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How to do things with nonwords: pragmatics, biosemantics, and origins of language in animal communication

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Abstract

Recent discussions of animal communication and the evolution of language have advocated adopting a '*pragmatics-first*' approach, according to which "a more productive framework" for primate communication research should be "pragmatics, the field of linguistics that examines the role of context in shaping the meaning of linguistic utterances" (Wheeler and Fischer, Evol Anthropol 21:195–205, 2012: 203). After distinguishing two different conceptions of pragmatics that advocates of the pragmatics-first approach have implicitly relied on (one *Carnapian*, the other *Gricean*), I argue that neither conception adequately serves the purposes of pragmatics-first approaches to the origins of human linguistic communication. My main aim in this paper is to motivate–and begin to articulate–an *intermediary* conception whose scope is narrower than Carnapian pragmatics but broader than Gricean pragmatics. To do so, I first spell out what I take to be the key insight offered by proponents of the Gricean approach concerning the emergence of linguistic communication, namely, its being communication 'from a psychological point of view' (Tomasello, Origins of human communication, MIT Press, Cambridge MA, 2008). I then develop this insight using key elements from the anti-Gricean 'biosemantic' account of linguistic communication due to Ruth Millikan (Millikan, Language, thought, and other biological categories: New foundations for realism, MIT Press, Cambridge MA, 1984, Millikan, Tomberlin (ed), Philosophical Perspectives 9, Ridgeview Publishing, Atascedero CA, 1995, Millikan R (2006) Varieties of Meaning. Mass.: The MIT Press (paperback edition), Cambridge, Millikan, Beyond concepts: unicepts, language, and natural information, Oxford University Press, Oxford UK, 2017, and elsewhere). I argue that the intermediary pragmatics-first approach that I propose, which draws on both Gricean and Millikanian resources, would be better equipped to serve the purposes of those who search for potential precursors of human linguistic communication in animal communication.

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Recent discussions of animal communication and the evolution of language have advocated adopting a '*pragmatics-first*' approach. The general idea behind this approach is that pragmatic phenomena are key to understanding certain continuities between animal and linguistic communication, and can thus aid our understanding of the emergence of human linguistic communication. In this spirit, Arnold & Zuber-bühler recommend adopting "a pragmatics approach to exploring how primates extract information from … highly ambiguous, though discrete, signals" (2013: 2). And Seyfarth & Cheney (2017) likewise propose that "animal communication constitutes a rich pragmatic system" and that "the *ubiquity of pragmatics*, combined with the relative scarcity of semantics and syntax, suggest that, as language evolved, semantics and syntax were *built upon a foundation of sophisticated pragmatic infer-ence*" (p. 340, emphases added). Relatedly, these (and other) authors propose a shift in perspective in the study of the evolution of language. Instead of looking from the start for the origins of human *language*–understood as a syntactically and seman-tically combinatorial, recursive system of discrete symbolic elements–we should begin by looking for the origins of human linguistic *communication*. This shift in focus is thought to allow us to recognize certain continuities in *use*–between what humans *do* with words and what nonhuman animals *do* with their communicative signals ('nonwords'). Such continuities may exist alongside the admittedly deep syn-tactic and semantic differences between human languages and animal communica-tion systems. Hence 'pragmatics first'.

However, if we are to adopt a pragmatics-first approach as these authors rec-ommend, we need a clearer understanding of which aspects of animal commu-nication should count as pragmatic. I begin–in Sect. Pragmatics: Carnapian, Gricean, and 'Intermediary'–by distinguishing two different conceptions of prag-matics that advocates of the pragmatics-first approach have implicitly relied on: one *Carnapian*, the other *Gricean*. I explain why Carnapian pragmatics sets the explanatory bar too low for pragmatics-first approaches, whereas Gricean prag-matics sets the bar too high. This motivates a need for developing an *intermedi-ary pragmatics* that would apply less indiscriminately than Carnapian pragmat-ics yet more broadly than Gricean pragmatics. In Sect. Intermediary pragmatics and communication 'from a psychological point of view'–pressing from above, as it were–I spell out what I take to be a key insight concerning linguistic com-munication and its emergence as it occurs in the work of a leading proponent of the Gricean approach, Michael Tomasello. In Sect. Intermediary pragmatics and biosemantics–pressing from below–I argue that this Gricean insight ought to be acknowledged by a view of communication which is Carnapian on its face: Ruth Millikan's biosemantics. Combining the Gricean insight with elements from Mil-likan's view, I articulate what I take to be a genuinely intermediary conception of

pragmatics. In Sect. Intermediary pragmatics: how to do things with nonwords, I explain how this intermediary conception could better serve the purposes of those who look for potentially significant precursors of human linguistic communication in animals' communicative behaviors. Along the way, I offer some possible illustrations from animal communication. I leave it for further empirical investigation to settle which forms of animal communication actually fall under the scope of intermediary pragmatics as characterized here.

Pragmatics: Carnapian, Gricean, and 'Intermediary'

In their (2012), Wheeler & Fischer advocate looking for "continuities … between the communication systems of humans and our extant primate relatives" in "the flexible, learned responses of receivers", since these presumably reveal capacities for contextual derivation of call contents (2012: 199). They therefore suggest that "a more productive framework" for primate communication research should be "pragmatics, the field of linguistics that examines the role of context in shaping the meaning of linguistic utterances" (2012: 2030). Likewise, Seyfarth & Cheney suggest we should turn to "sophisticated pragmatic inference" as the "foundation" upon which language was built (2017: 340). These authors' focus on 'pragmatic *inferences*' on the part of, specifically, the receivers of signals–and the kind of examples from primate communication that they appeal to–suggest that they are implicitly relying on a rather broad conception of pragmatics. On this conception, arguably found in Rudolf Carnap (1942) (see Bar-On & Moore 2018, Arnold & Bar-On 2020), pragmatics covers indiscriminately any phenomenon involving the use of contextual factors *of whatever sort* to derive the semantic content or significance of an utterance or signal.

Carnapian pragmatics

The study of the variation of the content of signal types with the context of production and its context-dependent apprehension by interpreters.

Carnapian pragmatics thus characterized covers a great variety of cases in which a signal or utterance requires fixing some contextual parameter–e.g. time, place, identity (or producer or receiver)–in order to receive a determinate interpretation. Carnapian pragmatics was initially introduced to accommodate the 'indexical' context-dependence of truth-conditions of natural language sentences such as "It's snowing", or "You are late", and later extended to accommodate the context-dependence of many other types of linguistic expressions (proper names, definite descriptions, adjectives, possessives, etc.).[1] But Carnapian pragmatics can be readily seen to cover a host of animal signals: various vocalizations by non-primates (birds, prairie dogs, and suricats, among others), as well as bee dances, cicadas' mating 'songs', firefly mating flashes, octopus color changes, and so on (see Fitch 2010: Ch. 4 for a relevant survey). In the case of animal signals, Carnapian context-dependence has

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1FL01 [1] See, e.g., Bach (1997), Recanati (2002), Carston (2008).

116 predominantly to do with the fact that they are produced and received by particular
117 individuals, at particular times, in particular places. So, for example, a baboon social
118 grunt is issued and received in a specific situation by baboons of a certain relative
119 social 'rank' and gender (Seyfarth & Cheney 2017). And a bee dance signals to
120 observer bees the presence of nectar at a specific direction and distance from where
121 the dance is performed (among other things).

