# INDEX

In this index, the following abbreviations are used: b for text box, f for figure, and t for table.

#### Α

AAC. See alternative and augmentative communication (AAC) AAE. See African American English (AAE) Abducens nerves, 43, 44t Accessory nerves, 42, 45 Accountability. See documentation; evidence-based practice Acoustic aspects of speech production, 68-69 Acoustic nerve, 327 Acoustic phonetics, 62 Acoustic reflex, 32 Acoustic theory of speech production, 53-54, 57 Adapted cueing techniques (ACT), 384 Adenoids, 188 Advanced forms, 152 Advocacy, for children with CAS, 386b Aerodynamic aspects of speech production, 65.68 Affricates acoustical qualities of, 68, 69 age of mastery of, 168 anatomy and physiology for, 23 in Asian languages, 244, 245 depalatalization and, 96 distinctive features of, 83 hearing impairments and, 394 markedness constraints and, 116, 117 overview of, 76 in Spanish-influenced English, 253 in SSL, 142, 160, 166-167, 168, 178, 191 stopping and, 95, 103, 120 African American children prevalence and risk factors of SSDs and, 2 SSL in, 215, 217-218

African American English (AAE). See also American English dialects assessment and treatment of SSD in, 218-222 lessons in Huck Finn's English, 211b overview of, 209-210, 212-213 phonological characteristics of, 213, 214t, 215, 216t Age ranges for cleft lip and palate repair, 390 for consonant clusters mastery, 162-164, 163t for consonant mastery, 155t, 156t, 157, 158t, 159, 160-161, 161t for diadochokinetic rates, 266t of distinctive features mastery, 168-169 for infraphonological stages, 144-146 for phonological awareness, 459, 460 for PP disappearances, 170-173, 172t, 173t prognosis and, 301 of sound classes mastery, 167-168 for speech intelligibility, 175, 293 for speech perception conditioning, 141-143 for SSL in AAE, 217-218 for SSL in Asian languages, 246-247 for SSL in Latino children, 232-233 for vowel mastery, 164-165 Airflow and air pressure, 23, 26, 27, 388, 392 Alliteration, 456, 457, 459, 460, 466 Allographs, 64 Allophones. See phonemes and allophones Alphabetic letters. See also International Phonetic Alphabet (IPA), 458 Alternate response mode (ARM). See also

contextual testing, 219

Alternating motion rates (AMRs). See also diadochokinetic rates and testing, 265, 313 Alternative and augmentative communication (AAC), 385, 386b, 389 Alveolar assimilation, 99 Alveolar ridge, 29 Alveolars. See lingua-alveolars; velar fronting (VF) American English dialects. See also African American English (AAE), 124, 210, 211b, 248-250 American English language. See also Mainstream American English (MAE) Arabic language versus, 79, 245-247 Chinese languages versus, 239-241, 253 Czech language versus, 457 East Asian languages versus, 243–245 German language versus, 458 Greek language versus, 457 Italian language versus, 235, 253, 457 Portuguese language versus, 235, 253 South Asian languages versus, 241 Southeast Asian languages versus, 242 - 243Spanish language versus, 229–230, 232, 233, 236 Swedish language versus, 235 Turkish language versus, 235, 253, 457 American Speech-Language-Hearing Association, 8, 188, 210, 249, 268, 306-307 AMRs. See alternate response mode (ARM) Anatomic variables in SSL. See speech anatomic variables in SSL Anatomy of speech and hearing. See specific mechanisms or structures Anesthetization, as an articulation assessment, 183, 184, 381 Angular gyrus, 39 Animal research, 147, 196 Ankyloglossia, 177 Antecedent stimuli, 367, 394 Anticipatory assimilation, 100 Apert syndrome, 322 Applicator sticks. See also tongue depressors, 265 Applied phonetics, 62

Approximants, 83 Approximations, 359–360 Apraxia Profile, 313 Aprosody, 308 Arabic language versus English, 79, 245-247 Arawakan language, 224 Arcuate fasciculus, 43, 46 Arizona Articulation Proficiency Scale-Third Edition (Arizona-3), 154-156, 162, 163t, 165, 218-219, 267, 268 ARM. See alternate response mode (ARM) Arresting sounds, 73 Articulation disorders. See also speech sound disorders (SSDs); specific PP or disorder, 3, 4, 5, 6-7, 12, 298, 299 Articulator bound and articulator free, 123 Articulators, 28f Articulatory gestures, 126, 275 Articulatory groping, 309 Articulatory mechanism, 28–30, 28f, 30f Articulatory phonetics, 62 Articulatory position diagrams, 358 Articulatory theory, 126 Arytenoid cartilage, 24, 24f, 25f Arytenoid muscles, 26, 26f Asian and Pacific Islander languages, 229-230, 237-247, 239t, 240t, 246-248 Assessment of Phonological Processes-Spanish, 234 Assessments. See also screening instruments; specific assessments; specific procedures alternate response mode (ARM), 219 analysis and interpretation of, 280-297 authentic assessment, 219 baseline establishment versus, 349 of children speaking AAE, 218-221 of children speaking Asian and Pacific Islander languages, 247 of children with CAS, 310-314 of children with CP, 318-321 of Latino children, 233-236 of Native American children, 225-227 diadochokinetic testing in, 179-180, 265-266, 266t, 290 dynamic, 464-465

ethnocultural variables in, 212 LPTs versus NPTs and, 9 for phonological awareness, 465t portfolio assessments, 220 standardized test administration, 262, 267-273 Assimilation patterns, 71, 98–100, 170, 172 Association fibers, 42-43 Ataxic CP, 315 Ataxic dysarthria, 316 Athetosis, 50 Attention deficits, 318 Audiological screenings. See hearing screenings Audiologists, 266, 267, 328, 329, 393-394 Audiometers, 267 Audiotaping, 275, 294 Auditory bombardment, 183, 416 Auditory discrimination. See also hearing impairments and hearing loss; speech discrimination testing, 139, 182-183, 192-197 Auditory discrimination training. See also sensory-perceptual training (ear training), 279-280 Auditory mechanism. See also hearing impairments and hearing loss, 30–33, 30f Auditory nerve, 30f Authentic assessments, 219 Autism spectrum disorder, 439 Autosegmental theory, 121–122 Axons and axon terminals, 34–36, 35f

## B

Babbling, 144, 145, 147–151, 150b, 164–165, 198, 202–203
Babies. See infants
Backing, 96–97
Basal ganglia, 39–40, 39f
Baselines, 348–351, 402b
Basilar membrane, 32
Behavioral theories of SSL, 201–206
Behavioral treatment approaches. See also corrective feedback; modeling; positive reinforcement; sound shaping, 335, 337, 389, 392, 409 Bernoulli effect, 27 Bilabials, 68, 74, 77, 145, 176 Bilingualism. See also ethnocultural variables; second language acquisition; specific languages, 235–236, 237, 238, 252, 258-259, 298, 457 Binary system, 79, 81-83, 82t, 85-86 Birth order, 186 Black English. See African American English (AAE) Blackfoot language, 224 Blends. See consonant cluster production Booster treatment, 357, 379 Bound morphemes, 63 Boys. See gender differences Bradykinesia, 50 Brain. See central nervous system (CNS); specific brain structures Brain stem, 40f, 41–42, 41f Breath indicators, 358 Broad phonetic transcriptions, 65, 276 Broca's area. See also cerebral initiation, 37-38, 43

# C

Canonical babbling (infraphonological stage 4). See also babbling, 144, 145-146, 147, 149 Cantonese dialect. See also Chinese languages versus English, 246, 253 Caregivers. See also families; mothers; parents, 203, 204, 221 Carrier phrases, 368 Carryover. See home program (cycles approach); maintenance programs; transfer and carryover, in traditional approach Case histories. See also family histories, 264, 290-291 Caseloads. See school caseloads Caudate nucleus, 39, 39f Central nervous system (CNS). See also neuromotor control of speech; neurons, 34, 36–43, 37*f*, 38*f*, 39*f*, 40*f*, 41*f*, 48–49 Central sulcus, 36, 37f, 38f Cerebellum, 40-41, 40f Cerebral cortex, 36, 37f

