Rationality in the Domesticated Dog and Other Non-Human Animals

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RESUMEN

Argumento, usando al perro domesticado como un caso de estudio, que nuestra concepción de la racionalidad de los animales no humanos no debería depender solamente de la atribución de actitudes proposicionales. Defiendo por el contrario la noción de que las acciones de un perro son racionales cuando le capacitan para adaptarse con éxito al entorno en momentos en los que la información relevante sobre el entorno está ausente, es difícil de alcanzar o es nueva. Además, el perro puede tomar parte en un curso de acción racional empleando procesos racionales, procesos cognitivos que le han conducido fiablemente en el pasado a la realización de acciones adecuadas que maximizan tal rasgo.

PALABRAS CLAVE: *racionalidad, perro, cognición, fiabilidad, adaptación.*

ABSTRACT

Using the domesticated dog as a case study, I argue that our conception of rationality in non-human animals should not solely depend on the attribution of propositional attitudes. Instead, I defend the notion that a dog's actions are rational when they enable her to successfully adapt to the environment at times when relevant environmental information is absent, hard to come by or novel. Furthermore, the dog may fix upon a rational course of action by employing rational processes, cognitive processes that have in the past reliably lead to adaptive, fitness maximising action.

KEYWORDS: *Rationality, Dog, Cognition, Reliabilism, Adaptation.*

INTRODUCTION

The study of non-linguistic creatures' cognitive skills has changed a lot since the days when behaviourism reigned. Researchers of non-human animal cognition have moved away from exclusively studying animal performance in laboratory settings; giving subsequent explanations of behaviour in terms of associative processes. Instead, non-human animals are increasingly studied in their natural settings and watched as they encounter various environmental

and social challenges. Laboratory studies continue but with research para-digms and conceptual frameworks that are not behaviourist.

Behaviourists explain behaviour in terms of conditioned responses to stimuli; other authors couch explanations for behaviour in terms of the con-ceptual contents of the mental states of non-human animals [Allen and Hauser (1991)] and there are those who wish to avoid explanations that in-volve attributions of propositional attitudes to non-human animals but who still want to give cognitive explanations of behaviour. I fall into the latter group of researchers and I also approach non-human animal cognition from the perspective of embodied cognition.

Embodied cognition encompasses a variety of theoretical approaches. Clark and Chalmers (2001) present some of the more radical ideas within embodied cognition but all perspectives appear to share the same general foundations. Embodied cognition at its most radical claims that while cognitive processes do occur in the neural tissues of an agent, they also spread over the non-neural body and into the agent's environment [Chemero and Silberstein, (2008)]. For example, when a hound is chasing down a rabbit, the functioning of the hound's brain, his bodily movements and the movements of the rabbit, are all part of the hound's cognitive process at that moment. Viewing cogni-tive processes this way casts them as two way interactions between a part of the external world and the agent's brain. Clark and Chalmers write 'all the components in such a system play an active causal role, and together they govern behaviour in the same sort of way that cognition usually does' [Clark and Chalmers (1998), pp. 2-3]. This perspective forms the background for the approach to rationality in the non-human animal that I argue for.

In the study of non-human animal cognition, this question often arises: 'what makes a non-human animal's behaviour rational?' For strict behaviour-ists, the non-human animal responds to a stimulus with conditioned re-sponses. For those who wish to explain non-human animal cognition in terms of propositional attitudes, a non-human animal is said to decide on a course of action based on a rational assessment of the beliefs and desires held at the time. The behaviour that this process leads to is, on this view, rational behav-iour. To meet this criterion a non-human animal must be capable of an as-sessment of, say, his or her beliefs about a situation and must also be capable of acting upon them. Aside from the fact that it is unlikely that many non-human animals are capable of holding human-like propositional attitudes, I argue that this notion of rationality is too restrictive to adequately character-ise rationality in the non-human and human animal.

