

Please send BBS your email address

All BBS Associates and any non-Associates who have served as referees, commentators or authors, or who are qualified and interested in serving as referees or commentators for BBS:

Please send us your electronic mail address, if you have one. (If you don't have one, you are strongly urged to look into the advantages of getting one -- not only for BBS's sake!)

BBS is implementing more and more of its peer communication functions by electronic mail. This not only increases the speed and efficiency of BBS's interaction with the world biobehavioral and cognitive science community, but it dramatically increases its scope and range as well. Abstracts can be circulated by email in advance to allow potential commentators to nominate themselves. Referee reports can be submitted by email. The BBS Associateship can be more representatively canvassed to determine what topics and authors they would like to see treated in BBS. New Associates can be nominated by email, etc.

Electronic mail addresses can be sent to our regular mail address. (Any available *departmental* or *institutional email directories* would be very helpful too.)

**Behavioral and Brain Sciences
20 Nassau Street, Room 240
Princeton NJ 08542**

Or they can be sent by electronic mail to any of the following electronic mail addresses. (Because email is not yet reliable, please try several until you receive confirmation that your message has been received.)

INTERNET

**harnad@confidence.princeton.edu
harnad@princeton.edu
harnad@elbereth.rutgers.edu
srh@flash.bellcore.com**

BITNET

harnad@pucc.bitnet

UUCP

**harnad@princeton.uucp
princeton!confidence!harnad**

CSNET

harnad%confidence.princeton.edu@relay.cs.net

Along with your email address you are encouraged to include your suggestions about current BBS editorial policy and directions you would like to see BBS take in the future.

Psychophysiology

JOURNAL OF THE SOCIETY FOR PSYCHOPHYSIOLOGICAL RESEARCH

EDITOR-IN-CHIEF

Michael G.H. Coles, *University of Illinois, Champaign*

METHODOLOGY EDITOR

John T. Cacioppo, *Ohio State University*

This prestigious international bimonthly journal plays a key role in advancing psychophysiological science. The premier journal in its field, *Psychophysiology* publishes new theoretical, empirical and methodological papers of the highest standards, covering research on the interrelationships between the physiological and psychological aspects of behavior.

The conceptual, empirical and technical advances reported in *Psychophysiology* have increasing importance in a wide range of fields, including:

- Cognitive Science and Cognitive Neuroscience
- Behavioral Medicine and Health Psychology • Psychiatry
- Psychopathology and Clinical Psychology • Applied Psychology

Each issue of *Psychophysiology* includes...

- empirical and theoretical papers
 - evaluative reviews of literature
 - methodological articles
 - special reports
 - book reviews
 - letters to the editor
 - meeting announcements
 - employment opportunities
- (featuring brief, current papers of special interest)

Subscription to *Psychophysiology*
(ISSN 0048-5772) Volume 30, 1993:
\$80.00 for institutions; \$49.00 for
non-member individuals; \$18.00 for
single parts.

Send order to:
Cambridge University Press
Journals Department
40 West 20th Street
New York, NY 10011-4211

These prices apply in the US, Canada
and Mexico only. Outside these countries,
write to Cambridge University Press, The
Edinburgh Building, Shaftesbury Road,
Cambridge CB2 2RU, United Kingdom.

Subscriber mailing address:

Name _____

Address _____

City _____ State/Prov. _____ ZIP _____

\$ _____ Subscription price
\$ _____ Canadians add 7% GST
\$ _____ TOTAL

() Payment enclosed. (Payment may be made
in US dollars or equivalent in Canadian
dollars.)

() VISA () MasterCard (Interbank # _____)

Card No. _____ Expires _____

Signature _____



ESSENTIAL READING FROM CAMBRIDGE

Measuring Behaviour

An Introductory Guide
Second Edition

Paul Martin and Patrick Bateson

Reviews from the previous edition...

"...clear, concise and always eminently sensible."
—*Times Higher Education Supplement*

"...an excellent little book."
—*British Psychological Bulletin*

"...destined to become a classic."
—*Trends in Ecology and Evolution*

Emphasizes techniques of direct observation, recording, and analysis for those about to embark upon behavioral research projects.

1993 232 pp. 44614-7 Paper \$16.95

Cell Biology of Olfaction

Albert I. Farbman

Presents a critical analysis of what is known about the olfactory sensory cells in both the nasal cavity and the vomeronasal organ in order to provide an understanding of the cellular basis on which olfactory-driven behavior is based.

