

## Index

- absolute time, 1, 232
- acceleration, 99, 118, 124, 133, 177, 287, 342, 366, 449, 545
- acuity, visual, 102, 105, 449
- adaptation, 43, 44, 48, 63, 64, 68, 78, 97, 124, 128, 202, 209, 212, 236, 243, 245, 248, 284, 288, 295, 345, 351, 352, 359, 489, 531, 532
- Adelson, E. H., 126, 137, 281, 392, 418, 525, 530
- affERENCE, 13, 57, 95, 97, 211, 423–428, 431, 435, 436, 438, 543–545, 548, 551
- after-image, 13, 33, 95–97, 100
- aim, target, 109, 110, 113, 118
- Alais, D., 233, 240, 272, 273, 402, 479, 481, 482, 493, 546
- algorithm, 278, 282, 284, 295, 350, 357, 358
- aliasing. *See* temporal aliasing
- allocentric location. *See also* exocentric location
- amodal  
   representation, 284  
   tokens, 278, 279
- Andersen, R. A., 56, 57, 207, 208, 211
- anorthoscopic distortion, 181
- Ansbacher effect, 181
- Anstis, S. M., 5, 127, 131, 137, 209, 226, 233, 262, 367, 408, 415, 418, 441, 465
- antedating, 4, 150–152, 154, 157, 158, 161, 550
- anticipation, 5, 56, 153, 164, 165, 168, 172, 177, 321, 346, 348, 350, 352, 353, 357, 359
- anti-saccade task, 32, 43, 44, 48, 153, 154
- apparent motion, 33, 95, 97, 100, 137, 182, 238, 264, 281, 284, 418, 423, 487, 507, 528, 529
- Arnold, D. H., 5, 202–205, 209, 239, 254–258, 261, 262, 264, 268–271, 273, 274, 289, 293, 381, 394, 516
- Aschersleben, G., 5, 181, 192, 193, 238, 243, 247, 321, 328, 329, 331–333, 354, 402, 403, 423, 432, 433
- asynchrony, 199–204, 206–211, 227, 232–234, 237, 238, 245, 254, 256–271, 273, 285–288, 290–293, 295, 301, 303, 305–313, 381, 393, 394, 488, 506, 517  
   *See also* perceptual asynchrony
- asynchrony threshold, 303, 306, 310, 313
- attention, 5, 6, 106, 126, 165, 183, 207, 274, 281, 290–292, 303, 426, 435, 519, 536, 538–542, 544, 546, 549, 552
- effect on perceived speed, 233
- effect on time perception, 269, 272
- endogenous, 269–271, 532, 543
- exogenous, 269–271  
   in flash-lag effect, 396–403, 414, 423, 479, 487, 493–495  
   in Fröhlich effect, 321, 328–331, 334  
   and motion information, 521, 524–526, 528–532  
   and perceptual asynchrony, 269–271, 516, 517  
   in representational momentum, 343, 348, 358, 367  
   and salience, 284, 294  
   shifts in, 203, 243, 256  
   in temporal order, 170, 174, 272, 286
- audiovisual interaction, 236, 243, 245, 247, 278, 279, 284, 286, 293–295, 303, 546
- audition, 3, 73, 74, 80, 152, 159, 160, 166, 169, 182, 217, 228, 247, 254, 271, 278, 283, 288, 290, 303, 342, 397, 479, 481, 550  
   and simultaneity, 232–235, 238, 240, 241, 243, 245, 279, 284, 286, 293–295
- awareness. *See* consciousness
- Bachmann, T., 6, 192, 193, 217, 223, 286, 484, 536–549, 551
- backward displacement, 333, 347, 353
- backward masking, 74, 223, 505, 506, 509, 511, 515, 516, 518, 536, 541, 549, 550
- backward motion, 326, 367, 375
- backward referral in time, 60
- Baldo, M. V., 5, 328, 367, 397–400, 403, 414, 423, 431, 482, 484, 488, 491, 492, 540
- Ballard, D. H., 125, 414
- Barlow, H. B., 258, 272, 273
- Bedell, H. E., 6, 202, 204, 255–258, 260–262, 264, 269–271, 273, 274, 289, 292, 293, 327, 367, 379, 381, 394, 397, 399, 403, 480, 537
- Berry, M. J., 192, 403, 431, 437, 441, 482, 484, 487
- bimanual task, 125
- binding, 5, 160, 250, 400, 402, 403, 547, 548, 550, 552  
   *See also* feature binding  
   temporal aspects of, 199–201, 205–212, 216, 217, 224, 247, 278–281, 284, 285, 288, 289, 291–294, 296, 304, 305, 312, 314, 484

- binocular, 103, 223, 225, 462, 529, 541  
 Bischof, N., 9, 27–29, 39, 41, 53  
 bistable percept, 522, 524, 529, 532  
 Blake, R., 202, 224, 517, 532  
 blur, 330, 435, 442, 448  
   *See also* streaks, motion and smear, motion  
 bottom-up process, 212, 284, 289, 331, 354, 355, 358, 399, 414  
 Braddick, O., 281, 419  
 brain time, 239, 282, 286  
   hypothesis, 256, 258, 259, 261, 262, 265–268, 270–272, 274  
 Breitmeyer, B. G., 73, 327, 539  
 Brenner, E., 4, 31, 109, 110, 113, 118, 124–128, 130, 131, 133, 134, 137, 367, 383, 400, 401, 484, 487, 490, 537  
 Bridgeman, B., 4, 10, 32, 46, 74, 80, 94, 99, 101–103, 105, 106, 124, 127, 128, 136  
 Burr, D. C., 4, 29, 32, 39, 41, 43, 44, 52, 53, 75, 125, 151, 223, 272, 273, 293, 323, 402, 442, 479, 481, 482, 489, 493, 522, 531, 546  
 Cai, R. H., 34, 39, 59, 72, 325, 329, 379, 383, 394, 417, 484, 487, 547, 548  
 cancellation, 4, 23, 34, 63, 67, 74, 77, 78, 85, 95, 97, 98, 101, 103, 238  
 Cartesian theatre, 246, 303  
 causally coupled motions, 305  
