Pragmatic Interpretation and Signaler-Receiver Asymmetries in Animal Communication

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Abstract: Researchers have converged on the idea that a pragmatic understanding of communication can shed important light on the evolution of language. Accordingly, animal communication scientists have been keen to adopt insights from pragmatics research. Some authors couple their appeal to pragmatic aspects of communication with the claim that there are fundamental asymmetries between signalers and receivers in non-human animals. For example, in the case of primate vocal calls, signalers are said to produce signals unintentionally and mindlessly, whereas receivers are thought to engage in contextual interpretation to derive the significance of signals. We argue that claims about signaler-receiver asymmetries are often confused. This is partly because their authors conflate two conceptions of pragmatics, which generate different accounts of the explanatory target for accounts of the evolution of language. Here we distinguish these conceptions, in order to help specify more precisely the proper explanatory target for language evolution research.

Keywords: animal communication, pragmatics, signaler-receiver asymmetry, language evolution
**Gricean Communication and the Evolution of Language**

Prominent theorists of language evolution have converged on the idea that pragmatic phenomena are of fundamental importance to the emergence of language (Tomasello 1999, 2008; Sperber and Wilson 2002; Scott-Phillips 2014, 2015). In particular, some of these authors have argued that it is the emergence of capacities for ‘Gricean’ or ‘ostensive-inferential’ communication, operating in conjunction with cooperative motivations, that is the seed of human language. At the heart of these arguments is a conception of human linguistic communication that goes back to Paul Grice (Grice 1957). Grice’s central idea was that human communication is made possible by hearers’ interpretive comprehension of speakers’ communicative intentions. What Grice called ‘speaker meaning’ is a matter of a speaker producing an utterance (acoustic, written, gestural, or otherwise) with the intention of (a) producing an effect on the psychological states of some receiver, and with the further intention of (b) producing that effect in part by means of the receiver’s recognition of that intention. The speaker (or gesturer) intentionally and overtly (or ‘ostensively’) produces an utterance with the intention of soliciting some response from her interlocutor (typically by aiming to produce some belief in her, or to solicit some action). The hearer infers the speaker’s communicative goal through recognizing the speaker’s intention to communicate, and infers the content of this intention on the basis of what the speaker said. The speaker’s intention is fulfilled just when the receiver recognizes her intention (and when this recognition plays some part in producing the intended effect). Call this the Classical Gricean picture of communication.
On the Gricean view, communicative intentions can play a foundational role in understanding the nature of language because they are *independent* of language. Grice took speaker meaning to be conceptually prior to conventional, structured linguistic meaning (Grice 1967[1987]). He envisaged an explanation of the standard meanings of words and sentences in terms of ‘ossified’ speaker meanings; viz., the meanings that speakers in a group regularly – if not always – intend to communicate by utterances. This feature of Grice’s account suggests a ‘pragmatics-first’ approach to the evolution of language, since it explains the emergence of conventional *semantic* properties of linguistic items (such as words and sentences) from acts of producing utterances with communicative intent.

The Classical Gricean picture requires more than that sender and receiver possess concepts and draw inferences (conscious or unconscious) that deploy those concepts. It requires that both senders and receivers have a ‘Theory of Mind’ (hereafter ToM); that is, a capacity to ascribe beliefs and other psychological states to creatures other than themselves. Insofar as Gricean communication presupposes such social cognition, a Gricean approach to understanding the evolution of language introduces a clear explanatory task: to explain the phylogenetic emergence of the relevant capacities in our hominin ancestors. As Origgi and Sperber put it, it implies that “language as we know it developed as an adaptation in a species already involved in inferential communication, and therefore already capable of some serious degree of mindreading… the existence of mindreading in our ancestors was a precondition for the emergence and evolution of language” (2000: 20).¹

This approach is controversial, since explaining the emergence of such social cognition – including a capacity for propositional and even recursive thoughts – *prior* to the emergence of propositional-compositional language would seem no less difficult than explaining the evolution
of language itself. Incorporating the Classical Gricean view into an account of language evolution thus means trading the ‘language Rubicon’ for a ‘psychological Rubicon’ (see Bar-On 2013, and this volume).

