

---

VOLUME 12  
NUMBER 3  
SEPTEMBER 1989

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

---

# Behavioral and Brain Sciences

---

Appearing in this issue, with Commentary . . .

**A solution to the tag-assignment problem for neural networks**

Gary W. Strong & Bruce A. Whitehead

**Explanatory coherence** Paul Thagard

**Genetic similarity, human altruism, and group selection**

J. Philippe Rushton

**Spontaneous tool use and sensorimotor intelligence in *Cebus*  
compared with other monkeys and apes**

Suzanne Chevalier-Skolnikoff

---

C A M B R I D G E U N I V E R S I T Y P R E S S

ISSN 0140-525X

# Behavioral and Brain Sciences

## Editor

Stevan Harnad  
20 Nassau St., Suite 240  
Princeton, NJ 08542  
E-mail: [harnad@confidence.princeton.edu](mailto:harnad@confidence.princeton.edu) or  
[harnad@pucc.bitnet](mailto:harnad@pucc.bitnet)

## Managing Editor

Chooi-Yeok Kuan

## Copy Editor (Chief)

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/MRC, Cambridge  
Peter Wason/University College, London

### *Language and Language Disorders*

Max Coltheart/Macquarie U.

### *Linguistics*

Robert Freidin/Princeton

### *Neurobiology*

Irving Kupfermann/Columbia

### *Neuropharmacology*

Susan D. Iversen/Merck Sharp and Dohme, Ltd.

### *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

### *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.

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

**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, which includes postage, of Volume 12 (1989) is US \$154.00 net in the U.S.A. and Canada (£95.00 in the U.K.; £102.00 in the rest of the world) for institutions; US \$65.00 net (£43.00) for individuals; US \$38.00 net (£26.00) for BBS Associates; and US \$38.00 net (£26.00) for students (in the U.S.A. and Canada only) who provide proof of eligibility with order. Single parts cost US \$43.00 net (£26.00) 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; 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.

