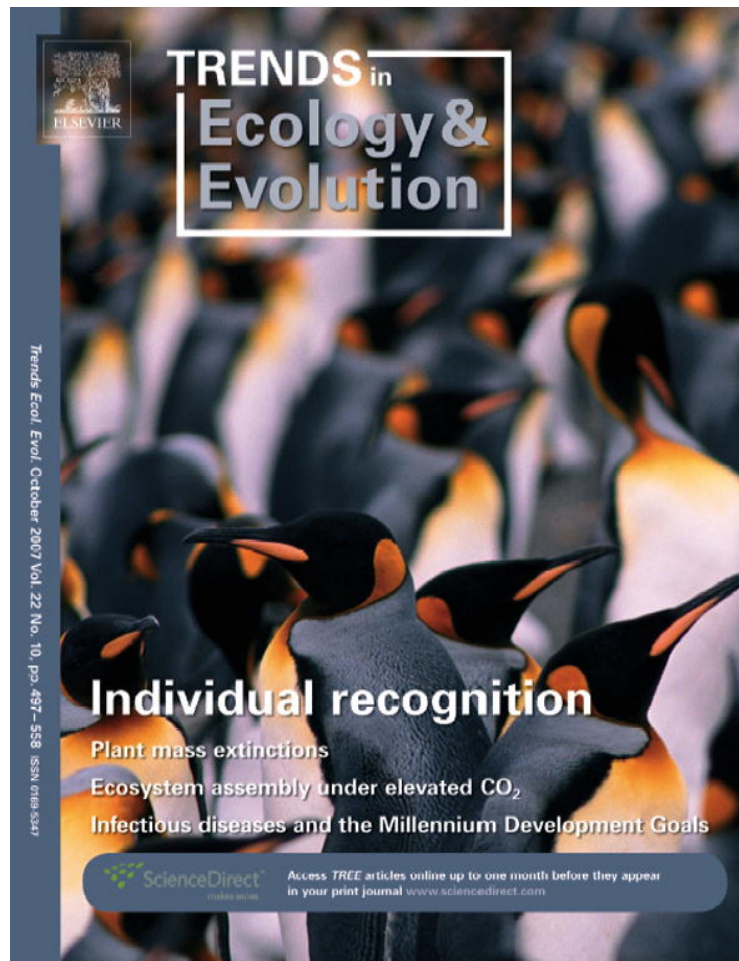


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Collective characters, such as the average gene frequency of the group, appear frequently in the group; aggregate characters such as this contrast with emergent characters such as density or relational characters such as sex ratio. Okasha makes much use of the distinction introduced into the literature by Arnold and Fristrup [1] and discussed by Damuth and Heisler [2], that between Multilevel Selection 1 (MLS1) and Multilevel Selection 2 (MLS2). The issue concerns which focal level is at stake. In MLS1, the particles are the focal units, and their frequency might be affected by which collectives they are in. In MLS2, the collectives themselves are the focal units.

Okasha presents the derivation of the multilevel version of the Price equation in a user-friendly fashion. As a reminder, the covariance of character and fitness is the sum of two components, the collective-level covariance and the average particle-level covariance, which are taken to represent the two components of selection at the distinct levels. As tempting as it is, there are problems with simply reading the levels of selection from the Price equation, as Okasha carefully reviews. Cross-level byproducts mean that it could seem as if there is collective selection when there is none. There is, however, a method that doesn't lead to this error, and that is the one pursued by Damuth and Heisler [2] – contextual analysis. As Okasha emphasizes, only one of these accounts can give a correct causal view of the levels of selection and contextual analysis 'seems superior on theoretical grounds' (p. 94). However, contextual analysis has the shortcoming that in 'soft selection' scenarios, it finds a collective level of selection, which is counter-intuitive. In soft selection, the collectives contribute the same number of individuals to the next generation, but there are collective effects on particle fitness. The Price

approach states there is no collective level of selection under soft selection. Thus, the theoretical superiority of contextual analysis does not come through universally in practice.

Okasha reviews several of the key philosophical issues in the levels of selection debates, including realism versus pluralism, reductionism and emergentism. Most helpful is his discussion of pluralism, in his argument that pluralism should be narrowly applied. In a chapter on 'The Gene's-eye View and its Discontents', Okasha tracks the fate of Williams', Dawkins' and Hamilton's views and those of their opponents. His proposed distinction between process and perspective doesn't really work to sort things out, but the section on outlaws is refreshing, and it is here that Okasha really argues in favor of the Price approach over contextual analysis.

Just as in the conventional levels of selection debates, there has been a genic versus hierarchal conflict within the evolutionary transitions literature as well. Here, as in the original debate, Okasha refuses to take sides, declaring that we do not need to choose between them. He gives an especially clear analysis of how MLS1 is relevant to the early stages of an evolutionary transition, whereas MLS2 is relevant to the later stages. Altogether, this is a clearly written, unique and useful book.

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Are killer whales the culprits?

