CHAPTER NUMBER

DO ANIMALS SEE OBJECTS?

PAWEŁ GRABARCZYK

Let's start by revisiting a familiar scene although from an unfamiliar perspective. Two men are travelling through the jungle. They stop at a clearing and look in the direction of a small, furry creature. "Gavagai!" says one of them. "A rabbit!" thinks the other. We are told that although we can safely bet that the man thinking about a rabbit refers to, well, rabbits, we can never be certain what is it that the user of the other expression refers to. It may very well be a rabbit, an undetached rabbit part, a set of rabbit parts etc. There is no way for us to know if the men share a common ontology. But what about the rabbit - what can we say about his experience? Can he think *about* the men he encountered? Does he see them as objects, sets of properties or maybe he focuses on one of their undetached parts?

In the context of the behavioral theory of language our initial story belongs to, these questions are almost automatically addressed. As Davidson puts it:

> A creature without the concept of an object, however good it is at discriminating what we call objects, is a creature without even the rudiments of the framework of thought. What calls for ontology is the apparatus of pronouns and cross reference in natural languages, what we represent by the symbolism of quantifiers and variables in elementary logic. These devices provide the resources for constructing complex predicates, and at this point semantics must map names and predicates onto objects. (Davidson 2004, 140)

It seems then that if you are not generous enough to credit a given creature with highly sophisticated language you simply should not make any assumptions about its ontology. Let's call this claim *the rule of ontological parsimony* (ROP for short).

Surprisingly, for such a counter-intuitive consequence that follows directly from a famous thesis, it is not discussed much in the literature. Perhaps the reason for this lack of interest is that the ontological relativity thesis is

thought to be more of a *reductio* argument for the traditional theory of meaning and its positive import isn't taken seriously enough. The other reason may be that the problem of animal ontology is mentioned mostly in the context of a wider argument against anthropomorphism,[1] so it is not obvious how many premises are needed for the ROP alone. This is especially apparent in the Davidson book quoted above - although he does talk about ontology, his main concern is attributing propositional attitudes to animals[2] and he uses various additional arguments besides the ontological indeterminacy thesis.[3]

In this paper I show that the rule of ontological parsimony can be defended with just a very weak version of the ontological relativity thesis: a version which I believe to be acceptable even to people who are not convinced by Quine's and Davidson's original arguments. I show also why breaking this rule can lead to some serious methodological errors and reintroduce stronger forms of anthropomorphism to science.

Let's start with the original ontological relativity thesis and see how we can water it down to make it more like a common sense observation than a highly debatable claim. What it says is that the ontological commitment of a subject can only be determined by interpreting a particular linguistic expression used by the subject and not the behavior that accompanies the utterance of this expression. There is no way for us to detect the set of categories employed by the subject just by observing its non-verbal behavior. Unfortunately, since it is an empirical fact that our language gives us several ways to describe a given perception (they are stimulus-synonymous but differ in the structure and syntactic categories of their parts) we have to assume that the foreign language can be as elastic as ours. To learn which of these variants has just been used by the subject, we can't just observe it, but have to start communicating with it verbally. To

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1   And sometimes even conspicuously absent - Quine mentions the topic in *Word and Object* and warns against using "the essentially dramatic idiom of propositional attitudes" when describing animal behavior, but says nothing about the idiom of ontological categories although a similar warning could easily be formulated. (Quine 1960, 218)

2   For the sake of convenience I am using the term "animal" to refer to non-human animals.

3   Which are arguably much more controversial. He refers to his holism of beliefs, the idea that having a belief requires one to have a corresponding second order belief and the idea that you can attribute concepts to a creature only if the creature itself differentiates between correct and erroneous application of said concept. (Davidson 2004, 135-150).

do that we have to speculate on all the aspects of the language we can't test empirically – namely – most of the grammatical features of the language we were about to ask (among them all the features Davidson talked about in the quotation above – pronouns, quantifiers, etc).

