34, 172–178
- Brannon, E. M., 256, 258
- Bride price, 118
- Bromage, T. G., 62
- Brooks, A. S., 57, 69
- Brown, P., 9, 12, 211
- Buka, 24
- Bunn, H. T., 71
- Burial, 59
- Byrne, R., 71, 174, 204
  
- Call, J., 204, 206, 214
- Campbell, Donald T., 79, 85, 92–93, 95
- Cannibalism, 29
- Carey, Susan, 225, 229, 266, 268, 270
- Carpenter, M., 210
- Carroll, R. L., 49
- Cartesian coordinate system, 209
- Case systems, 26–27
- Cashdan, E. A., 79, 81
- Castelo-Branco, M., 192, 194
- Catania, A. C., 258
- Caterpillars, 31–32
- Causality, 147
  - cognitive causal chains (CCCs) and, 152–164
  - cultural cognitive causal chains (CCCCs) and, 157–161, 163
  - mystic rituals and, 148–152, 156–159
- Cavalli-Sforza, L. L., 2–3, 54, 79, 123, 136, 147
- Changeaux, J.-P., 11
- Cheaters, 36, 85, 90–91, 114, 177
- Cheney, D. L., 114
- Children. *See* Humans
- China, 17
- Chloroplasts, 5
- Chomsky, N., 13, 220
  
- Church, Russ, 235–236, 252–254, 256
- Cladistic character, 24–25
- Clothing, 5–6, 13, 34
- Clutton-Brock, T. H., 62
- Coevolution, 13–15
- Cognition, 12–16
  - assembly coding and, 190–197
  - attention and, 193–197
  - binding mechanism and, 184
  - binocular rivalry and, 193–197
  - biological adaptation and, 204–214
  - cognitive causal chains (CCCs) and, 152–164
  - computation and, 184–185
  - cortical processing and, 185–187
  - cultural cognitive causal chains (CCCCs) and, 157–161, 163
  - cultural triggers and, 182–183
  - effector systems and, 184–185
  - human uniqueness and, 203–217
  - imagination and, 183
  - infants and, 14–15, 175–176, 209–214
  - invisible displacement task and, 226–228
  - learning and, 54
  - metarepresentations and, 183–190
  - modality and, 184–185
  - morals and, 219–245 (*see also* *Morals*)
  - motor skills and, 9–10, 15, 182–183, 190–197
  - neural substrates and, 169–178
  - numerosity and, 247–271 (*see also* *Mathematics*)
  - preconditional patterns and, 60–66
  - perseveration and, 225–234
  - representational structure and, 187–190
  - response synchronization and, 190–197
  - social complexity and, 204
  - spike timing and, 192
  - symbolic thought and, 55, 57
  - theory of mind and, 11, 34, 172–178
  - wild child and, 203–204
- Colby, A., 230
- Coleman, J., 106
- Color, 13–15

- Combes, Claude, 4–5, 45–52, 279
- Competition, 93–94
- Complexity, 2, 17, 20–22  
 language and, 204–214  
 learning and, 54  
 social, 54–55
- Conflict resolution, 82
- Conscience, 85
- Cook, James, 32
- Cooperation, 130  
 biased cultural transmission and, 118–119  
 “Big Mistake” hypothesis and, 110–111  
 extinction rates and, 125–129  
 functionalism and, 105–106  
 group selection and, 117–129  
 “Heart on Your Sleeve” hypothesis and, 109–110  
 kinship and, 107–108  
 lack of consensus on, 105–117  
 manipulation hypotheses and, 112–114  
 migration and, 119  
 morals and, 114–117, 120–125, 235–241  
 punishment and, 114–117, 120–122  
 rates of change and, 127–129  
 sociobiology and, 107–109  
 symbolic boundaries and, 128–129  
 variation and, 122–125
- Cordes, Sara, 11, 247–274, 279
- Cords, M., 82
- Cortex  
 auditory, 185  
 binocular rivalry and, 193–197  
 brain size and, 169–172  
 primary visual area and, 170–172  
 processing mechanisms of, 185–187  
 visual, 185, 193–197
- Cosmides, L., 110, 177
- Couvet, D., 46
- Cree people, 92
- Crimes, 85
- Culture, xii–xiii  
 acultural issues and, 53–54  
 biased transmission and, 118–119  
 brain and, 11–12, 181–201 (*see also* Brain)  
 burial, 59  
 cheaters and, 36, 85, 90–91, 114, 177  
 chimpanzee tyranny and, 53–54  
 cladistic character and, 24–25  
 cognitive causal chains (CCCs) and, 152–164  
 (*see also* Cognition)  
 complexity and, 2, 17  
 conflict resolution and, 82  
 conscience and, 85  
 crimes and, 85  
 cumulative nature and, 18, 27–29  
 Darwinism and, 133–137  
 defining, 10, 54  
 design and, 20–22  
 diffusion and, 17, 25–27  
 drift and, 119, 123–124  
 egalitarian syndrome and, 86–92  
 ethnicity and, 69  
 family and, 86–92  
 feedback and, 2–7, 30–33  
 functionless elements and, 29–30  
 group selection and, 30–33  
 helping another in pain, 235–239  
 histories and, 206–209  
 horizontal transmission and, 17, 25–27  
 human diversity and, 60–61  
 human uniqueness and, 203–217  
 kinship system and, 6, 21–23, 35, 105–130  
 lack of animal, 275–278  
 language and, 11–15 (*see also* Language)  
 learning and, 54  
 lifespan effects and, 70–72  
 mathematics and, 247–274 (*see also* Mathematics)  
 memes and, 8–9  
 migration and, 119  
 morals and, 82–96, 219–245 (*see also* Morals)  
 multiplicity and, 17, 22–24  
 mutualism and, 45–51  
 naturalistic approach to, 147–165  
 natural selection and, 5, 79–103  
 preconditional patterns and, 60–66