In short, this paper advocates giving cognitive explanations for behav-iour but rejects wholesale the notion that our explanations should solely rely on internal mental states like beliefs and desires. From an embodied cogni-tion perspective we can answer the question 'what makes a non-human ani-mal's behaviour rational?' without having to attribute propositional attitudes

to the non-human animal. The embodied cognition perspective I adopt emphasises the idea that the non-human animal is acted upon by the environment and in turn acts upon the environment in continuous feedback loops. Beliefs and desires are not 'inner' causes of behaviour. Rather, the environment, brain and non-neural body are one system, each affecting the other to produce adaptive behaviour.

In formulating an account of rationality in the non-human animal, this paper uses the domesticated dog as a case study. With no other animal have humans associated with for so long. The domestication of the dog as we know it is now placed between 15000-and 40000 years ago with it most likely occurring between 15000 and 20000 years ago [Miklosi, (2008), p. 114)]. Accordingly humans have influenced dogs' cognitive evolution more than any other non-human animal so they make a fascinating case study in any discussion of non-human animal cognition. I address two questions in the following order.

1) Given our embodied cognition approach, under what conditions are a dog's actions rational (under what conditions can we say it makes sense to perform the actions he does in certain circumstances?)

2) What processes enable a dog to fix upon rational courses of action (actions that make sense for him in a given set of circumstances)?

I will argue that the answers to the questions are as follows:

1) A dog's actions are rational (it makes sense to perform them in a particular circumstance) when they enable him to successfully adapt to the environment at times when relevant environmental information is absent, hard to come by or novel.

2) A dog fixes upon a rational course of action by employing processes that have in the past reliably lead to successful (or fitness maximising) actions. Such processes include the use of heuristics. Or, if processes that have in the past reliably lead to fitness maximising actions fail in a novel, a rational course of action is one which is adaptive in this novel situation.

As my answer to question 2) illustrates, my theory of rationality in the non-human animal is partly reliabilist. Reliabilism about rationality stands in stark contrast to internalist theories of rationality. First, as a reliabilist account of rationality, this paper argues that the non-human animal, such as the domesticated dog, fixes upon a rational course of action by using processes and methods that reliably lead to successful outcomes unless the situation is novel in which case the rational course of action is one which is adaptive. Second, this account implies externalism about mental states and naturally falls out of

the embodied cognition approach. An agent decides upon rational actions by using processes that have in the past worked reliably. The second claim, that reliabilism about rationality ties us to externalism about rationality is the claim that the agent (human or non-human) need not be aware of the processes that lead to the rational action. So, for example, a Border collie need not be aware of how he comes to fix on the best action when faced with a flock of sheep to round up; they must simply be reliable processes that have worked for him in similar past situations. In the following, I will show how the account of rationality that I advocate can be formulated and how attributing rationality to non-human animals need not depend on the attribution of propositional attitudes.

I. WHY RATIONALITY DOES NOT NECESSARILY DEPEND UPON PROPOSITIONAL ATTITUDES

Zoologist Alex Kacelnik discusses the notion of rationality that depends on the agent being the bearer of propositional attitudes. This conception of rationality, he calls PP-rationality. PP-rationality requires beliefs or actions to be adopted based on internal reasoning processes. It is a very human centred way to conceive of rationality, with a focus on '*process*, not on outcome' [Kacelnik (2006) p. 89]. A belief or action is rational depending on the internal reasoning processes behind it. This is a commonly held view of rationality and it depends upon the agent being the bearer of propositional attitudes with conceptual content. Representations within this view are the types of things that can constitute propositional attitudes. They are abstracted from the situation (in most cases) and can be combined and recombined to form different conceptual contents. Much in the same way as an X or a Y can be used in a logical proof. This view of rationality is internalist in the sense that the focus is on internal processes within the agent's head. Whether or not an action or belief is rational depends upon facts that are 'internal' to the agent: the internal mental states that the agent has at a particular time determines what course of action is rational for him at that time. On this view, our assessment of a subject's rationality depends upon which propositional attitudes they based their action on. Which propositional attitudes a subject has based their action upon is a difficult thing to determine with any animal, human or non-human that lacks reasonable language skills with which to express inner thoughts and beliefs. Furthermore, even *with* a reasonable set of language skills, we may not be aware of attitudes such as beliefs and desires that justify our actions. To illustrate, Kacelnik gives this example: a chess master is aware of only a fraction of the possible moves available to her at any given point, she does not go through a process of assessing all her relevant beliefs and desires when fixing on the best move for her to make.

