

Index

- Abacus, 214, 215, 223–4, 295, 298
 Academic anxiety, 83–96
 Access deficit hypothesis of dyscalculia, 30, 72
 Acoustic frequency, 10–13
 Acquired (vs.) developmental dyslexia, 49, 353, 384
 Adaptive intervention, 215–16, 293, 408
 Additive vs. interactive deficits, 75–6
 ADHD, 74, 79, 117
 Alcohol, 124–5
 Allele, 156–8
 Allophone, 15
 Amplitude envelope, 9, 11
 Amplitude modulation, 9–10, 11–12, 13
 Amplitude rise time, 12
 Animal models, 20, 115, 139, 146
 Anxiety, 79, 83, 117, 129, 130, 337, 347
 Approximate number system, 54, 286, 287, 321
 Arabic numerals / digits, 29, 185, 190, 320
 Arcuate fasciculus, 168–9, 202, 207
 Arithmetic fact knowledge, 26
 Arithmetic fact retrieval, 39, 42
 Arithmetic fluency, 68, 78
 Arithmetic problem solving, 39, 41, 215, 220, 222
 Articulation, 167, 171, 172
 Artificial grammar learning, 21
 Artificial intelligence, 45
 Assortative vs. random mating, 105
 ATOM (A theory of magnitude), 31
 Attention, 27, 38, 41
 Attentional window, 14
 Attitudes, 89–91, 237–41, 244
 Attrition bias, 337–8
 Audiovisual integration, 20, 163
 Auditory cortex, 17, 21, 167
 Auditory processing, 10
 Auditory steady state response, 11
 Autism, 13, 18, 20
 Automatization of learned skills, 19, 219, 385, 387
 Auto-regressive panel model, 200
 Autoregressor, 312, 313, 315
 Avoidance behavior, 91
 Bayes factor, 236
 Bayesian model, 48
 Bilingualism, 47, 277
 Biological validity, 47
 Blinding, 338
 Block design task, 235
 BOLD (blood-oxygen-level-dependent), 170
 Bottom-up vs. top-down, 217
 Box-and-arrow model, 45
 Brain stimulation, 350
 Breastfeeding, 133
 Calculation, 25
 Candidate genes, 155
 Cardinal principle, 319
 Cardinality, 26, 319
 Cause vs. consequence, 5, 15, 23
 Central executive, 39
 Cerebellar theory of dyslexia, 19
 Cerebellum, 19
 Childhood amnesia, 367
 Cochlear implant, 24
 Cognitive control, 28, 38, 41
 Cognitive enhancement, 350
 Community-based intervention, 363, 376
 Compensation, 32, 279, 335, 352, 360
 Computational modeling, 9, 45
 Concordance rate, 111
 Conduct disorder, 79, 247
 Connectionism, 49
 Connectionist dual process (CDP++) model, 47
 Consistent (transparent) orthography, 16, 66, 271, 314
 Continuous (dimensional) vs. categorical, 25
 Co-occurrence (Comorbidity), 20, 41, 65
 Coordination disorder, 71
 Copy number variants, 155, 159
 Cortical thickness, 165
 Counting, 185, 319
 Critical age hypothesis, 71
 Critical periods, 203, 371
 Cross-lagged panel models, 310
 Cross-over design, 15
 Cross-sectional vs. longitudinal design, 6, 8, 80
 Curriculum, 398–400
 Cutoff, 390, 394–5
 Declarative memory, 28, 39
 Decoding (letter-by-letter reading), 163, 305

- Deep learning, 46
 Deep neural network, 56
 Deep vs. shallow orthography, 269, 271
 Default mode network, 37
 Delayed neural commitment theory, 19
 Deletion (genetics), 155
 Delta frequency band, 13
 Depression, 79, 117, 130, 337
 Devanagari, 175
 Developmental language disorder, 10, 79, 246
 Diagnostics, 383
 Diffusion-weighted MRI, 167, 206
 Disability, 254
 Disconnection syndrome, 40
 Discrepancy criterion, 392, 395
 DNA, 155
 Domain-specific vs. domain-general, 27, 212, 286–7
 Dorsal stream (reading), 173
 Drugs, 122–30
 DSM-5, 389–94
 Dual-route model, 49
 Duplication (genetics), 159–60
