

Contents

Preface	ix
---------	----

Part I: Haunted by Music

1. A Bolt from the Blue: Sudden Musicophilia	3
2. A Strangely Familiar Feeling: Musical Seizures	18
3. Fear of Music: Musicogenic Epilepsy	23
4. Music on the Brain: Imagery and Imagination	30
5. Brainworms, Sticky Music, and Catchy Tunes	41
6. Musical Hallucinations	49

Part II: A Range of Musicality

7. Sense and Sensibility: A Range of Musicality	89
8. Things Fall Apart: Amusia and Dysharmonia	98
9. Papa Blows His Nose in G: Absolute Pitch	120
10. Pitch Imperfect: Cochlear Amusia	131
11. In Living Stereo: Why We Have Two Ears	143
12. Two Thousand Operas: Musical Savants	151
13. An Auditory World: Music and Blindness	160
14. The Key of Clear Green: Synesthesia and Music	165

Part III: Memory, Movement, and Music

15. In the Moment: Music and Amnesia	187
16. Speech and Song: Aphasia and Music Therapy	214
17. Accidental Davening: Dyskinesia and Cantillation	224
18. Come Together: Music and Tourette's Syndrome	226
19. Keeping Time: Rhythm and Movement	233
20. Kinetic Melody: Parkinson's Disease and Music Therapy	248
21. Phantom Fingers: The Case of the One-Armed Pianist	259
22. Athletes of the Small Muscles: Musician's Dystonia	264

Part IV: Emotion, Identity, and Music

23. Awake and Asleep: Musical Dreams	279
24. Seduction and Indifference	285
25. Lamentations: Music and Depression	295
26. The Case of Harry S.: Music and Emotion	302
27. Irrepressible: Music and the Temporal Lobes	305
28. A Hypermusical Species: Williams Syndrome	317
29. Music and Identity: Dementia and Music Therapy	335

Acknowledgments	349
-----------------	-----

Bibliography	353
--------------	-----

Index	369
-------	-----

Index

- absolute pitch, 94, 113–14, 120–30,
154, 155*n*, 158, 163, 168–9,
176, 330*n*
- acoustics, 143–50
- advertising, 42*n*, 44, 48
- afterimages, 46
- Alajouanine, Théophile, 314
- Albert, Martin L., 101, 107, 220–1
- Aldridge, David, 228–9
- Allen, Doris, 323*n*
- ALS, 261*n*, 308*n*
- Alsop, Joseph, 107
- Alzheimer, Alois, 307
- Alzheimer's disease, 236, 251*n*,
306, 335–47
see also dementia; frontotemporal
dementia
- amnesia, 187–213
emotional memory in, 202–4
episodic memory in, 195, 200–1,
207
preservation of musical skills in,
187–213, 337 and *n*
procedural memory in, 205–13,
210*n*
semantic memory in, 195,
199–201, 311
- transient global, 206*n*, 207
- amusia, 98–119
aphasia and, 215
cochlear, 106*n*, 131–42
congenital, 102–9
for dissonance, 109–10
emotional response to music and,
289–90, 292
for harmony, 112–19
for melody, 110–12
for pitch, 99, 100–12, 148, 286
for rhythm, 99
for timbre, 106–8
- amygdala, 14, 291, 330
- Angel C. (schizophrenia), 63*n*
- animals
memory span in, 159*n*
music and, 142*n*, 240 and *n*
sound and, 145
vision in, 146–7
- Anne (Williams syndrome), 318–9
- Anthropologist on Mars*, *An* (Sacks),
15*n*, 45, 116*n*, 135*n*, 154*n*,
167*n*, 245*n*, 290, 304, 342
- anticipation, in music, 211 and
n, 240
- antiepileptics, 10–11, 19, 52, 53, 57, 74

- aphasia, 96*n*, 214-23, 313, 315
 amusia and, 215
 music therapy and, 214, 218-23
 Asperger's syndrome, 290-1, 323
 athletic performance, 241-2
 Auden, W. H., 252
 Augustine, St., 245
 autism, 45, 96*n*, 154-5, 155*n*, 156*n*,
 237, 290-1, 291*n*, 304*n*,
 313*n*, 323
Awakenings (Sacks), xii, 44, 59, 249
 Ayotte, Julia, 104*n*, 106, 108, 110
 Aziz, Victor, 61*n*

