

Index

-
- Abiant events/tokens, 160–162, 165, 167, 168
- Abstraction, levels of, 51, 291
- Accessory circuits, 79
- Accommodation, 77, 264
- Action potential, 20–21
- Adaptive chaining, 258
- Adiant events/tokens, 160–162, 165, 168
- Afferent excitation pattern, 39
- Afferent-field aperture, 82, 118, 120–121, 123–126
- Affordance, 138, 146, 148, 165–168
- After-image, 92–93, 227
- Akers, R. F., 32
- Alexia, 278
- Alkon, D. L., 32
- Ambient illumination, effect on retinoid cells, 229, 238
- Ambiguous shapes, 228, 252–255, 275–276
- Analogical representation, 48, 57, 134, 139, 141, 214, 266
- Analysis of object relations, 7, 269, 272
- Analytic loss, 280
- Andersen, R. A., 130, 262
- Anderson, J. A., 3
- Anderson, J. R., 7
- Anderson, S. W., 284
- Angle of gaze, 130, 243
- Anisotropy of 3-D retinoid, 243–247
- Anorthoscopic perception, 227
- Aphasia, 285
- Armington, E. C., 248
- Arousal, 39, 183–184, 187, 258, 289
- Aspartate, 32, 33
- Associative hierarchy, 170–174
- Associative sequential recall, 169–174
- ATF-DTF interaction, 29, 30–32, 36, 258, 289
- Attention, selective/focal, 63–65, 127, 133–134, 162, 247, 261–264, 274–275, 292
- Attentional loss, 280
- Autaptic neuron, 24–25, 34, 56–59, 289
- Averaged prototype, 11–13, 199
- Axon collaterals, 24, 34, 37
- Axon transfer factor (ATF), 29–30, 32–33, 36, 39
- Back propagation, 14
- Backward chaining/mapping, 49–51, 113–114, 134, 291
- Ball, T. M., 267
- Ballard, D. H., 3
- Bank, B., 32
- Banks, W. P., 114
- Barlow, H. B., 60, 133
- Bartlett, J. C., 274
- Baudry, M., 32
- Belief, 303–304
- Bender, M. B., 280
- Benevento, L. A., 60
- Benson, D. F., 278
- Berti, A., 214
- Biasing input, 23–25
- Biederman, I., 6, 39, 265
- Binding consequences to actions, 140–142
- Binocular disparity, 73, 264
- Biological name, for learned pattern, 40, 54, 202
- Bisiach, E., 214, 279
- Blasdel, G. G., 259
- Blinkov, S. M., 15, 19
- Bliss, T. V. P., 32
- Boring, E. G., 1, 242, 245
- Bower, G. H., 7
- Brightening cell, 72–74
- Brown, J. W., 278

- Brown, T. H., 32
 Browning, M., 32
 Bruce, C., 261
 Bundesen, C., 87

 Calcium ions, 32
 Canonical shapes, 169
 Casco, C., 228
 Category membership, 46, 99
 Category signal, 46
 Cave, K. R., 269
 Cell fatigue, 40, 56, 151
 Center-surround inhibition, 31
 Centroid of stimulus pattern, 65–67, 118, 120, 125, 154
 Cerebellum, 34, 259
 Chaffin, R., 16, 112
 Chambers, D., 275, 276
 Chen, C., 34
 Choate, P. A., 273
 Churchland, P. M., 302
 Churchland, P. S., 302
 Clarkson, M. G., 265
 Class cell, 37, 40–44, 46, 48–54, 83–85, 99
 Classification time, 83
 Clifton, C., 216
 Clifton, R. K., 265
 Clock ring, 93–97, 289, 291
 Cognitive competence and cognitive style, 5–6
 Cognitive homeostasis, 154–156, 162
 Cognitive map, 134–138
 Cognitive-brain system, diagrammatic summary of, 288
 Collins, W. E., 271
 Comb filter, 9–11, 26, 37, 201, 260
 Combinatorial explosion, 8, 299–300
 Competent cognitive mechanism, primary criteria, 6
 Competitive pickoff, 46
 Complex environment, 201
 Complex predicates, 112
 Composing plans, 146–151
 Concept, 45–46, 271
 Confusion matrices, 193, 194–195
 Contour density, 118
 Contour tracing, 133, 138, 273–274
 Contour transform, 39
 Cooper, L. A., 88, 266
 Coren, S., 250
 Correlation cluster, 69–72, 75

 Cotman, C. W., 19, 154
 Covert shift of attention, 63
 Creativity, 301–302
 Cross-correlation of monocular inputs, equation for, 72

