

## BOOK REVIEW

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**Comparative Psychology: A Handbook**, by G. Greenberg and M.M. Haraway (Eds.), New York and London: Garland, 1998.

In the preface, the editors say that, in their version of Comparative Psychology (CP), the central focus is evolution, development, and species-typical behavior. While a broad range of animal species is covered, explicit comparisons are few. I like to think of CP as the study of similarities and differences in psychological mediation, but, in fact, few studies of CP achieve (or even strive to) that desideratum, perhaps the last great work being Razran's (1971) *Mind in Evolution*. Most of us study behavioral differences and similarities, and leave it at that. Even this watered down version of CP (really CB) is found more in the ethological literature than in the literature of CP. And to get one other carp out of the way, this compendium is structured more like an encyclopedia than a handbook, which is intended as a descriptive, not a negative, comment. Namely, the entries are quite brief compared to the chapter-length treatments one encounters in volumes called handbooks.

The text of this book runs to 865 pages and, although I agreed to the first editor's invitation to review this book, I did not read every entry in their entirety. I read the entries that interested me to determine if these entries were accurate, competent, interesting, fairly complete, and usable by students. And many of them were all of these. Thus, I would recommend purchase of the volume for one's laboratory, department, or institutional library.

To see how much of my version of CP there might be, I went to the final section on Cognitive Processes and there discovered a mix of entries on approaches to the study of cognition, cognition in animals (very restricted), counting (careful, concise), honey-bee dance language controversy (makes for spirited reading), language in animals (there is

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also a seemingly never-ending, somewhat depressing controversy here: if nonhuman primates seem to be doing it, is it language as used by humans?), self-recognition in nonhuman primates (what does mirror self-recognition signify?), and tool use (close to the data and alert to pitfalls). All highly analytical and critical – no grand (or even semi-grand) conclusions on comparative psychological mediation, I am afraid.

Next, I went to the Author Index to see how many times my work was cited. One fewer than S. J. Gould, several fewer than the first editor and G. G. Gallup, Jr. As for high counts, Darwin, Lorenz, and Schneirla get four lines each, which seems like justice is being done. (Later I learned that I was cited a bit more than showed up in the Author Index, so I caught up on Gould, provided the same didn't go for him). There is also a Species Index, where humans get almost 12 lines, rats almost 9, and birds 4. There were none for ducks but I know that is wrong as I read about my work in a few places. I also checked mallard duck and wood duck but came up empty (as with their Latin names). Another copyediting glitch is the absence of a List of Contributors with their affiliations to make it a simple matter to contact authors whose topics are of special interest.

The volume begins with a historical and philosophical section, wherein Nancy Innis gives capsule biographical summaries of 29 of the leaders in CP and closely related fields, all but three of whom are deceased (Jeff Bitterman, Nicholas Mackintosh, Ethel Tobach). C.W. Tolman writes a brief Euro-Marxist history of CP. That is succeeded by a nicely crafted review by Jean-Louis Gariépy in which he recounts, in a broadly-based theoretical way, the recent histories of CP, ethology, and the “developmental synthesis,” featuring Schneirla and his close colleagues, concluding with the “Modern Developmental Psychobiology,” which has carried the theoretical work of Kuo, Schneirla, and Lehrman to its present state, including some extensions to human beings which would have greatly pleased that trio. Section I closes with an international perspective on CP by R. Ardila.

Section II concerns Theory, Concepts, and Issues, topics that will also interest almost all readers. As befits an encyclopedia, here and elsewhere, the order of the entries is determined by the alphabet, so Allometry and Comparative Psychology (Thiessen and Villarreal) leads off with a quite unusual proposal that I was not able to follow but might be read with profit by those interested in “the allometry of behavior,” a rarely explored topic (McKinney & Gittleman, 1995). These authors are somewhat ambivalent about the concept of anagenesis, to which they think allometry is complementary, on the one hand, but they reject the idea of evolutionary progress, the kernel of anagenesis, on the other.