Whether this argumentation leaves any hope for animal ontology or not depends on our evaluation of the linguistic capabilities of animals. If we decide that no animal uses a proper language then the question of their ontology is automatically settled. If we decide that some of the animals have the capability to use language then the question of animal ontology remains open but the idea itself remains rather dubious. After all, even the most optimistic ethologists who attributed some form of syntax to animal language weren't optimistic enough to say that animals mastered the machinery of pronouns and quantifiers. Keep in mind that we have to be extra cautious here because most of the alleged evidence of animals using language with sophistication and creativity characteristic for syntax users, comes from research conducted on apes which used fragments of human natural languages (Savage-Rumbaugh, Brakke 1996, 278-286, Shettleworth 2010, 542). It is extremely easy for us to project our ontology onto the animal when it is using our own expressions.

Of course, you may wish to save animal ontology at the expense of an even riskier idea - you could assume that the necessary logical structure, although completely invisible on the surface of animal communication, is in fact the structure of the language of animal thought. The biggest flaw of this solution is fairly evident - it is wildly speculative and has no empirical evidence to back it up. The language of thought hypothesis remains controversial when applied to humans, even though in that case we cannot complain for the lack of linguistic material to analyze and extrapolate from.

So, let's see what can we do to simplify the argument. We will need two claims. The first is a factual observation about the English language:[4] every description of an observation can be ontologically paraphrased, that is rephrased using a different set of categories. For example – instead of talking about *objects* you could always talk about *organized sets of object parts* or about *pieces of space-time*. We can easily move between them and can think about these paraphrases as translations to a non-standard or less-standard English. We prefer some of the paraphrases and consider

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4 Of course, the same thing can be said about many other languages.

others to be awkward or cumbersome but there is nothing in what we observed that forces us to use one and not the other.[5]

The second thing is that we have to differentiate between stronger and weaker interpretation of ROP. The stronger states that if you cannot attribute a sophisticated enough language to a creature you can assume that it has no ontology at all; the weaker states that in this situation you simply cannot know which set of categories is the one the creature actually employs, so you shouldn't favor any of them. Fortunately, the strong assumption is something we can easily do without.[6] With this in mind we can formulate the weaker version of the whole argument:

1. Every description of an observation has its ontological paraphrase.
2. The only way to tell which of these descriptions is the one the observer actually employs is to ask the observer.
3. No animal has been taught language sophisticated enough to be asked such a question.

I believe (1) and (3) to be uncontroversial. As we noted, every individual object can be re-described as a set of its properties or a set of its parts and *vice versa*. And we know that there is nothing observable that sets apart the individual and the set of its properties. On the other hand, all the words we have been able to teach animals have been tightly connected with selected empirical stimuli (Premack 2004, 319), so it goes without saying that teaching them the difference between an individual and the set of its parts looks like a hopeless task. Thus, the reason someone might find the above reasoning to be unpersuasive is that they don't accept the second claim. What are the possible reasons for rejecting it?

First of all, someone might simply assume a naive realist stance: although there are competing descriptions of reality, only one of them is proper and the others are simply mistaken. The trouble with this view is that there is not much more to it - no additional arguments or evidence. It is just a metaphysical hunch and there is nothing that prevents us from saying that our intuitions differ in this respect. Philosophical discussions have been fueled by this type of intuition clashes for centuries and we all know how they end (or, rather, don't end).

The second possibility, one which we may call an even more naive realist stance, is the view that not only is the world ready-made, but also that its

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5   Just as there is nothing in what we observed that forces us to use English and not Polish.

6   I believe it to be defensible, but not necessary for the present argument.

ontological categories can be somehow perceived. I believe that the reason this view can be seriously taken into consideration is that we forget that sometimes even the most laconic descriptions fix the reference for us. If you think that it is evident that the table is an individual and not a set of parts you might have been tricked by the fact that this is the way the word "table" fixes the reference of a speaker and you might have inadvertently attributed it to the perception itself. But the moment we restrict ourselves only to indexical terms the illusion disappears. Consider the following example:

[for the editor: it is supposed to be a single dotted line]

Is what you see a dotted line or a set of hyphens? Frankly, I find the idea that there exists a definitive answer to this question and that it can be established by observation to be completely incomprehensible.

