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**CATEGORICAL PERCEPTION: THE GROUNDWORK OF COGNITION**  
NY: Cambridge University Press (S. Harnad, ed.)

Categorical Perception is a book about how the mind divides the things in the world into categories. The differences between colors are really just differences in physical energy. There is nothing out there that actually corresponds to why reds look red and greens look green. When we look at the spectrum, we should only see a smooth change in intensity, like gradually changing shades of gray, not the discrete set of qualitatively different color categories we do see. The same is true of sounds such as musical pitches, and especially the sounds we use to speak: We hear discrete differences in quality where we should only be hearing continuous differences in quantity. All evidence suggests that animals perceive such discrete categories too, and so do children. Categorical Perception is about the problem of how the mind turns the "blooming, buzzing confusion" that reaches our eyes and ears into the orderly set of discrete categories we see and hear. It is about the origins of categories, and their bases in the brain. Categories include not only elementary colors and sounds, but concrete objects like chairs and tables and abstract ideas like goodness and truth. So the problem of the origins of categories is also the problem of the origin of ideas, words and their meanings. Categorical Perception should be of interest to psychologists, biologists, brain scientists, computer scientists, linguists, anthropologists and philosophers as well as to inquiring general readers interested in the origins of words and ideas.

Contents:

- Introduction**
- Psychophysical and Cognitive Aspects of Categorical Perception: A Critical Overview *Stevan Harnad*
- Psychophysical Foundations of Categorical Perception
1. Categorical Perception: Some Psychophysical Models *Richard E. Pastore*
  2. Beyond the Categorical/Continuous Distinction: A Psychophysical Approach to Processing Modes *Neil A. Macmillan*
- Categorical Perception of Speech**
3. Phonetic Category Boundaries Are Flexible *Bruno H. Repp & Alvin H. Liberman*
  4. Auditory, Articulatory and Learning Explanations of Categorical Perception in Speech *Stuart Rosen & Peter Howell*
  5. On Infant Speech Perception and the Acquisition of Language *Peter D. Eimas, Joanne L. Miller & Peter W. Jusczyk*
- Models for Speech CP**
6. Neural Models of Speech Perception: A Case History *Robert E. Remez*
  7. On the Categorization of Speech Sounds *Randy L. Diehl & Keith R. Kluender*
  8. Categorical Partition: A Fuzzy-Logical Model of Categorization Behavior *Dominic W. Massaro*
- CP in Other Modalities and Other Species**
9. Perceptual Categories in Vision and Audition *Marc H. Bornstein*
  10. Categorical Perception of Sound Signals: Facts and Hypotheses from Animal Studies *Guenther Ehret*
  11. A Naturalistic View of Categorical Perception *Charles T. Snowdon*
  12. The Special-Mechanisms debate in Speech Perception: Evidence from Nonhuman Species and Nonspeech Signals *Patricia K. Kuhl*
  13. Brain Mechanisms in Categorical Perception *Martha Wilson*
- Psychophysical Indices of CP**
14. Electrophysiological Indices of Categorical Perception for Speech *Dennis L. Molfese*
  15. Evoked Potentials and Colour-Defined Categories *D. M. Regan*
- Higher-Order Categories**
16. Categorization Processes and Categorical Perception *Douglas L. Medin & Lawrence W. Barsalou*
  17. Developmental Changes in Category Structure *Frank C. Keil & Michael H. Kelly*
  18. Spatial Categories: The Perception and Conceptualization of Spatial Relations *Ellen Bialystok & David R. Olson*
- Cognitive Foundations**
19. Category Induction and Representation *Stevan Harnad*

Jerry A. Fodor (Philosophy Department, CUNY Graduate Center): "It's been pretty clear since Kant that the problem of cognition is largely the problem of judgement, and that the problem of judgement is largely the problem of categorization. Categorization in perception is perhaps the most empirically tractable aspect of this problem, and CATEGORICAL PERCEPTION offers a fine sample of the state of the art. Anybody who cares about cognitive science should have this stuff at his fingertips."

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Clifford Geertz (Institute for Advanced Study, Princeton): "Sociologists, anthropologists, philosophers, historians, and others approaching the question of the formation of cognitive categories from the side of their social construction will meet here a lucid and powerful set of analyses approaching it from the psychological and psychophysical side, and will discover how near to a meeting of minds the two sides are despite their different methods. CATEGORICAL PERCEPTION is a major step toward the integration of the science of human understanding."

R. Duncan Luce (Psychology Department, Harvard University): "Categorizing -- that most familiar and elusive of cognitive activities -- might be easier to understand were there inborn, primitive perceptual categories on which to build. Are there? That debate, which is especially controversial for speech, is the focus of this comprehensive, edited volume. Although the answer remains obscure, all of the issues, pertinent data and difficulties are laid clearly before us in CATEGORICAL PERCEPTION."