Because of the coincidence of the alphabetical ordering, Yarczower's entry on Anagenesis follows, which offers a more detailed understanding of the concept, using Rensch's criteria for identifying instances of anagenesis, and J. Huxley's notion of "grade," as distinct from "clade," which was accepted by leading evolutionists such as Gaylord Simpson and Ernst Mayr. Yarczower's critical discussion of the troublesome concept of evolutionary progress should help to clarify what I and others, following Rensch et al., have tried inadequately to render lucid in other contexts as far as CP is concerned. Other theoretical treatments in this section include Schneirla's A/W Theory (Raines and Greenberg), Developmental Contextualism, lucidly rendered by its author, Richard M. Lerner, Dynamical Systems and Dialectical Processes in Development and Evolution, somehow magically distilled to five pages by Kathryn Hood, Epigenesis, a little too distilled by David B. Miller, and a generous treatment of Evolution by the creative and many-faceted biologist Mae-Wan Ho. I couldn't help but notice a rather garbled account of some of my main experimental findings for which a *field* study is cited (yikes!). Otherwise, Professor Ho coherently presents the latest on non-neoDarwinian accounts of evolution, which she then links to the Schneirla-Lehrman epigenetic critique of Lorenz's theory of the innate and acquired in development. The other two theoretical entries that will seem familiar are Gibsonian Theory in Comparative Psychology (Flynn and Stoffregen) and a balanced evaluation of Sociobiology as a field of study, a theory of social behavior, and a statement about human nature (Moore and Michel). The rest of the section deals with issues such as homology (Burton), individual differences (Mather), instinct (Barnett), behavioral ecology (Klopfer and Podos), motivation (Hogan), species-typical behavior (Haraway and Maples), etc. There is a very arresting entry on Thermodynamics, Evolution, and Behavior (Swenson) to close out this Section, which I believe most readers will find novel but perhaps difficult, although it is concise and well written. It is intended as an optimistic reinterpretation of the second law of thermodynamics (which pictures a world in "degenerative disorder"), calling for self-organizational and autocatakinetic processes to rescue biology and psychology from such a dispiriting state of affairs. The only major item that is missing in Section II is the topic of behavioral heterochrony (Cairns, Gariépy, & Hood, 1990; McKinney & Gittleman, 1995).

Given that – to my way of thinking – a comprehensive theory of comparative psychology will necessarily involve behavioral and psychological anagenesis (e.g., Schneirla's concept of levels in the psychological capacities of animals), it is interesting to note that the entry on Lloyd Morgan's Canon (R.K. Thomas) concludes that the

canon≠parsimony but, rather, Lloyd Morgan's Canon=psychological anagenesis. The problem in its widespread acceptance and application is the lack of a generally agreed upon hierarchy of behavioral and psychological processes. (See, for example, Partridge and Greenberg's entry, Integrative Levels.) Once again, as an exemplar, Razran's (1971) *Mind in Evolution* comes to the fore, in which eleven ascending levels of learning are identified, going from habituation and sensitization at the low end to "symboling (the learning of thinking, planning, and willing)" at the high end. The cerebral underpinning for anagenesis, particularly increases in brain size and cortical evolution, is provided by Jerison's (1973) *Evolution of the Brain and Intelligence*. Anagenesis is further discussed in a cogent way in Hailman's entry, Comparative Methods in Behavioral Studies, in which, by way of contributing to a consensual psychological anagenic scheme (grades of psychological progress), he puts forth the idea that, "If...it could be shown that every animal that can master a reversal discrimination can also learn an oddity problem, but not vice versa, then it could be concluded that the former ability is higher than the latter..." (p.237).

The most intensively comparative of the entries is the entry on Hearing, in which H.E. and R. S Hefner summarize an enormous literature to which they themselves have made an outstanding contribution. While they conclude "...there is no trend toward better ears," in the review it is possible to tease out anagenic conclusions even in this ecologically highly constrained domain: "Although birds have the best hearing of nonmammalian vertebrates, they do not hear above 12 kHz and their ability to localize sound is generally not as good as that of mammals" (p.295). "In the case of insects, the selective [ecological] pressures have been dealt with in a relatively simple manner: approach a potential mate (or prey) and avoid a predator (bats). Mammals, on the other hand, have evolved the ability to use hearing to respond to sound sources in more sophisticated ways, as illustrated by the communication calls of monkeys and by human language"(p.300).

In the entry on Sleep (W.B.Webb), we learn that all mammals and birds manifest REM (rapid eye movement) and non-REM sleep, whereas there is little or no evidence of REM sleep in reptiles and fish, and the sleep structure in humans (and other primates) is the most complex of all species.

Before leaving the topic of anagenesis, it is necessary to repeat an already oft-repeated caveat: psychological anagenesis represents a nonuniform *trend*; it is not a necessarily universal pattern in the sense that it occurs without exception in all phyla. The concept of comparative psychological anagenesis is the recognition of the emergence of qualitatively progressive novelties in behavioral

characteristics and psychological capacities during the course of evolution. As noted earlier, the term "progressive" causes negative reactions in some comparative psychologists, so let me go on, more concretely, to say the cardinal defining features of comparative psychological anagenesis are increases in developmental psychological adaptability (flexibility) and improvements in behavioral versatility (Gottlieb, 1984). It is not only comparative psychologists who see utility in anagenesis as a separate lineage-transcendent form of evolution. To wit, Hölldobler and Wilson's (1983) noncladistic analysis of "the evolution of communal nest-weaving in ants," in which three progressive "phylogenetic grades" of nest building are discriminated in four independently evolved genera of formicine ants.

It is not possible to do justice to this useful tome in a review of this sort, but I hope I have given enough of the flavor that potential readers will seek it out. I have not touched on all of the eight Sections of the volume—rest assured there is much of interest here for anyone who finds CP, however defined, an attractive field of study. Where else could you learn, except on page 783 of Celia Moore's masterful review of *Vertebrate Sexual Behavior*, that the "Amazon molly, a familiar aquarium fish, is an all-female species that requires sperm from males of a different species to initiate the embryonic development of [its] eggs, although no use is made of the sperm's genetic material"?

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