But even if we take it to be true and believe that people can somehow perceive the categories of what they observe, there are still a lot of problems with this view. First of all, the animals differ from us - does every animal have what it takes to see world through the same category set we do? Consider a tick - its perception has to be constructed from the data retrieved from the limited sensory input it gets. When it detects butyric acid vapor it falls from whatever it was attached to and reacts to the shift of temperature - when it detects warmth it starts to burrow.[7] Is it obvious that its world consists of objects and properties? Wouldn't it be equally sensible to assume that it consists of states of the surroundings? If you believe that the tick employs the same or similar set of categories you do, do you also attribute it to viruses? Also, if an ontology is somehow given in our perception why is it always possible to describe whatever we observe with different categories?

The third possible ground for rejecting (2) is the assumption that even though there is no default ontology, it is possible to say which set of categories the observed creature employs because it manifests itself somehow in the creature's behavior. This is a very popular line of thought, especially among cognitive ethologists (Uller 1997. Wasserman 2002. Cheney & Seyfarth 2007, Taylor et al. 2009) . The main point here is that while some animal behavior can be easily interpreted without attributing a complex set of categories, sometimes we are presented with behavior which would be impossible to explain without the assumption that the

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7   I took this example from Carruthers (2004).

animals in question categorize the world similarly to us. The issue is explained well by Piaget, who writes about a 5-month-old child whose mother just left the room, and observes:[8]

> (…) he stamps and cries at the disappearance of every image, thus revealing his keen desire to see it reappear. But does this mean that the baby conceives of the vanished image as an object existing in space, remaining identical to itself and escaping sight, touch and hearing because it has been displaced and is masked by various solid substances? In such an hypothesis it would be necessary to attribute to the nursling a most improbable power of spatial representation and intellectual construction, and it would no longer be possible to understand the difficulty he will have until about 9 or 10 months of age, in searching actively for objects when they are covered by a cloth or a screen of some kind right before his eyes. (…)
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> But the hypothesis is neither necessary nor does it conform to observations. It is not necessary because it suffices for the child to hope for the return of the interesting image (of his mother etc.) that he attribute to it a sort of affective or subjective permanence without localization or substantiation; the vanished image remains, so to speak, "at disposal" without being found anywhere from a spatial point of view. It remains what occult spirit is to the magician; ready to return if one catches it successfully but obeying no objective law. (Piaget 1954,12-13)

What is interesting is that while what we have here is clearly the application of the rule of ontological parsimony I am advocating, a few pages later Piaget finds a behavior which he says cannot be interpreted without introducing a new ontological assumption. A child who looks for a toy which has been hidden behind a cloth has to have the concept of a persistent object, argues Piaget. But what (apart from the fact that this is the way we tend to think about toys) prevents us from interpreting the child's behavior the way he did in a quoted passage? Maybe the child started to think that the image he is interested in (the image of the hidden object) appears after he makes a given set of moves (which in effect remove the cloth). Maybe the child started to perceive, and expect, more complicated sequences of images? We could point out that what is saying here is that the child doesn't look for a toy when he didn't see it being hidden but this can be easily explained - the child perceives reality as a set of sequences of images and doesn't expect the toy image to appear in later

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8   The fact that he talks about a human animal isn't important for us because at this stage of his subject's development he is forced to resort to the same methods we use while studying non-human animals.

stages of sequences which had not been initiated by a toy image.[9] Of course, this explanation seems to be contrived. However, isn't this the case because we know what the child will think about the toy when he grows up, so we expect this knowledge to appear somewhere in one of his development stages? But this is something we cannot say about animals. The words you used to describe the behavior you observed fix the ontology for you, so if you start with talking about "a toy" and "a piece of cloth" you shouldn't be surprised that you find talking about "a sequence of toy-images" and "cloth-images" to be rather cumbersome. Things would have been the other way around had you started with a different ontological paraphrase of your initial description. A couple of examples ought to make my point clear.

Picture a typical scene: a postman approaches the gate and rings. Let's assume that he does it in some characteristic manner, let it be two short rings. A dog starts to bark ferociously. Because his reaction to the doorbell is stronger than normal it seems completely reasonable to say that he recognized the postman because he learned to recognize an event of a certain type – the characteristic doorbell. But couldn't we say that he treats the postman as an event of a familiar type – "the postman visit", and the ringing of the bell as an object "a door bell ringing"? How can you be sure that the dog differentiates between these categories (objects and events) and that it maps them onto the world the way you do?

