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KEY=LOOKING - PETERSEN BROWN

The Computational Infant Looking for Developmental Cognitive Science *Harvester/Wheatsheaf* qit-This book addresses central concerns in current infancy research...it will fill an extremely important gap.-qit - Gavin Bremner, University of Lancaster qit-The Computational Infant-qit offers a significant new approach to those aspects of developmental psychology and cognitive science that are relevant and necessary for explaining the foundations of the mind. The book addresses the key question of how psychologists can best conceptualize the abilities of young infants. Rutkowska develops a useful synthesis of developmental psychology and cognitive science that focuses on areas of mutual concern such as vision, information, adaptive behaviour, object understanding, intention and systems of representation, providing a route to evaluating the psychological relevance of alternative styles of computational explanation. **Theoretical and Computational Models of Word Learning: Trends in Psychology and Artificial Intelligence Trends in Psychology and Artificial Intelligence** *IGI Global* The process of learning words and languages may seem like an instinctual trait, inherent to nearly all humans from a young age. However, a vast range of complex research and information exists in detailing the complexities of the process of word learning. Theoretical and Computational Models of Word Learning: Trends in Psychology and Artificial Intelligence strives to combine cross-disciplinary research into one comprehensive volume to help readers gain a fuller understanding of the developmental processes and influences that makeup the progression of word learning. Blending together developmental psychology and artificial intelligence, this publication is intended for researchers, practitioners, and educators who are interested in language learning and its development as well as computational models formed from these specific areas of research. **Developing Cognitive Competence New Approaches To Process Modeling** *Psychology Press* Although computational modeling is now a widespread technique in cognitive science and in psychology, relatively little work in developmental psychology has used this technique. The approach is not entirely new, as a small group of researchers has attempted to create computational accounts of cognitive developmental phenomena since the inception of the technique. It should seem obvious that transition mechanisms -- or how the system progresses from one level of competence to the next -- ought to be the central question for investigation in cognitive developmental psychology. Yet, if one scans the literature of modern developmental studies, it appears that the question has been all but ignored. However, only recently have advances in computational technology enabled the researcher access to fully self-modifying computer languages capable of simulating cognitive change. By the beginning of the 1990s, increasing numbers of researchers in the cognitive sciences were of the opinion that the tools of mathematical modeling and computer simulation make theorizing about transition mechanisms both practical and beneficial -- by using both traditional symbolic computational systems and parallel distributed processing or connectionist approaches. Computational models make it possible to define the processes that lead to a system being transformed under environmental influence from one level of competence observed in children to the next most sophisticated level. By coding computational models into simulations of actual cognitive change, they become tangible entities that are accessible to systematic study. Unfortunately, little of what has been produced has been published in journals or books where many professionals would easily find them. Feeling that developmental psychologists should be exposed to this relatively new approach, a symposium was organized at the biennial meeting of the Society for Research in Child Development. The "cost of entry" was that speakers had to have a running computational model of a documented cognitive transition. Inspired by that conference, this volume is the first collection where each content chapter presents a fully implemented, self-modifying simulation of some aspect of cognitive development. Previous collections have tended to discuss general approaches -- less than fully implemented models -- or non self-modifying models. Along with introductory and review chapters, this volume presents a set of truly "developmental" computational models -- a collection that can inform the interested researcher as well as form the basis for graduate-level courses. **Neoconstructivism The New Science of Cognitive Development** *Oxford University Press* This work brings together theoretical views that embrace computational models and developmental neurobiology, and emphasize the interplay of time, experience, and cortical architecture to explain emergent knowledge. **Transforming the Workforce for Children Birth Through Age 8 A Unifying Foundation** *National Academies Press* Children are already learning at birth, and they develop and learn at a rapid pace in their early years. This provides a critical foundation for lifelong progress, and the adults who provide for the care and the education of young children bear a great responsibility for their health, development, and learning. Despite the fact that they share the same objective - to nurture young children and secure their future success - the various practitioners who contribute to the care and the education of children from birth through age 8 are not acknowledged as a workforce unified by the common knowledge and competencies needed to do their jobs well. Transforming the Workforce for Children Birth Through Age 8 explores the