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Title: Animal Ethics and Behavioral Science: An Overdue Discussion?

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2 **Abstract.** Animal ethics—the field of philosophy concerned with the moral status of animals—is  
3 experiencing a momentum unprecedented in its history. Surprisingly, animal behavior science  
4 remains on the sidelines, despite producing critical evidence on which many arguments in animal  
5 ethics rest. Here we explore the origins of the divide between animal behavior science and  
6 animal ethics, before considering whether behavioral scientists should concern themselves with  
7 it. We finally envision tangible steps that could be taken to bridge the gap, encouraging scientists  
8 to be aware of, and to more actively engage with, an ethical revolution that is partly fueled by the  
9 evidence they generate.

10 **Keywords**

11 animal behavior, behavioral biology, animal ethics, animal welfare

12           The moral status of animals is a longstanding question dating back at least to Aristotelian  
13 philosophy (see Regan & Singer, 1989 for an overview of historical and contemporary writings  
14 on the topic). However, it has been brought into especially acute focus in recent decades. The  
15 modern development of the animal ethics debate is fueled by many factors—among them, novel  
16 scientific insights into the complexities of animal minds and emotions (Bekoff & Pierce, 2017);  
17 the ever-increasing scale of industrial farming (Harrison, 2013/1964); and the Anthropocene, an  
18 era heralded by unprecedented human-induced changes to the earth’s climate, environments, and  
19 resident wildlife (Ceballos et al., 2015). The cumulative impact of these trends has raised the  
20 urgency of moral concerns over the nature of human-animal relationships, particularly in the  
21 context of our use, overuse, and misuse of animals. The exploitation of animals for food and  
22 other products represents just part of the prevailing narrative: a major shift is taking place in how  
23 people view the role of animals in research, entertainment, and even companionship. This turn  
24 was detectable in early publications like Ryder's (1975) *Victims of Science* and Singer's (1975)  
25 seminal *Animal Liberation*, and later built upon by those of other scholars (e.g., Donaldson &  
26 Kymlicka, 2011; Francione, 1995; Jamieson, 2002; Korsgaard, 2018; Nussbaum, 2018; Regan,  
27 1983; Rollin, 1992; see also Armstrong & Botzler, 2017 for a comprehensive anthology of  
28 readings on animal ethics). The last two decades have witnessed an exponential increase in  
29 literature and journals focusing on animal ethics—the field of philosophy concerned with the  
30 moral status of animals (Figure 1).

31           This transition in ethical thinking about animals has been, at least in part, driven forward  
32 by evolutionary theory and discoveries made in the behavioral sciences. Darwin’s theory of  
33 evolution by natural selection offered a new and powerful challenge to the anthropocentric  
34 assumption that humans are the pinnacle of creation—an assumption central to many historically  
35 and presently influential theological conceptions of the world (Rachels, 1990). As the earlier  
36 scientific revolution guiding human understanding of the natural order showed that the earth is  
37 not the center of the cosmos, this revolution more dramatically levelled human ontological status  
38 by insisting that humans are one of a countless variety of other animals. The disintegration of our  
39 pre-Darwinian understanding of nature, coupled today with the extent of anthropogenic changes  
40 faced by the environment and animals in the industrial world, has revealed deep-seated  
41 incompatibilities between dominant frameworks of value (still rooted in a pervasive sense of  
42 human superiority) and the current state of knowledge regarding the capacities of other species

43 and their vulnerability to human actions (e.g., Bekoff & Pierce, 2017; Jones, 2013; Rachels,  
44 1990).

45         Recent progress in scientific research on animal behavior has provided evidence used by  
46 animal ethics by documenting previously unknown aspects of animal life that have fundamental  
47 ethical implications. Studies on the cognitive, emotional, and social capacities of other species  
48 have discredited long-held assumptions about capacities thought to be unique to humans. Non-  
49 exclusively, this list includes the design and use of tools (Sanz, Call, & Boesch, 2013); the  
50 prevalence of animal cultures (Laland & Bennett, 2009) and the capacity to innovate (Reader,  
51 Morand-Ferron, & Flynn, 2016); the complexity and efficiency of animal vocal communication,  
52 including symbolic communication (Seyfarth, Cheney, & Marler, 1980) and forms of  
53 protosyntaxes (Ouattara, Lemasson, & Zuberbühler, 2009); the capacity for self-awareness  
54 (Gallup, Anderson, & Shillito, 2002), mental time-travel (Raby, Alexis, Dickinson, & Clayton,  
55 2007), and a wide range of emotional experiences, including joy and grief (de Waal, 2019);  
56 reports of complex forms of consciousness such as empathy (de Waal & Preston, 2017), and of  
57 social intelligence such as the formation of reciprocal alliances and the active management of  
58 long-term social relationships (Cheney & Seyfarth, 2007), systems of conflict resolution (Aureli  
59 & de Waal, 2000), and the ability to impute mental states to others (Call & Tomasello, 2008),  
60 including the strategic adjustment of one’s own knowledge of what others know (Emery &  
61 Clayton, 2001). These findings have all blurred traditional divisions structuring historical  
62 discussions of human uniqueness—including the opposition between nature and culture, between  
63 animal objects and human subjects, and between instinctive and rational actions—consequently  
64 casting doubt on the anthropocentrism that has largely dominated the history of ethics as a field  
65 of philosophical inquiry.

