

Contents

<i>Preface</i>	xiii
1 Perception as an Information-Extraction Process	1
Definition of Perception	1
A Phylogenetic Perspective	2
Relationship between Perception, Learning, and Thinking	3
Interrelationship of the Processes	6
Information-Processing Approaches to Perception	7
I Sensory Transduction	9
II Sensory Register	10
IIIA Short-Term Memory (STM)	12
IIIB Long-Term Memory (LTM)	12
IV Response	13
Evaluation of Our Perceptual Model	13
Historical Context	14
Plan of the Book	15
<i>Summary</i>	16
2 Hierarchical Organization of Perceptual Tasks	17
Difference between Recognition and Identification	18
Differences in the Amount of Stimulus Energy Required to Accomplish Perceptual Tasks	18
	vii

Early Studies Which Suggest a Gross Hierarchy	19
Elaborating Studies from Brightness or Figural Unity	
to Identified Form	20
Time for Information Processing at Different Levels	23
Word and Letter Identification	24
Processing Time and Stimulus Information	26
Learning and Perceptual Experiences	28
<i>Summary</i>	30
3 Sensory Psychophysics	31
Classical Psychophysical Methods	32
Method of Limits	33
Method of Constant Stimuli	34
Method of Adjustment	37
Evaluating the Threshold Concept	37
Signal-Detection Theory	38
Elements of TSD	39
Weber's Law and the Problem of a Psychophysical Scale	46
Psychophysical Laws	46
Fechner's Law	46
Power Law	48
Evaluation of the Psychophysical Laws and Theoretical Interpretations	51
<i>Summary</i>	52
4 Sensory Physiology of Vision	53
Visual Stimulus	53
Visual Receptors	55
Photochemistry of Rods and Cones	56
Neural Processes in Vision	59
Retinal Processes	59
Ganglion-Cell Responses	61
Postretinal Processes	63
<i>Summary</i>	71
5 Visual Psychophysics	72
Visual Sensitivity Functions	72
Spatiotemporal Factors in Vision	74
Adaptation	75
Temporal Resolution: Flicker	77
Spatial Inhibition: Mach Bands	79
Color Vision	80
Dimensions of Color	81

Color Mixing	82
Color Systems	82
Deficiencies in Color Vision	84
Theories of Color Vision	86
<i>Summary</i>	90
6 Audition	92
Auditory Stimulus	92
Physical Parameters	97
Anatomy of the Ear	100
Auditory Nervous System	100
Central Auditory Pathways	100
Responses of the Auditory Nerve	100
Sub-cortical Auditory Centers	102
Auditory Cortex	103
Theories of Hearing	103
Frequency Theories	103
Place Theory	104
An Evaluation of the Place and Volley Theories	106
Auditory Psychophysics	107
Sensitivity Functions	107
Masking	110
Classification of Auditory Sensations	113
Auditory Space Perception: Sound Localization	116
Acoustical Cues for Sound Localization	116
Intensity as a Cue: The Interaural Intensity Difference	117
Temporal Cues	117
Role of Head Movements in Localization	119
Pinnae and Sound Localization	120
Neurophysiological Correlates of Sound Localization	120
<i>Summary</i>	121
7 Context for Brightness and Color Constancy	123
Functional or Adaptive Significance of Perceptual Constancies	124
Designating Perceptual Constancies	124
Two Experiments: Organization of Size Constancy at a Higher Level than Brightness Constancy	125
Brightness and Color Constancy	129
Early Phenomenological Description	129
Maintenance of Brightness Constancy when Illumination Conditions Provide Information about Relative Albedos	130
Destruction of Brightness Constancy under Obscured Illumination Conditions	132