science of child development, particularly looking at implications for the professionals who work with children. This report examines the current capacities and practices of the workforce, the settings in which they work, the policies and infrastructure that set qualifications and provide professional learning, and the government agencies and other funders who support and oversee these systems. This book then makes recommendations to improve the quality of professional practice and the practice environment for care and education professionals. These detailed recommendations create a blueprint for action that builds on a unifying foundation of child development and early learning, shared knowledge and competencies for care and education professionals, and principles for effective professional learning. Young children thrive and learn best when they have secure, positive relationships with adults who are knowledgeable about how to support their development and learning and are responsive to their individual progress. Transforming the Workforce for Children Birth Through Age 8 offers guidance on system changes to improve the quality of professional practice, specific actions to improve professional learning systems and workforce development, and research to continue to build the knowledge base in ways that will directly advance and inform future actions. The recommendations of this book provide an opportunity to improve the quality of the care and the education that children receive, and ultimately improve outcomes for children. **Rational Constructivism in Cognitive Development** *Academic Press* Volume 43 of Advances in Child Development and Behavior includes chapters that highlight some of the most recent research in the area of Rational Constructivism. Each chapter provides in-depth discussions, and this volume serves as an invaluable resource for Developmental or educational psychology researchers, scholars, and students. Chapters that highlight some of the most recent research in the area Rational Constructivism discussed in detail **Infant Perception and Cognition Recent Advances, Emerging Theories, and Future Directions** *Oxford University Press, USA* Marianella Casasola is an Associate Professor in the Department of Human Development at Cornell University, where she has been teaching since earning her doctorate in Psychology at the University of Texas at Austin. Her research examines aspects of infant spatial cognition, young children's acquisition of spatial language, and the interplay between language and cognition during the first two years of development. **A Roadmap for Cognitive Development in Humanoid Robots** *Springer Science & Business Media* This book addresses the central role played by development in cognition. The focus is on applying our knowledge of development in natural cognitive systems, specifically human infants, to the problem of creating artificial cognitive systems in the guise of humanoid robots. The approach is founded on the three-fold premise that (a) cognition is the process by which an autonomous self-governing agent acts effectively in the world in which it is embedded, (b) the dual purpose of cognition is to increase the agent's repertoire of effective actions and its power to anticipate the need for future actions and their outcomes, and (c) development plays an essential role in the realization of these cognitive capabilities. Our goal in this book is to identify the key design principles for cognitive development. We do this by bringing together insights from four areas: enactive cognitive science, developmental psychology, neurophysiology, and computational modelling. This results in roadmap comprising a set of forty-three guidelines for the design of a cognitive architecture and its deployment in a humanoid robot. The book includes a case study based on the iCub, an open-systems humanoid robot which has been designed specifically as a common platform for research on embodied cognitive systems . **Piaget Today (Psychology Revivals)** *Psychology Press* Originally published in 1987, the contributors bring their different orientations to the study of child development and genetic epistemology to show the continuing value of Piaget's theory and its fruitfulness in providing insights which permit the advancement of science. This volume contains the proceedings of the VIIth Advanced Course of the "Fondation Archives Jean Piaget", held at the University of Geneva in 1985. The lectures and discussions included in this volume will help the reader to understand Piaget in the context of twentieth-century science and philosophy and to consider the present and future of the theory, as it was seen at the time of original publication. **Early Word Learning** *Routledge* Early Word Learning explores the processes leading to a young child learning words and their meanings. Word learning is here understood as the outcome of overlapping and interacting processes, starting with an infant's learning of native speech sounds to segmenting proto-words from fluent speech, mapping individual words to meanings in the face of natural variability and uncertainty, and developing a structured mental lexicon. Experts in the field review the development of early lexical acquisition from empirical, computational and theoretical perspectives to examine the development of skilled word learning as the outcome of a process that begins even before birth and spans the first two years of life. Drawing on cutting-edge research in infant eye-tracking, neuroimaging techniques and computational modelling, this book surveys the field covering both established results and the most recent advances in word learning research. Featuring chapters from international experts whose research approaches the topic from these diverse perspectives using different methodologies, this book provides