

Index

A not B search error navigation system studies, 416-417 action understanding role of the mirror neuron system, 495 theories of, 496-499 adipose tissue development critical period, 45 air displacement plethysmography (ADP), 45 Alberta Infant Motor Scale (AIMS), 472f17.1. American Academy of Pediatrics (AAP) guidance on screen time for young children, 435 reading aloud to infants, 228 Recommendations for Preventive Pediatric Health Care, 43 recommendations on media exposure for young children, 455 amygdala development effects of early stress on volume and function, 693 influence of infant-caregiver relationship, anxiety impact of parental anxiety on children, 729-731 approximate magnitude system (AMS), 422 approximate number system (ANS), 363, 422 arachidonic acid (ARA) role in visual development, 161-162 Asperger, Hans, 128 assisted reproductive treatment (ART), 40 asthma, 75, 83 Attachment and Biobehavioral Catch-up (ABC) intervention, 702 attachment assessment Attachment Q-Set (AQS), 691 infant attachment evaluation methods, Strange Situation Procedure (SSP), 689-690 attachment network configurations models, 699 attachment patterns disorganized attachment, 690 insecure-ambivalent attachment (type C), 690

insecure-resistant attachment (type C), 690 organized attachment, 690 secure attachment (type B), 690 universality and specificity of, 694-696 Attachment Q-Set (AQS), 691 attachment relationships comparison of maternal and paternal contributions to development, 699 developmental outcomes of early experiences, 691 effects of divorce, 702 in foster care, 700 in institutionalized care settings, 700 infant attachment to mother and father, 696-699 influence of socioeconomic conditions, 695 influence of the number of secure attachments, 697-698 influence on amygdala volume and function, 693 influence on cortisol secretion patterns and reactivity, 692 influence on the HPA axis, 692 interventions, 702-703 neurodevelopmental outcomes, 693 one infant with multiple caregivers, 696–699 parental education about, 700 psychophysiological outcomes, 692 quality of group care, 700 sociocultural contexts, 694-696 socioemotional outcomes, 691-692 stress physiology of attachment, 692 attachment theory, 687 additive hypothesis, 697 attachment network configurations models, 699 buffering hypothesis, 698 caregiver influence on attachment quality, 688 centrality of the infant-caregiver emotional tie, 688 competence hypothesis, 696 cross-cultural validity of, 694-696 environmental influences on attachment quality, 688

insecure-avoidant attachment (type A), 690



834 INDEX

attachment theory (cont.) comparison between infants and adults, 214 future relationships influenced by infant cross-cultural perspective on pitch attachment, 688 processing, 225 hierarchical hypothesis, 699 cross-cultural perspectives on temporal processing, 223 horizontal hypothesis, 699 implications for practice, 700-703 music processing, 221-227 integrative hypothesis, 697 pitch processing, 224-225 internal working models, 688 policy implications, 227-228 role in social and emotional development, main tenets, 688 normativity hypothesis, 695 228-229 public policy implications, 700-703 song and coordinated movement as sensitivity hypothesis, 694 sociocultural signals, 226-227 universality hypothesis, 695 temporal processing, 222-223 attention auditory perception biased competition concept, 186 auditory object perception, 218-219 common tasks used in research, 192-194 auditory scene analysis, 217-220 electroencephalography (EEG) assessment auditory stream segregation, 220 methods, 191 auditory system development, 215 executive attention, 186 basic auditory abilities, 214-221 congenital deafness. 215 eve-tracking tools, 189-190 heart rate as a measure of sustained consonant and dissonant tone attention, 190 combinations, 219 looking time measures, 187-189 harmonicity, 219 measurement, 187-194 minimum audible angle, 220 near infrared spectroscopy (NIRS), 191-192 prenatal period, 216 visual attention constructs, 186 singing, 219 See also multisensory attention, 206 sound-meaning associations, 221 attention-deficit hyperactivity disorder (ADHD), speech perception, 220 72, 75, 76, 78, 128, 143, 304, 454 auditory scene analysis, 217-220 infant attention and, 205 auditory system risk factors for, 4-5 fetal development, 9 attention development Autism Diagnostic Interview - Revised, 129 attention to eye gaze, 201-202 Autism Diagnostic Observation Schedule cultural bias, 203-204 (ADOS), 129, 322 effects of preterm birth, 205 Autism Observational Schedule for Infants, 137 feedforward and feedback cortical autism spectrum disorder (ASD), 49, 76, 78, connections, 197-198 83, 201, 304 attention, 134 first postnatal year, 194-197 clinical features, 128 individual differences, 202-205 infants of depressed mothers or fathers, co-occurring conditions, 128 202-203 definition, 128 diagnostic instruments, 129 influence of social, cultural and biological factors, 202-205 early development, 131-133 influence of socioeconomic status (SES), effects of dual language exposure, 671 204-205 emerging executive function, 135 interaction with body kinematics and ethical issues for research, 145-147 posture, 199-200 general cognitive development, 135 interaction with learning and memory, 200 genetic syndromes and, 142 interaction with vision development and implications of intersensory processing eye movement control, 198-199 deficits, 323-324 joint attention, 201-202 infant attention and, 205 other-race effect (ORE), 203-204 infant sibling research design, 129-131 policy implications, 205–206 justification for infant sibling studies, 147 predictive value of infant visual mirror neuron system (MNS) studies, 508-509 attention, 202 motor development, 132-134 auditory pattern perception multisensory attention skills assessment, 322 analysis of musical scenes, 222 new directions for research, 141-144



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman, Catherine S. Tamis-LeMonda

