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Book Review

Diverse views of communication

Sociobiology of Communication edited by Patrizia d'Ettorre and David P. Hughes. Oxford University Press, 2008. US $150 (hbk), US $75 (pbk) (320 pages) ISBN 978-0-19-921683-3 (hbk), ISBN 978-0-19-921684-0 (pbk)

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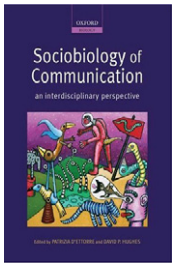

Communication takes place when a signal produced by a sender influences the probabilistic response of the receiver. This definition brings to mind birds singing, moths wafting odors or fruit flies producing love songs. But what about neurons, bacteria, slime moulds and our own genes? The purpose of *Sociobiology of Communication* is to push the envelope of the definition of communication. Two themes run throughout. One is that communication takes place in many taxa and under many circumstances in which it has not previously been appreciated. The second theme is signal reliability: how can signal 'honesty' be maintained when it would pay signalers to deceive receivers?

The table is set for both themes in the first chapter by Amotz Zahavi. He gives a cogent explanation of his handicap principle and offers the intriguing but debatable advice that 'explaining the special investment (the handicap) required by a signal provides a better understanding of its message than the common practice of deducing the message encoded in the signal from the reaction of the receiver to it.' If the same signal attracts a mate while it repels a rival, he tells us, it is neither a courtship nor a threat display but a signal of strength. Zahavi then employs the handicap approach in understanding signals in two rather diverse systems, babblers and slime moulds. There are no data presented here, just a forceful argument based on first principles. But as the rest of the book shows, hypotheses such as these are indeed testable.

A most interesting chapter is by Diggle *et al.* on quorum sensing in bacteria. In a well-studied example, *Vibrio* bacteria congregate in the light organ of a squid. The bacteria produce diffusible signals that bind to specific receptors. Once a threshold is reached, the bacteria start to emit light. It is thought that the light is a benefit to the squid, and that the squid's light organ enhances population growth rate in the bacteria. Thus, there appears to be a mutualism between the squid and the bacteria. But light emission is metabolically costly to the bacteria, and so we must ask, why not cheat? Game theory would address this question theoretically by introducing a cheater into a population and determining whether it could invade. In this system, however, the authors produce signal-negative and signal-blind mutants and introduce them into wild populations, and conclude that the system is maintained by kin selection. This study illustrates clearly that the intuitive explanations of signal honesty by Zahavi can be tested experimentally, and most elegantly so in this system. In addition, this chapter, along with David Haig's discussion of genomic imprinting and internal communication, are models of how basic evolutionary principles that have been developed mostly in the context of social communication in vertebrates and social insects can be fruitfully applied to a much wider spectrum of problems, even when the definition of 'communication' is broadened almost past recognition.

There are other gems in this volume; space only allows mentioning a few. Zuk and Tinghitella review studies of the evolution of silent male crickets in Hawaii. They address the expectation that sexual signals should evolve rapidly, but then wonder why there is not more evidence that this is the case. When theory is not supported by data, we usually suspect that there is some aspect of the phenomenon we do not truly understand. The authors suggest that the lack of rapid evolution of sexually selected traits might be one of those phenomena. Another discussion where some of our expectations are violated emerges in Hurst and Beynon's review of olfactory communication in rodents. It is now almost dogma that rodents and humans use MHC cues to choose better mates. But wild rodents also produce male urinary products (MUPs) whose effects might be confounded with MHC variation. MUPs seem to provide information useful in sex, kin and individual recognition as well as for assessing current social status, and might be far more important in communication in the wild than MHC cues have proven to be in laboratory-bred mice.

Finally, one of the most intriguing chapters is Crespi's review of psychosis and human communication. Citing data from evolutionary theory, neuroscience and genomics, he suggests that the psychosis which results from the conflict generated by both internal and external influences is an 'illness that made us human.' Crespi's words best sum this up: 'Balancing this conflict are the confluences of interest that emerge from genic cooperation, mother's love for child, and love of God – who, like our circle of kin created us in body and psyche and promises immortality, and who we serve to give life its meaning. In the beginning was the Word, and the Word was God – as are we, modern humans' (p. 243).

As the above quote illustrates, this is a book to stretch one's imagination of where and how animal communication concepts might apply. For the most part, it works.

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If one wants to be challenged to think outside of the box, this book represents a good exercise. But the reader should be advised that the book is not an introduction to, nor a prospectus on, the social behavior of communication. For that, the reader is referred to one of the standard texts [1,2].

References

1 Bradbury, J.W. and Vehrencamp, S.L. (1998) *Principle of Animal Communication.* Sinauer Associates
2 Hauser, M.D. (1996) *The Evolution of Animal Communication.* MIT Press

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