A Short History of Mathematical Population Dynamics

Introduces current evolutionary game theory--where ideas from evolutionary biology and rationalistic economics meet--emphasizing the links between static and dynamic approaches and noncooperative game theory. This text introduces current evolutionary game theory--where ideas from evolutionary biology and rationalistic economics meet--emphasizing the links between static and dynamic
approaches and noncooperative game theory. Much of the text is devoted to the key concepts of evolutionary stability and replicator dynamics. The former highlights the role of mutations and the latter the mechanisms of selection. Moreover, set-valued static and dynamic stability concepts, as well as processes of social evolution, are discussed. Separate background chapters are devoted to noncooperative game theory and the theory of ordinary differential equations. There are examples throughout as well as individual chapter summaries. Because evolutionary game theory is a fast-moving field that is itself branching out and rapidly evolving, Jörgen Weibull has judiciously focused on clarifying and explaining core elements of the theory in an up-to-date, comprehensive, and self-contained treatment. The result is a text for second-year graduate students in economic theory, other social sciences, and evolutionary biology. The book goes beyond filling the gap between texts by Maynard-Smith and Hofbauer and Sigmund that are currently being used in the field. Evolutionary Game Theory will also serve as an introduction for those embarking on research in this area as well as a reference for those already familiar with the field. Weibull provides an overview of the developments that have taken place in this branch of game theory, discusses the mathematical tools needed to understand the area, describes both the motivation and intuition for the concepts involved, and explains why and how it is relevant to economics.

Animal Signals

In the years since it first published, Neuroeconomics: Decision Making and the Brain has become the standard reference and textbook in the burgeoning field of neuroeconomics. The second edition, a nearly complete revision of this landmark book, will set a new standard. This new edition features five sections designed to serve as both classroom-friendly introductions to each of the major subareas in neuroeconomics, and as advanced synopses of all that has been accomplished in the last two decades in this
rapidly expanding academic discipline. The first of these sections provides useful introductions to the disciplines of microeconomics, the psychology of judgment and decision, computational neuroscience, and anthropology for scholars and students seeking interdisciplinary breadth. The second section provides an overview of how human and animal preferences are represented in the mammalian nervous systems. Chapters on risk, time preferences, social preferences, emotion, pharmacology, and common neural currencies—each written by leading experts—lay out the foundations of neuroeconomic thought. The third section contains both overview and in-depth chapters on the fundamentals of reinforcement learning, value learning, and value representation. The fourth section, “The Neural Mechanisms for Choice, integrates what is known about the decision-making architecture into state-of-the-art models of how we make choices. The final section embeds these mechanisms in a larger social context, showing how these mechanisms function during social decision-making in both humans and animals. The book provides a historically rich exposition in each of its chapters and emphasizes both the accomplishments and the controversies in the field. A clear explanatory style and a single expository voice characterize all chapters, making core issues in economics, psychology, and neuroscience accessible to scholars from all disciplines. The volume is essential reading for anyone interested in neuroeconomics in particular or decision making in general. Editors and contributing authors are among the acknowledged experts and founders in the field, making this the authoritative reference for neuroeconomics. Suitable as an advanced undergraduate or graduate textbook as well as a thorough reference for active researchers. Introductory chapters on economics, psychology, neuroscience, and anthropology provide students and scholars from any discipline with the keys to understanding this interdisciplinary field. Detailed chapters on subjects that include reinforcement learning, risk, inter-temporal choice, drift-diffusion models, game theory, and prospect theory make this an invaluable reference. Published in association with
the Society for Neuroeconomics—www.neuroeconomics.org Full-color presentation throughout with numerous carefully selected illustrations to highlight key concepts

**Game Theory in Biology**

The principles of game theory apply to a wide range of topics in biology. This book presents the central concepts in evolutionary game theory and provides an authoritative and up-to-date account. The focus is on concepts that are important for biologists in their attempts to explain observations. This strong connection between concepts and applications is a recurrent theme throughout the book which incorporates recent and traditional ideas from animal psychology, neuroscience, and machine learning that provide a mechanistic basis for behaviours shown by players of a game. The approaches taken to modelling games often rest on idealized and unrealistic assumptions whose limitations and consequences are not always appreciated. The authors provide a novel reassessment of the field, highlighting how to overcome limitations and identifying future directions.