66         Alternative systems of ethical values developed in contemporary animal ethics often rely  
67 on empirical evidence to demonstrate the possession (or lack thereof) by a non-human individual  
68 of the relevant attribute conferring moral consideration (Allen, 2006). The main theories in  
69 animal ethics are pathocentric (i.e., centered on sentience and the capacity to suffer) and  
70 therefore hinge on empirical knowledge documenting the sentience of animals—such as recent  
71 work demonstrating that fish feel pain (Brown, 2015). In addition, perceptions of animals as  
72 “subjects-of-a-life” are central to the deontological approach to animal ethics developed by Tom  
73 Regan that has also formed a critical part of the legal case for animal rights (Regan, 1983).

74 Studies revealing the existence of personalities (Sih, Bell, & Johnson, 2004), episodic memory  
75 (Clayton, Griffiths, Emery, & Dickinson, 2001), intentionality (Allen & Bekoff, 1995), and  
76 rationality (Hurley & Nudds, 2006) have thus been instrumental in revealing that animals have a  
77 subjective life, personal history, interests, and goal-oriented agency (Jones, 2013). Taken  
78 together, this constellation of results from scientific research on animals has paved the way to  
79 changed (and changing) perspectives on the moral status of animals.

80 Despite these critical contributions to animal ethics, animal behavior sciences like  
81 ethology, behavioral ecology, and comparative psychology have played a rather passive role in  
82 the progression and expansion of this movement. In other words, though animal behavior  
83 scientists' work has been integral, it is non-scientists who have primarily pioneered the  
84 integration of science and ethics. Here, we advance the argument that if the ethics of human-  
85 animal relationships are to be redefined, then more active participation on the part of animal  
86 behavior scientists has great potential—not just for moving animal ethics debates forward, but  
87 for scientists themselves. To be clear, in attempting to bridge the study of animal behavior and  
88 animal ethics, we are not just referring to the ethics of using animals in behavioral sciences—  
89 which have already been the focus of thorough reviews (see Text Box 1). Further, although the  
90 scientific literature has recently highlighted how animal behavioral sciences can inform animal  
91 conservation (e.g., Caro, 2007; Greggor et al., 2016) and animal welfare science (e.g., Dawkins,  
92 2006; Fraser, 1999), it has not yet extended to engage with the full realm of issues debated in  
93 animal ethics, which include questions about the fundamental ground of moral status. Our  
94 primary purpose in this article is to make that extension by addressing three key questions: What  
95 are the primary reasons for a gap between animal behavior science and animal ethics? Should  
96 behavioral scientists feel concerned about this growing disconnect? And how could they more  
97 actively contribute to the development of animal ethics?

98

### 99 **Why the gap?**

100 A primary reason for a frequent lack of communication between animal ethicists and behavioral  
101 scientists may reflect traditional difficulties in crossing disciplinary boundaries. Contemporary  
102 scientific culture remains largely disconnected from philosophy, which—unfortunately in our  
103 view—is not part of the regular academic training received by scientists; as a result, scientists  
104 may not be motivated or prepared to engage in broad ethical discussions that directly pertain to

105 their scientific practice or results. The persistence of a gap is exacerbated institutionally by a lack  
106 of educational and career development opportunities that cross-over between behavioral science  
107 and philosophy. But it is also caused by fundamentally different theoretical and methodological  
108 orientations. Science aims to discover causal relationships between states of affairs and  
109 phenomena in the physical world, while ethics is an explicitly value-laden, normative field of  
110 inquiry that aims to defend our best judgments as to what we ought to do. We are not here  
111 proposing a solution to the “fact/value” relationship or to the problem of whether there are  
112 normative facts and how they might “fit” into nature, but rather proposing that differences in the  
113 basic questions and methods of scientists and ethicists underlie a prevalent, but divisive attitude  
114 that science is rigorous and “objective” while ethical theorizing is more “subjective.”  
115 Acquainting scientists with rigorous debate in normative ethics and ethical theory, as well as  
116 pointing them to the ways in which scientific research can be enmeshed within the values of the  
117 particular times and places in which it is carried out (Kincaid, Dupré, & Wylie, 2007), may help  
118 emphasize the benefits of interdisciplinary dialogue and research into the complex historical and  
119 logical relationship between science and ethics. Greater awareness of the various conceptual and  
120 normative assumptions that may come along with different conceptual frameworks can only  
121 improve the quality of scientific thinking (Laplaine et al., 2019).

122         While scientists should all be aware of the spectrum of ethical discussions related to their  
123 daily scientific practice, they may sometimes fail to see that animal ethics is a broad and fast-  
124 growing area of philosophical inquiry and normative debate concerning the nature of human-  
125 animal relationships that is built on rational argumentation. It is important to realize that  
126 philosophers working on animal ethics may adopt a diversity of nuanced positions, and do not  
127 uniformly defend specific political or policy agendas. Scientists may sometimes lump the term  
128 “animal ethics” with other domains, in particular with the set of ethical regulations that rule their  
129 research activities (Text Box 1); with the emergence of animal welfare or conservation as  
130 scientific fields using research to assess and improve the animal condition; or even with the  
131 activism incited by animal rights associations. Conversely, while ethicists may be more aware of  
132 scientists’ work than the reverse, they may not be up-to-date with the most current research and  
133 debates in the field. Nor do ethicists necessarily have experience rigorously observing animal  
134 behavior. Disciplinary segregations between animal welfare scientists, conservation biologists,  
135 and (some) animal ethicists are particularly telling examples of the oddity that the divide

136 between these so-called “two cultures” persists even in the context of obviously shared ethical  
137 concerns (Fraser, 1999). While the integration of normative and empirical approaches to animal  
138 welfare and conservation sciences have eventually gained advocates (i.e., welfare: Dawkins,  
139 2006; Fraser, 1999; Würbel, 2009; conservation: Ramp & Bekoff, 2015), scientific discussions  
140 of ethical issues have focused on a rather specific set of questions with limited attention to  
141 foundational reflection on ethical frameworks and on how normative and empirical approaches  
142 relate (Dawkins, 2006).