 Cavanagh, P., 126, 127, 131, 136, 137, 209–211, 219, 272, 273, 281, 289, 291, 294, 328, 331, 332, 342, 383, 403, 414, 416, 423, 430, 431, 436, 465, 482, 485, 509, 511, 523, 525, 528, 530, 537, 549  
 cerebellum, 3, 38  
 Changizi, M. A., 5, 441, 443–445, 449, 459, 465, 467  
 Chappell, M., 397, 400, 401, 403  
 Clifford, C. W. G., 5, 199, 201, 202, 204–207, 209–211, 255–259, 261, 262, 264, 269–271, 273, 274, 281, 291–293, 394, 516, 531  
 clock, 1, 2, 57–60, 151, 152, 169, 170, 172, 302, 397, 408, 479  
   internal, 55, 152, 159, 174, 272  
   slowing down of, 55, 56  
 coincidence, 254, 255, 257, 264, 272–274, 278, 279, 281, 462, 515, 548  
 coincidence detection, 256, 257, 272–274, 548  
 color, 2, 130, 131, 149, 274, 278–281, 283–296, 312, 329, 346, 381, 383, 393, 400–402, 417, 418, 489, 491, 503, 504, 510, 511, 515–518, 531, 542, 547  
   and motion, 199–208, 217, 242, 254–270, 273, 301, 304, 305, 314  
   and orientation, 209–212  
 color-motion asynchrony, 206, 211, 274, 278–281, 283–295, 381, 393, 515–518, 547  
 compensation, 100, 102, 456, 477, 478  
   for eye movement, 4, 96, 98, 100–103, 105  
   for neural delays, 136, 246, 263, 394, 428, 435, 437, 444, 456, 462, 477, 478, 485, 493  
   for time differences, 241, 247  
 compression of time, 56, 59  
 conduction time, 164, 165, 168, 175, 226, 228, 234  
 consciousness, 6, 124, 125, 130, 170, 199, 200, 202, 207, 216, 217, 227–229, 291, 295, 296, 303, 305, 326, 328, 329, 345, 348–350, 399, 501, 511, 516, 521, 522, 536–538  
   and perceptual retouch theory, 541–552  
   micro-consciousness, 200, 295, 314  
 continuous sampling in perception, 353, 521  
 contracting, stimulus, 123, 124, 386–389, 391, 392  
 convergence of neural pathways, 226, 227  
 converging lines, 441–445, 448, 450, 452–455, 457, 464  
 coordinate transformation, 56, 135, 136  
 corollary discharge, 13, 15, 23, 27, 52, 57, 75, 98, 174  
 cortex, 3, 5, 38, 49, 52, 56, 57, 59, 132, 164, 175, 200, 207, 208, 210, 212, 221, 234, 256, 261, 262, 266, 282, 283, 286, 290, 295, 296, 304, 401, 403, 423–425, 429, 431, 435, 478, 487, 528, 538, 539, 542–552  
 Crick, F., 216, 521, 538, 541, 542, 552  
 cross-channel processes, 278, 279, 281, 283–285, 289, 293, 296  
 cross-feature comparison, 301  
 cross-modal interactions, 152, 224, 282, 288, 290, 313, 479, 482  
 crowding, 284, 289, 541  
 damped eye position signal, 13, 14, 25, 27, 31, 33  
 damping, 15, 16, 72  
 Dassonville, P., 10, 12, 13, 15, 19, 23, 25, 31, 39, 45, 68, 128  
 De Valois, K. K., 127, 441, 465, 486  
 De Valois, R. L., 127, 441, 465, 486  
 Dennett, D. C., 199, 202, 217, 224, 228, 238, 246, 265, 266, 272, 282, 286, 295, 296, 303  
 desynchronization, 240, 246, 528, 544  
 detectability, 379, 383, 385–393, 490  
 Deubel, H., 9, 32, 47, 106, 351  
 Di Lollo, V., 223, 330, 505–507  
 differential latency hypothesis, 6, 201, 202, 301, 302, 327, 379–383, 391, 393, 414, 416, 428, 431, 433, 436, 437, 477, 482, 484, 485, 490–493, 495  
 direction reversal, motion, 259, 260, 264–268, 287, 289, 293, 305, 309, 311–314  
 discrete  
   perception, 224, 340, 371, 521, 522, 525, 526, 530–532, 552  
   stimulation, 29, 33, 339, 347, 356, 370, 374–376, 482, 484, 504, 513, 537  
 double-step task, 21–23, 25–27, 45, 124–126, 130, 131, 137

- dual-channel differential latency hypothesis, 379–383, 391, 393
- Duhamel, J.-R., 16, 27, 52, 56, 57, 154
- duration, 56, 106, 152, 199, 216, 224, 228, 232, 260, 329, 427, 428, 488, 512, 545
- perceived, 53–55, 70, 149–154, 156–158, 160, 170–177, 181, 186, 192, 193, 293, 323, 522
- saccade, 20, 30, 71, 155, 157, 504
- stimulus, 14, 42, 52, 54, 70, 72–74, 77, 150, 151, 156, 161, 169–171, 174, 185, 186, 293, 306, 311, 312, 366, 368, 372, 386, 424, 434, 516
- Eagleman, D. M., 5, 60, 202, 216, 217, 223–225, 228, 266, 268, 271, 296, 314, 329, 367, 383, 397, 399–401, 414, 423, 433, 437, 484, 487–489, 492, 493, 509, 511, 522, 526, 530, 531, 537, 540, 545, 551
- ecological factors, 6, 63, 441, 442, 455, 457–460, 462–464
- EEG recording, 521, 526, 528, 529, 531, 532, 544
- efference copy, 23, 38, 52, 94–106, 135, 136, 154, 172
- egocentric location, 12, 31, 63, 72, 77, 79, 80, 84, 332, 334
- Einstein, A., 1, 56, 182, 302
- electrical stimulation, 9, 13–15, 295
- electrophysiological evidence, 174, 176, 217, 227, 304, 521, 522, 526, 529
- Empfindungszeit, 322, 479
- See also* sensation time
- endpoint, 124–127, 129, 130, 164
- Enns, J. T., 6, 203, 255, 256, 269, 270, 330, 401–403, 503, 505–507, 509, 510, 512–518, 538, 539
- equiluminant, 131