Game Theory in Biology is an advanced textbook suitable for graduate level students as well as professional researchers (both empiricists and theoreticians) in the fields of behavioural ecology and evolutionary biology. It will also be of relevance to a broader interdisciplinary audience including psychologists and neuroscientists.

**Evolution and the Theory of Games**

The essential textbook for learning game theory strategies Game Theory in Action is a textbook about using game theory across a range of real-life scenarios. From traffic accidents to the sex lives of lizards, Stephen Schecter and Herbert Gintis show students how game theory can be applied in diverse areas including animal behavior, political science, and economics. The book's examples and problems look at such fascinating topics as crime-
control strategies, climate-change negotiations, and the power of the Oracle at Delphi. The text includes a substantial treatment of evolutionary game theory, where strategies are not chosen through rational analysis, but emerge by virtue of being successful. This is the side of game theory that is most relevant to biology; it also helps to explain how human societies evolve. Aimed at students who have studied basic calculus and some differential equations, Game Theory in Action is the perfect way to learn the concepts and practical tools of game theory. Aimed at students who have studied calculus and some differential equations. Examples are drawn from diverse scenarios, ranging from traffic accidents to the sex lives of lizards. A substantial treatment of evolutionary game theory. Useful problem sets at the end of each chapter.

Neuroeconomics

This book both summarizes the basic theory of evolutionary games and explains their developing applications, giving special attention to the 2-player, 2-strategy game. This game, usually termed a "2×2 game" in the jargon, has been deemed most important because it makes it possible to posit an archetype framework that can be extended to various applications for engineering, the social sciences, and even pure science fields spanning theoretical biology, physics, economics, politics, and information science. The 2×2 game is in fact one of the hottest issues in the field of statistical physics. The book first shows how the fundamental theory of the 2×2 game, based on so-called replicator dynamics, highlights its potential relation with nonlinear dynamical systems. This analytical approach implies that there is a gap between theoretical and reality-based prognoses observed in social systems of humans as well as in those of animal species. The book explains that this perceived gap is the result of an underlying reciprocity mechanism called social viscosity. As a second major point, the book puts a sharp focus on network reciprocity, one of the five fundamental
mechanisms for adding social viscosity to a system and one that has been a great concern for study by statistical physicists in the past decade. The book explains how network reciprocity works for emerging cooperation, and readers can clearly understand the existence of substantial mechanics when the term "network reciprocity" is used. In the latter part of the book, readers will find several interesting examples in which evolutionary game theory is applied. One such example is traffic flow analysis. Traffic flow is one of the subjects that fluid dynamics can deal with, although flowing objects do not comprise a pure fluid but, rather, are a set of many particles. Applying the framework of evolutionary games to realistic traffic flows, the book reveals that social dilemma structures lie behind traffic flow.

Field and Laboratory Exercises in Animal Behavior

The last decade has seen a steady increase in the application of concepts from noncooperative game theory to such diverse fields as economics, political science, law, operations research, biology and social psychology. As a byproduct of this increased activity, there has been a growing awareness of the fact that the basic noncooperative solution concept, that of Nash equilibrium, suffers from severe drawbacks. The two main shortcomings of this concept are the following: (i) In extensive form games, a Nash strategy may prescribe off the equilibrium path behavior that is manifestly irrational. (Specifically, Nash equilibria may involve incredible threats), (ii) Nash equilibria need not be robust with respect to small perturbations in the data of the game. Confronted with the growing evidence to the detriment of the Nash concept, game theorists were prompted to search for more refined equilibrium notions with better properties and they have come up with a wide array of alternative solution concepts. This book surveys the most important refinements that have been introduced. Its objectives are fourfold (i) to illustrate desirable properties as well as drawbacks of the various equilibrium notions by means of simple specific examples, (ii) to study the
relationships between the various refinements, (iii) to derive simplifying characterizations, and (iv) to discuss the plausibility of the assumptions underlying the concepts.

