

0. Introduction

No-one, we surmise, would deny that the capacity to recognize co-specifics is essential for the evolution of the human, and many other, species into social animals: the capacity to recognize another qua individual lies at the very basic of sustaining social communities, based on partnership, kinship, or even common interest like the mafia (cf. Hurst et alii, 2001). Many would, however, accept that recognizing an individual is an instance of categorial perception so that it would be tantamount to recognizing a specific configuration of properties that uniquely characterizes him or her.

We argue that to recognize specificity is an entirely different capacity from categorial perception: it cannot be reduced to any of the possible modes of categorization. Surely, in many cases (a possibly unique) category membership is sufficient to identify an individual, provided that certain epistemic and pragmatic conditions obtain. But identifying is not recognizing specificity. For one reason, a set of features like having long, brownish curly hair may be identifying in a context, but it is not sufficient to constitute an individual across contexts, or a-contextually, simply because there could well be other individuals exemplifying the very same property. That it constitutes a unit set (in some contexts) is purely a contingent fact. And it remains so irrespective of how complex a property we would wish to choose.¹

For another reason, the capacity to recognize individuality in this digitalized way requires a far too intricate and time consuming computation, and one for each individual. It is doubtful that evolution had bothered to develop such a complicated recognition mechanism. That may be too costly when compared with available analogue cognitive procedures.² The main thrust of our argument is that evolution, through the properties of the niche together with those of the organism, offers a cognitively less costly solution to this problem: the recognition of individuals is based on the detection of indexical, that is, non-categorizable information about their specificity. Our self-assigned task here is three-fold: first, to define the conditions of possibility of this capacity, second, to account for its emergence, and third, to relate it to the ability of language.

1. The physical conditions on perceiving specificity

We take it to be uncontroversial that Nature “exists” in different types or patterns of energy like mechanical, chemical, electromagnetic, kinesthetic, etc. It is the task of physics to

* During the writing of this paper the first author was supported by a research grant from OTKA (No. T 026656).

¹ There seems to be a crucial difference between ‘natural’ individuals like organism and artifacts in this respect, that is, how individuation is made. For an artificial object like the Eiffel Tower may be individuated in terms of (micro-)features, viz. digitally.

² To avoid misunderstanding, we use the analogue/digital discrimination not to refer to the continuous/discrete character of the world in general, but to highlight, as in Bermúdez (2002), the difference between (the content of) perception and (the possible content of) belief; while the first could be nonconceptual, holistic, etc., the second is normally taken to be prepositional, hence categorial. Also, our aim is to contrast them as rival capacities with respect to a given purpose (viz. specificity recognition).

individuate these patterns. But physics also teaches us that energy manifests itself, or “appears”, in innumerable various forms of what we call “matter”. Matter is structured forms of energy. These latter forms tend to be unique and singular in that there are no two forms with the same material structure: there are no two snowflakes, crystals, eggs, or twins completely alike. (It is in the sense of uniqueness and singularity that we will use the term “specific” and “specificity” in this paper.) These two aspects, identifiable patterns (of energy) and variable singular forms (of matter) are the two sides of the same coin, viz. Nature. Organs with which a proper trade-off between pattern and variability can be accomplished are normally called ‘sense organs’: they are said to be attuned to particular types of energy, or ‘modalities’.

For the sake of our argument here, it suffices to correlate the capacity to perceive and process categorical information, viz. to discriminate among categories, with the aforementioned first side of Nature, and the capacity to recognize specific individuals qua individuals, viz. to discriminate among singularities, with the second. The first capacity yields conceptual understanding – in humans –, the second is tailored to tracking down individuals non-conceptually by being attuned to perceiving specific material forms like smell, sound, shape, etc. as indices: they inherently belong to the individuals precisely in the sense that there can be no two indices which are (perceived as) exactly the same (while different indices can signify the same individual).

