Scientific Thinking

This collection of essays focuses on three reasoning problems devised by Peter Wason - the selection task, the 2-4-6 task, and the THOG problem - which have had a considerable influence since their invention.; The reasons why people make so many errors in these seemingly simple tasks are still not fully understood. A variety of different theoretical perspectives have been used in trying to explain performance. These include the mental models approach, the pragmatic reasoning approach, and the mental logic approach. This book contains chapters which discuss all these theories. Other chapters review the literature or offer alternative theoretical perspectives. A final chapter by Peter Wason describes how he came to create the tasks discussed.

Merkur proposes an alternative to the traditional psychoanalytic explanation of mystical experiences as regression to the solipsism of earliest infancy. He does this by viewing unitive thinking as a line of cognitive development, and mystical moments as creative inspirations on unitive topics. Utilizing classical self-reports by Christian, Jewish, and Muslim mystics, Patanjali’s Yoga Sutras, and modern Western peak experiences, Merkur argues that experiences of mystical union are manifestations of a broader category of psychological processes that manifest in scientific and moral thought, as well as in mysticism. Unconscious as well as conscious, unitive thinking is sometimes realistic and sometimes fantastic, in patterns that are consistent with cognitive development in general. Mystical moments of unitive thinking may be considered moments of creative inspiration that happen to make use of unitive ideas. Building on the psychoanalytic object-relations theory that the self is always in relationship with an object, Merkur argues that the solipsism of some varieties of mystical union always implies unconscious ideas of a love object who is transcendent.

The Routledge International Handbook of Thinking and Reasoning is an authoritative reference work providing a balanced overview of current scholarship spanning the full breadth of the rapidly developing and expanding field of thinking and reasoning. It contains 35 chapters written by leading international researchers, covering foundational issues as well as state-of-the-art developments in thinking and reasoning research. Topics covered range across all sub-areas of thinking and reasoning, including deduction, induction, abduction, judgment, decision making, argumentation, problem solving, expertise, creativity and rationality. The contributors engage with cutting-edge debates such as the status of dual-process theories of thinking, the role of unconscious, intuitive, emotional and metacognitive processes in thinking, and the importance of probabilistic conceptualisations of thinking and reasoning. Authors also examine the importance of neuroscientific findings in informing theoretical developments, and explore the situated nature of thinking and reasoning across a range of real-world contexts such as mathematics, medicine and science. The Handbook provides a clear sense of the way in which contemporary ideas are challenging traditional viewpoints as "new paradigm of the psychology of reasoning" emerges. This paradigm-shifting research is paving the way toward a richer and more inclusive understanding of thinking and reasoning, where important new questions drive a forward-looking research agenda. It is essential reading for both established researchers in the field of thinking and reasoning as well as advanced students wishing to learn more about both the historical foundations and latest developments in this rapidly growing field.

Case studies, personal accounts, and analysis show how to recognize and combat pseudoscience in a post-truth world. In a post-truth, fake news world, we are particularly susceptible to the claims of pseudoscience. When emotions and opinions are more widely disseminated than scientific findings, and self-proclaimed experts get their expertise from Google, how can the average person distinguish real science from fake? This book examines pseudoscience from a variety of perspectives, through case studies, analysis, and personal accounts that show how to recognize pseudoscience, why it is so widely accepted, and how to advocate for real science. Contributors examine the basics of pseudoscience, including issues of cognitive bias; the costs of pseudoscience, with accounts of naturopathy and logical fallacies in the anti-vaccination movement; perceptions of scientific soundness; the mainstream presence of “integrative medicine,” hypnosis, and parapsychology; and the use of case studies and new media in science advocacy. Contributors David Ball, Paul Joseph Barnett, Jeffrey Beall, Mark Benisz, Fernando Blanco, Ron Dumont, Stacy Ellenberg, Kevin M. Folta, Christopher French, Ashwin Gautam, Dennis M. Gorman, David H. Gorski, David K. Hecht, Britt Marie Hermes, Clyde F. Herreid, Jonathan Howard, Seth C. Kalichman, Leif Edward Ottesen Kennair, Arnold Kozak, Scott O. Lilienfeld, Emilio Lobato, Steven Lynn, Adam Marcus, Helena Matute, Ivan Oransky, Chad Orzel, Dorit Reiss, Ellen Beate Hansen Sandseter, Kavin Senapathy, Dean Keith Simonton, Indre Viskontas, John O. Willis, Corrine Zimmerman

Speech and language pathologists, like all professionals who claim to be scientific in their practice, make a public commitment to operate on the basis of knowledge derived in accordance with sound scientific standards. Yet students in communication disorders are given relatively little grounding in the fundamentals of science; indeed, they often receive implicit encouragement to rely on clinical wisdom. This pathbreaking text introduces the principles of critical scientific thinking as they relate to assessing communication problems, deciding about alternative approaches to intervention, and evaluating outcomes. The author provides many illustrative examples to help readers contextualize the ideas. Her clear presentation will help not only undergraduate and graduate students but also established professionals reason more effectively about what they are doing and why. Though the examples come from speech and language pathology, this illuminating and readable book constitutes a valuable resource for all clinical practitioners.

