

VITA

NAME: Richard G. Coss

TITLE: Professor of Psychology

MAILING ADDRESS: Psychology Department, University of California, Davis, CA 95616

TELEPHONE: OFFICE (530) 752-1626; FAX: (530)-752-2087

E-MAIL: rgcoss@ucdavis.edu

EDUCATION:

B.S. 1962 University of Southern California: Architecture

M.A. 1966 University of California, Los Angeles: Design

Ph.D. 1973 University of Reading, England: Comparative Psychology

PROFESSIONAL EXPERIENCE:

1984-present Professor, Psychology, University of California, Davis

1979-present Faculty Member of the Graduate Group in Animal Behavior,
University of California, Davis

1975-present Faculty Member of the Graduate Group in Ecology, University of
California, Davis

1985-1991 Editorial Advisory Board, *Behavioral and Neural Biology*

1978-1984 Associate Professor, Psychology, University of California, Davis

1974-1978 Assistant Professor, Psychology, University of California, Davis

1971-1974 Lecturer, Design, University of California, Los Angeles

1970-1971 Free Lance Industrial Designer, Paris, France

1966-1970 Research Director, Compagnie de l'Esthetique Industrielle, Paris,
France

1962-1966 Engineer-Scientist (Project Engineer, Lunar Base Study), Douglas Aircraft
Company, Santa Monica, California

MEMBERSHIPS:

Animal Behavior Society

International Society for Ecological Psychology

International Society for the Arts, Sciences and Technology

Sigma Xi

AWARD:

NASA Fellowship, awarded in 1986 by the NASA-Ames Research Center.

Chancellor's Award for Excellence in Mentoring Undergraduate Research, June 2008.

MAJOR RESEARCH INTERESTS:

Evolution of behavior, especially antipredator behavior, as related to adaptive variation in populations as well as the developmental, physiological, and neurobiological constraints on behavior. A second research area involves theoretical and empirical studies of

aesthetics, human factors, habitat perception, and face recognition. Current focus is on the study of risk perception and habitat recognition in mammals, including humans.

RESEARCH SKILLS:

Experimental Research: 43 years of overall experience conducting experimental studies of behavior and physiology in fish and mammals with emphasis on the development of antipredator behavior and habitat perception from an evolutionary and ecological perspective.

Systems and Equipment Design: 12 years in product design with patents (pupilometer) in three countries (France, UK, US) and an international award in biomedical equipment design.

PREVIOUS EXTRAMURAL SUPPORT:

1979-1981 Principal Investigator: NSF BNS 79-06843, Environmental Determinants of Neurological Development and Juvenile Behavior (\$96,359.00).

1984-1987 Principal Investigator (David G. Smith, Co-PI) NSF BNS 84-06172, Adaptive Variation and Ontogeny of Antisnake Defenses by California Ground Squirrels (\$85,000.00).

1987-1990 Principal Investigator: NASA Training Grant NGT-7001, Space Station Aesthetics: Biomedical Aspects of Picture Perception (\$54,000.00).

1987-1991 Principal Investigator: NASA Ames Grant NAG 2-428, Space Station Aesthetics: A study of Visual Enhancement (\$60,000.00).

1998-1999 BBC Wildlife Unit research fund (\$6,500.00)

1996-2000 Principle Investigator: World Bank funds (Rs. 60,000) were managed by Coast Watch Center, Pondicherry, India, to study the antipredator behavior of macaques and langurs in southern India.

2002-2005 Co-principal Investigator The Wenner Gren Foundation. The Effects of Changes in Predation Pressures on the Antipredator Behavior of Green Monkeys (\$2,000.00).

BIBLIOGRAPHY

Coss, R. G. (1962). A mechanical hand. *Industrial Design* **9**, 56-63.

Coss, R. G. (1963). *Lunar Support Modules*. Douglas Report SM-44591.

Coss, R. G. (1965). *Mood Provoking Visual Stimuli: Their Origins and Applications*. Monograph, Univ. of Calif., Press, 1-55.

Coss, R. G. (1967). De nouveaux concepts esthetiques et le comportement du consommateur. *Design Industrie* No. 84-85.

Coss, R. G. (1967). Futuras tendencias de diseno. *Semario Sindical des Diseno Industrial, Barcelona*. **1**, 55-58.