The perception of color illustrates that finding the proper trade-off is not an easy task. Human vision is considered as one of the greatest achievements of evolution. It can discriminate 1400 different frequencies from one another. On the other hand, it is acknowledged that people recognize roughly 80 distinct pitches. Thus, “[t]here are many more phenomenal experiences than there are concepts of them.” (Block, 2002, 135) Here the two capacities come apart despite the fact that both are supported by the very same sense organ. But what is the function of discriminating so many pitches if there are no proper concepts for them? (Cf. Raffman, 1995)

This is the question that underlies our approach here. Thus, the variability of the physical substance that constitutes the source of stimuli for any organism can be called intrinsic in the sense that energy tends to appear in ways which are never physically completely alike. Organism can develop organs, which are sensitive to different ranges of their environment’s physical diversity. They are “‘avenues’ into the organism for information about the physical state of the external world” (Keely, 2002, 11), adding that only those discriminations of the physical energy type constitute a given modality for an organism which have a particular function in the organism’s behavior. Thus, human sense organs are “dedicated” to particular energy types which influence man’s actions. Thus, the detection of great many of the 1400 frequencies may be seen as a simple by-product of human vision, while those which are conceptualized play a proper function.³

We can then make a distinction between the intrinsic physical variability of Nature in which energy appears (possible stimuli our sense organs can detect) and a variability in which Nature appears to us, viz. a variability that we can both detect and make sense of. We can also dub the first kind of variability as the proximal, while the second the distal condition on recognizing (specific) forms. The latter is distal in the sense proposed by Ruth Millikan that the historical (i.e. evolutionary) success of a given behavior does not depend on the system itself, whether it produces correctly the responses to which it is wired, and neither on the proximal stimuli (the type of information the organism is attuned to); rather it is determined by a chain of

³ As Keely emphasizes, there are many modality-like discriminations, like the ones made by the vestibular or the vomeronasal system, which are not cognitively penetrable, hence non-conceptualisable, and yet have a proper function.

events in the environment that can have triggered off the organism's specific response. Thus Millikan (1990) describes the hoverfly as what reacts to proximal stimuli every time there is a black spot moving at a given angular speed on its retina, irrespective of what that spot is standing for: a co-specific female, a pebble, a leaf, or anything. It is the type of distal stimuli, more particularly, the more than the average rate of frequency that there is a proper co-specific rather than anything else that determines the reproductive success of the hoverfly's reaction. The hoverfly's reaction cannot be regarded as specific with respect to the types of distal stimuli. Rather, it "perceptually categorizes" them as the same on the basis of the proximal stimuli (the moving black spot). The latter serves for it as a vehicle for categorization.

Basically, there are two kinds of condition on utilizing the specificity of information about the physical world, rather than carving out certain ranges of stimuli as vehicle for categorization. The first has to do with the architecture of sense organs: they must be sensitive enough to distinguish the specific manifestations of physical substance, the tokens of physical properties as indices of specific individuals. We cannot go into the problem of what "sensitive enough" means, here. By analogy to color perception, regarding other modalities, we might ask like: How many different violins can a master musician distinguish on the basis of the physical properties, the overtones, of their sound? Or: How many different wines can an expert distinguish by their tastes?

To answer, we have to examine the selective pressures that the actual environment imposes, namely, when and why the recognition of specificity becomes functional. We point out three distal factors through which selective pressure manifests itself: (i) the physical aspects of the niche, viz. the variability in the physical substance (sound, color, shape, smell, taste, etc.); (ii) the improvement or reinforcement of the reproductive capacity of the organism; (iii) the contribution to the social coherence of the species the organism belongs to. Let us formulate the first – evolutionary – kind of condition on specificity recognition as (C1):

(C1) Specificity sensitiveness appears at a given evolutionary stage under certain pressures exerted through the physical properties of the niche to enhance and secure reproduction.

