



Subjects could request food items by inserting a finger into the hole in front of a plate. The experimenter handed over the requested items through the hole in the middle. Additional food items used for re-baiting were stored outside the test room.

Bohn, M., Call, J., & Tomasello, M. (2015)

Your friend Olga is coming for a drink. You put two plates on the table, one with olives and the other with almonds. When both plates have been emptied, you ask Olga, “Do you want anything else?” “Yes, please!”, she answers, pointing to the plate where the almonds had been. What is she requesting? The empty plate? Of course not. She is requesting more almonds. To do so, she uses a gestural metonymy: pointing to a container to convey something about its (past) content.

Container-for-content metonymies are quite common in language use. Typical examples are: “I just had one glass” or “the school bus was singing.” Some of these gestural or verbal metonymies have become conventional but we can produce or understand novel ones without effort. What communicative abilities does it take to make use of metonymies? Could a 12-month-old child, who does not yet speak, spontaneously produce an appropriate gestural metonymy? For that matter, could an ape?

In his doctoral work at the Max Planck Institute for Evolutionary Anthropology, Manuel Bohn asked an even more basic question: can infants and apes refer to absent entities? (See also earlier work by Liszkowski et al 2009; Lyn et al 2014). The capacity to do so is generally linked to the possession of language, so showing that they can would be an interesting challenge.

In one study (Bohn et al 2015), Bohn presented apes (chimpanzees, bonobos, gorillas, and orangutans) with two plates each containing three pieces of food: grapes (a higher quality food for apes) on one plate, and pieces of carrot (a lower quality food) on the other plate. The apes could point to one or the other plate and would be given a piece of food from it. As soon as a plate was emptied, the experimenter would take it out of the room and bring it back refilled.

In the critical test trials, however, the experimenter let the plates go empty without refilling them. Would the apes point to a now empty plate (as your friend Olga did)? And if so, would they point indiscriminately to one or the other plate to request more food, or would they point to the plate that had contained their preferred food? Several apes did point to an empty plate, the one that had contained grapes. What were they trying to convey? Not that they wanted the empty plate, obviously, nor just, we assume, that they wanted more food, but that they wanted grapes. They were, in other terms, communicating about (or “referring to”) absent entities.

In a parallel study, Bohn presented 12-month-old children with objects of two kinds: wooden cubes on one plate and colourful balls on a second plate. A child could request objects of one kind or the other by pointing to the right plate. She would then be given the toy and could throw it in a container. Children had fun doing so, and more fun with the balls than with the cubes. Whereas in the training trials, the experimenter refilled every plate as soon as it was empty, in the test trials, he sat and waited. As the apes had done, children pointed to the empty plate that had contained their preferred items, the colourful balls. Again, they were communicating about absent entities.

This double demonstration – in itself an achievement – raises a major question: what kind of mental abilities make it possible for these apes and infants to try and request absent objects (grapes or balls) by pointing at a now empty plate? There is no simple and obvious answer to this question.

Take, to begin with, the somewhat simpler question: what mental capacities make it possible to point to an object that is present in plain sight in order to request it? A plausible answer (even if it isn’t that compelling) appeals to reinforcement. It doesn’t much matter how, in a given individual, this behaviour first occurs: it could be an effect of chance, imitation, or some inherited disposition. The behaviour becomes part of the individual’s repertoire through being rewarded again and again by third parties handing over the object pointed at. If this is how so-called imperative pointing works, then apes or children should expect that, if they point at an empty plate, they will be handed the plate (a pretty useless gesture, then, unless they do want the plate).

In older children and adults, pointing is clearly an ostensive gesture. It attracts attention not only to the item pointed at but also to the fact that the communicator intends, by producing the gesture, to communicate some relevant information (for instance that she wants to be given the item) and to make it part of the common ground.

Understanding ostensive communication involves bringing together the information directly provided by the communicative behaviour and a context of background information. This by itself, however, doesn’t determine a single possible interpretation, let alone the intended one. The key to comprehension is – or so Deirdre Wilson and I have argued – that every act of ostensive communication conveys a presumption of its own relevance. Assuming for instance that, by pointing, Olga intended to convey *relevant* information to you, you can infer that she intended to answer your question (“Do you want anything else?”) and, more precisely, to request more almonds. In this situation, this is the first interpretation that comes to your mind and that satisfies your expectation of relevance (for a more detailed account of how such inference works, read our *Meaning and Relevance*, 2012).

Comprehension of ostensive communication consists in attributing an informative intention to the communicator rather than in just decoding a signal. Comprehension, in other terms, is a special form of mindreading. Even though there is now good evidence of mindreading ability in great apes (notably Kano et al. 2017), it is far from obvious that they are able to engage in ostensive communication and in particular to produce and comprehend novel signals intended to give evidence of the communicator’s informative intention.

There is plenty of evidence, on the other hand, that infants do comprehend and produce ostensive behaviour. They not only point at a visible object; they also readily point to a container to refer to the object it contains, which is good evidence of expecting inferential comprehension (Behne et al 2012 – there is, by the way, limited evidence of comparable behaviour in apes, e.g. Robert et al. 2014). Still, it could be argued that when you point at a box to refer to the object it currently contains, you are also pointing in the direction of that very object. Some inference may be needed to decide whether you are referring to the container or to the item it contains, but at least the two possible referents are present, even if only one of them is visible.