Cerebral hemispheres, 36 Cerebral initiation, 46-47 Cerebral palsy. See also developmental dysarthria (DD), 179, 290-291, 314-315 Cerebrum, 36 Cervical nerves, 22t Cheyenne language, 224 Childhood apraxia of speech (CAS) advocacy for children with, 386b assessment of, 266, 268, 306-314 genetic factors and, 187 overview of, 179 treatment approaches for, 381-385 Chinese languages versus English, 239–241, 253 Chorea, 50 Chromosomes. See genetic factors Cilia, 32 Cineradiography, 271 Citation form, 70 Cleft lip and palate. See also hard palate; lips; phonatory mechanism; soft palate, 176, 178, 290, 321-326, 389-393 Client-specific procedures, 465 Clinical Evaluation of Language Fundamentals-Fourth Edition, 464 Clinical Evaluation of Language Fundamentals Preschool-Second Edition, 464 Clinical phonetics, 62 Clinical practice and reasoning. See also ethnocultural variables; evidence-based practice analysis approaches in, 281-284, 291-292, 296-297 behavioral theories of SSL in, 203 CAS diagnosis in, 309–310 connected speech samples in, 276-277 LPTs versus, 104-105 natural phonological theory and, 110–111, 112 NPTs versus, 89, 105, 120-121, 287 NSOME and, 448 PAI and, 467–468, 470–471, 471b parental input on assessments in, 220 phonological theories versus, 124, 127, 128–129, 130, 133–134 prognosis in, 300-302

speech sound norms in, 174, 174b SSD subtypes and, 16-18 standardized test administration in, 272 - 273target behavior selection guidelines, 345-348 theoretician versus, 133-134 treatment practices in, 177-178, 302-303, 333, 371-372, 402b Clinical significance, 89 Closed-syllable words, 92 Closing interviews, 303-304 Cluster reductions (CR). See also error patterns; phonological patterns (PP), 93-94, 117, 120, 170, 235, 287 Clusters. See cluster reductions (CR); consonant cluster production CNS. See central nervous system (CNS) Coarticulation, 70-71 Cochlea, 30*f*, 32, 32*f* \*CODA. See also final consonant deletion (FCD), 103, 117, 121 Coda of syllables, 73 Code switching, 210 Cognate pairs, 79 Cognitive theories, 199-200, 256 Commissural fibers, 43 Common and uncommon phonological patterns across languages, 235 Comorbidity, as a classification, 10 Compensatory articulatory movements, 388, 392 Compensatory errors, 322–323 Complementary distribution, 63 \*COMPLEX. See also consonant cluster production, 102, 117, 120 Complexity approach. See also maximal contrast approach, 427, 429-432 Complex targets, 355 Concurrent treatment approach, 347, 352-353, 382, 409-412 Conditioning. See also operant conditioning methods, 139–143, 150b, 151, 203 Conductive hearing loss, 181, 327 Connected speech samples, 272–277, 274b, 285, 293 Connecting fibers (CNS), 42-43 Connectionist and spreading activation models, 56-57

Connectionist view, 204 Consistency. See error consistency Consistency approach. See core vocabulary approach Consistent deviant phonological disorders, 13 Consonant cluster production in AAE, 215, 217, 220 age of mastery of, 162-164, 163t in Asian languages, 243, 244 error patterns in, 162-164, 167 overview of, 72, 79, 80t-81t PAS learning and, 457 Spanish versus English, 230, 232 Consonant harmony, 99 Consonant omissions, in AAE, 213-214, 217 Consonant production. See also consonant cluster production acoustic theory of speech production and, 54 age ranges of mastery of, 155t, 156t, 157, 158t, 159, 160-161, 161t error patterns in, 166-167 initial, medial, and final sounds in, 72-73 overview of, 74, 75t, 76-79, 80t-81t, 81-83, 82t percentage of consonants correct (PCC), 294-295, 438 pressure consonants, 178 Spanish versus English, 230, 233 during transition from babbling, 148-149 Consonant sequence reduction. See cluster reductions (CR) Constraints. See also faithfulness constraints; markedness constraints, 101, 114, 115, 132 Context. See also environments: facilitative phonetic context, 175 Contextual Probes of Articulation Competence-Spanish, 234, 278, 312 Contextual testing. See also alternate response mode (ARM), 277-278, 295-296 Contiguous assimilation, 100 Contingency priming, 378 Continuous reinforcement schedule, 364 Contralateral motor control, 36, 47 Contrastive features, in AAE, 214t, 216t, 219-220

Contrastive features, in Native American languages, 225 Contrastive stress, 69 Contrastive stress drills, 384-385 Conversational levels, 370 Conversational probes, 376 Conversational speech. See also speech samples interpreters and, 249 in Latino children, 234 natural recasts within, 440-441 open-ended questions in, 370 standardized testing versus, 220-221, 272.273 target behavior selection and, 340 treatment session guests and, 377-378 Conversation stage, in sound stabilization training, 406 Core vocabulary approach, 436–439 Corniculate cartilage, 24 Coronal place nodes. See also linguaalveolars, 103, 123 Corpus callosum, 36, 43 Corpus striatum, 39 Correct/incorrect recordings, 270 Corrective feedback, 365-366, 367, 383, 394, 440 Corrective set, 406 Corticobulbar tracts, 47, 48f, 50 Corticospinal tracts, 47, 48f, 50 Costal cartilage, 20 Cotton gauze pads, 265 Covert contrasts, 125 CPAC-S. See Contextual Probes of Articulation Competence-Spanish Cranial nerves, 33, 42, 43-45, 44t, 46-48, 327 Craniofacial clinics, 391 Creole dialect, 210 Cricoarytenoid muscles, 26, 26f, 27f Cricoid, arytenoid, and cricoarytenoid joints, 25f Cricoid cartilage, 23, 24, 24f, 25f, 26f, 27f Cricothyroid muscles, 26, 27f Cross-sectional methods of research, 153–157, 155t, 156t

Crouzon syndrome, 322 Culture. See ethnocultural variables; specific languages Cuneiform cartilage, 24 Curriculum, treatment sequencing and, 352 Cycles approach. See phonological cycles approach Cytoplasm, 34 Czech language versus English, 194, 457

#### D

Danish speech production, 79 Data collection, 372-373, 402b Deaffrication. See also error patterns; phonological patterns (PP), 95-96 Deafness. See also hearing impairments and hearing loss, 180, 196, 326, 461 DEAP. See Diagnostic Evaluation of Articulation and Phonology (DEAP) Decibels, 180-181 Deep Test of Articulation, 278, 312 Delabialization, across languages, 235 Delayed imitation, 269 Delayed reinforcement, 377 Deletions and delinking. See also specific types, 103 DELV-Norm Referenced. See Diagnostic Evaluation of Language Variance–Norm *Referenced* (DELV-Norm Referenced) DELV-Screening Test. See Diagnostic Evaluation of Language Variation–Screening Test (DELV-Screening Test) Dendrites, 34, 35f, 36 DEP, 104, 115, 120, 287 Depalatalization (Dep). See also error patterns; phonological patterns (PP), 96, 173 Developmental analysis, 291 Developmental apraxia of speech. See childhood apraxia of speech (CAS) Developmental dysarthria (DD), 179, 266, 268, 314-321, 385-389, 439 Developmental norms. See also age ranges, 291, 341 Devoicing, 99 Diacritical markers, 65, 67t Diadochokinetic rates and testing, 180, 265-266, 266t, 290, 309, 313

Diagnosis. See assessments; specific conditions Diagnostic audiological evaluations, 266 Diagnostic Evaluation of Articulation and Phonology (DEAP), 268, 289, 437 Diagnostic Evaluation of Language Variance-Norm Referenced (DELV-Norm Referenced), 220 Diagnostic Evaluation of Language Variation-Screening Test (DELV-Screening Test), 220 Diagnostic report writing, 299-300, 304 Dialectal variations, 219, 236, 239, 249, 298 Dialects. See American English dialects; Spanish language and dialects Dialect-sensitive assessments. See Arizona Articulation Proficiency Scale-Third Edition (Arizona-3) Dialect Sensitive Language Test, 217 Diaphragm, 20, 20f, 22t, 23 Differential diagnosis, 261, 297-300, 309 Diminutization (Dim), 91, 172 Diphthong reduction, in AAE, 213, 217 Diphthongs. See also vowel production, 72, 86-87 Diplegia, 314 Discrete trial probes, 376 Discrete trials, 350-351, 366, 367-370 Discrimination. See auditory discrimination Discrimination training. See auditory discrimination training Dismissal from treatment, 357, 379 Distinctive features age of mastery of, 168-169 of consonants, 79, 80t-81t, 81-83, 82t error frequency and distribution analysis versus, 285 generalized production and, 374 of vowels, 85-86 Distinctive features theory, 3, 88, 419 Distortions, 6, 270 Documentation. See also phonetic transcriptions; speech samples audio and videotaping, 275, 294 of baselines, 348-351 correct/incorrect recordings, 270 data collection, 372-373, 402b diagnostic report writing, 299–300, 304

measurable objectives in, 353–356 prognostic statements, 300, 302 \*DORSAL. See also velar fronting (VF), 103, 120 Dorsal place nodes. See also linguavelars, 103, 123 Doubling. See also reduplication (Redup), 172 Down syndrome, 291, 436, 439 Dravidian languages. See South Asian languages versus English DTTC. See Dynamic Temporal and Tactile Cueing for Speech Motor Learning (DTTC) Dynamic assessments, 464–465 Dynamic sphincteroplasty, 390 Dynamic Temporal and Tactile Cueing for Speech Motor Learning (DTTC), 384 Dysarthria. See developmental dysarthria (DD)Dyskinesias, 50 Dyskinetic CP, 315 Dyslexia, 460 Dysprosody, 308 Dystonia, 50