- predisposition and, 15–16  
 properties of, 17–33  
 punishment and, 114–117, 120–122  
 purpose of, 2–16  
 ratchet, 2, 10, 34–35, 205–206, 209  
 rates of change and, 127–129  
 reductionism and, 13–15  
 religion and, 13, 31, 110, 122–123, 134,  
 147–152, 156–159, 173, 276  
 replicators and, 137–143  
 Rossel Island and, 18–33, 37nn11,12  
 selective conditions for, 69–72  
 sorcery and, 29–30  
 speculation and, 1  
 system complexity and, 20–22  
 tools and, 26–27 (*see also* Tools)  
 tradition and, 55  
 triggers of, 182–183  
 twin-track theories and, 2–10  
 variation and, 12–13, 22–24, 54  
 vertical transmission and, 17, 24–25  
 wares of, 133–134  
 weaning and, 7–8  
 Culturgen, 36n3  
 Cyclones, 30–32
- Damasio, H., 220, 229  
 Damerow, P., 209  
 Danzig, T., 206, 209  
 Darwinism, xiv, 3, 6–7, 18, 34, 94  
 brain and, 11–12  
 descent with modification, 17  
 genetics and, 133–143  
 model analysis of, 133–137  
 morals and, 220, 241–242  
 replicators and, 137–143  
 selfishness and, 135–137  
 theory of mind and, 176  
 Das, A., 193  
*David Copperfield* (Dickens), 219–221,  
 234–235, 239, 242  
 Davidson, I., 57  
 Davis, A. K., 258
- Dawkins, R., 3, 7–8, 48, 137–139, 147, 235  
 Deacon, T., 5–6, 12, 57, 69, 87  
 Dean, M. C., 62  
 Decade of the Brain, 203  
 Decimal system, 25  
 Dehaene, S., 251  
 Dennett, Daniel, 2, 7–8, 16, 133–145, 279  
 Deoxyribonucleic acid (DNA)  
 memes and, 8–9  
 mutualism and, 48–49  
 replicators and, 137–143  
 Descartes, Rene, 209  
 Kuhnian error and, 229–234  
 perseveration, 225, 229–234  
 Descent with modification, 3  
 Design, 18  
 brain and, 11  
 complexity and, 2, 17, 20–22  
 feedback and, 2–7  
 hand and, 5, 11, 36n5  
 twin-track theories and, 2–4  
 Developmentalism, 221  
 de Waal, Frans B. M., 82–83, 220, 235, 241  
 Diabetes, 8  
 Dialects, 177–178  
 Diamond, A., 8, 19, 29, 221, 223  
 Dias, R., 234  
 Dickens, Charles, 219–221, 234–235, 239, 242  
 Diesman, M., 192  
 Di Fiore, A., 70  
 Dinka people, 117–118, 128  
 Dion, D., 114  
 Disease, 8, 19, 30, 211  
 Division, 257–258  
 Dobzhansky, Theodore, 2  
 Dolphins, 276  
 Dorzé people, 148–149, 160–161  
 Dunbar, R. I. M., 10–12, 15, 279  
 on cognition, 169–179  
 on cooperation, 114  
 on cultural emergence, 59, 69, 71  
 on natural selection, 83, 89  
 Durham, W., 3, 7–8, 30, 79, 96

