

VOLUME 16
NUMBER 2
JUNE 1993

An International Journal of Current Research
and Theory with Open Peer Commentary

Behavioral and Brain Sciences

Appearing in this issue, with Commentary . . .

“What” and “where” in spatial language and spatial cognition Barbara Landau & Ray Jackendoff

Cultural and reproductive success in industrial societies: Testing the relationship at the proximate and ultimate levels Daniel Pérusse

Multiple book review of *Deduction* Philip N. Johnson-Laird & Ruth M. J. Byrne

Also, Continuing Commentary on

“Multiple book review of *The Intentional Stance*” (Dennett)

“Classical conditioning: The new hegemony” (Turkkan)

“The reliability of peer review for manuscript and grant submissions: A cross-disciplinary investigation” (Cicchetti)

“Is human information processing conscious?” (Velmans)

CAMBRIDGE

ISSN 0140-525X

Behavioral and Brain Sciences

Editor

Stevan Harnad

E-mail: harnad@clarity.princeton.edu or
harnad@pucc.bitnet
20 Nassau St., Suite 240
Princeton, NJ 08542

Managing Editor

Nancy Simon

Chief Copy Editor

Avis Kniffin

Associate Editors

Behavioral Biology
Jack P. Hailman/U. Wisconsin
Hubert Markl/U. Konstanz

Biosocial Behavior
Glendon Schubert/U. Hawaii, Manoa

Cognition and Artificial Intelligence
Zenon Pylyshyn/U. Western Ontario

Cognitive Development
Annette Karmiloff-Smith/MRC, London and MPI, Nijmegen

Evolutionary Biology
Michael T. Ghiselin/California Academy of Sciences

Experimental Analysis of Behavior
A. Charles Catania/U. Maryland, Baltimore County

History and Systems
Julian Jaynes/Princeton

Language and Cognition
Philip Johnson-Laird/Princeton

Language and Language Disorders
Max Coltheart/Macquarie U.

Linguistics
Robert Freidin/Princeton

Neurobiology
Irving Kupfermann/Columbia

Neurobehavioral Genetics
Wim E. Crusio/Centre National de la Recherche Scientifique

Neuropsychology
Jeffrey A. Gray/Inst. Psychiatry, London
John C. Marshall/Radcliffe Infirmary, Oxford

Neurophysiology
Sten Grillner/Karolinska Institutet

Paleoneurology
Stephen Jay Gould/Harvard

Perception
Bruce Bridgeman/U. California
Richard Gregory/U. Bristol

Philosophy
Daniel C. Dennett/Tufts
Gilbert Harman/Princeton

Philosophy of Science
Adolf Grünbaum/U. Pittsburgh
Massimo Piatelli-Palmarini/MIT

Primatology
Horst D. Steklis/Rutgers

Psychobiology
Victor H. Denenberg/U. Connecticut
David S. Olton/Johns Hopkins

Vision and Artificial Intelligence
Stuart Sutherland/U. Sussex

Editorial Policy *Behavioral and Brain Sciences* (BBS) is an international journal providing a special service called Open Peer Commentary* to researchers in any area of psychology, neuroscience, behavioral biology, or cognitive science who wish to solicit, from fellow specialists within and across these BBS disciplines, multiple responses to a particularly significant and controversial piece of work. (See *Instructions for Authors and Commentators*, inside back cover.) The purpose of this service is to contribute to the communication, criticism, stimulation, and particularly the unification of research in the behavioral and brain sciences, from molecular neurobiology to artificial intelligence and the philosophy of mind.

Papers judged by the editors and referees to be appropriate for Commentary are circulated to a large number of commentators selected by the editors, referees, and author to provide substantive criticism, interpretation, elaboration, and pertinent complementary and supplementary material from a full cross-disciplinary perspective. The article, accepted commentaries, and the author's response then appear simultaneously in BBS.

Commentary on BBS articles may be provided by any qualified professional in the behavioral and brain sciences, but much of it is drawn from a large body of BBS Associates who have become formally affiliated with the project.

Qualified professionals are eligible to become BBS Associates if they have (1) been nominated by a current BBS Associate, (2) refereed for BBS, or (3) had a commentary or article accepted for publication. A special subscription rate is available to Associates. Individuals interested in serving as BBS Associates are asked to write the editor.

