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Book Review

The Social Minds of Other Species

A review of Maddalena Bearzi and Craig B. Stanford, *Beautiful Minds: The Parallel Lives of Great Apes and Dolphins*. Harvard University Press, Cambridge, MA, 2008, 351 pp., US\$24.95 ISBN 978-0-674-02781-7 (hardcover).

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Beautiful Minds is written from alternating first person perspectives: Craig Stanford, a primatologist, writes about apes, and Maddalena Bearzi, a cetologist, writes about dolphins. The book is divided into eight chapters, covering personal histories of the authors' interest in their subjects, histories of their respective fields of study, and background on ape and dolphin biology, behavior, cognition, "politics," and culture. The final chapters focus on the relevance of these "parallel lives of great apes and dolphins" to human intelligence, and on pressing conservation issues. The main thesis of the book is that the complex social structures of both species were the driving force behind their parallel increases in brain size and intelligence; the "social intelligence" hypothesis. Although compelling, I found the supporting evidence much stronger overall for primates than for dolphins, especially when discussing political maneuvering, deception, and culture. As a dolphin biologist, I am aware that the dearth of available evidence for such behaviors in dolphins is due to the immense hurdles involved in observing their subtle behavioral interactions, but this does not change the fact that the bulk of evidence presented is not very convincing. For example, in the cetacean section of the chapter "Master Politicians," the evidence for political maneuvering consists of examples of cooperative fishing between humans and dolphins (I am not sure how this relates to dolphin "politics") and a rather tenuous example of a study of dolphin social networks. Furthermore, the "premier" example of dolphin tool use and culture, sponge carrying (discussed in chapters 5 and 7), has recently been suggested to be due to ecological, rather than cultural, variation (Sargeant, Wirsing, Heithaus, and Mann, 2007). Similarly, why are whale migrations considered cultural (p. 230), whereas those of other species are not? Bearzi in fact acknowledges that "the sum of information available on cetacean culture doesn't begin to reach the level of knowledge achieved for primates" (p. 235).

Overall, the book is quite readable, with a good blend of anecdotes and facts. However, the notion of a parallel between dolphins and great apes is far from new (although the authors suggest that they have "rarely...been considered as companion species," p. 3). This idea has in fact been presented by a variety of scientists over the past couple of decades, most notably Richard Connor and Lori Marino (e.g., Connor, 2007; Connor, Mann, Tyack, and Whitehead,

1998; Connor, Smolker, and Bejder, 2006; Connor, Smolker, and Richards, 1992; Marino, 1998, 2002, Marino, McShea, and Uhen, 2007). Connor noted parallels between dolphins and chimpanzees in their formation of male alliances and also in their overall social systems and brain size, and Marino compared brain size and cognitive abilities in primates and cetaceans (one paper was titled “Convergence of complex cognitive abilities in cetaceans and primates”). Thus, given the amount of published material on this topic, it appears that the intended audience for this book is not scientists; it must rather be geared toward a fairly sophisticated general audience.

The authors do a good job of chronicling the history of cetacean and primate field research in the chapter “Two Histories Afield.” In this chapter, as well as throughout the book, Stanford sends a compelling message regarding the dire conservation status of the great apes. Throughout the book he also makes the important point that the results of many laboratory studies of apes must be interpreted cautiously, due to the generally impoverished nature of their social environment. For example, he attributes chimpanzee “Nim Chimpsky’s” failure to master sign language to his rearing conditions.

The authors perpetuate several ideas that are common in the popular literature, but not necessarily based in fact. First is the notion the brain size is directly related to intelligence. Although this may seem like nitpicking, since there is undoubtedly some relationship between brain size and intelligence, I balk at its presentation as a simple correlation (as in the book’s introduction), given the difficulties even in quantifying human intelligence, and the lack of correlation between brain size and intelligence among humans. However, the authors do present a more balanced view of the topic later, in their “Cognition” chapter. Second is the idea that “...dolphins and apes...possess communication skills...so complex that we are only now beginning to understand how they work” (p. 3, and repeated in various forms throughout the book). Although I do not doubt (and in fact count on) that we have much to learn about dolphin communication, as it stands now there are few data indicating a vastly complex communication system. Again, this could be due to the many hurdles involved in studying dolphin communication, which have prevented a rate of progress comparable to that for many terrestrial species, but it is only fair to represent the data in hand. Similarly, what is known about the natural communication system of great apes, does not, to my knowledge, qualify as immensely complex, although this too may well represent a lack of data. My sense of what might be considered a “complex” communication system is one including referential vocalizations and/or some form of syntax, but in neither apes nor dolphins is there evidence for these, except perhaps in the individualized signature whistle contours produced by dolphins. [This is undoubtedly a topic about which I am particularly sensitive, as throughout my professional career I have attempted to dispense with the popularized notion of “dolphin language” (largely brought about by John Lilly, as noted on page 29), which has done much, I believe, to hold back the study of dolphin communication.]

