

Contents

1	Introduction	1
1.1	Toward New Tools	1
1.2	Epigenetic Epidemiology	2
1.3	Ecosystem Resilience	6
1.3.1	Comorbid Disorders	7
1.3.2	Some Cognitive Modules of Human Biology	8
1.3.3	Cognition as “Language”: an Introduction	11
1.3.4	A Multiplicity of Resilience Topologies	12
1.3.5	In Summary	14
1.4	A First Survey of the Obesity Pandemic in the USA	15
2	Models of Development	27
2.1	The Spinglass Model	27
2.2	Shifting Perspective: Cognition as an Information Source	30
3	Groupoid Symmetries	35
3.1	The First Level	36
3.2	The Second Level	36
3.3	Spontaneous Symmetry Breaking	37
3.4	A Biological Example	38
4	Epigenetic Catalysis	43
4.1	The Basic Idea	43
4.2	Rate Distortion Dynamics	44
4.3	More Topology	47
4.4	Inherited Epigenetic Memory	48
4.5	Multiple Processes	49
4.6	“Coevolutionary” Development	50
4.7	Multiple Models	51
4.8	Epigenetic Focus	52

5	Developmental Disorders	55
5.1	Network Information Theory	55
5.2	Embedding Ecosystems as Information Sources	56
5.3	Ecosystems Farm Development	56
5.4	A Simple Probability Argument.....	59
5.5	Developmental Shadows.....	60
5.6	Epigenetic Programming of Artificial Systems for Biotechnology	62
6	An Interim Perspective	63
7	The Obesity Pandemic in the USA	67
7.1	Introduction	67
7.2	Stress and the HPA Axis.....	68
7.3	HPA Axis Cognition	69
7.4	Interacting Information Sources.....	69
7.5	A HPA Axis Model	71
7.6	Psychosocial Stress, Occupational Control, and Weight Gain	74
7.7	Obesity as a Developmental Disorder.....	74
7.8	Recent Trajectories of Structured Stress in the USA	75
7.9	Confronting the Obesity Epidemic	82
8	Heart Disease	87
8.1	Coronary Heart Disease in the USA	87
	8.1.1 Cognition, Immune Cognition, and Culture	90
	8.1.2 Punctuated Interpenetration: Adapting to Pathogenic Hierarchy	93
	8.1.3 Implications for Intervention	94
8.2	Thrombogenesis.....	97
	8.2.1 Control Theory: The Data Rate Theorem	98
	8.2.2 The Information Cost of Hemostatic Regulation	99
	8.2.3 Control Failure Dynamics	101
	8.2.4 Cognitive Symmetry Breaking	102
	8.2.5 Onset of “Turbulent” Clot Growth	103
	8.2.6 Implications for Intervention	104
9	Cancer	107
9.1	A Developmental Model.....	107
9.2	Environmental Insult and Regulatory Failure	114
10	Autoimmune Disorders	121
10.1	Introduction	121
10.2	Nonorthogonal Eigenmodes of Immune Cognition	124
10.3	Circadian and Other Cycles	126
10.4	The Retina of the Immune Response	129
10.5	Circadian-Hormonal Cycle Synergism	130
10.6	The Cognitive HPA Axis	131

10.7	Phase Transitions of Interacting Information Systems	132
10.8	Autoimmune Disease	133
10.9	An Application to Asthma	135
10.10	Images of Pathogenic Social Hierarchy	136
11	Demoralization and Obesity in Upper Manhattan	141
11.1	Introduction	141
11.2	Methods	142
11.2.1	Recruitment of the Mothers	142
11.2.2	Prenatal Questionnaire	142
11.2.3	Socioeconomic Data	144
11.2.4	Chronic Community Stress Index	144
11.3	Data Analysis	147
11.4	Modeling Demoralization and Chronic Stress	147
11.5	Results	148
11.5.1	Demoralization and Chronic Stress	148
11.5.2	Signal Transduction Modeling	150
11.5.3	Body Mass Index	151
11.5.4	Household Deprivation	152
11.6	Discussion	154
11.6.1	The Asymmetric Inverted “U” Curve	154
11.6.2	The Body mass Index	155
11.7	Conclusion	157
12	Death at an Early Age: AIDS and Related Mortality	
	in New York City	161
12.1	Introduction	161
12.2	Data and Analysis	163
12.3	Results	165
12.4	Discussion	170
13	Western Atomism and Its Culture-Bound Syndromes	181
13.1	Introduction	181
13.2	Western Atomistic Economics	183
13.3	Cognition as an Information Source	185
13.4	Environment as an Information Source	187
13.5	Interacting Information Sources	188
13.6	Crosstalk Topologies	189
13.7	Punctuated Critical Phenomena	190
13.8	Implications	192
14	Environmental Induction of Neurodevelopmental Disorders	195
14.1	Introduction	195
14.2	Stabilizing Gene Expression	197
14.3	The Cost of Regulation	198
14.4	Parsing ρ	198
14.5	The Dynamics of Control Failure	199

14.6	Failure of Regulation as a Phase Transition	201
14.7	Estimating the Quadratic Variation	203
14.8	Implications	204
15	Mass De-Housing and Low-Weight Births.....	207
15.1	Introduction	207
15.2	Methods	209
15.3	Results	210
15.3.1	Upper Manhattan Birth Cohort	210
15.4	The Changing Geography of Low Birth-Weight Incidence 1990–2008	210
15.4.1	Maps	210
15.4.2	Regressions	211
15.5	Discussion	215
15.5.1	Center Data	217
15.5.2	What the Health District Maps Show	218
15.5.3	What the Regressions Show	219
15.6	Conclusion	220
15.7	Summary	221
16	Alzheimer’s Disease and “Right-to-Work” Laws	223
16.1	Introduction	223
16.2	Methods	226
16.3	Results	227
16.4	Discussion	232
16.5	Summary	235
17	Diabetes and Thyroid Cancer in Chinatown: Diversity and Acculturation	237
17.1	Introduction	237
17.2	Methods	238
17.3	Results	238
17.4	Implications	245
17.4.1	Limitations of This Study	247
17.5	Conclusion	247
17.6	Summary	248
18	Violence and Obesity	251
18.1	Introduction	251
18.2	Violence	252
18.3	Organic Pollutants and Obesity/Diabetes	261
18.4	Summary and Conclusion	265
19	Psychopathology, Sleep, and Culture	269
19.1	Introduction	269
19.2	Reaction Rate	271
19.3	The Data Rate Theorem	274

19.4	Elementary Rate Distortion Dynamics.....	275
19.5	An Optimization Model	277
19.6	Transition Dynamics	280
19.7	Environmental Induction of Sleep Disorders	281
19.8	Implications	281
20	Final Thoughts	285
21	Mathematical Appendix	295
21.1	The Shannon Coding Theorem	295
21.2	The “Tuning Theorem”	297
21.3	The Shannon–McMillan Theorem	299
21.4	The Rate Distortion Theorem	301
21.5	Groupoids	303
	21.5.1 Basic Ideas.....	303
	21.5.2 Global and Local Symmetry Groupoids	305
21.6	Morse Theory	306
21.7	Generalized Onsager Theory	308
21.8	Black–Scholes Calculation	310
21.9	Large-Scale Noise-Driven Cognitive Switch	311
21.10	The Data Rate Theorem	312
	References.....	315
	Index.....	341

Gene Expression and Its Discontents
The Social Production of Chronic Disease
Wallace, R.; Wallace, D.
2016, XIII, 344 p. 52 illus., Hardcover
ISBN: 978-3-319-48077-0