Index

Locators in **bold** refer to figures/tables/plates

**Abbreviations in sub-headings**

**BOLD** = blood-oxygen-level dependent signal

**NOLB** = natural organization of language and the brain

*a priori* models of language. *see* classical models

abstract language comprehension 83
accuracy of content, discourse analysis 45–49
action words, fMRI studies 10
active processing, NOLB model 111, 116–117
adaptive value. *see* evolutionary perspectives
Aesop's fable study 65–66
aesthetic responses, reading 135, 138, 143
aesthetic trajectory hypothesis 151
affective norms for English words (ANEW) 138, 139
affective processes. *see* emotional responses;
hot affective processes
affiliated processes, naturalistic paradigms 229, 230
agrammatic. *see* non-fluent primary progressive aphasia
airplane or bird example, NOLB model 103, 113–115, 116–117
Alzheimer's disease (AD) connected speech production 32–34, 33
discourse analysis 47
lexicon 42–43
speech output/discourse analysis 36
speech sample 54
ambiguity, linguistic 102, 103–105, 109
amygdala 150
analogical reasoning 215–217
anger 149–150. *see also* emotional responses
angular gyrus 64–65
anterior insula 150
anterior intraparietal sulcus 238

anterior temporal lobe
behavioral variant frontotemporal dementia 46–47
neurocognitive poetics model 145–146, 148
simulation hypothesis of literary reading 145–146
situation models 64–65
aphasia, post-stroke 124. *see also* primary progressive aphasia
appraxia of speech, connected speech production in 38–40
argument hierarchy account, syntactic processing 162–163
artifacts, neural signals 194
associative multiple read-out (AROM) model 148
attention foregrounding effects 151
naturalistic comprehension paradigms 234–236
auditory imagery, sensorimotor simulations 70–71
auditory scaffolding hypothesis 242
autonomic nervous system (ANS) 244–249
background effects, neurocognitive poetics model 146–147, 148–151
basic processes, naturalistic paradigms 230–231
basketball example, fMRI study 16
beaker example, non-linguistic context 82
beat gestures 89
behavioral variant frontotemporal dementia (bvFTD)
clinical studies 207–208
discourse analysis 36, 46–47
**speech rate** 32–34, 33, 37–38, 33–38, 37–38
**speech samples** 53
**Berlin Affective Word List (BAWL)** 138–139
**Biasless Identification of Activated Sites by Linear Evaluation of Signal Similarity (BIASLESS) approach** 20–21
**biological motion, sensorimotor simulations** 69
**bird or airplane example. see airplane or bird example**
**blood-oxygen-level dependent (BOLD) signal**
**autonomic effects** 244–249, 249–254
**naturalistic comprehension** 231, 232–234
**peak and valley analysis** 18–19, 25
**see also fMRI studies**
**Boston Diagnostic Aphasia Examination** 31–32
**boxological models** 144. see also neurocognitive poetics model
**Brain and Poetry (Schrott & Jacobs)** 143
**brain hemispheres, lateralization** 152–153, see also right-hemisphere networks
**BrainMap database** 107
**Broca’s region** 5–6, 11, 105–107, 174–176, 176–178
**context appropriateness** 166–169
**controversies surrounding** 160–162
**predictive coding** 169–170
**story-telling** 187
**syntax/syntactic processing** 160–165, 167
**within-sentence contextual effects** 170–172
**word frequency effects** 170
**working memory** 162–163, 172–174
care, neurocognitive poetics model 149–150
**classical models**
**fMRI studies** 17, 18, 20, 25, 105–107, 106
**limitations** 101–103, 109
**cnets. see context networks**
**co-active regional networks, fMRI studies** 13
**cognitive empathy, neurocognitive poetics model** 150–151
“cold” cognition
**naturalistic comprehension paradigms** 234
**reading** 137–138
**communication in dialogue** 183–184. see also multi-brain perspective
**competition, context networks** 112, 114–115, 120–121
**comprehension of language** 5
**abstract vs. concrete** 83
**language-centric theories** 78–79
**and language production** 49
**situation models** 64–65
**see also naturalistic comprehension paradigms; non-linguistic context in comprehension**
**computational overlap hypothesis, novel shared symbols** 211–212
**concrete language comprehension** 83
**connectedness, global/local** 45–49
**connectivity hubs, networks** 108
**content, narrative** 231–232
**context/contextual information**
**Broca’s region** 164–169, 167, 170–172
**fMRI studies** 8, 9, 14–16, 25, 237–239
**limitations of classical models** 101–103
**NOLB model** 103–105, 105, 119–120
**see also endogenous context; exogenous context; non-linguistic context**
**context networks (cnets)** 101, 112, 113–117, 119–120
**cooperation/competition** 112, 114–115, 120–121
**multiple subnetworks** 118–119
**oscillations/predictions** 116–117, 121–122
**reinstatement** 119–120
**self-organizing systems** 117–118
**speed/metabolic savings** 117, 122–123
**weighting** 115
**continuous streams of information, fMRI studies** 16–19, 26. see also event segmentation theory
**controlled language research (experimental control)** 1–3
**convergence, multi-brain perspectives** 183–184, 189–190
**conversation. see multi-brain perspective, dialogue**
**Cookie Theft scene, Boston Diagnostic Aphasia Examination** 31–32
**cooperation, context networks** 112, 114–115, 120–121
**co-speech gestures**
**fMRI studies** 10, 15, 19
**limitations of classical models** 101–103
**data-driven discovery methods** 22–24, 25
**defamiliarization, foregrounding effects** 151
**default-mode network (DMN)** 245
**definitions**
**context** 103
**natural language** 4–5
**situation models** 60
Index

