**Index**

Accidents, allocating responsibility for, 251–252  
Action analysis, 37–54  
by adults, 39–42  
attention focused in, 37, 51–53  
bottom-up processes in, 41  
brake points identified in, 39–40  
and change blindness, 38, 39, 48–49  
and effects of overlaid tones in videos  
for adults, 40  
for infants, 46–47  
end point judgments or completion points in,  
40, 51–54  
hierarchical organization in, 40–41  
by infants, 42–48  
intention detection in, 38, 39  
goal-relevant aspects of, 49  
and role of meaning, 39  
processing compared to object recognition, 53  
segmentation along intention boundaries in,  
40–42  
by infants, 42–48  
top-down processes in, 41  
in understanding of intentions, 4  
Age  
and change detection performance, 176–181,  
182  
and extramission beliefs, 109, 111, 117  
Airplane pilots, change detection by, 183, 187  
Animation  
and change blindness blindness, 245  
and illusion of explanatory depth, 245  
Appearance-reality conflations, 129  
Attention  
in action analysis, 37, 51–53  
affecting change blindness, 37–38, 48–49  
auditory, 26  
and change detection, 169, 170, 181  
children’s understanding of, 25–26, 131  
ad and cognitive processes, 166  
distorted by distractions, legal aspects of, 261,  
271–272  
and inattention blindness affecting behavior,  
262–264  
lapses of  
accidents in, 261  
and products liability law, 272–274  
limited capacity for, 25  
linked to awareness, 121–122, 126  
and processing of input, 25  
and scene representation, 166  
selectivity in, 25  
in situation awareness, 218  
task-oriented focus in, 26  
in task-unrelated images and thoughts, 204,  
208  
and zoning out while reading, 212  
Audition, and extramission beliefs,  
104–105  
Automatic processes  
in detection of gaze direction, 49  
distorted by conscious processing, 192  
and zoning out while reading, 219  
Automobile driving  
change detection in, 6, 165  
and liability for negligence, 254  
situation awareness in, 218  
Awareness  
definition of meta-awareness, 222–223  
of lexical ignorance, in children, 4–5,  
57–71  
meaning-cued, 59–60  
word-cued, 58–59  
visual, attention linked to, 121–122, 126  
of zoning out while reading, 209, 212
Beliefs about seeing, 5–7. See also Extramission beliefs
Beliefs of subjects about their capabilities, 2, 6, 8, 127, 145, 147, 187. See also Change blindness blindness
overestimation in (see Overestimation of cognitive abilities)
and predictors of underconfidence about knowledge, 247
Bootstrapping process used by children, 4, 10
Boundaries in segmented units of intentional action
seen by adults, 39–42
seen by infants, 44–48
Bright-line rules of conduct, 270
Causal patterns
search for
and illusion of explanatory depth, 241–243
and self-assessment of explanatory knowledge, 228–229
sense of insight into, 228, 242–243
Change blindness
and action analysis, 37–54
attention affecting, 37–38, 48–49
and beliefs about seeing, 5–7
compared to cognitive illusions, 193
examples of, 1–2, 121–126
actor swaps in, 2, 37, 124–125, 147, 187, 193
between-view changes in, 1, 123–124, 127
range of stimuli in, 38
expectations of stability in, 197
expertise affecting, 49–51
and failure to detect novel events, 122, 146, 262
and illusion of continuity, 126
as intentional task, 129
labeled objects affecting, in infants, 124
and trust in impressions of sameness, 67, 69, 70
Change blindness blindness, 126–132
analysis of magnitude of, 151–152, 154–156, 158
animation affecting, 245
and children’s reasoning about representations, 129–132
compared to illusion of explanatory depth, 228, 243–245
empirical demonstrations of, 147–161
estimates of change detection response time in
(see also Overestimation of cognitive abilities)
with delayed changes, 154–157
with immediate changes, 150–153
with increased magnitude of change, 157–158
experiments in, 145, 148–162
discussion of, 158–161
effects of particular changes used in, 160
goals of, 148
explanations for, 128–129
and justifications by adults, 131
and metacognitive control over visual processes, 161
as metacognitive error, 145–162
persistence throughout many trials, 152
and responsibility for accidents, 262–264