Consider also driving; many of our actions behind the wheel are not caused by a process whereby we assess all our beliefs about the situation (although some beliefs that we are not aware of may influence our decisions to an extent). Rather, the actions we perform to enable us to drive a car successfully, and the move that chess master makes to her advantage are more likely caused by the use of mental heuristics not an internal assessment of particular propositional attitudes about the current situation.

Heuristics are strategies for making decisions and solving problems. They allow for fast, efficient, online decision making and are behind much of what we consider to be rational behaviour. Simon Herbert's (1957) research was highly suggestive of the conclusion that humans in general actually have a very limited capacity to weigh up possible courses of action and process information in the face of many possible alternatives. Instead, he remarked that humans 'use simple strategies in decision making that focus on only a few facets of available options' [Herbert (1957) as cited in Weiten (2001), p. 327]. Therefore, it seems much more likely that rather than examining all their beliefs about the next possible move, the chess master and the driver use methods such as heuristics to decide on the best course of action. The heuristics used to come to the decision will be ones that have proved reliable in the past in relevantly similar situations. Thus, PP-rationality alone doesn't seem to furnish us with the best account of the rational processes behind an agent's course of action when interacting with the environment. But can we claim that using heuristics is a rational process? In fact, we can. The actions which are produced by heuristics count as rational processes since their use reliably facilitates the agent's success and/or survival in the right situations.[1]

This point applies to rationality in non-human animals as well as humans, as Susan Hurley wrote 'if domain-general reasoning [reasoning by the evaluation of propositional attitudes] is too restrictive as a conception of process rationality in the human case, then it shouldn't be required for process rationality in animals either' [Hurley (2006), p.13].

II. RATIONALITY AND RELIABILISM

At the heart of Hurley's remark, is the idea that rational processes are those cognitive processes which reliably result in behaviour that contributes to an agent's success in his or her environment. This conception of rationality is better suited to explanations of human and non-human rationality. What Kacelnik terms PP-rationality (the formulation of rational processes that traditional cognitive science tends to leave us with) is too restrictive to be applicable to human beings let alone non-human animals, so we are better off adopting a more liberal view of rational processes.

Of course, by adopting a more liberal account of rational processes I am not suggesting that there is no place whatsoever for an internalist account of rationality, akin to Kacelnik's PP-rationality. With human beings, we can incorporate both in some situations. Clearly, there may be times when an agent is both acting upon processes that have been successfully applied to a similar situation in the past, and upon assessments of her beliefs about the situation at hand. My argument is that we ought not to restrict our notion of rationality to an internalist, propositional attitude based account of rationality for it is too restrictive.

On a terminological note, sometimes the focus in discussions of rationality is on what makes an agent's behaviour rational. At other times, the focus is on what makes the processes behind behaviour rational. In the former dialogues rationality can be classed as behavioural rationality. In the latter, rationality can be classed as process rationality. Hurley above couches her remarks about rationality in terms of process rationality.
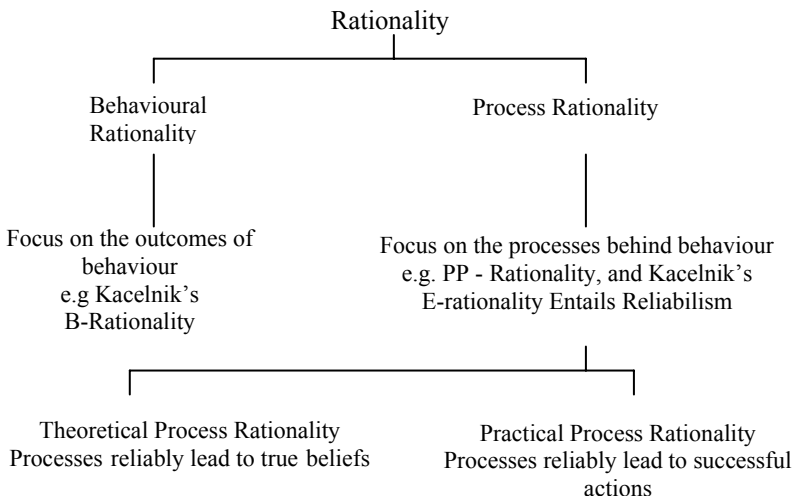
III. BEHAVIOURAL RATIONALITY AND PROCESS RATIONALITY IN THE DOMESTICATED DOG