143         The gap between ethicists and behavioral scientists has further been maintained by  
144 mutual defiance and skepticism. If and how animals should be used in science has been a core  
145 question of animal ethics since its inception, and behavioral research has immediately been the  
146 focus of severe criticism for conducting painful and unnecessary experiments (Ryder, 1975;  
147 Singer, 1975). Ethicists subsequently became suspicious towards, or dismissive of, any scientific  
148 procedure involving animals to study their behavior (Fraser, 1999). Meanwhile, animal behavior  
149 scientists naturally feared condemnation surrounding their research, and may have perceived the  
150 gradual development of ethical regulations on the use of animals in research (Text Box 1) as an  
151 extra source of constraints and bureaucracy in their work. This divide has likely been furthered  
152 by several aspects of the predominant disciplinary culture of animal behavior. Many animal  
153 behavior researchers have traditionally adopted the attitude of stifling empathy towards their  
154 study subjects in the interest of preserving scientific objectivity and avoiding behavioral  
155 interferences with the study subject (Kennedy, 1992). Such detachment in the name of  
156 objectivity may have contributed to the notion that an ethical sensibility towards subjects of  
157 research is “unscientific” and “subjective,” and may still prevent many researchers from  
158 perceiving open engagement with current debates in animal ethics as an integral part of, or at  
159 least as compatible with, scientific thinking and practice.

160         New points of tension have arisen in the course of contemporary discussions in animal  
161 ethics, which have for the most part been dominated by two competing approaches: utilitarian  
162 welfare-based and deontological rights-based approaches. Whereas both approaches share the  
163 idea that animal welfare is worthy of protection for its own sake and not for the sake of humans,  
164 the welfare approach insists that moral duties related to the humane treatment of animals come  
165 from animals’ capacity to feel pain and pleasure. It stems from a utilitarian and consequentialist  
166 approach to animal ethics, according to which the aggregate benefits of any intervention into



167 animal lives must exceed any harmful costs (Singer, 1975). In contrast, theories of animal rights  
168 are based in deontological ethics, pursuant to which duties to animals come from the respect that  
169 they deserve as agents with their own unique interests, aims, and goals. Theorists in this school  
170 consider animals' lives to be intrinsically valuable and propose to grant them basic rights—such  
171 as the right to life, freedom, and not to be tortured—to prevent them from being treated as “mere  
172 means” such that their interests are sacrificed to human interests (Donaldson & Kymlicka, 2011;  
173 Francione, 1995; Regan, 1983). This generates a critical tension with welfare approaches,  
174 according to which animals retain an instrumental value in situations in which benefits (to the  
175 human community) might outweigh harm (to the animals). It is clear that when animal scientists  
176 do engage with ethical debates, the prevailing utilitarian, welfare-based approach is often  
177 adopted by default, probably due—at least in part—to the use of animals in scientific research.  
178 However, many ethicists have instead favored theories of animal rights (Donaldson & Kymlicka,  
179 2011), though they have not uniformly condemned the use of animals in research within this  
180 framework. Thus, although the practical implications of such divergences in underlying ethical  
181 theory may be profound, rights-based theories do not necessarily exclude the possibility of  
182 research on animals. For example, just as human volunteers can participate in scientific  
183 experiments, it may be possible to envision a research protocol that respects the dissent of a non-  
184 human subject (e.g., Fenton, 2014), especially in behavioral research where experiments can be  
185 designed in which animals are free to participate.

186

### 187 **Should animal behavior scientists concern themselves with animal ethics?**

188 A greater integration between animal ethics and the animal behavior scientific community is  
189 desirable for ethical and pragmatic reasons. Foremost, there is an ethical reason in that scientists  
190 fulfill a social responsibility when they engage with and help others understand ethical  
191 implications of research. Yet there are also pragmatic benefits for science, including helping  
192 scientists examine sources of historical and cultural bias that may limit scientific questions and  
193 approaches, and so further enrich and broaden scientific understanding. Some of these benefits  
194 may admittedly arise from interactions with philosophical discussions about the nature of  
195 animals that are broader than animal ethics, for example philosophical work on animal minds,  
196 perception and representation, social learning and culture, altruism and cooperation, and  
197 rationality (Andrews, 2015; Andrews & Beck, 2018). Nonetheless, the recent renewal of the

198 philosophy of animals as a sub-field within the philosophy of science has played and continues  
199 to play a major role in the expansion of animal ethics insofar as it has also challenged  
200 anthropocentric approaches that have dominated classical philosophy. While the recognition of  
201 animal consciousness and subjectivity is growing, it is not unanimous in philosophy (*cf*  
202 Carruthers, 2000 and Tye, 2016, for instance). These important debates that are relevant to  
203 animal ethics, but are also broader, draw on and require science and should, therefore, be  
204 inspiring to animal scientists as well.