as visual metacognition, 126–129
Change detection
accurate prediction of success in, 128–129
by airplane pilots, 183, 187
and beliefs of subjects about their capabilities, 2, 6, 8, 127, 145, 147, 187 (see also Change blindness blindness)
false impressions in, 68
in flickering display of images, 6–7, 123, 165–183
age affecting, 176–181, 182
attention in, 169, 170, 181
in change blindness blindness studies, 145, 148–162
executive function in, 171, 173
individual differences in, 165–183
inhibition of irrelevant information in, 172, 173
interference measures affecting, 182
number and spatial relations of objects affecting, 182
perceptual speed in, 170, 173, 182
psychometric assessment in, 168–173
results of, 173–181
variance analysis between response times in, 173–176
verbal working memory in, 171, 173
visuospatial working memory in, 169, 170, 173, 182
interruptions affecting, in real world, 183
in perceptual matching trials, 67
Children and infants
development of knowledge about vision, 22–31
in infants, 14–22
level-1 and level-2 understanding, 22–25, 61–62
egocentric point of view in, 4
extramission beliefs of, 98
gaze-following behavior, 14–17
  in habituation trials, 16
illusion of explanatory depth in, 237–240
insights about attention, 25–26
lexical ignorance affecting perceptual
  performance, 4–5, 57–71 (see also Lexical
  ignorance awareness in children)
monitoring of stored knowledge, 5
reasoning about representations, 3–4, 13,
  129–132
self-assessment in
  of explanatory knowledge, 229
  of memory, 237–238
size constancy in (see Size constancy,
  developmental changes in)
studies of segmentation skills for action
  analysis, 42–48
familiarization phase in, 42–45
intermodal matching in, 45–46
tones related to completion points in, 46–47
testing with false-belief task, 3–4, 13, 130, 133,
  136–137
understanding of attention, 25–26, 131
Cingulate cortex in conflict monitoring, 222
Cognitive abilities
  overestimation of, 2, 6, 8, 127, 145, 147, 187, 252
  (see also Overestimation of cognitive
  abilities)
in real person, 262–264
in reasonable person test, and consequences of
  mismatch with real person, 264–275
Cognitive illusions compared to change
  blindness, 193
Cognitive processes
  controlled by implicit learning and memory,
  191
  in perceptual change detection, 166
Cognitive supplementation hypothesis
  and size constancy in children, 78
  instructions affecting, 86–89
  test of, 81–86
  and size estimates by adults, 78, 79–80, 92, 93
Coherence in scenes and perceptual
  expectations, 134
Comparative negligence system, 270–271
  adverse consequences of, 271–272
Comparison processes similar to strategy
  selection, 193
Comprehension monitoring during reading,
  204
  assessment of, 206–207
  and error detection in texts, 206–207
  and prediction of comprehension performance,
  206
  reciprocal teaching of, 205
  training for, 205–206
  transactional strategies for, 205
Computerized visual systems
  and evidence of extramission beliefs,
  99–101
  as nonintentional representations, 137–139
Concepts, theory-based approach to, 8
Conceptual information compared to perceptual
  information, 193–196
Conflations of appearance and reality, 129
Consciousness
  compared to metacognition, 8
  experiential, dissociation from
    metacognition, 203–204, 216–217
Conscious processing interfering with
  performance, 192–193
Controlled processing compared to automatic
  behaviors, 219
Daydreaming. See Zoning out while reading
Developmental issues in illusion of explanatory
  depth, 237–240
Development of knowledge about vision,
  13–31
  in children, 22–31
  in infants, 14–22
Dissociation, temporal, 203–204
Distance perception
  affecting appearance of objects, 5, 25
  and size estimations by children, 76, 77–78
  instructions affecting, 86–89
  testing of cognitive factors in, 81–86
Distractions affecting attention, legal aspects of,
  261, 271–272
Driving. See Automobile driving
Educational experiences affecting extramission
  beliefs, 105–111
Egocentric point of view in children, 4
Electroencephalography in zoning out during
  reading, 222
Emotional reactions to objects, and social
  referencing, 18–19
Executive function