We have no room here to adequately justify (C1). Let us briefly refer to one example. There is recent evidence that the vomeronasal system in humans "is primarily responsible for detecting pheromones, which in turn have been shown to play a central role in reproductive behavior." Notably, women, who are especially good at discriminating smells "do not report that they experience 'male' vs. 'female' qualia associated with the breaths." (Keely, 2002, 24) In fact, women are so good at detecting pheromones that they can identify not only gender but specific individuals (their new-born babes, for instance) by their smell. (See Wedekind, 1988)

2. The bio-logical conditions on perceiving specificity

Our hypothesis at this point is this: the selective pressures that the physical and the social environment exerted on man were such that they singled out four possible sensory fields where the capacity to recognize specificity could have evolved and functionalized. These are smell, voice or sound, face, and gait. We also assume that different environmental conditions favor different fields. While specific sound recognition is preferable in richly textured, impenetrable niches like rainforests precisely because sound can travel long distances, smell and/or face recognition acquires an individuating function when couples live in a tightly bounded space. Possibly, gait individuates only in 'higher' cultures where the artificial environment of city structure, mass movement, background noise, etc. severely restricts other modes. Be that as it

may, it leads to an important insight concerning the difference between the two concurrent (the category- and the specificity-driven) capacities; in species, from birds to higher primates, which live in communities, categorial perception is less efficient than specificity recognition in sustaining and reinforcing the cohesiveness of the group. It is this insight that we would like to elaborate a little below.

But before that, let us propose a second condition on recognizing specificity, a logical one, for it specifies how the variability of parts of the physical environment (stimuli) can become functional. We propose the following formulation:

(C2) The variability of physical substance such as smell, sound, face, and gait can become functional if it is to indicate (or designate) the singular and unique character, viz. the specificity of the individual whose index it thus becomes.

Expanding on (C2), we should note that by index we do not mean something like a Peircian sign, but a kind of ostensivity that is not dependent on the context. Ostensive categories like ‘the inhabitants of this village’, or ‘the footballers who ever scored and will score a goal’ imply a descriptive content: we need also to know what it is to be a villager or to score a goal in order to decide if a given individual is a villager or a goal-scorer. Clearly, a similar procedure is not sufficient for the recognition of specificity. For suppose a (specific) individual moves out of identifiable context and returns (a bird flies away and alights on nest); the identification of the returning individual as such requires either i. a stored representation of the individual and/or ii. the context he or she appeared in. It implies pattern recognition, that is a configuration of features. However, we suspect there is an upper bound to what could be represented in complexity, somewhat analogously to the limited capacity to understand multiply embedded clauses.

If so, there is a serious problem every ‘returning’ bird or individual has to face. Namely, that it is always possible that there is (or there has already been) another individual that comes at least as close to the prototype (coded in the given pattern) as the ‘original’ one. If it is satisficing conditions (of category membership, even if the unit set), then any individual that satisfies them, be them as complex as they may, is apt for being taken to be the ‘specific’ one in a given context. To recognize the ‘returning’ individual is one has to buy genuine specificity with context independence. Or more importantly, the potential recognizer is required to keep track of the same individual irrespective of the context in which he or she got originally acquainted with the individual. (Consider the case of the Prodigal Son.) What is needed here is often called the anchoring relation between the ‘returning’ individual, or the referent, and the vehicle defined as the index of the individual above. We contend that the anchoring relation obtains between the referent and some physical substance as its proper part (smell, sound, shape or taste): the latter condition renders the relation context-independent and at the same time enables the recognizer to (re-)identify the specific individual in any new context. Let us add this condition of keeping track or re-identifying to (C2):

(C2’) The variability of physical substance such as smell, sound, face and gait can become functional only in a way that it indicate (or designate) the singular and unique character, viz. the specificity of an individual in any context in which the individual appears. In other words, it becomes functional precisely as a means (an index) to keep track of the individual.