205

206 *Filling our social responsibility.* Many scientists are naturally interested in how their results  
207 inform and inspire societal debates—one obvious reason for animal behavioral scientists to  
208 engage with the literature on animal ethics. In addition to this natural curiosity, and despite  
209 commonly holding the view that scientific findings have no intrinsic normative value, scientists  
210 still usually support ideas of moral progress that follow from scientific progress in our rational  
211 understanding of the natural world. For example, where progress in understanding the neurologic  
212 development of infants uncovered the capacity for pain (Anand & Hickey, 1987), it became an  
213 ethical duty for scientists to advocate against neonatal surgeries without anesthesia. The parallels  
214 to our understanding of animal pain are obvious, and scientists could play an important role in  
215 advocating against farming or research practices that involve suffering in the form of pain as  
216 well. More generally, ethics makes a claim on scientists to engage with public debates on ethical  
217 issues that are related to their scientific activities (and sometimes even raised by their results)  
218 (Pain, 2013; Siekevitz, 1970). At a time when researchers in science and technology are often  
219 consulted to set the direction and values of society, and often occupy leadership roles on  
220 decision-making bodies, this obligation must increasingly be emphasized. For example, a  
221 communication from Mark S. Frankel, director of the Scientific Responsibility, Human Rights,  
222 and Law Program at the American Association for the Advancement of Science (AAAS), argues  
223 that students and scientists should put less emphasis on their internal responsibility regarding  
224 how research should be conducted, and more on their external responsibility by being “vitality  
225 concerned” with the influence that their work and knowledge can have on society (Pain, 2013).  
226 Scientists are increasingly required to justify the benefits of their research to society—this is  
227 notably the case for individual applications to research positions or funding, as well as for  
228 research evaluations at the institutional level—and growing debates on animal moral status spark

229 public interest in animal behavior science. In this context, active engagement with animal ethics  
230 could translate to a new and promising applied dimension of scientists' work—one that is both  
231 instrumentally beneficial and aligned with social responsibilities.

232

233 *Opening the “black box” of animal minds.* Following the vast accumulation of knowledge on  
234 animal behavior, scientists are faced with new questions about the nature of animal minds, a  
235 crucial topic also at the center of philosophical debate today (Andrews, 2015; Andrews & Beck,  
236 2018; Lurz, 2009). Nonetheless, the lingering conviction that animal mental states are  
237 unknowable—a “black box” that is inaccessible to science—or irrelevant to the explanation of  
238 behavior (e.g., Dawkins, 2015) has limited scientifically-informed ethical reasoning about  
239 animals. For example, Griffin's (1998) call to bring the study of consciousness to the fore of  
240 ethology nearly two decades ago is continually met with considerable resistance (for a historical  
241 overview on cognitive ethology, see: Allen & Bekoff, 2007), and some contemporary scientists  
242 deny that documenting the degree of animal consciousness is useful in the science of  
243 comparative cognition (Shettleworth, 2010). In addition to this fundamental debate on whether  
244 animal consciousness can and should be studied by scientists, some major explanatory  
245 frameworks in animal behavior science have downplayed the explanatory significance of animal  
246 mental and emotional lives. In particular, behavioral ecologists are traditionally trained to focus  
247 on the adaptive value of a trait, favoring ultimate over proximate explanations for behavior. As  
248 one example, infanticide is often framed exclusively in terms of evolutionary costs/benefits,  
249 rather than any underlying emotion or proximate motivation (e.g., see van Schaik & Janson,  
250 2009). Although these functional evolutionary explanations are valuable in their own right, they  
251 offer only a very limited view of animal emotions, capabilities, and agency, and little to no  
252 insight into perceptions, intentionality, rationality, or consciousness residing “inside” of animal  
253 minds. This poses a deeper, more fundamental epistemological problem in the sense that  
254 building a whole field of scientific inquiry around what is currently a “black box” inherently  
255 hampers ultimate explanatory and predictive efforts. This shortcoming in turn reveals how  
256 explanatory frameworks in the behavioral sciences can quickly overlook or render invisible the  
257 very “object” of moral concern—the organism itself as a potentially sentient entity that can be  
258 benefited or harmed—or, at the very least, relegate the organism to secondary status (Walsh,  
259 2015).

260           The language that animal behavior scientists habitually employ reflects this deeply  
261 entrenched practice (Crist, 1999). Reducing animal behavior to mechanistic, causal descriptions  
262 has reinforced the view of animals as “mere” objects or “vehicles” of their genes and  
263 environment, preempting any inferences to their mental life or agency (it is noteworthy that in  
264 the writings of early naturalists such as Darwin, animals were commonly portrayed as  
265 individuals with an array of meaningful subjective experiences and aims). For example, scientists  
266 have traditionally used terms such as “innate releasing mechanism” while habitually relegating  
267 complex behavioral phenomena—usually those linked with cognitive or affective capacities—to  
268 more “parsimonious” explanations, further distancing themselves from the animals they study.  
269 However, this presupposes that such technical, parsimonious descriptions are also unbiased, and  
270 it would behoove scientists to realize that the theoretical language they employ is built on an  
271 inherently skeptical bias towards animal subjective and agential traits. The animal ethics  
272 literature, which puts animal subjectivity and agency at the heart of its argumentation, places an  
273 ethical urgency and burden of proof on mechanistic views of animal behavior in the behavioral  
274 sciences to show that animals are *not* sentient (Birch, 2017, 2018), and to develop more solid  
275 inferences about the existence and character of animal subjectivity (e.g., see Godfrey-Smith,  
276 2016; Smuts, 2001).