  in change detection, 171, 173
  and cognitive processes, 166
  and metacognition, 7
Experiential consciousness, dissociation from
  metacognition, 203–204, 216–217
Expertise
affecting change blindness, 49–51
and overconfidence in explanatory knowledge, 245–246
visual, and perceptual inferences, 134
Expert testimony, problems with, 274
Explanations
omissions of detail in, 242
problems with, 242
Explanatory knowledge or understanding
compared to factual knowledge, 233–234
overconfidence in, 232–233
expertise affecting, 245–246
predicted for other people, 246–247
self-assessment of, 227, 229–232
in children and in adults, 229
and illusion of explanatory depth, 9, 228–232
(see also Illusion of explanatory depth)
search for causal patterns in, 228–229, 241–243
types of knowledge affecting, 232–233
and underestimation of information needed, 240
Extramission beliefs, 5–6, 24, 97–117, 129
in adults, 101
age affecting, 109, 111, 117
in ancient or medieval philosophers, 97
as camera analogy, 113
and change blindness findings, 5–6
in children, 98
and errors in reasoning, 115–116
evidence of, 99
in computer representations of vision, 99–101
intractability of, 106–107
learning affecting, 105–111
with active processing of information, 109–110
effective short-term experiences, 107–109
with extensive questioning, 110
ineffective experiences, 105–107
and nature of scientific misconceptions, 114–115
necessity training affecting, 102
ontology hypothesis in, 113
origins of, 113–117
and role of brain in vision, 113
and role seen for emissions in vision, 111–113
variables affecting number of responses
with audition and olfaction questions, 104–105
and transfer among questions, 104
with vision questions, 103–105
Eye movements
and change detection, 7, 122–123, 165
in flickering display of images trials, 178–180
and cognition, 214–215
in encoding object properties, 243
and zoning out while reading, 213–215, 222
Face recognition memory
irrelevant perceptual information in, 196
verbalization affecting, 192
Factual knowledge
compared to explanatory knowledge, 233–234
self-testing of, 234
False-belief task in testing of children, 3–4, 13, 130, 133, 136–137
Feeling of knowing
accuracy of judgments in, 189
and cue familiarity hypothesis, 189
and retrieval of items from memory, 188–190
strength of, affecting duration of search, 190
and trace access hypothesis, 189
Filmed intentional actions
color changes in, 52
frame deletions in, 52
Film editing, gaze-directed attention in, 134–135
Flickering display of images, change detection in, 6–7, 123. See also Change detection, in flickering display of images
Folk psychology
and approach to concepts, 8
and theory of mind, 13
Gaze
another person’s, followed by infants, 14–17
automaticity of gaze direction detection, 49
behavioral regularities associated with, 17
referential nature of, 15–17
and relation between gazer and object, 16–17
in habituation trials for infants, 16
Gaze-directed attention
and change detection, 134–135
in chimpanzees, 21
in preschool children, 24
Goal-relevant aspects of intentional action, 49
Gunpowder manufacture, development of, 240–241
Habituation trials
and gaze-following behavior of infants, 16
social referencing in, 18–19
Hearing, and extramission beliefs, 104–105
Ignorance
lexical, children’s awareness of, 4–5, 57–71
monitoring of, 57
Illusion of explanatory depth, 9, 228–232
adaptive value of, 243
animation affecting, 245
compared to change blindness blindness, 228, 243–245
developmental issues in, 237–240
factors affecting, 232
functional account of, 241–243
perceptually salient components affecting, 247
and search for causal patterns, 228–229, 241–243
in self-assessments
of narrative knowledge, 236–237
of procedural knowledge, 236
self-serving bias in, 228
sense of insight in, 228, 242–243
and underconfidence about knowledge, 247
visible parts affecting, 245
Inattention blindness, 121–122, 126, 146
and responsibility for accidents, 262–264
Incompetence, dual burden of, 232
Individual differences
in knowledge of distance related to apparent size, 91
in visual processing of scenes
attention in, 166
change detection in (see Change detection, in flickering display of images)
memory affecting, 166
