

or capabilities, and to reap the advantages of coordinated activities (Tomasello 1999). It is to the understanding of this process that signaling theory has the opportunity to make its greatest contribution.

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This lucid and ambitious paper persuasively argues that signaling theory enables us to understand disparate phenomena in which individuals or groups make great efforts to provide information to others about underlying attributes that are difficult or impossible to observe directly. The authors carefully specify the conditions under which such costly signaling is likely to occur. They have convinced me that a signaling framework helps explain certain otherwise puzzling aspects of human behavior.

The paper could have been more explicit about the extent to which the emitters and interpreters of costly signals understand their actions. Such signals have often been analyzed from the perspective of semiotics (e.g., Peirce 1932–58, Sebeok 2001); the assumption here is that senders and receivers know what is being communicated. The authors, however, do not emphasize the presupposed cultural knowledge entailed in signaling. Their focus instead is on functional analyses in which signaling is seen as a way for individuals and groups to acquire prestige, power, and mates. Relatively little attention is given to the cultural evolution of signaling. The authors tentatively say that “design forces” such as decision making, subconscious learning, natural selection, and adaptive cultural transmission should favor “a system of communication conforming to the costly-signaling framework.” This formulation leaves open the question whether the users of such systems of communication are aware of their alleged functions.

As Bliege Bird and Smith acknowledge, many of their “signaling” explanations of particular cultural phenomena are not new. They derive inspiration from the work of Veblen and Bourdieu on conspicuous consumption and symbolic capital and cite diverse other writers taking a signaling approach to topics such as the potlatch, monumental architecture, and Melanesian feasts. One could add related (although perhaps less directly relevant) analyses of multivalent ritual symbols (Turner 1967) and hierarchies of responses to environmental perturbations (Vayda and McCay 1975). Nonetheless, a number of their signaling-oriented explanations are new to me. Some are convincing (e.g., those concerning seemingly wasteful subsistence activities); others (e.g., those related to artistic elaboration) seem less compelling.

The underlying assumptions of this paper are clearly those of evolutionary ecology. In case after case, the function of costly signaling is said to be “enhanced social status and its subsequent political and reproductive advantages.” What marks this as evolutionary ecology is of course the emphasis on “reproductive advantages.”

The evidence that costly signalers have greater “reproductive success” than others is not presented in any detail. I would think that desires for increased social status (often including the acquisition of prestigious mates) and power would be sufficient motives for costly signaling among humans even if reproductive success is relevant to analogous phenomena among other species.

Perhaps the paper’s most debatable assertion is that “signaling theory allows us to address issues of symbolic value with rigorous empirical data and a set of testable predictions derived from a body of theory that is linked to individual strategizing and evolutionary dynamics.” Little supporting evidence is presented for this bold statement. The paper includes assertions such as “More rigorous formulation of signaling arguments and empirical tests thereof are needed,” “As in other domains, much further research is needed to subject these plausible scenarios to rigorous empirical test,” “Application of this theory to human social behavior is at an early stage and judgment of its value must await empirical evaluation,” and “The precise benefits to signalers and receivers have not been measured in most cases.” One of the major critiques of functionalist explanations is their nonfalsifiability; I see no reason to think that the explanations of signals offered here are any different.

A notable feature of this paper is its reexamination of conventional explanations for food sharing among foragers. Most anthropologists explain such generosity (often “unconditional”) with respect to uncertain returns to subsistence activities. From this perspective, food sharing is a risk-reducing activity that enables members of foraging groups to be fed even on days on which their subsistence efforts are unsuccessful. Food sharing also helps those who are ill or are working on non-subsistence-related tasks. Bliege Bird and Smith suggest that risk minimization is “a welcome but unanticipated outcome of rather than a motive for food sharing.” They emphasize instead the social benefits that accrue to those who signal their survival skills by being able to share some of the meat and plant foods they obtain. These two explanations of food sharing do not strike me as contradictory; both may help explain unconditional generosity among foragers.

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Human behavioral ecologists have been promoting signaling theory for the study of cultural phenomena for nearly two decades (e.g., Harpending, Draper, and Rogers 1987; Kaplan 1987; Cronk 1991, 1994a, b, 1995, 1999, 2001, n.d.; Irons 1996). Bliege Bird and Smith report progress on this front, identify some parallels with other approaches, and provide ethnographic examples that costly-signaling theory can elucidate. I am already on record as sharing their general position and will limit my comment to a few points.