Index

835

non-verbal communication, 137 somatotopic organization, 246-247 policy issues, 145-147 bone response to biological motion, 136 risk factors for, 4-5 robustness and replicability of study findings, bone growth 140-133 sensory processing and responses to basic sensory stimulation, 131-132 social attention, 136-137 social information processing, 136-137 social interaction, 137, 671 sociocultural perspective, 145-147 structural brain development, 139-140 verbal communication, 138-139 vocal learning and speech production, 620 Avon Longitudinal Study of Parents and Children (ALSPAC), 75 BDNF gene effects of DNA methylation, 77 methylation associated with bisphenol A (BPA), 75 Big Five personality inventory, 817 bilingualism, 639 effects on language development, 648 influence on memory development, 352 language perception in bilingual-learning infants, 588 See also dual language exposure, 676 bioelectrical impedance analysis (BIA), 45 biological motion response to, 136 birth weight, 41 body composition and, 46 bisphenol A (BPA) association with BDNF gene methylation, 75 body composition assessment, 44-46 air displacement plethysmography (ADP), 45 anthropometric assessment, 44, 45 bioelectrical impedance analysis (BIA), 45 deuterium dilution method, 45 magnetic resonance imaging (MRI), 45 categorization PEAPOD TM, 45 ultrasound measurement, 45 body length measurement methods, 46-47 body movements development in the fetus and infant, 9-10 body representation developing role of touch, 246-252 early development of proprioception and the postural schema, 248-249 embodied brain model, 14-29 learning in the primary somatosensory cortex, 21-23

production of osteocalcin, 59 bone density measurement, 45 influence of the brain, 59 Bowlby, John, 687, 688 brain development, 94 adulthood and later life, 95 age 2 through adolescence, 95 changes in head size and brain volume, 95-96 critical period for brain growth, 48 effects of early institutional care, 114-117 effects of environmental deprivation, 113-118 effects of poverty, 117 epigenetic impacts of fetal environments, 74-77 experience-expectant and experiencedependent processes, 108-113 face processing, 108-113 gray matter development, 96-101 influence of infant-caregiver attachment, 693 influence of osteocalcin, 59 influence on bone growth, 59 interfaces with physical growth, 59-60 myelination, 102-107 neuroimaging techniques, 99-101, 105-107 plasticity of language development, 645 prenatal period, 95 preparedness for language development, 645-646 processing of digital media in early childhood, 451-454 role in memory development, 348-350 social policy for optimal development, 119 synaptic pruning, 94, 97 synaptogenesis, 94, 96-101 volume expansion, 48 white matter development, 102–107 BRAIN Initiative, 6 caregivers. See infant-caregiver relationship; parent

average prototype formation, 393 biopsychosocial view, 400 conditioning studies, 385 cultural influences, 397-398 definition of, 215 definition of categories, 381 definition of concepts, 381 distinction from conceptualization, 384 EEG ERP studies, 389 evidence of infant categorization, 384-388, 389 experience and categorization, 397-398 familiarization-test procedures, 386-387 flexibility of categories, 382f14.1. future research directions, 400-401

multisensory development, 250-252



836 INDEX

categorization (cont.) cortisol imitation procedures, 388 influences on secretion patterns and language and categorization, 395-396 reactivity, 692 neural underpinnings of, 399 craniosynostosis, 51 neuroscientific evidence of, 389 critical periods, 41 newborns' abilities and limitations, 390-392 brain growth, 48 object manipulation by infants, 388 developmental origins of health, 46 origins of, 390-392 infant fat pattern development, 45 perceptual versus conceptual language perception development, categorization, 392-395 591-592, 593 policy implications, 401-402 muscle growth in infancy, 46 prelinguistic categories, 382 crossed-extension reflex in newborns, 246 role in cognition, 381 role in information organization, 383 beliefs about infant size, 53 context of child emotional development, sequential touching task, 388 social influences, 397-398 use of category labels, 395-396 head circumference assessment, 50 cell phone use, 442-443 emotional displays and parental responses, central pattern generators (CPGs), 11 763-764 chemesthesis 265 parental emotional expectations of children, 763 chest circumference, 52 CHILDES (CHIld Language Data Exchange influences on memory development, 352 System), 623 views on how big infants should be, 56 childhood adversity See also parent-infant interactions across epigenetic effects, 78-79 cultures, 808 cognitive differentiation cytokines, 59 perspective on emotional development, 743 cytosines Comprehensive Assessment of Family Media methylation within DNA, 73 Exposure (CAFE) tool, 444 Davis, Clara, 271 computational and neural model of navigation, 412-414 default mode network (DMN), 454 concepts deferred imitation paradigm, 343, 668 definition, 381 depression conceptualization effects of maternal depression on the fetus, 77 distinction from categorization, 384 impact of parental depression on children, conditioning studies 729-731 categorization in infants, 385 impact on infant attention development, conduct disorder, 75 202-203 Descartes, René, 563 congenital blindness, 215 congenital deafness, 215 deuterium dilution method, 45 congenital hearing loss Developing Human Connectome Project, 6 effects on vocal learning and speech developmental biology prodution, 619 application of epigenetics, 70 CONLERN model, 109 developmental coordination disorder, 509 core knowledge, 363 developmental disorders early knowledge of space and quantity, head circumference and, 49-50 410-411 perspectives on, 4-5 developmental robotics, 6 magnitude and number system, 422 object manipulation system, 418 diathesis-stress/dual risk models, 727 differential emotions theory, 718 developmental role of the subplate differential susceptibility models, 727, 729 layer, 13, 14 diffusion tensor imaging (DTI), 106 excitation/inhibition (E/I) neuron balance, digital landscape in infancy 14. 26-27 background cell phone use technoference, fetal development, 12-14 442-443 corticospinal tract background TV technoference, 441-442

fetal development, 11

effects of parental still-face, 442



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman , Catherine S. Tamis-LeMonda Index