a comprehensive yet coherent and unified representation of early word learning. It will be invaluable for both undergraduate and postgraduate courses in early language development as well as being of interest to researchers interested in lexical development. **The Cambridge Handbook of Cognitive Development** How does cognition develop in infants, children and adolescents? This handbook presents a cutting-edge overview of the field of cognitive development, spanning basic methodology, key domain-based findings and applications. Part One covers the neurobiological constraints and laws of brain development, while Part Two covers the fundamentals of cognitive development from birth to adulthood: object, number, categorization, reasoning, decision-making and socioemotional cognition. The final Part Three covers educational and school-learning domains, including numeracy, literacy, scientific reasoning skills, working memory and executive skills, metacognition, curiosity-driven active learning and more. Featuring chapters written by the world's leading scholars in experimental and developmental psychology, as well as in basic neurobiology, cognitive neuroscience, computational modelling and developmental robotics, this collection is the most comprehensive reference work to date on cognitive development of the twenty-first century. It will be a vital resource for scholars and graduate students in developmental psychology, neuroeducation and the cognitive sciences. **Computational Models of Cognitive Processes Proceedings of the 13th Neural Computation and Psychology Workshop, San Sebastian, Spain, 12-14 July 2012** *World Scientific* Computational Models of Cognitive Processes collects refereed versions of papers presented at the 13th Neural Computation and Psychology Workshop (NCPW13) that took place July 2012, in San Sebastian (Spain). This workshop series is a well-established and unique forum that brings together researchers from such diverse disciplines as artificial intelligence, cognitive science, computer science, neurobiology, philosophy and psychology to discuss their latest work on models of cognitive processes. **On Computational Techniques for Exploring Parent-infant Dynamics During Social Interaction** With the recent trend in developmental science toward new techniques and methods that involve sophisticated hardware and data processing, it is becoming more and more important to merge the many different subfields within psychology, computer science, and engineering. This current paper provides a new perspective on how the two fields of developmental science and computer vision may benefit from one another through a mutual interest in resolving the complex questions regarding human learning. Several well established techniques in cognitive development and image processing are outlined in terms of their importance in bridging the gap between the two research areas. The combined efforts help to formulate new sets of questions crucial to understanding human cognition, particularly in regards to the development of infant visual attention.

The methods and techniques outlined in this paper only scratch the surface of what is possible when combining knowledge across multiple disciplines. Specifically, processing images extracted from third-person and first- person-view cameras and head-mounted eye trackers can aid in understanding the complex series of factors involved in parent-child social interactions. Advantages in being able to collect extensive amounts of data from these techniques as well as their potential limitations will be discussed. **Computational Developmental Psychology** *MIT Press* An overview of the emerging discipline of computational developmental psychology, emphasizing the use of constructivist neural networks. Despite decades of scientific research, the core issues of child development remain too complex to be explained by traditional verbal theories. These issues include structure and transition, representation and processing, innate and experiential determinants of development, stages of development, the purpose and end of development, and the relation between knowledge and learning. In this book Thomas Shultz shows how computational modeling can be used to capture these complex phenomena, and in so doing he lays the foundation for a new subfield of developmental psychology, computational developmental psychology. A principal approach in developmental thinking is the constructivist one. Constructivism is the Piagetian view that the child builds new cognitive structures by using current mental structures to understand new events. In this book Shultz features constructivist models employing networks that grow as well as learn. This allows models to implement synaptogenesis and neurogenesis in a way that allows qualitative changes in processing mechanisms. The book's appendices provide additional background on the mathematical concepts used, and a companion Web site contains easy-to-use computational packages. **Computation, Cognition, and Pylyshyn** *MIT Press* Zenon Pylyshyn is a towering figure in cognitive science; his book "Computation and Cognition" (MIT Press, 1984) is a foundational presentation of the relationship between cognition and computation. His recent work on vision and its preconceptual mechanism has been influential and controversial. In this book, leading cognitive scientists address major topics in Pylyshyn's work and discuss his contributions to the cognitive sciences. Contributors discuss vision, considering such topics as multiple-object tracking, action, molecular and cellular cognition, and inhibition of return; and foundational issues, including connectionism, modularity, the evolution of the perception of number, computation, cognitive architecture, location, and visual sensory representations of objects. **The Computational Infant