

Contents

Preface	<i>page</i> xi
Acknowledgments	xix
1 Modeling elementary processes: reaction time and a little history	1
Reaction time in the history of experimental psychology	3
2 Some basic issues and deterministic models of processing	8
Serial vs. parallel processing	9
Self-terminating vs. exhaustive processing	12
The capacity issue	13
Latent network theory	15
3 Mathematical tools for stochastic modeling	23
Density and distribution functions	24
Mathematical expectations	29
The convolution integral and transform methods	30
The exponential distribution	36
Relationship between discrete and continuous variables	43
Summary	45
4 Stochastic models and cognitive processing issues	47
Parallel and serial definitions	50
Parallel-serial equivalence	55
Self-terminating vs. exhaustive processing	65
The independence vs. dependence issue	68
The capacity issue	76
5 Compound processing models	99
An experimental example	108
6 Memory and visual search theory	115
Problems with the standard serial exhaustive search model	122
Objections to other models	126
Specific alternatives to the serial exhaustive model	133

	A class of models falsified by parallel target-present and target-absent curves	148
	Related paradigms; current and future directions	151
7	Self-terminating vs. exhaustive search strategies	164
	Testing paradigms	166
	Serial position curves and identifiability	183
	Variances and higher moments	192
	Distributional approaches	201
	Tests involving accuracy	203
8	Nonparametric RT predictions: distribution-ordering approaches	206
	Introduction	206
	Capacity in exhaustive processing	208
	Capacity in self-terminating processing	212
	Capacity at the individual element level	215
	A proposed test of the self-terminating hypothesis	218
	Capacity during the minimum completion time	248
9	Reaction time models and accuracy losses: varied state and counting models	255
	An experimental overview	258
	Varied state models	260
	Counting models	272
	Conclusions	289
10	Random walk models of reaction time and accuracy	291
	Derivation of response probabilities and mean RT statistics	297
	More general random walk models	310
	Conclusions	315
11	Investigating the processing characteristics of visual whole report behavior	317
	Serial position curves and parallel vs. serial processing	321
	The independence question and a suggested method of testing for seriality	324
	Degradation by masking in serial and parallel systems	325
	A whole report experiment	329
	Analysis, results, and discussion	331
	General discussion	344
12	Additivity of processing times from separate subsystems and related issues	356
	The additive factor method and subsystems arranged serially or in parallel	358

Reaction time and measurement theory	387
An introduction to systems and automata theory in relation to additivity of reaction times	401
Summary and conclusions	412
Appendix 12.1	412
13 The parallel–serial testing paradigm	414
The basic paradigm	415
The basic models	416
Predictions and propositions	419
Models based on exponential intercompletion times and examples	427
An application	437
PST and distributional diversity and testability	445
14 Stochastic equivalence and general parallel–serial equivalence relations when system differences are minimal or ignored	448
A synopsis of implication and equivalence relations in probability spaces and models	449
Equivalence of parallel and serial models	457
15 A general discussion of equivalent and nonequivalent properties of serial and parallel systems and their models	463
Introduction	463
Natural properties of parallel and serial systems and their models	466
General discussion	468
References	483
Author index	496
Subject index	499