Index

837

future research directions, 443-444 future studies, 675-676 impact on infant learning, 442-443 language development and, 663-667 joint media engagement, 438-440 memory flexibility and, 667-670 media environment, 435-436 multiple language acquisition by young screen time for young children, 435-436 children, 661 sociocultural context of media use, 437-438 phonetic perception, 664 technoference, 440-443 policy implications, 675-676 TV and joint media engagement, 438-439 quality and quantity of language interactions, 674-675 videochat, 436, 440 digital media social interactions, 671 AAP recommendations, 455 sociocultural considerations, 672-673 socioeconomic background and, 673 assessing infant exposure to, 435 Fred Rogers Center position statement, 456 speech pattern detection, 665 National Association for the Education of word learning, 665-667 Young Children (NAEYC) position See also bilingualism, 676 statement, 456 Duchenne intensification hypothesis, policy implications, 455-456 756 - 758recommendations and guidelines, 455-456 dynamic systems approach transfer learning deficit, 445-449 emotional development, 744 Zero to Three (ZTT) Screen Sense dyslexia, 324 guidelines, 455 digital media learning Early Head Start, 539 default mode network (DMN), 454 Early Social Communication Scales dorsal attention network (DAN), 454 (ESCS), 322 effects of lack of social contingency, 454 electroencephalography (EEG) media processing in the brain in early ERP studies of infant categorization, 389 childhood, 451-454 imaging of digital media processing, neuroimaging studies, 451-453 451-453 policy implications, 449-450 mu rhythm as measure of MNS, 499-502 potential cognitive developmental electronic media neuroscience mechanisms, 453-454 impact on emotional development, 765 transfer learning, 444-450 embodied brain model, 14-29 direct matching theory of social cognition, atypical learning conditions in preterm 496, 498 infants, 23-27 cortical excitation/inhibition (E/I) neuronal discrete emotion theory, 743 divorce imbalance, 26-27 effects on attachment relationships, 702 early exposure to extrauterine DNA methylation, 73 environments, 28-29 docosahexaenoic acid (DHA) features of the model, 15-17 role in visual development, 161-162 immature learning of cortical body Donné, Alfred, 44 representation and multisensory dorsal attention network (DAN), 454 integration, 28-29 dorsal pathway, 525 implications for developmental care, 26 Down syndrome, 509 learning body representation in the primary drug exposure somatosensory cortex, 21-23 epigenetic effects on the fetus, 75 mechanisms of developmental dual energy X-ray absorptiometry (DEXA), 45 cascades, 28-29 dual language exposure mechanisms of spontaneous bodily attentional effects, 662-663 movements, 17-18 children with ASD, 671 motor development, 19-21 code-switching in bilingual children, 671 origins of neurodevelopmental cognitive advantages, 662-663 disorders, 26 cognitive flexibility and, 667-670 policy implications, 26 comparison with monolingual early simulating cortical learning of body learning, 661 representations, 27-28 cultural background and, 672 spinal circuit learning, 19-21 definition of dual language learners, 661 embodied cognition theory, 497



838 INDEX

embodied interactions infant emotional lives, 742 definition, 6 negative emotions, 745-749 sensorimotor experience and, 6 adult perceptions of infants' discrete embryonic development negative expressions, 746 body movement and negative emotion neural development related to sensorimotor learning, 10-14 expressions, 748 development of discrete negative sensory modalities, 6 spinal nervous system, 10-12 emotions, 746-748 distress expressions in fetuses, 745 emotion and emotion regulation approaches to study in infancy, 716 early cry-face expressions, 745 basic constructs, 716-717 facial expressions, 745 behavioral markers, 719 functionalist ontogenetic perspective, 749 core features, 715 genetic variance, 759 cultural context of emotion development, indications of anger and sadness 731-732 expression, 747 differential emotions theory, 718 negative emotion expression in emotiondifferentiation-oriented perspectives, 718 eliciting situations, 747 discrete emotions models, 718 physiological specificity of negative dynamic systems approaches, 718 emotion expressions, 748 postnatal cry-faces, 745 emotion regulation in infancy, 723-724 features shared with temperament, 715 recognition of pain in young infants, 765 neural bases and correlates of emotional functionalist perspective, 718 expressivity, 761 neural and physiological underpinnings, 720-721 perception of smiles, 760 normative development trends, 722-723 policy implications, 764-765 parental characteristics, 729-731 positive emotions, 749-756 parental depression and anxiety, 729-731 anticipatory smiling, 755 parental shaping towards cultural norms, contingent responsiveness, 754 development of happiness and joy, 751-752 parenting behaviors that impact on, Duchenne smiles, 750 728-729 happiness and pretense, 755 policy implications, 733–734 infant and mother responsivity to problem of distinct operational definitions, smiling, 753 717-718 interactive smiling (2-6 months), 753-754 role of infant caregivers, 715 laughter, 751 temperamental influence on neonatal smiling, 751-752 development, 727 open-mouth smiles, 750 temperamental variations, 724-727 positive affect multiplicity question, 756 prenatal smiling, 751-752 working definitions, 716–717 emotional development smiling (6-18 months), 755 affective prosody processing, 760 smiling intensity during interaction, 754 cognitive differentiation perspective, 743 social aspect of early positive affect cross-cultural comparison, 763-765 expression, 756 cultural differences in parental emotional social smiling (1-2 months), 752 expectations, 763 temporal patterning of smiles, 753 cultural diversity and public policy, 764 variety of positive emotion expression, 750-751 discrete emotion theory, 743 why infants smile, 754 Duchenne intensification hypothesis, 756–758 dynamic systems approach, 744 sociocultural theory, 744 emotional displays and parental responses, theoretical orientations, 742-744 763-764 empathy development, 761-762 empathy development, 761-762 contributions of early interactions, 762 functionalist theory, 744 future research directions, 762 genetic influences on, 762 future research directions, 765-766 heritability of positive and negative responses to other infants' cries, 761 expressivity, 759 responsiveness to adult distress, 762

impact of electronic media, 765

encoding specificity principle (Tulving), 344



More Information

Index 839

epigenetic effects	effects of prenatal flavor exposure, 273-281
fetal drug exposure, 75	effects of repeated exposure to food, 281–289
fetal toxin exposure, 75	food habits and beliefs, 263–264
epigenetic inheritance	influence of childhood experiences, 268
intergenerational and transgenerational effects, 80–82	influence of the mother's choices, 264 learning about foods, 273–289
patrilineal epigenetic inheritance, 81-82	neurobiology of flavor senses, 265-268
epigenetic mechanisms, 73–74	olfactory association with the mother, 268
histone modifications, 74	ontogeny of feeding behaviors and skills
non-coding RNAs, 74	(birth to 24 months), 265–272
epigenetic perspective, 71–74	policy implications, 290–291
epigenetics	role of olfaction, 265–266, 268
adversity and resilience in social	self-regulation of intake, 271–272
environments, 78–79	sense of taste, 265–266
application within developmental	signaling hunger and satiation, 270–271
biology, 70	snacking in children, 264–265
definition, 72	social modeling of, 289
effects of maternal obesity on the fetus, 76	sweets and sugar-sweetened beverages, 264
effects of maternal stress on the fetus, 76–77	fetal brain development
effects of prenatal nutrition on the fetus, 76	neuroscience perspectives, 5
effects of prenatal stress on the fetus, 76–77	use of large-scale datasets to elucidate, 5
effects of preterm birth, 76–77 effects related to socioeconomic status, 82–83	fetal development auditory system, 9
future directions, 84	body movements, 9–10
gene–environment interactions, 70, 71–74	cortex, 12–14
heritability of the epigenetic state, 72	corticospinal tract, 11
impacts of fetal environments on the	gustatory organs, 9
developing brain, 74–77	learning from sensorimotor experience, 4
influence of sociocultural context, 82–83 public policy implications, 83	neural development related to sensorimotor learning, 10–14
sex differences in epigenetic effects, 75	olfactory organs, 9
epigenome, 82–83	proprioception, 8
equilibrium	sense of equilibrium, 9
fetal development, 9	sensory capabilities, 4
executive attention, 186	sensory modalities, 7–9
extrapyramidal tract, 524	spinal nervous system, 10–12
	stretch reflex, 8, 10-11
face inversion effect, 110–112	tactile perception, 8
face processing, 108–113	visual system, 8
familiarization-test procedures	fetal environments
categorization in infants, 386–387	epigenetic impacts on the developing
Family Stress Model, 695	brain, 74–77
fat pattern development, 45	Field, Tiffany, 254
Fauconnier's brick, 635	First 5 California initiative, 563
feeding amniotic fluid, 273–281	FKBP5 gene, 79, 83 folate
breast milk, 273–281	supplementation in the maternal diet, 76
chemesthesis, 265	foster care
communication skills and, 270–271	infant attachment and, 700
complementary feeding, 281–289	fractional anisotropy (FA), 106
culture of feeding, 263–264	fragile X syndrome, 142, 205
development of feeding skills and	Fred Rogers Center, 456
patterns, 269–270	Freud, Sigmund, 341–342
development of taste preferences, 267–268	functional near infrared spectroscopy
early feeding patterns and practices, 264–265	(fNIRS), 376
early influence of what the mother	imaging of digital media processing, 451–453
consumes 273_281	mirror neuron system (MNS) studies 503