Looking for Developmental Cognitive Science The Cambridge Handbook of Cognitive Development** *Cambridge University Press* How does cognition develop in infants, children and adolescents? This handbook presents a cutting-edge overview of the field of cognitive development, spanning basic methodology, key domain-based findings and applications. Part One covers the neurobiological constraints and laws of brain development, while Part Two covers the fundamentals of cognitive development from birth to adulthood: object, number, categorization, reasoning, decision-making and socioemotional cognition. The final Part Three covers educational and school-learning domains, including numeracy, literacy, scientific reasoning skills, metacognition, curiosity-driven active learning and more. Featuring chapters written by the world's leading scholars in experimental and developmental psychology, as well as in basic neurobiology, cognitive neuroscience, computational modelling and developmental robotics, this collection is the most comprehensive reference work to date on cognitive development of the twenty-first century. It will be a vital resource for scholars and graduate students in developmental psychology, neuroeducation and the cognitive sciences. **Neuroconstructivism - I How the brain constructs cognition** *Oxford University Press* What are the processes, from conception to adulthood, that enable a single cell to grow into a sentient adult? The processes that occur along the way are so complex that any attempt to understand development necessitates a multi-disciplinary approach, integrating data from cognitive studies, computational work, and neuroimaging - an approach till now seldom taken in the study of child development. Neuroconstructivism is a major new 2 volume publication that seeks to redress this balance, presenting an integrative new framework for considering development. In the first volume, the authors review up-to-to date findings from neurobiology, brain imaging, child development, computer and robotic modelling to consider why children's thinking develops the way it does. They propose a new synthesis of development that is based on 5 key principles found to operate at many levels of descriptions. They use these principles to explain what causes a number of key developmental phenomena, including infants' interacting with objects, early social cognitive interactions, and the causes of dyslexia. The "neuroconstructivist" framework also shows how developmental disorders do not arise from selective damage to the normal cognitive system, but instead arise from developmental processes that operate under atypical constraints. How these principles work is illustrated in several case studies ranging from perceptual to social and reading development. Finally, the authors use neuroimaging, behavioural analyses, computational simulations and robotic models to provide a way of understanding the mechanisms and processes that cause development to occur. **Connectionist Models of Cognition and Perception** *World Scientific* Connectionist Models of Cognition and Perception collects together refereed versions of twenty-three papers presented at the Seventh Neural Computation and Psychology Workshop (NCPW7). This workshop series is a well-established and unique forum that brings together researchers from such diverse disciplines as artificial intelligence, cognitive science, computer science, neurobiology, philosophy and psychology to discuss their latest work on connectionist modelling in psychology. The articles have the main theme of connectionist modelling of cognition and perception, and are organised into six sections, on: cell assemblies, representation, memory, perception, vision and language. This book is an invaluable resource for researchers interested in neural models of psychological phenomena. Contents:Cell Assemblies:Describing Low Level Psychological Phenomena Through Cell Assemblies (C R Huyck)The Implications of Binding for Models of Cognitive Brain Function (P H de Vries & G J Dalenoort)Representation:The Role of Perception and Action in Object Categorisation (A Borghi et al.)Perception Orientated Representation in Problem Solving (A Wichert)Memory:Habituation During Encoding of Episodic Memory (S Sikström)Short Term Memory in a Network of Spiking Neurons (J Sougné)Vision:Efficient Processing in the Retina (B T Vincent)Implementation of Visual Routines (G J van Tonder & Y Ejima)Perception:Natural Scene Perception: Visual Attractors and Images Processing (A Chauvin et al.)Ebbinghaus Illusion: Questioning the Role of Conceptual Similarity (S M Lambert & A E Azzi)Language:Integrating Perception and Production in a Neural Network Model (G Westermann & E R Miranda)The Influence of Semantics in Lexical Selection in Speech (R A I Davies)and other papers Readership: Graduate students, academics and researchers in neural computation and psychology. Keywords:Connectionist;Neural;Network;Computation;Models;Psychology;Perception;Cognition;Memory;Vision;Language **What Babies Know Core Knowledge and Composition Volume 1** *Oxford University Press* What do infants know? How does the knowledge that they begin with prepare them for learning about the particular physical, cultural, and social world in which they live? Answers to this question shed light not only on infants but on children and adults in all cultures, because the core knowledge possessed by infants never goes away. Instead, it underlies the unspoken, common sense knowledge of people of all ages, in all societies. By studying babies, researchers gain insights into infants themselves, into older children's prodigious capacities for learning, and into some of the unconscious assumptions that guide our thoughts and actions as adults. In this major new work, Elizabeth Spelke shares these insights by distilling the findings