## E

Early, middle, and late sounds (EML), 160-161, 161t Ear structures. See auditory mechanism Ear training, 183, 402-403 East Asian languages versus English, 243 - 245Echo speech, 406 Eight-Step Continuum, 384 Electropalatography (EPG), 125–126, 271, 358 EML. See early, middle, and late sounds (EML) Empirical variables, missing, 132 Empty sets, 426, 430 Endolymph, 32 Endophenotypic classifications of SSDs, 10 English as a second language. See bilingualism; second language acquisition English language. See American English dialects; American English language; Mainstream American English (MAE) Environments. See also conditioning behavioral theories of SSL and, 202-203, 204, 205 generalized production across, 375, 377, 378, 406-407 genetic factors versus, 187, 190 learned versus innate behavior and, 194, 195, 196 natural, 339, 340, 350, 366, 376 PAS learning and, 457 second language acquisition and, 254-255, 258 socioeconomic status and, 186 Epenthesis. See also error patterns; phonological patterns (PP), 92, 104, 172 EPG. See electropalatography (EPG) Epiglottis, 23, 24*f*, 28*f* ERPs. See event-related potentials (ERPs) Error consistency, 343–344, 345 Error frequency and distribution analysis, 285-286 Error inconsistency, 301, 381 Error patterns. See also phonological patterns (PP); specific types articulation versus phonological disorders and, 9 compensatory errors, 322-323 consistent versus inconsistent, 15 historical perspectives on nomenclature of, 4 idiosyncratic, 345 natural phonological theory and, 111, 112 occurrence analysis in, 283-284 prognosis and inconsistency of, 301 recording of, 269, 270 SSL as inversely proportional to, 169 in standardized testing, 270 typical versus atypical, 16 Error rate, 184-185 Ethnocultural variables African American English (AAE), 209–210, 211b, 212–213, 214t, 215, 216t, 217-222 Asian and Pacific Islander languages, 237–248, 239t, 240t client-specific procedures and, 465 English dialects, 248–250

generalized production and, 346 Native American languages, 222-228, 227b overview of, 207-209 Spanish language and dialects, 228–237, 230t, 231t stimulus items and, 349, 350 target behavior selection and, 340, 346 Etiological classifications of SSDs, 10, 11t, 13 - 15Eustachian tubes, 30f Evaluator (EVAL), 113, 114, 115, 119, 119f Event-related potentials (ERPs), 140 Evidence-based practice behavioral treatment approaches, 335, 337-338 CAS treatment, 382 cleft lip and palate treatment, 392 complexity approach, 428-429 concurrent treatment approach, 352–353, 382, 409-410 core vocabulary approach, 439 DD treatment, 387 different treatment approaches, 399 generalization and generalized production, 343-344 high versus low frequency words, 345 language-based treatment approaches, 443-444 maximal opposition training, 424 minimal contrast approach, 420-421 naturalistic speech intervention approach, 442 norms as target behaviors, 341 NSOME, 445, 446-448 perceptual training, 422 phonological awareness (PA), 454-455, 471-472 phonological cycles approach, 418-419 PROMPT, 383-384 secondary reinforcers, 364 stimulability, 432-433, 436 traditional approach, 402-403 Evoked trials, 350-351, 372 Evoking procedures, 263, 269, 274–275, 274b, 403

Exemplars. See also key words; target behaviors, 282, 340, 344, 371, 372, 377 Expansion (infraphonological stage 3), 145, 149 Experiential-play activities. See also play activities, 417 Experimental phonetics, 62 Explanatory status of phonological concepts, 129–132 Explicit learning, 258 External auditory meatus, 30f, 31 Extrapyramidal system, 39, 49–51, 49f Eye contact, 212, 227b

## F

Facial nerves, 42, 44-45, 44t, 47 Facial symmetry, 265 Facilitative phonetic context, 277 FAITH, 103 Faithfulness constraints. See also nonlinear optimality phonological analysis, 101, 102, 115–116, 120–121 False (floating) ribs, 20–21 Familial prevalence (aggregation), as SSL variable, 186-188, 190 Families, 297–298, 301, 304, 340, 378 Family histories, 2, 309 FCD. See final consonant deletion (FCD) Feature geometry, 122–124 Feedback. See corrective feedback; informative feedback Feedback and feedforward models, 52-53 Females. See gender differences Fijian language, 102, 118 Final consonant deletion (FCD). See also phonological patterns (PP); vocalization (Voc), 92, 117, 120, 170, 230, 240, 287Final consonant deletion rule, 103 Final devoicing, 173 First words. See also protowords, 143, 151-152, 152b Fisher-Logemann Test of Articulation Competence, 234, 282 Fishing for Sounds, 369-370 Fissures, 36 Fistula, 390

Flaccid dysarthria, 315 Flashlights, 265 Flubarty Preschool Speech and Language Screening Test-Second Edition, 263 FMRI. See functional magnetic resonance imaging (fMRI) Follow-up after treatment, 357, 379 Foot, 122 Foreign language exposure. See also bilingualism; second language acquisition, 194 Foreign languages. See specific languages FOXP2, 187, 190 Fragile X syndrome, 291 Free morphemes, 63 Free variation, 63 French-English bilingualism, 457 French language. See also Khmer language, 111 Frequency of occurrence analysis, 283 Frequency of vibrations. See also pitch, 68 Fricative gliding, 97 \*FRICATIVES. See also stops and stopping, 103, 104, 117, 120, 121 Fricatives in AAE versus MAE, 217, 218 acoustical qualities of, 68, 69 age of mastery of, 168 anatomy and physiology for, 23, 65 in Asian languages, 243, 244 in cleft lip and palate, 79, 392 depalatalization and, 96 distinctive features of, 81, 83 generalized production of, 341, 343, 374-375 hearing impairments and, 394 markedness constraints and, 116, 117, 121 overview of, 74, 76, 178 place of articulation in, 78 in Spanish-influenced English, 253 in SSL, 142, 150, 152, 159, 160, 166-167, 168, 191 stopping and, 95, 103, 120, 121 voicing and, 116 Frontal lobe, 36–38, 37f Fronting. See also velar fronting (VF), 103, 120, 170, 286

Frozen forms, 152 Functional magnetic resonance imaging (fMRI), 140 Functional speech sound disorders, 265, 299

#### G

GAD. See General American Dialect (GAD) Games. See also play activities; specific games, 370-371, 423, 438, 440 GEN. See also generator (GEN), 118, 119, 119f Gender differences in CAS, 307 in cleft lip and palate, 321 in consonant mastery, 157, 158t, 163t phonological awareness and, 457 prevalence and risk factors of SSDs and, 2 in SSL, 185 General American Dialect (GAD). See also Mainstream American English (MAE), 210 Generalization, in second language acquisition, 257 Generalization and generalized production. See also transfer and carryover, in traditional approach, 343-344, 346, 373-378, 406-407, 409, 410 Generative grammar approach, 88, 107 Generator (GEN), 113, 114, 115 Genetic factors, 13-14, 184, 186-188, 190, 265 German alphabet, 458 German language versus English, 458 Gestural theory, 126 Gestures. See articulatory gestures; protowords; undifferentiated lingual gestures GFTA-2. See Goldman-Fristoe Test of Articulation-Second Edition (GFTA-2) Gibberish, 146 Girls. See gender differences Glides. See also liquid gliding (LG) acoustical qualities of, 68 age of mastery of, 168 anatomy and physiology for, 23, 68 distinctive features of, 83 markedness constraints and, 116 overview of, 76-77

in Spanish-influenced English, 229 in SSL, 142, 146, 149, 152, 159, 166, 168, 191 stopping and, 95 Globus pallidus, 39, 39f Glossectomy, 177-178 Glossing, 275 Glossopharyngeal nerves, 42, 44f, 45 Glottals, 79 Glottal stops, 178, 224 Glottis. See also subglottic air pressure; supraglottic air pressure, 25, 25f Gloves, 265 Goals, long-term. See also target behaviors, 339, 353, 357 Goal statements, 300 Goldman-Fristoe Test of Articulation-Second Edition (GFTA-2) age of mastery in, 154-156, 155t consonant clusters in, 162 dialect-sensitivity in, 219 gender differences in, 157, 158t in hearing impairments, 330 in Native American languages, 225 overview of, 267, 268 Goos, 145 Government agencies. See third-party payers Grammar. See universal grammar (UG) Grammars, 115, 118 "Grandfather Passage," 263 Grapheme-phoneme consistency, 458 Greek language versus English, 457 Gyri, 36, 37, 38