These considerations lead us to propose that specificity is represented, if at all, in a way that closely resembles what representations are in Active Perception Theory (APT). (See especially Thomas, 1999, Dreyfus, 1999, O’Regan & Noë, 2002, Neisser, 1994, Norman, 2002

and Stoffregan & Bardy, 2002 for an account.) The main idea is that one does not recognize specificity by comparing a given stimuli to some stored representation, but rather one recognizes it directly by being attuned to the specificity of the physical substance that functions as a vehicle for the individual. That is, one does not select the right representation on the basis of some similarity with the given stimuli, but one ‘sees it directly’ as a deviation from existing patterns or representations. We believe, following APT, that specificity recognition in most cases does not rise to the level of consciousness, but it triggers motor reaction more immediately. More radically put, ‘seeing deviations’ instead of categorical similarity precedes categorial perception, viz. recognizing that two individuals are alike qua members of the same category. Thus categorial perception and specificity recognition appear to be orthogonal. Let us formulate this idea as a further logical condition on recognizing specificity:

(C3) The perception of difference logically and empirically precedes categorial perception. Hence, individual recognition is direct, i.e. it is not mediated by categorial structure or category membership.

However, in the field of social cognition and communication it is hard to contest at least the possibility of the experiential quality of recognizing our fellow or family members. So we turn our attention to this field.

3. Social behavior and the ‘specificity’ of specificity

There is a growing literature on the existence and functionality of two visual, the dorsal and the ventral systems in humans (See e.g. Norman, 2002) The dorsal system is egocentric: it processes movement in the first place. It can make very fine temporal discriminations, and it operates very fast. It processes absolute size and distance by comparing them to the body of the actual subject. (Note that it is generally said to process moving ‘blobs’, rather than objects in the ordinary sense.) The ventral system is allocentric: it processes relative size, depth, colors, shapes, etc. It can also make very fine spatial discriminations so that the perception and categorization of objects belong here. It is however relatively slow in operation. This is one of the major reasons why certain scientists and philosophers associate consciousness or reflexivity with ventral processing. Although we cannot recapitulate our version of the evolutionary history of the two systems, we assume that the dorsal system is adapted mostly to a richly textured environment, with short visibility, where depth or distance does not offer much time for the organism’s reaction. That is, the faster the reaction, the more it is rewarded. The ventral system, on the other hand, is fit to operate in open territory, with far visibility, where there is enough time for deliberate reaction and contemplation. Here, the better computed the reaction is, the greater its reward. In other words, the dorsal processing is more dependent on the actual niche the organism is living in, whereas the ventral system provides a capacity to make fine distinctions giving rise to – even higher – categorial structures. Categorial thinking in turn offers more freedom in behavior with respect to the niche.

The differences between the two systems become especially acute when it comes to social perception. In our view, categorial perception tends to be less efficient in a socialized environment. Why? Well, we suppose that social structure (or membership) is grounded in the recognition of individuals qua individuals. We do not mean any partnership requires the recognition of individuality in this strong sense. We embrace whole-heartedly the idea proposed by Konrad Lorenz (1935) that in many species of birds an intruder may receive similar treatment by the parents as their young ones, while in other cases the young might

become inimical toward their parents, all this because the intruder or the parent respectively does or does not display an expected pattern of behavior. Recognition in these cases means pattern recognition, viz. categorial perception. Hence, one cannot say the individual bird is treated as an individual (in the strong sense). On the other hand, individuality in the strong sense is functionalized especially in those birds which are nest-leaving. In a nest where the young develop very quickly the capacity to fly, the importance of recognizing the returning ones may well be great. Lorenz is explicit on this point: these birds do not recognize the others simply as co-specifics or as category-members, but in their individuality. He alleges that they recognize their family members by the form of the head primarily – and the analogy with human facial recognition is hard not to make.