from research in developmental, comparative, and cognitive psychology, with excursions into studies of animal cognition in psychology and in systems and cognitive neuroscience, and studies in the computational cognitive sciences. Weaving across these disciplines, she paints a picture of what young infants know, and what they quickly come to learn, about objects, places, numbers, geometry, and people's actions, social engagements, and mental states. A landmark publication in the developmental literature, the book will be essential for students and researchers across the behavioral, brain, and cognitive sciences. **The Cambridge Handbook of Cognitive Development** "The scientific study of cognitive development in young children traces its roots back to Jean Piaget, a pioneer of this field in the twentieth century (Piaget, 1954, 1983). From infancy to adolescence, children progress through four psychological stages: (1) the sensorimotor stage from birth to two years (when cognitive functioning is based primarily on biological reactions, motor skills and perceptions); (2) the preoperational stage from two to seven years (when symbolic thought and language become prevalent, but reasoning is illogical by adult standards); (3) the concrete operations stage from seven to twelve years (when logical reasoning abilities emerge but are limited to concrete objects and events); and (4) the formal operations stage at approximately twelve years (when thinking about abstract, hypothetical, and contrary-to-fact ideas becomes possible). According to Piaget, the child, like the logician or mathematician, "models" objects, their properties, and their relations through a succession of cognitive frameworks, from primary biological reactions and motor skills to high-order formal thinking. After the age of twelve, children model a formal hypothetico-deductive logic that ultimately resembles the rational logic of scientists and mathematicians. Piaget was the first psychologist to take children's thinking seriously. His genius was based on the idea of building his child development theory on triple roots in epistemological, biological, and logico-mathematical foundations. Consequently, Piaget is now recognized as one of the precursors of cognitive science during the last century (Fischer & Kaplan, 2003)"-- **Advances in Child Development and Behavior** *Elsevier* Advances in Child Development and Behavior is intended to ease the task faced by researchers, instructors, and students who are confronted by the vast amount of research and theoretical discussion in child development and behavior. The serial provides scholarly technical articles with critical reviews, recent advances in research, and fresh theoretical viewpoints. Volume 32 discusses cultural contributions in development, infants' representation of objects and events, the impacts of affluence, mechanisms of early categorization and induction, attentional inertia, the early development of pictorial competence, and classroom competence. **How the Mind Comes Into Being An Introduction to Cognitive Science from a Functional and Computational Perspective** *Oxford University Press* More than 2000 years ago Greek philosophers were pondering the puzzling dichotomy between our physical bodies and our seemingly non-physical minds. Yet even today, it remains puzzling how our mind controls our body, and vice versa, how our body shapes our mind. How is it that we can think highly abstract thoughts, seemingly fully detached from the actual, physical reality? This book offers an interdisciplinary introduction to embodied cognitive science, addressing the question of how the mind comes into being while actively interacting with and learning from the environment by means of the own body. By pursuing a functional and computational perspective, concrete answers are provided about the fundamental mechanisms and developing structures that must bring the mind about, taking into account insights from biology, neuroscience, psychology, and philosophy as well as from computer science, machine learning, and artificial intelligence. The book provides introductions to the most important challenges and available computational approaches on how the mind comes into being. The book includes exercises, helping the reader to grasp the material and understand it in a broader context. References to further studies, methodological details, and current developments support more advanced studies beyond the covered material. While the book is written in advanced textbook style with the primary target group being undergraduates in cognitive science and related disciplines, readers with a basic scientific background and a strong interest in how the mind works will find this book intriguing and revealing. **Cognitive Developmental Change Theories, Models and Measurement** *Cambridge University Press* Cognitive Developmental Change makes a fascinating contribution to the fields of developmental, cognitive and educational science by bringing together a uniquely diverse range of perspectives for analysing the dynamics of change. Connecting traditional Piagetian, information processing, and psychometric approaches with newer frameworks for the analysis of developmental change it provides the reader with an account of the latest theory and research at the time of publication. The contributors to the volume, all internationally respected experts, were asked when writing to consider three main aspects of cognitive change. Its object (what changes in the mind during development), its nature (how does change occur?) and its causes (why does change occur? Or, what are the internal and external factors responsible for cognitive change?). As a result chapters cover key theories of cognitive change, the factors that affect change including neurological, emotional and socio-cultural factors and methods