- Erlhagen, W., 5, 182, 192, 345, 353, 354, 403, 422–428, 432, 492
- excitation, neural, 353, 423–428, 430–432, 436, 543, 548
- exocentric location, 31, 72
- See also* allocentric location
- expanding, stimulus, 123, 124, 383, 386–392, 530
- expansion/contraction, 379, 383, 387, 391, 392
- explicit representation, 132, 204, 283, 536, 537, 543, 544, 549
- extraocular, 33, 63, 79–81, 94, 98
- extraretinal, 4, 23, 63–65, 68, 74, 75, 78–80, 82, 94, 95, 103, 105
- extraretinal eye position information (EEPI), 63–65, 67, 68, 71–73, 75, 77, 79, 80, 85
- See also* eye position signal and internal eye position signal
- extrastriate areas, 200, 207–209, 211, 212, 290
- eye level, 79–82, 84, 86, 87, 444, 452
- eye movements, 4, 27, 59, 95, 101, 103, 109, 110, 112–115, 117–119, 122, 132, 135–137, 166, 189, 301, 332, 351, 355, 356, 358, 359, 376, 408, 414, 480, 494, 504, 522
- See also* saccades
- eye position signal (EPS), 23–27, 31–35
- time course, 23–26, 39, 78
- facilitation, 189, 207, 427, 435, 436, 537, 541, 542, 549, 550
- in-stream, 536–542, 547, 550
- path-dependent, 423, 430, 431
- feature binding, 199, 211, 212, 216, 217, 224, 280, 312, 517
- feedback, 5, 44, 47–49, 97, 102, 103, 109, 124, 125, 130, 136, 164, 167, 173, 185, 187, 191, 199, 207–212, 227, 334, 343, 369, 372, 414, 422–426, 435, 436, 487
- feedforward input, 227, 285, 400, 424, 431, 544
- feedforward mechanism, 98, 99, 350
- filtering, 15, 99, 423
- finish-line for neural/perceptual processes, 221, 303–305, 312
- Finke, R. A., 338–342, 345–348, 352, 366, 373, 422, 433
- first-order motion, 132, 523, 524, 531
- flash-initiated condition, 324, 329, 433
- flash-lag effect (FLE), 5, 6, 202, 223, 296, 301, 302, 304, 305, 312, 314–316, 354, 357, 379, 381, 385, 387, 388, 391, 393, 408, 422, 423, 430–437, 479–498, 503, 509–511, 513, 515, 516, 518, 536–541, 545, 546, 548, 549, 552
- and attention, 396–403
- and chopsticks illusion, 414–420
- and Fröhlich effect, 321–334
- and representational momentum, 366–376
- flash-misalignment effect (FME), 379–388, 391
- flash-terminated condition, 437
- flicker, 5, 33, 78, 106, 282, 283, 301, 306, 311–313, 315, 326, 418, 529
- forward displacement, 338, 341–343, 346–348, 351–357, 359, 397, 434, 435, 491
- forward model, 124, 172, 350
- forward motion, 6, 326, 367, 369, 370, 372, 374–376, 441, 442, 444, 445, 448–450, 452, 459
- forward movement, 444, 445, 448, 449, 452, 456
- fourier
- analysis, 525
- model, 521, 525
- motion, 525
- Fourier, 523, 526, 527
- fovea, 9, 12, 28, 66, 71, 96, 97, 329, 331, 351, 465, 477, 481
- Freyd, J. J., 5, 338–343, 345–348, 350, 352, 366, 367, 370, 371, 373, 374, 376, 403, 422, 433
- Frith, C. D., 177, 529, 531
- Fröhlich effect, 5, 302, 321–334, 354, 357, 402, 403, 422, 423, 431–433, 436–438, 479, 480, 488
- frontal cortex, 3, 16, 538
- frontal eye field (FEF), 13, 15, 26, 27, 52
- future prediction, 109, 124, 164, 165, 217, 338, 346, 353–355, 357, 358, 367, 394, 422, 423, 431, 485–487, 490, 491, 511, 549
- gamma-band oscillation, 548
- ganglion cells, 437, 486, 488

- Gaussian function, 54, 115, 128, 235, 237, 387, 425
- Gegenfurtner, K. R., 127, 331–334, 341, 342, 394, 402, 403, 465, 482
- Geisler, W. S., 125, 293, 442
- geometrical illusion(s), 5, 441, 442, 444, 445, 447, 448, 450, 452, 454, 457, 464, 467
- Gestalt, 279, 304, 321, 350, 414, 495, 550
- Gibson, J. J., 79, 123, 441, 467
- goal-directed behavior, 4, 121, 124, 126, 137, 399
- Goldberg, M. E., 17, 26, 27, 44, 52, 56, 151, 154
- Gomi, H., 4, 127, 131, 133
- Goodale, M. A., 23, 87, 124, 125, 127, 132, 136, 202, 228, 511
- gravity, effects of, 64, 79, 80, 342, 346, 353, 357, 366, 376
- grouping, 205, 278–281, 292, 367, 517, 518
- Haggard, P., 5, 149, 151–153, 160, 161, 169, 170, 174
- Hallett, P. E., 10, 23, 32, 67
- hand, 63, 68, 81, 86, 87, 109–111, 113, 115–118, 121, 124–136, 149, 164–168, 170, 172, 175, 178, 233, 237, 241, 242, 248, 288
- Harris, L. R., 5, 224, 232, 233, 236–243, 245, 290, 388
- Hazelhoff, F. F., 110, 301, 302, 479, 480
- Hazelhoff effect, 302
- Helmholtz, H. von, 1, 23, 39, 52, 75, 77, 96, 97, 100, 102, 301, 465
- Hering, E., 96, 102, 103, 441, 443, 444, 452, 465
- Hess effect, 226, 393, 480
- high-level processes, 5, 16, 123, 137, 301, 338, 351, 352, 355–360, 423
- Holcombe, A. O., 209–211, 224, 289, 294, 522, 526, 530, 531
- Honda, H., 4, 10, 12, 19–26, 29–31, 34, 39, 41, 45, 48, 67, 68, 75
- Hubbard, T. L., 5, 331–333, 338–343, 346, 347, 349–358, 366, 367, 372, 376, 403, 422, 423, 434, 435, 438