### H

Hard of hearing, 180, 326 Hard palate. See also cleft lip and palate, 28f, 29, 30f, 178 Harmony, 118–119 HAS. See high-amplitude sucking method (HAS) Head turn method, 140 Hearing. See auditory mechanism Hearing acuity, 180–181 Hearing impairments and hearing loss. See also deafness, 2, 180–182, 318, 324, 326–330, 393–395 Hearing screenings, 266–267 Hemiplegia, 314 Heschl's gyri, 38 High-amplitude sucking method (HAS), 139-140, 193-194 Hindi language. See also Asian and Pacific Islander languages, 118, 194, 241 Hispanics. See Spanish language and dialects Historical phonetics, 62 Histories. See case histories; family histories Hmong language, 242–243 Hodson Assessment of Phonological Patterns: Third Edition, 268, 330 Home program (cycles approach), 416 Homework. See speech assignments Homonymy, 345, 355, 420, 424 Huck Finn's English, 211b Huntington's disease, 50 Hyperkinesia, 50 Hyperkinetic dysarthria, 316 Hypernasality, 308, 392-393 Hypoglossal nerves, 42, 44f, 45 Hypokinesia, 50 Hypokinetic dysarthria, 316 Hyponasality, 308 Hypothesis of discontinuity, 147, 198

### L

ICD. See initial consonant deletion (ICD) IDENT, 115-116 IDENT-FEATURE, 120, 287 Idiopathic speech sound disorders, 265, 307 Idiosyncratic error patterns, 345 Idiosyncratic phonological patterns, 283 IEP. See Individualized Education Program (IEP) IFSP. See Individualized Family Service Plan (IFSP) Illiteracy. See also literacy skills, 460 Imitated speech. See also delayed imitation; stimulability testing, 203, 204, 360 Immovable articulators, 28, 29–30, 30f Implicit learning, 204, 258 Inconsistency. See error inconsistency Inconsistent deviant phonological disorders, 13

Incus, 31*f*, 32 Independent analysis, 280, 281 Indian languages. See Native American languages; South Asian languages versus English Individualized Education Program (IEP), 268, 357, 402b, 447b Individualized Family Service Plan (IFSP), 357 Individuals with Disabilities Education Act, 378 Infantile swallow. See tongue thrust Infants. See also babbling, 138-149, 193-197 Inferior colliculi, 42 Inferior frontal gyrus, 37 Informative feedback, 364 Infraphonological stages, 144-146 Initial, medial, and final consonants, 156t, 159, 282, 394 Initial, medial, and final sounds, 72–73 Initial consonant deletion (ICD), 92-93, 235 Innate behavior. See learned versus innate behavior; universal grammar (UG) Inner ear, 30f, 32-33, 32f Instructions, verbal, 360-361 Insurance companies. See third-party payers Integral stimulation, 384 Intellectual disabilities. See also mental retardation, 291 Intelligence, 2, 185–186 Intelligibility. See speech intelligibility Interaction hypothesis, 256–257 Intercostal muscles, 21 Intercostal nerves, 22t Interference patterns. See also rhythmic interferences, 236, 252-253 Interlanguage, 254, 257-258 Intermittent reinforcement schedule, 364 Internal capsule, 46 International Phonetic Alphabet (IPA), 64, 269-270, 271-272 Interpreters, 233-234, 247, 249 Intervocalic consonants, 72 Intonation, 69 Intraoral pressure, 322 Iowa-Nebraska Articulation Norms Project, 164

IPA. See International Phonetic Alphabet (IPA)
Isolation stage, in sound stabilization training, 404
Italian language versus English, 235, 253, 457

## J

Japanese language, 244–245 Jargon, 146 Jaw, 28*f*, 29, 37, 37*f* Judgment of success, 301 Juncture, 70

## K

Kannada language. See also Asian and Pacific Islander languages, 118, 241
Kaufman Speech Praxis Test for Children (KSPT), 313
Key words. See also exemplars; target behaviors, 278, 296, 362
Khan–Lewis Phonological Analysis: Second Edition, 268, 296
Khmer language, 243
Kinesthetic sensation, 183
Korean language, 244, 252
KSPT. See Kaufman Speech Praxis Test for Children (KSPT)

# L

Labial assimilation, 98, 170 Labial place nodes, 102, 123 Labials. See also bilabials, 149 Labiodentals, 78 Labyrinth, 32 Language. See linguistic theories of SSL Language-based treatment approaches, 442–444 Language disorders and language impairments (LI), 8, 184–185, 318, 324, 328, 462 Language-related variables, in PAS learning, 457–458 Languages. See specific languages Language variability, 205

From Assessment and Treatment of Speech Sound Disorders in Children: A Dual-Level Text, 3rd Ed., by Adriana Peña-Brooks and M. N. Hegde, Austin, TX: PRO-ED. Copyright 2015 by PRO-ED, Inc. Laryngeal nodes, 102, 123 Laryngeal structures, 23–24, 24f Laryngeal vibration, 358 Larynx, 28f, 37, 37f Lateral sulcus, 37, 37f, 38f Latino children. See also Spanish language and dialects; Spanish-speaking children, 231-237 Learned versus innate behavior. See also hypothesis of discontinuity; universal grammar (UG), 105, 109-110, 129-130, 193-197, 198-206 Learning. See speech sound learning (SSL) Learning disorders, 318 Let's Give It a Smile, 371 Let's Paste Spots on the Dalmatian, 371 LG. See liquid gliding (LG) LI. See language disorders and language impairments (LI) Ligature, 86 Linear phonological error pattern analysis, 282-284 Linear phonological theories (LPTs). See also distinctive features theory; natural phonological theory, 4, 8, 9, 108–113, 419 Ling system, 394 Lingua-alveolars. See also coronal place nodes acoustical qualities of, 68 depalatalization and, 96 overview of, 78 in SSL, 149, 159, 166-167, 176 stops and, 74 substitution patterns and, 94 Linguadentals, 78 Linguapalatals, 78 Linguavelars. See also dorsal place nodes; velar assimilation; velar fronting (VF), 68, 78, 103, 120, 149, 159, 168 Linguistic decoder, 195–196 Linguistic rules, 132 Linguistic theories of SSL, 197-201 Linking, 103 Lip rounding, 85 Lips. See also cleft lip and palate, 28f, 29, 37, 37f, 176

Liquid deviations, 171, 172 Liquid gliding (LG). See also error patterns; phonological patterns (PP), 97, 117, 170, 172 Liquid nasalizations, 235 \*LIQUIDS, 117, 121 Liquids. See also liquid gliding (LG) acoustical qualities of, 68 age of mastery of, 168 anatomy and physiology for, 68 in cluster deletions and substitutions, 93, 94 distinctive features of, 83 markedness constraints and, 116, 117 overview of, 77 place of articulation in, 78 in SSL, 142, 166, 168, 191 vocalization and, 97-98 vulnerability to, 297 Liquid simplifications, 232, 235 Lisps, 188, 297 Literacy-based approach. See phonological awareness intervention (PAI) Literacy instruction, 458-459, 460-461 Literacy skills articulation disorders and, 185 in developmental dysarthria, 389 hearing impairments and, 328 phonological awareness and, 454, 455, 457, 459, 462, 463, 464, 467 print awareness, 456 Longitudinal methods of research, 157–159 Lower motor neurons, 48 LPTs. See linear phonological theories (LPTs) Lungs, 20, 20f, 23

### Μ

MAE. See Mainstream American English (MAE)
Magnetic resonance imaging, 271
Mainstream American English (MAE) AAE versus, 213, 214t, 216t, 218, 219, 221–222
Native American languages versus, 228 overview of, 208, 210

Maintenance programs, 357, 373, 376–378, 407 - 408Major class distinctions. See distinctive features Males. See gender differences Malleus, 31f, 32 Malocclusions, 177, 177f, 188 Mandarin dialect. See Chinese languages versus English Mandible. See jaw Manipulatives. See stimulus items Manner, place, voicing analysis (MPV), 282, 285, 374, 420 Manner of articulation, 74–77, 75t Manual guidance, 358–359, 361 Markedness constraints. See also nonlinear optimality phonological analysis, 101, 102, 116-117, 120-121, 129, 130, 429 Marked phonological features, 116 Matches, 8 Maternal education, 2 \*MAX, 120, 121 MAX, 104, 115 Maxilla. 29 Maximal contrast approach, 355 Maximal opposition training. See also complexity approach, 343, 349-350, 421, 423-424 Mean length of utterance, 288–289 Mechanical feedback, 365 Medical histories. See case histories Medulla, 41f, 42, 43 Mental retardation. See also intellectual disabilities, 318 MET. See multidisciplinary evaluation team (MET) meetings Metalinguistics, 454 Metaphonological, 454 Metathetic errors, 308 Metrical theory, 122 Midbrain, 41f, 42 Middle ear, 30f, 31–32, 31f Middle ear infections. See also otitis media, 324 Mid-dorsum palatal stops, 179 Minimal contrast approach. See also minimal pair intervention method, 336, 355, 417