122   However, the capacity for this type of 'indexical'–or 'narrow'–context-dependent
123 interpretation (Recanati 2002) is not only widely shared across animal species; it
124 is also manifested in animals' derivation of information from *non*-communicative
125 signs. All signs–including so-called 'natural' signs–have content whose interpreta-
126 tion is keyed to the context in which they occur. Tree rings indicate the age of *this*
127 tree *at a given time*; racoon tracks will signify the recent presence of a (certain spe-
128 cies of) racoon at a particular point in a path; and certain kinds of red spots signify a
129 measles infection afflicting a particular individual at a specific time; and so on. The
130 use of such signs to derive information about the environment requires an ability
131 for context-dependent interpretation.[2] Granted, this marks *some* continuity between
132 humans' use of linguistic signs and animals' use of signals, but this continuity seems
133 hardly sufficient by itself to illuminate the origins of distinctively linguistic com-
134 munication. For, e.g., monkey call interpretation to count as relevant to these origins
135 it would have to be shown that it goes beyond the narrow kind characteristic of all
136 animal interpretation.[3]

137   It is telling that accounts that highlight flexible sensitivity to context in, say,
138 insect signals (e.g. Maynard Smith & Harper 2003; Oller & Griebel 2008) also typ-
139 ically note crucial differences between insect (as well as nonhuman primate) and
140 human communication. Key among these are differences pertaining to the *psychol-*
141 *ogy* underlying linguistic interpretation (see e.g. Maynard Smith & Harper 2003:
142 Ch.7 and Fitch 2010). Carnapian pragmatic analyses appear to be, by design, silent
143 on the issue of underlying psychology. Their focus is on generating correct contex-
144 tual mappings between signal types and the circumstances in which signal tokens
145 are produced. It is consistent with a given Carnapian analysis of, e.g., monkey calls
146 that call users 'compute' the context-dependent content of calls as though they were
147 merely natural signs of some threat. This suggests that a purely Carnapian analysis
148 of a form of communication can at best provide a starting point for a pragmatics-first
149 approach. Arguably, any such analysis ought to be supplemented with an account
150 of potentially relevant continuities in underlying psychology between the analyzed
151 form of communication and human linguistic communication.[4]

152   Emphasis on the underlying psychology of communication is very much at the
153 heart of a much more restrictive conception of pragmatics due to Paul Grice (1957).
154 As is well known, Grice distinguished sharply between 'natural' and 'nonnatural'
155 meaning. Natural signs, such as dark clouds, or rings on a tree trunk, or deer tracks,
156 possess (only) natural meaning. Natural meaning is 'factive'; nonnatural meaning

157 is not. Whereas it is not possible for the rings on a tree to mean that the tree is
158 300 years old unless that is the tree's age, it *is* possible for three rings on a bus to
159 mean that the bus is full, even if the bus is not full. Relatedly, unlike natural signs,
160 signs with nonnatural meaning are intentionally issued by minded agents with a spe-
161 cial kind of 'reflexive' intention that constitutes '*speaker meaning*': "[t]o say that
162 [a speaker] S meant something by U is to say that S intended the utterance of U to
163 produce some effect in an audience by means of the audience's recognition of *this*
164 *very* intention" (Grice 1968: 46, emphasis added).[5] On a strictly Gricean conception
165 of pragmatics, (properly) pragmatic phenomena include only utterances produced
166 with speaker meaning and interpreted as such. But even 'post-Gricean' accounts
167 of linguistic communication, which relax the strict conception, adhere to the core
168 Gricean idea human communication is distinctively '*ostensive-inferential*'.[6] Even
169 on post-Gricean views, the hallmark of human communication is the rational pro-
170 duction of an utterance by a speaker who intends "to make evident to an addressee
171 the intention to make some thought(s) manifest to [them]" (Carston 2015: 454). So
172 speakers overtly provide clues to enable their hearers to derive the specific contex-
173 tual meanings the speakers have in mind, relying on hearers' ability to 'read their
174 mind'. Gricean pragmatics as understood here has all and only forms of ostensive-
175 inferential communication in its scope.

176 **Gricean pragmatics**

177 The study of rationally evaluable communicative utterances issued by produc-
178 ers ostensively (or "overtly") and interpreted as such by their 'mindreading'
179 interpreters.

180 Gricean pragmatics covers a much narrower range of phenomena than does Car-
181 napian pragmatics, since it is only applicable to interactions involving ostensive-
182 inferential communication. Accordingly, proponents of a Gricean pragmatics-first
183 approach to the evolution of language have a very restrictive conception of the rel-
184 evance of forms of animal communication to our understanding of the emergence
185 of linguistic communication. To have such relevance, a form of animal communica-
186 tion would have to rely on at least some capacity for Gricean mindreading. It would
187 have to be shown that the nonhuman producers issue signals ostensively, with cer-
188 tain kinds of audience-directed communicative intentions, and that their nonhuman
189 receivers make inferences *about* those intentions when interpreting the signals. (See,
190 *inter alia*, Origgi & Sperber 2000, Burling 2005, Hurford 2007, Tomasello 2008,
191 Fitch 2010, and Scott-Phillips 2015.). Clearly, even if it is accepted that call receiv-
192 ers have a capacity to extract rich information from signals, it does not follow that
193 their doing so depends on their employment of Gricean mindreading. After all, ani-
194 mals could exercise that capacity in processing non-communicative natural signs,
195 which–by their nature–in no way involve speaker meaning or its attribution. The

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5FL01 [5] Although Grice himself may well not have been committed to the 'psychological reality' of his pro-
5FL02 posed analysis, proponents of a Gricean pragmatics-first approach deploy the Gricean conception pre-
5FL03 cisely to extract cognitive requirements that would have to be met by any legitimate precursor of human
5FL04 linguistic communication. (For relevant discussion, see Bar-On 1995, 2013.).

6FL01 [6] See Sperber & Wilson (1986/1995) and Sperber & Wilson (2015); see also Moore (2017).

exercise of an ability for (some) context-dependent interpretation of, say, alarm calls is consistent with the calls' being produced and interpreted as purely natural signs of the threats, so (by Gricean lights) can have no specific relevance to the emergence of linguistic communication.

The Carnapian and the Gricean conceptions of pragmatics can thus be seen to have very different implications for the relevance of behaviors such as primate alarm calls to the study of language evolution. On the Carnapian conception, primates' communication via calls would indeed be relevant to the evolution of language, simply in virtue of the (narrow) context-dependence of calls' content and interpretation. But, by the same token, so would *any* form of context-dependent interpretation, including animals' ubiquitous interpretation of natural signs. This means that a Carnapian pragmatics-first approach would set an explanatory bar that is too low. By contrast, on the Gricean conception, establishing the evolutionary relevance of primate calls would require showing pragmatic continuities *as understood by the Gricean conception*. Insofar as animals do not exhibit a capacity for ostensive-inferential communication, their use of calls and other signals can be no more relevant to the evolution of human linguistic communication than any other forms of non-mindreading contextual decoding of signals, natural signs included. But this means that a Gricean pragmatics-first approach sets an explanatory bar that is too high.

That the Gricean approach yields implausibly strong requirements can be readily appreciated by considering the linguistic communication of young children. It is generally accepted that the sort of mindreading tasks involved in producing and processing utterances with Gricean meaning are too cognitively taxing for children under the age of 4 or 5–an age at which they already engage in rather sophisticated forms of linguistic communication. (See, e.g., Breheny 2006.) Adopting a Gricean pragmatics-first approach to the evolution of language would likewise appear to set an impossible standard; for, it implies that our ancestors would have had to engage in Gricean communication before language could begin to emerge. This would present us with a puzzle that seems entirely of a piece with the puzzle of language evolution itself. This puzzle concerns the question how the psychological capacity required for ostensive-inferential communication–a capacity for thought that is *language-like*: viz. propositional-compositional, recursive, and metarepresentational–could have emerged before language. (See Bar-On 2013, 2018)

A plausible retreat for the Gricean proponent is to suggest that, even before engaging in properly Gricean communication, young children nevertheless exhibit capacities for intentional and cooperative 'pre-' (or 'minimally') Gricean' communication. And proponents of a Gricean pragmatics-first approach to the origins of language could similarly 'lower the bar', accepting that a form of non-Gricean nonhuman communication would be relevant to the emergence of linguistic communication, provided it could likewise be shown to manifest at least 'proto' Gricean

236 capacities.[7] Note that this would mean making room for a conception of pragmat-
237 ics whose scope is both narrower than that of Carnapian pragmatics and broader
238 than that of Gricean pragmatics. On such an 'intermediary' conception of pragmat-
239 ics, pragmatic phenomena would include many communicative interactions that are
240 not properly Gricean. At the same, they would not include *all* Carnapian context-
241 dependent uses of signals. To a first approximation, we can characterize *interme-*
242 *diary pragmatics* schematically, in analogy with the way we earlier characterized
243 Carnapian and Gricean pragmatics, as follows:

244 **Intermediary pragmatics–first pass**

245 The study of communicative interactions exhibiting capacities that a. go
246 beyond 'narrow' context-dependence, b. fall short of being ostensive-inferen-
247 tial, but c. exploit 'proto' Gricean capacities.