 Bach, Johann Sebastian, 36, 37, 152,
 198, 212*n*, 230, 275, 290, 300
 Baddeley, A. D., 200
 Baron, Patrick, 124*n*, 139*n*
 Baron-Cohen, Simon, 179, 181
 basal ganglia, 38, 52, 80-2, 95, 109,
 207, 240, 255, 258, 267,
 268-70
 Bauby, Jean-Dominique, 255*n*
 Bayley, John, 336
 Bear, David, 11
 Bearsted, Caroline, 206*n*
 Beeli, G., 173-4
 Beethoven, Ludwig van, 33, 92*n*, 212*n*,
 254*n*, 294, 313*n*
 Belin, Pascal, 108, 221
 Bell, Sir Charles, 266
 Bellini, Vincenzo, 92*n*
 Bellugi, Ursula, 322-4, 327-30,
 330*n*, 332
 Bennett, Carl, 45
 Benton, A. L., 99
 Berlioz, Hector, 283-4
 Berrios, German E., 61*n*
 Bessie T. (dementia), 343-4

 Beth Abraham Hospital, 248, 250-1,
 251*n*, 256, 302
 Beuren, Alois J., 321
 binding, perceptual, 116, 247
 Bizet, Georges, 258
 Blanke, Olaf, 13*n*
 blindness, 114*n*, 116-17, 160-4
 absolute pitch and, 126, 128*n*,
 163-4
 cortical mapping and reallocation
 in, 135, 163-4, 163*n*, 223
 savant syndrome and, 153 and *n*
 synesthesia and, 181-3, 315
 Blind Tom (savant), 153 and *n*
 Blood, Anne J., 290
 Boeve, B. F., 312
 Bossomaier, Terry, 158
 Botox, 271-2, 274
 Brahms, Johannes, 296-7
 brain imaging
 absolute pitch and, 128
 amusia and, 108-9, 109*n*
 body image and, 235-6, 236*n*
 emotional arousal and, 290
 imagining music and, 31-3
 melodic intonation therapy
 and, 221
 musical hallucinations and, 52, 78
 of musicians vs. nonmusicians, 94
 rhythm and, 240
 synesthesia and, 178, 180
 Williams syndrome and, 329-30
 brain tumors, 8, 20, 109, 143
 brainworms, 41-8, 231, 257
 Brandston, Howard, 148-50
 Broca's area, 215, 220-1, 221*n*
 Bruner, Jerome, 32, 75, 160-1
 Brust, John C., 215*n*
 Burton, Robert, 295