Encyclopedia of Complexity and Systems Science

Contests are an important aspect of the lives of diverse animals, from sea anemones competing for space on a rocky shore to fallow deer stags contending for access to females. Why do animals fight? What determines when fights stop and which contestant wins? Addressing fundamental questions on contest behaviour, this volume presents theoretical and empirical perspectives across a range of species. The historical development of contest research, the evolutionary theory of both dyadic and multiparty contests, and approaches to experimental design and data analysis are discussed in the first chapters. This is followed by reviews of research in key animal taxa, from the use of aerial displays and assessment rules in butterflies and the developmental biology of weapons in beetles, through to interstate warfare in humans. The final chapter considers future directions and applications of contest research, making this a comprehensive resource for both graduate students and researchers in the field.

Fundamentals of Evolutionary Game Theory and its Applications

Field and Laboratory Exercises in Animal Behavior is an interactive laboratory manual for students in animal behavior, ethology, and behavioral ecology. It is the first of its kind in this subject area that guides students through the diverse and fascinating fields of behavioral and ethological studies, employing a wide array of organisms as model systems for the study of behavior. Students participate in the development of hypothesis and turn the recording, analysis, and interpretation of data into an active and engaging process. A teacher-friendly companion
website provides extensive teaching notes on the background to each lab project, tips and hints for successful project presentation, sources for studying organisms, ideas for variations in labs, and alternate study organisms. This text is recommended for undergraduate courses in Animal Behavior, Ethology, and Behavioral Ecology. Provides fully developed and tested laboratory exercises Offers both field and lab experiences- adaptable for fall, spring, or summer courses Laboratories emphasize student thought and involvement in experimental design Includes an online supplement to the manual for teachers

Theory of Games and Economic Behavior

An ethologist shows man to be a gene machine whose world is one of savage competition and deceit

Principles of Animal Behavior

This wide-ranging collection demonstrates the continuing impact of evolutionary thinking on social psychology research. This perspective is explored in the larger context of social psychology, which is divisible into several major areas including social cognition, the self, attitudes and attitude change, interpersonal processes, mating and relationships, violence and aggression, health and psychological adjustment, and individual differences. Within these domains, chapters offer evolutionary insights into salient topics such as social identity, prosocial behavior, conformity, feminism, cyberpsychology, and war. Together, these authors make a rigorous argument for the further integration of the two diverse and sometimes conflicting disciplines. Among the topics covered: How social psychology can be more cognitive without being less social. How the self-esteem system functions to resolve important interpersonal dilemmas. Shared interests of social psychology and cultural evolution. The evolution of stereotypes. An adaptive socio-ecological perspective on social competition and bullying. Evolutionary game theory and
personality. Evolutionary Perspectives on Social Psychology has much to offer students and faculty in both fields as well as evolutionary scientists outside of psychology. This volume can be used as a primary text in graduate courses and as a supplementary text in various upper-level undergraduate courses.

Intelligent Biometric Techniques in Fingerprint and Face Recognition

Game Theory

Revised and updated, containing over 5,000 entries, with over 1,100 more entries than in the previous edition, Animal Behavior Desk Reference, Second Edition: A Dictionary of Behavior, Ecology, and Evolution provides definitions for terms in animal behavior, biogeography, evolution, ecology, genetics, psychology, statistics, systematics, and other related sciences. Formatted like a standard dictionary, this reference presents definitions in a quick- and easy-to-use style. For each term, where applicable, you receive: Multiple definitions listed chronologically Term hierarchies summarized in tables Definition sources Directives that show where a concept is defined under a synonymous name, and concepts related to focal ones Non-technical and obsolete definitions Pronunciations of selected terms Common-denominator entries Synonyms Classifications of organisms and descriptions of many taxa Organizations related to animal behavior, ecology, evolution, and related sciences Still the most complete work of its kind, Animal Behavior Desk Reference, Second Edition: A Dictionary of Behavior, Ecology, and Evolution will improve your scientific communication, particularly in the fields of animal behavior, evolution, ecology, and related branches of biology. If you are a teacher, student, writer, or active in science in any way, this book will prove to be one of your most valuable resources.
Determinants of Animal Behaviour

This encyclopedia, reflecting one of the fastest growing fields in evolutionary psychology, is a comprehensive examination of the key areas in animal cognition. It will serve as a complementary resource to the handbooks and journals that have emerged in the last decade on this topic, and will be a useful resource for student and researcher alike. With comprehensive coverage of this field, key concepts will be explored. These include social cognition, prey and predator detection, habitat selection, mating and parenting, learning and perception. Attention is also given to animal-human co-evolution and interaction, as well as metacognition and consciousness. Entries are tailored to the importance of the individual topic and the amount of empirical evidence that is available. All entries are under the purview of acknowledged experts in the field.

