



Animal personality and sentience as distinct concepts

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Commentary on [Owens et al.](#) on *Wildlife Personality*

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**Abstract:** Owens et al (2024) discuss how knowledge of both animal personality and sentience in target populations can be leveraged to enhance wildlife conservation programmes. In this commentary I expand on the distinction between these two concepts. Behavioural differences should be considered broadly across conservation programmes, not just those involving species deemed sentient.

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**1. Personality (and possibly sentience) extends beyond vertebrates.** As personality has been demonstrated in a wide range of animal species it is an important factor that should be accounted for in conservation programmes (Owens et al. 2024). Personality traits such as shyness-boldness (how individuals cope with risk) affect trappability, food acquisition, fighting success, predator avoidance, reproduction and social behaviours. These behavioural differences may reflect alternative strategies for fitness arising, for example, from frequency dependent selection (Wolf & McNamara 2012) or from adaptive trade-offs (Wolf et al. 2007). Thus, the effects of conservation measures designed on a 'one size fits all' basis could be inadvertently selective. Owens et al.'s case studies of vertebrate examples show how knowledge of personality and sentience can enhance conservation practices. Vertebrates, however, represent a small proportion of animal diversity, yet wildlife conservation needs to be applied broadly across taxa (Cardoso et al. 2011). There is a rich literature on personality in animals other than vertebrates (see Lucon-Xiccato 2024) and a current debate about the possibility of sentience in many of these non-vertebrate groups (e.g. see Elwood 2022a,b, Briffa 2022). Some concepts from animal personality research and sentience research in non-vertebrate animals seem relevant to the ideas discussed by Owens et al. and will be considered in the next sections.

**2. Personality does not need sentience.** For animals that are sentient it is possible that individuals will differ from one another in their expression of what could be called 'sentience traits'. There is still debate about exactly how sentience should be defined (e.g. see Briffa 2022), but if we define it in a narrow sense, to include only animals that experience feelings, then individuals might consistently differ from one another in feelings that arise from the same experiences. Feelings presumably represent adaptations; hence these between-individual differences in feelings have ramifications for survival and need to be considered in

in conservation measures. Sentience can also be defined more broadly to encompass different types of awareness (Broom 2007); so we should also expect individual differences in what information animals can perceive, retain and predict. If these capacities, too, are adaptations, then these differences also need to be considered in conservation measures.

Animal personality, however, can be present across a broad range of behavioural measures, not just those that (depending on how it is defined) imply sentience. Thus, unless we adopt the broadest possible definition of sentience (one that would encompass the most basic cognitive functions of animals), the fact that personalities exist does not imply sentience.

In their Precommentary on Owens et al., Adolphs & Xu (2024) consider how models of human personality can be applied to non-human animals, and thus how animal personality should be defined. This debate echoes some that have occurred in the animal behaviour and evolutionary ecology fields. As the study of animal personality has developed, researchers in these fields have reached a consensus that, from an ecological perspective at least, the (basic) definition of animal personality is straightforward: Animal personality is the presence of consistent between-individual differences in behaviour (Dingemanse & Dochtermann 2013). It is thus a population-level pattern rather than a property of individuals, who are better described as having different behavioural types.

More formally, we can say that animal personality is present when a significant amount of the total variance in a sample of longitudinal behavioural data is explained by its between-individual component, the other source being within-individual variance (sometimes referred to as residual variance). Such effects can be readily quantified as repeatability ( $R$ ), which makes them useful for evolutionary and ecological studies including the design of conservation strategies. Significant behavioural repeatability has been demonstrated in a broad array of animal phyla, for example chordates, molluscs, arthropods and cnidarians. The consensus among researchers about whether sentience has been demonstrated in examples across diverse phyla tends to be stronger the phylogenetically closer they are to humans. It is likely, for example that most sentience researchers would consider the case for sentience in primates to be stronger than for sea anemones, which are brainless (and lacking even a CNS) animals that nevertheless can learn (Cheng 2021) and thus show a degree of "awareness" (Broom 2007). Personality, on the other hand, has been demonstrated in examples from both of these taxa (e.g. Tkaczynski et al. 2020, Simpson & Briffa 2024). Thus, to paraphrase Adolphs & Xu, sea anemones can certainly act shy, but one can remain agnostic on the question of whether they also *feel* shy.

**3. Multiple levels of individual differences could be important for conservation.** While animal personality in its fundamental definition is synonymous with significant behavioural repeatability, Owens et al. also point out that there are other levels of behavioural differences that could be relevant to conservation. Individuals may react differently across the same environmental gradients (differences in plasticity or variation in behavioural reaction norms); they may show different amounts of within-individual variance under stable conditions (differences in predictability); and suites of behaviours may show between-individual correlations (behavioural syndromes). These patterns of between-individual behavioural differences are also found across the range of animal diversity, in species that are regarded as being sentient and in species where the issue is the subject of current debate. If these types of behavioural differences are important for conservation, they need to be accounted for regardless of whether the target species is considered sentient.

**4. Conclusion.** The target article by Owens et al. (2024) raises the important point that knowledge about both (1) animal personality and (2) animal sentience can be applied to animal conservation scenarios. This will be much more effective and useful if we avoid conflating consistent interindividual differences in behaviour with sentience itself, by weighing the evidence for (1) and the evidence for (2) separately, on a case-by-case basis.

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