840 INDEX

functional neural development histone modifications embodied brain model, 14-29 effects on gene expression, 74 functionalist perspective on emotional Holmes, Oliver Wendell, 632 development, 744 Home View project, 563 HomeBank, 623 gene-environment interactions, 70, 71-74 hormones influence on physical growth, 59 gene expression effects of DNA methylation, 73 HSD11B2 gene, 80 effects of histone modifications, 74 effects of DNA methylation, 77 effects of non-coding RNAs, 74 hypothalamic-pituitary-adrenal (HPA) axis gene silencing, 73 marker for stress physiology, 692 geometric module hypothalamus, 59 role in navigation, 415-416 role in physical growth, 59 Gesell, Arnold, 523, 819 Gibson, Eleanor, 305-306, 522-523 in vitro fertilization (IVF), 40 Gibson, James J., 305-306 infant-caregiver relationship growth. See physical growth attachment assessment methods, 689-691 growth references, 54-56 attachment network configurations model, 699 cultural views on how big infants centrality of, 688 should be, 56 comparison of maternal and paternal data analysis, 55 contributions to development, 699 data presentation, 55 effects of divorce, 702 definition, 53 foster care, 700 growth charts, 55-56 infant attachment to mother and father, limitations of growth charts, 57 696-699 policy on how big infants should be, 56 influence of socioeconomic conditions, 695 sampling for references, 54-55 influence of the number of secure growth spurts, 57-58 attachments, 697-698 Gusii people, 694, 696, 764 influence on amygdala volume and gustatory organs function, 693 fetal development, 9 influence on cortisol secretion patterns and reactivity, 692 habituation, 365, 376 influence on developmental outcomes, Hausa people, 695 influence on the HPA axis, 692 head circumference, 47-52 developmental disorders and, 49-50 institutionalized care settings, 700 early assessment, 50 interventions, 702-703 effects of prenatal toxin exposure, 49 neurodevelopmental outcomes, 693 effects of synostoses, 50 one infant with two caregivers, 696-699 genetic influences, 48 parental education about, 700 maximal occipital frontal circumference patterns of attachment, 690 (OFC), 47 psychophysiological outcomes, 692 microcephaly related to Zika virus exposure, 49 quality of group care, 700 head shape sociocultural contexts, 694-696 causes of head deformity, 50-52 socioemotional outcomes, 691-692 culture-related views on, 50-52 stress physiology of attachment, 692 effect of cradle boards, 51 Infant-Toddler Social Emotional Assessment, 322 normal variability among human infants, 50-52 inheritance positioning plagiocephaly, 50-52 epigenetic inheritance, 80-82 use of cranial orthotics, 50-52 insecure-ambivalent attachment (type C), 690 Head Start, 764 insecure-avoidant attachment (type A), 690 Head, Toes, Knees, and Shoulders Task insecure-resistant attachment (type C), 690 (HTKS), 323 institutional care hearing loss effects of, 78 effects on vocal learning and speech effects on brain development, 114-117 effects on infant attachment, 700 prodution, 619



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman , Catherine S. Tamis-LeMonda Index

Index 841

intention understanding theory of social LENA, 327 cognition, 497 'Like Me' theory of social cognition, 497 internal working models, 688 interoception, 240 magnetic resonance imaging (MRI) intersensory processing. See multisensory body composition assessment, 45 attention diffusion tensor imaging (DTI), 106 functional and structural studies of the Intersensory Processing Efficiency Protocol (IPEP), 316, 319, 323 MNS, 504 MCDESPOT MCR technique, 107 Intersensory Redundancy Hypothesis (IRH), 309-311 multicomponent relaxometry (MCR), 107 intraparietal sulcus (IPS) voxel-based morphometry (VBM), 105-106 possible role in spatial and numerical magnitude and number system, 422-425 processing, 424-425 approximate magnitude system (AMS), 422 Inventory of Callous-Unemotional Traits approximate number system (ANS), 422 (ICU), 794 core knowledge, 422 iPad, 435 cultural influences on development, 425 iPhone, 435 debate over infant sensitivity to number, 422-423 Kanner, Leo, 128, 131 intraparietal sulcus (IPS), 424-425 !Kung San people, 764 methodological issues, 423 neoconstructivist view, 422 laboratory temperament assessment battery neural bases of magnitude and number, (LAB Tab), 725 424-425 language policy implications, 425 Many Babies project, 563 interaction with categorization, 395-396 role in memory retrieval, 347-348 maternal depression effects on the developing fetus, 77 language development, 632-633 learning grammar, 632 impact on infant attention development, link with multisensory attention skills, 202-203 321-323 maternal diet plasticity of the brain, 645 folate supplementation, 76 preparedness of the brain for, 645-646 maternal obesity epigenetic effects on the fetus, 76 See also syntax learning; vocal learning; word learning, 633 maternal stress Language Environment Analysis epigenetic effects on the fetus, 76-77 (LENA), 441 maze tasks, 412-414 language perception MCDESPOT MCR technique, 107 attunement to native language before media. See digital media memory birth, 580 audiovisual speech perception, 582-583 age-related changes in memory processing, 344-345 bilingual-learning infants, 588 critical periods for development, 591-592, bilingualism and, 352 593 causes of individual differences in factors influencing critical periods, 593 performance, 350-351 childhood amnesia, 341-342 forming phoneme categories, 581-582 cultural influences, 352 influences on development, 579 deferred imitation paradigm, 343, 668 lateralization of language processing, dual-context statistical learning, 669 589-591 levels of word understanding, 585-587 earliest autobiographical memory, 352 mapping meaning, 585-587 effects of dual language exposure, 667-670 multimodal speech perception, 582-583 encoding specificity hypothesis, 668 native language discrimination, 580-581 factors affecting encoding, 350 neural specialization for language, 589-591 factors affecting information processing, 351 policy perspectives, 593-594 factors influencing memory retrieval, 346 rhythmicity of language, 580-581 future research directions, 354-355 word segmentation, 583-585 influence of early childhood experiences, lean body mass patterns, 46 341-342