Minimal pair intervention method, 420-423 Minimal pairs, 63-64, 420 Mirrors, 265, 358 Mismatches, 4, 8 Mixed dysarthria, 316 Mixed hearing loss, 327 Mixed type CP, 315 Modeled trials, 350, 351 Modeling. See also stimulability testing, 203-204, 360, 372, 383 Modified cycles approach, 417–418 Monitoring. See self-monitoring skills Monkey research, 147, 196 Monophthongs, 72, 217 Monoplegia, 314 Morphemes, 63–64 Morphophonemics, 71 Morphosyntactic features, 217 Motherese, 204 Mothers. See also caregivers; families; maternal education, 186, 202, 203, 204 Motivation, 301, 379 Motor-based approach. See traditional approach Motor cortex, functions of, 37f Motor program models, 54-56, 57 Motor skills, as SSL variable, 179-180 Motor speech disorders (MSDs), 12, 14 Movable articulators, 28, 29 MPV. See manner, place, voicing analysis (MPV) MSDs. See motor speech disorders (MSDs) Multidisciplinary evaluation team (MET) meetings, 262, 303-304 Multidisciplinary team approach. See also audiologists, 318, 319, 321, 324, 387, 391, 393 Multiple contrast approach, 420 Multiple-oppositions approach, 345, 347, 349-350, 424-426 Muscles, 21-22t, 23, 24-26, 26f, 27f, 29, 32 Myelin, 35 Myoclonus, 50 Myoelastic-aerodynamic theory, 27

From Assessment and Treatment of Speech Sound Disorders in Children: A Dual-Level Text, 3rd Ed., by Adriana Peña-Brooks and M. N. Hegde, Austin, TX: PRO-ED. Copyright 2015 by PRO-ED, Inc.

#### Ν

Narrow phonetic transcriptions, 63, 65, 270, 276Nasal assimilation, 99, 100, 170, 171, 235 Nasal cavity, 28, 28f Nasal deviations, 171 Nasality, 308, 392-393 Nasals acoustical qualities of, 68, 69 across languages, 235 age of mastery of, 168 anatomy and physiology for, 23, 68 in Asian languages, 241, 244 in cluster deletions, 93 distinctive features of, 83 markedness constraints and, 116, 118 in Native American languages, 224 overview of, 76 place of articulation in, 77, 78 in SSL, 142, 146, 149, 150, 152, 159, 166, 168, 191 universality of, 116 vocalization and, 97, 118 vulnerability to, 297 Native American languages, 222–228, 227b Native Languages of the Americas, 223 Nativist theory, 255 Natural environments, 339, 340, 350, 366, 376 Naturalistic speech intervention approach, 439 - 442Naturalness, 129, 130 Natural phonological theory, 89–100, 104-105, 108-113, 117, 198-199 Natural recasts, 440-441 Navajo language, 224, 225 Negative rules, 104 Nerve fibers, 35 Nervous system. See also central nervous system (CNS), 34-36 Neural impulses, 34-36 Neuromotor control of speech. See also central nervous system (CNS); nonspeech oral-motor exercises (NSOME), 46–51, 48*f*, 49*f* Neurons, 34–36, 35f, 48

Neurophysiological research of speech perception, 140-141 Neurophysiological variables in SSL, 179 Neurotransmitters, 36 Newborns. See infants NO COMPLEX, 102 Nodes, 102-103, 123 Nomenclature changes, 2–4, 5b, 89–90 Noncontiguous assimilation, 100 Noncontrasting treatment format, 430 Nonhomonymous maximal contrast approach. See empty sets Nonlinear optimality phonological analysis, 286 - 287Nonlinear phonological theories (NPTs), 4, 8-9, 100-105, 113-124, 119f, 199, 419 Nonmajor class distinctions. See manner, place, voicing analysis (MPV) Nonreflexive vocalizations. See also babbling, 144 Nonsense syllables stage, in sound stabilization training, 404 Nonsense Syllable Test, 433 Nonsense words (NSW), 430, 431 Nonspeech oral-motor exercises (NSOME), 444-448 Nonstandardized screenings, 263–264 Nonverbal communication systems, 385 Normalized speech acquisition (NSA), 11 Norms. See also age ranges, 291, 341 NSA. See normalized speech acquisition (NSA) NSW. See nonsense words (NSW) Nucleus, 34 Nucleus of syllables, 73, 122

## 0

Objectives. *See also* target behaviors, 339, 348–349, 353–357, 356*b*, 447*b* Objects. *See* stimulus items Obstruents. *See also* postvocalic devoicing; prevocalic voicing, 83 Occipital lobe, 37*f*, 39 Occurrence analysis, 283–284 Oculomotor nerves, 43, 44*t* Offglides, 86 Olfactory nerves, 43, 44*t*  OME. See otitis media with effusion (OME)

- Omissions. *See also* consonant omissions, in AAE; deletions and delinking, 6, 253, 270
- Onglides, 86
- **ONSET**, 104
- Onset Cluster Probe, 285
- Onset of syllables, 73, 122, 455, 460
- Open-ended questions, 370
- Open-syllable words, 92
- Operant conditioning methods. See behavioral theories of SSL; high-amplitude sucking method (HAS); positive reinforcement; visually reinforced head turn method (VRHT)
- Opthalmic nerves, 44
- Optic nerves, 43, 44*t*
- Optimality theory (OT), 101–102, 114–121, 119*f*
- Optimal output form, 118–119, 119f
- Oral astereognosis, 309
- Oral cavity, 28, 28f
- Oral sensation, 183-184
- Oral Speech Mechanism Screening Examination: Third Edition (OSMSE-3), 313
- Orbicularis oris muscle, 29
- Organic speech sound disorders, 265, 299
- Organ of Corti, 32, 33
- Orofacial examinations, 264–266, 266*t*, 290, 325, 329
- Orthodontic care, 390
- OSMSE-3. See Oral Speech Mechanism Screening Examination: Third Edition (OSMSE-3)
- Ossicular chain, 31*f*, 32 OT. *See* optimality theory (OT)
- Otitis media, 182, 291, 327
- Otitis media with effusion (OME), 2 Outer ear, 30*f*, 31
- Oval window, 32, 32*f*
- Overdifferentiation of phonemes, 252–253

#### Ρ

PA. See phonological awareness (PA)
PAI. See phonological awareness intervention (PAI)
Paired stimuli, 362, 363f

Paired Stimuli Kit, 362 Palatalization, in Japanese language, 245 Palatal prosthesis, 178 Palatals, 78 Palatal stops, 179 Palatine bone and process, 29, 30f Papago language, 225 Paraplegia, 314 Parent education. See also home program (cycles approach); speech assignments, 378, 387, 391, 394 Parents. See also caregivers; families; genetic factors; mothers, 203, 221, 372 Parietal lobe, 37f, 38–39 Parkinson's disease, 50 Partial assimilation, 100 PAS. See phonological awareness skill (PAS) learning PCC. See percentage of consonants correct (PCC) PECS. See Picture Exchange Communication System (PECS) Pectoralis major and minor, 21, 22t Peer monitoring, 407 Percentage of consonants correct (PCC), 294-295, 438 Percentage of occurrence analysis, 283-284 Perceptual phonetics, 62 Perceptual training. See also sensory-perceptual training (ear training), 421-422 Perilymph, 32 Peripheral nervous system, 34, 43–46, 44t, 48 Personal characteristics, as SSL variable, 185 - 186Pharyngeal flap surgery, 390 Pharyngeal fricatives, 178 Pharyngeal stops, 178 Pharynx, 27–28, 28f, 29 Pharynx shape, vowel production and, 84-85 Phonation (infraphonological stage 1), 144-145 Phonatory mechanism, 23–27, 24f, 25f, 26f, 27f Phoneme blending, 456, 460 Phoneme classification, 72-87, 75t, 80-81t,

From Assessment and Treatment of Speech Sound Disorders in Children: A Dual-Level Text, 3rd Ed., by Adriana Peña-Brooks and M. N. Hegde, Austin, TX: PRO-ED. Copyright 2015 by PRO-ED, Inc.