Coss, R. G. (1968). Designing for social display. *Modulus* **4**, 1-7.

- Coss, R. G. (1968). The ethological command in art. *Leonardo* **1**, 273-287.
- Coss, R. G. (1969). Electro-oculography: Drawing with the eye. *Leonardo* **2**, 399-401.
- Coss, R. G. (1970). The perceptual aspects of eye-spot patterns and their relevance to gaze behaviour. In C. Hutt and S. J. Hutt (Eds.), *Behaviour Studies in Psychiatry*. Pergamon Press, London. pp. 121-147.
- Coss, R. G. (1973). The cut-off hypothesis: Its relevance to the design of public places. *Man-Environment Systems* **3**, 417-440.
- [Reprinted in Coss, R. G. (2005) Editor. *Environmental Awareness: Evolutionary, Aesthetic and Social Perspectives*. First Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa. 473 pp.]
- Coss, R. G. (1974). Reflections on the evil eye. *Human Behavior* **3** (10), 16-22.
- [Reprinted 1981 in Dundes, A. *The Evil Eye*. Garland Publ. Inc., N.Y. pp. 181-191]
- Coss, R. G. (1974). Book review. Biology and Culture in Modern Perspective: Readings from Scientific American. Introductions by Joseph G. Jorgensen. *Leonardo* **7**, 270.
- Richer, J. M. and Coss, R. G. (1976). Gaze aversion in autistic and normal children. *Acta Psychiatrica Scandinavica* **53**, 193-210.
- Owings, D. H. and Coss, R. G. (1977). Snake mobbing by California ground squirrels: Adaptive variation and ontogeny. *Behaviour* **62**, 50-69.
- Coss, R. G. (1977). Constraints on innovation: The role of pattern recognition in the graphic arts. *Proc. Eight Western Symp. on Learning: Creative Thinking*. 24-44.
- [Reprinted in Coss, R. G. (2005) Editor. *Environmental Awareness: Evolutionary, Aesthetic and Social Perspectives*. First Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa. 473 pp.]
- Coss, R. G. and Globus, A. (1978). Spine stems on tectal interneurons in jewel fish are shortened by social stimulation. *Science* **200**, 787-789.
- Coss, R. G. (1978). Perceptual determinants of gaze aversion by the lesser mouse lemur (*Microcebus murinus*), the role of two facing eyes. *Behaviour* **64**, 248-270.
- Coss, R. G. (1978). Development of face aversion by the jewel fish (*Hemichromis bimaculatus*, Gill 1872). *Zeitschrift für Tierpsychologie* **48**, 28-46.

- Coss, R. G. and Owings, D. H. (1978). Snake-directed behavior by snake naive and experienced California ground squirrels in a simulated burrow. *Zeitschrift für Tierpsychologie* **48**, 421-435.
- Coss, R. G. (1979). Delayed plasticity of an instinct: Recognition and avoidance of 2 facing eyes by the jewel fish. *Developmental Psychobiology* **12**, 335-345.
- Coss, R. G. and Globus, A. (1979). Social experience affects the development of dendritic spines and branches on tectal interneurons in the jewel fish. *Developmental Psychobiology* **12**, 347-358.
- Coss, R. G. (1979). Perceptual determinants of gaze aversion by normal and psychotic children: The role of two facing eyes. *Behaviour* **69**, 228-254.
- Coss, R. G., Brandon, J. G. and Globus, A. (1980). Changes in morphology of dendritic spines on honeybee calycal interneurons associated with cumulative nursing and foraging experiences. *Brain Research* **192**, 49-59.
- Burgess, J. W. and Coss, R. G. (1980). Crowded jewel fish show changes in dendritic spine density and spine morphology. *Neuroscience Letters* **17**, 277-281.
- Coss, R. G. (1980). Face recognition by the jewel fish. *Anima* **91**, 57-63.
- Berard, D. R., Burgess, J. W. and Coss, R. G. (1981). Plasticity of dendritic spine formation: A state-dependent stochastic process. *International Journal of Neuroscience* **13**, 93-98.
- Keenan, L. C., Coss, R. G. and Koopowitz, H. (1981). Cytoarchitecture of primitive brains: Golgi studies in flatworms. *The Journal of Comparative Neurology* **195**, 697-716.
- Coss, R. G. and Burgess, J. W. (1981). Jewel fish retain juvenile schooling pattern after crowded development. *Developmental Psychobiology* **14**, 451-457.
- Burgess, J. W. and Coss, R. G. (1981). Short-term juvenile crowding arrests the developmental formation of dendritic spines on tectal interneurons in jewel fish. *Developmental Psychobiology* **14**, 389-396.
- Hennessy, D. F., Owings, D. H., Rowe, M. P., Coss, R. G. and Leger, D. W. (1981). The information afforded by a variable signal: Constraints on snake-elicited tail flagging by California ground squirrels. *Behaviour* **78**, 188-226.
- Owings, D. H. and Coss, R. G. (1981). How ground squirrels deal with snakes. *Anima* **99**, 37-43.