This publication was supported in part by NIH Grant LM 03539 from the National Library of Medicine.

Copying This journal is registered with the Copyright Clearance Center (27 Congress St., Salem, MA 01970). Organizations in the U.S.A. who are also registered with the CCC may therefore copy material (beyond the limits permitted by sections 107 and 108 of U.S. Copyright Law) subject to payment to the CCC of the per-copy fee indicated in the code on the first page of the article. This consent does not extend to multiple copying for promotional or commercial purposes.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, PA 19104, is authorized to supply single copies of separate articles for private use only.

For all other use, permission should be sought from the Cambridge or New York offices of the Press.

Subscriptions *Behavioral and Brain Sciences* (ISSN 0140-525X) is published quarterly in March, June, September, and December. Four parts form a volume. The subscription price for institutions of Volume 16 (1993) is US \$196.00 net in the U.S.A. and Canada; £133.00 in the rest of the world; for individuals US \$80.00 net (£54.00); for BBS Associates and for students (in the U.S.A. and Canada only) with proof of eligibility with order US \$46.00 net (£34.00); for APA, APS, and ASA members US \$64.00 net (£34.00) with proof of eligibility with order. Subscription price includes postage.

Single parts cost US \$50.00 net (£34.00) plus postage. Institutional orders may be sent to a bookseller, or, in the U.S.A. and Canada direct to: Cambridge University Press, 40 West 20 Street, New York, NY 10011-4211; in the U.K. and rest of the world to: Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, England. Individuals must order direct from the Press. Second class postage paid at New York, N.Y., and at additional mailing offices. Postmaster: Send address changes in the U.S.A. and Canada to *Behavioral and Brain Sciences*, Cambridge University Press, 40 West 20 Street, New York, NY 10011-4211.

Advertising Inquiries about advertising should be sent to the Journals Promotion Department of the Cambridge or New York Office of Cambridge University Press.

*Modelled on the 'CA Comment' service of the journal *Current Anthropology*.

Contents Volume 16:2 June 1993

Landau, B. & Jackendoff, R. "What" and "where" in spatial language and spatial cognition 217

Open Peer Commentary

Bennett, D. C. There is more to location than prepositions	239
Bridgeman, B. Spatial and cognitive vision differentiate at low levels, but not in language	240
Brown, H. D. The role of cerebral lateralization in expression of spatial cognition	240
Bryant, D. J. Frames of reference in the spatial representation system	241
Corballis, M. C. Generative versus nongenerative thought	242
Deregowski, J. B. Are spatial representations flattish?	243
Feldman, J. Causal models of spatial categories	244
Friederici, A. D. On places, prepositions and other relations	245
Heidorn, P. B. & Hirtle, S. C. Is spatial information imprecise or just coarsely coded?	246
Hoffman, D. D. No perception without representation	247

Ingle, D. Evolution and physiology of "what" versus "where"	247
Mainwaring, S. D. Distinguishing the linguistic from the sublinguistic and the objective from the configurational	248
Olson, D. R. Spatial development	249
Slobin, D. I. Is spatial language a special case?	249
Tarr, M. J. From perception to cognition	251
Tversky, B. & Clark, H. H. Prepositions aren't places	252
Wagemans, J. From observations on language to theories of visual perception	253
Wolfe, J. M. Talking to yourself about <i>what</i> is <i>where</i> : What is the vocabulary of preattentive vision?	254

Authors' Response

Landau, B. & Jackendoff, R. Whence and whither in spatial language and spatial cognition?	255
---	-----

Péruce, D. Cultural and reproductive success in industrial societies: Testing the relationship at the proximate and ultimate levels 267