Another concern is the presentation of tool use as a necessarily cultural phenomenon (e.g., p. 223). Although tool use certainly provides some of the best evidence for culturally transmitted behaviors in the great apes, it has recently been suggested that the one case of tool use in dolphins is heavily influenced by ecological factors (Sargeant et al., 2007). Much of the debate over animal culture revolves around excluding alternative mechanisms for certain behaviors (e.g., as described by Laland and Janik, 2006), something rarely as simple as it might

seem. The authors do a good job, however, discussing the issue of “cultural evolution” (pp. 237-239).

In making the case for the sophisticated cognitive abilities of dolphins and great apes, the authors present a great deal of material about cooperative hunting strategies (chapter 3). Although fascinating, it is important to note that many species other than cetaceans and primates utilize cooperative hunting (e.g., lions, wolves). I do not see why several killer whales chasing down an infant gray whale until it is too tired to flee is an example of “breathtakingly complex tactics” (p. 85). Other than the size of the gray whale calf, why is this different from several lions chasing down a young antelope? And what evidence is there for the statement that “Only through complex communication has the pod of killer whales managed to feed themselves” (p. 87)? Although all cooperatively hunting species may well utilize “complex communication,” little is known about how this is actually effected. Similarly, why does feeding on “widely scattered schools of fish or other animals” require great intelligence (p. 89)? Baleen whales, sharks and many birds all feed on these same food sources but no special claims are made for their intelligence.

Chapter 4, which focuses on cognition, is more balanced and thorough, with good presentations of many of the controversial topics in this area, such as theory of mind, imitation, self-recognition, and language (I especially liked the ape language section), all of which might be of particular interest to evolutionary psychologists. However, the authors were not consistent in how they presented the key concept of emulation vs. imitation. Bearzi refers to emulation as “true imitation,” when “the imitator has an understanding of the actions he or she is imitating” (p. 156). Yet Stanford describes emulation as different from “true imitation,” where a goal is achieved “without understanding the importance of imitating the process” (p. 153). I am surprised that such a fundamental inconsistency would not have been discovered in the editorial process. [Another disconnect between the two authors appears in chapter 8, when Bearzi writes that tool use “played a key role in the expansion of the brain” (p. 249), whereas Stanford had previously stated that “tool use and brain size were in fact disconnected by millions of years” (p. 150).] In addition, although I am as delighted as the next person by the various anecdotes of captive dolphins imitating human behaviors, I am not convinced that the dolphin who imitated the tank cleaner (p. 159) understood “the relationship between the actions of the diver and the outcome.” Just because a dolphin imitated the action of “cleaning” does not mean that it understood the purpose or outcome of this behavior. Similarly, an anecdote describing a group of dolphins fleeing from a great white shark (p. 163) is not necessarily a compelling example of complex cognitive abilities.

I was surprised, after the balanced treatment of language in chapter 4 (e.g., pp. 174-175), that Stanford questions why linguists object to dialectical differences among chimpanzee populations being considered language (p. 225). Even the loosest definitions of language would not include subtle differences in an unlearned, species-specific vocalization. If they were willing to “expand their definition” (p. 225) of language to include pant-hoot dialects, we would find that the animal world is full of examples of so-called language.