Infants. See Children and infants
Inferences
in action analysis, 37, 38, 52
of visual experience of others, 22
Informational aspects of seeing something, 19–20
Inhibition of irrelevant information in change detection, 172, 173
Insight, sense of, and illusion of explanatory depth, 228, 242–243
Intentional actions
boundaries between, 40
interpreted by children, 4
sensitivity to interruptions in, 4
Intentional collapse, causes of, 134–135
Intentional loop, and reasoning about representations, 132–137
Intentional theory of mind, 132–133, 134
Intention detection in action analysis
and change blindness, 38, 39, 48–49
goal-relevant aspects of, 49
and role of meaning, 39
and segmentation of action units
in adults, 40–42
in infants, 42–48
Interruptions
affecting change detection, 183
conscious processing interfering with visual metacognition, 192
sensitivity to, in intentional actions, 4
Intuitive aspects of reasonable person test, 257–258, 260–262, 275
Knowing, feeling of, and retrieval of items from memory, 188–190
Knowledge
explanatory, self-assessment of, 227, 229–232
and illusion of explanatory depth, 9, 228–232
(see also Illusion of explanatory depth)
types of
factual, 233–234
narrative, 236–237
procedural, 234–236
and self-assessment of explanatory knowledge, 232–233
Knowledge acquisition
identification of sources in, 27
perceptual access in, 26–27
preexisting biases or expectations affecting, 29
visual information in, 28–30
ambiguous input affecting, 29
different reactions to, 29–30
fake objects affecting, 29
visual properties identified in, 28
Language
learning of
by labeling of objects, 17–18
and perceptual performance in children, 4–5
and lexical ignorance awareness in children, 4–5, 57–71
structure detection by infants, 48
Learning experiences affecting extramission beliefs, 105–111
Legal issues
in allocating responsibility, 251–252
in metacognitive errors, 10, 275
in mismatch between reasonable and real person, 264–275
Legal issues (cont.)
and alternative means of identifying negligence, 270–275
corrective justice in, 267–268
overestimation of cognitive abilities in, 268–269
strict liability system in, 265–267
problems with expert testimony, 274–275
in products liability law, 272–274
Lexical ignorance awareness in children, 4–5, 57–71
in action reference, 60–61, 63
and appreciation of representational inadequacy, 68, 71
correlation with visual recognition judgments, 66–67
and detection of change, 67–68
and efficiency of memory processes, 65–67
encoding difficulty affecting, 65–66
preexposure affecting, 65
repetition priming affecting, 66
experiences promoting, 62–63
and global impression of novelty, 60–61, 66
and judgment of another’s ignorance, 61–62, 69
and mapping of novel words onto novel actions or objects, 60, 63–64, 69
efficient retrieval processes in, 64–65, 69
familiar name justifications in, 64
mutual exclusivity principle in, 64
meaning-cued awareness, 59–60, 63
in object reference, 59–60, 62–63
word-cued awareness, 58–59, 62–63
Liability
legal issues in, 251–252
for negligence, 254
products liability law, 272–274
strict liability system in tort law, 265–267
Magnetic resonance imaging, functional, in conflict monitoring, 222
Manufacturers, accountability in products liability law, 272–274
Meaning
in analysis of scenes and actions, 39
gists of, 39, 134
Meaning-cued lexical ignorance awareness in children, 59–60, 63
Memory
affecting change detection
verbal working memory in, 171, 173
visuospatial working memory in, 169, 170, 173, 182
false memories from perceptual information, 196
perceptual mechanisms in, 194–195
retrieval of items from
and feeling of knowing, 188–190
preretrieval stage in, 189
and scene representation, 166
studies with source of activation confusion models, 194–195
Meta-awareness, definition of, 222–223
Metacognition
adaptive character of, 196–197
as automatic or unconscious process, 188, 191
and feeling of knowing, 188–190
inaccuracies in, 192–193
and change blindness, 145–162
legal aspects of, 10, 275
performance related to, 6–7
and zoning out while reading, 219–220
Metaconsciousness
definition of, 222–223
dissociation from consciousness, 203–204, 216–217
markers of, 222