Developmental and Cell Biology Series 27
1992 291 pp. 36438-8 Hardcover \$59.95

Social Facilitation

Bernard Guerin

Reviews all work in social facilitation from 1898 onward, looking at both human and animal research. The author presents his own theory, based on modern theory analysis and reviews the state of social psychology today: its strengths, its weaknesses, and its future.

European Monographs in Social Psychology
1993 250 pp. 33358-X Hardcover \$54.95

Cooperation and Prosocial Behaviour

Edited by Robert A. Hinde and Jo Groebel

"...highly recommended to anyone generally interested in the vital topic of human prosocial behavior or who is preparing to embark on the study of any of its aspects." —*Jerome D. Frank, Journal of Nervous and Mental Disease*

1991 378 pp. 39110-5 Hardcover \$79.95
39999-8 Paper \$32.95

Primate Behaviour

Information, Social Knowledge, and the Evolution of Culture

Duane Quiatt and Vernon Reynolds

Details the social life of monkeys, apes and humans. Examines the importance of social information and knowledge in order to gain a full understanding of primate social behaviour and organisation.

Cambridge Studies in Biological Anthropology 12

1993 275 pp. 35255-X Hardcover \$74.95

The Practice of Behavioural and Cognitive Psychotherapy

Richard Stern and

Lynne M. Drummond

Case histories show how the integration of behavioral and cognitive approaches can contribute to the rehabilitation of a range of psychiatric disabilities, from obsessive compulsive disorders and anxiety states to chronic schizophrenia or depression.

1992 264 pp. 41741-4 Hardcover \$64.95
38742-6 Paper \$29.95

Now in paperback...

Categorical Perception

Edited by Stevan Harnad

"...thought provoking and broadly relevant across a spectrum of issues of concern to cognitive scientists."

—*Contemporary Psychology*

609 pp. 38594-6 Paper \$29.95

Altruism and Aggression

Social and Biological Origins

Edited by Carolyn Zahn-Waxler,

E. Mark Cummings, and

Ronald J. Iannotti

"...the approaches and research strategies described in this book are the waves of the future..." —*New England Journal of Medicine*

Cambridge Studies in Social and Emotional Development

352 pp. 42367-8 Paper \$24.95

Available in bookstores or from

CAMBRIDGE
UNIVERSITY PRESS

40 West 20th Street, New York, NY 10011-4211

Call toll-free 800-872-7423

MasterCard/VISA accepted. Prices subject to change.

BOOKS ON THE BRAIN

THE SEXUAL BRAIN

Simon LeVay

"This is a lucid, highly articulate account of a complex subject, written by one of the world's foremost neuroanatomists: LeVay is ideally suited to write on the subject of the part played by the brain in sexual orientation, a field in which he has recently made important contributions."—David H. Hubel, Harvard University
200 pp. \$22.50

MEMORY, AMNESIA, AND THE HIPPOCAMPAL SYSTEM

Neal J. Cohen and Howard Eichenbaum

This sweeping synthesis brings together converging findings from neuropsychology, neuroscience, and cognitive science that provide the critical clues and constraints for developing a more comprehensive understanding of memory. Specifically, they offer a cognitive neuroscience theory of memory that accounts for the nature of memory impairment exhibited in human amnesia and animal models of amnesia, that specifies the functional role played by the hippocampal system in memory, and that provides further understanding of the compartmental structure of memory.
326 pp., 56 illus. \$45.00

THE MERGING OF THE SENSES

Barry E. Stein and M. Alex Meredith

"How does a nervous system organized by sense modality produce our experience of an integrated multisensory world? *The Merging of the Senses* is both a beautiful synthesis of what has been found out and a guide to the experiments that must yet be done."—Michael I. Posner, University of Oregon
224 pp., 28 illus. \$42.50



© Oscar Chaves

MECHANISMS OF IMPLICIT LEARNING

Connectionist Models of Sequence Processing

Axel Cleeremans

"This is a major book. It will be viewed as the standard model of the task and will likely be a source of a great deal of future research. It is also an excellent example of using a connectionist or neural network model as theory in cognitive science."—Gary Dell, University of Illinois at Urbana Champaign
Neural Network Modeling and Connectionism series 230 pp., 60 illus. \$27.50