248 Many phenomena covered by Carnapian pragmatics would fall outside the scope
249 of intermediary pragmatics. But intermediary pragmatics would cover many phe-
250 nomena that are excluded from Gricean pragmatics. In the next section, I motivate
251 the need for considering a narrower range of phenomena than those covered by Car-
252 napian pragmatics, drawing on the work of Michael Tomasello. In Sect. 3, I explain
253 how the Gricean insight informing this work can be accommodated by the anti-
254 Gricean, biosemantic perspective on communication associated with the work of
255 Ruth Millikan. Intermediary pragmatics as I envisage it would integrate key Gricean
256 and Millikanian insights. I conclude by articulating an intermediary pragmatics-first
257 approach that would seek to identify legitimate psychological yet *non*-Gricean pre-
258 cursors of human linguistic communication in animal communication.

Intermediary pragmatics and communication 'from a psychological point of view'

261 In an essay on the origins of human communication, a leading proponent of the
262 Gricean view of language, Michael Tomasello (2008), argues that we humans
263 engage in a form of communication that is essentially different from all paradig-
264 matic forms of communication "in the biological world" (2008: 13), in being osten-
265 sive-inferential. Humans, Tomasello says, use "communicative signals that are cho-
266 sen and produced … flexibly and strategically for particular social goals… adjusted
267 … for particular circumstances", and "*intentional* in the sense that the individual
268 controls their use flexibly toward the goal of influencing" the behavior and psycho-
269 logical states of others; they intentionally inform others "for cooperative motives",
270 attending to their audience's psychological states and relying on their ability to infer
271 their communicative intentions (2008: 13). If we are to understand how things could
272 "move in the human direction", evolutionarily speaking, we must identify the origins

[7] See, e.g., Moore (2017) and (2018). Notably, however, Moore's 'minimally Gricean' communication
is still *ostensive* communication; so it may still set the bar too high for a pragmatics-first approach. (And
see fn. 10 below).

273 of this "underlying psychological infrastructure of human cooperative communica-
274 tion" (2008: 9f.). Yet Tomasello thinks that this infrastructure is (almost) entirely
275 absent from existing forms of animal communication.

Primate communication: minded and intentional yet not fully gricean?

277 Alarm calls and other "vocal displays", Tomasello argues, fail constitute psycho-
278 logical communication in his sense, because of the lack of flexibility in primate
279 call *production*: primates "do not learn to produce their vocal calls at all, and they
280 have very little voluntary control over them" (2008: 16); and their vocalizations are
281 "mostly very tightly tied to emotions" (2008: 17) (and compare Burling 2005, Hur-
282 ford 2007, and Fitch 2010.) Tomasello then goes on to propose that the *gestures* of
283 nonhuman primates may be "the best place to look for the evolutionary roots" of
284 human communication (2008: 15), since in the gestural domain there are hints of
285 what he describes as '*communication from a psychological point of view*': behav-
286 iors that involve *producers* who attempt to convey a message by trying to "influence
287 the behavior or psychological states of recipients intentionally" (2008: 14, emphasis
288 added). As an example of such behaviors in our closest relatives, the great apes,
289 Tomasello considers the use of so-called *attention-getters* by chimpanzees, which
290 include distinctive patterns of gestural, postural, and facial expressions (including
291 *ground-slap, poke-at,* and *throw-stuff*, 'play face and posture' displays, and 'leaf-
292 clipping' noises). (A prototypical example is that of a young chimpanzee produc-
293 ing a gesture to draw attention to her playful facial expression and posture; 2008:
294 27.) On Tomasello's analysis, in instances of attention-getting, the significance of
295 the complete communicative act does not reside in the attention-getting gesture
296 itself. Rather, the gesture's function is to draw the receiver's attention to a behavioral
297 display put on by the producers. In order to react appropriately, the recipient must
298 attend to the gesture (2008: 27–8).[8] The use of attention-getters is flexible: once in
299 an individual's repertoire, the individual can use them to accomplish a wide array of
300 social goals, such as play, grooming, nursing, and so on (*ibid*.). Importantly, the use
301 of attention-getters exhibits a 'two-tiered' structure; it is (as I shall put it) *psycho-*
302 *logically mediated*:

303   "[The] communicator has some action he wants from the recipient … and to
304   attain this he attempts to draw the recipient's attention to something…". [This]
305   indirectness [represents a] genuine evolutionary novelty–almost certainly con-
306   fined to great apes and perhaps other primates–and may be considered the
307   closest thing we have to a 'missing link' between nonhuman primate com-
308   munication and … human referential [ostensive-inferential] communication."
309   (2008: 29).

8FL01 [8] He adds: "Evidence for this interpretation is that on some occasions apes will actually hide a display
8FL02 from others, for example, covering up a facial fear-grimace display with their hands" (*ibid.).*
8FL03   An anonymous referee has pointed out, however, that some researchers (e.g. Hobaiter and Byrne 2014)
8FL04 deny that there is any category of great ape gestures that are used only to solicit attention.

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310   Now, as I read him, Tomasello does not think great apes are capable of fully
311 rational, ostensive-inferential communication. Still, he himself is prepared to regard
312 at least some of their communicative behaviors as providing a potential evolution-
313 ary 'missing link' and thus as relevant to the emergence of linguistic communica-
314 tion, precisely because they exhibit the psychological mediation essential to the lat-
315 ter. This suggests that we ought to separate two main strands that are intertwined in
316 Tomasello's Gricean conception of human communication. Gricean communication
317 is, first, *intentional* and *minded* communication: it depends for its success on com-
318 municators attending–and intentionally adjusting their communicative behavior–to
319 each other's mutually recognized states of mind. It thus exhibits a rather specific
320 type of context-dependence: *mind-dependent context-dependence* (as I shall put it).
321 But, secondly, Gricean communication is ostensive-inferential: it involves the pro-
322 duction of utterances with overt intentions to affect the audience states of mind, rely-
323 ing on the audience's ability to reflect on the producer's intentions (and other states
324 of mind).[9] As Tomasello himself seems to accept, communication can go beyond
325 mere Carnapian narrow context-dependence in being intentional and minded in the
326 relevant sense without yet *also* being ostensive-inferential. And such 'proto' Gricean
327 communication, it seems, could have potential significance for our understanding of
328 the emergence of fully mature human linguistic communication (whether in ontog-
329 eny or phylogeny) even from a Gricean perspective. In this way, I think Tomasello's
330 discussion opens up space for an intermediary conception of pragmatics which
331 covers forms of communication that are intentional and minded though not fully
332 Gricean. Thus:

333   **Intermediary pragmatics–Gricean take**

334   The study of *psychologically mediated* communicative uses of signals: the
335   production and apprehension of signals that have intersubjectively recognized
336   communicative purposes, and that depend for their success on animals' recog-
337   nition of each other's states of mind.

338   This conception is intermediary, insofar as it covers many instances of communi-
339 cation that fall short of being ostensive-inferential, while excluding all forms of Car-
340 napian context-dependent interpretation that fails to be psychologically mediated.[10]

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[9] We could also separate a third strand: the idea that *what* meaningful signs standardly or conventionally *mean* is ultimately dependent upon what speakers mean by them. (For some discussion and references, see Bar-On 1995).

[10] Moore's (2018) 'minimally Gricean' communicators are still said to engage in ostensive-inferential communication. They produce utterances with '*overt*' (i.e., ostensive) '*communicative intent'*; and their receivers *attribute intentions* to producers and to make *inferences* about their mental states. It is just that Moore thinks this becomes less cognitively demanding once we abandon Grice's 'third-clause' on speaker meaning, with its fourth-order meta-representations (2018: 8f.) (something that had already been advocated by Neale 1992; and see also, e.g., Sperber & Wilson 2015). By contrast, the intermediary con-ception I propose below would allow us to divorce the origins of meaningful communication from the presence of even 'minimally Gricean' speaker meaning.