 Dynamic measurement modeling, 418
- Early childcare quality, 328–9
 Education level, 240
 Educational policy, 438–41
 Educational technology, 297–8
 EEG (electroencephalography), 157, 170, 177
 Effective connectivity, 171, 176
 Embodied cognition, 185
 Enriched vs. impoverished environment, 371, 374
 Enumeration, 27
 Environment (shared, non-shared), 103
 Epigenetics, 371
 Episodic memory, 367
 Equal environments assumption, 105
 Error-based learning, 19
 Ethnicity, 251
 Event-related potentials, 170
 Exclusion criteria, 25, 67
 Executive functioning, 38, 73, 185
 Expressive language skills, 77
 Eye movement, 17, 339
- Fadeout of response to intervention, 362
 Family risk, 70, 102
 Farsi, 23
 Fetal alcohol spectrum disorder, 124
 Finger counting, 35, 75
 Fixation, 14, 17, 339
 Forced-choice task, 306
 Forgetting curve, 367
 Formal explicitness, 45
 Formant transitions, 10
 Fractional anisotropy, 164, 167
 Frequency doubling illusion, 17
- Functional connectivity, 22, 35, 37, 39, 167, 171, 172, 175, 176, 179
 Fusiform gyrus, 32, 179
- Gender bias, 90, 243
 Gender difference, 88, 233
 Gender stereotype, 238, 240
 Gene-environment correlation, 110, 370
 Gene-environment interaction, 111, 370
 General linear model, 200
 Generative model (deep learning), 48
 Genetic nurture, 369
 Genetics, 101, 155
 Genome-wide association study, 108, 157
 Give-a-number task, 319
 Grammar, 67
 Granularity, 274
 Graphematic transparency, 271
 Grapheme, 267
 Grapheme-phoneme conversion, 52, 270
 Grapheme-phoneme correspondence, 7, 271
 Gray matter, 40, 163, 166
 Group heritability, 104
 Growth curve model, 200
 Gyrification, 167
- Handwriting, 268
 Hangul characters, 275
 Hearing aid, 23
 Heritability, 103, 368
 Heterogeneity, 48, 69, 74, 444, 450, 463
 Hippocampal neurogenesis, 367
 Hippocampus, 39, 186, 192–3, 216, 219–24
 Home literacy environment, 102
 Home numeracy environment, 326–7
 Home spatial environment, 327–8
 Hyperactivity, 32, 36, 74, 117, 123, 141, 225, 347
 Hyperconnectivity, 19, 32, 37, 39, 188, 222, 226, 353
 Hyperlexia, 18
 Hypoactivity, 176
 Hypoconnectivity, 37
- ICD-11, 65, 389–92, 398
 Implementation research, 444–6
 Implicit learning, 20
 Inclusive education, 444, 448
 Inferior longitudinal fasciculus, 202, 208, 209
 Inhibition (working memory), 38, 73
 Intelligence, 392, 395–7
 Intention to treat analysis, 338
 Interactive activation model, 46
 Interference (anxiety), 84
 Intervention, 337–49
 Intervention study, 203, 205–7, 226, 294, 296
 Intraparietal sulcus (IPS), 28, 183
 Irlen syndrome, 340

- Kana characters, 7, 268, 275, 278
 Kanji characters, 268, 278
- Language acquisition, 5, 8
 Language proficiency, 67, 384, 385, 392, 416
 Latent change score model, 200
 Lateralization, 242
 Lesion studies, 30
 Letter knowledge, 12, 307–8
 Lexical restructuring hypothesis, 312
 Lexicalization, 51
 Liability-threshold model, 103
 Linear and nonlinear models, 192, 193, 200
 Linkage disequilibrium, 108
 Logographic script, 268, 272, 274, 280
 Long-term memory, 29, 35, 41, 186, 212, 216
 Low-frequency fluctuations, 40
- Magnetic resonance spectroscopy, 188
 Magnitude, 26–34
 Magnitude comparison, 27, 32
 Magnocellular theory, 17
 Manifestation (diagnosis), 385
 Maternal smoking during pregnancy, 123–4
 Math anxiety, 84