277  
278 *Questioning the anthropocentric legacy of behavioral studies.* The slow development of  
279 cognitive ethology is not merely a consequence of empirical limitations in accessing animal  
280 minds or a predominant focus on ultimate explanation in studies of animal behavior. The  
281 avoidance of attributing—or even studying—morally-relevant traits like agency, interests, or  
282 motivations and goals to non-human animals reflects a more pervasive bias, namely the  
283 perceived dangers of anthropomorphism (e.g., Wynne, 2004). In addition to shaping research  
284 questions, experimental settings and interpretations of results traditionally tend to disfavor  
285 anthropomorphic hypotheses, according to which similar mechanisms underlie the behavioral  
286 similarities observed between humans and non-humans. This occurs even when studying species  
287 that are closely related to us, a revelatory context regarding such a bias, referred to as  
288 “anthropodenial” by de Waal (1999). According to basic evolutionary principles, the most  
289 parsimonious explanation in such cases is the one assuming that similar processes in closely  
290 related species emerge from common ancestry (“phylogenetic parsimony”). A scenario in which

291 the evolution of distinct cognitive processes generates similar behavioral manifestations in  
292 closely related species is, in fact, improbable. It is also revealing to note that simple mechanistic  
293 explanations are generally favored over phylogenetic parsimony when discussing cognitive  
294 capacities, as opposed to physiological or anatomical traits, for which scientists have no problem  
295 invoking human-animal similarity (de Waal, 1999). This bias appears to be a direct, pervasive  
296 legacy of the famous Morgan's Canon proposed at the end of the 19th century, which states that:  
297 *'In no case may we interpret an action as the outcome of the exercise of a higher psychical*  
298 *faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the*  
299 *psychological scale'* (Morgan, 1894, p. 53). A large philosophical literature has recently  
300 accumulated around related methodological issues (Buckner, 2017; Fitzpatrick, 2008; Halina,  
301 2015; Keeley, 2004; Mikhalevich, 2014; Sober, 2012), and scientists can benefit from deeper  
302 reflection on any bias toward simplicity that is motivated by worries about the dangers of  
303 anthropomorphism.

304 Another upshot of this approach is that the threshold of evidence needed to provide  
305 support for a particular cognitive or emotional faculty in other species is much higher than in our  
306 own. For example, the definition of animal teaching initially proposed by Caro and Hauser  
307 (1992) has proven so strict that it would exclude many occurrences of human teaching as  
308 employed in common parlance (Laland & Hoppitt, 2003). This anthropocentric perspective has  
309 also figured prominently in debates about animal emotions (Bekoff, 2009; de Waal, 2019); it is  
310 not just a remnant of the behaviorist era but still alive today in the form of categorical rejections  
311 of anthropomorphism and anecdote. However, when the animal's perspective is carefully  
312 considered, anthropomorphic and anecdotal accounts have an important role to play in informing  
313 and inspiring rigorous science (Bates & Byrne, 2007; Burghardt, 1991; de Waal, 1999; Godfrey-  
314 Smith, 2016), particularly when it comes to animal mental capacities and emotions (Bekoff,  
315 2009). While this form of anthropocentric reductionism is very entrenched in the Western  
316 scientific culture in animal behavior, an independent academic tradition emerged in Japan, where  
317 anecdotes were valued, and where anthropomorphism was not considered a threat (Asquith,  
318 1996; de Waal, 2003). Despite intense criticisms by Western scientists, Japanese primatologists  
319 used individually-based observations—which are now the standard in ethological studies—and  
320 made fundamental discoveries in socio-ecology, such as the existence of tight family bonds  
321 structuring animal societies, and the diffusion of socially-learned behaviors throughout animal

322 groups, long before these questions crystallized interest in Western research (Asquith, 1996; de  
323 Waal, 2003). This example illustrates the potential benefits of raising scientists' awareness of the  
324 cultural and cognitive biases that may hamper progress in their discipline. And even though the  
325 fear of anthropomorphism may be less present in today's scientific culture than it used to be, the  
326 critical stance adopted by thinkers in animal ethics regarding anthropocentric values, combined  
327 with their fresh and attentive eye towards animal minds and subjectivity, encourages behavioral  
328 scientists who have not already done so to inspect the deeply entrenched sources of biases that  
329 inevitably affect their discipline.

330

331 *Enriching scientific practices.* A greater consideration of animal interests and subjectivity may  
332 be beneficial pragmatically by changing the way scientists ask questions, design protocols, and  
333 interpret animal reactions to experimental conditions. Integrating information about the first-  
334 person perspective of the animal is increasingly recognized as important in evolutionary  
335 modelling of the effects of natural selection on behavior (e.g., Akçay, Van Cleve, Feldman, &  
336 Roughgarden, 2009). When designing experiments, careful attention to the animal's perspective  
337 on a proposed task can reduce some biases—such as experimenter effects (Despret, 2015). For  
338 example, laboratory mice perceive gender of the experimenter and may consequently modify  
339 their behavioral response in an experiment, with male experimenters eliciting a greater stress  
340 response than females (Sorge et al., 2014). Along similar lines, earlier scholars appreciated that  
341 animals live in meaningful and complex worlds, and that adopting the animal's sensory  
342 perspective was a necessary precondition for the successful study of behavior (von Uexküll,  
343 1992/1957). In contrast, subsequent behavioral studies have sometimes failed to adopt such a  
344 perspective by designing studies linked to species-specific daily environmental challenges, and  
345 so are at risk of making erroneous inferences about animal capacities. For example, dogs were  
346 once thought to lack self-awareness due to their failure to pass the mirror self-recognition task,  
347 which is strongly biased towards visual species, but they were subsequently found to succeed in  
348 passing an “olfactory mirror” test (e.g., Gatti, 2016). The role of perspective-taking in animal  
349 behavior research is also central to the influential work of philosopher Merleau-Ponty (1998),  
350 who first established a link between animal behavior and phenomenology—which can arguably  
351 make a major contribution to both animal ethics (Painter & Lotz, 2007) and scientific research on  
352 animal behavior (Ruonakoski, 2007) by offering additional insights into animal subjectivity.