- Durkheim, E., 94  
 Dyson-Hudson, R., 79
- Economics, 105, 133–134, 147, 241  
 Edelman, G., 11  
 Effector systems, 184–185  
 Egalitarian syndrome, 86–92  
 Egypt, 17  
 Elman, J., 16  
 Ember, C., 79, 93  
 Encephalization quotient (EQ), 62, 64  
 Engel, A. K., 192, 197  
 Enquist, M., 177  
 Equivalence, 254, 266–268  
 Erdal, D., 81, 90  
 Estioko-Griffin, A., 91  
 Ethiopia, 161  
   Albazo study and, 148–152, 156–159  
 Ethnicity, 69, 128–129  
 Ethology, xi  
 Eukaryotic cells, 5, 49–51  
 Eurasia, 57  
 Eusocial societies, 107  
 Evans-Pritchard, E. E., 148  
 Eves, H., 209  
 Evolution, xii  
   auto-domestication and, 6–7  
   Baldwin effect and, 5–6  
   bipedal gait and, 181  
   cooperation and, 105–130  
   culture and, 53–77 (*see also* Culture)  
   as economic model, 133–134  
   feedback and, 2–7, 30–33  
   God and, 133  
   group selection and, 6 (*see also* Group selection)  
   Holocene era, 69  
   language and, 181 (*see also* Language)  
   Mesolithic era, 93  
   mutualism and, 45–51  
   naturalistic approach to, 147–165  
   natural selection and, 5 (*see also* Natural selection)  
   Paleolithic era, 56–66  
   parasitism and, 45–48  
   Pleistocene era, 69–70, 92  
   predisposition and, 15–16  
   punctuated equilibrium and, 4–5  
   quantum leaps in, 45–52, 64  
   recent human origins and, 56–60  
   replicators and, 3  
   selfish gene and, 7  
   semantic norms and, 133–144  
   sexuality and, 6  
   theory of mind and, 11, 34, 174–178  
   twin-track theories and, 2–10  
 Evolutionarily stable strategy (ESS), 177  
 Extinction, 125–129
- Family, xiv–xv. *See also* Group selection  
 egalitarian syndrome and, 86–92  
 frequency-dependent bias and, 124–125
- Feedback, 18, 30–31  
 Baldwin effect and, 5–6  
 challenges to, 4–10  
 group selection and, 6  
 kin selection and, 6  
 mechanisms for, 2–7  
 natural selection and, 5  
 Rossel Island and, 32–33  
 sexuality and, 6  
 twin-track theories and, 2–10  
 weaning and, 7–8
- Feldman, M. W., 2–3, 33, 50, 136, 147  
 on cooperation, 123  
 on cultural emergence, 54  
 on natural selection, 79
- Fischer, K. E., 70
- Fish, 27–28, 31, 48
- Flanagan, J. G., 81
- Foley, Robert A., 5, 11, 279  
 on cognition, 206  
 on cultural emergence, 53–77  
 on morals, 237  
 on natural selection, 79

- Food  
 cooperative behavior and, 239–241  
 experimentation dangers and, 27–29  
 invisible displacement tasks and, 226–230  
 numerosity and, 251–252  
 poisons and, 27–29  
 perseveration behavior and, 226–234  
 sago, 31  
 weaning and, 7–8
- Fore people, 30
- Fossey, D., 79, 82
- Fossil record, 56, 181
- Fox, R., 10, 81
- Fractions, 248
- Frank, Robert, 109–110
- Free riders, 90–91
- Freiwald, W. A., 192
- Fried, M. H., 81
- Fries, P., 193
- Fujita, K., 230, 232
- Functionalism, 105–106
- Furur-Haimendorf, C. von, 82
- Gainer, P., 236
- Gallistel, Randy, 11, 247–274, 279
- Gall wasp, 4
- Gardner, P., 81
- Gazzaniga, M. S., 214
- Gelade, G., 193
- Gelman, Rochel, 11, 247–274, 279
- Gender issues, 82, 277  
 alpha males and, 84  
 bride price and, 118  
 egalitarian syndrome and, 86–92  
 gathering and, 113  
 hunting and, 91–92, 113  
 marriage and, 111  
 weapons and, 86
- Genetics, 8–9, 13, 33–34, 45  
 amino acids and, 139–143  
 cultural replicators and, 137–143  
 Darwinism and, 133–137  
 egalitarian syndrome and, 86–92  
 eukaryotic cells and, 49–51  
 morals and, 86  
 mutualism and, 45–51  
 recent human origins and, 56–58
- Gibbon, J., 251–253, 256–258
- Gieberman, 85
- Gilbert, C. D., 193
- Gintis, H., 109
- God, 133, 140
- Goldman-Rakic, P. S., 185, 221
- Goldstein, D. B., 56
- Gollub, L. R., 258
- Gomé*, 148–152, 156–160
- Goodall, Jane, 79, 82, 205
- Goody, J., 27, 95
- Gopnik, M., 225, 229
- Gorokan languages, 21, 24
- Gould, Stephen J., 7, 34, 49
- Grammar, 207
- Gray, C. M., 187, 191–193, 197
- Great Plains of North America, 127–128
- Greeks, 248–249
- Group selection, 6, 18, 30–33  
 biased cultural transmission and,  
 118–119  
 brain size and, 169–170  
 cheaters and, 36, 85, 90–91, 114, 177  
 cooperation and, 117–129  
 dialects and, 177–178  
 direct competition and, 93–94  
 egalitarian syndrome and, 86–92  
 extinction rates and, 125–129  
 migration and, 119  
 model plausibility and, 125–126  
 morals and, 82–96, 120–122  
 problems with, 118–120  
 punishment and, 114–117, 120–122  
 rates of change and, 127–129  
 reciprocity and, 114–117, 120–122  
 symbolic boundaries and, 128–129  
 variance in, 89–90, 122–125  
 warfare and, 93
- Gumperz, J., 214