This book covers a wide variety of subjects, ranging from a New World Calendar to Einstein's Theories of Relativity. It describes interesting aspects of Astronomy, History, Philosophy and Life, using simple terms that do no require prior knowledge of these matters. Several natural phenomena are examined and many scientific aspects of our environment and of life in general, are presented. The book is full of fascinating information that effectively makes it a short course in basic science and astronomy and an imaginative study of many aspects of human nature. A short section on humour provides a relaxing variation from the seriousness of the technical subjects and the controversial natureof the human

aspects.
Scientific Thinking is a practical guide to inductive reasoning—the sort of reasoning that is commonly used in scientific activity, whether such activity is performed by a scientist, a reporter, a political pollster, or any one of us in day-to-day life. The book provides comprehensive coverage of such topics as confirmation, sampling, correlations, causality, hypotheses, and experimental methods. Martin’s writing confounds those who would think that such topics must be dry-as-dust, presenting ideas in a lively and engaging tone and incorporating amusing examples throughout. This book underlines the importance of acquiring good habits of scientific thinking, and helps to instill those habits in the reader. Stimulating questions and exercises are included in each chapter.
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How is existing knowledge reconciled with new information in the mind of a young child, as compared to that of a more sophisticated thinker? Development of Scientific Thinking Skills explores a new framework for the conceptualization of changes in the strategies of inductive reasoning from middle childhood to adulthood. Cognitive development Thinking skills Scientific thinking Evidence evaluation Theory Revision
Gavin I. Langmuir's work on the formation and nature of antisemitism has earned him an international reputation. In History, Religion, and Antisemitism he bravely confronts the problems that arise when historians have to describe and explain religious phenomena, as any historian of antisemitism must. How, and to what extent, can the historian be objective? Is it possible to discuss Christian attitudes toward Jews, for example, without adopting the historical explanations of those whose thoughts and actions one is discussing? What, exactly, does the historian mean by "religion" or "religious"? Langmuir's original and stimulating responses to these questions reflect his inquiry into the approaches of anthropology, sociology, and psychology and into recent empirical research on the functioning of the mind and the nature of thought. His distinction between religiosity, a property of individuals, and religion, a social phenomenon, allows him to place unusual emphasis on the role of religious doubts and tensions and the irrationality they can produce. Defining antisemitism as irrational beliefs about Jews, he distinguishes Christian anti-Judaism from Christian antisemitism, demonstrates that antisemitism emerged in the twelfth and thirteenth centuries because of rising Christian doubts, and sketches how the revolutionary changes in religion and mentality in the modern period brought new faiths, new kinds of religious doubt, and a deadlier expression of antisemitism. Although he developed it in dealing with the difficult question of antisemitism, Langmuir's approach to religious history is important for historians in all areas.
A concise introduction to the fundamental concepts of social scientific thinking and research, this classic text makes scientific thinking, research methods, and statistics accessible to undergraduates at a commonsense level. This text is intended for use in a broad array of the social sciences, including Political Science, Sociology, and Psychology. Available with InfoTrac Student Collections http://gocengage.com/infotrac. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.
This volume of the Thinker's Guide Library employs critical thinking concepts in the development of productive scientific thought. Readers will learn to reason within the logic of their scientific disciplines and will find their analytical abilities enhanced by the engaging framework of inquiry set forth by Richard Paul and Linda Elder.
Met zijn boek God als misvatting rekende Richard Dawkins af met het geloof als middel om de werkelijkheid te begrijpen. Maar God is niet de enige bedreiging van de wetenschap en van het gezonde verstand. Ook de belangstelling voor astrologie, homeopathie en andere pseudowetenschappen blijft Richard Dawkins een doorn in het oog. Waarom wil de mens zo graag bedrogen worden door sprookjes en mythen? De vraag stellen is hem beantwoorden: de mens wil graag verleid worden door mooie verhalen. Er is geen enkele reden om daarvoor het terrein van de wetenschap te verlaten want Een regenboog ontrafelen is precies dát: een mooi verhaal. De verklaringen die de wetenschap heeft te bieden, bevatten juist vaak de meeste schoonheid. Er schuilt poëzie in de formule, en gelukkig hebben we Richard Dawkins om dat te laten zien.'
A.C. Crombie is one of the best known writers on the history of Science. Science, Optics and Music in Medieval and Early Modern Thought brings together a coherent body of essays that complement his books and are of independent value. A.C. Crombie traces general themes in the development of Science: the Aristotelian inheritance and the importance of the search for logical explanation in the middle ages; the ambitions and limitations of experiment and quantification; changing attitudes to scientific progress; the relations between Science and the Arts, and between Mathematics, Music and Medical Science; and the study of the senses. In particular he shows how the mechanistic hypothesis stimulated the experimental and philosophical study of vision.
Murphy (Christian philosophy, Fuller theological Seminary) argues against the skepticism about Christian belief, and shows how it is similar to scientific reasoning as described by contemporary philosophers of science employing a postmodern, holistic perspective. Annotation copyrighted by Book News, Inc., Portland, OR
This volume of the Thinker’s Guide Library employs critical thinking concepts in the development of productive scientific thought. Readers will learn to reason within the logic of their scientific disciplines and will find their analytical abilities enhanced by the engaging framework of inquiry set forth by Richard Paul and Linda Elder.
Defense of Scientific Hypothesis: From Reproducibility Crisis to Big Data sets out to explain and defend the scientific hypothesis. Alger's mission is to counteract the misinformation and misunderstanding about the hypothesis that even seasoned scientists have concerning its nature and place in modern science. Most biological scientists receive little or no formal training in scientific thinking. Further, the hypothesis is under attack by critics who claim that it is irrelevant to science. In order to appreciate and evaluate scientific controversies like global climate change, vaccine safety, etc., the public first needs to understand the hypothesis. Defense of Scientific Hypothesis begins by describing and analyzing the scientific hypothesis in depth and examining its relationships to various kinds of science. Alger then guides readers through a review of the hypothesis in the context of the Reproducibility Crisis and presents survey data on how scientists perceive and employ hypotheses. He assesses cognitive factors that influence our ability to use the hypothesis and makes practical and policy recommendations for teaching and learning about it. Finally, Alger considers two possible futures of the hypothesis in science as the Big Data revolution looms: in one scenario, the hypothesis is displaced by the Big Data Mindset that forgoes understanding in favor of correlation and prediction. In the other, robotic science incorporates the hypotheses into mechanized laboratories guided by artificial intelligence. But in his illuminating epilogue, Alger envisions a third way, the Centaur Scientist, a symbiotic relationship between human scientists and computers.
Scientific ThinkingBroadview Press