for measuring and modelling change. **Computers, Cognition and Development Issues for Psychology and Education** *John Wiley & Sons Incorporated* Presents the implications of recent advances in information technology for applications in the field of psychology. Brings together work from researchers in artificial intelligence, education, and developmental psychology. Discusses issues posed by the increasing spread of information technology into society, including the effects on young children. Explains how insights that arise from the achievements of artificial intelligence may help define new computer environments for human learning. In particular, attention is focused on the debate between the advocates of the procedural language, LOGO, and those of the logic-programming language, PROLOG. Looks at computational metaphors of mental activity in cognitive science and developmental psychology. **Developmental Robotics From Babies to Robots** *MIT Press* A comprehensive overview of an interdisciplinary approach to robotics that takes direct inspiration from the developmental and learning phenomena observed in children's cognitive development. Developmental robotics is a collaborative and interdisciplinary approach to robotics that is directly inspired by the developmental principles and mechanisms observed in children's cognitive development. It builds on the idea that the robot, using a set of intrinsic developmental principles regulating the real-time interaction of its body, brain, and environment, can autonomously acquire an increasingly complex set of sensorimotor and mental capabilities. This volume, drawing on insights from psychology, computer science, linguistics, neuroscience, and robotics, offers the first comprehensive overview of a rapidly growing field. After providing some essential background information on robotics and developmental psychology, the book looks in detail at how developmental robotics models and experiments have attempted to realize a range of behavioral and cognitive capabilities. The examples in these chapters were chosen because of their direct correspondence with specific issues in child psychology research; each chapter begins with a concise and accessible overview of relevant empirical and theoretical findings in developmental psychology. The chapters cover intrinsic motivation and curiosity; motor development, examining both manipulation and locomotion; perceptual development, including face recognition and perception of space; social learning, emphasizing such phenomena as joint attention and cooperation; language, from phonetic

babbling to syntactic processing; and abstract knowledge, including models of number learning and reasoning strategies. Boxed text offers technical and methodological details for both psychology and robotics experiments. **Looking for 'constraints' in Infants' Perceptual-cognitive Development** Abstract: "Constraints on the development of mind are being invoked with increasing frequency, but without agreement as to what they are, how they work or what they do. This paper evaluates the theoretical potential of the notion of 'constraints' for attempts to understand infant object knowledge, by considering some important senses in which constraints have been proposed and following through the implications of attempting to apply them to infant perceptual-cognitive development. Marr's view of constraints, and the explanatory framework with which it is associated, helps to clarify the interpretation of data that suggest domain-specific innate constraints on infant object perception. **Neuroconstructivism: Perspectives and prospects** *Oxford University Press* What are the processes, from conception to adulthood, that enable a single cell to grow into a sentient adult? The processes that occur along the way are so complex that any attempt to understand development necessitates a multi-disciplinary approach, integrating data from cognitive studies, computational work, and neuroimaging - an approach till now seldom taken in the study of child development. Neuroconstructivism is a major new 2 volume publication that seeks to redress this balance, presenting an integrative new framework for considering development. Computer and robotic models provide concrete tools for investigating the processes and mechanisms involved in learning and development. Volume 2 illustrates the principles of 'Neuroconstructivist' development, with contributions from 9 different labs across the world. Each of the contributions illustrates how models play a central role in understanding development. The models presented include standard connectionist neural network models as well as multi-agent models. Also included are robotic models emphasizing the need to take embodiment and brain-system interactions seriously. A model of Autism and one of Specific Language Impairment also illustrate how atypical development can be understood in terms of the typical processes of development but operating under restricted conditions. This volume complements Volume 1 by providing concrete examples of how the 'Neuroconstructivist' principles can be grounded within a diverse range of domains, thereby shaping the research agenda in those domains. **Computational Explorations in Cognitive Neuroscience Understanding the Mind by Simulating the Brain** *MIT Press* This text, based on a course taught by Randall O'Reilly and Yuko Munakata over the past several years, provides an in-depth introduction to the main ideas in the computational cognitive neuroscience. The goal of computational cognitive neuroscience is to understand how the brain embodies the mind by using biologically based computational models comprising networks of neuronlike units. This text, based on a course taught by Randall O'Reilly and Yuko Munakata over the past several years, provides an in-depth introduction