The male alliances formed by chimpanzees and dolphins in both Shark Bay and in Sarasota (which are actually different species) are repeatedly cited as evidence for high level cognitive abilities. However, male alliances are also seen in lions, which weakens the proposed link with big brains (p. 124). There were also several inconsistencies in the various discussions

of male alliances in dolphins. First, a semantic point: the alliances seen in Shark Bay are not “called consortships” (p. 121); the alliances are the male pairs or trios, and when they associate with a female, they are called consortships. Second, I do not know of examples of dolphin coalitions functioning in “hostile encounters with other groups” (p. 207). The description in the text is very vague, first discussing interactions with predators, which do not seem relevant to “the politics of war” (the subtext of this section), and then describing how dolphins “scare an intruder” (p. 210). Since dolphins have not been shown to be territorial, I was puzzled by this, and did not find anything in the further reading section that provided further information. Finally, the formation of male coalitions is said to typify “many species among ... higher primates and dolphins” (p. 259), yet to my knowledge these coalitions have been seen only in chimpanzees and bottlenose dolphins (*Tursiops* sp.).

Although it may be expected in a book of this length, I found a variety of inconsistencies and inaccuracies in the text that were bothersome (at least to me, although I admit to being a compulsive nitpicker). Here are some examples, first from Bearzi’s sections:

- 1) The sperm whale is called the “largest” of the cetaceans (p. 73), which is incorrect. Sperm whales are the largest of the odontocete, or toothed cetaceans, but there are many species of mysticetes (baleen whales) that are bigger. In addition, baleen whales do not have large brain to body weight ratios, yet “whales” are included in the list of species with a “high degree of intellect” (p. 135).
- 2) To my knowledge, no dolphin male has been documented to live into its fifties, as stated (p. 76).
- 3) Where did the number five billion come from for number of species (p. 135)? That is about an order of magnitude off from any estimates I have heard.
- 4) Peter Tyack’s research (p. 160) did not look at imitation of man made sounds, but rather at imitation of signature whistles. The study that looked at imitation of man-made sounds at around the same time was by Richards, Wolz, and Herman (1984). In addition, the function of “whistle matching” observed by Vincent Janik (p. 160) is not known; the idea that dolphins are addressing one another is only speculative at this stage.

From Stanford’s sections:

- 1) There are numerous instances of conflicting information. For example: “What we know about the last of the great ape species, the bonobo, is a fraction of what is known about each of the others” (p. 60), and later: “In the forests of Asia live the last of the four great apes [orangutans], and the most enigmatic, poorly understood ones, too” (p. 79). The phrase “make love not war” apes for bonobos is said to have dated to the 1950s (p. 60), after which it was largely discredited, but then is said to have been coined in “recent years” (p. 109). Chimpanzee society is said to be “remarkably uniform across Africa,” consisting of “immigrant females and lifelong resident males” (p. 108), yet later it says that in some cases “females remain in their home community for life” (p. 110). On this note, I am confused as to how male kinship can be low in most communities if males are lifelong residents (p. 196). Gorillas are said to “disdain even the insects that chimpanzees relish” (p. 82), and later said to “sometimes eat termites and ants” (p. 221).
- 2) There is a tendency to repeat identical information several pages apart; this occurred dozens of times. Although I recognize the value of repetition for the sake of emphasis, at times it seemed excessive.

3) Polygyny is incorrectly defined (p. 102) as meaning that “there are multiple males and females in the group.”

My scientific and editorial criticisms notwithstanding, the book was a mostly well-written, enjoyable read. The intended non-scientific audience is likely to learn a lot from it, and to benefit from two of its “take home messages.” First, the idea that we can learn about our own biology and evolution through the study of non-human animals is always important to convey to non-scientists, especially in these days when “Intelligent Design” keeps trying to rear its ugly head in our schools. Second, although not the main purpose of the book, the authors do a fine job of imparting the fact that the conservation status of these fascinating, social animals is dire indeed. Although the authors state that “the situation for cetaceans is far worse than for apes” (p. 296), I had the opposite impression after reading about the grave threats to the apes’ ever dwindling habitats.

Given that there are only four great ape species and that they are limited to areas threatened by wars, habitat degradation, and hunting, their situation is grim at best. Although cetaceans have much larger areas of habitat and there are many more species than of great apes, they too face serious threats such as hunting, reductions in their food supply, bycatch, and pollution. The final chapter presents many disturbing examples, such as the recent extinction of the Chinese river dolphin and the expanding trade in bush meat, which should impress upon readers the need for immediate action in conserving these animals...regardless of whether their mental faculties are as close to human beings as the authors propose.

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