 Damasio, A. R., 285
 Davidson, B. J., 64
 Day, R. H., 250
 Decoding, and array-to-pattern models, 9–10
 Decomposability, 115
 Decoupler cell, 85, 87
 Deep structure, 48
 Defining a subject, 108–110, 285
 Dendrite transfer factor (DTF), 29–34, 36, 39
 Dendrodendritic gradient, 24, 79–81
 Depth perception, 69–78, 279
 Derr, M. A., 143
 Derthick, M., 48
 Designing a cognitive model, issues, 7–15
 Desimone, R., 165, 259, 260, 263
 Detection matrix, 37, 40–44, 63, 65, 85
 Discharge latency, 22–24
 Discharge threshold, 22
 Disparity planes (Z-planes), 70, 75
 Displeasure, 156–157, 160
 Distance between objects, analyzing, 130–133
 Duration of synaptic changes, 29
 Dwell-time, on autaptic cells, 231
 Dynamic masking/cropping, 82

 Ebner, T. J., 264
 Edge detection, 39
 Effective code, 40
 Egocentric spatial frame, 55, 60, 62, 69, 118, 228, 245, 261–262, 274
 Ehrlich, S., 270
 Emergent images, 276–277
 Emmert's law, 245
 Encoding plans, 142–145
 Energy minimum, 9, 10
 Environmental agnosia, 278–279
 Environmental paths, representation of, 63
 Episodic learning, 14–15, 183–187, 219–221, 291
 Episodic matrix, 95–96
 Episodic processing, 93, 95–97

- Episodic trigger, 97
 Error tolerance, in centroid adjustment,
 65–68, 118, 120–121
 Ervin, F. R., 156, 160
 Essick, G. K., 130, 262
 Estes, W. K., 46
 Excitatory postsynaptic potential (EPSP),
 20–24, 34, 36, 40, 56, 81, 83, 93
 Explanation, levels of, 3–5
 Extrapolation, in mental imagery, 273
 Eye tremor, 248
 Eye-position-dependent visual cells, 264
- Fahlman, S. E., 7, 99
 Farah, M. J., 275, 276, 281
 Fatigue, and interneurons, 233, 248–250
 Faulconer, B. A., 114
 Feature extraction/detection, 46–48, 125,
 198–199
 Feature-list checkoff, 46
 Feldman, J. A., 3, 6
 Feldman, M., 280
 Ferguson, E. S., 266
 Ferreira, F., 216
 Figure reversal, 254–255, 275–276
 Filter cell, 37, 39–44, 46–47, 51, 85, 126
 Finke, R. A., 272, 273, 275, 276
 Fite, K. V., 243
 Fitzpatrick, D., 259
 Fixation, 65, 118, 120, 124, 202, 204, 276
 Flora, J., 114
 Flux detectors, 118, 120
 Focal attention, 82
 Fodor, J. A., 114, 115
 Forgetting, 29, 184
 Frederickson, R. E., 274
 Frequency of cell discharge, and integra-
 tion slope, 22–23
 Funahashi, S., 261, 262
 Fuster, J. M., 282–283
- Galanter, E., 139
 Gardner-Medwin, A. R., 32
 Gating, 25, 53–54, 142, 145
 Generalized delta rule, 14
 Generalized neuron, 20–24
 Geo-centered frame, 135
 Gerren, R. A., 32
 Gersuni, G. V., 297
 Glaser, E. M., 24, 56
 Gleitman, H., 283
- Glezer, I. I., 15, 19
 Glutamate, 32, 258
 Gnadt, J. W., 264
 Goal, 146, 153
 Goldman-Rakic, P. S., 261
 Gould, J. L., 47
 Graham, C. H., 89
 Grossberg, S., 3
 Guenther, R. K., 114
 Gustafsson, B., 257
- Hafner, S., 32
 Harnad, S., 7
 Heath, R. G., 156
 Hedonic system, 157–158
 Helmholtz, H., 228
 Hemi-spatial neglect, 214
 Hemifield disparity, 67, 121
 Herrmann, D. J., 16, 112
 Heuristic self-locus, 63–65, 135, 138
 Hierarchy of recall, 170
 Hill, R. M., 60, 133
 Hillman, D. E., 34
 Hinton, G. E., 4, 7, 198
 Hippocampus, 32, 257–259, 260
 Hoffman, D. D., 117
 Holistic representation, 46–48, 125, 199
 Holway, A. H., 242
 Homeostasis, 154–156, 157, 295
 Hopfield, J. J., 3, 9, 11
 Horridge, G. A., 19
 Hubel, D., 89
 Humphreys, G. W., 279
 Hyperexcitation, 281
 Hypothalamus, 156
 Hypothetical scenes, 62
- Identity relation, 109
 Illusions, 6, 228, 287
 Ilusory motion, 247
 Image-bound recall sequence, 171
 Imagery, 40–44, 77–78, 159, 266–269
 Image translation, on retinoid, 56–62
 Imaging matrix, 37, 40–44, 48, 126–127,
 129, 268
 Incidental motion, 134
 Independent-levels paradigm, 3–5
 Inferencing, 103–104, 109–112, 115
 Inferior parietal cortex, 260–261, 262
 Inferior temporal cortex, 259–260
 Inferring a subject, 110–112, 285