The Bounds of Reason

How can we make better sense of animal behavior by using what we know about the brain? This is the first book that attempts to answer this important question by applying neural network theory. Scientists create Artificial Neural Networks (ANNs) to make models of the brain. These networks mimic the architecture of a nervous system by connecting elementary neuron-like units into networks in which they stimulate or inhibit each other's activity in much the same way neurons do. This book shows how scientists can employ ANNs to analyze animal behavior, explore the general principles of the nervous systems, and test potential generalizations among species. The authors focus on simple neural networks to show how ANNs can be investigated by math and by computers. They demonstrate intuitive concepts that make the operation of neural networks more accessible to nonspecialists. The first chapter introduces various approaches to animal behavior and provides an informal introduction to neural networks, their history, and their potential advantages. The
second chapter reviews artificial neural networks, including biological foundations, techniques, and applications. The following three chapters apply neural networks to such topics as learning and development, classical instrumental condition, and the role of genes in building brain networks. The book concludes by comparing neural networks to other approaches. It will appeal to students of animal behavior in many disciplines. It will also interest neurobiologists, cognitive scientists, and those from other fields who wish to learn more about animal behavior.

Game Theory in Action

Specially selected from The New Palgrave Dictionary of Economics 2nd edition, each article within this compendium covers the fundamental themes within the discipline and is written by a leading practitioner in the field. A handy reference tool.

Animal Behavior Desk Reference

Covering the major topics of evolutionary game theory, Game-Theoretical Models in Biology presents both abstract and practical mathematical models of real biological situations. It discusses the static aspects of game theory in a mathematically rigorous way that is appealing to mathematicians. In addition, the authors explore many applications of game theory to biology, making the text useful to biologists as well. The book describes a wide range of topics in evolutionary games, including matrix games, replicator dynamics, the hawk-dove game, and the prisoner’s dilemma. It covers the evolutionarily stable strategy, a key concept in biological games, and offers in-depth details of the mathematical models. Most chapters illustrate how to use MATLAB® to solve various games. Important biological phenomena, such as the sex ratio of so many species being close to a half, the evolution of cooperative behavior, and the existence of adornments (for example, the peacock’s tail), have been
explained using ideas underpinned by game theoretical modeling. Suitable for readers studying and working at the interface of mathematics and the life sciences, this book shows how evolutionary game theory is used in the modeling of these diverse biological phenomena.

Encyclopedia of Animal Cognition and Behavior

From a zoologist and psychologist, an astonishing look at the biological and strategic roots of human decisions. Humans, like bacteria, woodchucks, chimpanzees, and other animals, compete or cooperate in order to get food, shelter, territory, and other resources to survive. But how do they decide whether to muscle out or team up with the competition? In The Survival Game, David P. Barash synthesizes the newest ideas from psychology, economics, and biology to explore and explain the roots of human strategy. Drawing on game theory—the study of how individuals make decisions—he explores the give-and-take of spouses in determining an evening's plans, the behavior of investors in a market bubble, and the maneuvers of generals on a battlefield alongside the mating and fighting strategies of "less rational" animals. Ultimately, Barash's lively and clear examples shed light on what makes our decisions human, and what we can glean from game theory and the natural world as we negotiate and compete every day.

Evolutionary Game Theory

John von Neumann and Oskar Morgenstern conceived a groundbreaking mathematical theory of economic and social organization, based on a theory of games of strategy. Not only would this revolutionize economics, but the entirely new field of scientific inquiry it yielded—game theory—has since been widely used to analyze a host of real-world phenomena from arms races to optimal policy choices of presidential candidates, from vaccination policy to major league baseball salary negotiations.
And it is today established throughout both the social sciences and a wide range of other sciences.