353 When it comes to studying animal behavior, Merleau-Ponty (1998) questions the behaviorist way  
354 of interpreting the scientist's role, requiring the scientist's detachment from the study subject.  
355 Rather than rejecting anthropomorphism and denying their own sensitivity towards the behavior  
356 of study subjects, scientists could acknowledge that human experience, careful observation, and  
357 even engaged interaction with animals are the only possible starting points for their  
358 investigations, because absolute detachment is impossible in practice (e.g., see Candea, 2010;  
359 Ruonakoski, 2007; Smuts, 2001).

360 An interdisciplinary dialogue between philosophers, ethicists, and scientists may promote  
361 changes in paradigms that could usefully complement traditional approaches and open  
362 productive, more holistic avenues to study and understand animal behavior without  
363 compromising scientific rigor. In particular, research in cognitive ethology on concepts rooted in  
364 classical, anthropocentric philosophy (e.g., self-awareness, empathy, free will, or culture) would  
365 benefit from such discussions, which may facilitate the establishment of more inclusive  
366 definitions (i.e., applicable to studying non-human animals) that retain theoretical and empirical  
367 traction. It would further encourage reflection on the most efficient research approaches and the  
368 criteria that would provide supporting evidence for the existence of such phenomena in other  
369 species. As one example, some philosophers reexamined the state of knowledge regarding  
370 behaviors long thought to be human-unique, such as the capacity to commit suicide (e.g., Peña-  
371 Guzmán, 2017), by lending more weight to animal subjectivity than many scientists traditionally  
372 have. These exercises illustrate the potential power of such interdisciplinary dialogues for  
373 enriching the perspectives of scientists working on animal behavior, while making them more  
374 aware of the fact that a collection of scientific observations can lead to divergent interpretative  
375 frameworks.

376 In sum, interactions between the science of animal behavior and animal ethics could have  
377 a greater and mutually beneficial scope, addressing questions about what animals are, how we  
378 should treat them, and how to envision potential futures for human-animal interactions. The  
379 possibility of such a productive exchange between science and philosophy has a strong precedent  
380 in the relationship between the science of ecology and environmental philosophy. By generating  
381 new scientific knowledge on the interconnectedness and dependence amongst various forms of  
382 life, the field of ecology has also influenced ethical thought. Though not uniformly defended by  
383 ethicists, ecology has led to calls to regard supra-individual processes, such as ecosystems

384 themselves, as intrinsically valuable and as objects of ethical concern—particularly concerning  
385 planetary health criteria grounded in the capacity to sustain and generate biodiversity. Just as in  
386 the case of animal behavior science and animal ethics, ecology too has been a source for  
387 combating anthropocentrism and generating a more balanced, indeed scientifically informed,  
388 worldview regarding the place of humans as one species embedded within deeply  
389 interconnected, interdependent living systems (Callicott, 1990).

390

### 391 **How can animal behavior scientists engage with philosophy and animal ethics?**

392 In turn, animal behavior scientists can contribute to animal ethics in various ways. Their  
393 potential contributions to animal ethics span the full spectrum of scientific activities—not only in  
394 offering original evidence that fuels theoretical progress in animal ethics, but shaping its  
395 practical applications, lending pertinent expertise, and communicating effectively with the wider  
396 public. There are, however, boundary conditions to what they can offer to ethicists; one  
397 prerequisite is that some research involving animals is tolerated—itself a source of disagreement  
398 even within the animal ethics community—provided that its costs are minimal and outweighed  
399 by clear benefits. As a result, behavioral scientists should carefully take ethical considerations  
400 into account when designing their research (Text Box 1).

401 *Foster productive interdisciplinary exchanges.* An essential first step in this integration could be  
402 for behavioral scientists to familiarize themselves with the field of animal ethics (Armstrong &  
403 Botzler, 2017 provide a comprehensive anthology of readings on animal ethics), which will also  
404 cultivate mutual respect and awareness across fields. However, at least to our knowledge, animal  
405 ethics, and philosophy more generally, are often absent from animal behavior educational  
406 programs and curricula. Reciprocally, academic departments in animal studies are typically  
407 housed in social science or humanities faculties, and often lack scientists. This structural  
408 separation limits cross-disciplinary exchanges, which could be encouraged by the development  
409 of joint teaching, reading groups, research programs, and conferences. Mutual engagement and  
410 integrative theory-building could be further fostered by hosting philosophers and ethicists in  
411 scientific labs and research groups. Further, several interdisciplinary journals now provide a  
412 forum wherein scholars across these disparate fields can comment on topics of mutual interest



413 ranging from animal emotions to the most sound approaches to animal protection legislation  
414 (e.g., see Birch, 2017 along with associated commentaries).

415         Upon gaining meaningful exposure to the basic purview of animal ethics, scientists of  
416 animal behavior can further update some of their conceptual frameworks and research practices  
417 (as elaborated in the previous section), which may simultaneously foster the endorsement of their  
418 findings by non-scientists pursuing related questions. Among the most notable successes in this  
419 regard is pioneering work in the area of compassionate conservation, which attempts to appease  
420 tensions between scientists who conventionally focus on species and populations and ethicists  
421 who typically focus on individuals (Ramp & Bekoff, 2015).