**Gricean Communication and Signaler-Receiver Asymmetries**

The Classical Gricean view supposes that to be a Gricean communicator, an individual must be capable not just of intentionally producing and responding to signals, but also of acting with and attributing communicative intentions. The production of utterances with communicative intentions and their comprehension is cognitively demanding, because according to the Classical Gricean view (Sperber 2000; Scott-Phillips 2014, 2015) they require entertaining fourth-order meta-representations of mental states – something that has yet to be identified even in ten-year-old children (Liddle and Nettle, 2006; see Moore, Forthcoming b). Despite this evidence, researchers have often taken it for granted that the abilities required for Gricean communication are present in young children but not in nonhuman animals (e.g., Sperber 2000; Tomasello 2008; Corballis 2011; Scott-Phillips 2014, 2015). Even assuming that nonhuman animals have first-order thoughts (i.e. thoughts about the world, including others’ behavior) and possess various concepts and are able to draw inferences (conscious or unconscious) using those concepts, many doubt that they have higher-order thoughts about others’ mental states. Thus, Tomasello, Call and Hare conclude that “in contrast to human children, chimpanzees may not understand … such things as … communicative intentions” (Tomasello, Call & Hare, 2003: 156).

Even apart from animals’ comparative lack of ToM capacities, there seems to be a difficulty in regarding animal vocalizations, specifically, as a source of insight into human communication. It has long been assumed that primate vocalizations, especially, are involuntary
emotional responses to salient stimuli (e.g., Tomasello 2008; although see Slocombe et al. 2010; Slocombe and Zuberbühler 2007; Crockford et al. 2012 for challenges). If this assumption is correct, then primate calls are not a species of intentional behaviour. For this reason, many researchers have argued that we should focus on the comprehension and not the production of primate calls to tell us what we want to know about language evolution.

Some of those who adopt the Gricean approach to the evolution of language have argued that the receiver’s side of the sender-receiver relationship raises no problems peculiar to human communication, since nonhuman receivers regularly deploy interpretive mechanisms when responding to (even unintentionally produced) con- and extra-specific signals. This, it is claimed, reveals a fundamental asymmetry between animal senders and receivers. On this view, defended by Fitch (2010), the real explanatory challenge for language evolution research is to explain the emergence of senders who act with Gricean communicative intentions; the problem of the receivers’ contribution was solved long ago.

Some empirical data appears to support the speaker-hearer asymmetry claim. Wheeler and Fischer (2012) review evidence suggesting that non-human primates lack the voluntary control over their vocalisations that humans have. In their words,

the same neurobiological circuits that are responsible for innate vocalizations, including laughter and reactions to pain in humans, exist in both nonhuman primate and human nonverbal vocal production systems; the more derived parts responsible and necessary for voluntary control of vocalizations seem to be limited to humans, or at least have not been identified in other primates. (2012:197)

Thus, in the words of Seyfarth and Cheney, when primates learn about the world from hearing
another’s screams, they “acquire information from signalers who do not, in the human sense, intend to provide it” (2003: 168).

Unlike human utterances, calls produced by primates also appear not to be produced with sophisticated other-directed goals in mind. For example, Seyfarth and Cheney have shown that vervet monkeys produce calls that dramatically affect the behavior of their audience, but without seeming to take into account the psychological states of their audience (Seyfarth and Cheney 2003). In producing e.g. ‘contact barks’, baboon callers also seem to show little awareness of their listeners’ states (of mind or otherwise) (Cheney et al. 1996). Thus, on the part of signalers, there seem to be only affective reactions to a perceived situation, albeit ones that may exhibit sensitivity to the presence of a suitable audience.²

Whereas animal vocal production appears to be unsophisticated, animal receivers show an impressive capacity for making contextual inferences to extract information from others’ signals. Thus Seyfarth cites experiments (Bergmann et al. 2003) that show that baboon listeners who witness a sequence such as ‘A threat-grunts to B and B screams’ must be attributing to A a disposition to act toward B in a very specific way. Seyfarth thinks this supports the view that, as listeners, “baboons (and probably many other animals) deduce information about events and scenes in the world from the vocalizations that other animals make … extract[ing] detailed, propositional-type information from signalers” even in the absence of sophisticated, intentional production (personal communication). Tomasello, too, finds a “stark contrast” between the “flexible comprehension” exhibited by call receivers and the inflexibility exhibited by call producers (2008: 16f.), and he cites as the reason for the lack of flexibility the fact that nonhuman vocalizations “are mostly very tightly tied to emotions” (2008: 17). If this is right, then there seems to be an asymmetry between inflexible signalers and sophisticated receivers in
at least some animal communication systems.