dialogue. see multi-brain perspective, dialogue
Dictionary of Affect (Whissell et al.) 139
diffusion tensor imaging 37–38
discourse analysis context 238–239
neurodegenerative diseases 45–49
diseases. see neurodegenerative diseases
dorsal anterior cingulate cortex 145–146
dorsal posterior cingulate cortex 145–146
dorsal premotor cortex 66–67
dorsomedial prefrontal cortex
behavioral variant frontotemporal dementia 46–47
neurocognitive poetics model 148, 150
situation models 63–64, 65–67, 68
dual-stream models 108
ecological laboratory tradition, language research 2
ecological validity 2–3
electroencephalography (EEG) 187–188, 193–194, 246
ELN (extended language network) 65
emotion potential of texts, neurocognitive poetics model 139–141, 141
emotional competencies, reading as source of 144
emotional responses
naturalistic comprehension paradigms 230, 232–234
neurocognitive poetics model 149–150
reading 136–137
words 138
see also “hot” affective processes
empathy 136, 145–146, 150–151, 231–232
endogenous (neural) context
fMRI studies 14–16, 25
NOLB model 103–104
environmental context. see exogenous context
event gestalts, neurocognitive poetics model 148
event-indexing model, working models 61
event-related brain potentials (ERPs) 77–78, 93–95
linguistic versus visual context effects 90–91
linking issues 91–93
non-linguistic context 87–90
time course of visual attention 81–86
see also neurodegenerative context
event segmentation theory (EST)
fMRI studies 16–18, 25
global updating of working models 61–62
see also continuous streams of information
evolutionary perspectives
communication 202
reading 135, 136–137
exogenous (environmental) context
fMRI studies of natural language 14–16, 25
multi-brain perspective 193–194
NOLB model 103–104
experimental control 1–3
experimental semiotics. see novel shared symbols
explicit conditions, situation models 63–64
extended language network (ELN) 65
external predictor models, fMRI studies 20
extratextual reality 147
eye tracking 77–78
predictions of language input 121
time course/temporal correlations 81–86
see also non-linguistic context
FA (fractional anisotropy) 37–38, 45
facial expressions, multi-brain perspective 186
facial movements 8. see also contextual information
facts vs. fiction, simulation hypothesis 145–146
familiarity 148, 151
fear 149–150. see also emotional responses
feeling of familiarity, neurocognitive poetics model 148
fiction feeling hypothesis 150
fictional genres 145–146
figurative language processing 141–143, 152–153
fluency, neurodegenerative diseases 34
fMRI studies of natural language 5, 8–10, 14–26, 228–229
autonomic effects 244–249
classical models 17, 18, 20, 25, 105–107, 106
case studies/methodology 10–14
multi-brain perspectives, dialogue 185–187, 193–194
neurodegenerative diseases 47–49
newer directions 14–24
novel shared symbols 210–211
resting state approaches 118–119
situation models 63–65
see also blood-oxygen-level dependent signal; Broca’s region; naturalistic comprehension paradigms
fNIRS (functional near-infrared spectroscopy) 194
foregrounding effects, neurocognitive poetics model 146–147, 151–153
fau}