Game Theory

Game theory, the formalized study of strategy, began in the 1940s by asking how emotionless geniuses should play games, but ignored until recently how average people with emotions and limited foresight actually play games. This book marks the first substantial and authoritative effort to close this gap. Colin Camerer, one of the field's leading figures, uses psychological principles and hundreds of experiments to develop mathematical theories of reciprocity, limited strategizing, and learning, which help predict what real people and companies do in strategic situations. Unifying a wealth of information from ongoing studies in strategic behavior, he takes the experimental science of behavioral economics a major step forward. He does so in lucid, friendly prose. Behavioral game theory has three ingredients that come clearly into focus in this book: mathematical theories of how moral obligation and vengeance affect the way people bargain and trust each other; a theory of how limits in the brain constrain the number of steps of "I think he thinks . . ." reasoning people naturally do; and a theory of how people learn from experience to make better strategic decisions. Strategic interactions that can be explained by behavioral game theory include bargaining, games of bluffing as in sports and poker, strikes, how conventions help coordinate a joint activity, price competition and patent races, and building up reputations for trustworthiness or ruthlessness in business or life. While there are many books on standard game theory that address the way ideally rational actors operate, Behavioral Game Theory stands alone in blending experimental evidence and psychology in a mathematical theory of normal strategic behavior. It is must reading for anyone who seeks a more complete understanding of strategic thinking, from professional economists to scholars and students of economics, management studies, psychology,
political science, anthropology, and biology.

**Applied Game Theory and Strategic Behavior**

This novel reassessment of the field presents the central concepts in evolutionary game theory and provides an authoritative and up-to-date account. The focus is on concepts that are important for biologists in their attempts to explain observations. This strong connection between concepts and applications is a recurrent theme throughout the book.

**Conceptual Breakthroughs in Ethology and Animal Behavior**

All of life is a game, and evolution by natural selection is no exception. The evolutionary game theory developed in this 2005 book provides the tools necessary for understanding many of nature's mysteries, including co-evolution, speciation, extinction and the major biological questions regarding fit of form and function, diversity, procession, and the distribution and abundance of life. Mathematics for the evolutionary game are developed based on Darwin's postulates leading to the concept of a fitness generating function (G-function). G-function is a tool that simplifies notation and plays an important role developing Darwinian dynamics that drive natural selection. Natural selection may result in special outcomes such as the evolutionarily stable strategy (ESS). An ESS maximum principle is formulated and its graphical representation as an adaptive landscape illuminates concepts such as adaptation, Fisher's Fundamental Theorem of Natural Selection, and the nature of life's evolutionary game.

**Game Theory and Animal Behavior**

Game theory has revolutionized the study of animal behavior. The fundamental principle of evolutionary game theory—that the strategy adopted by one individual depends on the strategies
Read PDF Game Theory And Animal Behavior

exhibited by others--has proven a powerful tool in uncovering the forces shaping otherwise mysterious behaviors. In this volume, the first since 1982 devoted to evolutionary game theory, leading researchers describe applications of the theory to diverse types of behavior, providing an overview of recent discoveries and a synthesis of current research. The volume begins with a clear introduction to game theory and its explanatory scope. This is followed by a series of chapters on the use of game theory to understand a range of behaviors: social foraging, cooperation, animal contests, communication, reproductive skew and nepotism within groups, sibling rivalry, alternative life-histories, habitat selection, trophic-level interactions, learning, and human social behavior. In addition, the volume includes a discussion of the relations among game theory, optimality, and quantitative genetics, and an assessment of the overall utility of game theory to the study of social behavior. Presented in a manner accessible to anyone interested in animal behavior but not necessarily trained in the mathematics of game theory, the book is intended for a wide audience of undergraduates, graduate students, and professional biologists pursuing the evolutionary analysis of animal behavior.

The Economics of Network Industries

This comprehensive volume looks at a range of topics covering the habits of a variety of animals, including how macaques teach their offspring, how rats transmit avoidance behavior, how supplementary feeding of tree frogs affects their breeding behavior, and more. Studies in animal behavior can have far-reaching implications for animals and humans alike—suggesting how humans can improve conservation efforts, how we can better protect animals both in the wild and in captivity, and what can be learned about humans from animals.

The Evolution of Cooperation
This book introduces upper-level undergraduates, graduate students, and researchers to the latest developments in network economics, one of the fastest-growing fields in all industrial organization. Network industries include the Internet, e-mail, telephony, computer hardware and software, music and video players, and service operations in the banking, legal, and airlines industries among many others. The work offers an overview of the subject matter as well as investigations about specific industries. It conveys the essential features of how strategic interactions between firms are affected by network activity, as well as covering social interaction and its influence on consumers' choices of products and services. Virtually no calculus is used in the text, and each chapter ends with a series of exercises and selected references. The text may be used for both one- and two-semester courses.