422

423 *Produce relevant original evidence.* As highlighted above, original evidence stemming from the  
424 natural course of animal behavior science has already played a role in inspiring important  
425 developments in animal philosophy. Of course, while detailed knowledge concerning the  
426 cognitive, affective, and social lives of animals can contribute to our understanding of what is  
427 “painful” to an animal, its degree of sentience and consciousness, the optimal environments in  
428 which it thrives, etc., it certainly cannot tell us what is right or wrong—the central concepts that  
429 structure ethical theory and practice. Nevertheless, biological knowledge on the natural behavior  
430 of different species, in relation to their phylogenetic position and ecology, can help in setting  
431 species-specific criteria for animal ethics agendas. It also has a hand in proposing modes of  
432 interactions with animals that are respectful of their physiology and psychology, consistent with  
433 a new theory of animal rights that borrows concepts from political philosophy (including  
434 citizenship or sovereignty) to envision a new legal frame applicable to the complexity and  
435 diversity of animal-human relationships (Donaldson & Kymlicka, 2011).

436         In addition, as has already occurred in conservation practice, there is growing pressure  
437 for policy decisions concerning animal ethics to be evidence-based, and animal behavior  
438 scientists are positioned to contribute data and knowledge that can, at a minimum, inform  
439 political decisions regarding the assignment of diverse taxonomic groupings to particular moral  
440 categories (Jones, 2013). The diversity of species that animal behavior scientists study—many of  
441 which are beneath the radar of philosophers in favor of a focus on higher vertebrates (with  
442 notable exceptions, e.g., Godfrey-Smith, 2016; Tye, 2016)—can raise new ethical concerns and  
443 priorities. For example, combined with novel insights on behavioral and cognitive complexity,

444 accumulating scientific evidence that fish feel pain has supported the argument that they be  
445 granted similar legal protections to other vertebrates (Brown, 2015). Similarly, legal personhood  
446 campaigns, generally devised to grant legal protections to large mammals, are contingent on  
447 evidence concerning capacities like self-awareness and autonomy (Andrews et al., 2018; Wise,  
448 2000). Thompson (2019) recently outlined how scientists' work could better position lawyers to  
449 build personhood cases, citing four domains—innovativeness, altruism, self-control, and  
450 defiance—that would more demonstrably provide evidence for autonomy to the court system.  
451 Despite philosophical disagreement over the personhood defense of animal rights (e.g., see  
452 Korsgaard, 2018; Nussbaum, 2018), such communications are important given that scientists do  
453 not naturally design their research in light of legal principles and questions.

454         The need for evidence-based animal ethics frameworks is not to overlook the veritable  
455 limits of scientific knowledge. It is important to note that the pace and reach of scientific  
456 progress is not always compatible with more immediate ethical decisions, necessitating guidance  
457 on what to do in the absence of convincing scientific evidence for aspects of animal sentience  
458 (e.g., see Birch, 2017). Further, burden of proof frameworks must weigh the relative  
459 consequences of under- versus over-attributing particular mental states to animals, as such  
460 estimations can immediately impact welfare and related policy decisions—in particular, the  
461 implications of our systematic use of skepticism as the default position should be carefully  
462 evaluated (Birch, 2017, 2018). It is also important to acknowledge the diversity of ethical stances  
463 towards the weight of scientific evidence—not merely in terms of what is accepted/tolerated, but  
464 what is encouraged as the optimal way to understand the complexity of the world around us.  
465 There are important philosophical discussions about the sources of our judgment as to whether or  
466 not animals have minds and mental lives, with some defending non-inferential approaches based  
467 on direct experience (see Jamieson, 2012; see also Bekoff, 2009 for an interesting discussion of  
468 scientific vs. common-sense approaches, which are likely best considered in tandem when it  
469 comes to animal ethics).

470         Regardless of one's position here, many scientists in the field of animal behavior spend  
471 considerable time observing animals, and thus have a wealth of direct “real world” experiences  
472 in this regard. A deep understanding of evolutionary theory, allied with the intimate experiences  
473 that people who work extensively with animals have, can translate to a unique perspective on  
474 animals and human-animal relationships that ethical debate should capitalize on (see Godfrey-

475 Smith, 2016; Smuts, 2001 for pertinent examples). Phenomenologists are particularly interested  
476 in such perspectives given their potential to elucidate new realms of being and experience,  
477 challenging traditional philosophical views on animal natures and intersubjectivity (Merleau-  
478 Ponty, 1998).

479

480 *Provide scientific expertise.* Scientists' ability to synthesize and scrutinize academic knowledge  
481 has the potential to further guide the public and policymakers in their interpretation of scientific  
482 evidence. For example, The Cambridge Declaration on Consciousness (Low et al., 2012)—  
483 prompted by the accumulation of data revealing that humans are not unique in possessing the  
484 neurological substrates that generate consciousness—was written by a group of neuroscientists to  
485 challenge previously held standards. Animal behavior scientists could similarly consider  
486 synthesizing information about species' intellectual, emotional, and social lives in a format that  
487 can be used by decision-makers when drafting and/or updating ethics policies and legislation,  
488 preferably through quantitative meta-analyses and systematic reviews. Conservation and animal  
489 behavior scientists recently convened to identify research priorities in animal behavior that  
490 promote progress in applied conservation (Greggor et al., 2016); a similar exercise could benefit  
491 the translation of animal ethics into practical actions. Court cases on animal legal personhood are  
492 arising in a growing number of countries, providing a new context where animal behavior  
493 scientists may be expected to act as experts. However, unlike scientists who regularly intervene  
494 in court cases and are well aware of the legal culture, such as criminologists or psychiatrists,  
495 animal behavioral scientists are generally unprepared for such an exercise. At a smaller scale  
496 (and if not already the case), behavioral scientists can join ethics committees to ensure  
497 independent representation of animal interests in other scientific fields, and ascertain that ethical  
498 concerns are carefully weighed when reviewing articles and grant applications in their own field.