341 **Psychologically mediated communication: signal repertoires versus signal uses**

342 As mentioned earlier, Tomasello thinks that psychologically mediated communica-
343 tion is not only likely confined to the great apes; it is also limited to their *gestural*
344 communication, which he takes to contrast sharply with all communication via
345 unlearned calls. Production in primate vocalizations is said to be completely inflexi-
346 ble and constitute 'individualistic expressions of emotions', as opposed to 'recipient-
347 directed acts'; consequently, "vocal displays, with their genetically fixed and highly
348 inflexible structure, would seem to be a very long way from human-style commu-
349 nication" (2008: 18–20). Thus, on Tomasello's view, precious few existing forms
350 of animal communication would fall under the scope of intermediary pragmatics as
351 just characterized.

352 However, I believe Tomasello's position here fails properly to draw an important
353 distinction: between signal *repertoires*, on the one hand, and the way animals *make
354 use* of them in communicative episodes, on the other. Primate call repertoires–under-
355 stood as distinct patterns of vocalization–may well be unlearned and perhaps have
356 acoustic and informational structure that is genetically fixed and inflexible. But from
357 this it does not follow that primates' *use* of their innate calls–what they *do* when
358 producing and interpreting calls in communicative episodes–fails to exhibit some
359 psychological continuity with aspects of human linguistic communication. More
360 specifically, whether or not primates' call use is psychologically mediated in the rel-
361 evant sense cannot be settled by determining the etiology and structure of the calls,
362 understood as elements in a system (the signal repertoire), or even whether they are
363 issued as 'expressions of emotions'. It depends, rather, on whether primates' produc-
364 tion and reception of calls essentially relies on their recognition of each other's states
365 of mind (such as attention, intentions, or various affective states). It is in principle
366 possible for communicators to produce and interpret elements of unlearned, limited,
367 constrained, and expressive repertoires in relevantly flexible ways. For, producers
368 can be mindful of their audience's psychological states in their use of such signals,
369 and receivers can recognize the signals as addressed to them, and both can modify
370 their use in light of their perception of each other's psychological states, thereby
371 manifesting a capacity for intentional and minded communication.[11]

372 Tomasello himself appears implicitly to recognize the possibility of a dissocia-
373 tion between features of signal repertoires and of signal use, respectively, when he
374 observes that the use of the pointing gesture, which arises spontaneously in human

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11FL01 [11] Cheney & Seyfarth (2003), Marler (2004), and Snowdon (2008) suggest that the innate and expres-
11FL02 sive or 'emotional' character of calls and other displays is consistent with their having at least function-
11FL03 ally referential dimensions. Bar-On (2013) and (2018) argues the expressive character of calls and other
11FL04 signals is consistent with call users bringing their production under voluntary control and using them
11FL05 intentionally and mindfully.
11FL06
11FL07   As an anonymous referee has remarked, those who advocate a construal of chimpanzee (or other) com-
11FL08 munication as 'intentional and minded' need to establish that chimpanzees rely on representations of
11FL09 each other's *psychological states* as opposed to their (anticipated) behaviors. On the Millikanian view
11FL10 to be proposed below ("Psychologically mediated communication: an integrated view"), this would be a
11FL11 matter to be determined by the *proper function* of the relevant representations. It is arguably a plausible
11FL12 hypothesis that social creatures harbor representations whose proper function is to represent each other's
11FL13 psychological states. But, on Millikan's view, this does not mean they have *conceptual* or *theoretical
understanding* of mental states.

375 babies, already exhibits psychological mediation (2008: Ch.4). But, given this dis-
376 sociation, it cannot be concluded that primates (or other species) cannot make psy-
377 chologically mediated uses of signals purely on the basis of the fact that the sig-
378 nals belong to unlearned, limited, and rigidly structured repertoires. Indeed, recent
379 experiments by Crockford et al. (2012) suggest that Ugandan wild chimpanzees
380 make selective and strategic use of elements of an extremely limited and innately
381 constrained repertoire. When producing a snake alert call, these chimpanzee mani-
382 fest fine-tuned sensitivity to whether or not call receivers have themselves seen the
383 snake or have previously heard the call (as well as how far away they were rela-
384 tive to the caller, and whether they were affiliated with the caller). What Crockford
385 et al. were specifically attempting to determine is whether–and to what extent–chim-
386 panzee callers and receivers engage in minded and intentional (= psychologically
387 mediated) communication, despite having at their disposal a very limited and rigidly
388 fixed repertoire of calls.[12] It remains in dispute whether the experiments are suffi-
389 cient to establish that chimpanzees are mindreaders who reflect on receivers' "state
390 of knowledge" (as the authors themselves suggested). But the findings do seem to
391 show that call producers consult and closely monitor, specifically, others' attention
392 to a potential threat, and that call receivers tailor their movements to the location
393 of a threat that is invisible to them but which they recognize to be perceived by
394 the caller, carefully skirting the location; and both appear to tailor their responses
395 to their apprehension of each other's perception, level of alarm, and so on. To the
396 extent that this is so, these chimpanzees' call communication may well fall within
397 the scope of intermediary pragmatics as here understood. Being psychologically
398 mediated, their communication would seem to go beyond merely narrow Carnapian
399 context-dependence; and, though it falls short of being properly Gricean, it should
400 still be of interest to proponents of a pragmatics-first approach.

Intermediary pragmatics and biosemantics

402 The need for an intermediary pragmatics, we have seen, can be motivated 'from
403 above': from a broadly Gricean perspective of the need to identify psychologically
404 mediated forms of communication. I now turn to an opposing perspective associ-
405 ated with the work of Ruth Millikan. Millikan's 'biosemantic' approach (e.g. 1989,
406 2006) is designed to provide a single framework within which to account for both
407 nonhuman and human communication, whereby *neither* need rely on ostensive-
408 inferential abilities. Millikan's denial that such abilities must play an essential role
409 in our understanding of *even linguistic* communication has led critics (e.g. Origgi
410 & Sperber 2000) to object that her view treats linguistic communication on the
411 *code model*–which suggests that it would be friendly to a Carnapian pragmatics-
412 first approach. However, after briefly outlining key features of Millikan's bioseman-
413 tics, I explain how the need for intermediary pragmatics can also be motivated 'from

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12FL01 [12] For an illuminating discussion of related experiments to show that chimpanzees meet criteria for
12FL02 intentional (though not fully Gricean) communication, see Schel et al. (2013).

414 below': from within Millikan's anti-Gricean view. I thus conclude that an inter-
415 mediary pragmatics-first approach which integrates both Gricean and Millikanian
416 insights would be especially suitable for the purposes of those who seek potential
417 precursors of human linguistic communication in animal communication.

Millikan on natural versus intentional signs

419 Earlier, we noted that animal calls and other communicative signals are different
420 from natural signs, such as clouds or deer-tracks, and various other physiological
421 symptoms, such as sneezes or red measles spots. In their seminal work, Maynard
422 Smith & Harper (2003) distinguish–within the category of animal signals–between
423 *cues* and *signals*. A cue is "any feature of the world, animate or inanimate, that can
424 be used by an animal as a guide to future action" (2003: 3); whereas a (communica-
425 tive) *signal* is "any act or structure which alters the behaviour of other organisms,
426 which evolved because of that effect, and which is effective because the receiver's
427 response has also evolved" (*ibid.*). For example, the CO_2 emitted by a mammal,
428 which conveys to a mosquito the location of something to bite, is a cue for the mos-
429 quito, but is not produced as a signal by the mammal (*ibid.*) (so cues are merely
430 natural signs in Grice's sense). By contrast, a funnel spider's vibrating of its web,
431 which conveys to an opponent information about the vibrating spider's size, *is* a
432 signal, since it presumably evolved to convey information about its size (*ibid.*; and
433 see Ch. 1 and *passim*). Monkey alarm calls, social grunts and 'chutters', and other
434 vocalizations in social animals are likewise signals in that they have been *designed*
435 to communicate information to designated recipients (*op. cit.* Ch. 7).