Let's switch the animal and picture another scene. A cat observes a row of street lamps being lit. For some reason she is interested in this and moves her head accordingly. Does she observe a series of events, a developing process or maybe she tracks a moving object – "the lightning". If you believe "the ligtnning" to be too exotic an object, consider that ontologically it is not that different from a growing shadow and you probably don't have a problem with attributing the ability to observe shadows to cats.

And now imagine another situation: a dog chases a ball. The ball rolls under the bed and the dog runs to the other side waiting for it to re-emerge. At the first glance it is evident that the dog perceives the ball as an object that has a trajectory in space. But what if the dog thinks that the bed is a

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9 Piaget notes that the child looks for a box which fell out of his hands even if he didn't see it (Piaget 1954, 15) which seems to block the sequence interpretation, but we have to remember that he feels the box falling out of his hands, so the only thing you have to do is that you introduce multisensory sequences.

natural phenomenon that destroys balls and creates exact copies of them on the other side? You might say that the latter explanation is absurd but why is this the case? Is it because we know it to be false and any respectable dog should know it to? Or is it simply too complicated a theory to attribute to a dog? But isn't the theory of objects moving in 3D space even more complicated? [10]

What we do here is that we tend to think that what is natural for us is objectively simpler than what seems exotic to us. This tendency is not exclusive to ontological considerations. We were sure that some birds can copy a behavior, because we noted that after small number of birds (sometimes just one of them) successfully opened a bottle of milk, the behavior spread to the whole flock. The other hypothesis, namely that there was no imitation involved and every bird made the discovery from scratch seemed to be much less believable. [11] But it turns out that it is the latter hypothesis which has been proven to be more likely. It just so happens that one of the birds was lucky enough to be in a situation which triggered his interest in the bottle and the opened bottle with spilled milk provided a powerful stimulus for the other birds to take a similar interest in other bottles which subsequently led to a series of identical discoveries. It surprises us because we may not realize how anthropomorphic the idea of an ingenious bird changing the history of his flock really is and how neurologically complicated the task of imitation happens to be.

We are blinded by the fact that most times the attribution of our ontology to animals seems to fit the observable behavior perfectly, but the fact is that we oftentimes ignore or disregard the behavior that would have been easier to interpret by attributing a different ontology. We may label some of the things animals do as weird or erroneous, but they may be perfectly normal under a different description. Consider the following problem pointed out in Schulte 2012: when we describe the way a frog reacts to a detected fly we may want to refrain from saying that it perceived "a fly" because there are simply too many restrictions we have to add. Frogs react not only to flies but also to other insects (so "an insect" may be considered a better description) sometimes they react to inanimate objects which meet certain requirements (so "a small dark moving object" may be a better

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[10] In fact some of the research on dogs strongly suggests that they do not represent trajectories of objects (Colier-Baker et al., 2004)

[11] The description of bird behaviour can be found in (Fisher & Hinde 1949), the critique can be found in (Thorpe 1951) and (Thorpe 1963). A similar critique concerning the behavior of apes can be found in (Whiten 1989).

description). But there are even more troubling complications – the frog has to be hungry (so maybe "food" would be better) and if it detects a predator the fleeing reaction is the one with a higher priority. But as I suggested before the complications pile up only because we started with our familiar ontology of objects and try to adjust it to the observed behavior. If we decided to start with situations (for example - a global stimuli consisting of a small dark moving object, lack of predators and the initial internal state of the frog) we wouldn't have to add any additional requirements.It may seem that even if this analysis is correct, the issue is not particularly significant. Couldn't we say that the attribution of a given set of categories to animals is only a manner of speech and get away with it? If the differences between sets of categories employed are undetectable empirically, what harm can they do to serious research? Maybe a dash of anthropomorphism is simply unavoidable and we shouldn't be alarmed by it?

Let's begin answering this question by noting that the reason why it is so hard to eliminate anthropomorphism from our explanations - it is natural for us because it proved to be very useful in the process of natural selection. In a way it is the least expensive theory there is: to predict the behavior of a given creature just put yourself in its position and think what you would do in its situation. When you do that, there is a decent chance you will end up with a successful prediction, because both of you had to develop mechanisms giving you similar results - results which enabled you to survive in the environment you share (Kennedy 1992, 103). But the similarity of results doesn't mean similarity of mechanisms - that is why, while being fairly successful in predicting the behavior of other entities, anthropomorphism is a very bad theory when it comes to explaining that behavior.