499

500 *Add a scientific credit to animal ethics in outreach efforts.* Finally, scientists are often perceived  
501 as the authorities on animal behavior, and therefore have the opportunity to inform and engage  
502 the public about animal interests. Yet while it is commonplace for animal behavior scientists to  
503 emphasize the conservation implications of their work, other broader impacts related to the moral  
504 standing of animals are emphasized relatively less in their public outreach. Increasingly, research  
505 on animal behavior has mass public appeal, which opens the door for animal behavior scientists

506 to more actively engage with contemporary animal ethical or philosophical debates and  
507 discussions—following the recent tracks of some behavioral scientists (Balcombe, 2006; Bekoff,  
508 2009; Brown, 2015; Smuts, 2001).

509

### 510 **Concluding remarks**

511 Animal behavioral scientists have much to gain from their academic community’s engagement  
512 with animal ethics. By jumping into the discussion, scientists also engage more directly with a  
513 revolution that has been in part stimulated by their work. Given the rapid rise and foreseeable  
514 progress of debates around animal ethics, it is certain that the current generation of animal  
515 behavior scientists will have to confront the questions that it raises in the coming decade(s), both  
516 as scientists and as citizens. Developing a stronger, more informed and engaged stance that aims  
517 to build consensus surrounding questions raised in animal ethics becomes critical to ensure the  
518 long-term importance and contribution of their scientific field, to fulfill their moral obligations,  
519 and to meet societal expectations by taking part in debates that they are well-positioned to  
520 inform. We hope that this paper will encourage this pressing and overdue discussion.

521

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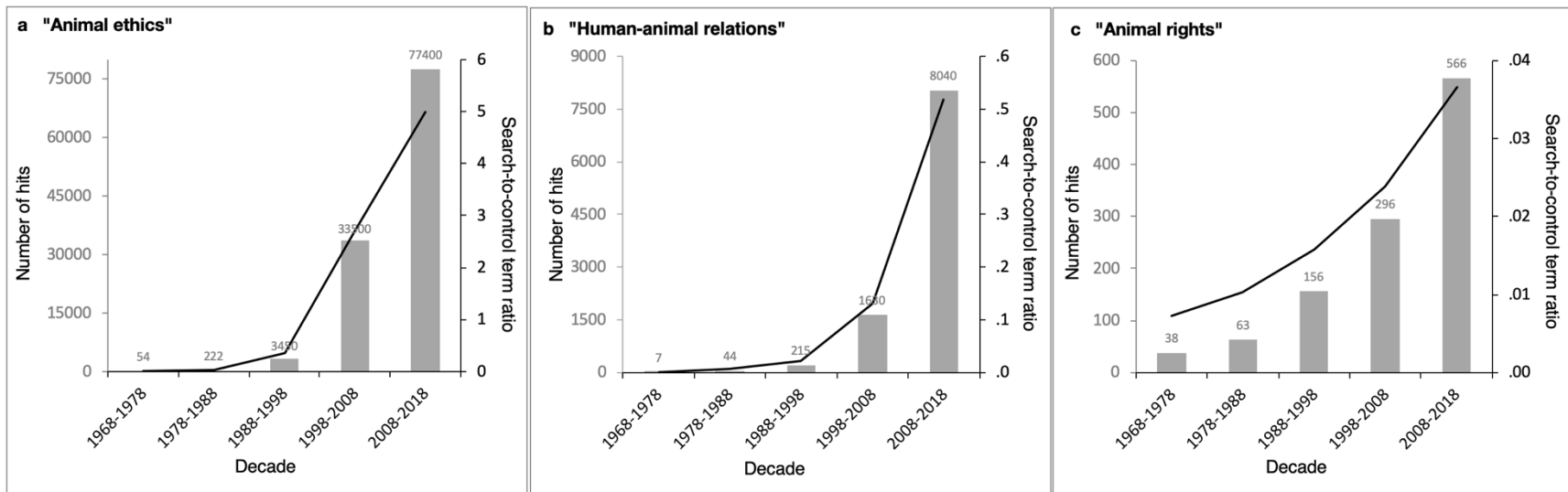
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**Figure 1.** Web-based search results (grey bars correspond to total number of hits) for the search terms (a) “animal ethics” as well as (b) “human-animal relations” in academic articles, and (c) “animal rights” in U.S. state/federal case law. The ratio of the total number of hits for each search term to the total number of hits for the (control) search term “animal” during the same decade is illustrated by black lines (see secondary Y-axis) to account for growth in scientific knowledge over time. All information was obtained from Google Scholar on May 17, 2019.

### **Text Box 1: The ethics of using animals in behavioral science**

In this paper, we emphasize potential interactions between the philosophical field of animal ethics and behavioral sciences. Ethical issues raised by research in behavioral sciences are a related, though different and narrower issue. On top of legal requirements, professional organizations have taken further practical steps to ensure that ethical issues related to animal welfare are an integral part of the design of the research being conducted by setting up their own standards (see the Association for the Study of Animal Behaviour's (2012) guidelines and the Guidelines for Ethical Conduct in the Care and Use of Nonhuman Animals in Research by the American Psychological Association (2010)). The main scientific journals in psychology and behavioral ecology require that these standards be met to publish a paper. It certainly does not mean that all ethical issues associated with animal behavior sciences have been thoroughly resolved, and future work should strive to keep ethics questions central to its interests. Empirical work attempting to measure the stress, pain, and mortality caused by study protocols is an emerging field of research (e.g., Hämäläinen, Heistermann, Fenosa, & Kraus, 2014; Le Maho et al., 2011), and several recent reviews have been dedicated to these and other ethical issues (Costello et al., 2016; Field et al., 2019; Mackinnon & Riley, 2010).