- Caedmon, 7
- Caldwell, David, 172-3, 183
- Candia, Victor, 271
- Carlson, John, 72*n*
- Casals, Pablo, 212*n*
- cerebellum, 52, 94, 95, 109, 207, 240,
255, 269, 330
- Challenger, Melanie, 281
- Charles Bonnet syndrome, 182
see also hallucination, visual
- Chen, Joyce L., 240-1
- children
absolute pitch in, 126-7, 129
blind, 126, 161-4
hemispheric specialization in,
155-6, 156*n*, 220-1
language acquisition in, 96, 127,
156, 220-1
memory development in, 207
motor development in, 207-8
musical hallucinations in, 68-9
musical training in, 93-7
nursery rhymes and, 47, 237
rhythm in, 242, 247
synesthesia in, 181
- chimpanzees and memory, 159*n*
- Chinese speakers, *see* tonal languages
- Chopin, Frédéric, 5-6, 12, 31, 51, 90,
101, 254, 256
- Chorost, Michael, 55*n*, 64*n*, 106-7*n*
- Christian (Williams syndrome), 318
- chroma, 121, 123, 129
- Cicoria, Tony, 3-8, 12-17
- Claparède, Édouard, 202-3, 205
- Clarke, Arthur C., ix, 40
- cochlea
brain's tuning of, 137
pitch distortion, 131-42
- cochlear implants, 54-5, 55*n*, 106*n*
- Cohen, Donna, 335
- Cohen, Jon, 159*n*
- Cohen, Neal J., 202-3
- Cole, Jonathan, 261-2*n*
- Colman, W. S., 61
- colorblindness, 107*n*, 108*n*, 135*n*,
167, 169*n*
- colored music, *see* synesthesia
- Comfort, Heidi, 332-4
- Cook, Perry, 240
- Cordelia (Rebecca West character),
89-90, 91-2, 97
- cortex
auditory, 32, 33, 55*n*, 77, 94-5,
108, 109*n*
motor, 32, 38, 94-5
visual, 77, 94-5, 128, 163, 167, 178,
180, 182, 223, 329
- Corti, Alfonso, 132
- cortical mapping
auditory-spatial, 145
body image and, 135, 236, 270-1
cochlear, 110, 135-8, 139*n*,
140-1, 142*n*
context and, 133-4, 136*n*, 140
retinal, 136*n*
visual, 163
- cortical remapping, attention and,
136-7, 136*n*, 140, 142, 270
- creativity
autism and, 313*n*
dementia and, 307, 313-14,
316, 342
sudden emergence of, 5-7, 11-12,
15-16, 157-8, 305-16
synesthesia and, 171, 176-7
Tourette's syndrome and,
228-9, 231
see also savant talents

- Critchley, Macdonald, xiii, 23-5,
25*n*, 99
- Crosby, T. W., 81-2
- Crystal (Williams syndrome),
322-4, 324*n*
- Crystal, H. A., 337*n*
- Cytowic, Richard, 178-9
- D. L. (amusia), 103-6, 108 and *n*
- Dallas, Duncan, 250
- Damashek, Mark, 124*n*
- dance, 99, 104, 235, 236, 240*n*, 244-6,
249, 250*n*, 252-3, 258, 304*n*,
318, 320, 345
- Darwin, Charles, x, 242, 292
- Davis, John, 153*n*
- deafness
Beethoven and, 33-4
congenital, 95*n*
tone-deafness, *see* amusia
see also hearing loss
- "Dear Abby" column, 60
- Deborah (Williams syndrome), 319-20
- dementia
forms compared, 307-8, 309,
311, 312
see also Alzheimer's disease;
frontotemporal dementia
- depression, 149, 257, 287, 295-301
- Deutsch, Diana, 53*n*, 125-9
- Devinsky, Orrin, 13*n*
- disinhibition
frontotemporal dementia and,
305-16
savant powers and, 157, 158*n*
synesthesia and, 182
- dissonance, perception of, 109-10, 123
- Donald, Merlin, 246-7
- dreams, music in, 5, 279-84
- drumming and drum circles, 228-9
- Dunning, Jennifer, 268
- dyskinesia, 224-5
- dystonia, musician's, 264-75
- earworms, 41-8, 231, 257
- Eco, Umberto, 200, 210*n*
- Ed M. (parkinsonism), 254
- Edelman, Gerald M., 148, 255
- Edith T. (parkinsonism), 253
- Ehlen, Patrick, 175-7, 183
- elephants
description by Williams patient, 324
Thai orchestra, 240*n*
- Eliot, T. S., 187
- Ellis, Havelock, 246*n*
- Emerson, Ralph Waldo, 339 and *n*
- emotion
depression and, 295-301
heightened response to music, 3-22,
312-34
indifference to music, 143-50,
285-94
music and, xi, xii, 11, 35, 37, 39-40,
43, 47, 80, 82, 93, 109, 115*n*,
227, 243*n*, 245-7, 257-8,
285-94, 295-301
speech cadences and, x, 243*n*, 322
stereophony and, 143-50
- encephalitis lethargica, 249
- encephalitis, herpes, 26, 157, 188
- Enrico (piano tuner), 160
- epilepsy
hallucination and, 15, 61
musical inspiration and, 8-11,
15-16
musical seizures and, 18-22
musicogenic, 23-9
photic, 25