- Coss, R. G. and Brandon, J. G. (1982). Rapid changes in dendritic spine morphology during the honeybee's first orientation flight. In M. D. Breed, C. D. Michener and H. E. Evans (Eds.), *The Biology of Social Insects*. Westview Press, Boulder, pp. 338-342.
- Burgess, J. W. and Coss, R. G. (1982). Effects of chronic crowding stress on midbrain development: Changes in dendritic spine density and morphology in jewel fish optic tectum. *Developmental Psychobiology* **15**, 461-470.
- Brandon, J. G. and Coss, R. G. (1982). Rapid dendritic spine stem shortening during one-trial learning: The honeybee's first orientation flight. *Brain Research* **252**, 51-61.
- [Reprinted 1990 in Shaw, G. McGaugh, J. and Rose, S. (Eds.), *Neurobiology of Learning and Memory*. World Scientific Publ. Co., Singapore, pp. 427-437]
- Burgess, J. W. and Coss, R. G. (1983). Rapid effect of biologically relevant stimulation on tectal neurons: Changes in dendritic spine morphology after nine minutes are retained for twenty-four hours. *Brain Research* **266**, 217-223.
- Chen, M. J., Coss, R. G. and Goldthwaite, R. O. (1983). Timing of dispersal in juvenile jewel fish during development is unaffected by available space. *Developmental Psychobiology* **16**, 303-310.
- Leger, D. W., Owings, D. H. and Coss, R. G. (1983). Behavioral ecology of time allocation in California ground squirrels (*Spermophilus beecheyi*): Microhabitat effects. *Journal of comparative psychology* **97** (4), 283-291.
- Smith, D. G. and Coss, R. G. (1984). Calibrating the molecular clock: Estimates of ground squirrel divergence made using fossil and geological time markers. *Molecular Biology and Evolution* **1** (3), 249-259.
- Coss, R. G. and Owings, D. H. (1985). Restraints on ground squirrel antipredator behavior: Adjustments over multiple time scales. In T. D. Johnston and A. T. Pietrewicz (Eds.), *Issues in the Ecological Study of Learning*. Lawrence Erlbaum Assoc., N. J., pp. 167-200.
- Coss, R. G. (1985). Evolutionary restraints on learning: Phylogenetic and synaptic interpretations. In N. M. Weinberger, J. L. McGaugh and G. Lynch (Eds.), *Memory Systems of the Brain: Animal and Human Cognitive Processes*. Guilford Publications, N. Y., pp. 253-278.
- Coss, R. G. and Perkel, D. H. (1985). The function of dendritic spines: A review of theoretical issues. *Behavioral and Neural Biology* **44**, 151-185.