With this asymmetry in mind, Wheeler and Fischer conclude that “any continuities or parallels that exist between the communication systems of humans and our extant primate relatives reside not in the ability of signal producers to transmit symbolically encoded information, but in the flexible, learned responses of receivers” (2013: 199). Accordingly, they recommend that “a more productive framework” for primate communication research should be “pragmatics, the field of linguistics that examine the role of context in shaping the meaning of linguistic utterances” (2013: 203).

Combining the asymmetry claim with a Gricean conception of the task for a theory of the evolution of language, Fitch draws the following conclusion:

[A]nimal communication, before language, largely involved signalers who generate signals either automatically (e.g. innate calls) or selfishly (“manipulations”), and thus obeyed no Gricean maxims. *Listeners, on the other hand, have been processing these signals inferentially, fulfilling their half of the Gricean equation, for the entire history of communication systems.* ... The component of this Gricean model that demands special evolutionary explanation is ... the speaker’s contribution to this cooperative endeavor.

‘Going Gricean,’ then, *required a fundamental change in the rules of animal communication on the part of signalers,* and this step is a logical necessity before language could get off the ground. (2010: 135, emphases added; see also *ibid.* §4.11).

This shifts the target of language evolution research. Followers of Grice take the primary task of language evolution research to be to provide an account of the social and ecological selection pressures that led to the emergence of subjects’ capacities to both *act with and understand* communicative intentions (Sperber & Wilson 1995; Origgi and Sperber 2000;
Tomasello 2008; Scott-Phillips 2014). On their view, animal communication systems differ from human languages precisely in being fully captured by the (non-Gricean) ‘code model’, on which neither animal signalers nor animal receivers exhibit Gricean mindreading capacities. Thus, they would deny that there is a signaler-receiver asymmetry that is relevant to the emergence of Gricean communication. By contrast, Fitch claims that animal receivers have long been ‘fulfilling their half of the Gricean equation’. For Fitch’s view to be right, we have to take it for granted that our nonhuman ancestors already had the relevant cognitive abilities needed for flexible, pragmatic interpretation, so that all that would require explanation is the phylogenetic emergence of speakers who were motivated to produce utterances with Gricean communicative intentions. (See also Hurford 2007: 332 and passim.)

So, despite agreement about the need for a pragmatics-first approach to language evolution, there are now two different agendas on the table. According to the first, an account of language evolution must explain the emergence in phylogeny of subjects who can act with and attribute communicative intentions. On the second agenda, language evolution research need explain only the emergence of speakers who are able to put existing cognitive capacities to use in the production of communicative acts.

The apparent disagreement stems, at least in part, from the presence of two different conceptions of pragmatics. The signaler-receiver asymmetry described above is relevant to the explanation of the evolution of language on one but not the other. If theorists of language evolution are to embrace a pragmatics-first approach, then, before settling on the agenda for a theory of language evolution, they must be clear on this distinction.

Signaler-Receiver Asymmetries and Pragmatics
On the approach advocated by Tomasello, Scott-Phillips, Sperber and Wilson, and others, it is not enough that animal receivers extract rich information from signals. What needs to be established is that, when interpreting signals, receivers make inferences about signalers’ communicative intentions. But from the fact that receivers extract rich information from the signals they receive (even if they do so inferentially) it does not follow that their doing so depends on their employment of (even a rudimentary) Theory of Mind. Many creatures extract rich information about their physical environment without attributing mental states to anyone.