436 On Maynard Smith & Harper's analysis, what separates communicative from
437 natural signs is a matter of their evolutionary history and biological purpose, rather
438 than the informational content they carry or their reliability. Communicative sig-
439 nals, unlike natural signs, thus have what Millikan has described as *proper func-
440 tions*, where an item's proper function is some effect that instances of the item have
441 had, historically, which accounts for why the item has continued to be reproduced
442 (1984: 28). On Millikan's biosemantic account (as on Maynard Smith & Harper's),
443 the communicative character of a wide variety of animal signals–e.g. bee dances,
444 octopuses' 'angry' flashes, beaver danger tail splashes, alarm calls–are to be under-
445 stood in terms of the fact that they have evolved through a process of mutual adjust-
446 ments between signalers and receivers. This is something Millikan thinks animals'
447 communicative signals and human linguistic signs in fact have in common. Both
448 are 'intentional representations', in the sense that they "are *supposed to* represent
449 things; this is their (natural) proper function–*why* they continue to be produced …"
450 (1984: Ch. 6). What renders both intentional in Millikan's sense is the fact that "they
451 have been 'designed', in accordance with human or animal purposes, or by learning
452 mechanisms, or by natural selection, to be interpreted according to predetermined
453 (semantic) rules to which targeted interpreters are cooperatively adjusted" (2004:

15–16).[13] And this explains another commonality Millikan finds between animal and human communicative signals: in contrast with natural signs, they are non-factive–they can be *false* (see, e.g. Millikan 2006: Ch. 6). However, this does not render them nonnatural in Grice's sense. For, although both animal and linguistic communicative signals have evolved via processes that involve mutual ('coopera-tive') adaptations between signalers and receivers (2006: 104f.), *neither* must rely on producers' and interpreters' Gricean (ostensive-inferential) mindreading abilities.

On Millikan's account, *all* signs carry specific information only relative to the ('local') context in which they occur. What we earlier described as Carnapian nar-row context-dependence is everywhere. (See her 2006: Ch.s 3 & 4, and 2017: Part II.) When it comes to animal signals, Millikan also notes a certain evolutionary continuity between intentional and natural signs; animal communicative signals in many cases "evolve gradually" from natural signs or 'cues', such as preparatory 'intention movements' (2006: 103f.). Moreover, Millikan thinks that animal signals do not entirely lose their character as natural signs, once they become intentional (in her sense).[14] For an interpreter of an animal signals, the mechanism and history of the signals make no difference–so long as they "correlate well enough with cor-responding world affairs within some trackable domain"; … [I]t doesn't matter to the purposes of the chick whether its mother's food call is merely a recurrent natural sign, or also an intentional sign" (2006: 105, 109). In other words, in general, the signals need not be *treated* by their users *as* communicative in order to accomplish their designed purposes. And, in particular, although successful communication often requires convergence between producers and receivers' states of mind, it does not require them to *think about* each other's states of mind.

Just as a gosling's imprinting mechanism has the proper function of allowing it to fix on images of its mother so it can follow her, and bee dances have the proper function of directing fellow bees to where there is nectar, so linguistic utterances in the indicative mood have the proper function of producing *beliefs* in hearers, and utterances in the imperative mood have the proper function of producing in hear-ers *desires* to comply.[15] (Likewise for other linguistic 'constructions', which include words and phrases, as well as syntactic structures.) But serving these proper func-tions does not require that speakers *intend* their hearers to form beliefs and desires (1984: 58); and "[i]nterpreting speech does not require making any inference or hav-ing any beliefs … *about speakers' intentions*" (1984: 62, emphasis added). Infer-ence may well be needed to derive the contextual meaning of utterances; but–at least in basic cases of language use–there is no need for hearers to decipher what

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[13] Millikan's notion of proper function covers what Maynard Smith & Harper refer to as "indices", as well as "handicaps" (2003: 15). Indeed, Millikan's 1984 account is, by design, applicable to a very wide range of biological representational devices, including e.g., the magnetosomes that guide certain bacteria to oxygen-poor waters by directing them to magnetic north (2006: 82), as well as signals produced and consumed by sub-systems *inside* organisms. (See also, e.g. 2006: Ch. 13.).

[14] To be precise, it is *correct* animal signals (i.e., ones that map onto existing states of affairs) that can serve as natural signs of what they represent.

[15] A complication I am here setting aside is Millikan's claim that, unlike indicative and imperative utter-ances, animal representations are (all or most) 'pushmi-pullyu' representations. (See e.g. 1995 and 2006: 80ff. and *passim.* And see Bar-On (under review) for discussion).

490 the *speaker* is 'trying to say', or what is 'on her mind'.[16] What is more, even "con-
491 ventional human signs", when "used for their conventional purposes … *usually are*
492 *read the same way that natural signs are read*" (2006: 109, emphasis added). Such
493 linguistic signs can serve their proper function without their producers or receiv-
494 ers recognizing their proper function or being aware of the processes that have 'sta-
495 bilized' them into conventional signs. So, for example, if I hear the doorbell and
496 say to you: "There's someone at the door", I do not need to have–and you don't
497 need to recognize–a Gricean intention concerning your belief in order for my utter-
498 ance successfully to communicate to you what it is conventionally designed to com-
499 municate (i.e., what historically accounts for the proliferation of utterances of that
500 type), namely: that there is someone at the door. Millikan would thus deny that the
501 communicative-intentional (in her sense of 'intentional') character of even linguis-
502 tic signals *normally* depends on the presence and attribution of Gricean intentions.
503 Although she agrees that we do, sometimes, need to consider speakers' intentions
504 when interpreting their communicative acts. For example, the interpretation of com-
505 pletely innovative uses of language may require considering the producer's inten-
506 tions. (For relevant discussion, see, e.g., her 2006: esp. 107f. and 131ff., and 2017:
507 Chapters 12, 13, esp. pp.174ff.).

508 This aspect of Millikan's view puts it directly at odds with views that take
509 Gricean mindreading to be not only uniquely but also *essentially* involved in linguis-
510 tic communication. It has led critics to argue that her account purchases continuities
511 between human and nonhuman communication at the cost of inappropriately apply-
512 ing a 'code model' to *both*. (See Origgi & Sperber 2000.) On a standard construal of
513 the code model, senders produce signals that encode (context-dependent) messages,
514 which receivers then contextually decode, where the mechanisms for pairing sig-
515 nals with messages are reflexive/automatic or sub-personal, or else–if they involve
516 learning–are purely associative. (See, e.g., Scott-Phillips 2015: 5, 157.) Although
517 at least some Griceans (e.g., Origgi & Sperber, Scott-Phillips) believe the code
518 model is perfectly suitable for understanding all animal communication, they think
519 it is entirely inadequate when it comes to human linguistic communication. Humans
520 regularly communicate successfully using sounds and gestures that do not have pre-
521 existing conventional ('encoded') meanings. But, moreover, successful linguistic
522 communication typically goes beyond conventional meanings; it *essentially* exploits
523 our distinctive capacity for ostensive-inferential mindreading. And these authors
524 think this has direct evolutionary implications: any explanation of the evolution of
525 linguistic communication must suppose that "language as we know it developed as
526 an adaptation in a species *already involved in [ostensive-] inferential communica-*
527 *tion*, and therefore already capable of some serious degree of mindreading" (Origgi
528 & Sperber 2000: 159, emphasis added).[17]

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[16] Millikan's claim here should only be taken to imply that thinking about others' mental states is not
essential to the use of meaningful language, and, by implication, would not have had to precede the
emergence of language.

[17] As noted earlier (Sect. 1), this means that a post-Gricean account of the emergence of linguistic com-
munication would incur a problematic burden: to provide an evolutionary explanation of some of the
very same capacities whose emergence it seeks to explain–viz., the capacities to form and interpret

Psychologically mediated communication: an integrated view

Now, suppose we were to deny–with Millikan–that ostensive-inferential Gricean mindreading is any more essential to linguistic communication than it is essential to all nonhuman communication. Suppose, moreover, we were to accept that animal signals and even conventional linguistic signs (at least in some of their uses) *can* be *treated as* natural signs. Does this obviate all need for intermediary pragmatics that would cover *mind-dependent* context-dependent communication? In other words, does accepting Millikan's biosemantic framework mean there is no need to go beyond Carnapian pragmatics? What I want to argue next is that, appearances to the contrary, we *ought* to, and also *can*–by Millikan's own lights–accommodate the Gricean insight regarding psychological mediation used here to motivate intermediary pragmatics.