 Medial temporal lobe, 28, 39, 216, 219
 MEG (magnetoencephalography), 170
 Mental lexicon, 8, 10
 Mental number line, 296, 320–1, 322–3
 Mental rotation task, 237, 322–3
 Metalinguistic awareness, 8, 267
 Mismatch negativity (MMN), 157
 Missing heritability, 108
 Morpheme, 273
 Morphological awareness, 268, 275
 Motivation, 109–11, 238, 240–1, 330–1
 Motor deficits, 71
 MRI, 155, 167, 170, 177, 187, 200, 202, 217
 Multifactorial causation, 69
 Multiple deficit theories, 5, 22, 54
 Multisensory integration, 163, 164, 166
 Multitiered system of supports, 434
 Myelination, 164, 167–8
- Nature vs. nurture, 368
 Neural entrainment, 350
 Neural hyper-excitability, 20
 Neural network for reading, 163
 Neural noise theory, 20
 Neural oscillations, 11, 170, 173, 178, 350, 358
 Neuronal migration, 156, 160
 Neuronal recycling hypothesis, 268
 Neurotransmitter, 188
 Nicotine, 122–4
 Non-symbolic quantity judgement, 27, 30
 Nonword reading, 15, 16
 Nonword repetition, 16, 313
 Normal distribution of abilities, 66, 388
- Number acuity, 54, 57
 Number line estimation task, 320
 Number neuron, 55
 Number sense, 27, 28, 184, 320–2
 Number systems knowledge, 319
 Number word, 344
 Numeracy, 318
 Numerical distance, 31–2, 190
 Numerical order, 38, 72
 Numerosity, 190, 324
- Oculomotor control, 22
 Ordinality, 26, 185, 188
 Orthographic depth, 271–2
 Orthographic lexicon, 50
 Orthographic transparency, 271
 Orthography, 66–7, 267–81
- Perceptual noise, 53
 Performance & age matching, 13
 Performance bias, 337
 Perseverance, 90
 Persistence (diagnosis), 26, 385, 388
 Phase dependency, 9
 Phase locking, 350
 Phoneme, 7–11
 Phoneme deletion task, 53
 Phoneme discrimination, 15
 Phoneme rate, 11
 Phonetics, 6–18
 Phonics, 51
 Phonological awareness, 7, 71, 270, 272, 275, 277, 305–8
 Phonological constancy, 12
 Phonological deficit, 14, 270, 275
 Phonology, 6–18
 Pitch, 10
 Place value knowledge, 73
 Placebo, 338
 Plasticity (neural), 202–11, 212–28
 Pleiotropy, 161
 Polygenetic inheritance, 161
 Poor reader, 427–9
 Poverty, 260
 Prediction, 305–17, 318–31
 Predictive coding, 165
 Prefrontal cortex, 29, 34, 185
 Prematurity, 118–20
 Prenatal and postnatal development, 115–18
 Preregistration, 338
 Prevalence of dyscalculia, 283
 Prevalence of dyslexia, 67
 Prevention, 410
 Print-to-speech conversion, 172
 Probabilistic vs. deterministic risk factor, 69
 Problem solving, 29
 Problem solving strategy, 35
 Procedural learning, 19, 20

- Processing speed, 78
 Protective factor, 90
 Pruning (synapses), 164
 Pseudoword reading, 176, 179, 209, 271
 Psycholinguistic grain size, 8
 Psychophysiological interaction, 191
 Publication bias, 364, 366
- Qualitative interview, 90
- Racism, 255–7
 Randomized controlled trial, 337
 Rapid auditory processing theory, 10
 Rapid automatized naming, 70, 308
 Reading accuracy, 18, 66, 314
 Reading anxiety, 94
 Reading fluency (speed), 23, 66–7, 68, 305, 314
 Reasoning, 25, 185, 197, 198
 Referral bias, 243
 Reinforcement learning, 48
 Reporting bias, 338
 Resilience, 90, 431, 432
 Response to intervention, 431, 434, 448
 Retrospective chart review, 129, 148
 Rhyme awareness, 306–7
 Rhyming, 206, 241
 Rhythm (music), 12–13
 Rhythm (speech), 9, 11
 Risk factors, 66, 68–70, 77–80
- Saccade, 14, 18, 22
 Second language, 277–8