82t

Phoneme collapse, 424, 425 Phoneme elision or deletion, 456, 460 Phoneme isolation, 456, 466 Phoneme manipulation, 456, 457, 458, 466, 470 Phoneme markedness, 257 Phonemes and allophones. See also coarticulation; distinctive features age of mastery of, 153-160, 155t in Asian languages, 242, 243, 244, 246-247 inventory of sounds and, 71 overdifferentiation of phonemes, 252-253 overview of, 62-64 Spanish versus English, 236 Phoneme segmentation, 456, 457, 460, 466 Phonemic awareness, 453, 454, 456, 460-461, 469-470 Phonemic inventories. See also phonetic inventories; sound inventories, 281 Phonemics, 64 Phonemic synthesis, 460 Phonetic alphabets. See also International Phonetic Alphabet (IPA), 458 Phonetic contexts, 70 Phonetic difficulty levels, 382, 394 Phonetic inventories. See also phonemic inventories; sound inventories, 280, 296-297, 296b, 355 Phonetic placement techniques, 358–359, 384 Phonetics. See also speech sound production, 61-65, 66t-67t, 87-89, 107, 134b Phonetic stress, 69 Phonetic transcriptions inadequacy of, 125, 126 overview of, 64-65, 66t-67t process of, 293 of speech samples, 276 in standardized testing, 270–272 types of, 63, 65, 270, 276 Phonetic versus phonological theories, 124-127 Phonological approximation, 252 Phonological awareness (PA), 453–456, 461-467, 465t Phonological awareness intervention (PAI), 444, 467-473, 471b

Phonological awareness skill (PAS) learning, 456 - 461Phonological concepts, explanatory status of, 129 - 132Phonological constraints, 4, 355 Phonological contrast approaches, 419–427 Phonological cycles approach, 183, 292, 413-419 Phonological delays. See also age ranges, 12-13, 15, 299 Phonological disorders. See also speech sound disorders (SSDs) assessments for, 268 causes and diagnosis of, 8-9 classifications and types of, 13, 299 definition of, 90 historical perspectives on, 3, 4, 88 overview of, 7-8, 298 phonological awareness and, 462 phonological delays versus, 15 Phonological error pattern analysis, 282-284, 285, 294, 295-296 Phonological knowledge, 4, 17, 125, 128, 285-286 Phonological Knowledge Protocol (PKP), 285 Phonological mean length of utterance (PMLU), 288-289 Phonological patterns (PP). See also error patterns; specific patterns assessments for, 268 common and uncommon across languages, 235 generalized production and, 374 historical perspectives on nomenclature of, 4, 89-90 reasons for existence of, 124 target behaviors and, 342, 344, 347 treatment objectives for, 355 in typical speech sound learners, 169-173, 172t, 173t, 283 Phonological planning deficits, 13 Phonological process analysis, 3–4, 9, 104-105 Phonological Process Analysis (Weiner), 171 Phonological processes. See also phonological patterns (PP), 4, 89-90, 108-110, 124

Phonological processing, 453 Phonological regression. See also progressive idioms; regressive idioms, 200 Phonological rules. See also phonology; phonotactics, 4, 101-104, 108, 109-110, 130, 131 Phonological tests, 268 Phonological theories. See also specific theories articulation disorders and, 6 evaluation of, 127-132 goals of, 107 ignorance of social interaction in, 132 lack of treatment procedures in, 335-336, 338 overview of, 106-107 phonetic theories versus, 124-127 phonological disorders and, 8 surface (SR) and underlying (UR) representations in, 4 Phonological universals, 254 Phonology, 5b, 87-89, 106-107 Phonotactic constraints, 280 Phonotactics, 71 Photo Articulation Test: Third Edition, 267, 268 Phrases stage, in sound stabilization training, 405 Physical prompts, 361 Physical stimulus generalization, 373-374 Physiological phonetics, 62 Physiology of speech and hearing. See specific mechanisms or structures Picture Exchange Communication System (PECS), 385 Pictures. See also stimulus items, 349-350, 358 Pidginization, 210, 257 Pierre Robin syndrome, 322 Pinna, 30f, 31 Pitch. See also frequency of vibrations, 68, 69.70 PKP. See Phonological Knowledge Protocol (PKP) Place of articulation. See also manner, place, voicing analysis (MPV), 75t, 77-79 Play activities. See also games; stimulus items, 366, 369, 370, 417, 425, 434, 435 Plosives, 178

PMLU. See phonological mean length of utterance (PMLU) Pons, 41f, 42, 43 Portfolio assessments, 220 Portuguese language versus English, 235, 253 Positional constraints, 281 Positioning techniques, 387, 389 Positive reinforcement. See also behavioral theories of SSL; operant conditioning methods, 337, 338, 362-367, 373, 377, 383 Positive rules, 104 Postlingual hearing loss, 329 Postvocalic consonants and clusters, 72 Postvocalic devoicing, 99 Potential optimal target patterns, 414 Poverty of the stimulus hypothesis, 203-204 PP. See phonological patterns (PP) PPK. See productive phonological knowledge (PPK) Preferred Practice Patterns (ASHA), 188 Prelingual hearing loss, 329 Prelinguistic development, 137–149 Premaxilla, 29, 30f Premotor cortex. See also cerebral initiation, 37 Preschool Language Scale, Fifth Edition Spanish, 234 Preschool Language Scale–5, Spanish Screening Test, 234 Preschool Motor Speech Evaluation and Intervention, 268 Preschool Profile, 313 Pressure consonants. See also affricates; fricatives; stops and stopping, 79, 178, 322 Prevalence and risk factors for articulation disorders, 12 in CAS, 307 in cleft lip and palate, 321, 322, 390, 391, 393 for comorbidity of disorders, 8 in CP, 314, 318, 386 in hearing impairments, 327 for language impairments, 184 for MSDs, SDs, and SEs, 12-14

for OME, 14 overview of, 1, 2 Prevocalic consonant clusters, 72 Prevocalic voicing, 99, 172 Primary auditory area. See also cerebral initiation, 38, 38f Primary motor cortex, 37, 37f, 38f Primary reinforcers, 363-364 Primitive articulation (infraphonological stage 2), 145 Print awareness, 456 Probes and probing, 372, 373-376, 416, 423, 429-430 Production practice words, in cycles approach, 416-417 Production training: sound establishment, 403Production training: sound stabilization, 403 - 406Productive phonological knowledge (PPK), 285, 429, 430 Prognosis, 291-292, 300-302, 321, 387 Prognostic statements, 300, 302 Progress. See also treatment efficacy, 372–373 Progressive assimilation. See also sound shaping, 100, 384 Progressive idioms, 152 Projection fibers, 42 Prompts, 361-362 Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT), 383-384 Property theory, 255 Proportion of whole-word correctness (PWC), 288 Proportion of whole-word proximity (PWP), 289 Proportion of whole-word variability (PWV), 289, 436 Proprioceptive awareness exercises, 407 Proprioceptive cues, 383 Prosodic theory, 200 Prosody, 128 Prosthodontic care, 390 Protophones, 144 Protowords, 149-151, 150b Psycholinguistics, 201

Public schools. See also teachers advocacy within, 386b curriculum and treatment sequencing in, 352 Individualized Educational Program (IEP), 268, 357, 402b, 447b Individualized Family Service Plan (IFSP), 357 MET meetings in, 303-304 norms and, 291, 341 screenings, 263 second language acquisition and, 298 SSDs in caseloads, 1, 2 stimulus items within, 377 Punjabi-English bilingualism, 457 Putamen, 39, 39f PWC. See proportion of whole-word correctness (PWC) PWP. See proportion of whole-word proximity (PWP) PWV. See proportion of whole-word variability (PWV) Pyramidal system, 47-49, 48f, 50

## Q

Quadratus lumborum muscles, 21, 22*t* Quadriplegia, 314 Quasivowels, 144–145 *Quick Screen of Phonology*, 263

## R

"Rainbow Passage," 263
Raspberries, 145
Rate of speech, 69–70, 356, 388
Reading. See literacy instruction; literacy skills
Reading disorders (RD), 184, 187
Realization in production, 200
Recording, of connected speech samples, 275
Recording sheets, baseline, 350, 351
Reduction, 103–104
Redup. See reduplication (Redup)
Reduplicated babbling, 146
Reduplication (Redup). See also error patterns; phonological patterns (PP), 91, 172

Referrals, 266, 267 Reflexive vocalizations, 144 Regressive assimilation, 100 Regressive idioms, 152, 152b Reinforcement. See positive reinforcement Reissner's membrane, 33 Relational analysis, 281, 287 Releasing sounds, 73 Remediation cycles, in cycles approach, 415 - 416Report writing. See documentation Research. See also evidence-based practice; specific topics with animals, 147, 196 correlation versus causation in, 189-190 cross-sectional methods of, 153-157, 155t, 156t methodological issues in, 154, 160-161, 192-194 theoretical issues in, 194-197 Resonatory mechanism, 27-28, 28f Respiratory mechanism, 19–21, 20f, 21f, 22t, 23 Response complexity levels advancement through, 368, 371-372 concurrent treatment approach and, 347, 382, 409-410 maintenance programs and, 377 modeling and, 360 phonetic difficulty and, 382, 394 probing within, 372 successive approximations and, 359 in traditional approach, 403-406 treatment initiation and, 351-352 Response cost, 366 Response recordings, in standardized testing, 269-272 Response topographies, 349, 374, 377 Reverse swallow. See tongue thrust Rhotic diphthongs, 87 Rhyme awareness, 455, 457, 459, 466, 469 Rhyme matching, 459 Rhyme oddity, 459 Rhyme of syllables, 73, 122 Rhythm. See metrical theory Rhythmic interferences, 236, 241

Rib cage, 20, 21*f* Rime of syllables, 455, 460 Risk factors. *See* prevalence and risk factors Role playing, 406 Root nodes, 123 Rounded vowels, 85 Round window, 32, 32*f* Rule extraction, 131–132 Rule following, 131 Rule governed, 131 Rules. *See* linguistic rules; negative rules; phonological rules; positive rules

