



Forum

The blurred boundaries of functional reference: a response to Scarantino & Clay



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The past years have shown a resurgence of interest in conceptual issues in animal communication, with much of the debate centering on the concept of information (e.g. Carazo & Font, 2010; Rendall, Owren, & Ryan, 2009; Ruxton & Schaefer, 2011; Scarantino, 2010; Scott-Phillips, 2008; Seyfarth et al., 2010), and whether the identification of so-called ‘functional reference’ contributes to a better understanding of linguistic reference, and ultimately the evolution of speech (Fedurek & Slocombe, 2011; Manser, 2013; Townsend & Manser, 2013; Wheeler & Fischer, 2012). Scarantino and Clay’s (2015; hereafter S&C) Forum article in this issue continues this debate, and is largely a response to a recent paper of ours (Wheeler & Fischer, 2012). In our original paper, we contended that all cases of animal communication in which receiver responses could be explained in terms of the information provided by the signal could be said to function referentially. According to most definitions, this applies to the entire spectrum of animal communication (see Rendall et al., 2009). Because the boundaries of ‘functional reference’ have been blurred to a degree where it is no

longer productive to distinguish between functionally referential communication and communication more generally, we suggested to abandon the term altogether. In addition, we argued that the original motivation to study ‘referential’, ‘semantic’ or ‘symbolic’ communication in animals was to search for the substrate that gave rise to referential communication in human speech. Once it became clear that functionally referentially calls most likely do not share central criteria for linguistic reference, and therefore do little to illuminate the origins of linguistic reference, the concept lost much of its allure, at least to us. We further suggested an alternative framework that aims to elucidate the potential cognitive mechanisms underpinning receiver behaviour. Specifically, we suggested to distinguish between ‘meaning attribution’ and ‘decision making’, and to consider the role of additional sources of information, such as contextual variation on both.

In their article, S&C take another route, and argue that it would be more productive to retain the term ‘functional reference’ but redefine what would constitute such a signal. Moreover, they criticize our notion of meaning attribution in animals. We find much to both agree and disagree with in S&C’s proposal. Considering their paper as a whole, most of the disagreement between their perspective and our own seems to be a rather simple difference in preferred terminology rather than a fundamental difference

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regarding the nature of animal communication. Indeed, a substantial part of their paper is an attempt to formalize the roles of information and context and their relevance for signal receivers, and we find these contributions to be both insightful and largely consistent with the alternative framework we propose. At the same time, we disagree with S&C on a number of points and believe that it ultimately underscores the strengths of our proposed framework for conceptualizing the cognitive mechanisms involved in signal perception.

SENDERS VERSUS RECEIVERS AND THE LEVELS OF ANALYSIS

The concept of functional reference was introduced to acknowledge that some signals appeared to function in the same way as human words while the proximate mechanisms that underpinned the production of such signals essentially remained unclear (Marler, Evans, & Hauser, 1992). Yet, despite professed neutrality regarding the cognitive mechanisms underpinning functionally referential communication, a distinction was made from the beginning between referential and emotional aspects of animal signalling; that is, at the level of the mechanisms (Marler et al., 1992). Although, initially, emotional and symbolic aspects of animal communication were pitted against each other (Marler, 1984), it was later conceded that these two aspects were not mutually exclusive, insofar as a given signal could simultaneously have both referential and emotional components, just as a human speaker's current emotional state will have some effect on the structure of a given linguistic utterance, but emotion and reference were nevertheless considered distinct aspects at the mechanistic level (Marler et al., 1992). A purely emotional signal would thus not qualify as referential, indicating that the mechanistic-agnosticism of functional reference had its limits.