An example of behavioural rationality is often adopted by economists. On this approach an agent engages in rational behaviour when he or she behaves in such a way that her actions lead to the accomplishment of a desired goal. That is, an action is rational whenever it is characterised by patterns of behaviour that result in those outcomes most beneficial to the agent. This is classical behavioural rationality. Game Theory is based on this conception: rationality as behaviour patterns which maximise utility for the agent. The focus in classical behavioural rationality is on the outcomes of behaviour rather than the processes behind them In his chapter in *Rational Animals*, Kacelnik discusses this version of behavioural rationality under the heading E-rationality. E-rationality claims that patterns of actions are rational when they maximise the expected utility for the agent.

An alternative example of behavioural rationality is Kacelnik's notion of B-rationality. B-rational behaviour maximises fitness 'across a set of evolutionarily relevant circumstances' [Hurley (2006), p. 22]. The focus in B-rationality, as with E-rationality, is on the outcome of behaviour rather than the processes behind behaviour. What makes an agent's behaviour rational is, for Kacelnik, determined by the outcomes of the behaviour (whether the behaviour maximises fitness) not the processes that guide it.

Recall that process rationality is concerned not so much with outcomes of behaviour but with how an agent comes to select the method by which she will achieve her goal. Rational processes must be reliable in order to count as rational. That is, they must lead to the right results reliably. It cannot be mere

coincidence that the method used to achieve a goal worked. Therefore, any theory of rationality that couches rationality in terms of process rationality must also be reliabilist. In the literature surrounding process rationality, there are two types of process rationality: theoretical and practical (process) rationality. In practical process rationality, rational processes reliably lead to the agent choosing an action which will achieve his or her goals. Theoretical process rationality stipulates that the rational process reliably leads to true beliefs. In summary, rational processes are those which reliably lead to the selection of an action which will achieve the agent's ends. The behaviours that the processes lead to are rational precisely because they stem from a rational process. The following diagram briefly sums up the different types of rationality which I have discussed above.

Rationality

Behavioural
Rationality

Process Rationality

Focus on the outcomes of
behaviour
e.g Kacelnik's
B-Rationality

Focus on the processes behind behaviour
e.g. PP - Rationality, and Kacelnik's
E-rationality Entails Reliabilism

Theoretical Process Rationality
Processes reliably lead to true beliefs

Practical Process Rationality
Processes reliably lead to successful
actions

To recap, the previous discussion highlights a distinction between rational behaviour and rational processes. Rational processes are those processes that reliably lead to rational behaviour. A rational process is a process that has reliably worked in the past to produce actions which maximise an agent's adaptive fitness. A rational action is one which enables the agent to successfully adapt to the environment at times even when relevant environmental information is hard to come by or costly. Thus there is a distinction between behavioural rationality (rational actions) and process rationality (rational processes). When Kacelnik discusses PP-rationality, he is talking about a type of process rationality: that is, he is discussing traditional cognitive science's answer to 'how does an agent come to perform rational

actions?' When Hurley talks about heuristics, she is also talking about process rationality: how the agent comes to, or fixes on rational actions.

As mentioned above, I will not argue for either adopting a process rationality approach, or a behavioural rationality approach. This is because the two are not mutually exclusive. Both behavioural and process rationality can work together for a formulation of rationality in the human and non-human animal. In the following, I explain why this is the case.

