

## Special issue on multimodal communication

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Darwin's pivotal book *The Descent of Man, and Selection in Relation to Sex* in 1871 first brought evolutionary analysis on the study of communication during reproduction. More than a century later, in the 1980s and 1990s, did this landmark publication begin to durably influence studies on the role of signaling in sexual selection. The behavioral ecology context of sexual signaling, for example, was introduced by Zahavi's handicap principle (Zahavi 1975; Hamilton and Zuk 1982), increasing our awareness of signal costs and resulting honesty. Today, the impact of Darwin's work is clearly evident in advances in sexual selection theory (Kuijper et al. 2012) and in the elaboration to, for instance, unimodal multiple signals (Møller and Pomiankowski 1993; Johnstone 1996). Much research has been focused on visual signals in which psychophysical models are typically integrated to evaluate communication from an animal's perspective (Endler and Mielke 2005). The field has since expanded, now encompassing complex multimodal signaling—the use of simultaneous signaling in multiple sensory modalities (Partan and Marler 1999).

In categorizing multimodal signals, Partan and Marler (1999) noted “The communicative consequences of combining signal components from different sensory channels remain poorly understood, and we lack a theoretical framework for dealing with them.” The present special issue aims to develop standards for the important and exciting field of multimodal communication, an area of research that is so much broader than sexual selection and signaling. The contributors to this special issue present significant and novel

results, and suggest future directions for the study of multimodal communication to promote a challenging multidisciplinary approach involving sensory physiology and neurobiology.

Again in homage to Darwin, we credit the origination of the study of multimodal communication to *The Expression of the Emotions in Man and Animals* (1872), and here present his modern legacy. As Chief Editors of Behavioral Ecology and Sociobiology, we are grateful to have had the opportunity to work with Guest Editors James Higham (Department of Anthropology, New York University, USA) and Eileen Hebets (School of Biological Sciences, University of Nebraska, USA) to develop and publish this special issue, *Multimodal Communication*. We congratulate Drs. Higham and Hebets on successfully recruiting leading researchers to participate in their synthesis and extend our appreciation for their efforts in assembling these important contributions. We are certain their work will impact future research in the analysis of communication.

### References

- Darwin C (1871) *The descent of man, and selection in relation to sex*. John Murray, London
- Darwin C (1872) *The expression of the emotions in man and animals*. John Murray, London
- Endler JA, Mielke PW (2005) Comparing entire colour patterns as birds see them. *Biol J Linn Soc* 86:405–431
- Hamilton WD, Zuk M (1982) Heritable true fitness and bright birds: a role for parasites? *Science* 218:384–387
- Johnstone RA (1996) Multiple displays in animal communication: ‘backup signals’ and ‘multiple messages’. *Philos T Roy Soc B* 351:329–333
- Kuijper B, Pen I, Weissing FJ (2012) A guide to sexual selection theory. *Annu Rev Ecol Evol S* 43:287–311
- Møller AP, Pomiankowski A (1993) Why have birds got multiple sexual ornaments? *Behav Ecol Sociobiol* 32:167–176
- Partan SR, Marler P (1999) Communication goes multimodal. *Science* 283:1272–1273
- Zahavi A (1975) Mate selection: a selection for a handicap. *J Theor Biol* 53:205–214

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