in processing of conscious processes, 8
triggering of, 220–221
Mindfulness, and zoning out while reading, 218
Mind-wandering affecting task performance, 204–205, 218. See also Zoning out while reading
Misleading intuitive epistemology
and errors in knowledge of technology, 240–241
and errors in visual memories, 244
Monitoring
of cognitive activities
and attention to contents of thought, 216–217
neurological markers of, 222
of comprehension during reading, 204 (see also Comprehension monitoring during reading)
of ignorance or lack of understanding, 57
of stored knowledge
by children, 5
and visual metacognition, 7
Moses illusion, 193
Narrative knowledge, 236–237
self-assessment of, 237
Negligence
causes of, 256
comparative negligence, 270–271
adverse consequences of, 271–272
Index

identification of bright-line rules of conduct in, 270
overestimation of cognitive abilities affecting, 265–269
and legal distraction doctrine, 261, 271–272
liability for, 251, 254

Olfaction, and extramission beliefs, 104–105
Overconfidence in explanatory knowledge, 232–233
in another person, 246–247
expertise affecting, 245–246
Overestimation of cognitive abilities, 2, 6, 8, 127, 145, 147, 187, 252
change blindness blindness in (see Change blindness blindness)
consequences of, 268–269
and estimates of memory in children, 237–238
and problems with expert testimony, 274–275
and responsibility for accidents in change blindness blindness, 262–264
in inattention blindness, 262–264

Perceptual learning hypothesis, and size constancy in children, 77–78, 90. See also Visual perception
Performance related to metacognition, 6–7
Perspective taking, research on, 3–4
Picture recognition and awareness of lexical ignorance in children, 5, 66–67, 69
performance predictions in, 136
Pilots of aircrafts, change detection in, 183, 187
Predictions of performance. See Overestimation; Underestimation
Problem solving, strategy selection in, 7, 190–191
Procedural knowledge compared to explanatory knowledge, 234–236
self-testing of, 236
Products liability law, 272–274

Reading
and comprehension monitoring, 204 (see also Comprehension monitoring during reading)
and zoning out, 7–8, 203–223 (see also Zoning out while reading)
Reasonable conduct
and collective intuition about appropriate behavior, 259
about cognitive abilities, 260–262
problems with standards for, 251–252
social judgments of, 259
Reasonable person test
consequences of mismatch with real person, 264–275
definition of, 253, 255
idealized standards for, 255
and assessment of conduct, 256–258
changes in, 258
conformity with, 255–256
as objective standard for liability, 258
physical abilities affecting, 258
intuitive aspects of, 257–258, 275
and purpose of tort law, 253–255
Reasoning about representations and change detection, 135
in children, 3–4, 13, 129–132
in intentional loop, 132–137
in nonintentional computerized conditions, 137–139
Representations interacting with visual world, 132–140. See also Visual representations
Resource conservation in metacognition, 193, 196–197
Responsibility for accidents, allocation of, 251–252
Risky behavior, and liability for negligence, 254
Saccadic eye movements. See Eye movements
Search
for causal patterns in illusion of explanatory depth, 228–229, 241–243
in retrieval of items from memory, 188–190
Self-assessment of explanatory knowledge or understanding, 227, 229–232
in children, 229
overconfidence in, 232–233
search for causal patterns in, 228–229
types of knowledge affecting, 232–233
of factual knowledge, 234
and illusion of explanatory depth, 228 (see also Illusion of explanatory depth)
of procedural knowledge, 236
Self-awareness, and empathic responses in infants, 21
Situation awareness, and zoning out while reading, 217–218
Size constancy
instructions affecting judgments of in adults, 79–80
in children, 86–89
Size constancy, developmental changes in, 75–93
and cognitive judgments by adults, 78, 92, 93
and cognitive supplementation hypothesis, 78
instructions affecting performance, 86–89
supported by perceptual knowledge test scores, 82–86, 91
test of, in children, 81–86
distance affecting apparent size in, 76, 77–78
instructions affecting, 86–89
test of, in children, 81–86