The ability to make inferences about the significance of a call in light of contextual information is one that Grice himself would contrast with the ability to understand communicative intentions. His notion of speaker meaning is introduced in contrast with what he labeled natural meaning. The latter is the sort of significance we assign to various natural signs, as when we say, e.g., “Those dark clouds mean rain”. In contrast with utterances that possess speaker meaning, natural signs possess natural meaning independently of anyone’s intending to communicate anything by them. An astute observer can learn to recognize natural meaning by learning the causal correlations between the presence of the sign and what it signifies. Thus, the hearer of an animal call can learn that it correlates with the presence of some specific danger whether or not it was produced intentionally, and thereby derive the call’s natural meaning independently of attributing communicative intent.

Returning to Fitch’s formulation of the speaker-hearer asymmetry, if animal signals are issued unintentionally, then it would seem odd to credit receivers with a Gricean interpretation of them. For this would suggest that hearers regularly attribute communicative intentions where none exist. If animal signalers do not ‘fulfil their half of the Gricean equation’, then at best we could credit animal receivers with regularly – but falsely – attributing communicative intentions.
If signalers never act with Gricean intentions, such attributions would at best be idle. Moreover, on the face of it, ‘receivers’ and ‘signalers’ designate different roles, not distinct subcategories of creatures, with their own distinct psychological capacities. The receiver of an alarm call on one occasion is likely a producer of such a call on another. So whatever psychological capacities animals are thought to possess as receivers, it is unlikely that they disappear when the same animals assume the role of signalers. So either both animal signalers and receivers should be credited with a capacity for ostensive-inferential communication or neither should be.

Perhaps when Fitch claims that animal receivers ‘fulfill their half of the Gricean equation’, he has in mind something less cognitively demanding than the ability to attribute communicative intentions. Perhaps his idea is simply that animal receivers are astute interpreters of the natural significance of unintentionally produced signals. He does write that there is “strong evidence that sophisticated inference is common among primates” (2010: 189). However, while Fitch argues that monkeys, prairie dogs, suricates, ground squirrels, many birds, and even chickens, all produce a great variety of calls that are claimed by Fitch to be “inferentially interpreted” by receivers despite the absence of any “intentional encoding” (2010: 191), this would not support the conclusion that these species are Gricean interpreters.

If animal receivers are not Gricean interpreters, then this ‘pragmatics-first’ approach is different from the one advocated by Origgi and Sperber, Tomasello, and other Griceans. In that case, the form of the pragmatics-first approach that focuses primarily on the contextual inferences of animal receivers is only indirectly relevant to their theories of language evolution. Moreover, from the Gricean perspective, once it’s acknowledged that animal receivers neither act with nor attribute communicative intentions, then there is no basis for maintaining that animal communication exhibits a ‘fundamental asymmetry’ that is relevant to a pragmatic
understanding of language evolution. Whatever asymmetry there is between signaler and receivers, it is not relevant to a Gricean understanding of what is required for the emergence of language.

Signaler-Receiver Asymmetry and Pragmatic Interpretation: Diagnosis

There are two different sorts of cognitive prerequisites for genuinely Gricean communication. First, there are interlocking speaker-hearer rational mindreading capacities: the capacity to issue utterances with other-directed informative-communicative intentions, and the capacity for attributing of those intentions (on the hearer’s side). In addition, at least on the hearer’s side, inferential capacities are also needed to figure out the specific content of the message the speaker is trying to convey, based on the evidence provided by the speaker and the context of the utterance. When drawing a sharp distinction between animal and human communication, and when speculating on the Rubicon that must have been crossed to explain the advent of language, neo-Gricean thinkers focus on the first set of (mindreading) capacities. By contrast, Fitch, Hurford, Wheeler and Fischer, and others (including Scarantino & Clay 2015), who are looking to find evidence for precursors of language in the behaviors of existing animals, focus on the second set of (inferential) capacities. Assuming “inference” is understood in a suitably relaxed fashion it is uncontroversial that inferential capacities exist in the animal kingdom. However, this observation does little to support the conclusion that animal receivers are in any way Gricean interpreters. But then the puzzle for language evolution is as much to explain the emergence of Gricean interpreters as it is to explain how signalers have become Gricean producers.
If this diagnosis is correct, it clearly reveals that, when Fitch talks about animal receivers as engaging in pragmatic interpretation (and “fulfilling their half of the Gricean equation”), he must have in mind something much weaker than is required by the Classical Gricean view. For, as noted earlier, contextual interpretation need not presuppose the attribution of communicative intentions. So the observed disparity in flexibility between signalers and receivers does not support any symmetry in “fulfilling one’s half in the Gricean equation”.