- spiritual feelings and, 6-7, 11,
 12, 15-17
 synesthesia and, 181
 Estrin, Glen, 272
 Feider, Erica vanderLinde, 12
 filling-in phenomenon, 32-3
 Fischer-Dieskau, Dietrich, 298-9
 Fleisher, Leon, 34, 45, 268, 272-5
 flow, kinetic, 233-47
 in Parkinson's, 248-58
 focal dystonia, 264-75
 Forster, E. M., 299
 Foss, Lukas, 254
 Fox, Orlan, 280
 Frances D. (parkinsonism), 252
 Frank V. (absolute pitch), 123-4
 Freedman, Lawrence R., 287
 Freud, Sigmund, 203, 292-3, 314, 331
 frontal lobe damage, 45, 128, 157, 194,
 205, 215, 217, 237, 302-4,
 305-16, 336
 frontotemporal dementia, 157,
 158, 305-16
 Frucht, Steven J., 123, 272
 Fry, Hunter J., 269
 Fujioka, Takako, 95
 functional MRI, *see* brain imaging
 G. G. (musicogenic seizures), 26-7
 Gaab, Nadine, 94*n*, 163
 Galaburda, A. M., 156
 Galileo, 240*n*
 Galton, Francis, 30, 166, 178, 179
 Gardner, Howard, 328
 Garrison, Richard, 250*n*
 Geist, Woody, 34, 338-43, 339*n*
 George (Somerset Maugham
 character), 90-2, 97
 Geroldi, C., 312
 Geschwind, Norman, 61*n*, 156 and
 n, 220-1
 Giordano, Matt, 229
 Glennie, Evelyn, 95*n*
 Goldberg, Elkhonon, 303-4
 Gooddy, William, 253-4
 Gordon B. (musical hallucinations),
 63-7, 64*n*, 120
 Gosselin, N., 109-10
 Gougoux, Frederic, 164
 Gould, Stephen Jay, 97
 Gowers, William R., 75*n*, 266-7, 266*n*
 Graffman, Gary, 268, 273
 Grandin, Temple, 290-1
 Grant, Ulysses S., 102*n*
 Grateful Dead, 245
 Greg F. ("The Last Hippie"),
 245, 341-2
 Griepentrog, Gregory J., 129
 Griffiths, T. D., 78, 104*n*, 108, 288-9
 Guevara, Che, 99
 H. M. (amnesia), 205-6
 Hall, Stanley, 181
 Hallett, Mark, 269-71, 274
 hallucination
 auditory, 77*n*
 dreams and, 6, 14*n*, 279-82
 filling in and, 32-3
 musical, *see* musical hallucinations;
 see also imagery; epilepsy
 neural basis of, 52, 77-8, 315
 of phantom limbs, 53, 261
 schizophrenia and, 62*n*, 77*n*
 sensory deprivation and, 74-6
 synesthesia and, 181, 183
 visual, 13, 46-7, 52, 61, 76,
 182-3, 280-1