- Hallpike, C. R., 129
- Hamilton, W. D., 235  
 on cooperation, 106–107, 110, 114, 129–130  
 on natural selection, 90
- Hammer, M. F., 56
- Hands, S., 11, 36n5
- Hardin, C. L., 13–15
- Harpending, H., 56, 112
- Harper, D. G. C., 258
- Hartnett, P., 270
- Harvey, P. H., 62
- Hauser, Marc D., 10–12, 14, 279  
 on animal culture, 275–278  
 on cultural emergence, 53  
 on morals, 219–245  
 on real numbers, 266
- Hawkes, K., 70
- “Heart on Your Sleeve” hypothesis, 109–110
- Hebb, D. O., 190
- Heine, B., 206
- Henshilwood, C., 57
- Herculano-Houzel, S., 193
- Hewlett, B. S., 92
- Heyman, G. M., 257
- Hierarchies, 81
- Hirshleifer, R., 116
- Hobson, P., 211
- Hoebel, E. A., 85
- Holloway, R. L., 61
- Holocene era, 69
- Homo erectus*, 60, 62
- Homo ergaster*, 62, 67
- Homo heidelbergensis*, 60, 62, 66–67
- Homo helmei*, 67, 69
- Homo sapiens sapiens*, 181, 184
- Hood, B. M., 226–228
- Hopper, P., 207
- Horizontal transmission, 17, 25–27
- Howieson’s Poort, 57
- Hublin, J. J., 59
- Humans  
 adaptive abilities of, 204–214  
 anatomically modern, 57–59  
 auto-domestication and, 6–7  
 Baldwin effect and, 5–6  
 cannibalism and, 29  
 clothing and, 13, 34–35  
 conscience and, 85  
 cooperation and, 105–132  
 diversity of, 60–61  
 effort diminution and, 135–136  
 egalitarian syndrome and, 86–92  
 hand and, 5, 11, 36n5  
 hierarchies and, 81  
 infantile processing and, 14–15, 175–176,  
 209–214  
 invisible displacement task and,  
 226–228  
 language and, 13–20 (*see also* Language)  
 lifespan effects and, 70–72  
 mathematics and, 208–209, 247–271  
 mental capacities of, 173–174  
 morals and, 82–96 (*see also* Morals)  
 Neanderthals and, 6, 10, 58–66, 73  
 nonverbal counting and, 260–270  
 ontogeny and, 209–215  
 political behavior and, 81–96  
 perseveration behavior and, 225–234  
 recent origins of, 56–60  
 Rossel Island people, 14–33, 37nn11,12  
 sanctioned behavior and, 82–86, 94–97  
 symbolic thought and, 55, 57  
 theory of mind and, 11, 34, 172–178  
 uniqueness of, 203–217  
 weaning and, 7–8
- Humphrey, N. K., 6, 204
- Hunter-gatherers, 113  
 brain size and, 169–170  
 cheaters and, 85, 90–91  
 egalitarian syndrome and, 86–92  
 morals and, 82–96  
 sanctioned behavior and, 82–86, 94–97  
 warfare and, 93  
 weapons and, 86
- Hurst, L. D., 46
- Huxley, Thomas H., 31, 45



- Imitation, 175–176  
 Independence, 3  
 Individualism, 105–107  
 Infants. *See* Humans  
 Information, 3  
   brain size and, 169–172 (*see also* Brain)  
   cognitive causal chains (CCCs) and, 152–164  
   human uniqueness and, 201–207  
   imagination and, 183  
   infantile processing and, 14–15, 175–176, 209–214  
   language and, 205 (*see also* Language)  
   mathematics and, 247–271  
   mutualism and, 48–49  
   optic tract and, 170–172  
   poisons and, 27–29  
   replicators and, 137–143  
   syntax and, 207  
   theory of mind and, 11, 34, 172–178  
 Ingman, M., 56  
 Inhibition, 11  
   alcohol and, 12  
   brain and, 221–225, 241–242  
 Insects, xii, 31–32  
 Integers, 247–249  
   exact equivalence and, 266–268  
   origin of, 265–266  
   small amount perception and, 268–270  
   triggers for, 265–266  
 Inuit people, 6  
 Irrational numbers, 247–249  
  
 Jackendoff, R., 12, 220  
 Jaisson, Pierre, xi–xvii, 279  
 Jerison, H. J., 61–62  
 Joffe, T., 171  
 Johnson, D. M., 251  
 Johnson, M., 213  
  
 Kano, T., 79, 82  
 Kant, Immanuel, 219–220, 241  
 Kaplan, H., 70, 113  
 Kay, P., 13–15, 67, 69  
  
 Keeley, L. H., 93  
 Keil, A., 193, 229  
 Keller, J. V., 258  
 Kelly, R. L., 79, 84, 90, 95, 117–118  
 Kinderman, P., 173  
 King, B., 10  
 Kinship, 6, 21–23, 35  
   cooperation and, 105–130  
   marriages and, 111–114  
   symbolic boundaries and, 128–129  
 Kirch, P. V., 19, 24, 27  
 Klein, R. G., 56–57, 67, 69, 87, 128, 206  
 Knauft, B. B., 81, 93, 120  
 Kniffin, K. M., 91  
 Knight, C., 57  
 Kohlberg, L., 230  
 König, P., 192  
 Kreiter, A. K., 192  
 Krings, M., 6, 10  
 Kroll, E. M., 71  
 Krubitzer, L., 184  
 Kudo, H., 169  
 Kuhl, P. K., 14  
 Kuhnian perseveration, 225–234  
 Kula trade, 25  
 Kummer, H., 205  
 !Kung San people, 169–170  
  