Genuine specificity (specificity in the strong sense) is essentially ostensive in character in that with the rise of hierarchically structured higher primate and human society it is not necessarily governed by an underlying genetic relation. On the one hand, changing hierarchy among members in social groups would not be possible if specificity were a question of pure category membership. Furthermore, social often means that the group is open to ‘newcomers’ (cf. the mafia again), even though openness does not imply that there are no particular conditions a newcomer will have to satisfy. What our argument states is that the cohesiveness of the group is parasitic on, and it is enhanced by, the capacity of direct recognition of specificity. From this it follows that genuine specificity is not similarity-based but intransitive. Last but not least, we found that the capacity to recognize specificity makes possible re-identification in a context-free manner, i.e. the tracking down of individuals. This process is also exercised linguistically. But it shall turn out that the linguistic tracking down of individuals most often termed as co-reference is an impoverished way of recognizing specificity.

4. Specificity in language: de re vs. de dicto

Following a suggestion in (Kvart, 1993, 316), we can identify three conditions on linguistic specificity.

They include first, (i) certain causal conditions that are external to language in the sense of the anchoring relation. Although there are considerable differences between approaches incorporating such relations into the semantics of language and those which exclude them (see theories of wide and narrow propositional content), what matters is whether the objects of perception are reducible to, or are equivalent with, the objects of (propositional) belief; in other words, if there is an identifying non-conceptual part of belief-content. This idea is closely connected with a second type of conditions that linguistic specificity is often said to imply. Namely, that (ii) specificity imposes certain epistemic constraints that guarantee either that the speaker know who a given individual a is (Hintikka, 1962), or that a exists (Kvart, 1993), or simply that the speaker be non-descriptively acquainted with a. Sometimes, the conditions are formulated cognitively in that specificity boils down to having a particular individual in mind, and it is this mental fact that enables one to track down individuals verbally or non-verbally. The idea that substance concepts are a means to (re-)identifying individuals can be ranked here. (cf. Millikan, 2000) Now, if we accept that perceptual content is in itself “too specific to feature in a suitably objective belief-content” (Bermudez, 2002, 95), the non-conceptual content of any (hence specificity-involving) perception can only enter belief at the expense of losing the sense of specificity as understood in this paper.

Finally, when it comes to the third kind of conditions, it turns out that formal linguists (such as the adherents of Discourse Representation Theory or Dialogue Game Theory) tend to

simply take no notice of the ‘specificity’ of specificity or they exclude it from the proper domain of linguistics. (See Kamp & Bende Farkas, 2001) What they are after are the so-called (iii) descriptive adequacy condition: they propose language-internal, viz. semantic, and mostly technical, strategies to explain away anaphoric chains as the condition of possibility for co-reference. The resultant techniques range from (syntactic or formal) co-indexing through variable binding to file keeping or embedding discourse representations.

The basic problem with these approaches is not only that they do not, because they simply do not have the means to take specificity ‘specifically’. It is also that they presuppose a ‘perspectival’ understanding of specificity, for they analyze genuinely specific, viz. de re interpretations in terms of a de dicto one. The reduction of de re to de dicto is, however, only reasonable, if specificity means sameness under different perspectives which are otherwise definable or describable, hence they can enter into propositional content. The problem whether specificity can be analysed as changing perspectives is old. Remember the Russellian attempt to define singular propositions (implying knowledge by acquaintance) versus descriptions. The dilemma is this: if perspective is perceptual, to (re-)identify individuals across contexts cannot be grounded in language. If perspective means the ‘horizon’ of language, de re specificity falls outside its scope and remains a mystery. And it does not help much to refer to a difference between internal and external anchors (Kamp & Bende-Farkas, 2001) or to use anchoring relations as a pragmatic guarantee of specificity (Gronendijk & Stokhof, 1982, or Kwart, 1993). This dilemma is well illustrated with the much debated case of evolutive anaphor. (See e.g. Reboul, 1994) The moral for linguistics appears to be that there can hardly be given any other foundation than metaphysical to how one can continue to talk about the ‘same’ individual even when all its properties have been changed. It is along these lines that we reach our very tentative and sketchy conclusion.