It was more than a decade later that Seyfarth and Cheney (2003) pointed out that the mechanisms underpinning signal production in most animals are unrelated to the mechanisms that are involved in the perception of those same signals. The distinction between emotion and reference was, they claimed, like comparing apples and oranges, not because a given signal could potentially have both emotional and referential components as Marler et al. (1992) correctly pointed out, but because emotion is best seen as related to signal production, while the referential aspects applied to the receiver. That is, a signal could be purely emotional in its production, but, if the signal's production shares a predictable relationship with the occurrence of something salient to receivers, then the potential exists for receivers to take the signal as being indicative of that salient phenomenon. Wheeler and Fischer's (2012) argument was largely based on this insight: the production of most signals, even in species with relatively well-developed cognitive abilities, appears indeed to be based on very different mechanisms than those involved in the production of language, but there may be some degree of cognitive continuity in the mechanisms involved in the comprehension of calls and language on the side of the receivers (but see Scott-Phillips, *in press*). At least in some cases, recipients learn through experience that a given signal is associated with a given phenomenon, and this learning explains their responses to one degree or another (but see Owren & Rendall, 2001; Rendall et al., 2009 for extended discussions of factors affecting lower-level responses).

Although S&C do not make an explicit distinction between senders and receivers, they do so implicitly by setting no limits on what mechanisms should underpin the production of functionally referential signals, while limiting such designation to cases in which receivers 'take the call to stand for' something (and thus excluding cases in which behavioural responses are driven solely by, for example, neuroendocrine processes). S&C thus seem truly

agnostic regarding the mechanisms underlying signal production, leading them to advocate for the extension of the realm of possible 'referents' to include phenomena that are considered 'internal' to the signaller. Such a conception of 'referent' is in line with that suggested by Smith (1981); it contrasts, though, with that of the originators of the concept of functional reference (Macedonia & Evans, 1993; Marler et al., 1992), and it is this change that arguably does more to move functional reference away from its original conception than do the proposed changes to the production and perception criteria that S&C largely focus on.

The suggestions to remove the distinction between internal and external 'referents' and to eliminate the focus on context specificity in both signal production and signal perception are fully in concordance with our own suggestions (Wheeler & Fischer, 2012). Indeed, despite some disagreements about the weight given to different lines of evidence, it seems that when S&C would conclude that 'signal *x* functionally refers to *y*', we would likewise tend to conclude that 'the receiver has attributed the meaning *y* to the signal', and vice versa. That the difference is largely terminological is evinced by the fact that S&C equate their conception of functional reference with receivers taking a signal *x* to 'stand for' a phenomenon *y*; it is hard to see this as much more than a slightly different way of saying that the receiver attributes the meaning *y* to the signal. The differences between our perspectives regarding what evidence might be necessary for one to draw the conclusion that *x* means (or 'refers to', or 'stands for') *y* for a given receiver may be a point of genuine disagreement, but this is a separate issue from which set of terminology (or even which conceptual framework) one prefers; one could easily adopt their criteria and our terminology or vice versa, and one should not conflate these realms as S&C appear to do.

Our rejection of the term 'functional reference' and embracement of 'meaning attribution' stems from an explicit consideration of the distinction between signallers and receivers. While referring to something (in the original sense) is a behaviour performed by the sender, attributing meaning to a signal is something done by a receiver. What we know about the proximate mechanisms involved in most forms of animal communication (including but not limited to vocal communication in most mammals) preclude the signals from being referential in the way that words in human language are (Wheeler & Fischer, 2012). At the same time, the behavioural responses of receivers are shaped by experience in a way that suggests that receivers are indeed attributing what can legitimately be called 'meaning' to signals. We suggested that this is possible not because the signals carry symbolic meaning, but because they carry a type of 'natural meaning' (*sensu* Grice, 1957), which is instantiated when natural spatiotemporal associations between two phenomena lead to the occurrence of one entailing the occurrence of the other; this is not unlike the production of a signal correlating with the occurrence of another event (Scarantino, 2010; Scott-Phillips, *in press*; Wharton, 2003). In contrast, the idea that signallers are referring to things appears to be, at best, an analogy. In other words, because animal signals have natural meaning, we are perhaps able to empirically address the question 'what does that signal mean to a monkey?' In contrast, when animal signals lack symbolic meaning, the questions 'what did that monkey mean by producing that signal?' or 'what was that monkey referring to?' are ill-posed (see Grice, 1957).

S&C are correct that our application of the term 'natural meaning' to animal signals in many cases falls outside the boundaries of Grice's (1957) concept (S&C's criticism that we can do playbacks of snake alarms in the absence of snakes is not a good argument, though, as experimental manipulations could be applied to any of Grice's actual examples to argue that natural meaning does not exist at all; but we concede that the fact that naturally

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