- Hubel, D. H., 130, 254, 465
- hyperacuity, 2
- illusions, 3, 79, 85, 87, 94, 104, 105, 127, 136, 137, 165, 173, 177, 202, 217, 221, 222, 224–226, 254, 259, 262, 263, 273, 274, 285, 286, 292, 321, 322, 324, 327, 328, 334, 379, 383, 385, 397, 400–403, 417, 422, 423, 427, 430–436, 482, 503, 509–511, 515–518, 547, 551
- chopsticks, 5, 408–412, 414, 415, 419
- chronostasis, 4, 149–161, 169, 170, 174
- stopped clock, 149, 153
- unified theory of, 441–452, 457–467
- Wagon Wheel, continuous (c-WWI), 6, 521–526, 528–532, 552
- imaging, 272, 436
- independence assumption, 305
- inflow signal, 64, 75–77, 80, 103–105
- inhibition, neural, 74, 204, 208, 212, 245, 258, 265, 288, 315, 327, 328, 334, 353, 423–428, 430, 432, 436, 505, 506, 541, 543, 550
- integration, 2, 27, 78, 132, 164, 175, 176, 178, 181, 223, 236, 241, 273, 296, 303, 304, 313, 358, 392, 401, 403, 411, 433, 477, 486–490, 505, 506, 511, 539, 545, 546, 548, 551
- interception, 109, 112, 117–119
- internal eye position signal (iEPS), 9, 11–16
- time course, 9, 11, 13, 16
- involuntary eye movement, 65, 96, 101
- Ivry, R. B., 5, 164, 170
- Jancke, D., 5, 182, 192, 345, 353, 354, 423–425, 427, 428, 432, 436, 492
- Jeannerod, M., 125, 199
- Johnston, A., 5, 127, 199, 202, 204, 239, 255–257, 259–261, 263–266, 268–272, 278, 281, 282, 286, 287, 289, 290, 292, 293, 304, 305, 314, 338, 342, 394, 516, 531
- just noticeable difference (JND), 235, 237, 238, 248, 249
- Kaiser, M. K., 29, 44, 49, 56, 59, 348, 444, 450
- Kammer, T., 192, 321, 328–330, 332, 367, 402, 403, 423, 436, 484, 491
- Kanai, R., 5, 16, 205, 258, 291, 391, 400, 401, 441
- Kanwisher, N., 442, 530, 538
- kappa effect, 5, 181–184, 186, 189, 192, 193
- Kerzel, D., 5, 110, 127, 321, 328, 329, 331–334, 338, 341–343, 351, 354–356, 358, 371, 376, 394, 402, 403, 423, 424, 433, 435–438
- Khurana, B., 1, 5, 6, 118, 324, 331, 367, 397, 399–401, 414, 433, 441, 484, 486, 491–493, 540, 541, 546, 549, 550
- Kinsbourne, M., 199, 202, 217, 246, 265, 266, 272, 282, 286, 295, 303
- Kirschfeld, K., 192, 321, 328–330, 332, 367, 402, 403, 423, 436, 482, 484, 491, 550
- Klein, S. A., 5, 242, 243, 247, 328, 367, 397–399, 414, 423, 465, 482, 484, 488, 491, 492, 540
- Koch, C., 6, 216, 224, 284, 313, 521, 522, 526, 538, 541, 542, 552
- Koenderink, J. J., 205, 206, 314
- Kolers, P. A., 73, 217, 281
- Kowler, E., 118, 132, 414
- Kramer, E., 9, 27–29, 39, 41, 53
- Krekelberg, B., 16, 26, 31, 41, 42, 56, 316, 379, 397, 399, 414, 423, 430, 431, 442, 482, 484, 485, 487, 489, 511, 531, 537, 545
- Lacquaniti, F., 164
- Lamme, V. A., 227, 228, 400, 401, 435, 538, 541

- Lankheet, M. J. M., 5, 301, 314, 531
- Lappe, M., 4, 23, 29, 31, 32, 38, 41–44, 49, 56, 59, 75, 316, 379, 397, 399, 414, 423, 430, 431, 482, 484, 485, 487, 489, 511, 537, 545
- latency, neural, 3, 6, 9, 15, 16, 39, 41, 64, 71, 78, 132–134, 154, 184, 208, 209, 212, 258, 278, 305, 330, 334, 384, 385, 396, 399, 417, 423, 430, 435, 447, 450, 456, 479–481, 483, 536, 537, 539–541, 543–546, 548–551
- differences in, 5, 13, 72, 152, 199–202, 216–221, 223–226, 228, 234, 304, 307, 310–314
- See also* differential latency hypothesis
- lateral geniculate nucleus (LGN), 219, 487, 542, 543
- lateral interactions, 422, 423, 434, 435, 437
- lateral intraparietal area (LIP), 16, 27, 52, 154
- Lee, D. N., 123
- Libet, B., 60, 228, 232, 255, 261, 262, 266, 271, 283, 284, 291, 295, 296, 550, 551
- Lightstone, A. D., 10, 23, 67
- Livingstone, M., 130, 223, 254, 465
- local sign, 33, 64, 74, 77, 79, 304
- localization, 4, 11, 12, 16, 17, 19–21, 23, 27–35, 38, 39, 42, 43, 45, 53, 57, 58, 63, 64, 67, 69, 72–75, 77, 78, 80, 81, 106, 321, 356, 402, 427, 428, 433, 435–437, 478, 479, 489, 528, 532
- and forward shifts, 328, 330–334
- Lorentz transformation, 56–58
- low-level processes, 136, 289, 294, 303, 312, 334, 338, 343, 345, 351, 355–359, 367, 423, 524, 531
- luminance contrast, 2, 27, 29, 41, 42, 46, 49, 70–72, 128, 131, 136, 185, 273, 282, 283, 287, 288, 301, 304–306, 310–312, 323, 324, 328, 329, 346, 367, 379, 385–387, 397, 399, 402, 403, 425, 430, 431, 433, 441, 452–459, 461, 462, 465, 481, 505, 512, 523
- and latency, 216, 219–226, 242, 258
- Mach, E., 1, 97, 495
- MacKay, D. M., 327, 465, 481
- Macknik, S. L., 223
- manual
- accuracy, 63, 87
  - behavior, 63, 85, 87
  - corrections, 131, 137
  - error, 87
  - following response, 126, 132–135
  - interception, 117
  - localization, 68
  - pursuit, 134
  - response, 130, 134
  - settings, 63, 86