How powerful is this tendency to cast yourself into what you observe was shown by a classic experiment performed by Mary Ann-Simmel and Fritz Heider, who showed that even simple motions of crude geometric shapes are almost universally described by humans in anthropomorphic terms like "fear", "desire", "wants" etc (Heider & Simmel 1944). Paradoxically the more experience a given researcher has, the more likely they are to use anthropomorphic descriptions. It is because after using these descriptions a number of times, they start to be convinced that certain human-like properties are simply evident:

> Most field workers - whose research places them in very close contact with
> their animals [primates] - have no doubt that their animals act consciously
> (Dubar 1985, 39).

We have been aware of these risks for quite a long time now. After all, they have been addressed more than a hundred years ago in Lloyd Morgan's *Canon*, which famously states:

> In no case is an animal activity to be interpreted in terms of higher psychological processes, if it can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development. (Morgan 1903, p. 59)

Although there are still some controversies concerning the importance of Morgan's *Canon*,[12] we can quite safely assume that it is mostly adhered to. Researchers restrain from attributing mental properties to animals or to assume what Dennett calls "the intentional stance" (Dennett 1989, 17) - we can break the canon if we are aware of the fact that the attribution of mental properties is just a way of speaking that is comfortable for us, a useful shortcut, but nothing more. It plays a role similar to metaphors – when we use them we oftentimes think faster and more efficiently but we shouldn't take them too seriously.[13]

Another obvious point of reference is Uexkull's concept of „Umwelt". Couldn't ROP be treated simply as a consequence of incompatibility of different Umwelten? I believe that the concept of Umwelt is much broader than what I wish to convey because it covers not only ontological differences but also differences of content. Uexkull gives an example of a flower stem which can be perceived as a pipe full of liquid by a spittlebug or a path by an ant (Uexkull 2001). Both examples belong to the same ontological category – that of objects. The question I am interested in is if we can establish whether the ant perceives a path or a set of its properties.[14]

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12 Some point out that the fear of anthropomorphism can be more of a cultural peculiarity of the West then a universal methodological canon (Asquith 1986); others warn that since when classic behaviorism went out of favor, researchers take more and more liberties concerning the attribution of the mental properties to animals (Kennedy 1992); some even defend a weak form of anthropomorphism (Fisher 1996).

13 Although some believe that even this domesticated anthropomorphism is too much – see (Burghardt 1985)

14 I admit that the difference between ontological and non-ontological categories may not be as clear as I am making it to be but I do not have the space to elaborate on it here. I hope that all the examples I use in the paper – the opposition between individuals and sets of individuals, objects and properties, properties of first and second order (properties of properties), objects and situations are rather uncontroversial as examples of ontological differences.

The trouble with ontology is that it is so seamlessly embedded into our language that we tend to forget that it is a theory, and not something that is simply present in our perception. We learned not to extend our folk psychology to animals but it is not as easy with our folk physics.[15]This weak form of anthropomorphism may initially seem to be completely innocuous but as it happens it is oftentimes used as a springboard to much stronger and more controversial claims.

A number of spectacular examples of what is believed to be a display of human-like mental features come from the research on the alleged animal's ability to abstract. Parrots are supposed to have higher cognitive features because they recognize new objects using a property abstracted from a set of different objects (Pepperberg 2001). Bees are supposed to abstract second order properties because they can differentiate between letters written with different typesets (Gould 1988). But what if we said that bees and parrots perceived the world as sets of properties from the start? Then all of a sudden there is no abstraction involved. We assumed that what they needed is an advanced mental operation, because we took for granted that their world has to consist primarily of objects, so the ability to focus on a property looks like an important achievement. But couldn't it just as well be exactly the opposite?

One of the most prominent examples of an ontological decision influencing an ethological theory is a methodological decision introduced in Rescorla-Wagner model (Rescorla & Wagner 1972). Every set of properties the model takes as a stimulus is treated as a simple sum of properties and not as a new compound. The effect of this decision is that the ability to react to compound properties automatically looks like an outstanding cognitive achievement. See (Shettleworth 2010, 182) for further discussions of this problem.