Let us return to the distinction drawn earlier between signal repertoires and the ways signals are used by producers and receivers (2.2). I think we should agree with Millikan that (genuinely) communicative signals possessed of proper functions may nevertheless be produced and interpreted as natural signs of the states of affairs they represent (when correct). But note, too, that–as Griceans often observe (see e.g. Grice 1989)–a sign with *natural* meaning can be used intentionally and even ostensively to communicate a certain message and be interpreted as such. As Tomasello notes, a communicative gesture with a content that is unlearned and unstructured–such as pointing–can be modified and adjusted by a child depending on her audience and used flexibly to communicate variable messages. More generally, the way producers and interpreters use communicative signals is relatively independent of whether the signals, as elements in a repertoire, have acquired their content naturally, or rather via a learning process of mutual adjustments. It is also independent of whether the elements are unlearned or conventional, what informational content they have, *as well as* whether or not they have a Millikanian proper function. Whether communicators use signals in ways that go beyond narrow Carnapian context-dependent, whether or not they only engage in coded communication, is not something that can be decided just by studying the properties of elements of signal repertoires and their history in abstraction from their use in communication. It requires examining more directly the psychological aspects of their use in given situations.

Accepting the Gricean insight derived from Tomasello's discussion, what is of special interest for our purposes is the possibility that unlearned and rigidly structured animal signals whose content is fixed by their proper function may nevertheless be used in psychologically mediated ways. We can capture this possibility, I submit, while preserving key elements of Millikan's biosemantic view. Distinguishing *distal* from *proximal* functions of communicative signals, I propose the following:

Footnote 17 (continued)

language-like compositional, recursive, and metarepresentational thoughts (and other propositional attitudes).

Psychologically mediated communication (a Biosemantic Take)

In a given species, the accomplishment of the proper function of signals with given representational contents may essentially rely on users' apprehending and responding to features of each other's psychological states–what they are attending or reacting to, where they are heading, what they intend to do, whether they are angry, playful, scared, and so on. If so, then we may say that, in that species, the signals' *distal* proper function is accomplished through the fulfillment of a more *proximal*–and mind-dependent–proper function.

The signal's distal proper function is itself not essentially mind-dependent; it is whatever beneficial effects for signalers and receivers that explain why elements of call systems have emerged and continue to exist. The signal's proximal proper function would be mind-dependent inasmuch as its accomplishment would rely on communicators' evolved capacity for a certain kind of psychological give and take, of a sort that is absent from fully coded communication.

Let me first illustrate what I have in mind in terms of Millikan's own characterization of certain *linguistic* phenomena.[18] As noted earlier (3.1), Millikan holds that what are in fact conventional linguistic signs may be *treated* as natural signs, rather than as intentionally produced communicative signals. However, when it comes to devices such as the demonstrative "this", her account seems rather different. When using such devices, she notes, language speakers rely on *non*-conventional, "*improvisational*" techniques or methods: "[g]esturing toward something, pointedly looking at it, nodding toward it, …. Rolling one's eyes toward it, … are common ways to assure that one's hearer will think of the right thing". In other words, the use of such devices appears mind-dependent (in our sense). Now, on traditional pragmatic accounts, this renders the acquisition and use of demonstratives (and indexicals such as "you", "he") difficult. Indeed, Griceans often cite our regular success in communicating via such linguistic 'pointing' devices as evidence for the use of Gricean mindreading capacities in linguistic communication (see, e.g., Tomasello 2008: 57ff.). Millikan disagrees. For, she thinks that, on the contrary, demonstratives "are among the most primitive of signs" (2006: 153). Demonstratives such as 'this' are different from conventional signs in having no specific referential content that they have been designed to convey (1984: 168). Instead, "'this' appears to be a peculiar sort of free variable–a place holder for something the speaker has in mind and that the hearer will easily gather … as what the speaker means". It only 'protorefers', and what it refers to "must be *improvised*". In general, "improvised signs do not *themselves* have referents … What they mean is, just, what the improviser intends them to mean" (1984: 166f.).[19] But even linguistic signs that have some conventional meaning exhibit this feature: to "know which John is meant when somebody says

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[18] In the next section, I provide some possible illustrations from existing forms of animal communication.

[19] See Millikan (1984: Ch. 10) for the relevant notion of improvisation in connection with the analysis of indexicals. Millikan discusses the main implications of her view for the acquisition of language in, e.g., (2006: Ch. 10, esp. pp. 128–133) and (2017: Chapters 13–14, esp. pp. 196–198).

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'John'… you may have to take into account with whom the speaker is acquainted, … or what general domain he or she has in mental focus…" (2006: 131). The same applies to knowing which dog is intended when one uses the definite description "the dog" to refer to a particular dog (2006: 127f.).

What this suggests is that, on Millikan's own account, successful referential communication via certain linguistic devices may not only be independent of convention and heavily context-dependent; it may also *essentially* rely on users' abilities to track and recognize each other's states of mind. These are mind-dependent abilities–to disclose and apprehend aspects of what communicators have in mind. As I would put it: In the case of certain linguistic devices, the distal (referential) proper function–to pick out some relevant item of interest in the world–is to be accomplished by fulfilling a more proximal, mind-dependent function: to draw the hearer's attention to what the speaker has in mind.

Does this not take us back to a Gricean (ostensive-inferential) view of linguistic communication? Doesn't acknowledging mind-dependent aspects of communication necessarily re-introduce the idea that speakers and hearers must be thinking *about* each other's mind when communicating? Millikan thinks it does not–correctly, I believe. She says:

> "[I]f you understand the phrase 'understand what the speaker intends to communicate' transparently, it does not imply that the hearer thinks about the mind of the speaker at all. It describes the content of the hearer's understanding, but not necessarily by using a description of that content that the hearer herself would employ or understand (…) It means, merely, that the hearer thinks *the same content* that the speaker purposefully communicates … no thoughts about other people's minds are necessary in order to grasp their meanings during ordinary communication … (2006: 131)." (And compare Recanati (2002: 113).

Unlike genuinely coded communication, successful linguistic communication often does require communicators to be able to draw each other's attention to what they are attending to, and more generally, to know what is on each other's mind. But that does not mean that speakers and hearers must be able to think *about* each other's thoughts and other states of mind, or have intentions, beliefs, or desires directed *at* those states. Put differently, the *enabling conditions* for successful mind-dependent communication may include communicators' ability to see what others see, or hear what they hear, or notice what they notice (as well as recognize each other's other states of mind). But the 'methods' or 'techniques'–the underlying psychological mechanisms–used in accomplishing such psychological coordination need not involve representing others' mental states *as such*, *attributing* specific communicative intentions, beliefs, and desires, or having *beliefs about* those states–where this, in turn, is taken to require having conceptual understanding *of* mental states. And, moreover, the *goals* of such communication in no way need to include coming to understand, or know about, what is on others' mind. Of course, it is consistent with this claim that more sophisticated human communicators sometimes do employ such metarepresentational attributions and engage in fully ostensive-inferential communication. What matters, in the present context, is whether the capacity for

651 ostensive-inferential communication is *necessary* for the emergence of linguistic
652 communication, as Griceans maintain. Millikan would deny that it is. If she is right,
653 this opens up the possibility that the capacity for fully Gricean, ostensive-inferential
654 communication is parasitic on linguistic capacities and that the former cannot pre-
655 cede the latter in either phylogeny or ontogeny.[20]

656   Millikan notes in this connection a mistaken assumption that has driven contem-
657 porary debates concerning whether animals and young children possess a 'theory of
658 mind'. This is the assumption

659   "that to represent a mental state … requires knowing certain things about what
660   it is… [so] must involve knowing things that our current theories take to be
661   definitive of mental states. In particular … one would recognize that another
662   individual harboured a false belief and could predict their behaviour accord-
663   ingly." (2017: 104).

664   Millikan thinks it is a mistake to suppose "that recognizing another's mental
665 states requires having a theory of mind … [t]hat "a 'theory' would be required for
666 awareness of another's mental states" (2017: 103), so that, for example, for an infant
667 to learn to look where a parent looks when she says "See that doggie?" the infant
668 would have to "employ … concepts of mental states " and "understand the innards
669 of minds" (2006: 133).