to the main ideas in the field. The neural units in the simulations use equations based directly on the ion channels that govern the behavior of real neurons, and the neural networks incorporate anatomical and physiological properties of the neocortex. Thus the text provides the student with knowledge of the basic biology of the brain as well as the computational skills needed to simulate large-scale cognitive phenomena. The text consists of two parts. The first part covers basic neural computation mechanisms: individual neurons, neural networks, and learning mechanisms. The second part covers large-scale brain area organization and cognitive phenomena: perception and attention, memory, language, and higher-level cognition. The second part is relatively self-contained and can be used separately for mechanistically oriented cognitive neuroscience courses. Integrated throughout the text are more than forty different simulation models, many of them full-scale research-grade models, with friendly interfaces and accompanying exercises. The simulation software (PDP++, available for all major platforms) and simulations can be downloaded free of charge from the Web. Exercise solutions are available, and the text includes full information on the software. **Neuroconstructivism - II Perspectives and Prospects** *Oxford University Press* What are the processes, from conception to adulthood, that enable a single cell to grow into a sentient adult? The processes that occur along the way are so complex that any attempt to understand development necessitates a multi-disciplinary approach, integrating data from cognitive studies, computational work, and neuroimaging - an approach till now seldom taken in the study of child development. 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This volume complements Volume 1 by providing concrete examples of how the Neuroconstructivist principles can be grounded within a diverse range of domains, thereby shaping the research agenda in those domains. **Handbook of Child Psychology, Cognition, Perception, and Language** *John Wiley & Sons* Part of the authoritative four-volume reference that spans the entire field of child development and has set the standard against which all other scholarly references are compared. Updated and revised to reflect the new developments in the field, the Handbook of Child Psychology, Sixth Edition contains new chapters on such topics as spirituality, social understanding, and non-verbal communication. Volume 2: Cognition, Perception, and Language, edited by Deanna Kuhn, Columbia University, and Robert S. Siegler, Carnegie Mellon University, covers mechanisms of cognitive and perceptual development in language acquisition. It includes new chapters devoted to neural bases of cognition, motor development, grammar and langauge rules, information processing, and problem solving skills. **Processes of Change in Brain and Cognitive Development Attention and Performance XXI** *Oxford University Press* In recent years there has been a shift within developmental psychology away from examining the cognitive systems at different ages, to trying to understand exactly what are the mechanisms that generate change. What kind of learning mechanisms and representational changes drive cognitive development? How can the imaging techniques available help us to understand these mechanisms? This new volume in the highy cited and critically acclaimed Attention and Performance series is the first to provide a systematic investigation into the processes of change in mental development. It brings together world class scientists to address brain and cognitive development at several different levels, including phylogeny, genetics, neurophysiology, brain imaging, behavior, and computational modeling, across both typically and atypically developing populations. Presenting original new research from the frontiers of cognitive neuroscience, this book will have a substantial impact in this field, as well as on developmental psychology and developmental neuroscience. **Handbook of Child Psychology and Developmental Science, Cognitive Processes** *John Wiley & Sons* The essential reference for human development theory, updated and reconceptualized The Handbook of Child Psychology and Developmental Science, a four-volume reference, is the field-defining work to which all others are compared. First published in 1946, and now in its Seventh Edition, the Handbook has long been considered the definitive guide to the field of developmental science. Volume 2: Cognitive Processes describes cognitive development as a relational phenomenon that can be studied only as part of a larger whole of the person and context relational system that sustains it. In this volume, specific domains of cognitive development are contextualized with respect to biological processes and sociocultural contexts. Furthermore, key themes and issues (e.g., the importance of symbolic systems and social understanding) are threaded across multiple chapters, although every each chapter is focused on a different domain within cognitive development. Thus, both within and across chapters, the complexity and interconnectivity of cognitive development are well illuminated. Learn about the inextricable intertwining of perceptual development, motor development, emotional development, and brain development Understand the complexity of cognitive development without misleading simplification, reducing cognitive development to its biological substrates, or viewing it as a passive socialization process Discover how each portion of the developmental process contributes to subsequent cognitive development Examine the multiple processes – such as categorizing, reasoning, thinking, decision making and judgment – that comprise cognition The scholarship within this volume and, as well, across the four volumes