INDUCTIVE INFERENCE AND ITS NATURAL GROUND

An Essay in Naturalistic Epistemology

Hilary Kornblith

Hilary Kornblith presents an account of inductive inference that addresses both its metaphysical and epistemological aspects. He argues that inductive knowledge is possible by virtue of the fit between our innate psychological capacities and the causal structure of the world.
136 pp. \$20.00

LANGUAGE, MUSIC, AND MIND

Diana Raffman

Raffman provides the first cognitivist theory of the nature of ineffable, or verbally inexpressible, musical knowledge.
Representations in Mind Series 180 pp. \$22.50

SUBSYMBOLIC NATURAL LANGUAGE PROCESSING

An Integrated Model of Scripts, Lexicon, and Memory

Risto Miikkulainen

"Miikkulainen's work establishes a new standard for connectionist AI research on sentence understanding, and it will serve to demonstrate how various problems can be dealt with that have plagued many other approaches."—James L. McClelland, Carnegie Mellon University
Neural Network Modeling and Connectionism series 408 pp., 129 illus. \$45.00

PROTOCOL ANALYSIS

Verbal Reports as Data
Revised Edition

K. Anders Ericsson and Herbert A. Simon

"...The new version is a significant updating, especially with respect to the many situations in which retrospective protocols are necessary. Equally important, the new book provides a more complete and updated theoretical picture of the connections between focal task processes and reporting processes. Every researcher, from apprentice to expert should read this book."—Alan Lesgold, University of Pittsburgh
496 pp. \$19.95 paper

Now Available in Paperback

THE ORGANIZATION OF LEARNING

Charles R. Gallistel

Learning, Development, and Conceptual Change series. 664 pp. \$19.95 paper

UNDERSTANDING THE REPRESENTATIONAL MIND

Josef Perner

"An example of cognitive science at its best. Philosophical ideas and ideas from artificial intelligence blend seamlessly with Perner's ideas about developmental psychology. At the same time Perner is an extremely careful and sometimes dazzlingly ingenious experimenter."—Alison Gopnik, *Science*
368 pp. \$15.95 paper

To order call toll-free 1-800-356-0343 [US & Canada or (617) 625-8569. MasterCard & VISA accepted.

The MIT Press

55 Hayward Street, Cambridge, MA 02142

Behavioral and Brain Sciences

Instructions for Authors and Commentators

Behavioral and Brain Sciences (BBS) is a unique scientific communication medium, providing the service of Open Peer Commentary for reports of significant current work in psychology, neuroscience, behavioral biology or cognitive science. If a manuscript is judged by BBS referees and editors to be appropriate for Commentary (see Criteria below), it is then circulated to a large number of commentators selected (with the aid of systematic bibliographic searches) from the BBS Associateship* and the worldwide biobehavioral science community, including individuals recommended by the author.

Once the Commentary stage of the process has begun, the author can no longer alter the article, but can respond formally to all commentaries accepted for publication. The target article, commentaries and authors' response then co-appear in BBS. Continuing Commentary and replies can appear in later issues.

Criteria for acceptance To be eligible for publication, a paper should not only meet the standards of a journal such as *Psychological Review* or the *International Review of Neurobiology* in terms of conceptual rigor, empirical grounding, and clarity of style, but it should also offer a **clear rationale for soliciting Commentary**. That rationale should be provided in the author's covering letter, together with a **list of suggested commentators**. The original manuscript plus **eight copies** must be submitted.

A paper for BBS can be (i) the report and discussion of empirical research that the author judges to have broader scope and implications than might be more appropriately reported in a specialty journal; (ii) an unusually significant theoretical article that formally models or systematizes a body of research; or (iii) a novel interpretation, synthesis, or critique of existing experimental or theoretical work. Occasionally, articles dealing with social or philosophical aspects of the behavioral and brain sciences will be considered.

The service of Open Peer Commentary will be primarily devoted to original unpublished manuscripts. However, a recently published book whose contents meet the standards outlined above may also be eligible for Commentary. In such a BBS Multiple Book Review, a comprehensive, article-length précis by the author is published together with the commentaries and the author's response. In special cases, Commentary will also be extended to a position paper or an already published article dealing with particularly influential or controversial research. Submission of an article implies that it has not been published or is not being considered for publication elsewhere. Multiple book reviews and previously published articles appear by invitation only. **The Associateship and professional readership of BBS are encouraged to nominate current topics and authors for Commentary.**