Open Peer Commentary

Alcock, J. Exadaptations	283
Betzig, L. Where are the bastards' daddies?	284
Bookstein, F. L. Converting cultural success into mating failure by aging	285
Borgerhoff Mulder, M. Cultural success and the study of adaptive design	286
Broude, G. J. Attractive single gatherer wishes to meet rich, powerful hunter for good time under mongongo tree	287
Carey, G. The status/reproduction correlation: But what is the mechanism?	289
Daly, M. Beyond reproductive success differentials	289
Dickemann, M. Human reproductive plasticity	290
Dunbar, R. I. M. On the evolution of alternative reproductive strategies	291
Dupré, J. Scientism, sexism and sociobiology: One more link in the chain	292
Flinn, M. V. Evolutionary psychology: Black box "mechanisms"?	293
Glenn, N. D. Some evidence on cultural and reproductive success in the United States	293
Hartung, J. Péruce is right	294
Hill, E. M. Are our reproductive choices affected by aspects of socioeconomic resources?	294
Irons, W. Monogamy, contraception and the cultural and reproductive success hypothesis	295
Kaplan, H. The problem of resource accrual and reproduction in modern human populations remains an unsolved evolutionary puzzle	297
Kemper, T. D. Social dominance attainment, testosterone, libido and reproductive success	298

Kenrick, D. T. Do these sociobiologists have an answer for everything?	299
Low, B. S. Resources and reproduction: What hath the demographic transition wrought?	300
Mealey, L. Sociobiology or evolutionary psychology? The debate continues	300
Mueller, U. Actual and potential reproduction: There is no substitute for victory	301
Plotkin, H. C. Stretching the theory beyond its limits	303
Silverberg, J. The adaptiveness of imaginatively eliminating behaviors: Stripping the cultural varnish from the natural evolutionary woodwork	304
Simpson, J. A. Male reproductive success as a function of social status: Some unanswered evolutionary questions	305
Smith, E. A. Cultural versus reproductive success: Resolving the conundrum	307
Steven, D. C. "Potential" reproductions as an alternative proxy for reproductive success: A great direction, but the wrong road	307
Thiessen, D. Sexual momentum may be independent of social status	308
Thompson, N. S. Oh no! Not social Darwinism <i>again!</i>	309
Vining, D. R., Jr. Problems with the Darwinian hypothesis	310
Wahlsten, D. Sociobiology flops again	310
Wilson, M. What is the adaptation: Status striving, status itself or parental teaching biases?	311

Author's Response

Péruce, D. Human status seeking is a Darwinian adaptation	312
---	-----

Johnson-Laird, P. N. & Byrne, R. M. J. Précis of *Deduction* 323

Open Peer Commentary

Andrews, A. D. Mental models and tableau logic	334
Bach, K. Getting down to cases	334

Bara, B. G. Toward a developmental theory of mental models	336
--	-----

Baron, J. Deduction as an example of thinking	336	Inder, R. Architecture and algorithms: Power sharing for mental models	354
Barwise, J. Everyday reasoning and logical inference	337	Legrenzi, P. & Sonino, M. The content of mental models	354
Braine, M. D. S. Mental models cannot exclude mental logic and make little sense without it	338	Luchins, A. S. & Luchins, E. H. Gestalt theory, formal models and mathematical modeling	355
Bundy, A. "Semantic procedure" is an oxymoron	339	MacLennan, B. J. Visualizing the possibilities	356
Chater, N. Mental models and nonmonotonic reasoning	340	Manktelow, K. I. Models for deontic deduction	357
Cohen, L. J. Some difficulties about deduction	341	ter Meulen, A. G. B. Situation theory and mental models	358
Crawford, J. M. Tractability considerations in deduction	343	Newstead, S. E. Do mental models provide an adequate account of syllogistic reasoning performance?	359
Davis, H. Deduction by children and animals: Does it follow the Johnson-Laird & Byrne model?	344	Oaksford, M. Mental models and the tractability of everyday reasoning	360
Engel, P. Mental-model theory and rationality	345	Over, D. Deduction and degrees of belief	361
Evans, J. St. B. T. On rules, models and understanding	345	Polk, T. A. Mental models, more or less	362
Falmagne, R. J. On modes of explanation	346	Pollard, P. There is no need for (even fully fleshed out) mental models to map onto formal logic	363
Fetzer, J. H. The argument for mental models is unsound	347	Savion, L. Unjustified presuppositions of competence	364
Fillenbaum, S. Deductive reasoning: What are taken to be the premises and how are they interpreted?	348	Stenning, K. & Oberlander, J. Nonsentential representation and nonformality	365
Fisher, A. Mental models and informal logic	349	Stevenson, R. J. Models, rules and expertise	366
Galotti, K. M. & Komatsu, L. K. Why study deduction?	350	Tweney, R. D. Scientific thinking and mental models	366
Garnham, A. A number of questions about a question of number	350	Wetherick, N. E. More models just means more difficulty	367
Grandy, R. E. Rule systems are not dead: Existential quantifiers are harder	351		
Green, D. W. Mental models: Rationality, representation and process	352	Authors' Response	
Hodges, W. The logical content of theories of deduction	353	Johnson-Laird, P. N. & Byrne, R. M. J. Mental models or formal rules?	368