- Rowe, M. P., Coss, R. G. and Owings, D. H. (1986). Rattlesnake rattles and burrowing owl hisses: A case of acoustic Batesian mimicry. *Ethology* **72**, 53-71.
- Parks, T. E., Coss, R. G. and Coss, C. S. (1986). Thatcher and the Cheschire Cat: Context and the processing of facial features. *Perception* **14**, 747-754.
- Parks, T. E. and Coss, R. G. (1986). Prime illusion. *Psychology Today* **20**, 6-8.
- Poran, N. S., Coss, R. G. and Benjamini, E. (1987). Resistance of California ground squirrels (*Spermophilus beecheyi*) to the venom of the Northern Pacific rattlesnake (*Crotalus viridis oreganus*): A study of adaptive variation. *Toxicon* **25**, 767-777.
- Barbour, C. G. and Coss, R. G. (1988). Differential color brightness as a body orientation cue. *Human Factors* **30** (6) 713-717.
- Coss, R. G. and Owings, D. H. (1989). Rattler battlers. *Natural History* **5**, 30-35.
- Coss, R. G., Clearwater, Y. A., Barbour, C. G., and Towers, S. R. (1989). Functional decor in the international space station: Body orientation cues and picture perception. *NASA Technical Memorandum* **102242**.
- Coss, R. G. and Towers, S. R. (1990). Provocative aspects of pictures of animals in confined settings. *Anthrozoös* **3**, 162-170.
- Towers, S. R. and Coss, R. G. (1990). Confronting snakes in the burrow: Snake-species discrimination and antisnake tactics of two California ground squirrel populations. *Ethology* **84**, 177-192.
- Poran, N. S. and Coss, R. G. (1990). Development of antisnake defenses in California ground squirrels (*Spermophilus beecheyi*): I. Behavioral and immunological correlates. *Behaviour* **112**, 222-245.
- Goldthwaite, R. O., Coss, R. G., and Owings, D. H. (1990). Evolutionary dissipation of an antisnake system: Differential behavior by California and Arctic ground squirrels in above- and below-ground contexts. *Behaviour* **112**, 246-269.
- Coss, R. G. and Moore, M. (1990). All that glistens: Water connotations in surface finishes. *Ecological Psychology* **2**, 367-380.
- Owings, D. H. and Coss, R. G. (1991). Context and animal behavior I: Introduction and review of theoretical issues. *Ecological Psychology* **3**, 1-9.
- Clearwater, Y. A. and Coss, R. G. (1991). Functional aesthetics to enhance well-being in isolated and confined settings. In A. A. Harrison, Y. A. Clearwater, and C.

McKay (Eds.), *The Human Experience in Antarctica: Applications to Life in Space*. Springer-Verlag, N. Y., pp. 331-348.

Coss, R. G. (1991). Context and animal behavior III: The relationship between early development and evolutionary persistence of ground squirrel antisnake behavior. *Ecological Psychology* **3** (4) 277-315.

Coss, R. G. (1991). Evolutionary persistence of memory-like processes. *Concepts in Neuroscience* **2** (2), 129-168.

Towers, S. R. and Coss, R. G. (1991). Antisnake behavior of Columbian ground squirrels (*Spermophilus columbianus*). *Journal of Mammalogy* **72**, 776-783.

Coss, R. G. (1993). Evolutionary persistence of ground squirrel antisnake behavior: Reflections on Burton's commentary. *Ecological Psychology* **5**, 171-194.

Coss, R. G., Gusé, K. L., Poran, N. S., and Smith, D. G. (1993). Development of antisnake defenses in California ground squirrels (*Spermophilus beecheyi*): II. Microevolutionary effects of relaxed selection from rattlesnakes. *Behaviour* **124**, 137-164.

Coss, R. G. and Moore, M. (1994). Preschool children recognize the utility of differently shaped trees: A cross-cultural evaluation of aesthetics and risk perception. In M. Francis, P. Lindsey, and J. S. Rice (Eds.), *The Healing Dimensions of People-Plant Relations: Proceedings of a Research Symposium*. Center for Design Research, University of California, Davis, pp. 407-423.

Coss, R. G. (1995). *Behavioral Science* **39**, 80-83. Book Review: Strongman, K. T. (Ed.) *International Review of Studies on Emotions, Volume 2*. John Wiley & Sons, Inc., New York, 1992, 327 pp.

Coss, R. G. and Goldthwaite, R. O. (1995). The persistence of old designs for perception. In N. S. Thompson (Ed.), *Perspectives in Ethology 11: Behavioral Design*, Plenum Press, New York, pp. 83-148.

Tromborg, C. T. and Coss, R. G. (1995). Decibels, denizens, and dens. *American Zoo and Aquarium Association Annual Conference Proceedings*, Woodland Park Zoological Gardens, Seattle, Washington, pp. 521-528.

Coss, R. G. and Biardi, J. E. (1997). Individual variation in the antisnake defenses of California ground squirrels (*Spermophilus beecheyi*). *Journal of Mammalogy* **78**, 294-310.