One of the recent studies (Taylor et al. 2009) suggests that New Caledonian crows perceive causal connections which, if you believe David Hume, makes them more perceptive than human beings.[16] Crows were presented with a translucent tube which had two traps at the bottom. One of the traps was covered with a lid (which had a solid color). Right between the traps there was a piece of meat and the crow had to learn that pushing it from one side (eg. from right to left side of the tube) moved the meat out of the tube while pushing it from the other side didn't (because

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15 Or naive physics as ontology is sometimes called (Smith & Casati 1994)

[16] Admittedly the authors acknowledge this ironic consequence in the beginning of the paper.

the meat felled into the uncovered trap). The question the researchers asked is exactly of the type we ask here – they wanted to know if the crows learned to recognize some visual property of the tube or if they were able to recognize an abstract feature – namely functional, causal structure. They tackled this question by presenting the crows with another puzzle, one that was very dissimilar to the tube in terms of observable features but similar in terms of causal features. They showed crows a rectangular table divided into two compartments. Both compartments had a piece of meat positioned at the end but one of the parts had a rectangular hole in the surface. Because the hole was as wide as the whole compartment it was not possible to get the meat by pushing or pulling it. It was observed that those crows which mastered the first puzzle learned to deal with the second puzzle much faster than the crows without such prior experiences. But why couldn't we simply decide that what the crows really mastered is the detection of the visual property of "having a hole on the surface"?. The reason why the difference between these interpretations is important is that causality (in the sense Taylor et al. use the term) is a second order property while "having a hole on the surface" is a first order property and the ability to perceive first order properties doesn't impress us much (we attribute it even to fairly simple organisms). Only the ability to detect second order properties strikes us as a cognitive task worth reportingPremack noted (inPremack & Premack 1983) that monkeys which learned to do a match-to-sample test learn to do the next test (but with a different set of icons) considerably quicker. This was interpreted as a sign of them having a concept of "identity". The rationale behind this strong conclusion was that the monkeys understood the general pattern of this type of tests and applied it to the test of the same type, although the direct physical stimuli were completely different. Wasserman drew very similar conclusions about pigeons. He showed them two pictures – one was a set of 32 small icons and the other consisted of one of these icons repeated 32 times. They learned to peck a green button when presented with the latter and a red one when presented with the former. Then he took a new set of 32 icons and created a corresponding image of 32 repetitions of one of them. The pigeons didn't have a problem with pecking the right buttons although they had never seen any of the new icons.

But of course there are many less exciting interpretations of these studies.[17] In this type of experiments animals are rewarded for finding any

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17 It should be noted, that there is no consensus regarding the abilities of pigeons. For example, Macphail et al. show that teaching them more abstract concepts

pattern, so they might have found something that is common to these pictures but what we simply didn't realize was there (because we were so focused on the second order property). This is exactly what happened in a study similar to the previously mentioned experiment involving bees. In this study, pigeons were supposed to have learnt the concept of the letter "A" because they recognized it in vastly different typesets. It turned out that what the pigeons really learned was to recognize shapes of the upper parts of the letters so that they didn't differentiate between "A" and "N" or "2" and "S" (Morgan et al. 1976). Are we supposed to say that the properties they found were less abstract then the ones we expected to teach them? Or maybe they just didn't fit any of our categories? Moreover – if we really discovered that pigeons or monkeys have a concept of "identity" should we now reinterpret all of their behavior and decide that they also have the concept of "green" and "red" - after all they differentiate between the colors and we didn't attribute these concepts to them only because we didn't want to assume that they have higher mental capabilities.

Another classic example is (Hernstein & Loveland 1964) who attributed concept formation to pigeons based on the opposition of two ontologically different types of stimuli representation: a set of sufficient and necessary features and a prototype understood as an artificial, mentally construed individual.

Another interesting example of jumping to anthropomorphic conclusions, comes from Uller (1997). Monkeys saw that two eggplants were placed behind the screen. When the screen was lifted and they saw only one eggplant, they were surprised (as indicated by their significantly higher level of attention). This behavior was interpreted as a sign of them having a concept of a numeral (or a proto version of it). But consider this - "an eggplant" is a word of divided reference so it is a natural thing for us to describe the monkey's behavior this way and maybe even draw the aforementioned conclusion. But what if our language was a little different and instead of the countable word "an eggplant" we used only the uncountable word "eggplant". Couldn't we then describe the experiment by saying that the monkeys are surprised when they see less eggplant than they expected? But in this scenario we wouldn't draw any interesting conclusions about the notion of numeral or sortal. Are the cognitive abilities of monkeys dependent on the specifics of English?