Fitch’s Gricean reading of the asymmetries likely turns on a conflation of two different sorts of pragmatic phenomena, which have been described independently by Carnap (1942) and Grice (1957). Carnap introduced the term ‘pragmatics’ to cover the study of those aspects of meaning that are dependent on contextual (or ‘situational’) factors. On this reading, pragmatic phenomena include the various ways in which the same sentence (type) might be interpreted differently in different contexts. (So, for example, “It’s raining” might be used to convey a different proposition on different occasions.) Pragmatics in Carnapian sense can also cover the ways in which an animal alarm call (understood as a type) might be assigned different significances (and so elicit different responses) in different circumstances. Consider for example, the finding by Palombit, Seyfarth, and Cheney (1997) that male baboons are more likely to respond to calls produced by females with whom they have mated than other females – particularly where those females have a dependent offspring and are in the presence of a potentially infanticidal male. Wheeler and Fischer’s treatment of such differential responses as pragmatic phenomena is in keeping with the Carnapian notion.

Although Grice’s work on pragmatics encompassed the ways in which the interpretation of words and sentences can vary with their use (and thus context), he was primarily interested in a deeper phenomenon than the context-sensitivity of interpretation – namely the dependence of
linguistic meaning on a special kind of (communicative, audience-directed) intentions. He offered an analysis designed to capture the structure of those intentions, which must be understood by hearers if they are to comprehend the speaker’s intended meaning. In addition to an analysis of the nature of speaker meaning, Grice (1975), introduced a set of heuristics – ‘Conversational Maxims’ – to which hearers can appeal in trying to make sense of speakers’ communicative intentions (referred to by Fitch 2010: 135, quoted above).

On the Gricean view, to engage in pragmatic interpretation just is to attribute communicative intentions. Therefore on the Carnapian but not the Gricean version of pragmatics, there can be phenomena of pragmatic interpretation even in the absence of intentional communication. To recap:

Carnapian pragmatics is the study of the variation (and derivation) of the significance of sentence (or signal) types with the context of production.

Gricean pragmatics is the study of the production of utterances with communicative intentions and their mindreading interpretation by interlocutors.

These different notions of pragmatics have made their way into the literature on animal communication without being properly distinguished. Moreover, they yield different accounts of what is involved in a pragmatics-first approach to language evolution. If we treat Fitch, Wheeler and Fischer, Cheney and Seyfarth, as making claims about Carnapian pragmatic phenomena, then it is clear that what they have in mind is not the attribution of communicative intentions, but simply hearers’ ability to make discriminations about the significance of various bits of environmental information – including information derived from unintentionally produced alarm calls. This is not the sense of pragmatics to which Tomasello and others are appealing when giving an account of the Gricean foundations of language evolution.
Conflating these two different senses of pragmatics threatens to be pernicious. For example, when observing that primate receivers of calls can derive different messages from the same calls in different situations – and thus engage in Carnapian interpretation – one can mistakenly conclude that understanding such interpretation can help account for the phylogenetic emergence of abilities needed for Gricean communication. While there may be some overlap in the abilities deployed in Carnapian contextual interpretation and Gricean mindreading interpretation, the former are in no way sufficient for the latter. Since Gricean but not Carnapian interpretation requires possession of sophisticated ToM, there could be (and likely are) creatures capable of Carnapian contextual interpretation alone.

At times, the slide between the two senses of ‘pragmatics’ is made explicitly. For example, Scott-Philips (2014, 2015) argues that there is a fundamental, qualitative difference between animal communication, which can be fully understood on the ‘code model’, and human communication, which is essentially ‘ostensive-inferential’ (Scott-Phillips 2014, 2015). On the neo-Gricean view that he defends, it is the absence of the ability for ostensive-inferential communication that explains why non-human great apes did not develop language. Pragmatic phenomena on this approach are understood in the Gricean way. Yet, Scott-Phillips reverts to the Carnapian conception when defining pragmatics as “the branch of linguistics that studies meaning and language use in context” (2015: glossary; see also Scott-Phillips 2010). His use of the term ‘pragmatics’ is thus not univocal. The same equivocation seems to be present in work by Fitch (2010), Hurford (2007), and sometimes even Tomasello (2008: 14-15).