Behavioral Game Theory

Animal Behavior, Second Edition, covers the broad sweep of animal behavior from its neurological underpinnings to the importance of behavior in conservation. The authors, Michael Breed and Janice Moore, bring almost 60 years of combined experience as university professors to this textbook, much of that teaching animal behavior. An entire chapter is devoted to the vibrant new field of behavior and conservation, including topics such as social behavior and the relationship between parasites, pathogens, and behavior. Thoughtful coverage has also been given to foraging behavior, mating and parenting behavior, anti-predator behavior, and learning. This text addresses the physiological foundations of behavior in a way that is both accessible and inviting, with each chapter beginning with learning objectives and ending with thought-provoking questions. Additionally, special terms and definitions are highlighted throughout. Animal Behavior provides a rich resource for students (and professors) from a wide range of life science disciplines. Provides a rich resource for students and professors from a wide
range of life science disciplines Updated and revised chapters, with at least 50% new case studies and the addition of contemporary in-text examples Expanded and updated coverage of animal welfare topics Includes behavior and homeostatic mechanisms, behavior and conservation, and behavioral aspects of disease Available lab manual with fully developed and tested laboratory exercises Companion website includes newly developed slide sets/templates (PowerPoints) coordinated with the book

The Selfish Gene

The tremendous world-wide interest in intelligent biometric techniques in fingerprint and face recognition is fueled by the myriad of potential applications, including banking and security systems, and limited only by the imaginations of scientists and engineers. This growing interest poses new challenges to the fields of expert systems, neural networks, fuzzy systems, and evolutionary computing, which offer the advantages of learning abilities and human-like behavior. Biometric Techniques in Fingerprint and Face Recognition presents a thorough treatment of established and emerging applications and techniques relevant to this field so rich with opportunity.

Game Theory in Biology

As Eugene Wigner stressed, mathematics has proven unreasonably effective in the physical sciences and their technological applications. The role of mathematics in the biological, medical and social sciences has been much more modest but has recently grown thanks to the simulation capacity offered by modern computers. This book traces the history of population dynamics---a theoretical subject closely connected to genetics, ecology, epidemiology and demography---where mathematics has brought significant insights. It presents an overview of the genesis of several important themes: exponential
growth, from Euler and Malthus to the Chinese one-child policy; the development of stochastic models, from Mendel's laws and the question of extinction of family names to percolation theory for the spread of epidemics, and chaotic populations, where determinism and randomness intertwine. The reader of this book will see, from a different perspective, the problems that scientists face when governments ask for reliable predictions to help control epidemics (AIDS, SARS, swine flu), manage renewable resources (fishing quotas, spread of genetically modified organisms) or anticipate demographic evolutions such as aging.

**Evolutionary Game Theory, Natural Selection, and Darwinian Dynamics**

Principles of Animal Behavior has long been considered the most current and engaging introduction to animal behavior. The Third Edition is now also the most comprehensive and balanced in its approach to the theoretical framework behind how biologists study behavior.

**The Survival Game**

This encyclopedia provides an authoritative single source for understanding and applying the concepts of complexity theory together with the tools and measures for analyzing complex systems in all fields of science and engineering. It links fundamental concepts of mathematics and computational sciences to applications in the physical sciences, engineering, biomedicine, economics and the social sciences.