formalist contract, reading 144
foundation laying, updating of working models 62
fractional anisotropy (FA) 37–38, 45
Frege, Gottlob 140
Frog, Where Are You? children’s picture book task 31
frontal lobes, theory of mind 210
frontoparietal control network 145–146
frontopolar cortex 145–146
frontotemporal dementia (FTD) 32–34, 32–33, 37–38, 207–209. see also behavioral variant frontotemporal dementia; semantic dementia
Fry, Stephen, quotation 101
functional connectivity analysis, fMRI studies 13–14
functional magnetic resonance imaging. see fMRI studies
functional near-infrared spectroscopy (fNIRS) 194
functionalist–cognitivist paradigms 161, 162–164, 169–170
fusiform gyrus 247
general linear model (GLM), fMRI studies 12–13
generativist transformation-based theories, syntactic processing 161, 162–164
genres, literary 144–145
gestures
multi-brain perspective, dialogue 185–186, 187–188
naturalistic comprehension paradigms 249
see also co-speech gestures
global connectedness, discourse analysis 45–49
global updating, working models 61–62, 71
The Good, The Bad, and The Ugly film study 21–22
grammar, neurodegenerative diseases 43–45
Granger causality 185
gray matter atrophy 45
guided introspection 6
Harry Potter books study 141
heart-rate variability (HRV) studies 245
hemispheres, lateralization 152–153. see also right-hemisphere networks
Hoffmann, E. T. A. 140, 141, 149–150
“hot” affective processes
naturalistic comprehension paradigms 234
reading 135, 137–138
see also emotional responses
“how” principles, NOLB model 112, 113–117
hyperscanning 184
IAPS (International Affective Picture System) 138
identification, neurocognitive poetics model 150–151
imagery, mental, sensorimotor simulations 70–71
immersion, neurocognitive poetics model 136, 149–151
incremental updating, working models 61
independent component analysis (ICA) 22–24, 25
inference condition, situation models 63–64
inferior frontal cortex 46–47, 64–65
inferior frontal gyrus (IFG) 160–162
attention 235
context 239
fMRI studies 11–12
naturalistic comprehension paradigms 247
neurocognitive poetics model 150
prediction and statistical learning 242–243
situation models 64–65, 66–67
see also Broca’s region
infraparietal sulcus 64–65
insight impairment, frontotemporal dementia 207–208
intention recognition system, multi-brain perspective 185
interactive nature of dialogue 191–193
International Affective Picture System (IAPS) 138
interpretation preferences, visual attention 85
inter-subject correlations, fMRI studies 21–22, 25
interventions for language disorders 124
intraparietal sulcus 64–65
intra-subject correlations, fMRI studies 20–21, 25
keyhole error, naturalistic comprehension 229–231
laboratory language research 1–2. see also experimental control
language-centric theories, comprehension 78–79
260  Index

language disorders, therapeutic interventions 124
language production, and comprehension 49
language research controlled/simplified stimuli tradition 1–2 ecological laboratory tradition 2 natural language 1, 2, 3–5 see also comprehension of language; fMRI studies; speech lateral frontotoparal region 145–146 lateral orbital region 64–65 lateral premotor cortex 66 lateralization hypothesis, neurocognitive poetics model 152–153. see also right-hemisphere networks left inferior frontal gyrus 160–162. see also Broca’s region lesion-based studies 11, 161–162 Lewy body disease (LBD) connected speech production in 32–34, 33 discourse analysis 47–49 speech sample 54–55 Lewy body spectrum disorder (LBSD) connected speech production in 32–34, 33 discourse analysis 47–49 grammar 44 production and comprehension of language 49 speech rate 37–38 lexicon language comprehension 78 neurodegenerative diseases 40–43 linguistic ambiguity 102, 103–105, 109 linguistic references, and working memory 173–174 linguistic vs. visual context effects 90–91. see also non-linguistic context linking issues, non-linguistic context 86–87, 91–95 literal vs. figurative language processing 141–143 literary reading. see neurocognitive poetics model literature search, contextual information 104–105 local connectedness, discourse analysis 45–49 logopenic variant primary progressive aphasia grammar 43–45 lexicon 42 speech output/discourse analysis 36