literature review of, 75–76
and perceptual learning hypothesis, 77–78
viewing distance affecting, 76, 77–78
Skilled performance affected by conscious processing, 192
Social judgments of reasonable conduct, 259
Social referencing by adults looking at objects, 18–19
Source of activation confusion models of information in memory networks, 194–195
Standards for reasonable conduct, problems with, 251–252
Statistical structure, and segmenting dynamic intentional action, 41–42
by infants, 48
Strategy selection in problem solving, 7, 190–191
base rates of success in, 190
resource expenditure in, 193, 196–197
similar to comparison processes, 193
and transactional strategies to improve reading comprehension, 205
as unconscious act, 190
Task-unrelated images and thoughts
awareness of, 208
factors affecting, 207
intentional, 208
unintentional, 208
Task-unrelated images and thoughts (TUITs), 204–205, 207–208
Temporal dissociation, 203–204
Testimony by experts, problems with, 274–275
Theory of mind
and development of knowledge about vision, 22
and folk psychology, 8, 13
functionally dissociable, 137
and inferences about action, 38
and intentional actions, 4, 132–133, 134
and knowledge monitoring, 5
and perspective taking, 3, 4
Theory theorists, 14
Tip-of-the-tongue phenomenon, 189
Tort law
allocating responsibility in, 251–252
basic purposes of, 251, 253–255
competing theories in, 254–255
corrective function of, 251, 253, 255
deterrence function of, 251, 253, 255
Trace access hypothesis in feeling of knowing, 189
Underconfidence about knowledge, predictors of, 247
Underestimation
of information needed for explanatory knowledge, 240–241
of performance in picture memory task, 136
Understanding
assessment during development, 237–240
of attention, by children, 25–26, 131
and illusion of explanatory depth, 241–243
lack of, monitoring of, 57
of vision, 3–5
level-1 and level-2 in, 22–25, 61–62
Unreasonable conduct, determination of, 251–252
Vision
development of knowledge about, 13–31
in children, 22–31
in infants, 14–22
and theory-of-mind development, 22–30
and extramission beliefs, 5–6, 24, 97–117, 129
(see also Extramission beliefs)
and mastery of object permanence tasks, 20
understanding of, 3–5
Visual metacognition
and change blindness blindness, 126–129
and concept of intentional loop, 135–136
conservation of resources in, 196–197
and development of size constancy, 75–93
inaccuracies in, 187–188
interference from conscious processing, 192
Visual perception. See also Looking
attention linked to awareness in, 121–122, 126
and change blindness (see Change blindness)
and cognitive supplementation hypothesis, 77–86
and expectations leading to coherent scenes, 134
extramission theory of, 24, 97–117
information compared to conceptual information, 193–196
input importance in knowledge acquisition, 26–30
and knowledge of distance affecting object size and shape, 5, 25, 82–86
age-related changes in, 89–90, 91
individual differences in, 91
level-1 and level-2 understanding of, in children, 22–25, 61–62
and lexical ignorance awareness in children, 5, 57–71
picture recognition correlated with, 5, 66–67, 69
and metacognition, 7
overestimated completion of, 9
properties of perceptual representation system, 195–196
speed affecting change detection, 170, 173, 182
Visual representations
children’s reasoning about, 3–4, 13, 129–132
inadequacy of, and lexical ignorance awareness in children, 68, 71
individual differences in, 165–183
reasoning about (see Reasoning about representations)

Word-cued awareness of lexical ignorance, in children, 58–59

Zoning out while reading, 7–8, 203–223
and automatic versus controlled processing, 219
awareness of, 209, 212
and cognition versus metacognition, 219–220
and comprehension performance, 210, 212
and error detection in texts, 207
and eye movement control during reading, 213–215, 222
helpful aspects of, 221
implications of, 213–220
markers of, 221–222
and mindfulness, 218
previous research on, 204–208
recent research on, 208–213
and research on task-unrelated images and thoughts (TUITs), 204–205, 207–208
and situation awareness, 217–218
and triggering of metaconsciousness, 220–221
unawareness of, 209–210, 217