of this edition, illustrate that developmental science is in the midst of a very exciting period. There is a paradigm shift that involves increasingly greater understanding of how to describe, explain, and optimize the course of human life for diverse individuals living within diverse contexts. This Handbook is the definitive reference for educators, policy-makers, researchers, students, and practitioners in human development, psychology, sociology, anthropology, and neuroscience. **Conceptual Development Piaget's Legacy** *Psychology Press* This book examines a key issue in current cognitive theories - the nature of representation. Each chapter is characterized by attempts to frame hot topics in cognitive development within the landscape of current developmental theorizing and the past legacy of genetic epistemology. The chapters address four questions that are fundamental to any developmental line of inquiry: How should we represent the workings and contents of the mind? How does the child construct mental models during the course of development? What are the origins of these models? and What accounts for the novelties that are the products and producers of developmental change? These questions are situated in a historical context, Piagetian theory, and contemporary researchers attempt to trace how they draw upon, depart from, and transform the Piagetian legacy to revisit classic issues such as the child's awareness of the workings of mental life, the child's ability to represent the world, and the child's growing ability to process and learn from experience. The theoretical perspectives covered include constructivism, connectionism, theory-theory, information processing, dynamical systems, and social constructivist approaches. The research areas span imitation, mathematical reasoning, biological knowledge, language development, and theory of mind. Written by major contributors to the field, this work will be of interest to students and researchers wanting a brief but in-depth overview of the contemporary field of cognitive development. **Causal Learning Psychology, Philosophy, and Computation** *Oxford University Press* Understanding causal structure is a central task of human cognition. Causal learning underpins the development of our concepts and categories, our intuitive theories, and our capacities for planning, imagination and inference. During the last few years, there has been an interdisciplinary revolution in our understanding of learning and reasoning: Researchers in philosophy, psychology, and computation have discovered new mechanisms for learning the causal structure of the world. This new work provides a rigorous, formal basis for theory theories of concepts and cognitive development, and moreover, the causal learning mechanisms it has uncovered go dramatically beyond the traditional mechanisms of both nativist theories, such as modularity theories, and empiricist ones, such as association or connectionism. **Proceedings of the Twenty-first Annual Conference of the Cognitive Science Society** *Psychology Press* This book presents the complete collection of peer-reviewed presentations at the 1999 Cognitive Science Society meeting, including papers, poster abstracts, and descriptions of conference symposia. For students and researchers in all areas of cognitive science. **Developmental Cognitive Neuroscience** *John Wiley & Sons* **Proceedings of the 25th Annual Cognitive Science Society Part 1 and 2** *Psychology Press* This volume features the complete text of the material presented at the Twenty-Fifth Annual Conference of the Cognitive Science Society. As in previous years, the symposium included an interesting mixture of papers on many topics from researchers with diverse backgrounds and different goals, presenting a multifaceted view of cognitive science. This volume includes all papers, posters, and summaries of symposia presented at the leading conference that brings cognitive scientists together. The theme of this year's conference was the social, cultural, and contextual elements of cognition, including topics on collaboration, cultural learning, distributed cognition, and interaction. **Neurocomputational Models of Cognitive Development and Processing Proceedings of the 14th Neural Computation and Psychology Workshop** *World Scientific* This volume presents peer-reviewed versions of papers presented at the 14th Neural Computation and Psychology Workshop (NCPW14), which took place in July 2014 at Lancaster University, UK. The workshop draws international attendees from the cutting edge of interdisciplinary research in psychology, computational modeling, artificial intelligence and psychology, and aims to drive forward our understanding of the mechanisms underlying a range of cognitive processes. **Connectionist Models of Neurocognition and Emergent Behavior From Theory to Applications - Proceedings of the 12Th Neural Computation and Psychology Workshop** *World Scientific* This volume collects together most of the papers presented at the Twelfth Neural Computation and Psychology Workshop (NCPW12) held in 2010 at Birkbeck College (England). The conference invited submissions on neurocomputational models of all cognitive and psychological processes. The special theme of this conference was OC From Theory to ApplicationsOCO, which allowed submissions of pure theoretical work and of pure applied work. This topic extended the boundaries of the conference and highlighted the extent to which computational models of cognition and models in general are integrated in the cognitive sciences. The chapters in this book cover a wide range of research topics in neural computation and psychology, including cognitive development, language processing, higher-level cognition, but also ecology-based modeling of cognition, philosophy of science, and real-world applications."