670   As an antidote to the familiar 'theory'-theory construal of mindreading, Millikan
671 proposes that recognition of mental states "might involve merely *affording* knowl-
672 edge rather than *factic* knowledge" (2017: 104, emphasis added). To have afford-
673 ing knowledge of, say, another's mental state, one does not need to possess factual
674 information about–or any theoretical understanding of–what states of that type are.
675 One does not need to possess 'factic' beliefs *about* the state *as such*, or to have a
676 *concept of* the state (as traditionally understood). One only needs to have a kind of
677 *practical* knowledge: an ability to "recognize [the state] in some way or ways so as
678 either to collect information about it or to learn how to deal with it" (*op. cit.*). For
679 example, a dog can "perceive, and thus represent" what is, in reality, a squirrel's
680 *intention* to escape up a tree. The dog can learn different ways of recognizing when
681 a squirrel intends to escape. But, says Millikan, "[t]he dog no more needs to grasp
682 the true nature of squirrel intentions in order to represent and take account of them
683 than you or he needs to grasp the true nature of water–…–in order to represent it"
684 (2017:106).[21]

20FL01 [20] Relevant here are arguments by e.g. de Villiers (2000) for the developmental dependence of the rel-
20FL02 evant metarepresentational and conceptual capacities on the mastery of certain linguistic structures.

21FL01 [21] Clearly much more needs to be said about the nature of the dog's representation of the squirrel's
21FL02 intention and, more generally, about the possibility of representing mental states without having concepts
21FL03 of–or beliefs about–them. For Millikan, this possibility requires understanding the role of pushmi-pullyu
21FL04 representations (mentioned in footnote 15) in animal cognition as combined with the deployment of what
21FL05 in her (2017) she dubs 'unicepts'. For relevant discussion, see her (1995), (2017: 7.6 and *passim*), and
21FL06 (2006: esp. Part IV).
21FL07   Millikan's view on these matters departs from tradition in a number of important ways. But in the pre-
21FL08 sent context, the main point that bears emphasis is this. By seeking to establish whether or not infants
21FL09 and nonhuman animals possess a *theory* of mind (and by taking the representation of mental states to
21FL010 require some conceptual/theoretical understanding of minds) researchers are imposing on the represen-

685 Putting together Tomasello's Gricean insight with key elements in Millikan's
686 anti-Gricean view, we can arrive at what I take to be a plausible and genuinely inter-
687 mediary pragmatics-first approach. Unlike Gricean approaches, this intermediary
688 approach would not limit its attention to communicators who can have informed
689 beliefs about mental states, or possess conceptual or theoretical understanding of
690 what having such states amounts to. It would study any aspects of animals' use of
691 calls or other communicative signals that rely on animals' capacity to 'perceive,
692 and thus represent' each other's states of mind. Arguably, many animals exhibit this
693 capacity in their uptake of *expressive behavior*–behavior that is designed openly to
694 show psychological states, and thus enables non-inferential perception or recogni-
695 tion of those states (in the sense of Recanati 2002; Millikan 1984, 2006, 2017; see
696 Bar-On 2013, 2018, Arnold & Bar-On 2020). Communication that exploits such
697 a psychological capacity would be, in my sense, mind-dependent *without being*
698 *theory-of-mind-dependent*. Coded communication does not exploit such a capac-
699 ity; animals whose communication involves purely encoding and decoding signals
700 have no need to rely on psychological mediation. When it comes to coded commu-
701 nication, the derivation of the contents of signals is accomplished automatically, or
702 reflexively, or through associative learning.[22]

703 In contrast with coded communication, when it comes to psychologically medi-
704 ated communication, the accomplishment of the (distal) communicative function of
705 signals essentially relies on the accomplishment of a more proximal psychological
706 function. Thus:

Intermediary pragmatics–a synthesis

708 The study of communicative devices whose distal proper function is designed
709 to be accomplished via the fulfillment of a proximal psychological function:
710 devices whose uses are psychologically mediated, in that they rely on pro-
711 ducers' and receivers' sensitivities to–or recognition of–each other's states of
712 mind and a non-theoretical ability to represent those states.

713 In keeping with the Gricean insight, explaining the emergence of linguistic com-
714 munication requires explaining the emergence of psychologically mediated com-
715 munication. The latter would represent an evolutionary innovation relative to coded
716 communication. On my proposed account, this innovation would have appeared on
717 the evolutionary scene *when our nonhuman ancestors, who already had the capac-*
718 *ity for openly showing and non-inferentially perceiving each other's psychological*

Footnote 21 (continued)

tation of mental states standards that many in philosophy of language and mind believe we should not
impose on representation more generally.

22FL01 [22] Recently, Scarantino has suggested that we can think of what animals do with emotion expressions
22FL02 (including alarm calls) in terms of "analogs" of Austinian speech acts. However, Scarantino himself pre-
22FL03 sents his 'theory of affective pragmatics' as "pragmatic *in the Carnapian sense only*: It aims to capture
22FL04 how the meaning of emotional expressions depends [narrowly] on their context of production…" (2017:
22FL05 217, emphasis added). It is thus consistent with his view that expressive communication is fully coded
22FL06 communication.

719   *states, began to harness this capacity to enhance or modify their use of communica-*
720   *tive signals.*

Intermediary pragmatics: how to do things with nonwords

722   One implication of the foregoing discussion is that advocates of pragmatics-first
723   approaches should not assume from the outset that nonhuman-human communica-
724   tive continuities depend, specifically, on whatever similarities can be found between
725   animal signals and natural language discrete *words* or phrases that encode symbolic,
726   conventional meanings. As the above discussion of linguistic devices such as "this"
727   illustrates, improvisation most clearly plays an indispensable role when it comes to
728   communication via expressions that do *not* have fixed symbolic-conventional con-
729   tent. It can also play a crucial role when it comes to expressions that have highly
730   open-ended, situation-specific content–e.g., indexicals such as "here" and "there",
731   exclamatives (e.g. "wow! ", "yay!", "hey!", and also "psst" or "shh"), expletives
732   (e.g. "dammit!"), but also, inter alia, proper names and definite descriptions–devices
733   whose successful use in communication depends, at a minimum, on communicators'
734   ability to attract, gauge, and modify each other's attention to specific features of the
735   given situation. Indeed, on one influential view of language evolution, due to lin-
736   guist Ray Jackendoff (2002), a subset of these sorts of non-symbolic devices, which
737   carry no or limited encoded meanings, constitute present-day linguistic "fossils" of
738   *Protolanguage*: a hypothetical intermediate stage in the evolution of language from
739   animal communication. What would have rendered Protolanguage an *intermediate*
740   stage in our ancestors' journey to language is the fact that it would have consisted
741   exclusively of a small repertoire of non-symbolic devices–holophrastic elements,
742   with very minimal semantics and no syntax (as exemplified by the fossils) (2002:
743   235ff.).[23] If the intermediary pragmatics-first approach envisaged here is on the right
744   track, it could shed light on what would have rendered Protolanguage *pragmati-*
745   *cally*–and not only semantically–intermediate: users of Protolanguage would have
746   essentially relied on their *non-Gricean* capacities for situation-specific psychologi-
747   cal give-and-take.[24]

On the potential evolutionary significance of 'nonwords'

749   This way of understanding the contribution of my proposed intermediary pragmat-
750   ics-first approach to the origins of language gives rise to the following two questions:

23FL01   [23] See Progovac (2017) for a systematic and illuminating development of the idea of Protolanguage from
23FL02   a broadly Chomskian perspective on language.

24FL01   [24] A fuller discussion would, of course, need to make good on the claim made here that the relevant psy-
24FL02   chological give-and-take need not rely on Gricean mindreading capacities. (See Bar-On (under review)
24FL03   and ms. in-progress.).

751   (i)   What might be the evolutionary advantage of having a Protolanguage that
752   works in a psychologically mediated (yet non-Gricean) way? And
753   (ii)   What non-Gricean capacities exhibited by *extant* nonhuman animals might
754   have made it possible for such a Protolanguage to have emerged?

Attempting to provide full answers these questions goes beyond the scope of this paper. But here are some initial thoughts.