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

# Contents Volume 12:3 September 1989

<b>Strong, G. W. &amp; Whitehead, B. A.</b>	<b>A solution to the tag-assignment problem for neural networks</b>	<b>381</b>
<b>Open Peer Commentary</b>		
<b>Aiple, F. &amp; Fischer, B.</b>	Synchrony of spikes and attention in visual cortex	397
<b>Bridgeman, B.</b>	Modeling separate processing pathways for spatial and object vision	398
<b>Butler, B. E.</b>	Do we need an early locus of attention to resolve illusory conjunctions?	398
<b>Cave, K. R.</b>	Visual attention and beyond	400
<b>Dawson, M. R. W.</b>	Constraining tag-assignment from above and below	400
<b>Duncan, J.</b>	Parallel processing: Giving up without a fight	402
<b>Feldman, J. A.</b>	Tags is for kids	403
<b>Fields, C.</b>	Affordance perception and the Y-magnocellular pathway	403
<b>Findlay, J. &amp; Kentridge, R.</b>	More packaging needed before tags are added	404
<b>Hardin, C. L.</b>	The bicameral retina at a glance	405
<b>Krueger, L. E. &amp; Stadlander, L. M.</b>	Features and locations: Dichotomy or continuum?	406
<b>Kruschke, J. K.</b>	State transitions in constraint satisfaction networks	407
<b>Lesperance, R. M. &amp; Kaplan, S.</b>	A nonspatial solution to a spatial problem	408
<b>Levenick, J. R.</b>	A self-organizing perceptual system	409
<b>Müller, H. J., Humphreys, G. W., Quinlan, P. T. &amp; Donnelly, N.</b>	Fundamental design limitations in tag assignment	410
<b>Parker, D. M.</b>	Simultaneous processing of features may not be possible	411
<b>Plaut, D. C.</b>	Neural networks and computational theory: Solving the right problem	411
<b>Prinzmetal, W. &amp; Ivry, R.</b>	Damn the (behavioral) data, full steam ahead	413
<b>Sandon, P. A.</b>	An attentional hierarchy	414
<b>Sun, R. &amp; Schalit, E.</b>	Is the tag necessary?	415
<b>Wagemans, J., Verfaillie, K., De Graef, P. &amp; Lamberts, K.</b>	Is extension to perception of real-world objects and scenes possible?	415
<b>Winder, C. P.</b>	Where's the psychological reality?	417
<b>Young, M. P., Paterson, I. R. &amp; Perrett, D. I.</b>	Attention to detail?	417
<b>Authors' Response</b>		
<b>Strong, G. W. &amp; Whitehead, B. A.</b>	The value of modeling visual attention	419
<b>Thagard, P.</b>	<b>Explanatory coherence</b>	<b>435</b>
<b>Open Peer Commentary</b>		
<b>Achinstein, P.</b>	Explanation and acceptability	467
<b>Bereiter, C. &amp; Scardamalia, M.</b>	When weak explanations prevail	468
<b>Cheng, P. C.-H. &amp; Keane, M.</b>	Explanatory coherence as a psychological theory	469
<b>Chi, M. T. H.</b>	Assimilating evidence: The key to revision?	470
<b>Cohen, L. J.</b>	Two problems for the explanatory coherence theory of acceptability	471
<b>Dawes, R. M.</b>	Thagard's Principle 7 and Simpson's paradox	472
<b>Dietrich, E.</b>	Is Thagard's theory of explanatory coherence the new logical positivism?	473
<b>Earle, D. C.</b>	On the testability of ECHO	474
<b>Feldman, J. A.</b>	What's in a link?	474
<b>Gabrys, G. &amp; Lesgold, A.</b>	Coherence: Beyond constraint satisfaction	475
<b>Giere, R. N.</b>	What does explanatory coherence explain?	475
<b>Hobbs, J. R.</b>	Are explanatory coherence and a connectionist model necessary?	476
<b>Josephson, J. R.</b>	Inference to the best explanation is basic	477
<b>Klayman, J. &amp; Hogarth, R. M.</b>	Does ECHO explain explanation? A psychological perspective	478
<b>Levine, D. S.</b>	Explanatory coherence in neural networks?	479
<b>Lycan, W. G.</b>	Explanationism, ECHO, and the connectionist paradigm	480
<b>Mangan, B. &amp; Palmer, S.</b>	New science for old	480
<b>McCauley, R. N.</b>	Acceptability, analogy, and the acceptability of analogies	482
<b>McDermott, D.</b>	Optimization and connectionism are two different things	483
<b>O'Rorke, P.</b>	Coherence and abduction	484
<b>Papineau, D.</b>	Probability and normativity	484
<b>Read, S. J. &amp; Miller, L. C.</b>	Explanatory coherence in understanding persons, interactions, and relationships	485
<b>Reggia, J. A.</b>	Measuring the plausibility of explanatory hypotheses	486
<b>Simon, H. A.</b>	ECHO and STAHL: On the theory of combustion	487
<b>Sintonen, M.</b>	Theory autonomy and future promise	488
<b>Wetherick, N. E.</b>	Psychology, or sociology of science?	489
<b>Zytkow, J. M.</b>	Testing ECHO on historical data	489
<b>Author's Response</b>		
<b>Thagard, P.</b>	Extending explanatory coherence	490