This book examines the learning and development process of students' scientific thinking skills. Universities should prepare students to be able to make judgements in their working lives based on scientific evidence. However, an understanding of how these thinking skills can be developed is limited. This book introduces a new broad theory of scientific thinking for higher education; in doing so, redefining higher-order thinking abilities as scientific thinking skills. This includes critical thinking and understanding the basics of science, epistemic maturity, research and evidence-based reasoning skills and contextual understanding. The editors and contributors discuss how this concept can be redefined, as well as the challenges educators and students may face when attempting to teach and learn these skills. This edited collection will be of interest to students and scholars of student scientific skills and higher-order thinking abilities.

At the turn of the 21st century, the most valuable commodity in society is knowledge--particularly new knowledge that may give a culture, company, or laboratory an adaptive advantage. Knowledge about the cognitive processes that lead to discovery and invention can enhance the probability of making valuable new discoveries and inventions. Such knowledge needs to be made widely available to ensure that no particular interest group "corners the market" on techno-scientific creativity. Knowledge can also facilitate the development of business strategies and social policies based on a genuine understanding of the creative process. Furthermore, through an understanding of principles underlying the cognitive processes related to discovery, educators can utilize these principles to teach students effective problem-solving strategies as part of their education as future scientists. This book takes the reader out onto the cutting edge of research in scientific and technological thinking. The editors advocate a multiple-method approach; chapters include detailed case studies of contemporary and historical practices, experiments, computational simulations, and innovative theoretical analyses. The editors attempt a provocative synthesis of this work at the end. In order to achieve true scientific and technological progress, an understanding of the process by which species are transforming the world is needed. This book makes an important step in that direction by leading to breakthroughs in the understanding of discovery and invention.