- Ingle, D., 47, 243
 Inhibitory postsynaptic potential (IPSP),
 21, 34, 56
 Initial conditions, and secular goals,
 160–161
 Input/output, in model system, 7–9
 Intentionality, 302
 Interdependent-levels paradigm, 4–5
 Internal maps, 63
 Interneurons, in retinoid, 56–59, 228–
 230, 233
 Ito, M., 32
 I-token, 302–304
- Jacobs, L., 280
 Jackendoff, R., 48, 51
 Jay, M., 65
 Jay, T. M., 258
 Johnson-Laird, P. N., 16, 112, 216
 Jolicoeur, P., 273, 274
 Ju, G., 39, 265
 Julesz, B., 73
- Kandel, E. R., 19
 Karluk, D., 264
 Kauer, J. A., 258
 Kenny, S., 143
 Klatsky, R. L., 114
 Kohonen, T., 3
 Komatsu, Y., 32
 Koriat, A., 266
 Kosslyn, S. M., 6, 41, 77, 267–269
 Kroll, J. F., 114
 Kuffler, S. W., 19, 39, 160, 298
- Labeled line, 40, 128, 132, 139, 261
 Landau, B., 283
 Landauer, T. K., 297
 Landis, T., 279
 Laroche, S., 258
 Larsen, A., 87
 Larson, L., 32, 33
 Latched cell, 101, 103, 109
 Latent representation, 48
 Learning equation, 30–32, 34, 36
 Learning, 13–15, 25–36, 289
 Lee, K. S., 32
 Levick, W. R., 60, 133
 Lewis, D. J., 281
 Lexical assignment, 113, 134, 268, 271,
 278
- Lexical tokens, and sensory world,
 112–114
 Lexicon, 106, 284–285
 Linden, D. J., 32, 33
 Line-of-sight cluster string, in stereopsis,
 69, 72, 75
 Livingstone, M., 89
 Local circuit neurons, 19
 Locating objects, 126
 Locator cells, 129
 Lomo, T., 32
 Long-term potentiation (LTP), 32–34,
 257–259
 LoTurco, J. J., 32
 Lund, J., 259
 Luzatti, C., 214, 279
 Lynch, G., 32, 33
- McClean, J. P., 64, 274
 McClelland, J. L., 3, 4, 8, 9, 14
 McCloskey, M., 228, 238
 McConkie, G. W., 270
 McGaugh, J. L., 19, 154
 MacKay, M., 273
 Magnitude, encoding, 139–140
 Malenka, R. C., 258
 Margolis, H., 7
 Mark, V. H., 156, 160
 Marr, D., 3, 4, 135
 Martin, A. R., 19, 160, 298
 Mays, L. E., 65, 264
 Membrane potential, 20–24
 Memory, 11, 44, 265
 Mental extrapolation, 273
 Mervis, C., 11
 Metzler, J., 266
 Michel, E. M., 280
 Milgram, N. W., 32
 Miller, G. A., 16, 139, 216
 Miller, J., 60
 Mind, 305
 Minsky, M. L., 14
 Miyashita, Y., 260
 Moon illusion, 242–247
 Moran, J., 165, 263
 Morgan, M., 228
 Morrison, R. E., 271
 Mosaic cells/array, 37, 39–44, 46–47, 48,
 63, 79, 82, 85, 89, 99, 127, 129
 Motion detection cells, 133–134, 229
 Motivational biasing of attention, 162–165