**Animal Contests**

Conceptual Breakthroughs in Ethology and Animal Behavior highlights, through concise summaries, the most important discoveries and scientific revolutions in animal behavior. These are assessed for their relative impact on the field and their
significance to the forward motion of the science of animal behavior. Eighty short essays capture the moment when a new concept emerged or a publication signaled a paradigm shift. How the new understanding came about is explained, and any continuing controversy or scientific conversation on the issue is highlighted. Behavior is a rich and varied field, drawing on genetics, evolution, physiology, and ecology to inform its principles, and this book embraces the wealth of knowledge that comes from the unification of these fields around the study of animals in motion. The chronological organization of the essays makes this an excellent overview of the history of animal behavior, ethology, and behavioral ecology. The work includes such topics as Darwin’s role in shaping the study of animal behavior, the logic of animal contests, cognition, empathy in animals, and animal personalities. Succinct accounts of new revelations about behavior through scientific investigation and scrutiny reveal the fascinating story of this field. Similar to Dr. John Avise’s Contemporary Breakthroughs in Evolutionary Genetics, the work is structured into vignettes that describe the conceptual revolution and assess the impact of the conceptual change, with a score, which ranges from 1-10, providing an assessment of the impact of the new findings on contemporary science. Features a lively, brisk writing style and brief entries to enable easy, enjoyable access to this essential information. Includes topics that cover the range of behavioral biology from mechanism to behavioral ecology. Can also be used as supplemental material for an undergraduate animal behavior course, or as the foundational text for an upper level or graduate discussion course in advanced animal behavior.

Oxford Bibliographies

This 1982 book is an account of an alternative way of thinking about evolution and the theory of games.

Evolutionary Perspectives on Social Psychology
Although there is extensive literature in the field of behavioral ecology that attempts to explain foraging of individuals, social foraging--the ways in which animals search and compete for food in groups--has been relatively neglected. This book redresses that situation by providing both a synthesis of the existing literature and a new theory of social foraging. Giraldeau and Caraco develop models informed by game theory that offer a new framework for analysis. Social Foraging Theory contains the most comprehensive theoretical approach to its subject, coupled with quantitative methods that will underpin future work in the field. The new models and approaches that are outlined here will encourage new research directions and applications. To date, the analysis of social foraging has lacked unifying themes, clear recognition of the problems inherent in the study of social foraging, and consistent interaction between theory and experiments. This book identifies social foraging as an economic interaction between the actions of individuals and those of other foragers. This interdependence raises complex questions about the size of foraging groups, the diversity of resources used, and the propensity of group members to exploit each other or forage cooperatively. The models developed in the book will allow researchers to test their own approaches and predictions. Many years in development, Social Foraging Theory will interest researchers and graduate students in such areas as behavioral ecology, population ecology, evolutionary biology, and wildlife management.

Neural Networks and Animal Behavior

Why are animal signals reliable? This is the central problem for evolutionary biologists interested in signals. Of course, not all signals are reliable; but most are, otherwise receivers of signals would ignore them. A number of theoretical answers have been proposed and empirical studies made, but there still remains a considerable amount of confusion. The authors, one a theoretician the other a fieldworker, introduce a sense of order to
this chaos. A significant cause of confusion has been the tendency for different researchers to use either the same term with different meanings, or different terms with the same meaning. The authors attempt to clarify these differences. A second cause of confusion has arisen because many biologists continue to assume that there is only one correct explanation for signal reliability. The authors argue that the reliability of signals is maintained in several ways, relevant in different circumstances, and that biologists must learn to distinguish between them. In this book they explain the different theories, give examples of signalling systems to which one or another theory applies, and point to the many areas where further work, both theoretical and empirical, is required.

Stability and Perfection of Nash Equilibria

Game theory is central to understanding human behavior and relevant to all of the behavioral sciences—from biology and economics, to anthropology and political science. However, as The Bounds of Reason demonstrates, game theory alone cannot fully explain human behavior and should instead complement other key concepts championed by the behavioral disciplines. Herbert Gintis shows that just as game theory without broader social theory is merely technical bravado, so social theory without game theory is a handicapped enterprise. This edition has been thoroughly revised and updated. Reinvigorating game theory, The Bounds of Reason offers innovative thinking for the behavioral sciences.

Animal Behavior

A famed political scientist's classic argument for a more cooperative world We assume that, in a world ruled by natural selection, selfishness pays. So why cooperate? In The Evolution of Cooperation, political scientist Robert Axelrod seeks to answer this question. In 1980, he organized the famed Computer
Prisoners Dilemma Tournament, which sought to find the optimal strategy for survival in a particular game. Over and over, the simplest strategy, a cooperative program called Tit for Tat, shut out the competition. In other words, cooperation, not unfettered competition, turns out to be our best chance for survival. A vital book for leaders and decision makers, The Evolution of Cooperation reveals how cooperative principles help us think better about everything from military strategy, to political elections, to family dynamics.