Bliege Bird and Smith identify parallels between costly-signaling theory and the insights of Veblen, Mauss, and Bourdieu. While these theorists are likely to be familiar to cultural anthropologists, other social scientists have independently developed similar ideas. Schelling (1960) provided insights about signals of commitment, Spence (1973) developed a model of job-market signaling, Frank (1988) applied the same logic to signals of moral commitment, and political scientists (e.g., Baumgartner and Leech 1998, Kollman 1998) have made similar arguments about the lobbying efforts of interest groups. Even Theodore Geisel, better known as Dr. Seuss (1961), explored indexical signals (Maynard Smith and Harper 2003) and the circumstances in which they might be undermined by innovation.

Costly signals' ubiquity and prominence make them an appropriate choice for an article of this kind. However, as Bliege Bird and Smith point out, signaling theory also offers other insights. Among the most promising is the examination of the role of receiver psychology in signal design (Guilford and Dawkins 1991, Rowe 1999). Bliege Bird and Smith refer to this briefly in their discussion of sensory exploitation, suggesting that a consideration of this factor might shed light on such phenomena as advertising, propaganda, and pornography. Other examples already in the literature of signals with design features that reflect the importance of receiver psychology include "motherese" (Fernald 1992), kin terms in political rhetoric (Salmon 1998), kin terms and mating competition (Chagnon 1988, 2000), derogation of same-sex mating competitors (Buss and Dedden 1990), features of religious concepts (Boyer 1999) and rituals (Sosis and Alcorta 2003:265), symmetry in ceramic designs (Washburn 1999), and neoteny in toy design (Hinde and Barden 1985).

Signaling theory's breadth has implications for the way it is best approached by anthropologists. Bliege Bird and Smith's method of first identifying behaviors that are remarkable for their costliness is representative of much of the existing literature. This approach is vulnerable to the criticism that it stacks the deck in favor of costly-signaling theory. An alternative is to identify a signal without regard to its apparent costliness and then explore a variety of explanations, including but not limited to costly-signaling theory, for its design features. For example, some colleagues and I chose to study cosmetics not because of their costs but because of their popularity, their importance in the lives of many people, and their relevance to the study of facial attractiveness. While women may spend a great deal of time and money on cosmetics, such costs are not related to their underlying qualities in the way predicted by costly-signaling theory. Our preliminary findings indicate that receiver psychology is more important than cost in understanding cosmetics use, with women using them primarily to make their faces more noticeable and memorable (Cronk et al. 2002, Milroy et al. 2002, Wigington et al. 2004).

As Bliege Bird and Smith explain, the common and conflicting interests of signalers and receivers are keys to understanding signal design. In evolutionary terms, a

conflict of interests exists between two parties when selection would favor a different outcome for their interaction if it were determined solely by selection on genes in one party or the other (Maynard Smith 1991, Trivers 1974). Two parties have common interests when selection acting on genes in both of them would favor the same outcome from their interaction. Bliege Bird and Smith state that costly signaling is favored when signalers and receivers have "partially competing interests." It is possible to describe this situation more precisely. Specifically, costly-signaling theory is relevant where there are confluences of interest between individual signalers and individual receivers in contexts where the broader categories to which signalers and receivers belong have conflicting interests. For example, predators and prey *as categories* have conflicting interests, but *individual* predators and *individual* prey, like the ungulates mentioned by Bliege Bird and Smith, experience a confluence of interests if the prey are truly capable of making a pursuit not worth the predator's bother. The conflict of interest in that case is not between the alert, physically fit individual of the prey species and the predator but rather between different members of the prey species. Similar reasoning can be applied to other situations where costly and indexical signals are common, such as courtship displays.

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Bliege Bird and Smith offer us a clear and well-structured article that highlights potential applications of signaling theory for the study of human behavior and culture. This theory stems from biology's interest in the role that information plays in the evolution and functioning of biological systems. In particular, it owes much to the work of Amotz Zahavi, an Israeli evolutionary biologist who has sought to explain the evolution of structures and behaviors that appear to endanger organisms and, thus, to decrease their fitness. As is the case in sociobiology and related fields of inquiry (e.g., evolutionary psychology and behavioral ecology), sexual selection as a sign of fitness and cost/benefit estimates are key to signaling theory.

The theory, in addition, favors visible behaviors in which sender(s) and receiver(s) of information interact and in the process appraise each other and gain some benefit. Moreover, it assumes that cost helps ensure the reliability of the signal (Zahavi 1979, 1993). This is problematic when it comes to humans because they engage in a variety of concealed and ambiguous actions that are often costly. Bliege Bird and Smith, to their credit, attempt to present a nuanced argument and concede that this exposes one of the theory's limitations, specifically, its inability to account for costly unconditional acts of generosity that are secret or anonymous.

However, it seems to me that Bliege Bird and Smith