842 INDEX

memory (cont.) expectations for how individuals tend to methods to study infant memory, 342-343 treat each other, 782-783 Mobile Conjugate Reinforcement and expectations for how observers of fair and Operant Train paradigms, 343 unfair distributions will behave, 785 policy implications, 352-354 expectations for how observers of help and principles of infant memory development, harm will behave, 782 expections for how recipients of help and 344-345 reactivation of memories, 346 harm will behave, 780-781 role of brain maturation, 348-350 fairness and unfairness, 783-785 role of language in memory retrieval, 347–348 implications, 793-794 Visual Recognition Memory (VRM) influence of social evaluations on social interactions, 792-793 paradigm, 342 Mencius, 777-778 making sense of infants' choices, 789-790 mental representations of objects, 420-421 methods for exploring, 779 mental rotation of objects, 420-421 morality of context-based evaluations, microcephaly 791-792 related to Zika virus exposure, 49 neural correlates of moral understanding microRNAs (miRNAs), 74 and evaluations, 795 mirror neuron system (MNS) policy implications, 797 autism spectrum disorder (ASD) studies, preference/choice paradigms, 785-792 508-509 preferences for fair versus unfair choices, 788 development theories, 496-499 relationship to development of cooperation, direct matching theory of social cognition, 792-793 496, 498 responses to prosocial and antisocial EEG mu rhythm as measure of MNS, 499-502 individuals, 792-793 EEG mu rhythm studies in infants, 504-506 sociocultural context, 796 embodied cognition theory, 497 understanding helpful versus harmful acts, 779 fNIRS studies, 503 understanding of morally-relevant acts, functional and structural MRI studies, 504 779-785 functions, 495-496 what infants are evaluating, 791 intention understanding theory of social Morris water maze, 412, 413 cognition, 497 motor development 'Like Me' theory of social cognition, 497 Alberta Infant Motor Scale (AIMS), measuring in infancy, 499-504 472f17.1. cultural-historical differences in network perspective, 499 neuro-atypical populations, 508-509 childrearing practices, 475-476 neuroimaging techniques, 499-504 experimental manipulations of timing and policy implications, 509 form, 476-477 role in action understanding, 495 facilitative effects of augmented experience, 476-477 role of experiences, context and culture, flexibility of motor behavior, 480-482 506-508 functional actions in a changing significance in social communication disorders, 509 environment, 480-481 structure, 495-496 implications for clinical intervention, 482-486 Mobile Conjugate Reinforcement implications for neuroscience, 482-486 paradigm, 343 individual differences and unique solutions, mobile devices infant acquisition of motor skills, 469-471 background cell phone use technoference, 442-443 intraindividual variability, 477-478 impact on infant learning, 442-443 limitations of milestone charts, 470-471 locomotor actions, 470 Moment app (Apple devices), 444 moral sense in humans manual actions, 470 origins of, 777-778 multiple developmental pathways, 478-479 moral sense in infants physical growth 43-52 actions in context, 791 plasticity of development, 474-477 evaluations of helpers versus harmers, postural transformation, 469

786-788

sticky mittens training, 477



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman , Catherine S. Tamis-LeMonda Index

Index

843

variability of development, 477-479 promotion through social interaction, variety of means to achieve functional 326-327 outcomes, 482 training interventions, 329 Mullen Scales of Early Learning (MSEL), multisensory attention skills assessment 132, 321 findings in preterm infants, 325-326 multicomponent relaxometry (MCR), 107 importance of individual difference measures, 314-315 multilingualism, 661 multisensory attention individual difference measures of intersensory processing, 315-319 conceptual issues, 305-306 detection of amodal information, 305-306 Intersensory Processing Efficiency Protocol detection of modality-specific (IPEP), 316, 319 intersensory processing in ASD, 323-324 information, 309 differentiation view of intersensory Mullen Scales of Early Learning (MSEL) development, 305-306 assessment, 321 Multisensory Attention Assessment educating attention through intersensory redundancy, 311-312 Protocol (MAAP), 316-318 effects of intersensory redundancy, 307 policy implications of findings on ASD, history of intersensory research, 305-306 323-324 integration view of intersensory policy implications of preterm birth development, 305 findings, 325-326 intersensory facilitation, 309, 310 potential predictive value for ASD, 322 Intersensory Redundancy Hypothesis predictive value of MAAP testing, 321-322 (IRH), 309-311 muscle growth neural evidence of intersensory processing, critical period, 46 306-307 music processing, 221-227 physiological evidence of intersensory analysis of musical scenes, 222 processing, 306-307 cross-cultural perspective on pitch policy implications, 313-314 processing, 225 role of intersensory redundancy in cross-cultural perspectives on temporal perceptual development, 308-314 processing, 223 selective attention to amodal pitch processing, 224-225 information, 308 policy implications, 227-228 unimodal facilitation, 309, 310 role in social and emotional development, Multisensory Attention Assessment Protocol 228-229 song and coordinated movement as (MAAP), 316-318, 321-322 multisensory attention skills sociocultural signals, 226-227 basic attention skills, 321-322 temporal processing, 222-223 definition, 303 myelination of axons, 102-107 detecting early risk, 172-174 detection of amodal information, 303 National Association for the Education of Young Children (NAEYC), 456 developmental pathways, 328 establishing typical developmental National Institute of Child Health and trajectories, 328 Human Development, Study foundational nature of intersensory of Early Childcare and Youth processing, 314-319 Development, 692 future research directions, 328-329 nativist-empiricist debate importance of caregiver responsiveness and early knowledge of space and quantity, interactions, 326–327 410-411 learning in infants, 303-304 navigation system, 412-417 link with language outcomes, 321-323 A not B search error, 416-417 link with social outcomes, 321-323 allocentric information, 412 measurement of individual differences, computational and neural model of 321-323 navigation, 412-414 cultural influences on development, 417 neurodevelopmental disorders and, 304 predictive value of individual differences, geometric module debate, 415-416 321-323 inertial information, 412 promoting optimal development, 329 maze tasks, 412-414