In all the categories described, the decisive consideration for eligibility will be the desirability of Commentary for the submitted material. Controversiality *simpliciter* is not a sufficient criterion for soliciting Commentary: A paper may be controversial simply because it is wrong or weak. Nor is the mere presence of interdisciplinary aspects sufficient: General cybernetic and "organismic" disquisitions are not appropriate for BBS. Some appropriate rationales for seeking Open Peer Commentary would be that: (1) the material bears in a significant way on some current controversial issues in behavioral and brain sciences; (2) its findings substantively contradict some well-established aspects of current research and theory; (3) it criticizes the findings, practices, or principles of an accepted or influential line of work; (4) it unifies a substantial amount of disparate research; (5) it has important cross-disciplinary ramifications; (6) it introduces an innovative methodology or formalism for consideration by proponents of the established forms; (7) it meaningfully integrates a body of brain and behavioral data; (8) it places a hitherto dissociated area of research into an evolutionary or ecological perspective; etc.

In order to assure communication with potential commentators (and readers) from other BBS specialty areas, **all technical terminology must be clearly defined or simplified, and specialized concepts must be fully described.** Authors should use numbered section-headings to facilitate cross-reference by commentators.

Note to commentators The purpose of the Open Peer Commentary service is to provide a concentrated constructive interaction between author and commentators on a topic judged to be of broad significance to the biobehavioral science community. Commentators should provide substantive criticism, interpretation, and elaboration as well as any pertinent complementary or supplementary material, such as illustrations; all original data will be refereed in order to assure the archival validity of BBS commentaries. Commentaries and articles should be free of hyperbole and remarks *ad hominem*.

Style and format for articles and commentaries Articles must not exceed 14,000 words (and should ordinarily be considerably shorter); **commentaries should not exceed 1,000 words.** Spelling, capitalization, and punctuation should be consistent within each article and commentary and should follow the style recommended in the latest edition of *A Manual of Style*, The University of Chicago Press. It may be helpful to examine a recent issue of BBS. A title should be given for each article and commentary. An auxiliary short title of 50 or fewer characters should be given for any article whose title exceeds that length. Each commentary must have a distinctive, representative **commentary title**. The contributor's name should be given in the form preferred for publication; the affiliation should include the full institutional address. **Two abstracts**, one of 100 and one of 250 words, should be submitted with every article. The shorter abstract will appear one issue in advance of the article; the longer one will be circulated to potential commentators and will appear with the printed article. A list of 5–10 keywords should precede the text of the article. Tables and figures (i.e. photographs, graphs, charts, or other artwork) should be numbered consecutively in a separate series. Every table and figure should have a title or caption and at least one reference in the text to indicate its appropriate location. Notes, acknowledgments, appendices, and references should be grouped at the end of the article or commentary. Bibliographic citations in the text must include the author's last name and the date of publication and may include page references. Complete bibliographic information for each citation should be included in the list of references. Examples of correct style for bibliographic citations are: Brown (1973); (Brown 1973); (Brown 1973; 1978); (Brown 1973; Jones 1976); (Brown & Jones 1978); (Brown et al. 1979). References should be typed in alphabetical order in the style of the following examples. **Journal titles should not be abbreviated.**

Kupfermann, I. & Weiss, K. (1978) The command neuron concept. *Behavioral and Brain Sciences* 1:3–39.

Dunn, J. (1976) How far do early differences in mother-child relations affect later developments? In: *Growing points in ethology*, ed. P. P. G. Bateson & R. A. Hinde. Cambridge University Press.

Bateson, P. P. G. & Hinde, R. A., eds. (1976) *Growing points in ethology*. Cambridge University Press.

Preparation of the manuscript The entire manuscript, *including notes and references*, must be typed **double-spaced** on 8½ by 11 inch or A4 paper, with one-inch margins, 60 characters per line and 25 lines per page, and should not exceed 50 pages. Please do not right-justify margin. Pages should be numbered consecutively. It will be necessary to return manuscripts for retyping if they do not conform to this standard.

Each table and figure should be submitted on a separate page, not interspersed with the text. Tables should be typed to conform to BBS style. Figures should be ready for photographic reproduction; they cannot be redrawn by the printer. Charts, graphs, or other artwork should be done in black ink on white paper and should be drawn to occupy a standard area of 8½ by 11 or 8½ by 5½ inches before reduction. Photographs should be glossy black-and-white prints; 8 by 10 inch enlargements are preferred. All labels and details on figures should be clearly printed and large enough to remain legible even after a reduction to half size. It is recommended that labels be done in transfer type of a sans-serif face such as Helvetica.