- hallucinogens, 73*n*, 115*n*, 286
- Halpern, A. R., 32
- Hamilton, R. H., 163
- Hamzei, Farsin, 261
- Hannon, Erin E., 99
- harmony, deafness for, 112–19
- Harrison, John E., 178–9, 181
- Harry S. (frontal lobe damage),
302–4
- Hart, Mickey, 246*n*
- Harvey, William, 248
- hearing loss
cochlear damage and, 131–42
cortical reallocation and, 223
hallucination and, 49, 51–2, 54, 55,
60, 63*n*, 64, 66*n*, 68, 70, 81 and
n, 84, 182, 315
musical imagery and, 33–4
recruitment and, 66*n*, 67, 84
resulting from music, 48, 132*n*
see also deafness
- Hécaen, Henri, 101, 107
- hemispheres, cerebral, interaction of,
15, 94–5, 99, 109, 155–8, 156*n*,
220–3, 288, 314–5
- Henahan, Donal, 72*n*
- Henson, R. A., xiii, 25, 99
- Hermelin, Beate, 154
- Hermesh, H., 62*n*
- Heschl's gyrus, 109*n*
- hippocampus, 205, 207, 255
- Hippocrates, 235
- Hoffmann, E. T. A., 166*n*
- Hubbard, E. M., 169*n*, 180
- Hull, John, 114*n*, 163*n*
- Huron, David, 211
- Huxley, Aldous, 217*n*
- Huysmans, Joris-Karl, 166*n*
- Hyde, Krista, 106, 109*n*
- I. R. (amusia), 289
- I., Mr. (colorblindness), 135*n*, 167, 175
- inhibition, cortical, 38, 68, 73–4, 77,
155–7, 182, 194, 218–19, 221,
235–6, 261, 267, 314, 316
- insects, flight sounds of, 121
- intoxication, 73*n*, 115*n*, 158*n*,
250*n*, 286*n*
- iPods, 48, 58, 132 and *n*, 257
- Island of the Colorblind, The* (Sacks),
108*n*
- Iversen, John, 240*n*, 243 and *n*
- Ives, Charles, 51
- Izumi, Yukio, 63*n*
- J. (exact auditory memory), 238
- Jackendorff, Ray, 258*n*
- Jackson, John Hughlings, 20, 28,
217–18, 314, 315
- Jacob L. (cochlear amusia), 132–42
- Jacome, Daniel E., 15, 315
- James, Henry, 292
- James, William, x, xii, 14, 39*n*, 292
- Janáček, Leos, 34, 243*n*
- Japanese speakers, *see* tonal languages
- Jenkins, Florence Foster, 100*n*
- Jennings, A. R., 108
- Jimmie (amnesia), 187–8, 189*n*
- John C. (musical hallucinations),
58–9
- John S. (Tourette's syndrome), 226–7
- Jones, Tom, 155, 304*n*
- Jon S. (musical seizures), 18–20
- Jorgensen, Jorgen, 143–8
- Joseph D. (musical hallucinations),
70–1
- Jourdain, Robert, 51*n*, 69, 313*n*
- June B. (musical hallucinations),
78–80

- Kapur, Narinder, 200n, 314n
- Keats, John, 30, 178
- Kelley, William, 33
- Kertesz, Andrew, 308n, 311
- King, Carole, 41
- Kinnison, Malonnie, 241-2
- Klawans, Harold L., 206n
- Koltun, Jan, 346
- Konorski, Jerzy, 77-8, 82
- language
 compared to music, x, 96, 102n, 104
 and n, 106n, 108, 129-30, 130n,
 216-19, 216n, 243n
 loss of, *see* aphasia
- Lanier, Jaron, 149n
- Lassus, Orlandus, 193, 199
- L-dopa, 59, 250, 258
- Leahy, Christine, 174-5 and n
- Lederman, Richard J., 268n
- left-hand repertoire, 273
- Leg to Stand On*, A (Sacks), 233, 281n
- Lehrer, Jonah, 211n
- Leibniz, G. W., 242
- Lenhoff, Gloria, 239, 325-6
- Lenhoff, Howard, 325-7
- Lesser, Wendy, 297, 299
- Levitin, Daniel J., 102n, 122, 144, 147,
 240, 327-8, 330
- Lhermitte, François, 102
- lightning strike, effects of, 3-8, 12-17
- Llinás, Rodolfo, 37-9, 80, 82, 207-8
- locked-in syndrome, 255n
- loudness, and hearing loss, 48,
 132n, 139-40
- Louis F. (frontotemporal dementia),
 308-12, 313
- Luria, A. R., 178n, 215n, 218, 219,
 236, 255n
- Lusseyran, Jacques, 164, 182-3
- lyrics, unconscious associations
 to, 35-7
- Machover, Tod, 95n
- Magnani, Franco, 15
- Mahler, Gustav, 143, 280
- Mails-Gagnon, Angela, 236n
- Majestic (Williams syndrome), 319
- Mälzel, Johann, 254n
- Mamlok, Dwight, 55-7, 244
- Man Who Mistook His Wife for a Hat*,
 The (Sacks), 60n, 151, 158n,
 188n, 190n, 228n, 236, 343
- Margaret H. (musical hallucinations),
 66n
- Markowitz, Eric, 20-2
- Marks, Gerry, 96-7
- Mars Attacks!*, 294n
- Marsden, C. David, 268
- Martin (savant), 151-3, 157, 161
- Martin, Paula I., 221n
- Matsuzawa, Tetsuro, 159n
- Maugham, Somerset, 90
- Maurer, Daphne, 180-1
- Meghan (Williams syndrome), 318
- melodic intonation therapy, 220-3
- melody
 dynamism of, 210-13, 211n, 234,
 236, 239
 inability to perceive, 101-19
- memory
 amphetamines and, 158n
 blindness and, 114n, 161-2
 emotion and, 202-3, 337, 340, 343
 episodic/explicit, 195, 200, 206-7,
 311, 344
 fidelity of, 46-7, 111, 151-2, 158,
 238, 240