844 INDEX

navigation system (<i>cont.</i>) Morris water maze, 412, 413	learning from object interactions, 4 materials for play, 537–538
Piaget's view, 416–417	neural underpinnings, 523–525
policy implications, 417	non-symbolic play, 529-530
reorientation paradigm, 415	object interactions, 537
rotation paradigms, 416–417	perception-action theory, 522-523
neoconstructivist view	Piaget's ideas, 521–522
early knowledge of space and quantity, 410–411	policy implications, 538–540 practice directions, 538–540
magnitude system, 422	prospective adjustments, 527
neocortex	role of parents and caregivers, 534–536
developmental role of the subplate layer, 13, 14	role of the pyramidal and extrapyramidal tracts, 524
fetal development, 12-14	role of the ventral and dorsal streams, 525
neonates	scaffolding of infant play, 535-536
early competences, 3	scaffolding of object manipulation, 535
neural development	social influences, 534–536
embodied brain model, 14–29	symbolic play, 530–531
relation to sensorimotor learning, 10–14	theoretical foundations, 521–523
neural oscillators in the spinal circuit, 11	working with educators, 540
neurodevelopmental disorders	working with parents, 539
influence of atypical learning conditions in	working with practitioners, 540
preterm infants, 23–27	object manipulation system, 418–421
perspectives on, 4–5	core knowledge, 418
risk in preterm birth, 13–14	cultural influences, 421
neurodevelopmental outcomes of infant attachment, 693	dorsal ("where-how") stream processing, 418–420
neurofibromatosis type 1 (NF1), 142	grasping and manipulating objects, 419–420
Nicaraguan Sign Language, 641	mental representations of objects, 420-421
non-coding RNAs	mental rotation, 420–421
effects on gene expression, 74	neural substrates, 418–419
NR3C1 gene, 79, 80	policy implications, 421
effects of increased DNA methylation, 77	"sticky mittens" studies, 419
Nso people, 763–764	ventral ("what") stream processing,
number. See magnitude and number system;	418–420
quantity	object play. See object manipulation and play
	olfaction
obesity	emotional links, 268
epigenetic effects of maternal obesity, 76	memories evoked by odors, 268
object-based attention, 186	role in feeding, 265–266, 268
object manipulation and play	olfactory organs
caregiver play participation, 537	fetal development, 9
cognitive-representational approach,	Open Dynamics Engine, 15
521–522	Operant Train paradigm, 343
combining objects and surfaces, 527–528	Oral Reading Fluency (ORF) tests, 323
contrasting research approaches, 520	osteocalcin, 59
cultural variation, 536–538	other-race effect (ORE), 203–204
development of object manipulation,	OXTR gene, 79
525–528	oxytocin, 816
development of object play, 528–531	
distancing from the functions of objects, 532–533	pain recognition in young infants, 765
distancing from the self, 531–532	pain perception, 244
distancing in time and space, 533–534	palmar grasp reflex, 242
exploration through play, 529	parent-infant interactions across cultures
gateway to tool use, 528	Africa, 819
investigation of object affordances, 522-523	Aka people, 818



Index

845

Argentina, 809, 815, 817 United Kingdom, 809 Australia, 808 United States, 809, 810, 811, 812, Bali, 819 815, 817, 819 Baoulé people, 819 United States immigrant cultures, 818 Belgium, 809, 815, 817 United States native peoples, 819 challenges of the cross-cultural approach, values of the cross-cultural approach, 821-822 819-821 cross-cultural differences, 815 Wolof people, 819 cross-cultural similarities, 814 parents cultural context of parenting, 805-806 cultural differences in emotional cultural perspective on differences and expectations of children, 763 similarities, 807-808 cultural differences in responses to didactic parenting, 810 children's emotional displays, 763-764 direct and indirect effects of parents on impact of parental depression and anxiety on children, 729-731 infants, 811 European American, 810, 811, 815, 819 influence of parental characteristics on emotion and emotion regulation in findings, 824-825 formative nature of experiences in children, 729-731 infancy, 813 moderation of temperamental expression in France 819 children, 728 Ganda people, 819 parenting behaviors that impact on child goals of cross-cultural research, 824-825 emotion and emotion regulation, Hopi people, 819 728-729 importance of the cross-cultural shaping children's emotions towards approach, 825 cultural norms, 731-732 Indian mothers in the UK, 809 See also infant-caregiver relationship, 734 PEAPOD TM, 45 Israel, 809, 817 Italy, 809, 816, 817 perception-action theory, 522-523 Jamaican mothers in the UK, 809 phonetic perception Japan, 809, 811, 816, 817 effects of dual language exposure, 664 justification for the cross-cultural approach, physical growth 819-821 birth weight, 41 Kipsigis people, 812, 819 bone-brain collaboration, 59 language used by parents, 810 controls, 41 critical periods, 41 Lebanon, 808 material parenting, 810 cultural beliefs about infant size, 53 need for data on non-WEIRD nations, 806 cultural views on how big infants Netherlands, 819 should be, 56 Ngandu people, 818 definition of growth, 14-29 nurturant parenting, 810 developmental timing, 42 parent education and support, 822-823 dynamic context for developing motor parenting perspective, 808-811 skills, 60 parenting responsibilities, 805 embryonic phase, 40 parents' cultural cognitions, 809-810 growth references, 54-56 parents' cultural practices, 810-811 growth spurts, 57-58 hormonal influences on, 59 physical parenting, 810 policy implications, 822-823 how babies grow, 57-58 Puerto Rico, 810 impact of psychosocial stresses, 59 range of interactions, 813 individual growth biology, 57-58 research challenges, 806 influence of maternal pre-conceptual role of the mother, 808 environment, 40 Samoa, 810 organ formation, 40-41 social parenting, 810 physiological and neurological sources of similarities and differences, 815-818 interfaces, 59-60 South Korea, 817 policy on how big infants should be, 56 specificity principle, 807 policy to promote healthy infant growth, 60-61 Taiwan, 815