- masking, 6, 74, 106, 151, 186, 327, 328, 330, 334, 347, 503, 505–509, 512, 513, 515, 516, 536–538, 543, 548, 550
- See also* backward masking, metacontrast
- Mateeff, S., 9, 12, 25, 27, 28, 34, 110, 270, 465, 481
- Mather, G., 137, 202, 465
- Matin, L., 4, 9, 12, 19, 39, 48, 53, 63–82, 84–87, 95, 99, 110, 166, 168
- Maunsell, J. H., 137, 219, 220, 223, 226, 227, 290, 441
- Maus, G. W., 5, 6, 486, 490, 491, 495
- McKee, S. P., 137, 234, 385, 465, 468
- medial superior temporal area (MST), 26, 27, 122, 123, 287, 313
- Meister, M., 192, 403, 482, 493
- memory, 4, 32, 38, 46–49, 59, 68, 74, 77, 105, 106, 283, 304, 333, 338, 346, 347, 351, 353, 358, 359, 366, 399, 400, 423, 507, 519
- metacontrast, 63, 73, 74, 78, 192, 321, 327–331, 334
- Metzger, W., 5, 302, 321, 325–327, 329, 367, 397, 422, 430, 480–482, 492
- microgenesis, 536, 538–540, 550
- middle temporal visual area (MT), 26, 27, 122, 134, 136, 200, 205–208, 278, 286, 290, 310, 313, 442, 487
- mid-level processes, 278–285, 287, 289, 291, 293, 294, 296
- Milner, A. D., 23, 87, 125, 228, 511
- mislocalization of stimuli, 7, 10–13, 15, 17, 19–23, 25–32, 34, 38, 39, 41–46, 48–50, 52, 53, 59, 63, 72, 79, 80, 102, 322, 329, 331, 334, 351, 422–424, 427, 430, 433, 435, 487
- Mittelstaedt, H., 23, 39, 77, 97
- Morrone, M. C., 4, 16, 29, 32, 39, 41, 43, 44, 52–54, 56, 59, 75, 126, 151, 156, 286, 522
- motion aftereffect (MAE), 128, 202, 203, 209, 285, 293, 345, 351, 352, 359, 418, 531
- motion detector, 126, 282, 283, 285, 310, 314, 315, 530, 531, 545
- motion energy, 134, 137, 418, 525
- motion extrapolation, 165, 301, 302, 314, 315, 345–347, 353, 396, 397, 399, 414, 423, 426, 433, 437, 438, 444, 477, 478, 482, 484–486, 490–493, 495, 511, 536–538, 545, 549
- motor
- command, 23, 43, 48, 166, 169, 170, 172, 174, 175, 177
  - localization, 23, 32, 334
  - plan, 43, 44
  - processes, 2, 44, 135, 263
  - system, 3, 134, 216, 228, 356, 478, 512, 513
- motor cortex, 161, 169, 175
- Movshon, J. A., 392, 529
- MT. *See* middle temporal visual area (MT)
- Müller-Lyer illusion, 441
- Murakami, I., 4, 127, 219, 286, 314, 327, 383, 399, 414, 416, 423, 430, 431, 436, 465, 480, 482, 484, 492, 509, 511, 537, 546, 549
- Müsseler, J., 5, 181, 182, 192, 321, 324, 328–333, 338, 341, 351, 354, 357, 402, 403, 423, 432, 433, 435–438

- neural correlates, 9, 202, 221, 233, 430, 438, 542
- neural delay(s), 60, 69, 78, 164–166, 168, 169, 173, 175, 176, 209–211, 217, 223, 228, 259–262, 264, 282, 283, 286, 287, 290–292, 296, 307, 310–316, 379, 381, 382, 384, 385, 387, 389, 391–394, 397, 399, 401, 403, 416, 417, 423, 428, 431, 434, 437, 441, 444, 477, 506, 538, 542, 545, 546, 549, 550
- and flash-lag effect, 482–486, 492–495
- and interception, 109, 110, 117, 124, 125, 129, 130, 136
- and perisaccadic mislocalization, 9, 11–13, 16, 27
- and simultaneity constancy, 232–234, 236, 238–243, 245–247, 249, 250
- neural network, 182, 192, 278, 292, 400, 403, 427
- neuromuscular
- delays, 4, 109, 110, 117
- junction, 79–81
- neurophysiological considerations, 25, 27, 192, 217, 254, 272, 400, 401, 403, 422, 432, 486, 492, 493
- neutral density filter, 71, 224–226
- Newsome, W. T., 134, 210, 465, 529
- Nijhawan, R., 1, 5, 6, 110, 165, 170, 232, 302, 314, 315, 324, 327, 354, 366, 367, 376, 379, 393, 396, 397, 399–402, 408, 414, 422, 423, 431, 433, 436, 437, 441, 478–482, 484, 486, 489–495, 509, 511, 537, 540, 541, 545, 546, 549, 550
- Nishida, S., 5, 125, 127, 199, 202, 204, 236, 239, 255–257, 259–261, 263–266, 268–272, 278, 282, 284, 286, 287, 289, 290, 292–294, 304, 305, 314, 394, 516
- noise in neural processes, 15, 55, 103, 173, 262, 273, 313, 382, 542
- non-linear effect, 15, 272–274, 327, 428
- nonlinearity, 131, 227, 426
- nonspecific modulation, 543, 544, 547
- O'Regan, J. K., 28, 29, 34, 105, 106
- object updating, 6, 401, 503–507, 509–511, 513–518, 539
- object-substitution masking, 503, 505
- oculomotor, 13, 16, 21, 23, 44, 47–49, 77, 94–97, 99, 101, 102, 105, 332, 338, 345, 351, 354, 359
- offset, 175, 176, 241
- neural response, 264
- saccade, 12, 19, 28, 42
- spatial, 5, 53, 56, 59, 70, 71, 203, 226, 325, 326, 415–417, 482, 550
- stimulus, 2, 43, 68, 70, 173, 305, 353, 423, 426, 434, 436, 438, 486, 506, 507, 528
- temporal, 259, 260, 264, 266, 518, 529
- Ögmen, H., 6, 219, 258, 327, 367, 379, 380, 382, 383, 385, 388, 389, 397, 399, 403, 480, 537, 539
- onset, 175, 357
- neural response, 262, 264, 295, 431, 546
- saccade, 10–12, 14, 19, 20, 22, 23, 25, 27, 28, 30–35, 39, 40, 42, 44, 45, 53–55, 58, 59, 72, 151