memory (*cont.*)

- implicit, 198–9
 - pitch, 109*n*, 124, 137
 - procedural
 - in amnesia, 187–213 (*esp.* 205–7, 206*n*)
 - in dementia, 337, 339–42, 339*n*
 - and imagery, 114*n*
 - savant, 151–9
 - semantic, 195, 199–201
 - for sequences, 112, 159*n*, 217*n*, 236–9
 - short-term (working), 117–18, 159*n*, 188, 199
- Mendelssohn, Felix, 234, 281
- Merzenich, Michael, 270–1
- Messiaen, Olivier, 171*n*
- metronome, 254*n*
- Michael B. (musical hallucinations), 68–9, 69*n*
- Micheyl, Christophe, 137
- migraine
 - amusia and, 101–2
 - musical hallucinations and, 69*n*, 73, 74
 - Nietzsche's, 257
 - TGA and, 206*n*
- Mill, John Stuart, 295
- Miller, Bruce L., 158*n*, 307–8, 311, 312–3, 315
- Miller, Jonathan, 34, 188, 256*n*
- Miller, Leon K., 153, 156*n*
- Miller, Timothy C., 81–2
- Milner, Brenda, 205
- mimesis, 227, 247, 341
- Minsky, Marvin, 211
- mirror neurons, 219
- Mitchell, D. J., 157
- Mitchell, Silas Weir, 259–61

Mithen, Steven, 129–30, 242

Moore, G. E., 263

motor and auditory systems,

- interaction of, xi, 27, 32–3, 38, 80, 94, 207–9, 212, 219, 224–5, 233–47, 248–58

movement and music, *see* rhythm;

dance

movement disorders, 226–32, 248–58,

264–75, 345

Mozart, Wolfgang Amadeus, 6, 89,

122–3, 227, 292

Mozart effect, 95

MRI and fMRI studies, *see* brain

imaging

multiple sclerosis, 124*n*

music therapy, xii–xiii

- amnesia and, 209–10
 - aphasia and, 214–23
 - autism and, 237, 291*n*, 304*n*
 - dementia/Alzheimer's and, 335–47
 - history of, 250–1, 251*n*
 - paralysis and, 234–5
 - parkinsonism and, 248–58
 - relationship with therapist in, 219–20
 - Tourette's syndrome and, 226–32
 - Williams syndrome and, 319–20
- music
- avoidance or fear of, 10–11, 23–9, 288
 - craving for, 5–12, 15–17
 - cultural differences in, 99–100, 211, 243 and *n*, 333
 - expectation and, 33, 210–13, 211*n*
 - exposure to, 34–5, 81, 95–6, 99–100, 281, 292
 - freshness of, 212 and *n*