In Kacelnik's account of B-rationality, there is the thought that it is evolution which furnishes the agent with a repertoire of rational behaviours, behaviours that maximise fitness for the animal agent. This, however, is problematic because evolution can only do so much for an animal agent faced with environmental and social challenges. For example, evolution has provided the dog with a fixed set of epistemic capacities, but over the course of the dog's life, there will be novel tasks or situations that require him to flexibly adapt: circumstances that evolution has not kitted him out for. The degree to which a dog must possess cognitive plasticity (be adaptive and flexible in his behaviour) depends on the varieties of challenges that he is likely to encounter in his environment.

On this point, Kim Sterelny writes 'animal agents would be rational [by Kacelnik's B-rationality theory] to the extent that their capacity to choose the optimal action in their situation was not subverted by constraints on their capacity to access and use the information. So understood, rationality would be an aspect of optimal design' [Sterelny (2006), p. 302]. And I agree, because Kacelnik's conception of rationality does not take into account the times in which an animal must adapt to circumstances on the fly, his theory of B-rationality is limited and only applicable to those encounters with the environment which his ancestors have encountered frequently and where relevant information is not hidden from the animal. Thus, there will be times when behaviours which have in the past been successful, will not be applicable to the situation at hand. In these cases, the rational course of action is one which is adaptive in this novel situation.

Rationality, I argue, ought to be grounded not just in processes that have in the past been successful for a non-human animal, but also within the plasticity of an agent's cognitive processes that enable him to successfully adapt to the environment at times when crucial information is difficult to obtain and an agent must, if it is to be successful, think on his feet. In other words, we ought to partly tie our conception of rationality to the idea that rationality is grounded in the flexibility of an agent's cognitive processes that enable him to successfully adapt to the environment at times when relevant environmental information is hard to come by or costly. Rational behaviour can result from these flexible cognitive processes when it maximises his adaptive fitness.

In summary, rationality for the non-human animal is behaviour which maximises the non-human animal agent's chances of success in his or her environment. This behaviour can be the result of flexible cognitive processes or the result of reliable processes which have in the past been successful. For those like me who adopt embodied cognition, the environment plays an active role in shaping an agent's cognitive processes. On Hurley and Kacelnik's account, cognitive processes that reliably lead to fitness maximising behaviour are rational processes and are predetermined by evolution. But as argued in the previous section, this conception of rational processes is as limited as if we were to accept only the internalist version (I.e. Kacelnik's PP-rationality).

The environment, the non-neural body and the brain all interact to produce reliable cognitive processes that inform rational action. Constantly, relevant aspects of the environment affect the agent's behaviour and brain and vice versa in a continuous feedback loop. Because of these interactions with the environment, there is also a great degree of plasticity in an agent's cognitive processes. Once we recognise the large part that the environment plays in shaping an agent's cognitive processes we can recognise that there is some degree of cognitive flexibility available to every agent interacting in the world. It is this cognitive flexibility that facilitates successful (fitness maximising) behaviour even in novel and/or hostile environments for which evolution cannot have kitted out the agent. Thus rational behaviour in novel situations can arise from these flexible cognitive processes. This thought is at the heart of John Haugeland's remark:

> A sophisticated system (organism) designed (evolved) to maximise some end (such as survival) must in general adjust its behaviour to specific features, structures, or configurations of its environment in ways that could not have been fully prearranged in its design [Haugeland as cited in Clark (2008), p. 150].

IV. CONCLUSION

Thus, taking an embodied approach to the study of non-human animal cognition allows us to see more clearly how rationality might be more liberally characterised to include the notions that rational behaviours result from reliable processes and that rationality can also be grounded in the flexibility of an agent's cognitive processes which enable him to successfully adapt to the environment at times when relevant environmental information is hard to come by or costly. I began this chapter with two questions:

1) Given our embodied cognition approach, under what conditions are the dog's actions rational?

    2) And 2) how does the dog fix upon rational course of action?