- stimulus, 2, 5, 42, 68, 70, 71, 73, 149, 151–153, 160, 169, 170, 172–177, 190, 217, 219, 221, 226, 235, 240, 263, 278, 286, 290, 292, 303, 305, 314, 321, 322, 324, 325, 327–334, 382, 399–403, 428, 431–433, 438, 480, 486, 506, 515, 518, 528, 529, 532, 536, 537, 540, 541, 544, 546, 549, 551
- onset repulsion effect (ORE), 5, 321, 322, 331–334, 357, 403, 438
- optic flow, 123, 124, 137, 441–443, 445, 447–450, 452, 453, 455, 457–459, 464
- optimization, 99, 164, 175, 239, 266, 267, 272, 273, 303, 304, 312, 327, 396, 428, 454
- Orbison illusion, 441, 443, 444, 457, 461, 465
- outflow signal, 64, 75–77, 80, 95–97, 103–106
- paralysis, ocular, 33, 63, 79, 80, 96, 166, 174
- parietal cortex, 3, 272, 521, 528–532
- Patel, S. S., 6, 219, 229, 327, 367, 379, 385, 388, 389, 397, 399, 403, 480, 537
- perceived time, 5, 56, 152, 160, 161, 177, 182, 202, 238, 246, 418
- perceiving-the-present hypothesis, 441, 459–461, 465
- perceptual asynchrony, 199, 204–206, 209–211, 254–271, 274, 284, 286, 287, 289, 290, 292, 294, 379, 402, 503, 515, 518
- perceptual asynchrony illusion (PAI), 402, 515–518
- perceptual constancy, 64
- perceptual judgment, 23, 44–46, 193, 401, 402
- perceptual latency priming (PLP), 536–539, 541, 546, 548, 549, 552
- perceptual stability, 38, 63, 64, 67, 78
- See also* visual stability
- perisaccadic compression of space, 4, 9, 10, 23, 27, 31, 38–50, 52–56, 58–60, 75
- perisaccadic mislocalization, 19, 21, 23, 25, 29, 31, 32, 40, 72
- in lit environment, 19, 27, 28, 31, 32
- in the dark, 9–11, 17, 19, 23, 27–29, 31, 32, 35, 39–42, 45, 48, 59, 64–66, 71
- of flickering stimuli, 19, 29, 32, 33, 35
- time course of, 9, 10, 20–22, 26, 33, 34, 42, 63, 65, 70
- perisaccadic stimuli, 31, 32, 34
- persistence, 4, 15, 39, 63–65, 68–74, 77, 78, 323, 351, 355, 427, 544, 545
- phosphene, 13
- Poggendorf illusion, 441
- point of subjective equality (PSE), 54, 65–70, 76, 77, 85, 149, 151, 156–160, 167, 168, 171, 173, 174, 341, 351
- point of subjective simultaneity (PSS), 235–239, 241–245, 248, 249, 303, 305–308, 310–312, 314
- pointing, 10, 13, 32, 39, 44, 45, 63, 68, 81, 87, 96, 103, 125, 127, 131, 134, 247, 332, 333, 366, 416, 485, 488, 511–513

- Pola, J., 9, 15, 16, 19, 39, 48, 65, 67, 69–72, 78, 110
- Ponzo illusion, 441, 443, 444, 448–450, 461, 462, 465
- Pöppel, E., 238, 241, 285, 303
- population coding, 49, 256, 262, 290, 313, 353, 400, 423–428, 430–437, 487
- positional correction, 302
- postdiction, 6, 60, 217, 228, 296, 396, 401, 414, 477, 484, 487–490, 545  
*See also* retrospective
- postsaccadic, 31, 38, 44, 46–49, 63, 67, 68, 73, 74, 78, 149–154, 156–159
- pre-activation of neurons, 423, 431
- preattentive process, 279, 291, 294, 531
- prediction, 23, 122, 124, 131, 164–166, 168, 217, 242, 243, 273, 346–349, 351, 354, 356, 375, 376, 394, 397–399, 414, 437, 478, 484–487, 495
- presaccadic, 4, 15, 27, 31, 34, 44, 46–50, 55, 63, 67, 72–74, 76, 153, 154
- primary visual cortex (V1), 3, 5, 134, 165, 174, 199, 207, 209, 211, 219, 220, 226, 278, 422, 423, 427, 428, 437, 487
- priming, 174, 183, 184, 190–193, 353, 503, 512–516, 518, 536, 537, 549  
*See also* spatial priming
- processing time, 27, 184, 187, 189, 190, 192, 193, 200, 202, 232–234, 241, 246, 248, 256–259, 262, 265, 269–272, 286, 287, 289, 290, 330, 540
- proprioception, 13, 15, 94, 96, 97, 103–105, 164, 233
- proprioceptive feedback, 13, 15
- proximity  
 spatial, 191, 238, 278, 279, 517, 518  
 temporal, 192, 281
- psychometric function, 54, 55, 67, 71, 72, 167, 168, 171, 203, 369, 385–392
- Pulfrich effect, 224, 225, 311, 393
- Purushothaman, G., 6, 219, 316, 327, 367, 379, 385, 388, 389, 394, 397, 399, 403, 430, 431, 480, 482, 484, 492
- Purves, D., 153, 484, 521, 522, 524
- Ramachandran, V. S., 127, 441, 465
- random  
 behavior, 97, 237, 509  
 dot pattern, 205, 206, 222, 293, 304–307, 311, 312  
 motion, 258, 455, 546  
 noise, 15  
 position, order of stimuli, 45, 55, 110, 160, 203, 294, 306, 332, 333, 456
- reaching behavior, 4, 7, 63, 72, 82, 118, 121, 123–137, 159, 160, 164, 165, 210, 219, 254, 341, 342, 349
- reaction time, 112, 124, 126, 130, 181, 184, 186–193, 202, 234, 241, 244–246, 262, 263, 290, 291, 293, 296, 301, 314, 331, 399, 479, 492, 541
- reafference, 57, 58, 98
- real time, 11, 153, 239
- recalibration, 236, 248, 249, 284, 286, 294
- receptive fields, 16, 49, 52, 165, 206, 207, 259, 313, 315, 400, 425, 487, 542, 545  
 shifts in, 16, 27, 49, 52, 56, 154, 487