Hanson, M. T. and Coss, R. G. (1997). Age differences in the response of California ground squirrels (*Spermophilus beecheyi*) to avian and mammalian predators. *Journal of Comparative Psychology* **111**, 174-184.

Coss, R. G. and Schowengerdt, B. T. (1998). Evolution of the modern human face: Aesthetic and attributive judgments of a female profile warped along a continuum of paedomorphic to late archaic craniofacial structure. *Ecological Psychology* **10**, 1-24.

[Reprinted in Coss, R. G. (2005) Editor. *Environmental Awareness: Evolutionary, Aesthetic and Social Perspectives*. First Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa. 473 pp.]

Parks, T. E. and Coss, R. G. (1998). Cognitively based apparent motion: An extreme case. *Perception* **27**, 1485-1486.

Owings, D. H., Coss, R. G., and Henry, K. R. (1999). *Introduction to Psychobiology*. Pearson Custom Publishing, Needham Heights, MA.

Coss, R. G. (1999). Effects of relaxed natural selection on the evolution of behavior. In S. A. Foster and J. A. Endler (Eds.), *Geographic Variation in Behavior: Perspectives on Evolutionary Mechanisms*. Oxford University Press, Oxford, pp. 180-208.

Ramakrishnan, U., Coss, R. G., and Pelkey, N. W. (1999). Tiger decline caused by the reduction of large ungulate prey: Supporting evidence from a comparative study of leopard diets in two reserves in southern India. *Biological Conservation* **89**, 113-120.

Ramakrishnan, U., and Coss, R. G. (2000). Age differences in the responses to adult and juvenile alarm calls by bonnet macaques (*Macaca radiata*). *Ethology* **106**, 131-144.

Biardi, J. E., Coss, R. G., and Smith, D. G. (2000). California ground squirrel (*Spermophilus beecheyi*) blood sera inhibits crotalid venom proteolytic activity. *Toxicon* **38**, 713-721.

Ramakrishnan, U., and Coss, R. G. (2000). Recognition of heterospecific alarm vocalizations by bonnet macaques (*Macaca radiata*). *Journal of Comparative Psychology* **114**, 3-12.

Coss, R. G. and Ramakrishnan, U. (2000). Perceptual aspects of leopard recognition by wild bonnet macaques (*Macaca radiata*). *Behaviour* **137**, 315-335.

Ramakrishnan, U. and Coss, R. G. (2001). A comparison of the sleeping behavior of three sympatric primates: A preliminary report. *Folia Primatologica* **72**, 51-53.

Ramakrishnan, U. and Coss, R. G. (2001). Strategies used by Bonnet Macaques (*Macaca radiata*) to reduce predation risk while sleeping. *Primates* **42**, 193-206.

- Hanson, M. T. and Coss, R. G. (2001). Age differences in the response of California ground squirrels (*Spermophilus beecheyi*) to conspecific alarm calls. *Ethology* **107**, 259-275.
- Owings, D. H., Coss, R. G., McKernon, D., Rowe, M. P., and Arrowood, P. C. (2001). Snake-directed antipredator behavior of rock squirrels (*Spermophilus variegatus*): Population differences and snake-species discrimination. *Behaviour* **138**, 575-595.
- Hanson, M. T., and Coss, R. G. (2001). Age differences in arousal and vigilance in California ground squirrels (*Spermophilus beecheyi*). *Developmental Psychobiology* **39**, 199-206.
- Coss, R. G., Marks, S., and Ramakrishnan, U. (2002). Early Environment shapes the development of gaze aversion by wild bonnet macaques (*Macaca radiata*). *Primates* **43**, 217-222.
- Coss, R. G. and Moore, M. (2002). Precocious knowledge of trees as antipredator refuge in preschool children: An examination of aesthetics, attributive judgments and relic sexual dimorphism. *Ecological Psychology* **14**, 181-222.
- Coss, R. G. (2003). The role of evolved perceptual biases in art and design. In E. Voland and K. Grammer (Eds.). *Evolutionary Aesthetics*. Heidelberg: Springer-Verlag. pp. 69-130.
- Coss, R. G., Ruff, S. and Simms, T. (2003). All that glistens: II. The effects of reflective surface finishes on the mouthing activity of infants and toddlers. *Ecological Psychology* **15**, 197-213.
- Owings, D. H., Coss, R. G., and Henry, K. R. (2003). *Introduction to Psychobiology*. 3rd Edition. Pearson Custom Publishing, Needham Heights, MA.
- Coss, R. G. and Charles, E. P. (2004). The role of evolutionary hypotheses in psychological research: Instincts, affordances, and relic sex differences. *Ecological Psychology* **16** (3), 199-236.
- Coss, R. G., Ramakrishnan, U., and Schank, J. (2005). Recognition of partially concealed leopards by wild bonnet macaques (*Macaca radiata*) the role of the spotted coat. *Behavioural Processes* **68**, 145-163.
- Ramakrishnan, U., Coss, R. G., Schank, J., Dharawat, A., and Kim, S. (2005). Snake-species discrimination by wild bonnet macaques (*Macaca radiata*). *Ethology* **111**, 337-356.
- Coss, R. G. (2005) Editor. *Environmental Awareness: Evolutionary, Aesthetic and Social Perspectives*. First Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa. 473 pp.