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**J U N E 2 1 - 2 3 , 1 9 8 7**

**Sunday, June 21, 1987**

**9:00 a.m.-11:00 a.m.**

**SYMPOSIUM DEPRESSION, COGNITION, AND RATIONALITY**

**Chair:** Evalyn Segal, Psychology, San Diego State University

**Speakers:** George Graham, Philosophy, University of Alabama at Birmingham  
Christopher Peterson, Psychology, University of Michigan

**Commentator:** Lynn Rehm, Psychology, University of Houston  
Richard Garrett, Philosophy, Bentley College

**1:00 p.m.-3:15 p.m.**

**CONCURRENT CONTRIBUTED PAPERS-SESSIONS I AND II**

**SESSION I Behavior and Belief**

**Speakers:** Ruth Garrett Millikan, Philosophy, University of Connecticut

"What is Behavior? or Why Narrow Psychology Ethology is Impossible"  
David Martel Johnson, Philosophy, York University

"'Brutes Believe Not', Why Non-Human Animals Have No Beliefs"

**SESSION II Computational Theories of Mind**

**Speakers:** David Kirsch, Artificial Intelligence, Massachusetts Institute of Technology  
"The Concept of Computation in Connectionist Systems"  
Joseph Levine, Philosophy, North Carolina State University  
"Demonstrative Thought"

**3:30 p.m.-5:00 p.m.**

**INVITED LECTURE LANGUAGES OF THE DEAF**

**Speaker:** Howard Pozner, Salk Institute, San Diego

**5:00 p.m.-6:00 p.m.**

**WINE AND CHEESE RECEPTION**

**7:00 p.m.-10:00 p.m.**

**SYMPOSIUM ANALOGY AND LEARNING**

**Speakers:** Dedre Gentner, Psychology, University of Illinois  
Doug Medin, Psychology, University of Illinois  
Keith Holyoak, Psychology, University of California, Los Angeles

**Commentator:** Eva Kittay, Philosophy, SUNY Stony Brook

**Monday, June 22, 1987**

**9:00 a.m.-11:30 a.m.**

**SYMPOSIUM CONNECTIONISM AND IMAGE SCHEMATIC STRUCTURES**

**Chair:** Patricia Churchland, Philosophy, University of California, San Diego

**Speakers:** David Rumelhart, Psychology, University of California, San Diego  
George Lakoff, Linguistics, University of California, Berkeley  
Mark Johnson, Philosophy, Southern Illinois University  
Terry Sejnowski, Biophysics, Johns Hopkins University

**12:30 p.m.-2:45 p.m.**

**CONCURRENT CONTRIBUTED PAPERS-SESSIONS III, IV, AND V**

**SESSION III: Logic and Reasoning**

**Speakers:** David Sanford, Philosophy, Duke University  
"Circumstantial Validity"  
Howard Margolis, University of Chicago  
"Cognitive Statistics"

**SESSION IV: Mentalistic Explanations**

**Speakers:** Joseph Thomas Tolliver, Philosophy, University of Maryland  
"Knowledge without Truth"  
Louise M. Anthony, Philosophy, North Carolina State University  
"Anomalous Monism and the Problem of Explanatory Force"

**SESSION V: Subjective Experience**

**Speakers:** James S. Kelly, Philosophy, Miami University  
"On Quining Qualia"  
Richard J. Hall, Philosophy, Michigan State University  
"Is An Inverted Pain-Pleasure Spectrum Possible?"

**3:00 p.m.-5:30 p.m.**

**SYMPOSIUM. CONCEPTUAL AND SEMANTIC CHANGE IN CHILDHOOD AND SCIENCE**

**Speakers:** Annette Karmiloff-Smith, Medical Research Council Cognitive Development Unit  
Alison Gopnik, Psychology, Scarborough College, University of Toronto  
Susan Carey, Psychology, Massachusetts Institute of Technology  
Philip Kitcher, Philosophy, University of California, San Diego

**8:00 p.m.-9:00 p.m.**

**PRESIDENTIAL ADDRESS**

Stevan Harnad, Editor *Behavioral and Brain Sciences*  
"Uncomplemented Categories or What is it Like to be a Bachelor"

*Presidential reception given by Chancellor and Mrs. Richard C. Atkinson, University House*

**Tuesday, June 23, 1987**

**9:00 a.m.-11:00 a.m.**

**SYMPOSIUM SEMANTICS**

**Chair:** Richard Jeffrey, Philosophy, Princeton University

**Speakers:** Harry Field, Philosophy, University of Southern California  
Barbara Hall Partee, Linguistics, University of Massachusetts, Amherst  
Norbert Hornstein, Linguistics, University of Maryland