## S

Scaffolding. See also corrective feedback; positive reinforcement, 469 Scalene muscles, 21, 22t S-CAT. See Secord Articulation Contextual Test (S-CAT) School-Age Profile, 313 School caseloads, 1, 2, 291 SCIP: Sound Contrasts in Phonology-Evidence-Based Treatment Program, 431 Screening instruments, for hearing, 266–267 Screening instruments, for speech sounds, 263 - 264Screening Test for Developmental Apraxia of Speech: Second Edition (STDAS-2), 313 SDs. See speech delays (SDs) Secondary reinforcers, 364 Second language acquisition. See also bilingualism, 63, 251-258, 279, 457 Secord Articulation Contextual Test (S-CAT), 278, 312 Self-monitoring skills, 378, 407 SELPAs. See Special Education Local Plan Areas (SELPAs) Semantic awareness contrasts. See also minimal contrast approach, 413 Semicircular canals, 30f, 32, 32f Semivowels. See glides; liquids Sensation. See oral sensation Sensorineural hearing loss, 181, 327 Sensory deprivation, 183 Sensory motor approach, 278 Sensory-perceptual training (ear training), 402-403

Sentence complexity, error rate and, 184–185 Sentences stage, in sound stabilization training, 405-406 Sequential bilingualism, 252 Sequential motion rates (SMRs). See also diadochokinetic rates and testing, 265, 313 SEs. See speech errors (SEs) Session structure, in treatment, 366–373, 377-378 Severity, as a classification, 10, 16, 301 Severity analysis, 294-295, 299 Shadowing, 406 Shprintzen syndrome, 322 Sibilants, 83, 297, 368 Sibling number, as SSL variable, 186 Silent posturing, 309 Simultaneous bilingualism, 252 Single-word samples, 272–273, 282, 285 Slow-motion speech, 406 S.M.A.R.T. goals, 354, 356 SMRs. See sequential motion rates (SMRs) Social communication skills, 388-389 Social interaction, 132 Social reinforcers, 364 Socioeconomic status AAE phonological characteristics and, 213, 218 educational status, 190 phonological awareness and, 457, 459, 460 prevalence and risk factors of SSDs and, 2 SSL in Latino bilingual children, 233 as SSL variable, 186 Sociolinguistic theories, 205, 257 "Soft" neurological signs, 309 Soft palate. See also cleft lip and palate, 28, 28f, 29, 178–179 Soma, 34, 35f Sound amplitude, 68 Sound blending, 466 Sound classes. See also cognate pairs; distinctive features; manner, place, voicing analysis (MPV); phonological processes age of discrimination of, 142 age of mastery of, 167-168

defined, 374 generalization and changes in, 343 generalized production across and within, 374-375 multiple-oppositions approach and, 347 target behaviors and later-developing, 341 Sound duration, 68-69 Sound establishment, 403 Sound-in-isolation level, 354 Sound-in-isolation level discrete trials, 367 Sound-in-phrase level, 352 Sound-in-sentence level, 352 Sound-in-syllable level discrete trials, 367-368 Sound inventories. See also phonetic inventories, 71, 217 Sound-in-word, -phrase, and -sentence level discrete trials, 368-370 Sound-in-word level, 351 Sound localization. See auditory discrimination Sound posters, 406 Sound shaping, 359-360, 382, 383 Sound spectrum, 68 Sound stabilization, 403–406 Source-filter theory of speech production, 53-54, 57 South Asian languages versus English, 241 Southeast Asian languages versus English, 242-243 Southern American Dialect, 210, 211b Spanish Articulation Measures, Revised Edition, 234Spanish language and dialects. See also Latino children, 228–229, 230t, 231t, 252, 253 Spanish Language Assessment Procedure, Third Edition, 234 Spanish Preschool Articulation Test, 234 Spanish-speaking children. See also Latino children, 457 Spastic CP, 315 Spastic dysarthria, 49, 316 Special education, 268, 303–304, 357, 386b, 402b, 447b Special Education Local Plan Areas (SELPAs), 357

Spectrographic displays, 358 Speech anatomic variables in SSL, 176-179, 177fSpeech assignments, 407 Speech bulbs, 390-391 Speech delays (SDs), 11-12, 13-14 Speech discrimination testing, 278–280 Speech-Ease Screening Inventory: K-1, 263 Speech errors (SEs), 12, 14-15 Speech intelligibility AAE versus MAE and, 222 in cerebral palsy, 316-317 in developmental dysarthria, 388 glossectomy and, 178 hard palate removal and, 178 intelligibility analysis, 292-293 naturalistic speech intervention approach and, 439 overview of, 175 phonological error pattern analysis and, 282 target behavior selection and, 340, 344-345, 346 traditional analysis and, 282 Speech learning stages, 144–146 Speech perception. See also auditory discrimination; auditory mechanism, 138-143, 192-197, 459 Speech production theories, 51–58 Speech recasts, 440 Speech samples. See also connected speech samples; response recordings, in standardized testing, 218, 220-221, 234-235, 249, 294 Speech sound disorders (SSDs). See also specific conditions definitions of, 5-9 evaluation of subtypes of, 15-16 historical perspectives on, 2-4, 5b, 88-89 as rooted in phonetics, 134 subtypes of, 10–18, 11t Speech sound learning (SSL). See also age ranges ethnocultural variables and, 207-209 evaluation of research on, 189-190, 192-197 first words, 151–152, 152b

individual sounds and sound patterns production, 153-159, 155t, 156t, 158t as inversely proportional to error patterns, 169 prelinguistic development, 137-149 speech intelligibility, 175 speech sound pattern learning, 167-174, 172t, 173t, 174b theories of, 197-206 transition from babbling to meaningful speech, 149–151, 150b variables related to, 176–188, 177f Speech sound mastery, speed of, 297 Speech sound production. See also phonetics; specific sound classes acoustic aspects of, 68-69 aerodynamic aspects of, 65, 68 airflow and air pressure modifications for. 23 analysis of, 280-290 as a biobehavioral event, 124 CNS areas for, 36, 37, 47 coarticulation in, 70-71 in infants, 143-149 mechanisms for, 19 morphophonemics, 71 phonological awareness and, 462-464 phonotactics, 71 PNS areas for, 44-45 research needs in, 235-236 sound inventory, 71 suprasegmental aspects of, 69-70 Speech sound screenings, 262–263 Speech therapy services. See clinical practice and reasoning; treatment Spinal accessory nerves, 44f, 45 Spinal nerves, 22t, 42, 45-46, 47 Spreading, 103 SR. See surface representation (SR) SSDs. See speech sound disorders (SSDs) SSL. See speech sound learning (SSL) Standardized screening instruments, 263 Standardized test administration, 267-273 Stapedius, 32 Stapes, 31f, 32 Statistical learning approach, 204

STDAS-2. See Screening Test for Developmental Apraxia of Speech: Second Edition (STDAS-2) Sternum, 20 Stickers, 364 Stickler syndrome, 322 Stimulability intervention approach, 347, 432-436 Stimulability probing, 416, 423, 429-430 Stimulability testing, 277, 291-292, 342 Stimulability training, 292 Stimulus items. See also games; play activities; target word cards child's environments and, 377 client-specific procedures and, 465 in complexity approach, 431 discrete trial probes and, 376 in minimal pair production training, 421, 423 naturalistic speech intervention approach and, 440 pacing of, 351, 369 for PAI, 468-469 paired, 362 preparation of, 349-350 sound-in-word, -phrase, and -sentence level, 368 in stimulability intervention approach, 434 vowel diagrams, 367 Stops and stopping. See also error patterns; phonological patterns (PP) acoustical qualities of, 68 age of mastery of, 168 anatomy and physiology for, 23, 65, 68 in Asian languages, 241, 244 cleft lip and palate and, 392 disappearance of, 170, 171 distinctive features of, 83 as error patterns, 166 frication of, 235 generalized production and, 375 hearing impairments and, 394 as an initial target, 344 markedness constraints and, 116, 117, 120 in Native American languages, 224

in nonlinear optimality phonological analysis, 286 overview of, 74, 89-90, 95, 103 place of articulation in, 77, 78 prevocalic voicing and, 99 in SSL in infants and toddlers, 146, 152, 159, 168, 191 as substitution patterns, 170, 178, 179 types of, 178, 179, 224 universality of, 116 voicing and, 116 Stopwatches, 265 Stress. See contrastive stress; metrical theory; phonetic stress Stress patterns, in CAS, 308, 309 Stress-timed languages, 69 Subcostal muscles, 21 Subglottic air pressure, 26, 27 Substantia nigra, 39, 39f Substitution of phonemes, 253 Substitution patterns in AAE, 213, 215, 216t, 217, 220 across languages, 235 in Asian-influenced English, 240, 240t, 243, 244, 245 in cleft lip and palate, 323 in foreign languages, 235 overview of, 94-98 phonological theories and, 6 recording of, 270 in Spanish-influenced English, 231t in SSL, 170 velopharyngeal inadequacy and, 178-179 Successive approximations, 359–360 Sucking rate. See high-amplitude sucking method (HAS) Sulci, 36, 37, 37f, 38f Superior colliculi, 42 Supplementary motor cortex. See premotor cortex Supraglottic air pressure, 26 Supramarginal gyrus, 39 Suprasegmental aspects of speech production, 69-70, 139, 307 Surface representation (SR), 4 Swedish language versus English, 235