- Biardi, J. E., Chien, D. C., and Coss, R. G. (2005). California ground squirrel (*Spermophilus beecheyi*) inhibition of rattlesnake venom digestive and hemostatic toxins. *Journal of Chemical Ecology* **31** (11), 2501-2518.
- Stankowich, T., and Coss, R. G. (2006). Effects of predator behavior and proximity on risk assessment by Columbian black-tailed deer. *Behavioral Ecology* **17**, 246-254.
- Rabin, L. A., Coss, R. G., and Owings, D. H. (2006). The effects of wind turbines on antipredator behavior in California ground squirrels (*Spermophilus beecheyi*). *Biological Conservation* **131** (3), 410-420.
- Ennis, M., and Coss, R. G. (2006). Orbital frontal cortex ablations of rock squirrels (*Spermophilus variegatus*) disinhibit innate antisnake behavior. *Behavioral Neuroscience* **120** (6), 1299-1307.
- Stankowich, T., and Coss, R. G. (2007). The re-emergence of felid camouflage with the decay of predator recognition in deer under relaxed selection. *Proceedings of the Royal Society, Series B* **274**, 175-182.
- Stankowich, T. and Coss, R. G. (2007). Effects of risk assessment, predator behavior, and habitat on escape behavior in Columbian black-tailed deer. *Behavioral Ecology* **18**, 358-367.
- Coss, R. G., McCowan, B., and Ramakrishnan, U. (2007). Threat-related acoustical differences in alarm calls by wild bonnet macaques (*Macaca radiata*) elicited by python and leopard models. *Ethology* **113**, 352-367.
- Owings, D. H., and R. G. Coss. (2007). Social and antipredator systems: Intertwining links in multiple time frames in J. Wolff, and P. W. Sherman, eds. *Rodent Societies: Ecological and Evolutionary Perspectives*. Chicago, University of Chicago Press. pp. 305-316.
- Stankowich, T. and Coss, R. G. (2008). Alarm walking in Columbian black-tailed deer: its characterization and possible antipredatory signaling functions. *Journal of Mammalogy* **89**, 636-645.
- Coss, R. G. (2008). Hypothesis testing: A challenge for undergraduate researchers. *Explorations* **11**, 3-6.
- Owings, D. H., and Coss, R. G. (2008). Hunting California ground squirrels: Constraints and opportunities for northern Pacific rattlesnakes. In W. K. Hayes, K. R. Beaman, M. D. Cardwell, and S. P. Bush (Eds.). *The Biology of Rattlesnakes*. Loma Linda University Press, Loma Linda, California. pp. 155-168.

Prokosch, M. D., Coss, R. G., Scheib, J. E., & Blozis, S. A. (2009). Intelligence and mate choice: Using an objective measure of male intelligence to predict women's preferences. *Evolution & Human Behavior* **30**, 11-20.

Coss, R. G., Fitzhugh, E. L., Schmid-Holmes, S., Kenyon, M. W., & Etling, K. (2009). The effects of human age, group composition, and behavior on the likelihood of being injured by attacking pumas. *Anthrozoös* **22**, 77-87.