Continuing Commentary

On Dennett, D. C. (1988) <i>Précis of The Intentional Stance</i> . BBS 11:495–546.			381
Bennett, J. Comments on Dennett from a cautious ally	381	Author's Response	
Ringen, J. Dennett's intentions and Darwin's legacy	386	Dennett, D. C. Evolution, teleology, intentionality	389
On Turkkkan, J. S. (1989) Classical conditioning: The new hegemony. BBS 12:121–179.			392
Malmo, R. B. & Furedy, J. J. Settling the stimulus-substitution issue is a prerequisite for sound nonteleological neural analysis of heart-rate deceleration conditioning	392	Tonneau, F. Stimulus correlations in complex operant settings	393
Merckelbach, H. & van den Hout, M. Classical conditioning: The hegemony is not ubiquitous	393	Author's Response	
		Turkkkan, J. S. Functions and effects of Pavlovian stimuli	394
On Cicchetti, D. V. (1991) The reliability of peer review for manuscript and grant submissions: A cross-disciplinary investigation. BBS 14:119–186.			398
Crothers, C. Peer review reliability: The hierarchy of the sciences	398	Author's Response	
Luce, R. D. Reliability is neither to be expected nor desired in peer review	399	Cicchetti, D. V. The reliability of peer review for manuscript and grant submissions: "It's like déjà vu all over again!"	401
Sinclair, J. D. Drop censorship in science	400		
On Velmans, M. (1991) Is human information processing conscious? BBS 14:651–726.			404
Glicksohn, J. Putting consciousness in a box: Once more around the track	404	Habibi, A. & Bendele, M. S. On relativity of time and the causal status of consciousness	404

EDITORIAL NOTE	405	EDITORIAL NOTE	409
Navon, D. Experience and information should be distinguished	405	Author's Response	
Neill, W. T. Consciousness, not focal attention, is causally effective in human information processing	406	Velmans, M. Consciousness, causality and complementarity	409
Rao, K. R. Consciousness, awareness and first-person perspective	407		

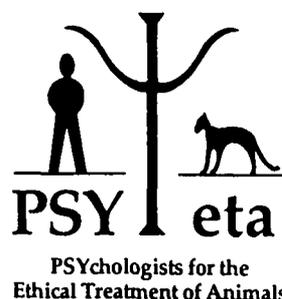
PSYCHOLOGISTS FOR THE ETHICAL TREATMENT OF ANIMALS

Human Innovations and Alternatives, an annual publication featuring brief articles from various laboratory disciplines that describe in concrete terms "alternatives" in husbandry, toxicology, experimental design and procedure and teaching. Individual subscriptions are \$20, institutional \$25. For information on manuscript submission, write to: Emmanuel Bernstein, Ph.D., Adirondack Counseling, Glenwood Estate, Saranac Lakes, NY 12983.

Society and Animals publishes studies which describe and analyze our experience of nonhuman animals. The goal of the journal is to stimulate and support an emerging content area within the social sciences consisting of studies of the ways in which nonhuman animals figure in our lives. Individual subscriptions are \$30 per volume (2 issues). For information on manuscript submission, write to: Kenneth Shapiro, Ph.D., PSYeta, P.O. Box 1297, Washington Grove, MD 20880-1297.

Subscriptions are payable to: PSYeta, P.O. Box 1297, Washington Grove, MD 20880-1297.