speech rate 37–38
speech sample 52–53 long-term memory 61
magnetic resonance imaging. see fMRI; structural MRI magnetoencephalography (MEG) 211–212, 246 manual movements 8. see also contextual information; gestures many-to-many structures-to-functions mapping 11 map tasks 193 mapping, updating of working models 62 mean length of utterance (MLU), neurodegenerative diseases 44 meaning gestalts, neurocognitive poetics model 146–147 meaning-making. see novel shared symbols meaning-mapping, computational features of communicative interactions 215–217 medial frontal cortex 64 medial prefrontal cortex (mPFC) multi-brain perspective, dialogue 187, 189 neurocognitive poetics model 152 simulation hypothesis 145–146 theory of mind 204, 210 media-psychological model, reading 145 MEG (magnetoencephalography) 211–212, 246 memory long-term 61 naturalistic comprehension paradigms 236–237 NOLB model 116–117 see also working memory mental imagery, sensorimotor simulations 70–71 mentalizing 186, 189, 204. see also theory of mind metabolic savings, context networks 117, 122–123 metaphor. see figurative language processing middle cingulate cortex 150 middle cingulate gyrus 240–241 middle temporal gyrus (MTG) 247 sensorimotor simulations 70–71 situation models 65–67 Mini Mental State Examination (MMSE) 47 mirror neuron system 185–186, 189 mirroring 203–204 MLU. see mean length of utterance
Index

moment-by-moment language comprehension 79–81. see also non-linguistic context; time course studies
neuropsychological approach (lesion-based studies) 11, 161–162
nodes, context networks 112, 113–117
noise, neural signals 194
noise variance 9
NOLB model (natural organization of language and the brain) 5, 101–103, 123–124
basic outline of 109–112
and classical models 105–107, 106, 124
and contemporary models 107–109
contextual information 103–105, 105
principles 112, 113–117
see also context networks (cnets)
non-continuous measures, language comprehension 79
non-fluent variant primary progressive aphasia 32–34, 33
grammar 44
silences 42
speech errors/speech apraxia 38–40
speech output/discourse analysis 36
speech rate 35, 37–38
speech sample 51
words per minute 35–37
non-linguistic context in language comprehension 5, 77–78, 93–95
event-related brain potentials 87–90
language-centric theories 78–79
linguistic versus visual context effects 90–91
linking issues 86–87, 91–95
time course/temporal correlations 81–86
visually situated theories/methodology 79–81
non-verbal/verbal representations, NOLB model 110
nouns, semantic variant primary progressive aphasia 41
novel shared symbols 6, 201–207, 217–220
clinical studies 207–210
computational features of interaction 215–217
computational overlap hypothesis 211–212
fMRI studies 210–211
neural mechanisms 210–215
referential communication 201
Tacit Communication Game 205–207, 210–211
object–subject (OS) structures 162–164
object–subject–verb (OSV) structures 95, 93–95
observational studies, limitations 43

“One Boy’s Day” study 66–67
one-to-one structure-to-function models 11.
see also univariate activity maps
oscillations, context networks 121–122
P600 effect (syntactic positive shift) 87–90, 91–95, 240
parahippocampal cortex 67
parahippocampal gyrus 70
paraphrase conditions, situation models 63–64
parietal lobe 64–65
Parkinson’s disease (PD) 32–34, 33, 36
Parkinson’s disease with dementia (PDD) 32–34, 33, 47–49
pars opercularis/orbitalis/triangularis 11–12
parsing, computational features 215–217
peak-and-valley analysis, BOLD response 18–19, 25
perception, NOLB model 116–117
perspective taking 215–217. see also theory of mind
phonemic errors 39–40
phonetic errors 39–40
piano example, non-linguistic contexts 82
time-sentence verification 79–81
poetry, mood induction 149–150. see also
neurocognitive poetics model of literary reading
polar prefrontal region 47
positive anymore speech construction 30
posterior cingulate cortex 148, 240–241
posterior superior temporal sulcus (pSTS) 65–66
naturalistic construction of situation models 65–66
novel shared symbols 212–214, 217–220
PPA. see primary progressive aphasia
Praat signal-processing software 32
precuneus, movie perception 240–241
neurocognitive poetics model of literary reading 148
simulation hypothesis of literary reading 145–146
situation models 65–66, 67, 68
story-telling 187
prediction
Broca’s region 169–172, 175–176
context networks (cnets) 116–117, 121–122
naturalistic comprehension paradigms 242–244
prediction error account, syntax/syntactic processing 162–163
Shannon, Claude 202