How can educators bridge the gap between "big" ideas about teaching students to think and educational practice? This book addresses this question by a unique combination of theory, field experience and elaborate educational research. Its basic idea is to look at science instruction with regard to two sets of explicit goals: one set refers to teaching science concepts and the second set refers to teaching higher order thinking. This book tells about how thinking can be taught not only in the rare and unique conditions that are so typical of affluent experimental educational projects but also in the less privileged but much more common conditions of educational practice that most schools have to endure. It provides empirical evidence showing that students from all academic levels actually improve their thinking and their scientific knowledge following the thinking curricula, and discusses specific means for teaching higher order thinking to students with low academic achievements. The second part of the book addresses issues that pertain to teachers' professional development and to their knowledge and beliefs regarding the teaching of higher order thinking. This book is intended for a very large audience: researchers (including graduate students), curricular designers, practicing and pre-service teachers, college students, teacher educators and those interested in educational reform. Although the book is primarily about the development of thinking in science classrooms, most of it chapters may be of interest to educators from all disciplines.

Expectations for early learning are very different than they were even as recently as a decade ago. With increased recognition of the intellectual capacities of young children, as well as a growing understanding of how these capacities develop and can be fostered, has come a growing recognition that early childhood education, in both formal and informal settings, may not be helping all children maximize their cognitive capacities. Mathematical and Scientific Development in Early Childhood explores the research in cognition and developmental psychology that sheds light on children's capacity to learn mathematical and scientific ideas. This summary report of the discussions and presentations at the workshop is designed to frame the issues relevant to advancing research useful to the development of research-based curricula for mathematics and science for young children.

IV. Developmental & Social Psychology: Simona Ghetti (Volume Editor) (Topics covered include development of visual attention; self-evaluation; moral development; emotion-cognition interactions; person perception; memory; implicit social cognition; motivation group processes; development of scientific thinking; language acquisition; development of mathematical reasoning; emotion regulation; emotional development; development of theory of mind; category and conceptual development; attitudes; executive function.)

What does it take to be a scientist? Equally important, what does it take to be happy as a scientist? Drawing on thirty years of experience, Philip Schwartzkroin offers the budding scientist an invaluable glimpse into the day-to-day life of the researcher, filling a huge hole in the education of most would-be scientists--whether undergraduates or high school seniors. As Schwartzkroin points out, many of the most important things researchers learn as they hone their craft are not written down anywhere. And many of these insights come as a surprise to the naïve and well-meaning student who somehow believes that "doing research" is an occupation that is substantially different from doing a job in "the real world." This book looks at the "job" of science. Starting with suggestions about how to decide whether you'd want to pursue such a career (and if so, how to get started), the book works through some of the obvious topics relevant to a research profession--how to write a paper, give a talk, construct a grant proposal. It also examines less obvious topics that are generally incorporated into a research education only by trial and error--"thinking" like a scientist, negotiating scientific politics, dealing with research ethics, and understanding social interactions. And the book includes many "real-life situations" that may confront the young scientist, along with the author's advice on how to solve these problems. Based on the author's long career in the laboratory and his rich experience mentoring trainees, So You Want to be a Scientist provides information and insights that will help the young scientist make better decisions and choices. It will also be useful to teachers, counselors, and parents for its realistic look at the demands and requirements for success in a research career.

This definitive volume is the result of collaboration by top scholars in the field of children's cognition. New edition offers an up-to-date overview of all the major areas of importance in the field, and includes new data from cognitive neuroscience and new chapters on social cognitive development and language Provides state-of-the-art summaries of current research by international specialists in different areas of cognitive development Spans aspects of cognitive development from infancy to the onset of adolescence Includes chapters on symbolic reasoning, pretend play, spatial development, abnormal cognitive development and current theoretical perspectives

An intriguing look at the marginal sciences of the nineteenth century and their influence on the culture of the period.

The book exposes many of the misunderstandings about the scientific method and its application to critical thinking. It argues for a better understanding of the scientific method and for nurturing critical thinking in the community. This knowledge helps the reader to analyze issues more objectively, and warns about the dangers of bias and propaganda. The principles are illustrated by considering several issues that are currently being debated. These include anthropogenic global warming (often loosely referred to as climate change), dangers to preservation of the Great Barrier Reef, and the expansion of the gluten-free food market and genetic engineering.

A collection of 6 volumes of Oakeshott's work: Notebooks, 1922-86, Early Political Writings 1925-30, The Concept of a Philosophical Jurisprudence, Vocabulary of a Modern European State, Lectures in the History of Political Thought, and What is History?

Rediscover science from a child's perspective and enhance your inquiry-based science toolbox with brain-based strategies that integrate science across content areas and improve student outcomes.