Contributing Field Factors	133
Contextual Framework for Evaluating Contrast Explanations	137
Reflectance Ratios in the Context of the Albedo	141
Organismic Factors and Subjective Set	142
Physiological Explanation	144
<i>Summary</i>	145
8 How Size and Shape Constancy Are Mediated	146
Nature of Size Constancy	146
Determination of Size Constancy	147
Measurement of Size Constancy and the Brunswik Ratio	147
Relationship between Perceived Size and Physical Distance	148
How the Distance Variable is Involved	150
Methods and Attitudes Affect Size-Distance Relationships	153
Naturalistic Research Further Considered: Attitude and Information	156
Conclusions on Size Constancy	159
Shape Constancy: Methods, Data, and Theory	160
Application of the Brunswik Ratio in Determining the Index of Phenomenal Regression	160
Dependency of Shape Constancy on Spatial Cues	162
How the Orientation Factor Might Be Engaged: Innate and Experiential Determiners	163
Comparison of the Perceptual Constancies	166
Influence of Age, Development, and Learning on the Constancies	166
<i>Summary</i>	169
9 Emergence and Organization of Figure	170
Homogeneous Field or <i>Ganzfeld</i>	171
Autokinetic Effect	172
Figure-Ground Phenomena: Primitiveness and Instability of Figural Unity	172
Attempts to Make the Figure More Stable	174
Gestalt Laws of Perceptual Organization: Grouping and Figural Unity	177
Law of <i>Pragnanz</i>	178
Generalization of the Gestalt Laws	178
Contributions from Information Theory	183
<i>Summary</i>	190
10 Information Processing Part One: Form Perception and Pattern Recognition	192
Metrics of Form	194
Coding Mechanisms for Form	200
Theory of Feature Analysis	200

Schemata or Prototype Theory	201
Perception as Information Processing	205
Sensory Register	207
Extraction of Stimulus Information from the Icon	213
Neurophysiology and Information Processing in Perception	220
<i>Summary</i>	225
11 Information Processing Part Two: Attention and Illusions	226
Attention	226
Stimulus and Eye-Movement Factors in Attention	227
Central or Internal Factors	229
Illusions	234
Figural Aftereffects	234
Geometric Illusions	242
<i>Summary</i>	247
12 Perceptual Learning and Development	248
Theoretical Perspective	248
Plasticity of Innate Perceptual Capacities	250
Innate Structural Organization in the Cortex	251
Sensory-Deprivation Effects	253
Form Discrimination from Stabilized Retinal Images	254
Experiential Deprivation Studies	256
Differential Perceptual Sets and Differential Experience	258
Developmental Studies	260
Response Specificity and Feature Differentiation	264
Five Trends in Perceptual Development	267
<i>Summary</i>	270
13 Space Perception	271
Two-dimensional Space: Experiments and Principles	272
Interaction between Visual and Proprioceptive Determiners of the Perceived Vertical and Horizontal	273
Individual Differences in Visual-Proprioceptive Determination	273
Dominant Visual Framework	274
Increasing Importance of Proprioceptive Stimulation in a Reduced Visual Framework	275
Adaptation to an Optically Rearranged Spatial Environment	276
Three-dimensional Space	284
Primary Cues	284
Secondary Cues: Gradients	291
Gradient Theory of Space Perception	293

Other Secondary Cues	296
Interaction and Utilization of Cues	299
<i>Summary</i>	305
14 The Perception of Movement and Events	306
Perspective Reversal and Rotary Motion	306
Real and Apparent Motion	309
Organization of the Perception of Real Movement	310
Thresholds of Velocity and Displacement and Velocity Constancy	310
Tests of Three Hypotheses of Motion	313
Apparent Movement	316
Spatiotemporal Relationships and Interresponse Interval	316
Configurational Effects	318
Mechanics of Coding Information for Movement	320
Gibson's Theory of Relative Transformation of the Ambient Array	321
Motion-Detection System of Successive Retinal Stimulation	321
Integration of Motor and Visual Information	323
Motion and Event Perception	323
Kinetic Depth Effect	325
<i>Summary</i>	326
15 Social Perception, Motives, and Personality	328
Perception of Social Events: Causality, Intentionality, and Motives	329
Michotte's Work on Phenomenal Causality	329
Person Perception or Social Cognition	332
Nonverbal Communication	333
Recognition of Facial Expression of Emotions: Clinical and Cultural	
Aspects	335
Cultural Influences	338
Processing of Personality-Relevant Information	340
Cognitive Congruence Explanation of Defense	343
<i>Summary</i>	349
16 Retrospect and Prospect	351
Cognitive Transformation of Needs to Motives	352
Emotional Components of Cognitive Set	354
 <i>Bibliography</i>	 359
 <i>Index</i>	 359