- Motivational tokens, and behavioral gating, 54
- Motter, B. C., 260–261
- Mountcastle, V. B., 260–261, 262
- Mueller-Leyer illusion, 250
- Mueller-Leyer, F. C., 250, 251
- Murakami, K., 32
- Myers, N. A., 265
- Narrative comprehension, 215
- Naturally varying shapes, 189
- Necker cube, 252–254
- Necker, L. A., 252
- Negation, 221–225
- Networks of matrices, 49–54
- Neuron, as a leaky integrator, 22
- Neuronal capacity, and lifetime learning, 297–298
- Neuronal properties, 19
- Neurons, number of in human cortex, 19
- Neurotransmitter, 20, 32
- Newell, A., 4, 48, 154
- Nicholls, J. D., 19, 160, 298
- Nicoll, R. A., 258
- Nissen, H. W., 159
- N-methyl-D-aspartate (NMDA), receptors, 32–33, 257–258
- Noise, 27–28, 45
- Normal foveal axis, 60, 63, 65, 67, 69, 118, 121, 292
- Normalization of transfer weights, 13–14, 26, 27–28, 34, 44
- Norman, J., 266
- Novelty detection, 83–85, 202
- Novelty-test cell, 83
- Object motion, characterization of, 133–134
- Object-centered frame, 135, 272
- Ocular convergence, 77, 264
- Olds, J., 156
- One-trial learning, 14, 33, 258
- Oomura, Y., 158
- Ordered tokens, 139–140
- Ordinal logic, 45, 46, 199
- Orthogonal induction of illusory motion, 249
- Overwriting, 26, 28
- Paivio, A., 267
- Palinopsia, 280–281
- Papert, S. A., 14
- Parafoveal facilitation of foveal response, 270–271
- Parallel distributed processing models (PDP), 4, 8, 10–11, 14, 26
- Parieto-occipital lesions, and palinopsia, 280
- Parks, T., 228
- Parsing objects, 117, 120–126, 201–214
- Parsing system, 118–122
- Pattern classification/recognition, and array-to-line mapping, 7–9
- Pattern translation, 57–62, 78, 118
- Pendulum illusion, 239, 242
- Perani, D., 214
- Perris, E. E., 265
- Physical symbol, 48, 154
- Pinker, S., 47, 117, 135, 201, 267, 272, 273, 275, 276
- Plan, 115, 138, 153, 282, 294
- Plato, 1
- Plaut, D. C., 48
- Pleasure, 156–157, 160, 295
- Point logic, 45
- Pollatsek, A., 230, 271
- Position comparators, 131
- Posner, M. I., 64
- Possible worlds, 159
- Posterior parietal cortex, 262, 264
- Postsynaptic receptors, 32
- Potter, M. C., 114
- Pragmatics, of cognition, 300–301
- Predicate token, 101, 103, 108
- Prefrontal cortex, 259, 261–262, 282–283
- Premotor cortex, 264
- Pribram, K. H., 139
- Priming, selective, 51–54, 63, 77, 162, 296
- Processing effort, 121, 204
- Productivity, 115
- Pronoun reference, 216–221
- Propositional representation, 48
- Protein kinase C (PKC), 32–34
- Protein phosphorylation, 32–33
- Prototype, averaged/generalized, 11–13
- Ptolemy, 245
- Purkinje cells, 34, 259
- Putnam, H., 301, 302
- Pylshyn, Z. W., 114, 115, 267, 302
- Pyramidal cells, 19, 259

