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The "Precautionary Principle" – A work in progress

Commentary on **Birch** on *Precautionary Principle*

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Abstract: The target article by Birch illustrates the practical difficulties with the "Animal Sentience Precautionary Principle" (ASPP) while presenting potential solutions. However, the ASPP will be difficult to use without guidelines detailing how evidence of sentience should be assessed. Moreover, extrapolating conclusions found for a single species to all species within an Order is problematic. Finally, I recommend that Birch demonstrate his ASPP framework using a controversial test case to help show how it could be used in real-world situations.

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As legislators wrestle with regulations regarding animal welfare, there is a lack of consensus within the scientific community as to which animals experience pain. The present article is helpful in working to codify the "Precautionary Principle," that is, the idea that it is better to err on the side of protection when the evidence is ambiguous as to whether a species can experience pain.

However, in trying to clarify this principle, Birch (2017) highlights how difficult these issues are to resolve. For example, he argues that the "Animal Sentience Precautionary Principle" (ASPP) should be extended to animals who show evidence of sentience. He lists examples of evidence that he finds compelling, such as the ability to learn conditioned place avoidance. However, Birch explicitly excludes *Drosophila melanogaster* from ASPP, despite its robust capacity for learning conditioned place avoidance (e.g., Wustmann et al., 1996). He explains this decision by noting that invoking ASPP for this species would negatively impact biomedical research. However, Birch does not explain how he compares these two factors (evidence for sentience vs. reduced biomedical research), so we are unable to see how ASPP might be used in a real-world example. A detailed example for *D. melanogaster*, or another species about which there is some controversy, would be helpful to demonstrate the value of his framework.

As Birch points out, his target article is not intended to answer the difficult question of whether a particular species experiences pain. However, leaving this question unanswered makes the application of ASPP difficult. Birch does invoke "inference to the best explanation" as a method to help evaluate competing hypotheses. However, in science, "Occam's Razor" is a more popular method: scientists typically favour the simplest explanation (also see Morgan's Canon; Morgan, 1903). If it can be shown that entities without emotion or "sentience" can pass Birch's tests for sentience, then demonstrating these criteria in a species may be insufficient for ASPP. For example, appropriately programmed robots can use nociception as a motivating force, show conditioned place avoidance, and demonstrate the ability to simulate pain behaviour (see Adamo, 2016). The existence of these robots demonstrates that species can pass Birch's criteria for sentience even if they are without emotion or pain sensation. How the existence of a viable alternative explanation for these phenomena impacts ASPP needs to be more fully discussed. For example, if behavioural criteria are equivocal, will certain neurobiological criteria be enough to tip the balance toward ASPP?

Another important issue raised by Birch is whether ASPP can be automatically extended to related species. Birch argues that ASPP can be extended to an entire Order based on the results from a single species. However, there are difficulties with generalizing to all animals within an Order. For example, Birch uses Octopoda to explain why Order is an appropriate level for the generalization of sentience. It also provides an illustration of some of the pitfalls of generalizing across such a large phylogenetic group. Learning studies on octopuses use fast-moving, shallow-dwelling octopuses such as *Octopus vulgaris* that live in complex environments (e.g., Mather and Kuba, 2013). However, deep-sea octopods have a very different lifestyle. For example, *Bathypolypus arcticus* lives on the cold, dark sea floor, between 200 and 600 m below the surface and is largely sedentary (Wood, 2000). The selective forces on this species are different from those on *O. vulgaris*; it would be incorrect to assume that *B. articus* has the same abilities as octopus living in shallow waters. Similarly, the Order Hemiptera includes active predators and species that require advanced navigational abilities (Romoser and Stoffolano, 1998). However, the Order also includes scale insects. Female scale insects are sessile, and have a reduced central nervous system (Bielenin, 1974). To assume that all the animals in this Order have the same cognitive abilities is unjustified. Regardless of the phylogenetic level chosen for generalization of ASPP, generalization of cognitive capacity should not be assumed without an examination of the life history of the species in question.

Also, Birch seems suspicious of anatomical data. However, anatomical hypotheses can be tested statistically in the same way as any other scientific hypothesis. With modern software, anatomical structures can be assessed for their volume, shape, and size in various dimensions. These quantities can be used in statistical tests.

Although I have raised some concerns, Birch's target article does succeed in highlighting the slippery nature of ASPP. ASPP will be of limited help in drafting regulations unless the issues raised by Birch and this commentary are addressed.

References

Adamo, S. A. (2016). Do insects feel pain? A question at the intersection of animal behaviour, philosophy and robotics. *Animal Behaviour, 118*, 75-79. doi:10.1016/j.anbehav.2016.05.005

Bielenin, I. (1974). Studies on processes of postembryonic morphogenesis in scale insects (Coccoidea, Homoptera) 2. Central nervous-system of *Quadraspidiotus-ostreaeformi* (Curt.) during postembryonic development. *Acta Biologica Cracoviensia Series Zoologia, 17*(2), 181-212.

Birch, J. (2017). Animal sentience and the precautionary principle. *Animal Sentience* 16(1).

Mather, J. A., & Kuba, M. J. (2013). The cephalopod specialties: complex nervous system, learning, and cognition. *Canadian Journal of Zoology-Revue Canadienne De Zoologie, 91*(6), 431-449. doi:10.1139/cjz-2013-0009

Morgan, C.L. (1903). *An introduction to comparative psychology*. London: W. Scott.

Romoser, W.S., & Stoffolano, J.G. (1998). *The Science of Entomology*. Boston: McGraw-Hill.

Wood, J. (2000). *The natural history of Bathypolypus arcticus, a deep-sea octopus (Prosch)*, Dalhousie University, Halifax.

Wustmann, G., Rein, K., Wolf, R., & Heisenberg, M. (1996). A new paradigm for operant conditioning of *Drosophila melanogaster*. *Journal of Comparative Physiology A-Neuroethology Sensory Neural and Behavioral Physiology, 179*(3), 429-436.