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Guilty as charged

Commentary on [Marino & Merskin](#) on *Sheep Complexity*

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Abstract: Sheep have had a bad rap with regard to their behavioral capabilities, and to a large extent, that negative view of sheep has arisen from our failure as human observers to view the world from the perspective of the sheep themselves. Studies sensitive to what sheep identify as of value in the world have revealed a different picture: sheep have cognitive, emotional and social complexity beyond our crude stereotype. Clearly, what we need to do is to evaluate non-human animals on their own terms and not as a reflection of ourselves.

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1. Introduction. Growing up in Australia, I was never more than a short car ride away from the countryside where I could see sheep. Their seemingly mindless flock mentality was striking. My poor impression of sheep was confirmed during my Ph.D. when I was studying free-living Australian magpies at an agricultural research station 60 km out of Melbourne. The station was investigating how agriculture could be integrated with habitats suitable for sustaining wildlife, such as wetlands. There were fields growing wheat, but also ones with herds of cattle, sambar deer and sheep. Over the years, I had many interactions with both the cattle and the deer — from rubbing their noses to frolicking with them along the fence line. The sheep were the odd ones out — I never had a positive social interaction with them. Their failure to make any connection with me confirmed my view that sheep are not very bright. I suspect that I am not the only one with such a negative view of sheep; after all, we label someone who mindlessly follows the group derogatively as being a sheep!

The target article by Marino & Merskin (2019) shatters this view of sheep. Through a thorough review of the literature exploring the cognitive and emotional capabilities of this species, they clearly demonstrate that there is an inner richness to the life of sheep. Most strikingly, the authors show that their social behavior, far from being limited to mindlessly following the flock, has considerable complexity. There are hierarchies, personal relationships and individual qualities that shape how the animals associate. The supposedly mindless social behavior most striking to the casual human observer is not that mindless after all. There is a deeper lesson to be learned from our traditionally disparaging view of sheep, one concerning our own biases and how we need to overcome them to study the behaviour of other animals.

2. Seeing the world through their eyes. In the early years of the 20th century, von Uexküll (1934/2010) made important strides in developing a framework for studying the behavior of animals. With detailed examples from a diversity of species, he showed that animals filter out much of the sensory information available so as to focus on the key elements essential for their survival and reproduction. This often means that what the human observer perceives is not necessarily what is of importance to the animal being studied. By identifying what is of perceptual relevance to the species in question, the animal's perspective becomes discernible, enabling us to gain insight into the subject's world — what von Uexküll called the *umwelt*. It often turns out that relatively simple sensory inputs from the array of possible inputs available are sufficient to guide the behavior of the animal (see Ewert, 2005).

It is not just that different species may use sensory systems that are different from ours (such as rattlesnakes use thermal images to help track mammalian prey; Clark, 2016); even within the same sensory modality, different cues may provide specific perceptions that guide behavior. For example, during play fighting, many species of rodents compete for contact with particular areas of their partner's body (Pellis & Pellis, 2009). For these nocturnal rodents, play occurs in the dark; so the key sensory modality is touch. Some species may compete for nuzzling the nape of the neck, others may compete for nibbling the cheek or licking the mouth. It is not the sensory modality that differentiates the *umwelt* of these species, but the particular tactile perceptions that guide them in gaining access to a particular target. For a rat, which nuzzles the nape, an approach from the rear may end when the constriction of the neck is detected. In contrast, for a Djungarian hamster, for whom the partner's mouth is the target, an approach from the rear is bypassed, as the attacker continues on past the neck, over the top of their partner's head to reach down to their mouth. Understanding the subject species' *umwelt* leads to better experimental designs for evaluating a variety of psychological capabilities.

3. Beyond the *scala naturae*. The other important consideration in gaining a more objective view of sheep is to finally get away from categorizing animals in terms of how closely they match humans. Comparative studies need to contrast traits, not species. For example, the literature on the social play of sheep shows that it is not as sophisticated as that of some other ungulates, such as pigs (Pellis & Pellis, 2016), but this does not mean that sheep are more 'primitive' than pigs on all traits. Rather, such differentiation of traits can provide clues as to how the more complex forms may have evolved (Pellis & Pellis, 2009). Again, as shown by Marino & Merskin's review, sheep have helped break old stereotypes. The next time I see some sheep, I will view them with new respect.

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