- receptor, 3, 75, 79, 165, 234, 477, 478, 542
- reconstruction  
 of eye position, 12, 46  
 of motion trajectory, 333, 428, 429  
 of order of events, 226, 227, 232  
 of travelling wave, 429  
 of visual space, 47–49, 168, 503
- recurrent processing, 227, 353, 354, 422–427
- Rees, G., 529, 531, 542
- reference frame, 233, 333
- Regan, D., 122, 123, 392, 454
- Reichardt, W., 272, 273, 282, 313, 494, 530, 531, 545
- relativity, 2, 59, 182, 302, 316
- remapping  
 of position information, 301, 315, 349, 350  
 of receptive fields, 52, 59
- Rensink, R. A., 106, 328, 330, 505, 506, 538
- representational momentum, 5, 338–341, 343, 345–350, 352–357, 359, 360, 366, 403, 422, 423, 433–437
- resynchronization, 232, 240
- retinal error signal, 9
- retinotopic, 47, 65, 66, 68–72, 77, 504  
 map, 49, 56, 487, 493  
 position, 66, 72, 487, 537
- retouch, perceptual, 536, 541–552
- retrospective, 151, 153, 154, 217, 237, 296, *See also* postdiction
- reversed phi, 5, 408, 418, 419
- Rizzolatti, G., 2, 56
- Rock, I., 465, 467
- Rogers, B. J., 418, 465
- Ross, J., 4, 9, 10, 29, 31, 32, 39, 41, 43, 44, 52, 53, 56, 59, 75, 125, 151, 156, 223, 293, 442, 465, 468, 522
- saccades, 5, 9–16, 19–35, 38–49, 52–60, 63–69, 71–80, 94, 96, 97, 99, 100, 102, 105, 106, 117, 118, 124, 149–159, 161, 169, 174, 191  
 saccade amplitude, 10, 12, 14, 16, 33, 41, 42, 44, 100, 169  
 saccadic suppression, 9, 16, 52, 56, 73, 74, 99, 100, 102, 151, 155
- salience, 258, 270, 271, 284, 285, 289, 290, 292, 294
- Schiller, P. H., 15, 202, 256
- Schlag, J., 4, 9, 13, 16, 19, 23, 27, 31, 34, 39, 45, 48, 59, 64, 68, 72, 110, 155, 169, 379, 383, 394, 397, 399, 400, 417, 441, 484, 487, 511, 547, 548
- Schlag-Rey, M., 4, 9, 13, 19, 23, 31, 34, 39, 45, 48, 59, 64, 68, 72, 110, 155, 169, 397, 399, 400, 484, 511
- second-order motion, 126, 136, 523, 527, 531

- Sejnowski, T. J., 60, 202, 217, 223, 228, 268, 271, 296, 314, 329, 367, 383, 397, 400, 401, 414, 423, 433, 437, 484, 487–489, 492, 493, 509, 511, 537, 540, 545
- sensation time, 321–324, 326, 330, 331, 432, 479, 480
- sensitivity, 49, 52, 74, 233, 273, 274, 305, 313, 352, 399, 507, 526, 527, 530, 531
- Sheth, B. R., 128, 400–402, 441, 481, 484, 537, 539
- shift in position/time, 41, 43, 44, 47–50, 56, 59, 126–128, 130–132, 160, 170–172, 243, 245, 292, 303, 305, 306, 311, 314, 315
- forward shifts, 325, 331, 351, 366, 372, 373, 387, 388, 391, 401, 414–419, 422, 432, 436, 447, 480, 490, 493, 494
- Shimojo S., 5, 128, 205, 236, 237, 255, 256, 259, 265–268, 270, 271, 291, 324, 367, 397, 400–403, 410, 441, 465, 481, 493, 537
- simultaneity of events, 224, 235, 236, 238, 242, 243, 249, 278, 279, 284, 286, 289, 292, 294, 303–305
- simultaneity window, 248, 303, 305
- simultaneity, detection, 235, 242, 243, 245, 248, 250, 280, 302, 303
- simultaneity, horizon of, 238
- simultaneity, perceived, 5, 223, 227, 232–234, 237, 239, 240, 248, 259, 269, 279, 281, 286, 292, 293, 295, 301, 303, 306, 324
- single neurons, 216, 219, 220, 226, 232, 256, 424, 435
- sinusoidal profile, 78, 99, 101, 203, 381, 523, 524, 527
- smear, motion, 323, 442, 443, 445, 454, 455
- See also* streaks, motion and blur
- Smeets, J. B. J., 4, 109, 110, 118, 124–128, 130, 131, 133, 134, 137, 367, 383, 400, 401, 484, 487, 490, 537
- smooth motion, 332, 333, 340, 355, 356, 370, 371, 374, 376
- smooth pursuit eye movements, 4, 103, 110–114, 117–119, 132, 136, 137, 302, 332, 351, 355, 356, 358, 408, 414, 480
- Snowden, R. J., 118, 205, 207, 208, 211, 258, 465, 531
- somatosensory
- cortex, 245, 550
  - stimulation, 166, 295
- Sommer, M. A., 27, 49, 154
- space and time. *See* space-time
- space constancy, 94–100, 102, 103, 105, 106
- space perception, 38, 63, 77, 79, 84
- space-time, 1–4, 6, 9, 56–58, 166, 181, 182, 193, 205, 211, 232, 281, 295, 316, 382, 396, 402, 428, 433, 482, 483, 503, 527, 536, 547, 548, 550, 551
- spatial extrapolation. *See* motion extrapolation
- spatial frequency, 151, 459, 461, 465, 468, 481, 522, 525
- spatial priming, 5, 181, 183, 184, 186, 189, 190, 192
- spatiotemporal, 47, 63, 73, 74, 106, 279–281, 284, 294, 343, 345, 346, 350, 423, 427, 431, 432, 435, 548
- Spehar, B., 201, 202, 204–207
- Spence, C., 233, 237, 238, 241–243, 245, 247, 397, 540, 546
- Sperling, G., 12, 16, 126, 131, 137, 269, 281, 284, 286, 418, 523, 525, 530
- Sperry, R. W., 2, 23, 39, 52, 77, 98
- stabilization, 2, 94, 166
- stimulus onset asynchrony (SOA), 235, 237, 240, 243, 248, 303, 304, 327, 537
- stopped clock effect. *See* illusions