 Lahr, M., 56–57, 62, 67, 206  
 Lakoff, G., 213  
 Laland, K. N., 5, 9, 50  
 Lamarckian methods, xi, xiii, 5  
 Landauer, T. K., 259  
 Langacker, R., 211  
 Language, 11, 34–36, 181, 203  
   Austronesian, 19, 24–25  
   case systems and, 26–27  
   categories and, 15  
   coevolution and, 13–15  
   decimal system and, 25–26  
   dialects and, 177–178  
   Gorokan, 21, 24–25  
   grammar and, 207

- Language (cont.)  
 human uniqueness and, 204–214  
 infantile processing and, 14–15, 211–214  
 innateness and, 15–16  
 mapping of numerical magnitude and, 259–265  
 mathematics and, 247, 252  
 morals and, 83  
 multiplicity and, 17  
 Neanderthals and, 59  
 outside entities and, 205–206  
 Rossel Island and, 14–33  
 symbolic thought and, 55  
 syntax and, 207  
 written, 17  
 Yéfi Dnye, 14, 19, 24
- Lapita peoples, 19
- Larynx, 53
- Lavery, J. J., 237
- Learning, 9–10, 54  
 brain and, 11–12  
 cooperation and, 105–130  
 human uniqueness and, 201–207  
 infantile processing and, 14–15, 175–176, 209–214  
 numerosity and, 247–271  
 preconditional patterns and, 60–66  
 punishment and, 114–117, 120–122  
 ratchet culture and, 205–206  
 theory of mind and, 11, 34, 172–178  
 variation maintenance and, 122–125
- Lee, R. B., 64, 67, 70, 81, 90
- Leimar, O., 177
- Length, 248–249
- Leslie, A. M., 266, 268, 270
- Levinson, Stephen C., 1, 34–36, 279  
 on cognition, 11–16, 214  
 on cultural emergence, 54  
 on feedback mechanisms, 2–10, 18, 30–33  
 on Rossel Island people, 14–33, 37nn11,12  
 on transmission factors, 17–18
- Lewontin, R., 7
- Liep, J., 23, 25
- Lifespan, 70–72
- Logarithms, 259–260
- Longevity, 70–72
- Löwel, S., 192
- Lumsden, C. J., 3
- Lynch, J., 24–25
- Maasai people, 112–113, 116
- McBrearty, S., 57, 69
- McBurney, C. B. M., 57
- MacFall-Ngai, M. J., 48
- McFarland, D., 143n2
- McGrew, W. C., 10, 53, 163, 276
- McLachlan, A., 47
- McLarnon, A., 59, 67, 69
- Mae Enga war party, 115, 127
- Maffi, L., 13–15
- Magnitude, 247–248  
 ancestral status of, 249–259  
 distance and, 259–260  
 duration and, 257–258  
 exact equivalence and, 266–268  
 mapping and, 259–265  
 memory and, 252–253  
 nonverbal counting and, 260–270  
 size and, 259–260  
 small amount perception and, 268–270
- Malaria, 8
- Malinowski, B., 105
- Mandler, G., 261
- Manipulation hypotheses, 112–114
- Mapping, 259–265
- Margulis, L., 5
- Marriages, 111, 115  
 bride price and, 118  
 manipulation hypotheses and, 112–114  
 military superiority and, 117–118
- Martin, R. D., 61–62
- Marxism, 161
- Maryanski, A., 106
- Mathematics, 25–26, 203, 208–209, 271  
 addition, 255–256  
 binary systems, 252