Some of the claims are even more optimistic than that. Evans et al.(1993) declare that a chicken's signals refer to the kinds of predators it observed.

is extremely difficult (Macphail et al. 1995).

But how do we decide if shrieks refer to the predator, the danger it represents or the sort of fear the animal feels? Maybe we should render them rather as imperatives, such as "hide!", or maybe they are animal expletives? After what I have said it should not come as a surprise that the question of the reference of animal signals is a methodological minefield. Figuring it out is a hopeless task because we cannot be sure even when it comes to the words we painstakingly taught our subjects. Although the words we used have a fixed reference in English there is always the possibility of undetectable shift of usage. For example, animals which had been taught to use signs rarely used them to express something else than their present needs (Savage-Rumbaugh; Brakke 1996, 275). Couldn't it be the case that the word "apple" as used by the chimpanzee refers to the specific urge she feels (apple-hunger) and not the fruit?

It seems that what happens here is that in case of ontology we oftentimes don't see the difference between *de dicto* and *de re* modes of speech. This opposition is invoked in discussions about the attribution of propositional attitudes to animals, but not in the context of attribution of categories. But the analogy is striking - let's say that I describe the behavior of a dog and say: "The dog sees my client". What I mean by that is, of course, *de re* interpretation. No matter how intelligent I believe my dog to be, I probably don't believe him to understand my business relations. Needless to say, there are multiple ways to refer to my client, let's say that the one of co-referring descriptions is "the CEO of XYZ company". Asking if dog sees that person as the CEO of XYZ company or as my client would probably be considered a silly question – he cannot see the person as either, as the dog doesn't have the necessary knowledge.

Similarly, when you say that an animal "sees an object" you may treat it as an innocent manner of speech, and would probably have little trouble replacing with an equally natural paraphrase, but it would be just as silly to insist that the animal sees something *as an object* rather than *as a situation* or *as a global stimulus*.

The biggest obstacle for someone who wishes to follow the rule of ontological parsimony is that, contrary to Lloyd Morgan's Canon, one cannot simply refrain from talking about the properties one was advised to avoid.[18] So it is important to end by stressing once more that the error of

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[18] It is worth pointing out that some of the researchers acknowledge this problem. As pointed out by Schulte, even using the term "perceiving" or "seeing" has be seen as antropomorphic. (Incidentally he uses s similar idea of Principle of Parsimony but defines it in a broader terms which makes it closer to original

ontological anthropomorphism comes from treating the ascribed ability to use certain categories too seriously and not just from simple act of attributing them. It is obvious that we have to choose one of the available descriptions and that it comes with an embedded set of categories. But we shouldn't mistake this for the a false claim that it is obvious that a given animal has the ability to differentiate between these categories. There really is no point in asking if a shepherd dog guards sheep rather than a flock. And yet, this is exactly the type of question some researchers ask.

References.
Asquith, P. J., (1986), Anthropomorphism and the Japanese and western traditions in primatology. [in:] Primate Ontogeny, Cognition and Social Behavior (Else, J. & Lee, P. ed.), Cambridge University Press, pp. 61-77

Burghardt, G. M. (1985), Animal Awareness. Current Perceptions and Historical Perspective. American Psychologist, August 1985, pp. 905-919.

Carruthers, P., (2004) On Being Simple Minded, American Philosophical Quarterly 41(3), pp. 205-220

Cheney, D. L., Seyfarth R. M. (2007), Baboon Metaphysics. The Evolution of a Social Mind, The University of Chicago Press.

Colier-Baker, E., J. M. Davies and T. Suddendorf, (2004), Do dogs (Canis Familiaris) understand invisible displacement?, Journal Of Comparative Psychology 118, pp. 421-433.

Davidson, D., (2004) Problems of Rationality, Oxford Clarendon Press.

Dennett, D. (1989) The Intentional Stance, MIT Press.