This makes Bohn's finding that not only infants but also apes point to an empty location to request an absent item quite remarkable: the behaviour of apes or infants pointing to an empty plate is neither an unambiguous signal nor an ambiguous signal with just two referents. So, what is it?

"It's a metonymy!" semioticians might answer, and, yes, sure, a metonymy it is. But metonymy is not an explanation, it is something to be explained. In the case of linguistic communication, the classical view that the intended meaning is recovered by attending to relationships of proximity is as inadequate as the view that the intended meaning of metaphor is recovered by attending to relationships of resemblance. It is not that these explanations are totally false, it is that they fall so pathetically short. Any given item stands in a relationship of proximity (in time, space, role, etc) to so many other things, just as any given item stands in a relationship of resemblance to countless other items. Besides container-for-content, there are metonymies based on cause-for-effect, effect-for-cause, instrument-for-function, part-for-whole, whole-for-part, token-for-type (the last three being synecdoche, generally considered a kind of metonymy), and so on.

If being in a metonymic relationship was all that determined the interpretation of pointing to an empty plate, the pointing would be multiply ambiguous and could refer not only to the things the plate had just contained, but to about any object or action associated with that plate or with plates in general: knives, forks, cups, other food items, eating, dish washing; and in the particular case of the apes in Bohn's experiment, it could refer not just to generic grapes but to the grapes that had already been eaten or to food in general, and not just to refilling the plate but to other actions such as taking the plate away. Of course, it seems quite clear that what the apes want is none of the above but just more grapes. Are we ready, however, to assume that they expect the experimenter to read their mind?

Bohn's study provides, I believe, novel evidence confirming what we already had good reasons to believe, namely that infants are able not just to comprehend but also to produce ostensive gestures. We should be much more cautious in attributing the same competence to apes. Bohn's study strongly suggests, however, that we should explore the possibility that, between the coded signals common in animal communication and the fully fledged ostensive communication typical of humans, there might be some intermediate form of partial ostension, exploiting the relevance aspect more than the mindreading aspect of ostension.

Let me explain. The first principle of relevance theory (what we call the "cognitive principle": humans tends to maximise relevance in the way they allocate their attention and draw inferences) may well be true, even if to a lesser extent, of other animals with high cognitive capacities, apes in particular. If so, apes can expect the attention and inferences of their conspecifics to tend to maximise relevance. They may then be able and disposed to act on the mental states of others by attracting their attention to stimuli the relevance of which they can anticipate. Wildlife examples of such a disposition to act on the attention of others to produce predictable reactions include male chimps shaking branches to attract the attention of a female to their erect penis in the hope of mating with her (Tutin & McGinnis 1981). In Bohn's experiment, the apes attracting attention to the empty plate may similarly anticipate that this will be relevant to the experimenter by suggesting to

him to refill the plate, as he had done before.

Of course, acting on the attention of conspecifics (or of animals of other species) expecting a fixed behavioural response is quite common. What is involved here is less trivial; it is the ability to produce a novel behaviour and expect a novel response. The experimenter had the empty plate in front of him and was presumably aware of it. What the ape does is, so to speak, insist that this is more worthy of attention and more relevant than the experimenter seemed to be realising.

All this suggests a whole new direction of research on communication at the borderline of ostension, and not only among apes, but also among humans. Alongside fully fledged ostensive communication, humans may well engage in communicative behaviour aimed at enhancing the relevance of some stimuli without conveying much, if anything, about their mental states in doing so.

References

- Behne, T., Liszkowski, U., Carpenter, M., & Tomasello, M. (2012). Twelve-month-olds' comprehension and production of pointing. *British Journal of Developmental Psychology*, 30, 359-375.
- Bohn, M., Call, J., & Tomasello, M. (2015). Communication about absent entities in great apes and human infants. *Cognition*, 145, 63-72. <http://dx.doi.org/10.1016/j.cognition.2015.08.009>
- Fumihiro Kano, Christopher Krupenye, Satoshi Hirata & Josep Call (2017) Eye tracking uncovered great apes' ability to anticipate that other individuals will
- act according to false beliefs, *Communicative & Integrative Biology*, 10:2, e1299836, DOI: 10.1080/19420889.2017.1299836
- Liszkowski, U., Carpenter, M., & Tomasello, M. (2007). Pointing out new news, old news, and absent referents at 12 months of age. *Developmental Science*, 10(2), 1-7. <http://dx.doi.org/10.1111/J.1467-7687.2006.00552.X>.
- Lyn, H., Russell, J. L., Leavens, D. A., Bard, K. A., Boysen, S. T., Schaeffer, J. A., & Hopkins, W. D. (2014). Apes communicate about absent and displaced objects: Methodology matters. *Animal Cognition*, 17(1), 85-94. <http://dx.doi.org/10.1007/s10071-013-0640-0>.
- Roberts, A.I. *et al.* (2014) Chimpanzees modify intentional gestures to coordinate a search for hidden food. *Nat. Commun.* 5:3088 doi: 10.1038/ncomms4088.
- Tomasello, M. (2008). *Origins of human communication*. MIT Press.
- Tutin, C. E., & McGinnis, P. R. (1981). Chimpanzee reproduction in the wild. *Reproductive biology of the great apes: Comparative and biomedical perspectives*, 239-264.
- Wilson, D. & Sperber, D. (2012) *Meaning and Relevance*. Cambridge UP.