Syllabic complexity, 184–185 Syllabics, 72, 83 Syllabification, 73 Syllable awareness, 455-456, 457, 460, 466 Syllable blending, 466 Syllable deletions. See also unstressed syllable deletion (USD), 91 Syllable duration and stress errors, 236, 240, 246 Syllable onset, 460 Syllable sequencing problems, 308 Syllable structure patterns, 69, 73, 90–94, 149, 151–152, 169, 280 Syllable-timed languages, 69 Synapses, 36 Syntactic Structures (Chomsky), 2

### T

Tactile cues, 383–384 Tactile-kinesthetic cuing, 358, 394 Tagalog language, 243-244 Talking. See conversational speech; social communication skills; speech samples Tardive dyskinesia, 50 Target behaviors, 339-366, 356b, 363f, 371, 373-376, 419, 420 Target responses, 371, 394 Target word cards, 416 Teachers, 377, 378, 463-464 Teeth, 30, 176–177, 177f Temporal lobe, 37f, 38 Tenseness, vowel production and, 85 Tensor tympani, 32 Terminal knobs, 35, 36 Test of Minimal Articulation Competence, 277 Test of Phonological Awareness in Spanish-*TPAS*, 234 Tests. See specific assessments Thai language, 243 Third-party payers, 348, 353, 372, 379 Thompson language, 194 Thoracic cavity, 20, 23 Thoracic nerves, 21, 22t Thoracic vertebrae, 20 Thyroarytenoid muscles, 25

Thyroid cartilage, 23, 24, 24*f*, 25*f*, 26*f*, 27*f* Tokens, 364 Token withdrawal, 366 Tonal languages. See Asian and Pacific Islander languages; Native American languages Tonal variations. See autosegmental theory Tongue, 28f, 29, 37, 37f, 183 Tongue depressors, 265, 277, 358 Tongue position, vowel production and. See also undifferentiated lingual gestures, 83-85 Tongue thrust, 188 Tonsils, 188 Total assimilation, 100 Touch-cue method, 384 TPAS. See Test of Phonological Awareness in Spanish–TPAS Trachea, 20, 24f Tract variables, 126 Traditional analysis, 281–282 Traditional approach, 401–409, 402b Transfer and carryover, in traditional approach. See also generalization and generalized production, 406-407 Transverse thoracic muscles, 21, 22t Treacher Collins syndrome, 322 Treatment. See also clinical practice and reasoning; evidence-based practice; target behaviors; specific treatment approaches authors' reasons for descriptions of, 400-401 behavioral procedures used in, 335, 337-338 for CAS, 381-385 common operations in various programs of, 334 common variables in, 334, 397-398 definition of, 398 differences in varied approaches to, 398-400 dismissal from and follow-up after, 379 efficiency within, 372, 403-404, 408, 410, 412 elements for comprehensive, 338, 352 eligibility criteria for, 268

maintenance program implementation in, 376-378 making recommendations for, 302-303 session structure in, 366-373, 377-378 specific activities in, 370-371 stimulability testing and, 292 Treatment efficacy. See also evidence-based practice, 372–373, 402b Treatment guidelines for childhood apraxia of speech (CAS), 381-383 for cleft lip and palate, 391-393 concurrent treatment approach, 411 for developmental dysarthria (DD), 387-389 minimal pairs production training, 422-423 multiple-oppositions approach, 425-426 for PAI, 468-470 phonological cycles approach, 415–417 for speakers of varied English dialects, 248 - 250for SSD in African American children, 221-222 for SSD in Asian children, 247-248 for SSD in Latino children, 236-237 for SSD in Native American children, 228 stimulability intervention approach, 434-435 traditional approach, 402-408 Treatment history, prognosis and, 301 Treatment objectives. See objectives; target behaviors Treatment outcomes. See prognosis; treatment efficacy Treatment planning, 333, 357-358 Tremors, 50 Trigeminal nerves, 42, 43–44, 44t, 47 Trochlear nerves, 43, 44t True words, 151 Turkish language versus English, 235, 253, 457 Twin studies, 187, 190, 203 Two-point sensory discrimination, 183 Tympanic membrane, 30f, 31, 31f Type of error recordings, 269, 270

#### U

UG. See universal grammar (UG) Ultrasound recording, 271 Underdifferentiation of phonemes, 252 Underlying representation (UR), 4, 200 Underspecification theory, 103 Undifferentiated lingual gestures, 125-126 Ungliding, 213 Unilateral upper motor neuron dysarthria, 49 Unison speech, 406 Universal grammar (UG), 3, 4, 114–115, 127, 198, 200, 255-256 Unmarked phonological features, 116–117 Unrounded vowels, 85 Unstressed syllable deletion (USD). See also error patterns; phonological patterns (PP), 90-91, 170, 172, 215, 232 Upper motor neurons, 48 UR. See underlying representation (UR) Usage-based theory of phonology and language, 204-205 USD. See unstressed syllable deletion (USD) Utterances. See also babbling; phonological mean length of utterance (PMLU); protowords, 150b, 256, 293 Uvula, 29

# V

Vagus nerves, 42, 44*f*, 45 Van der Woude syndrome, 322 Variable ratio schedule, 364-365 Variegated babbles, 146 VDP. See Verbal Dyspraxia Profile (VDP) Velar assimilation, 98-99, 170 Velar fricatives, 178 Velar fronting (VF). See also error patterns; fronting; phonological patterns (PP), 88, 94, 96, 171, 172 Velars. See linguavelars Velopharyngeal closure, 29 Velopharyngeal inadequacy, 178-179, 322, 323, 390 Velopharyngeal incompetence, 392 Velum. See soft palate

Verbal antecedents, 377 Verbal behaviors. See behavioral theories of SSL; target behaviors Verbal corrective feedback, 365 Verbal diversity. See bilingualism; ethnocultural variables Verbal Dyspraxia Profile (VDP), 313 Verbal Motor Production Assessment for Children (VMPAC), 313-314 Verbal praise, 364, 365 Verbal prompts, 361 Vestibuloacoustic nerves, 33, 34, 38 Vestibulocochlear nerves. See also cerebral initiation, 44f, 45 VF. See velar fronting (VF) Videotaping, of speech samples, 275 Visible sounds, 342 Visual cues, 196 Visually reinforced head turn method (VRHT), 140, 193-194 VMPAC. See Verbal Motor Production Assessment for Children (VMPAC) Voc. See vocalization (Voc) Vocables. See protowords Vocabulary. See also core vocabulary approach, 459 Vocal abuse, 393 Vocal emphasis, 360, 361 Vocal folds. See also laryngeal structures, 25–27, 25f, 65, 68 Vocalization (Voc). See also error patterns; phonological patterns (PP), 97-98, 173 Voicing. See also manner, place, voicing analysis (MPV); resonatory mechanism anatomy and physiology for, 24, 26, 65, 68 in consonant production, 75t, 79 in developmental dysarthria, 388 in East Asian languages, 245 epenthesis and, 92 markedness constraints and, 116 morphophonemics and, 71 in Native American languages, 224 phonetic difficulty and, 382 phonetic placement techniques and, 358 prevocalic, 99, 172 in SSL, 159, 170

in treatment of hearing impaired children, 394 in vowel production, 83 Voicing assimilation, 170 Vowel diagrams, 367-368 Vowel disorders, 112, 394 Vowel errors, in Latino children, 232 Vowelization. See vocalization (Voc) Vowel production acoustical qualities of, 68 acoustic theory of speech production and, 54 age of mastery of, 164-165 anatomy and physiology for, 23 diphthongs and monophthongs in, 72 in infraphonological stages, 144-145 overview of, 83-87 pitch in, 69 rate of speech and, 69-70 Spanish versus English, 229-230, 232 syllabics in, 72 during transition from babbling, 148 Vowel quadrants, 84-85 VRHT. See visually reinforced head turn method (VRHT)

## W

Waardenburg syndrome, 322 Wealth of the stimulus hypothesis, 204 Wepman's Auditory Discrimination Test: Second Edition, 329 Wernicke's area. See also cerebral initiation, 38, 38f, 43 Whole-word accuracy (WWA), 288 Whole-word correctness, proportion of (PWC), 288 Whole-word measure analysis, 287-290 Whole-word phonetic transcription, 269, 270-271 Whole-word proximity, proportion of (PWP), 289 Whole-word variability, proportion of (PWV). See also core vocabulary approach, 289 Word-based phonological theory, 200 Word pairs, ways of forming, 426–427, 428t

Word positions, generalized production across, 374 Words. *See* first words; nonsense words (NSW); open-syllable words; proto-

words; true words Words stage, in sound stabilization training, 405

Writing. See literacy instruction; literacy skills

WWA. See whole-word accuracy (WWA)