As regards (i): The survival benefits of all animal signals, we may assume, are just the benefits (to producers and receivers) of the receivers' taking an action that is appropriate to perceived situations (avoiding predation, getting food, securing a mate, increasing social bonds, and so on). In social creatures that *have* states of mind (such as sensation, perception, attention, but also affective states such as fear, agitation, and so on), being able to recognize and spontaneously respond to various features of these states can be very useful, insofar as it can greatly enhance their ability to engage in appropriate behavior and modify it flexibly in response to changing circumstances, by allowing individuals to take advantage of each other's states of mind. (It can no doubt be useful for me to recognize your fear of something that I myself had failed to notice, and of which I, too, should be afraid.) To put it in Millikanian terms, in minded creatures, others' states of mind constitute significant *affordances*. But, now, suppose this capacity for 'minding other minds' can be *coopted* (or 'harnessed') in their use of communicative signals. This would allow communicators to make more diverse and flexible uses of elements of their limited, noncombinatorial (and unlearned) repertoires, thereby significantly increasing the number of messages they can convey and understand. (Users of Jackendoff's Protolanguage would have been able to convey a reasonably wide–even if by no means unlimited–range of situation-specific messages. Think of how many messages can be conveyed by pointing, for example.) Such an increase in expressive power and communicative agility would no doubt help animals navigate their environment, both physical and social. But suppose–as suggested earlier–that being attuned to key features of others' states of mind, as openly displayed in some of their (expressive) behaviors, does not require thinking *about*, or attributing to others, mental states *as such*; that is, suppose it does not rely on a(n even minimally) metarepresentational theory of mind. Then, in contrast with narrowly context-dependent, rigidly coded, and 'unminded' communication, mind-dependent communication as described here could be seen to have some of the advantages of Gricean communication, yet without relying on the cognitive resources required for the latter.[25] To repeat, then, on the present proposal, the key evolutionary innovation that could have put our ancestors on their way to linguistic communication would have involved the *coupling* of a widespread capacity for context-dependent use of communicative signals with a less widespread capacity for non-theory-of-mind representation of others' state of mind. It is when the latter capacity is harnessed so as to allow animals to modify and

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25FL01   [25] It would not even need to appeal to a capacity for 'minimal Gricean' communication (as described by,
25FL02   e.g., Moore (2018)–which still relies on overt communicative intentions on the part of speakers and their
25FL03   inferential attribution to speakers by their hearers (see footnote 10 above).

791 augment the communicative function of the former that we begin to have 'communi-
792 cation from a psychological point of view'.

Psychologically mediated communication in monkeys?

794 We can now turn to question (ii) above. As we saw earlier (2.1), there are some
795 indications in current studies of chimpanzees' use of unlearned calls that primates
796 exhibit some capacity for psychologically mediated communication. But it would
797 be instructive to consider whether some origins of such communication could be
798 found even earlier, phylogenetically speaking. What about monkey calls, which (as
799 we have seen) have been used to motivate pragmatics-first approaches–and which
800 are often dismissed by Griceans as entirely irrelevant to the origins of human com-
801 munication? Here, again, adopting an intermediary pragmatics-first approach would
802 mean establishing, at a minimum, that monkeys' use of their unlearned calls (in
803 production and reception) is not fully 'scripted', or dictated by monkeys' percep-
804 tion of the *non*-social situation, and that in producing and interpreting calls monkeys
805 directly rely on their perception of each other's states of mind–that communication
806 via calls involves psychological give and take as described above.

807   To illustrate, consider the call system of putty-nosed monkeys–an arboreal spe-
808 cies of monkeys belonging to the genus *Cercopithecus*.[26] Putty-nosed males have
809 a repertoire of three 'loud' call types that can carry over long distances: *booms*,
810 *pyows*, and *hacks*. *Booms* are very rarely heard and occur in a wide range of con-
811 texts, whereas *pyows* and *hacks* are produced frequently. All these calls were ini-
812 tially thought to be functionally referential (just as the vervet alarm calls had been
813 claimed to be) (Eckhardt & Zuberbühler 2004). However, in a reevaluation of
814 the putty-nosed call system, Arnold & Zuberbühler (2013) argue that *pyows* and
815 *hacks*–whether produced discretely or in sequences–simply do not behave like func-
816 tionally referential labels for distinct types of predator (2013: 1). They note that call
817 series were observed to be produced in a variety of contexts that did not involve
818 predators at all (2013: 2). And even when produced discretely, neither *hacks* nor
819 *pyows* seemed tightly linked to the presence of specific types of predators. Instead,
820 their use seems to depend on "a high degree of flexibility in both call production and
821 comprehension that is absent in context-bound, though potentially more informative,
822 signals". *Pyows*, especially, "appear to function primarily as an attention getter"
823 (2013: 5, and compare 2012: 307). Given the relatively loose, unstable relationship
824 between calls and the presence of (specific types of–or any) predators, the authors
825 conclude that the use of both types of calls must rely "on listeners' abilities to inte-
826 grate information from a number of sources" (*ibid*).

827   Notably, Arnold & Zuberbühler observe that "listeners … *attempt to acquire*
828 *additional information about the behavior of the caller*" in order to determine the
829 cause or target of the call (2013: 2, emphasis added). Thus, when a putty-nosed male

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26 The following description follows Arnold & Bar-On (2020). Bar-On (under review, mentioned in
footnote 4 above) offers a critical discussion of a contextual semantic-pragmatic analysis of putty-nosed
monkeys' calls that does not incorporate the features highlighted here under 'mind-dependence'.

830 produces a *pyow* call, his body posture and other features of his demeanor reveal
831 aspects of his state of mind–whether he is alarmed or relaxed, and, if alarmed, how
832 alarmed he is, what he is alarmed by, what his attention is directed at, and how he
833 is preparing to act next. Upon hearing his call, other group members within sight
834 can be observed to actively attempt to find out more about his state in order to learn
835 what the male was calling about, rather than immediately reacting by reflexively
836 engaging in a fixed pattern of anti-predator behavior. If females with visual access
837 observe the male's alert body posture and his gaze as fixated on the threat, they
838 will subsequently chime in with their own *chirp* calls. And other group members
839 who lack visual access to the male appear to be alerted to the threat upon hear-
840 ing female *chirp* calls that accompany the male calls. Only then do they approach
841 the threat and begin calling and mobbing. All in all, what Arnold & Zuberbühler
842 seem to describe is an intricate and highly dynamic pattern of 'division of commu-
843 nicative labor' surrounding the putty-nosed monkey intragroup calling behavior.[27]
844 Determining whether this description is correct would require more careful analysis.
845 But if it is, this would suggest that the communicative work of at least some monkey
846 call systems goes beyond the integration of environmental cues, general background
847 knowledge, and context-dependent information that is tightly associated with innate
848 call types. It relies crucially on monkeys' recognition and uptake of multiple psy-
849 chological aspects of the calling situation (as openly shown in monkeys' expressive
850 behaviors). In that case, putty-nosed monkeys' use of calls, too, would fall under the
851 scope of intermediary pragmatics as presented here.

852   ***

853   In this paper, I have argued that, if we are to identify potential precursors of
854 human linguistic communication in animal communication, we ought to adopt
855 a genuinely intermediary pragmatics-first approach. Doing so, I have suggested,
856 means looking beyond the Carnapian narrow context-dependence of the informa-
857 tional content of animals' communicative signals, as well as beyond their Millika-
858 nian distal proper function. In keeping with the Gricean insight concerning com-
859 munication 'from a psychological point of view', this requires investigating the
860 extent to which the relevant forms of communication exploit a capacity for mind-
861 dependent context-dependent uses of signals. Such uses would resemble and poten-
862 tially foreshadow what Millikan describes as 'improvisational' uses of non-symbolic
863 linguistic devices. An intermediary pragmatics-first investigation could help shed
864 light on the emergence of linguistic communication by bringing into view a way of
865 reconceiving the puzzle of the evolution of language. In approaching the puzzle, we
866 should not be asking, in the first place: How could metarepresentational ostensive-
867 inferential communication have emerged from merely coded animal communica-
868 tion? We should instead be asking: How could animals' psychological capacity for
869 non-Gricean recognition of each other's states of mind come to be harnessed so as
870 to enable psychologically mediated uses of communicative signals? Initially posing

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27FL01 [27] A different–though potentially compatible–'dynamic' construal of monkey calls (utilizing Stalnaker's
27FL02 notion of a 'common ground') is proposed in Armstrong (2018: 13f.).

871 our question in this way would, I believe, open up promising new directions in the
872 study of animal communication and the evolution of linguistic communication.

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