- streaks, motion, 442. *See also* smear, motion and blur
- subcortical areas, 3, 132, 154, 261, 266, 542–544, 549
- subjective foveal trajectory, 12
- subthreshold activity, 426, 431, 436
- summation, 25, 104, 177, 272, 273, 286, 352, 425, 428, 431
- superior colliculus (SC), 13–15, 25, 27, 344, 345
- supplementary eye field (SEF), 13, 15
- suprathreshold activity, 426, 431, 437
- synaptic process, 56, 57, 226, 426, 478, 487, 544, 548
- synchronicity
- perceived, 5, 301, 309
  - window of, 301, 305, 307, 308, 311, 312
- synchrony, 16, 152, 201, 203, 233, 234, 240, 241, 246, 257, 259, 263, 268, 271, 273, 278, 279, 281–283, 285, 288, 290–295, 304–307, 309, 312, 517, 544, 546, 548
- systematization of illusions, 467
- tactile stimulation, 160, 161, 166, 168, 169, 172, 175, 176, 182, 232–236, 240, 241, 243, 245, 247, 248, 294, 342, 482
- See also* vibrotactile stimulation
- tandem effect, 181, 403
- tau effect, 182
- temporal
- aliasing, 521, 522, 524, 525, 529, 530, 532
  - analysis, 305, 314
  - binding, 201, 208, 211, 216, 217, 281, 284, 285, 289, 292, 294, 296, 482, 548
  - frequency, 78, 294, 313, 381, 521, 522, 524, 526, 528, 531
  - priming, 193
- temporal asynchrony, 287, 516. *See also* perceptual asynchrony
- temporal judgments, 54–56, 59, 170, 182, 184, 186, 219, 257, 266, 269, 281–285, 287, 291–293, 296, 310
- temporal order judgment (TOJ), 55, 56, 152, 193, 234, 235, 237–243, 245, 250, 263, 264, 281, 286, 289, 290, 303, 479, 536, 546
- thalamus, 13, 27, 227, 542, 543, 548
- Thornton, I. M., 321, 331–333, 339, 342, 438
- thresholds, 99, 102, 174, 226, 290, 301–303, 306–313, 348, 352–354, 385, 386, 426, 427, 430–432, 434–436, 490, 544, 551
- time dilation, 4, 52, 58, 59
- time markers, 5, 158, 199, 204, 256, 257, 259–262, 264–266, 270, 272, 278, 279, 283, 284, 286–288, 290–296, 479
- time perception, 170, 256, 261, 272, 285. *See also* perceived time
- time-to-collision (tau), 123
- Tipper, S. P., 338, 346, 352



- top-down process, 284, 294, 331, 354–356, 358, 399, 400, 408, 414, 422, 424, 426, 427, 435, 437
- topographic, 3, 105, 493, 529  
*See also* retinotopic
- touch, 160, 233, 236, 241–248, 303, 341, 397, 409, 410
- transduction, 3, 233, 234, 238, 303, 478
- transmission, neural, 3, 57, 79, 80, 173, 182, 224, 233, 241, 278, 282, 294, 478, 493, 494, 539
- transparency, 211, 324  
 motion, 205–208, 212, 258, 259, 291, 409, 412, 419
- travelling wave of neural activity, 423, 424, 427–436, *See also*  
 wave of neural activity
- Treisman, A. M., 152, 272, 274, 279, 294, 358, 538, 541
- unconscious processing, 96, 228, 291, 296, 333, 514, 515, 518
- unloading task, 165–168  
 computer-unloading, 167  
 external-unloading, 166, 168  
 self-unloading, 166–168
- V5, 200, 259, 286, 290, 304, 310, 487
- van de Grind, W. A., 5, 28, 47, 301, 302, 314
- vanishing point, 341, 442–445, 452–454, 457, 459, 465
- VanRullen, R., 6, 49, 224, 521, 522, 524, 526, 529, 530, 532, 552
- vector, retinal, 11–13
- ventriloquism, temporal, 238
- veridical, 16, 28, 30, 34, 35, 39, 42, 127, 151, 165, 169, 170, 173, 176, 201, 240, 248, 258, 279, 289, 290, 294, 347, 348, 353, 392, 525, 528, 529, 538
- vernier, 53, 71, 72, 416, 417
- Verstraten, F. A. J., 123, 137, 531
- vibrotactile stimulation, 170, 171, 173, 177, *See also* tactile stimulation
- vision action dissociation, 23, 87, 127
- visual cortex, 200, 208, 211, 212, 217, 219, 221, 278, 284, 427
- visual illusions, 125, 127, 396, 397, 403, 422, 427, 428, 430, 436–438
- visual stability, 4, 19, 23, 38, 46, 52, 60, *See also* perceptual stability
- visuomotor response, 124–128, 130, 135, 137
- visuomotor system, 121, 122, 124–127, 130, 131, 135–137
- Viviani, P., 211, 255, 256, 263, 264, 269, 292
- von Békésy, G., 12, 27
- von Holst, E., 12, 39, 97
- Vroomen, J., 243, 249, 294, 482
- Watanabe, K., 5, 33, 34, 324, 331, 366, 367, 400, 414, 492, 493, 541
- wave of neural activity, 345, 354, 422, 423, 426–434, 436, 437, 545  
*See also* travelling wave of neural activity
- Whitney, D., 4, 121, 124–136, 219, 286, 314, 327, 328, 331, 332, 342, 383, 397, 399, 414, 416, 423, 428, 430, 431, 436, 465, 480, 482, 484, 492, 509, 511, 537, 545, 549
- Wiersma, H., 110, 301, 302, 479, 480
- Wurtz, R. H., 27, 49, 74, 123, 151, 154
- Yarrow, K., 5, 149–153, 155–161, 169, 174
- Zeki, S., 199–202, 204, 205, 207, 209–211, 217, 219, 229, 254–257, 259, 260, 262, 264–266, 268, 269, 271, 272, 283, 285, 286, 290, 292, 295, 304, 305, 312, 314, 381, 394, 402, 487, 515, 516, 547