I then stated that I would answer them thus:

    1) A dog's actions are rational (it makes sense to perform them in a particular circumstance) when they enable him to successfully adapt to the environment at times when relevant environmental information is absent or hard to come by, or when the situation is novel.

    2) The dog decides upon a rational course of action by employing processes that have in the past proved reliable in leading to successful and/or fitness maximising) behaviours in the current situation. Or, if processes that have in the past reliably lead to fitness maximising actions fail in a novel, a rational course of action is one which is adaptive in this novel situation.

Answer 1) gives an account of behavioural rationality. That is, it states under what conditions are a dog's behaviours rational. Answer 2) then claims that rational processes are those that reliably produce successful behaviour in the current situation. Or are those adaptive behaviours which arise from flexible cognitive processing in novel situations. Rational behaviour doesn't necessarily depend upon internalist, propositional attitude dependent cognitive processing.

    The conception of rationality which I have argued for above applies to both human and non-human animals. One of its strongest features is that it can cope with situation specific type of rationality that dogs and other non-human animals display. For example, a primate might behave in particular ways in certain contexts that she cannot generalize to logically similar contexts. Hurley asks us to suppose a monkey observes that another fellow monkey 'a' is dominant over monkey 'b'. She also recognises that 'b' is dominant over 'c'. Although she has never observed 'a' and 'c' together, she can realise that 'a' is dominant over 'c' and is able to use this information towards various ends [Hurley (2006)]. The ability to reason in this way in such a situation may not be generalisable, however. For the monkey, while able to make transitive inferences in this context may not be able to in a foraging situation [Hurley (2006), p. 150]. In other words, practical knowledge of how to complete tasks may be tied to specific situations. It is likely that the domestic dog occupies islands of practical rationality. For this reason, it is important that our notion of non-human animal rationality incorporates this. We should expect rational actions and the rational processes by which the dog fixes upon the rational action to be tied to specific situations and not generalisable. For example, the processes that reliably lead to a dog's success in a training task (such as coming back to a call) may not work when the situation is altered but the task has remained the same.

In conclusion, I have argued that we ought to be more liberal in our accounts of rationality and accept that rational processes are flexible and adaptive cognitive processes. They can also be those that reliably lead to rational behaviour in the agent's environment. In short, rational behaviour in the non-human animal is behaviour that maximises fitness or is successful in achieving the agent's goals.*

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NOTES

[1] The use of heuristics as rational processes has been somewhat controversial. Heuristics do not always cause rational behaviour in other situations. They are very situation specific. This is why a heuristic when used in its appropriate setting counts as a rational process. When used in a non relevant situation, it is not a rational process.

REFERENCES

ALLEN, C., & HAUSER, M.D. (1991), 'Concept Attribution in Nonhuman Animals: Theoretical and methodological problems in ascribing complex mental processes', *Philosophy of Science,* Vol. 58, (2), pp. 221-240.

CLARK, A. (2008), *Supersizing the Mind: Embodiment, Action and Cognitive Extension,* Oxford, Oxford University Press

CLARK, A. & CHALMERS, D. (1998), 'The Extended Mind', *Analysis*, Vol. 58 (1), pp. 7-19.

HURLEY, S. (2006), 'Making Sense of Animals', in Hurley, S. and Nudds, M. (eds.), *Rational Animals?* Oxford, Oxford University Press, pp.139-175.

KACELNIK, A. (2006), 'Meanings of Rationality', in Hurley, S. and Nudds, M. (eds.), *Rational Animals?* Oxford, Oxford University Press, pp.87-107.

MIKLOSI, A. (2008), *Dog Behaviour*, *Evolution and Cognition*, Oxford, Oxford University Press

STERELNY, K. (2006), 'Folk Logic and Animal Rationality', in Hurley, S. and Nudds, M. (eds.), *Rational Animals?* Oxford, Oxford University Press, pp. 293-313.

WEITEN, W. (2001), *Psychology, Themes and Variations*, Fifth Edition, Belmont, Wadsworth/Thomson Learning.