- Quadrantal disparity, in retinoid excitation, 65–68, 118, 154, 292
 Quillian, M. R., 99
 Quintana, J., 282–283
- Racine, R. J., 32
 Random processes, and redundant storage, 297
 Random-dot stereogram, 73–76
 Ratcliff, R., 9, 11
 Ratliff, F., 248
 Rayner, K., 270, 271
 Reaction time, 48
 Recall ring, 94–97, 219, 291
 Reciprocal inhibition, 88
 Recognition under noisy conditions, 174–179
 Recognition under rotation, 179–183
 Reed, C. F., 242
 Referential token, and homeostasis, 154–155
 Reimann, E., 242
 Reisberg, D., 275, 276
 Reiser, B. J., 267
 Relaxation, 8, 9–10
 Remington, R. W., 64, 274
 Representation, 11–13
 Representational loss, 279
 Representational structure, 114–115
 Representation of depth, in monocular viewing, 77
 Representing relationships among objects, 130–133
 Reset neuron, 37, 40, 83–85
 Resolving goals, 165–168, 296
 Reticular activating system, and arousal, 39, 83
 Retinal-afferent organization, 82
 Retinoid, 55–60, 118, 304
 Retinoid system, 60–78, 291
 Retinotopic coordinates, 39, 79, 82
 Richards, W. A., 117
 Richards, W., 228
 Riddoch, M. J., 279
 Riggs, L. A., 248, 250
 Ring-ray coordinates, for representation, 82–83
 Rock, I., 228, 242
 Rolls, E. T., 157
 Rosch, E., 11
 Rosenbaum, D. A., 143
 Rosenblatt, F., 3
 Rotation transformer, 85, 87–89
 Routtenberg, A., 32, 33
 Rumelhart, D. E., 3, 4, 8, 9, 14
- Saccade span in reading, 271–272
 Saccades, 55, 61, 64–65, 118, 120, 124, 202, 271
 Saito, H., 134
 Saturation limit (Lim), 29–31, 41, 108, 258
 Scene analysis, 82
 Scene assembly, 61–62, 205, 268–269
 Scene synthesizer, 62
 Schematic representations, on retinoid, 133
 Schur, E., 242, 247
 Searching for objects, 210–211
 Secular goals, 158–162, 296
 Seeing-more-than-is-there, 227–238
 Self-directed learning, 201
 Self-locus, 62–65, 127–128, 261–264, 268, 292
 Self-locus excursion paths, 63, 140, 162, 214, 247, 272–273, 284
 Self-query, 115, 149, 155, 295
 Semantic dissociation, 285
 Semantic network, 99–115, 215, 268, 284–285, 293
 Semi-rigid objects, recognition of, 47
 Sensory-motor association, 51–54, 282–283
 Sensory-motor loop, 54
 Set point, 154–156, 157
 Sheikh, A. A., 41, 267
 Shepard, R. N., 41, 88, 169, 266
 Shepard, G. M., 19, 24, 56, 233, 248, 259
 Sheu, F. S., 32, 33
 Shift control cells, 56–60, 228–230, 264
 Shimojo, S., 228
 Shulman, G. L., 64, 274, 275
 Siegel, R. M., 130, 262
 Significant exemplar, 12–13
 Sign language, rate of acquisition in aphasia, 285
 Size constancy, 89–93, 127, 227, 245, 246, 272, 293
 Size illusion, 92
 Size scaling, shape specific and general, 269–270
 Size transformer, 85–87, 126
 Smith, R., 245

- Smolensky, P., 3
 Snyder, C. R. R., 64
 Sobin, A. J., 280
 Sparks, D. L., 65
 Spatial memory, 126, 128–129
 Spatial reference, 130
 Spelke, E., 283
 Spinelli, D. N., 243
 Spitzer, H., 263
 Step ring, 145, 152, 282
 Stepping pulse, 143, 145
 Stereoscopic vision, 69–78
 Stillings, N. A., 11, 99, 216
 Stimulus-bound recall sequence, 171
 Stimulus familiarity, and reaction time, 48
 Storing and recalling plans, 151–152
 Striate cortex, 259
 Strobing, 25
 Subject token, 101, 103, 108
 Subjunctive expression/state, 303
 Superior colliculus, 64
 Superior temporal sulcus, 134, 264
 Superposition, 45, 175–177
 Sweet, W. H., 156, 160
 Symbols used in circuit diagrams, 35
 Synapse, 20
 Synaptic capacity, 298–299
 Synaptic delay, 11
 Synaptic matrix, 37–54, 290, 304
 Synaptic plasticity, model of, 29–34
 Synaptic transfer weight, 22, 26, 30, 34, 36, 79, 81, 99
- Tank, D. W., 3
 Tasks to be performed, 16–17
 Temporo-parietal cortex, 285
 Template-filter model, 201, 214
 Temporal reference, 93–95, 282
 Terminal-sensing cell, 131
 Thierry, A. M., 258
 Token, 48, 51, 54, 270
 Topographagnosia, 278–279
 Tranel, D., 285
 Transfer weight, 9–11
 Transformations, of evoked patterns, 85, 276
 Trehub, A., 3, 6, 10, 14, 33, 37, 41, 46, 54, 55, 60, 65, 69, 74, 82, 85, 93, 115, 117, 169, 174, 183, 189, 201, 230, 238, 239, 267, 269, 281, 289, 297, 302
- Troost, B. T., 280
 Tsal, Y., 275
 Tulving, E., 15, 93
 Type/token distinction, 51
- Ullman, S., 273
 Unstable perception, 252
- van der Loos, H., 24, 56
 Van Essen, D. C., 89
 Velocity-sensitive motor cells, in visual systems 264
 Vestibular apparatus, 60
 Visual agnosia, 278
 Visual capture, 204
 Visual fixation cells, 264
 Voronin, L. L., 32
- Wallach, H., 242
 Waterfall illusion, 247–249
 Watkins, J. W., 228, 238
 Whitely, M. K., 32
 Wickelgren, W. A., 184
 Word cell, 101, 103
- Yajeya, J., 282–283
- Zola, D., 270
 Zöllner, F., 228
 Z-plane brightening, 74, 75, 265