- Cartesian coordinates, 209
- closed systems, 248
- distance, 259–260
- division, 257–258
- fractions, 248–249
- integers, 247–249
- irrational numbers, 247–249
- length, 248–249
- mapping, 259–265
- multiplication, 258
- ordering, 248, 258–259
- size, 259–260
- subtraction, 256–257
- transcendental numbers, 247
- Maynard Smith, J., 48–49
- Mayr, E., 19
- Mead, G. H., 203
- Mechanisms, cognitive
  - accumulator counting, 265 (*see also* Numerosity)
  - assemblies and, 190–197
  - auto-domestication and, 6–7
  - binocular rivalry and, 193–197
  - cognitive, 172–174 (*see also* Cognition)
  - cortical processing, 185–187
  - dialects, 177–178
  - Diamond retrieval task and, 221–225
  - inhibitory, 221–225 (*see also* Morals)
  - reciprocity and, 114–117, 120–125
  - response synchronization and, 190–197
  - theory of mind and, 11, 34, 172–178
- Mechanisms, evolutionary
  - Baldwin effect and, 5–6
  - feedback, 2–7
  - functionalism and, 105–106
  - group selection, 6, 18
  - imitation and, 175–176
  - kin selection and, 6
  - mating avoidance, 111
  - memes and, 8–9
  - metarepresentations and, 183–190
  - natural selection and, 5, 11
  - selfish gene and, 7
  - sexuality and, 6
  - social complexity and, 54–55
- Mechner, F., 251
- Meck, W. H., 252–254
- Meggitt, M., 93
- Mellars, P., 69
- Meltzoff, A. N., 14, 210, 225, 229
- Memes, 3, 8–9
  - Darwinism and, 137–143
  - true replication and, 138
- Memory
  - numerosity and, 251–255
  - random access, 11
  - short-term, 193–197
- Mesolithic era, 93
- Mexico, 26
- Mice, 17
- Midgely, 8
- Miller, Robert, 237–238, 257
- Miltner, W. H. R., 193
- Mites, 47–48
- Mithen, S. J., 57, 87
- Mitochondria, 5
- Mole rat, 107
- Moles, 17
- Moore, J., 48
- Morals, 11
  - Cartesian perseveration and, 225, 229–234
  - cheaters and, 36, 85, 90–91, 114, 177
  - conscience and, 85
  - cooperation and, 114–117, 120–125, 235–241
  - crimes and, 85
  - Darwinism and, 220, 241–242
  - David Copperfield* and, 219–221, 234–235, 239, 242
  - early communities and, 84–96
  - egalitarian syndrome and, 86–92
  - group competition and, 93–94
  - helping another in pain, 235–239
  - inhibition and, 241–242
  - Kant and, 219–220
  - Kuhnian perseveration and, 225–234

- Morals (cont.)  
 language and, 83  
 origin hypothesis for, 82–83  
 passion and, 221–225  
 perseveration behavior and, 225–234  
 reciprocity and, 114–117, 120–125  
 reductionism and, 219–220  
 residual problem and, 85–86  
 sanctioned behavior and, 82–86, 94–97  
 weapons and, 86  
*Morani*, 112–113  
 Mother-infant bonds, 67  
 Motor skills, 9–10, 15  
 cultural triggers and, 182–183  
 response synchronization and, 190–197  
 spike timing and, 192  
 Movshon, J. A., 194  
 Moyer, R. S., 259  
 Multiplication, 258  
 Multiplicity, 17, 22–24  
 Munk, M. H. J., 193  
 Mutualism  
 evolutionary tempo and, 49–51  
 information and, 48–49  
 parasitism and, 45–48  
 symbiosis, 4  
 system properties and, 48–51  
 Mysticism, 161  
 misfortunes and, 148–152  
 naturalistic approach and, 147–152,  
 156–159  
 rituals and, 148–152, 156–159  
 sorcery and, 29–30  
 Nativism, 13–15  
 Naturalistic approach  
 Albazo study and, 148–152, 156–159  
 cognitive causal chains (CCCs) and,  
 152–164  
 cultural cognitive causal chains (CCCCs)  
 and, 157–161, 163  
 presupposition of, 147–148  
 Natural numbers, 248–249  
 Natural selection, xi, 5  
 ancestral resource use and, 80  
 cladistics and, 79–80  
 common ancestor portrait for, 81–96  
 conflict resolution and, 82  
 cooperation and, 105–130  
 group competition and, 93–94  
 morals and, 82–96  
 primates and, 79–80  
 replicators and, 137–143  
 social control effects and, 86–87  
 Neanderthals, 6, 10, 73  
 preconditional patterns and, 60–66  
 tools and, 58–59, 62, 64  
 Neocortex, 11, 169–172  
 Nettle, D., 177  
 Neurons, 198  
 assembly coding and, 190–197  
 binocular rivalry and, 193–197  
 brain size and, 169–172  
 cell divisions and, 185  
 cognitive mechanisms and, 172–174  
 cortical processing and, 185–187  
 effector systems and, 184–185  
 metarepresentation and, 183–190  
 representational structure and, 187–190  
 response synchronization and, 190–197  
 spike timing and, 192  
 theory of mind and, 172–178  
 Noble, D., 57  
 Noss, A. J., 92  
 Nowak, L. G., 114, 192  
 Nuer people, 117–118, 128  
 Numerosity. *See also* Mathematics  
 adding and, 255–256  
 birds and, 251, 256–257  
 distance and, 259–260  
 division and, 257–258  
 duration and, 252–253, 257–258  
 equivalence and, 254, 266–268  
 latency and, 249–251  
 mapping and, 259–265  
 memory and, 251–255