Concluding Remarks
There are interesting asymmetries between signalers and receivers in animal communication – including those described by Fischer and Wheeler (2012) and others. Indeed, even within Gricean dyads, there are marked differences in ‘cognitive load’ between speakers and hearers (Moore, 2013). For example, Gricean communication requires that hearers infer speakers’ communicative goals – but not that the speakers infer their own goals. This suggests that Gricean communication is cognitively more demanding on hearers, reversing the asymmetry claims considered earlier.

Our goal here has not been to argue against all of the assumptions that motivated the original asymmetry claims. For example, the possibility that some primate calls are not produced voluntarily is at least partly independent of questions about the phylogenetic emergence of the capacity for Gricean communication. Some empirical evidence suggests that great apes’ call production may involve more voluntary control than has been assumed (Slocombe et al. 2007, 2010; Crockford et al. 2012). However, while voluntary control over production is necessary for acting with Gricean intentions, it is not sufficient. So this empirical evidence does not show that these calls are produced with Gricean intentions; and their precise relevance for the study of language evolution still requires clarification.

We hope to have shown that the pragmatic asymmetries highlighted by Fitch (2010) and Wheeler and Fischer (2012) are at best indirectly relevant to the study of language evolution. Failure to recognize this is likely to undermine our interpretation of comparative data, since an equivocal use of the label ‘pragmatics’ risks masking deep differences between the two conceptions of the task of language evolution research. For example, on the Carnapian conception of pragmatics, existing forms of animal communication may seem to be continuous with and more immediately relevant to theorizing about the evolution of language than on the
traditional Gricean conception. That is why Tomasello, Scott-Phillips and others have argued that animal communication does not illuminate the origins of language, and that language evolution required the emergence in phylogeny of a completely new form of communication that presupposed the capacity to act with and understand communicative intentions.

Our view is that language evolution research would now be best served by asking what could constitute genuine precursors to Gricean communication, and by looking for evidence of such precursors in animal communication. One way to pursue this line of research (favoured by Bar-On 2013, and this volume), would be to consider what forms of language (or proto-language) might have emerged in phylogeny via the operation of non-Gricean mechanisms, and prior to the emergence of a capacity to produce and comprehend utterances with communicative intentions. Recognizing forms of animal communication, like expressive communication, that resemble Gricean communication in certain (but not all) respects and identifying non-Gricean mechanisms (such as ontogenetic ritualization, voluntary control, and imitation) may then provide valuable insights into the emergence of human communication in phylogeny.

An alternative approach (Moore, 2016, Forthcoming a, Forthcoming b) argues that classical interpretations overstate the socio-cognitive abilities that Gricean communication requires, and that once we reconsider the demands of Gricean communication, it is appropriate to conclude that great apes are already Gricean communicators. On this approach, other instances of Gricean communicators in the animal kingdom may not be rare – rendering the study of animal communication directly relevant to understanding the evolution of language after all.

These different approaches to studying precursors or early forms of Gricean communication may well be complementary rather than incompatible. The fact that they can be
pulled apart, however, suggests that there can be several different paths to progress in language evolution research. All approaches could benefit from a more fine-grained characterization of the various asymmetries that exist in animal communication systems, as well as from a more nuanced account of what is entailed by a pragmatics-first approach to language evolution.

Notes on Contributors

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Further Reading

of communicative intentions in language evolution, see Bar-On (2013; this volume) and Moore (2016; Forthcoming b).

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Additionally, Tomasello (2008) argues that Gricean communication is a cooperative, reciprocal endeavor, and that consequently it could emerge only “within the context of collaborative activities” (2008: 7). Moore (forthcoming a) argues against this claim.

Some recent evidence undermines aspects of this asymmetry claim. For example, see Crockford et al. (2012) for evidence that chimpanzee vocalizations are both produced voluntarily and sensitive to the others’ knowledge states.