Dunbar, R. I. M. (1985) How To Listen To Animals, New Scientist, 106, pp. 36-9

Evans, C.S., Evans, L. & Marler, P. (1993). "On the Meaning of Alarm Calls: Functional Reference in an Avian Vocal System." Animal Behaviour, 46: 23–38.

Morgan's Canon than my ROP. Schulte 2012)

Fisher, J. & Hinde, R. A., (1949) The opening of milk bottles by birds, British Birds 42, pp. 347-57.

Fisher, J. (1996), The Myth of Anthropomorphism, [in:] Bekoff M., Jamieson D (ed.) ., Readings in Animal Cognition, MIT Press, pp. 3-16
Gould, J. L. (1988), A mirror image ambiguity in honey bee visual memory. Animal Behaviour 36: pp. 487-492.

Heider, F., Simmel, M. (1944), An Experimental Study of Apparent Behavior, The American Journal of Psychology, Vol. 57, No. 2 (Apr., 1944), pp. 243-259

Hernstein, R. J. and D. H. Loveland, (1964), Complex visual concept in the pigeon. Science, 146, pp. 549-551

Kennedy, J. S., (1992), The New Anthropomorphism, Cambridge University Press.

Macphail, E. M; Good, M.; Honey, R. C.; Willis, A. (1995) Relational learning in pigeons: The role of perceptual processes in between-key recognition of complex stimuli, Animal Learning & Behavior 23(1), pp. 83-92.

Morgan, M. J.; Fitch, M. D.; Holman, J. G.; Lea, S. E. G., (1976) Pigeons learn the concept of an "A", Perception 5(1), pp. 57-66

Quine, W.v.O., (1960) Word and Object, MIT Press

Pepperberg, I. M., (2002), Cognitive and Communicative Abilities of Grey Parrots, [in:] Bekoff, M., Allen, C., Burghardt, G. (ed.) The Cognitive Animal. Empirical and Theoretical Perspectives on Animal Cognition, MIT Press. pp. 247-254.

Piaget, J., (1954) Construction of reality in the child,Routledge.

Premack, D. and A. J. Premack (1983), The Mind of an Ape, New York: W.W. Norton and Company.

Premack, D., (2004) Is Language the Key to Human Intelligence?, Science 303(5656), pp. 318-320.

Rescorla, R. A. and A. R. Wagner, (1972), A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement an nonreinforcement. In: Classical Conditioning II: Current Theory and Research, ed. A. H. Black and W. F. Prokasy. pp. 64-99, New York: Appleton-Century-Crofts.

Smith, B. & Casati, R., (1994) Naïve Physics: An Essay In Ontology, Philosophical Psychology, 7/2 (1994), pp. 225-244

Savage-Rumbaugh, S., Brakke, K.E., (1996) Animal Language: Methodological and Interpretive Issues [in:] Bekoff M., Jamieson D (ed.) ., Readings in Animal Cognition, MIT Press, pp. 269-288

Shettleworth, S. (2010), Cognition, Evolution and Behavior, Oxford University Press.

Schulte, P. (2012), How Frogs See the World: Putting Millikan's Teleosemantics to the Test, Philosophia, 10.1007/s11406-011-9358-x, pp. 1-14

Taylor, A. H., Hunt, G. R., Medina, F. S and Gray, R. D., (2009), Do New Caledonian crows solve physical problems through causal reasonings?, Proceedings of The Royal Society B. 2009, 276, pp. 247-254.

Thorpe, W. H., (1951) The learning abilities of birds. Ibis 93, pp.252-296.

Thorpe, W. H., (1963) Learning and instinct in animals, Methuen & Co: London

Uexkull, J. (2001), An introduction to Umwelt, Semiotica 134, pp. 107-110

Uller, C. (1997). Origins of Numerical Concepts: A Comparative Study of Human Infants and Nonhuman Primates. Cambridge, MA: MIT Press.

Wallach, W. & Allen, C. (2009) Moral Machines. Teaching Robots Right from Wrong, Oxford University Press.

Wasserman, E. A., (2002), General Signs, [in:] Bekoff, M., Allen, C., Burghardt, G. (ed.) The Cognitive Animal. Empirical and Theoretical Perspectives on Animal Cognition, MIT Press. pp. 175-182.

Whiten, A. (1989) Transmission mechanism in primate cultural evolution. Trends in Ecology and Evolution 4, 61