- in schools, 95*n*
- indifference to, 10, 110, 285–94, 295–301
- neural correlates, *see* brain imaging
- origins of, *x*, 129–30, 130*n*, 239, 242, 247
- social importance of, *x*, 161, 237–9, 244–7, 347
- structure of extracted, 211 and *n*, 152–4
- temporality in, 210–13, 212*n*
- ubiquity in modern environment, 47–8, 132*n*, 257
- unpleasant or distorted, *see* amusia
- musical hallucinations, 49–86, 111
 - causes of, 67–8, 71–8
 - compared to brainworms, 73
 - concussion and, 71
 - deafness and, 49–86 *passim*, 55*n*, 64*n*, 66*n*, 67–8
 - distortion or telescoping in, 51*n*, 53*n*, 66*n*
 - early memory and, 52, 54, 59–60, 81 and *n*, 85
 - epilepsy and, 61
 - imagery vs., 6, 50, 66
 - intoxication and, 73*n*
 - mechanical noise and, 56–7, 64–5, 76
 - medication and, 49–50, 52, 53, 57, 59, 67
 - meditation and, 74
 - neural basis, 52, 61, 77–8
 - positional, 71–2
 - schizophrenia and, 62*n*, 77*n*
 - sensory deprivation and, 74–8
 - shrapnel and, 72*n*
 - tinnitus and, 64*n*, 63–4
 - transient, 59–60
 - young people with, 68, 69, 71
- musical imagery, 30–40, 41–8
 - expectation and, 32–3
 - loss of, 117–18
 - neural correlates, 31–3, 256
 - Parkinson's and, 253, 256
 - procedural memory and, 114*n*
 - tenacity of, *xi*
 - unconscious associations of, 35–7, 39
- musical preferences, sudden change in, 5–11, 292, 307, 312
- musical talent
 - innate vs. learned, 89–97, 126–30, 321, 327–9
 - range of, 89–97, 157–8
 - unusual emergence of, 15–16, 157–8, 305–16
 - see also* savant talents
- musical training, neural effects of, 32, 33 and *n*, 81, 92–7, 126–30, 137, 163–4, 205, 282*n*, 330
- musicality, range of, 89–97
- musicophilia, *x*, 5–12, 15–17
 - in frontotemporal dementia, 305–16
 - in Williams syndrome, 317–34
- Nabokov, Vladimir, 102, 179, 293
- near-death experience, 3–4, 7, 13–14
- Nelson, Kevin R., 14*n*
- Newton, Isaac, 165
- Nietzsche, Friedrich, *xi*, 258 and *n*, 337
- noise
 - hearing loss and, 48, 132*n*, 139–40
 - rhythmic patterns and, 56–7, 64–5, 76, 84, 243–4
- Nordoff, Paul, 291*n*

- Noreña, A. J., 142*n*
- Novalis, 252
- O'C., Mrs., and Mrs. O'M. (musical hallucinations), 60
- Ockelford, Adam, 153*n*, 162–3
- olivocochlear bundles, 137
- Oppenheim, David, 74–5
- Ostwald, Peter, 51*n*
- Otten, Erna, 259
- out-of-body experiences, 3–4, 13 and *n*, 14
- Overlords, the (Arthur C. Clarke characters), ix, 40
- Oxford Companion to Music, The*, 120, 122, 123*n*, 165
- P. C. (musical hallucinations), 72*n*
- P., Dr. (man who mistook his wife for a hat), 236–7, 343
- Pamela (Williams syndrome), 320–1
- paradoxical functional facilitation, 314*n*
- paralysis, functional, 233–6
- parkinsonism, 44, 59, 248–58, 269, 308*n*
- Pascual-Leone, Alvaro, 32, 94, 163
- Patel, Aniruddh D., 104*n*, 216*n*, 239–40, 240*n*, 242, 243*n*
- Penfield, Wilder, 61, 80
- Penhune, Virginia, 240
- Peretz, Isabelle, 103, 104*n*, 106, 107, 109, 289–90
- performance
- amnesia and, 187–213
 - dementia and, 305–16, 335–48
 - dystonia and, 264–75
 - procedural memory and, 205–13, 210*n*
 - phantom limbs and fingers, 53*n*, 259–63
- Pharr, Charlotte, 319
- piano tuners, absolute pitch in, 124*n*, 139*n*, 160, 174
- Piccirilli, Massimo, 102*n*
- Pick, Arnold, 307
- Picker, Tobias, 93, 231
- Pick's disease, 307–8, 308*n*, 313–14; *see also* frontotemporal dementia
- Pinker, Steven, x, 242
- pitch
- absolute, *see* absolute pitch
 - distortion, 106*n*, 131–42
 - relative, 114, 128, 129, 172
- planum temporale, 94, 128, 329–30, 330*n*
- plasticity, neural, 16, 94–5, 109*n*, 110, 128*n*, 135–6, 136*n*, 140, 142*n*, 147–8, 163, 223, 236, 270–1
- Poskanzer, David C., 24*n*
- practice
- dystonia and, 270
 - neural effects, 31–4, 94–6, 205, 209, 262*n*
- Pring, Linda, 162
- Professor B. (amusia), 111
- Proust, Marcel, 37, 201, 210
- Rachael Y. (amusia), 112–19
- Ralescu, Maria, 288
- Ramachandran, V. S., 169*n*, 180 and *n*, 183
- Rangell, Leo, 83–8, 244
- Rapin, Isabelle, 323*n*
- Ravel, Maurice, 313
- Ray G. (Tourette's syndrome), 228
- reallocation, cortical, *see* plasticity