shifting 62, 67

silences, neurodegenerative diseases 34–35, 41–42

simplified language research 1–2. see also experimental control

simulation hypothesis of literary reading 145–146

simulations, sensorimotor 68–71, 72

situation models 5, 59–60, 72

naturalistic construction 65–68

neurophysiology 63–65

segmentation of narrative into events 60–63

sensorimotor simulations 68–71, 72

social cognition 247

social information, reading as source of 144

speech apraxia 38–40

speed, context networks (cnets) 117, 122–123

Sphärengeruch (spheric fragrance) of words 136–137

state space semantic, NOLB model 110

statistical learning 242–244

sterile environment analogy 6–7. see also experimental control

story-telling

multi-brain perspective 186–187

structural-affect theory 149

see also narrative experience; neurocognitive poetics model

strength of contingencies 243–244

structural-affect theory, stories 149

structural magnetic resonance imaging (MRI) 37

structural priming 170

structure-building, updating working models 62

structure tracking, prediction and statistical learning 242–244

subject–object (SO) structures 162–164

subject–object–verb (SOV) structures 89, 93–95

subjective segmentation, fMRI 16–18, 25

subjectivity, reading 136

subnetworks, multiple 118–119

superior frontal cortex

behavioral variant frontotemporal dementia 46–47

situation models 63–65

superior frontal gyrus (SFG) 239

superior parietal lobule 238

superior temporal gyrus (STG) attention 234–236

fMRI studies 11

naturalistic construction of situation models 67

novel shared symbols 214–215

sensorimotor simulations 70–71

superior temporal sulcus attention 234–236

context 239

multi-brain perspective, dialogue 185

neurocognitive poetics model 150

situation models 64–65

theory-of-mind 204, 210

supramarginal gyrus (SMG) 238

supratemporal plane 234–236

surface form 60

suspense, neurocognitive poetics model 136, 149–150

SWIFT model of eye-movement control 148

symbols, novel. see novel shared symbols

syntactic positive shift. see P600 effect

syntax/syntactic processing

Broca’s region 160–165, 167

discourse context 164–169

language comprehension 78–79, 86–87

Tacit Communication Game 205–207, 210–211

tangram task 193

temporal dimensions. see time course studies
temporal lobes

atrophy, semantic dementia 208

novel shared symbols 212, 217–220
temporal poles, and theory of mind 204, 210
temporal-parietal cortex 67
temporal variant frontotemporal dementia (semantic dementia) 208

tempero-parietal junction (TPJ)

neurocognitive poetics model 150

theory-of-mind 204, 210

textbase, situation models 60

thematic role assignment, non-linguistic contexts 92

theory of mind (ToM) 145–146, 231–232

computational features of interactions 215–217

multi-brain perspective, dialogue 186, 189

neurocognitive poetics model 148, 150

novel shared symbols 204, 210, 219–220

therapeutic interventions for language disorders 124
Index

time course studies 175–176
Broca’s region 187–188, 190–191
multi-brain perspective, dialogue 175–176
non-linguistic contexts 79–86
ToM. see theory of mind
tone perception 241
tool use 247

unification model, syntactic processing 162–163
univariate activity maps, fMRI studies 12–13
validity, ecological 2–3
ventral striatum 152
ventromedial prefrontal cortex (vmPFC) 65–66, 208–210, 212, 217–220
verbal representations, NOLB model 110
verbs, semantic variant primary progressive aphasia 41
virtual reality devices, multi-brain perspectives 194
visual perception 4
visually situated language comprehension 79–81. see also non-linguistic context

weighting, context networks (cnets) 115
Wernicke’s area 11, 102, 105–107, 187
“what” principles, NOLB model 112, 113–117
white matter, neurodegenerative diseases 37–38
“why” principles, NOLB model 112, 113–117
within-sentence contextual effects 170–172
Wittgenstein, Ludwig, quotation 101
word frequency effects, Broca’s region 167, 170
word–object relationships 85
words, neurocognitive poetics model 136–137, 138
words per minute (WPM), neurodegenerative diseases 34, 35–37. see also speech rate
working memory attention 236
Broca’s region 162–163, 172–174
working models
global/incremental updating 61–62, 71
situation models 61
structure-building framework 62