Authors are requested to submit their **single-sided**, double-spaced original manuscript plus **eight (8) double-sided copies** for refereeing, and commentators their original plus **two copies**, to: Stevan Harnad, Editor, Behavioral and Brain Sciences, 20 Nassau St., Suite 240, Princeton, NJ 08542. **Electronic mail:** harnad@clarity.princeton.edu or harnad@pucc.bitnet. Though not mandatory, ascii email versions or floppy disks of submissions (in addition to hard copies) facilitate processing. *In case of doubt as to appropriateness for BBS commentary, authors should write to the editor before submitting eight copies.*

Editing The publishers reserve the right to edit and proof all articles and commentaries accepted for publication. Authors of articles will be given the opportunity to review the copyedited manuscript and page proofs. Commentators will be asked to review copyediting only when changes have been substantial; commentators will not see proofs. Both authors and commentators should notify the editorial office of all corrections within 48 hours or approval will be assumed.

Authors of target articles receive 50 offprints of the entire treatment, and can purchase additional copies. Commentators will also be given an opportunity to purchase offprints of the entire treatment.

*Individuals interested in serving as BBS Associates are asked to write to the editor.

To appear in Volume 16, Number 3 (1993)

Offprints of the following forthcoming BBS treatments can be purchased for educational purposes if they are ordered well in advance. For ordering information, please write to Journals Department, Cambridge University Press, 40 West 20th Street, New York, NY 10011.

From simple associations to systematic reasoning: A connectionist representation of rules, variables and dynamic bindings using temporal synchrony

Lokendra Shastri, University of Pennsylvania, and Venkat Ajjanagadde, University of Tuebingen

We describe the beginnings of a computational account of humans' remarkably efficient and almost reflexive reasoning ability. Our connectionist system, SHRUTI, can encode a large body of specific and general knowledge and perform inferences within a few hundred msec, solving the *dynamic binding problem* by propagating rhythmic patterns of activity, representing bindings as *synchronous* firing of appropriate nodes. A number of psychologically relevant constraints on reflexive reasoning and the capacity of the working memory underlying such reasoning are also suggested.

With Commentary from GW Cottrell; G Dorffner; R Eckhorn; WJ Freeman; S Grossberg; G Hirst & D Wu; S Hölldobler; JE Hummel & KJ Holyoak; S Ohlsson; G Palm; DS Touretzky & SE Fahlman; I Tsuda; and others.

Cultural learning

Michael Tomasello, Emory University, Ann Cale Kruger, Georgia State University, and Hilary Horn Ratner, Wayne State University

In this theory, human cultural learning is social learning in which intersubjectivity or perspective-taking plays a vital role. It takes three forms during human ontogeny: imitative learning, instructed learning, and collaborative learning—in that order. This progression arises from the developmental ordering of the underlying social-cognitive concepts and processes. Further correlations between social cognition and cultural learning comes from comparing normal children, children with autism, and wild and enculturated chimpanzees. Cultural learning is a uniquely human form of social learning, providing the psychological basis for cultural evolution.

With Commentary from S Baron-Cohen; C Boesch; J Bruner; AI Goldman; A Gopnik & A Meltzoff; T Ingold; AS Lillard; DR Olson & JW Astington; C Trevarthen; B van Oers; BM Velichkovsky; A Whiten; and others.

Express saccades and visual attention

B Fischer and H Weber, University of Freiburg

A controversial observation in oculomotor research in recent years is the phenomenon of "express" saccades with extremely short reaction times (100 msec in man, 70 msec in monkey). Some regard them as anticipatory reactions, others as visually guided. We hypothesize that they are generated by an optomotor reflex that is controlled by higher brain functions of disengaged visual attention and decision making. We propose a neural network as the basis for a more elaborate theory of the optomotor system.

With Commentary from VI Belopolsky; M Jüttner & W Wolf; PA Reuter-Lorenz & HC Hughes; E Ruhnau & VG Haase; MA Sommer, PH Schiller & RM McPeck; JAM Van Gisbergen & AWH Minken; F Vitu; MG Wenban-Smith; and others.

Among the articles to appear in forthcoming issues of BBS:

RIM Dunbar, "Co-evolution of neocortex size, group size and language in humans"

D Lubinski & T Thompson, "Species and individual differences in communication based on private states"

Multiple book review of M Donald, *Origins of the modern mind: Three stages in the evolution of culture and cognition*