**Respondent:** Stephen Schiffer, Philosophy, University of California, San Diego

**11:15 a.m.-12:30 p.m.**

**INVITED LECTURE MEMORY AND BRAIN**

**Speaker:** Larry R. Squire, Psychiatry, University of California, San Diego

**1:30 p.m.-3:45 p.m.**

**CONCURRENT CONTRIBUTED PAPER SESSIONS VI AND VII**

**SESSION VI Concepts**

**Speakers:** Kenneth R. Livingston and Janet Andrews, Psychology, Vassar College  
"Reflections on the Relationship between Philosophy and Psychology in the Study of Concepts Is there Madness in our Methods?"  
Andrew Woodfield, Philosophy, Bristol  
"A Two-Tiered Model of Concept Formation"

**SESSION VII Intentionality**

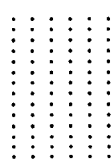
**Speakers:** Ron Amundson, Philosophy, University of Hawaii at Hilo  
"Doctor Dennett and Doctor Pangloss"  
Robert Van Gulick, Philosophy, Syracuse University  
"Consciousness, Intrinsic Intentionality, and Self-Understanding Machines"

**4:00 p.m.-5:30 p.m.**

**INVITED LECTURE CONSCIOUSNESS**

**Speakers:** Daniel Dennett, Philosophy, Tufts University  
Kathleen Akins, Philosophy, Tufts University

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# Behavioral and Brain Sciences

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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.

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

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# Behavioral and Brain Sciences

To appear in Volume 10, Number 2 (1987)

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## Brains make chaos in order to make sense of the world

**C. A. Skarda & W. J. Freeman, *CREA, Ecole Polytechnique and University of California, Berkeley***

Among the models that attempt to explain neural dynamics are engineering approaches based on the digital computer as well as the more recent "connectionist" models. Neural evidence from electroencephalographic (EEG) recordings on the olfactory bulb indicates that the digital computer metaphor is unsuitable to explain neural functioning. Connectionist models may use computational mechanisms like those used by the brain, but they lack features that we hypothesize are essential for neural dynamics, including dense local feedback (Negative, mutually excitatory, and mutually inhibitory), chaotic and oscillatory activity, and interactive sensorimotor feedback. In this paper we discuss our EEG data and the resulting neural model, the relation of our model to alternative engineering models, and some implications of our view of neural functioning for psychological theories.

**With Commentary from** A Babloyantz; JA Barnden; RM Boynton; R Brown; MA Corner & AJ Noest; DC Earle; A Garfinkel; S Grossberg; DS Levine; DH Perkel; R Rosenfeld, DS Touretzky & the Boltzmann Group; R Thom; and G Werner.

## Dopamine, schizophrenia, mania and depression: Toward a unified hypothesis of cortico-striato-pallido-thalamic function

**N. R. Swerdlow & G. F. Koob, *Mercy Hospital & Medical Center and Scripps Clinic & Research Foundation***

Preclinical and clinical evidence of aberrant brain dopamine (DA) function in the pathophysiology of several psychiatric disorders suggests a testable integrative model based on the connections and interactions between cortical regions classically associated with the limbic system and infracortical regions including the nucleus accumbens, ventral pallidum and dorsomedial nucleus of the thalamus. Analogous suggestions have been made about the neural substrate of several movement disorders.

**With Commentary from** GF Alheid & L Heimer; DL Chute; AR Cools; JH Fallon; HC Fibiger; JA Gray & I Baruch; PW Kalivas; AE Kelley; A Phillips; P Soubrie & P Carnoy; A Wolkin & R Cancro; and others.

## Primate handedness reconsidered

**P. F. MacNeilage, M. G. Studdert-Kennedy & B. Lindblom, *University of Texas, Austin, Queens College, CUNY & University of Stockholm***

Existing findings on manual functional asymmetries in nonhuman primates suggest two feeding-related evolutionary precursors to human specializations: (1) A left hand (right hemisphere) specialization for visually guided movement accompanied by a postural support specialization involving the right upper limb may have evolved with the prehensile hand in prosimians. The left hand preference remains present in monkeys but not in humans. (2) A right hand (left hemisphere) specialization for manipulation and bimanual coordination may have evolved in monkeys from the postural specialization with development of the opposable thumb and decreasing demands on the right limb for support of vertical postures.

**With Commentary from** M Annett; JL Bradshaw; B Brésard & F Bresson; MP Bryden & RE Steenhuis; MC Corballis; G Eitlinger; II Glezer; MA Goodale; Y Guiard; HJ Jerison; RAW Lehman; WF McKeever; IC McManus; and others.

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