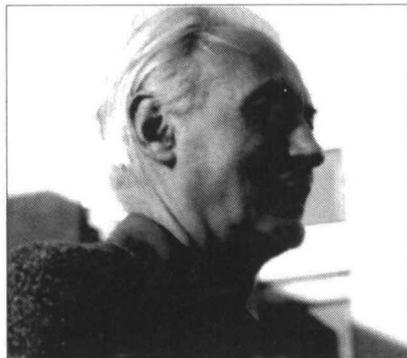
PSYeta is an independent association of psychologists dedicated to the promotion of animal welfare within the science and profession of psychology and within the community at large.



NEW FROM HARVARD

Crossroads between Culture and Mind

Continuities and Change in Theories of Human Nature
Gustav Jahoda



Jahoda traces the historical origins of the conflict surrounding the relationship between mind and culture. He demonstrates that the preoccupation with this relationship is not new. The salient issues began to crystallize three centuries ago in Europe in the form of two distinct traditions whose contrasting conceptions of human nature and the human mind still remain the focus of current debates. The dominant tradition was produced by the scientific approach that had proved so successful in the physical realm. Jahoda identifies the current form of this debate as but a phase in psychology's long fascination with the role that culture plays in the formation of the mind.
\$29.95 cloth

Dyslexia and Development

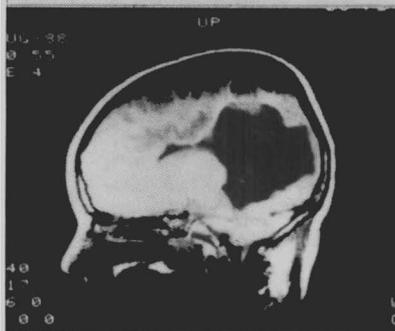
Neurobiological Aspects of Extra-Ordinary Brains

Edited by Albert M. Galaburda

Dyslexia and Development presents the latest findings of neurobiological research, which suggest a link between seemingly minor brain abnormalities and learning disorders, particularly dyslexia. The authors examine epidemiologic and clinical issues that may make the developing brain more vulnerable to environmental and genetic influences, which can in turn lead to abnormal brain plasticity and behavior. Neurologists and neurobiologists, psychologists, psycholinguists, psychiatrists, and special educators will find here a guide to more enlightened understanding and more effective treatment of dyslexia.
20 halftones, 34 line illus., \$45.00 cloth

Introducing a new series:
**PERSPECTIVES IN
COGNITIVE NEUROSCIENCE**

Stephen M. Kosslyn,
Series Editor



Hemispheric Asymmetry

What's Right and What's Left
Joseph Hellige



In the past few years, such popular renderings of "right brain" and "left brain" functioning have encouraged the belief that the left hemisphere controls symbolic processing and rational thinking, while the right hemisphere controls intuitive and creative thinking. Joseph Hellige argues that this view is far too simplistic. How, he asks, do the two hemispheres interact to form an integrated information-processing system? What is the relationship of hemispheric asymmetry to perception, cognition, and action? Is hemispheric asymmetry unique to humans, and how did it evolve? He surveys the extensive data in the field and provides a valuable overview of our current understanding of hemispheric asymmetry and its evolutionary precedents.
\$35.00 cloth

The Child's Path to Spoken Language

John L. Locke



Progressing gradually from babbling to meaningful sentences is something most babies do naturally. But why is that? John Locke's answer constitutes a fascinating journey along the path of language development, a tour that takes in all the stops—neurological and perceptual, social and linguistic—that mark the way to intelligible speech. A major synthesis of the latest research on early language acquisition, *The Child's Path to Spoken Language* revises the way we understand ourselves and our approach to speech.
\$39.95 cloth

Origins of the Modern Mind

Three Stages in the Evolution of Culture and Cognition
Merlin Donald

"A wonderful book that deserves to be read by everyone interested in the human mind. It weaves together the best available evidence into a convincing theory of cognition, culture, consciousness, and communication—their structure, evolution, meaning, and future." —Hans Moravec, Carnegie Mellon University

"A radically different evolutionary framework for the understanding of mind and behavior: I don't know when I have enjoyed reading a book more, or when I have learned so much from one."

Sheldon White, Harvard University
17 line illus./\$14.95

Available at bookstores or from

Harvard University Press Cambridge, MA 02138
Call tollfree: 1-800-448-2242