- multiplication and, 258
  - ordering and, 258–259
  - primates and, 251–255
  - rate and, 256–257
  - rats and, 249–251, 254–258
  - size and, 259–260
  - small amount perception and, 268–270
  - subtraction and, 256–257
  - vertebrates and, 249–259
- Olmstead, Judith, 149–150
- Optic tract, 170–172
- Orstrom, E., 176
- Pagel, M., 62
- Paleolithic era, 56–66
- Palmer, C. T., 88
- Papua, New Guinea, 108, 115
  - extinction rates, 125–129
  - rates of change, 127–129
  - Rossel Island people and, 14–33, 37nn11,12
- Paracer, S., 4
- Parasitism, 45–48
- Passions within Reason* (Frank), 109
- Pattern matching, 15
- Peirce, Charles, 203
- Pérusse, R., 268
- Peterson, D., 79, 90
- Philippines, 91
- Philippis, W. A., 190
- Philosophers, 105, 164n2. *See also* Morals
- Piaget, J., 221
- Pinker, S., 13, 209, 214, 220
- Plains Indians, 127–128
- Plants, 107
- Platt, J. R., 251
- Pleistocene era, 69–70, 92
- Plotkin, H., 12
- Poisons, 27–29
- Political scientists, 105
- Politics, 161
- Pollination, xvi
- Ponyfish, 48
- Potts, R., 84, 86
- Power of systems, 35
- Powers, Richard, 133
- Pre-Aurignacian people, 57
- Predisposition, 15–16
- Premack, David, 10, 53, 275–279
- Preuss, T. M., 223
- Primary visual area, 170–172
- Primates, 2, 10, 55–56
  - alcohol and, 12
  - behavior and, 79–80 (*see also* Behavior)
  - brain size and, 169–172
  - cooperation and, 108–129, 237–241
  - Diamond retrieval task and, 221–225
  - human adaptive abilities and, 204–206
  - inhibitory response and, 221–225 (*see also* Morals)
  - invisible displacement task and, 228–229
  - lack of culture in, 276–278
  - natural selection and, 79–80
  - numerosity and, 251–255
  - primary visual area and, 170–172
  - resource use and, 80
  - theory of mind and, 11, 34, 172–178
  - Wrangham model and, 79–80
- Psychology, xi–xii, 12–13
  - exact equivalence and, 266–268
  - religion and, 173
  - theory of mind and, 11, 34, 172–178
- Public productions, 156–161
- Pufferfish, 27–28
- Pygmies, 92
- Pylyshyn, Z. W., 268
- Pythagoreans, 248
- Queensland, 26–27
- Radcliffe-Brown, A. R., 105, 147
- Random access memory (RAM), 11
- Rappaport, R. A., 106
- Rasmusen, E., 116
- Ratchet culture, 2, 10, 34–35, 205–206, 209
- Rationalism, 105–107

- Rats, 107, 235–239  
 latency and, 249–251  
 numerosity and, 249–251, 254–258
- Real numbers  
 ancestral status of, 249–259  
 exact equivalence and, 266–268  
 integers and, 247–249  
 magnitude and, 247–248  
 memory and, 252–253  
 nonverbal counting and, 260–270
- Reciprocity  
 frequency-dependent bias and, 123–125  
 learning and, 114–117, 120–123
- Reductionism, 12–15, 219–220
- Religion, 13, 31, 110, 134, 276  
 mystical rituals and, 148–152, 156–159  
 naturalistic approach and, 147–152, 156–159  
 selfishness and, 122–123  
 theory of mind and, 173
- Rendall, D., 70
- Rendell, L., 10
- Replicators, 3, 137–143
- Reproduction, xv, 70–71
- Response synchronization, 190–192  
 binocular rivalry and, 193–197
- Rice, G. E., 236
- Richerson, Peter J., 3, 6, 35, 176, 280  
 on cooperation, 105–132  
 on cultural emergence, 54  
 on natural selection, 79, 89, 92, 94
- Ridley, M., 220
- Roberts, A. C., 223, 251
- Robinson, M., 268
- Rodriguez, E., 193
- Roelfsema, P. R., 193
- Roman numerals, 209
- Rose, H., 12
- Rose, S., 7, 12
- Rossel Island peoples, 37nn11,12  
 anthropological study of, 13–33  
 big man system of, 32  
 cannibalism and, 29  
 cyclones and, 30–32  
 decimal system and, 25–26  
 food and, 27–28  
 poisons and, 27–29  
 sorcery and, 29–30  
 tools and, 26–27
- Sago, 31
- Sahlins, M., 129
- Sahul, 27
- Sanctioning, 83–86, 96–97
- Santos, Laurie, 227
- Saussure, 35
- Savastano, H. I., 257
- Saxe, G., 208
- Schick, K., 62
- Schmidt, K. E., 193
- Schneider, W., 191
- Sealy, J., 57
- Selassie, Haile, 161
- Selfishness, 7  
 cooperation and, 105–130  
 Darwinism and, 135–137  
 egalitarian syndrome and, 86–92  
 free riders and, 90–91  
 morals and, 82–96  
 mutualism and, 45–51  
 religion and, 122–123  
 sanctioned behavior and, 82–86, 94–97
- Service, E. R., 81
- Sexuality, xv–xvi, 277  
 auto-domestication and, 6–7  
 crimes and, 85  
 mating avoidance and, 111
- Seyfarth, R. M., 114
- Sharma, J., 185
- Shebo, B. J., 261
- Shepher, J., 111
- Shuurman, R., 69
- Sickle-cell anemia, 8
- Siegler, R. S., 268
- Sigmund, K., 114
- Silberberg, A., 230
- Simon, H., 92