## Rushton, J. P. Genetic similarity, human altruism, and group selection 503

### Open Peer Commentary

- Anderson, J. L. A methodological critique of the evidence for genetic similarity detection 518
- Archer, J. Why help friends when you can help sisters and brothers? 519
- Daly, M. On distinguishing evolved adaptation from epiphenomena 520
- Dunbar, R. I. M. Genetic similarity theory needs more development 520
- Economos, J. Altruism, nativism, chauvinism, racism, schism, and jizzum 521
- Eibl-Eibesfeldt, I. Familiarity, xenophobia, and group selection 523
- Eysenck, H. J. Testing one of Rushton's predictions 523
- Findlay, C. S. Biocultural versus biological systems: Implications for genetic similarity theory 524
- Gangestad, S. W. Uncompelling theory, uncompelling data 525
- Ghiselin, M. T. Genetics versus economics as the basis for friendships and other preferences 526
- Gouzoules, H. Genetic similarity between friends and lovers: Is an evolutionary view warranted? 526
- Graves, J. & Byrne, R. W. Mate selection: The wrong control group 527
- Hallpike, C. R. Green beard theory 528
- Hartung, J. Testing genetic similarity: Out of control 529
- Hepper, P. G. Recognising kin = Recognising genetic similarity 530
- Jensen, A. R. "Total perceived value" as the basis of assortative mating in humans 530
- Kenrick, D. T. Altruism, Darwinism, and the gift of Josiah Wedgewood 531
- Kline, P. Not genes: Behaviour 532
- Krebs, D. Detecting genetic similarity without detecting genetic similarity 533
- Leek, M. & Smith, P. K. Phenotypic matching, human altruism, and mate preference 534
- Lynn, R. Balanced polymorphism for ethnocentric and nonethnocentric alleles 535
- Masters, R. D. If "birds of a feather . . . ," why do "opposites attract"? 535
- Nagoshi, C. T. How important are distal genetic factors in human assortative mating? 537
- Reynolds, V. When is similarity genetic? 538
- Ridley, M. When does natural selection favour assortative mating? 539
- Rowe, D. C. Why birds of a feather flock together: Genetic similarity? 540
- Stam, H. J. How not to explain psychological phenomena 541
- Tooby, J. & Cosmides, L. Kin selection, genic selection, and information-dependent strategies 542
- van den Berghe, P. L. Heritable phenotypes and ethnicity 544
- Vine, I. The role of genes in genetic similarity detection 545
- Wahlsten, D. Science or prejudice? 546
- Waldman, B. Sociobiology, sociology, and pseudoevolutionary reasoning 547
- Wilson, D. S. Problems with the altruism hypothesis 548

### Author's Response

- Rushton, J. P. Similarity and ethnicity mediate human relationships, but why? 548

## Chevalier-Skolnikoff, S. Spontaneous tool use and sensorimotor intelligence in *Cebus* compared with other monkeys and apes 561

### Open Peer Commentary

- Adams-Curtis, L. E. Does a Piagetian description work? 588
- Anderson, J. R. On the contents of capuchins' cognitive tool-kit 588
- Baldwin, J. D. Does "spontaneous" behavior require "cognitive special creation"? 589
- Bard, K. A. & Vauclair, J. What's the tool and where's the goal? 590
- Bekoff, M. Tools, terms, and telencephalons: Neural correlates of "complex" and "intelligent" behavior 591
- Bernstein, I. S. Cognitive explanations: Plausibility is not enough 593
- Branch, M. N. Using behavior to explain behavior 594
- Etienne, A. S. The application of the Piagetian stage concept to comparative research 595
- Falk, D. Primate tool use: But what about their brains? 595
- Fragaszy, D. M. Tool use, imitation, and insight: Apples, oranges, and conceptual pea soup 596
- Gibson, K. R. Tool use in cebus monkeys: Moving from orthodox to neo-Piagetian analyses 598
- Greenfield, P. M. *Cebus* uses tools, but what about representation? Comparative evidence for generalized cognitive structures 599
- Johnson, M. & Karmiloff-Smith, A. The right tools for the job? 600
- Johnston, T. D. & Toth, J. P. Piagetian stages and the anagenetic study of cognitive evolution 600
- Kortlandt, A. The applicability of Piagetian concepts to animals 602
- Macphail, E. M. Tool use implies sensorimotor skill: But differences in skills do not imply differences in intelligence 602
- Menzel, E. W., Jr. Is intelligent behavior a directly observable phenomenon? 603
- Parker, S. T. Imitation and derivative reactions 604
- Pepperberg, I. M. Tool use in birds: An avian monkey wrench? 604
- Savage, A. & Snowdon, C. T. Apples and oranges: The pitfalls of comparative intelligence 605
- Savage-Rumbaugh, S., Brakke, K. & Wilkinson, K. Tool use in monkeys 606
- Tomasello, M. Cognition as cause 607
- Visalberghi, E. Primate tool use: Parsimonious explanations make better science 608
- Westergaard, G. C. & Sackett, G. P. Advanced sensorimotor intelligence in *Cebus* and *Macaca* 609

### Author's Response

- Chevalier-Skolnikoff, S. Tool use in *Cebus*: Its relation to object manipulation, the brain, and ecological adaptations 610