4. Conclusion

If we accept as we tried to argue that genuine specificity is orthogonal to categorial perception, hence to its linguistic variants (since it falls outside the scope of language), language can only provide a very truncated version of it. What at first sight might seem a proper linguistic variant of specificity, namely fiction with its (co-)reference to non-existent but specific individuals, turns out to be parasitic on sensory perception. But the orthogonal character of the two capacities is even stronger. For while language is a means to make always finer distinctions by creating new categories, this it can only do at the expense of reducing its capacity to represent specificity. So, not only the two capacities, but perception and language are orthogonal as well. So much so that an account of the fact that we, humans, reached a high level of categorial thinking like mathematical abstraction and succeeded in building up a hierarchical society and telling individuals by their faces would in our opinion have to offer a less than an optimal solution, rather than a cost-benefit type of optimizing in evolutionary theory.

References

- Bermúdez, J. L. (2002). The sources of self-consciousness. *The Journal of the Aristotelian Society*, 58, 85-107.
- Block, N. (2002). How not to find the neural correlate of consciousness. *Intellectica*, 31, 125-136.

- Dreyfus, H. L. (1999). The relevance of phenomenology to scientific explanation intelligence without representation. Available at <http://www.hfac.uh.edu/cogsci/dreyfus.html>
- Gronendijk, J. & Stokhof, M. (1981). A pragmatic analysis of specificity. In: F. Heny (Ed.), *Ambiguities in intensional contexts* (pp. 152-191). Dordrecht: Reidel.
- Hurst J. L., Payne C. E., Nevison C. M., Marie A. D., Humphries R. E., Robertson D. H. L., Cavaggioni A., Beynon R. J. (2001): Individual recognition in mice mediated by major urinary proteins. *Nature*, 414 (6864), 631-634.
- Kamp, H. & Bende-Farkas Á. (2001). Indefinites and binding. From specificity to incorporation. Lectures notes. 13th Summer School in Logic, Language and Information. Helsinki, 2001. Revised version.
- Keely, B. L. (2002). Making sense of the senses: individuating modalities in humans and other animals. *The Journal of Philosophy*, 99, 5-28.
- Kvart, I. (1993). A Theory of Thinker Reference. *Philosophical Studies*, 74, 291-323.
- Lorenz, K. (1935). Der Kumpan in der Umwelt des Vogels. *Journal für Ornithologie*, 83, 137-215; 289-413.
- Millikan, G. R. (1990). Truth rules, hoverflies and the Kripke-Wittgenstein paradox. *The Philosophical Review*, 99, 323-353.
- Millikan, G. R. (2000). *On clear and confused ideas: an essay about substance concepts*. New York: Cambridge UP.
- O'Regan, J. K. & A. Noë (2002). A sensorimotor account of visual consciousness. *Behavioral and Brain Sciences*, 24, XXX-XXX.
- Neisser, U. (1994). Multiple systems: a new approach to cognitive theory. *European Journal of Cognitive Psychology*, 6, 225-241.
- Norman, J. (2002). Two visual systems and two theories of perception: an attempt to reconcile the constructivist and ecological approaches. *Behavioral and Brain Sciences*, 24, XXX-XXX.
- Raffman, D. (1995). On the persistence of phenomenology. In: T. Metzinger (Ed.), *Conscious experience*. Schoningh.
- Reboul, A. (1994). A language-based metaphysics for evolving reference. In A. Reboul (Ed.), *Evolving reference and anaphora: time and aspects*. Amsterdam: Benjamins.
- Stoffregen, T. A. & Bardy, B. G. (2002). On specification and the senses. *Behavioral and Brain Sciences*, 24, XXX-XXX.
- Thomas, N. (1999). Are theories of imagery theories of imagination? An active perception approach to mental content. *Cognitive Science*, 23, 207-245.
- Wedekind, C. et alii (1988). Examples of MHC-correlated Sexual selection in mice and humans. In: Y. Espmark, T. Amudsen, G. Rosenqvist (Eds.), *Animal signals* (pp. 437-444). Trondheim: Tapir Academic Press.