846 INDEX

physical growth (cont.) poverty role of the hypothalamus, 59 effects on brain development, 117 saltatory growth pattern, 57-58 prenatal nutrition size versus growth, 41-42 epigenetic effects on the fetus, 76 physical growth measurement, 43-52 prenatal stress AAP Recommendations for Preventive epigenetic effects on the fetus, 76-77 Pediatric Health Care, 43 prenatal toxin exposure birth weight, 46 developmental effects, 49 body composition, 44-46 preterm birth body length, 46-47 effects on attention development, 205 bone density measurement, 45 effects on multisensory attention skills, brain volume expansion, 48 325-326 chest circumference, 52 epigenetic effects on the infant, 76-77 developmental disorders and, 49-50 influence of atypical learning conditions effects of prenatal toxin exposure, 49 and context, 23-27 fat pattern development, 45 risk of neurodevelopmental disorders, 4-5, growth references, 53-57 13-14, 76-77 Preyer, Wilhelm, 9 head circumference, 47-52 head shape, 50-52 primary somatosensory cortex lean body mass patterns, 46 learning body representations, 21-23 limitations of growth charts, 57 proprioception, 240 sampling frequency, 43 early development of, 248-249 ultrasound measurement of body fetal development, 8 composition, 45 Providence Talks initiative, 563 weight, 43-44 psychophysiology physical reasoning contribution to physical reasoning approximate number system, 363 research, 376 contribution of neuroscience/ psychosocial stresses psychophysiology to research, 376 impact on physical growth, 59 core knowledge, 363 pyramidal tract, 524 definition, 363 development of expectations about object quantitative development behavior, 364-371 See also magnitude and number system, 425 development of expectations about quantity substances, 372-375 core knowledge view of early development, habituation, 365, 376 410-411 implications for learning systems, 377 neoconstructivist view of early influence of linguistic distinctions, 376 development, 410-411 looking and reaching study paradigms, Quick Interactive Language Screener 364-371 (QUILS), 634 policy implications, 377 Quinean conundrum, 632 quantity discrimination, 363 relation to achievement of postural reading delay, 324 milestones, 368 reading disorder, 304 sociocultural perspective, 376 reorientation paradigm, 415 Piaget, Jean, 497 robotics on object manipulation and symbolic play, developmental robotics, 6 use of sensorimotor interactions in 521-522 view of the navigation system, 416-417 learning, 6 play. See object manipulation and play rotation paradigms Play & Learning Across a Year project, 563 navigation system studies, 416-417 positioning plagiocephaly, 50-52 postnatal rearing environment saltatory growth pattern, 57-58 epigenetic effects, 78-79 secure attachment (type B), 690 postural schema self-other schemas, 688 early development of, 248-249 sensitive periods

early visual experience, 553

postural transformation, 469



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman , Catherine S. Tamis-LeMonda Index

Index

847

sensorimotor experience rhythmicity of language, 580-581 embodied interactions and, 6 word segmentation, 583-585 influence on fetal learning, 4 speech production sensorimotor learning adult input as targets for imitation, 608 neural development related to, 10-14 adult responses as positive reinforcers, sensory modalities 607 - 608embryonic and fetal development, 7-9 canonical syllables, 603-604 sequential touching task computational models, 612-615 categorization in infants, 388 conversational turn-taking, 605 sign language systems, 641 cross-cultural perspectives, 618-619 smartphones, 435 culturally sensitive policies on assessment and intervention, 622-623 Social Communication Questionnaire, 322 social environments early meaningful speech, 605 epigenetics of adversity and effects of congenital hearing loss, 619 resilience, 78-79 future research directions, 624 social outcomes influence of socioeconomic status link with multisensory attention skills, (SES), 616 321-323 interventions to promote, 621-622 Social Responsiveness Scale, 322 linguistic differences, 617-618 mechanisms of, 606-612 sociocultural context influence on epigenetic effect, 82-83 neural underpinnings, 609-612 sociocultural perspective on emotional policy perspectives, 621-623 development, 744 potential early indicators of ASD, 620 socioeconomic status (SES) prelinguistic vocalization types, 602-604 effects on brain development, 117 protophones, 602-603 epigenetic effects related to, 82-83 role of intrinsically-motivated play, 606 influence on attention development, role of social input, 606-608 204-205 spike timing-dependent plasticity (STDP), 13 influence on vocal learning and speech production, 616 activity-dependent neural development and spatial attention, 186 learning, 11-12 spatial domain central pattern generators (CPGs), 11 core knowledge view of early development, spinal circuit learning 410-411 embodied brain model, 19-21 neoconstructivist view of early spinal nervous system development, 410-411 development in the embryo and specificity principle, 807 fetus, 10-12 statistical learning, 423 speech pattern detection effects of dual language exposure, 665 dual-context, 669 speech perception, 220 syntax learning, 641-642 attunement to native language before word learning, 634 birth, 580 word segmentation, 585 audiovisual speech perception, 582-583 "sticky mittens" studies, 419 bilingual-learning infants, 588 effects on motor development, 477 critical periods for development, 591-592, still-face during mobile phone use, 442 factors influencing critical periods, 593 still-face paradigm, 728 Strange Situation Procedure (SSP), 689-690 forming phoneme categories, 581–582 influences on development, 579 stress physiology of attachment, 692 lateralization of language processing, stretch reflex 589-591 fetal development, 8, 10-11 levels of word understanding, 585-587 subplate layer mapping meaning, 585-587 role in development of the cortex, 13, 14 multimodal speech perception, 582-583 sustained attention, 186 native language discrimination, 580-581 synaptic pruning during childhood and neural specialization for language, 589-591 adolescence, 94, 97