Game Theory Evolving

The outstanding feature of this book is that it provides a unified account of three types of decision problem. It covers the basic ideas of decision theory, classical game theory, and evolutionary game theory in one volume. No background knowledge of economics or biology is required as examples have been carefully selected for their accessibility. Detailed solutions to the numerous exercises are provided at the back of the book, making it ideal for self-study. This introduction to game theory is intended as a first course for undergraduate students of mathematics, but it will also interest advanced students or researchers in biology and economics.

Collective Animal Behavior

Fish travel in schools, birds migrate in flocks, honeybees swarm, and ants build trails. How and why do these collective behaviors occur? Exploring how coordinated group patterns emerge from individual interactions, Collective Animal Behavior reveals why animals produce group behaviors and examines their evolution across a range of species. Providing a synthesis of mathematical modeling, theoretical biology, and experimental work, David Sumpter investigates how animals move and arrive together, how they transfer information, how they make decisions and synchronize their activities, and how they build collective
structures. Sumpter constructs a unified appreciation of how different group-living species coordinate their behaviors and why natural selection has produced these groups. For the first time, the book combines traditional approaches to behavioral ecology with ideas about self-organization and complex systems from physics and mathematics. Sumpter offers a guide for working with key models in this area along with case studies of their application, and he shows how ideas about animal behavior can be applied to understanding human social behavior. Containing a wealth of accessible examples as well as qualitative and quantitative features, Collective Animal Behavior will interest behavioral ecologists and all scientists studying complex systems.

Animal Behavior

Since its original publication in 2000, Game Theory Evolving has been considered the best textbook on evolutionary game theory. This completely revised and updated second edition of Game Theory Evolving contains new material and shows students how to apply game theory to model human behavior in ways that reflect the special nature of sociality and individuality. The textbook continues its in-depth look at cooperation in teams, agent-based simulations, experimental economics, the evolution and diffusion of preferences, and the connection between biology and economics. Recognizing that students learn by doing, the textbook introduces principles through practice. Herbert Gintis exposes students to the techniques and applications of game theory through a wealth of sophisticated and surprisingly fun-to-solve problems involving human and animal behavior. The second edition includes solutions to the problems presented and information related to agent-based modeling. In addition, the textbook incorporates instruction in using mathematical software to solve complex problems. Game Theory Evolving is perfect for graduate and upper-level undergraduate economics students, and is a terrific introduction for ambitious do-it-yourselfers.

Social Foraging Theory

Are animals intelligent? How do they learn to solve everyday survival problems? Can they be intentionally deceptive? The investigation of animal behaviour is an important and fascinating aspect of comparative psychology. Determinants of Animal Behaviour thoroughly covers the section on determinants of animal behaviour in the AQA (A) comparative psychology module and deals with the three main topics featured in the syllabus. Firstly the evolutionary explanations of animal behaviour are discussed, including the biological explanations of apparent altruism. Secondly the nature of classical and operant conditioning in animal behaviour is considered and finally the role of social learning in animals is investigated. Real life examples are used throughout the book to illustrate the arguments presented. Determinants of Animal Behaviour is an ideal introductory text to the subject, full of real life examples and both traditional and cutting-edge research. It will be of interest to all students new to comparative psychology and highly accessible to anyone wishing to know more about the diversity and ingenuity of animal behaviour.

Game-Theoretical Models in Biology

Useful Tools to Help Solve Decision Making Problems. Applied Game Theory and Strategic Behavior demonstrates the use of various game theory techniques to address practical business, economic, legal, and public policy issues. It also illustrates the benefits of employing strategic thinking that incorporates the
uncertainty surrounding the behavior of other parties. Real-world applications of game theory Exploring a variety of games, the book outlines the process of modeling game theory questions while thinking strategically. It introduces core concepts through simple examples and case studies taken from the authors’ consulting work in the automotive, beer, wine, and spirits industries as well as in debates over government regulation. The authors include newly developed software applications that can construct and solve game theory models and present strategic options in clear, visual diagrams. Out of the box and into the business world Striking the right balance between necessary mathematics and practical applications, this book shows how game theory can be used in real life, not just in mathematical models. It helps readers improve their strategic thinking, define games based on actual situations, model games with payoffs and probabilities, and make strategically sound decisions.

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