- Simon, T. J., 268, 270
- Singer, Wolf, 11–12, 181–201, 280
- Skyhooks, 133
- Smith, Adam, 106
- Smith, B. H., 62
- Smith, D. C., 46
- Smith, E. A., 79, 84
- Sober, E., 6, 88, 91, 129, 220
- Sociality, xii–xiv, 12–13, 275–278  
 “Big Mistake” hypothesis and, 110–111  
 cognitive causal chains (CCCs) and, 152–164  
 (see also Cognition)  
 complexity and, 54–55  
 cooperation and, 105–130  
 family and, xiv–xv, 86–92, 124–125  
 “Heart on Your Sleeve” hypothesis and,  
 109–110  
 helping another in pain, 235–239  
 human uniqueness and, 203–207  
 manipulation and, 112–114  
 morals and, 82–96, 114–117 (see also Morals)  
 plants and, 107  
 perseveration and, 225–234  
 public productions and, 156–161  
 sanctioned behavior and, 82–86, 94–97
- Solomon Islands, 24, 26
- Soltis, Joseph, 93, 125, 127
- Sorcery, 29–30
- Spandrels, 7
- Spelke, E. S., 225–226, 229
- Spencer, H., 105
- Sperber, Dan, 8–9, 280  
 on naturalistic approach, 147–165  
 on semantic norms, 137–139, 141–142,  
 144n4
- Spriggs, M., 24, 26
- Stammbach, Eduard, 239–240
- Stanford, C. B., 82, 84
- Stanier, R. V., 1
- Steinmetz, P. N., 193
- Sterelny, K., 7
- Stevens, S. S., 263
- Stiner, M. C., 59, 71
- Stoner, G. R., 194
- Strassman, B., 113
- Stringer, C. B., 56
- Subtraction, 256–257
- Sudest Island, 25
- Superorganism, 32
- Sycamore fig, 4
- Symbiosis, 4. *See also* Altruism; Mutualism;  
 Parasitism
- Symbolic thought, 55, 57
- Syntax, 207
- Szathmary, E., 49
- Tallon-Baudry, C., 193
- Talmy, L., 12
- Tattersall, I., 60, 79
- Technology, 3, 11, 57–59, 62, 64, 67. *See also*  
 Tools
- Termites, 107–108
- Terrace, H. S., 256, 258
- Terrill, A., 24
- Thatcher, Margaret, 106
- Theft, 85
- Theory of inclusive fitness, 114, 129–130
- Theory of mind, 11, 34  
 cheaters and, 177  
 Darwinism and, 176  
 evolution of, 174–178  
 human capacity and, 173–174  
 neurons and, 172–178  
 religion and, 173
- Thornhill, N. W., 113
- Tiger, L., 81
- Tiitinen, H., 193
- Toma, 211
- Tomasello, Michael, 2, 10–11, 15, 35, 280  
 on cognition, 203–217  
 on cultural emergence, 54
- Tooby, J., 110, 177
- Tools, 17, 23, 181, 204  
 blade technology and, 57  
 cultural diffusion and, 25–27  
 cyclone house and, 30–31

- Tools (cont.)  
 Darwinism and, 133–134  
 Neanderthals and, 58–59, 62, 64  
 ratchet culture and, 205–206  
 weapons, 86
- Toth, N., 62
- Traditional behavior, 55, 276–277
- Transcendental numbers, 247
- Traugott, E., 207
- Treisman, M., 193
- Trick, L. M., 268
- Trivers, R. L., 90, 114, 129–130, 235
- Turke, P. W., 70
- Turner, J. H., 106
- Twin-track theories, 2–10
- Unionicola ypsiliphora*, 47–48
- Valladas, G., 59
- van den Berghe, P. L., 110
- Variation, 12–13, 17, 22–24  
 chronological, 59  
 ethnic, 54  
 group selection and, 89–90, 122–125  
 learning and, 122–125  
 numerosity and, 251–252
- Vehicles, 3
- Vehrencamp, S. L., 93
- Vertical transmission, 17, 24–25
- Vigilant, L., 58
- Visual cortex, 185, 193–197
- Voland, E., 7
- Von der Malsburg, C., 187, 191
- Vygotsky, Lev, 203, 211
- Waddington, C. H., 92
- Wade, M. J., 89, 91–92
- Wallis, J. D., 223
- Warfare, 93
- Weaning, 7–8
- Weapons, 86
- Weber's law, 259
- Wechkin, S., 238
- Westermarck, E., 111
- West Side Story*, 143
- Whalen, J., 260, 262
- Whales, 10, 276
- Wheeler, P., 16
- Whitehead, H., 10
- Whiten, A., 10, 53, 71, 81, 90, 204–205
- Wiessner, P., 81
- Williams, G. C., 7, 90–91, 137, 235
- Wilson, D. S., 6, 88, 90–91, 129, 220
- Wilson, E. O., 3, 87, 89, 91, 114, 147, 235
- Wilson, H. Q., 220
- Winterhalder, B., 88, 92
- Wittgenstein, Ludwig, 203
- Wolf, A. P., 111
- Wolves, 17
- Woodburn, J., 81
- Wrangham, R., 70, 79, 81–82
- Wright, R., 220
- Yéli Dnye, 14, 19, 24
- Young, H. P., 106
- Zandé people, 148–149