policy perspectives, 593-594

synaptogenesis in the infant brain, 94, 96-101



848 INDEX

synostoses plantar grasp reflex, 242 effects on head circumference, 50 policy implications, 253 syntax learning proprioception, 240 bilingualism, 648 receptor types and distributions, 240 development in infants, 641 role of sociocultural factors, 254-255 differences in communicative contexts, rooting response in newborns and infants, 248-249 646-647 effects of sociocultural differences, 646-647 social touch, 244-245 learning non-adjacent relations, 642-643 somatosensory homunculus, 246 leveraging domain-general processes, 641-643 taste policy implications, 647-649 chemesthesis, 265 problem of syntax, 632 culture of foods, 263-264 prosodic bootstrapping of syntactic units, 643 development of taste preferences, 267-268 sign language systems, 641 early feeding patterns and practices, socially communicative contexts, 643 264-265 socioeconomic status gap, 647-649 effects of mother's diet on breast milk, statistical learning, 641-642 273-281 temporal attention, 642-643 effects of prenatal flavor exposure, 273-281 timing of interventions, 648 effects of repeated exposure to food, 281-289 influence of the mother's choices, 264 tracking input structure to uncover syntactic rules, 641-642 neurobiology of flavor senses, 265-268 underlying neural mechanisms, 645-646 preference for sweet tastes, 272 use in word learning, 640 role of olfaction, 268 using word knowledge to bootstrap, 644 sense of, 265-266 snacking in children, 264-265 tablets, 435 social modeling and food preferences, 289 tactile perception sweets and sugar-sweetened beverages, 264 benefits of massage, 253, 254 technoference, 440-443 benefits of skin-to-skin contact for temperament babies 253 core features, 715 crossed-extension reflex in newborns, 246 features shared with emotion and emotion C-Tactile (CT) afferent fibers, 244 regulation, 715 parental moderation of expression, 728 definition of touch, 240 developing role in the bodily self, 246-252 policy implications, 733-734 development of pain perception, 244 susceptibility to environmental influences early development of affective aspects, 244-245 and, 727 early development of haptic sensing, 241-243 variations in emotion and emotion early development of proprioception and regulation, 724-727 the postural schema, 248-249 working definition, 716-717 effects of early tactile experiences, 253 theory of mind, 495, 506 exploratory procedures in the early Too Small to Fail initiative, 563 postnatal period, 241-243 touch. See tactile perception fetal development, 8 toxin exposure future research on tactile development, 252 epigenetic effects on the fetus, 75 importance of, 238 tuberous sclerosis (TS), 142 influence of other sensory inputs, 240 Tulving's Encoding Specificity Principle, 344 interoception, 240 background TV technoference, 441-442 location of touch in external space, 249 multisensory development of body parent and child joint media engagement, representations, 250-252 438-439 multisensory interactions, 238, 240 neural substrates of touch, 239-241 ultrasound ontogeny of, 241 measurement of body composition, 45 origins of tactile body maps in brain and behavior, 246-247 ventral pathway, 525

vista space, 415

visual attention. See attention

palmar grasp reflex, 242

passive tactile inputs, 246



Cambridge University Press 978-1-108-42603-9 — The Cambridge Handbook of Infant Development Edited by Jeffrey J. Lockman , Catherine S. Tamis-LeMonda Index

Index 849

visual development cross-cultural differences related to diet. 161-162 cultural biases in the tuning of early face processing, 170-172 discrimination between own-race and otherrace faces, 171 early visual experience and development of face processing, 172-174 early visual experience in the development of low-level vision, 160-161 early visual experience in the development of motion processing, 165-167 effect of diet on development of low-level vision, 161-162 effects of congenital cataracts, 160-161, 165-167, 172-173 effects of premature birth, 161, 167, 174 face input and, 170 face processing, 168-169 perceptual narrowing, 171-172 policy implications, 174-176 role of arachidonic acid (ARA), 161-162 role of docosahexaenoic acid (DHA), 161-162 tuning to own species, 171 visual experience atypical development and, 561 biased early experiences, 552-553 cultural context, 562-563 development of face perception, 552-553, developmental neuroscience, 559-561 developmentally changing context, 555-557 ego-centric vision, 549-550 everyday visual tasks, 558-560 policy implications, 563 role in visual development, 549 sensitive period, 553 shift in attention to manual actions, 555-556 skewed distribution of object categories, 558-560 sleeper effects of early deficits, 553 social context, 562-563 visual perception of the newborn acuity, 157 congenital blindness, 215 contrast sensitivity, 158-159 detecting faces, 168–169 effects of retinal immaturity, 158 high-level vision, 163-165 immaturity of the pathway from the retina to the primary visual cortex, 158-159 learning about individual faces, 169 low-level vision, 157-160 motion processing, 163-165 peripheral vision, 160 stereopsis, 160

visual recognition memory (VRM) paradigm, 342 visual system fetal development, 8 vocal learning adult input as targets for imitation, 608 adult responses as positive reinforcers, 607-608 canonical syllables, 603-604 clinical perspectives, 619-620 computational models, 612-615 conversational turn-taking, 605 cross-cultural perspectives, 618-619 culturally sensitive policies on assessment and intervention, 622-623 early meaningful speech, 605 effects of congenital hearing loss, 619 future research directions, 624 influence of socioeconomic status (SES), 616 interventions to promote, 621-622 linguistic differences, 617-618 mechanisms of, 606-612 neural underpinnings, 609-612 policy perspectives, 621-623 potential early indicators of ASD, 620 prelinguistic vocalization types, 602-604 protophones, 602-603 role of intrinsically-motivated play, 606 role of social input, 606-608 voxel-based morphometry (VBM), 8 Vygotsky, Lev, 411, 534 Waddington, Conrad, 72, 74 weight infant weight measurement, 43-44 WEIRD (Western, educated, industrialized, rich and democratic) nations, 806 Williams syndrome, 422, 509 word learning acquiring phonological and semantic biases, 639 associative word learning theories, 634 attention-shifting ability, 636 Bayesian inference models, 635 bilingualism, 648 challenges for infants, 633 communicative context, 637-638 context of dyadic interaction, 636-638 cross-situational models, 634 differences in communicative contexts, 646-647

effects of dual language exposure, 665-667

effects of sociocultural differences, 646-647

influence of vowel hyperarticulation by

hypothesis testing models, 634

infant-directed speech, 636-637

adults, 637



More Information

850 INDEX

word learning (cont.)

leveraging domain-general processes, 634–636 link with learning grammar, 632 mutual exclusivity bias, 639 policy implications, 647–649 problem of reference, 632 Quinean conundrum, 632 social nature of, 636–638 socioeconomic status gap, 647–649 statistical learning, 634 sustained attention to word referents, 635 syntactic bootstrapping, 640

timing of interventions, 648 underlying neural mechanisms, 645–646 verb learning, 640 word-to-world mappings, 634–635 writing skills development, 559

zebrafish embryo studies spinal circuit learning, 20–21 Zero to Three (ZTT) Screen Sense guidelines, 455 Zika virus exposure microcephaly related to, 49