Whales, Whaling, and Ocean Ecosystems edited by James A. Estes and Douglas P. DeMaster and Daniel F. Doak and Terrie M. Williams and Robert L. Brownell Jr. University of California Press, 2006. US\$54.95 hbk (402 pages) ISBN 978 052024884 7

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In 2003, Alan M. Springer and colleagues published a paper [1] that initiated an ongoing vigorous scientific discussion. They presented an hypothesis for the existence of top-down control of ecosystem structure in the northern North Pacific, suggesting that mid-20th century industrial whaling removed the principal prey source of mammal-eating killer whales, which switched to feeding on smaller marine mammals, resulting in sequential, drastic declines in populations of harbor seals, northern fur seals, Steller sea

lions and sea otters. Also in 2003, James A. Estes and colleagues convened a symposium on whaling and whale ecology with the aim 'to examine the ecological roles of whales, past and present, from the broadest set of viewpoints possible'; the sequential megafaunal collapse hypothesis comprised a major, if not the central, theme. *Whales, Whaling, and Ocean Ecosystems*, edited by the conveners, represents the proceedings from that symposium, arranged over 31 chapters by 59 contributors.

For example, 'Background' includes chapters on ecological theory, particularly on top-down versus bottom-up controls of ecosystem structure and impacts of human harvesting, often using examples from more tractable terrestrial ecosystems. The authors of these chapters come from outside the relatively narrow field of marine mammal

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biology, adding an especially valuable component to the book by providing a much broader context. An unfortunate side effect, however, is that space limitations force many arguments to be kept short by referring the reader to the literature for details. Thus, those unfamiliar with the literature might have a difficult time following the arguments.

'Whales and Whaling' includes chapters of more specific background information, including the evolutionary history of cetaceans as apex predators, effects of commercial whaling in the North Pacific and killer whale biology. Palumbi and Roman presented their estimates of pre-whaling abundances of whales based on present population genetics, which led to its own set of arguments when published [2]. I particularly liked the chapter by Reeves and Smith, who provided a concise and readable summary of whaling history, which sorted global whaling into a useful 'taxonomy' of 109 'operations' within 11 'eras'.

In my opinion, 'Process and Theory' was the weakest section, discussing cetacean energetics and ecology, and the range of ecosystem impacts of removing large numbers of whales. It came across largely as an extended argument in support of the sequential megafaunal collapse hypothesis. This is perhaps not surprising given that all eight authors of the hypothesis [1] were contributors to the book, including three of the volume editors. 'Case Studies' was another strong section that expanded the discussion beyond whales and whaling impacts in the North Pacific, and the 'Social Context' section included chapters on the social, legal and cultural aspects of whaling. This section seemed somewhat out of place and was not strongly related to the remainder of the volume.

The most serious weakness of *Whales, Whaling, and Ocean Ecosystems* is a result of the nearly four years that have passed between the symposium and publication (although the book is dated 2006, it was published in January 2007). In that time, science has caught up with the sequential megafaunal collapse hypothesis. More recently published papers (e.g. Refs [3–6]) have pointed out several weaknesses in the hypothesis, such as the finding that killer whales are not important predators of great whales, with the exception of gray whale calves and minke whales; that there is a mismatch in the timing of the major pulse of whaling in the northern North Pacific and

the observed declines in pinnipeds and sea otters; and that there have not been similar declines in Dall's porpoise and other small cetaceans that are known to be killer whale prey. The same symposium held today would probably result in different and more balanced conclusions. Professionals in the field will be aware of the contingent nature of science, will recognize that *Whales, Whaling, and Ocean Ecosystems* is presenting mainly one side of the issue, and will know how and where to find the other side(s). Students and non-professional readers will be more likely to accept its conclusions as gospel. I was also somewhat disappointed in the narrow geographical range represented by the contributors, only one of whom is from outside North America (Australia).

That said, *Whales, Whaling, and Ocean Ecosystems* will be a valuable resource for marine mammalogists and marine ecologists, and presents a synthesis of a complex issue of broad interest. The chapters are clearly written and readable, without the marked variability in quality that one sometimes finds in multi-authored volumes. However, the breadth and complexity of the book will limit its utility as a textbook or general reference for students.

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Free journals for developing countries

The WHO and six medical journal publishers have launched the Health InterNetwork Access to Research Initiative, which enables nearly 70 of the world's poorest countries to gain free access to biomedical literature through the internet.

The science publishers, Blackwell, Elsevier, Harcourt Worldwide STM group, Wolters Kluwer International Health and Science, Springer-Verlag and John Wiley, were approached by the WHO and the *British Medical Journal* in 2001. Initially, more than 1500 journals were made available for free or at significantly reduced prices to universities, medical schools, and research and public institutions in developing countries. In 2002, 22 additional publishers joined, and more than 2000 journals are now available. Currently more than 70 publishers are participating in the program.

Gro Harlem Brundtland, the former director-general of the WHO, said that this initiative was "perhaps the biggest step ever taken towards reducing the health information gap between rich and poor countries".

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