- recitation, 130*n*, 217–18, 217*n*, 238–9
- recruitment (of sounds with deafness),
66*n*, 67, 84
- religious music, 35, 43–4, 130*n*, 161,
224–5, 245–6
- repetition
brainworms and, 41–8
as feature of music, xi–xii, 39, 43–4,
47, 211*n*, 224, 237, 314
musical hallucinations and, 63,
70, 74–5
procedural memory and, 207–8, 236
tics, echolalia, and, 45, 227
- Révész, Geza, 153*n*
- rhythm
congenital deafness and, 95*n*
cultural influences on, 99–100
deafness for, 99, 100*n*
epilepsy and, 23
movement and, 39, 104, 224–5,
233–47, 248, 252–4, 254*n*,
257–8, 258*n*
origins of, 242–4
perception of, xi, 47, 73, 84, 101,
103, 104–5, 109, 144, 242–3
social bonding and, 244–7
speech and, 216, 238–9, 242–3, 243*n*
Tourette's and, 226–9
Williams syndrome and, 319–20,
325, 327
- Rimbaud, Arthur, 178
- Rimsky-Korsakov, Nikolai, 171*n*
- Rizzolatti, Giacomo, 219
- Robbins, Clive, 291*n*
- Rogers, Susan E., 122
- Rohrer, J. D., 10–11
- Rorem, Ned, 34*n*, 292
- Rosalie B. (parkinsonism), 256 and *n*
- Rose R. (parkinsonism), 44, 59
- Ross, Elliott D., 337*n*
- Rouget, Gilbert, 246*n*
- Rousseau, Jean-Jacques, x, 130*n*
- Russell, S. M., 109*n*
- Sacks, Elsie (mother), 59, 297–8
- Sacks, Oliver
amphetamines and, 158*n*
amusia, experience of, 101–2
brainworms and, 43–4
dancing and, 245
dreams and hallucination, 279–81
imagery, experience of musical,
31, 34–6
leg paralysis of, 233–5
mourning and, 296–9
swimming and, 242
tinnitus of, 64*n*
- Sacks, Sam (father), 30–1, 162*n*
- Saffran, Jenny R., 129
- Salimah M. (sudden musicophilia),
8–10
- Samuel S. (aphasia), 214–5, 219–20
- savant talents, 151–9, 161, 304*n*,
315, 328
- Schellenberg, E. Glenn, 95
- schizophrenia, 51*n*, 62*n*, 77*n*
- Schlaug, Gottfried, 94, 128, 163,
222–3, 330*n*
- Schopenhauer, Arthur, xi, 211*n*
- Schubert, Franz, 298–9
- Schumann, Robert, 51 and *n*, 123, 268
- Scoville, W. B., 205
- Scriabin, Alexander, 171*n*
- Sculthorpe, Gretta, 345
- sensitivity to sound, 66*n*, 67, 84
in epilepsy, 26
in Williams syndrome, 318
- sensory deprivation, 74–8