 Segmentation theory, 312
 Segregation (neural), 223–4
 Selection bias, 337
 Selectivity (neural), 203–5
 Self concept, 331
 Self efficacy, 431
 Self esteem, 337
 Self-report questionnaires, 85
 Self-teaching, 48
 Semantic representation, 29
 Sensitive periods of learning, 81, 371, 373
 Serial reaction time task, 21
 Severity (diagnosis), 385, 390
 Shifting (working memory), 71, 73
 Short-term memory, 38
 Short-term vs. long-term effects, 351, 358, 363–76
 Simple view of reading, 305
 Simulation, 45–59
 Single nucleotide polymorphism, 155
 Social class, 253, 259
 Social construction, 253
 Social context, 254, 258
 Social stratification, 254
 Socioeconomic status, 117, 181, 251, 253, 256, 257
 Spatial attention, 15–17, 23, 184, 185
- Spatial skills, 27, 38, 237
 Special education, 251–61
 Specificity (diagnosis), 385, 392, 395
 Speech-in-noise perception, 9–11, 19–20
 Spelling, 67–8
 Stage model of reading, 163–5
 Statistical learning, 9, 21
 Stereotypes, 89, 90, 91, 260
 Stress (psychosocial), 117, 130–3
 Stress (syllabic), 8, 9, 12
 Stroke (character), 272, 273, 275
 Subitizing, 56, 185, 196, 344
 Superior longitudinal fasciculus, 187, 195, 197
 Supervised vs. unsupervised learning, 47
 Surface (vs. phonological) dyslexia, 48
 Sustaining environment hypothesis, 374
 Syllabic script, 268
 Syllable, 7–9, 272–5
 Systems neuroscience, 25, 31
- Task avoidance, 331
 Task difficulty, 39
 Task format, 68
 Task switching, 41
 Teaching to test, 366
 Temporal sampling theory, 11
 Test-retest reliability, 200
 Theories of dyscalculia, 25
 Theories of dyslexia, 5
 Theories of math anxiety, 83
 Theta frequency band, 12, 22
 Three-hit model, 116
 Toxicants, 122–30
 Toy model, 46
 Training to the test, 407
 Trait and state, 85, 89, 368
 Transcoding, 73
 Transcranial alternating current stimulation, 350, 358
 Transcranial direct current stimulation, 350, 351
 Transcranial electrical stimulation, 350
 Transcranial magnetic stimulation, 31, 350, 353
 Transcranial random noise stimulation, 350, 358
 Transfer effect, 214, 221, 360
 Transparent vs. opaque orthography, 271, 390, 400–2
 Treatment adherence bias, 338
 Treatment fidelity, 338, 341
 Triangle model, 50
 Triple code model, 31, 287
 Tuning (neural), 163, 174, 203, 204
 Twin studies, 102–5
- U-curve (inverted), 164, 166
 Unexpectedness (diagnosis), 385, 388
 Updating (working memory), 73–4

-
- Ventral stream (reading), 163, 164, 168, 173
Ventral stream (vision), 174–5, 185
Verbal arithmetic fact retrieval, 39, 42
Verbal working memory, 71, 74, 78
Vergence control, 17
Video games, 16–17, 18
Visual attention, 14–17
Visual attention span theory, 14–15
Visual categorization, 15
Visual cortex, 18, 22, 184, 185
Visual crowding effect, 71
Visual discrimination, 15
Visual motion processing, 17–18
Visual number form (area), 29, 185, 191
Visual search, 15
Visual steady state response, 190
Visual word form (area), 163, 174, 175, 202, 203–4, 268, 270
Visuospatial working memory, 38–9, 324
Vocabulary, 67, 71, 311–12
Wait to fail strategy, 448
Weber fraction, 58
Weber's law, 56
White matter, 39–40, 163–70
William's Syndrome, 18
Word frequency, 47, 51
Word recognition, 46, 48, 49, 51, 202, 205
Word-based math problem solving, 42
Working memory, 27, 28, 38–9, 41, 71, 72–4, 78