Brown, Culum (2022) Fine-tuning the criteria for inferring sentience. *Animal Sentience* 32(7)

Fine-tuning the criteria for inferring sentience
Commentary on **Crump et al** on *Decapod Sentience*

Culum Brown
Macquarie University, Sydney, Australia

Abstract: "Sentience" means the capacity to feel, and feelings are private affairs. Sentience is hence extremely difficult to quantify in nonhuman animals. We have no direct means of determining whether an animal is sentient. Thus we rely on a series of indirect measures or criteria which collectively provide some level of confidence about the probability that an animal is sentient. Crump et al. propose a modified framework based on 8 criteria for estimating the likelihood of sentience in a target taxon. Whereas I very much like their proposed framework, I would suggest a couple of amendments that may improve it further: a weighting for each criterion and the addition of a "data insufficient" category (to differentiate lack of evidence from evidence of lack).

Culum Brown, Professor of vertebrate evolution at Macquarie University, is Co-Editor of *Fish Cognition and Behavior* and Editor of the *Journal of Fish Biology. He* studies behavioural ecology of fishes with a special interest in cognition, personality and laterality. **Website**

Crump et al.'s target article provides a general framework for evaluating evidence of sentience, which is then applied to decapod crustaceans. This new framework is essentially a modification of one proposed by Smith & Boyd in 1991, making it more adaptable to non-mammalian targets. In particular, Smith & Boyd's emphasis on opioids as the primary neurotransmitter may not be appropriate in all animals. Crump et al. have also removed some of the vagaries associated with criterion 6 (flexible self-protection) that could just be the result of nociception and associated reflexive withdrawal responses. Similarly, criterion 7 (associative learning) may well be met by sensitisation or habituation, which does occur in animals without central nervous systems. Here more emphasis is placed on learning in which integrative processing is occurring. The latter two changes are an improvement on the Smith & Boyd citeria even when they are applied to mammals.

Overall, I think the proposed 8-point checklist is excellent and its application to decapods certainly suggests that the evidence for sentience in some decapods (e.g., Brachyura) is strong and it is substantial in others. The true outcome for many taxa, however, is obscured by missing data. This is my primary concern with the proposed approach; I am certain that there will be those who misinterpret the outcomes (deliberately or otherwise) as evidence of a lack of sentience, rather than just a current lack of evidence for sentience. Here I would propose an alternative; the creation of a category called "Data Insufficient". In those taxa for which we simply don't have enough information to make informed decisions on many of the criteria,

data-insufficient labelling would reduce the probability of misinterpretation of the outcome. It would also identify important targets for further research.

As with many such checklists (e.g., Sneddon et al 2014; Brown & Dorey 2019) there is no single criterion for sentience; rather it is the accumulation of multiple criteria that improves our confidence that an organism is sentient. I would argue, however (and indeed so do the authors) that not all criteria are equal in this respect. Although I like the simplicity of the grading system posed by Crump et al. -- ranging from very high confidence of sentience to high confidence for a lack of sentience depending on the sum of the number of criteria met -- I think this is also simplistic. Some of the criteria ought to be weighted more than others:

---

1. Nociception

2. Sensory integration

3. Integrated nociception

4. Analgesia: (a) endogenous (b) exogenous

5. Motivational trade-offs

6. Flexible self-protection

7. Associative Learning

8. Analgesia preference: (a) self-administer (b) location (c) prioritised

Crump et al.'s 8 criteria

Criterion 1 (nociception) on its own, for example, does not provide evidence for sentience, whereas each of criteria 5 (motivational trade-offs) to 8 (analgesia preference) alone would be far more compelling. In this modified scheme one could still sum the weighted criteria to generate a sliding scale similar to the one proposed, but it would provisionally flag taxa that have insufficient data. With these few tweaks we should have a very compelling method of identifying pain sentience in any organism.

References

Brown, C. & Dorey, C. (2019). Pain and Emotion in Fishes – Fish Welfare Implications for Fisheries and Aquaculture, *Animal Studies Journal*, 8(2), 2019, 175-201.

Crump, Andrew; Browning, Heather; Schnell, Alex; Burn, Charlotte; and Birch, Jonathan (2022) Sentience in decapod crustaceans: A general framework and review of the evidence. *Animal Sentience* 32(1)

Smith, Jane A.; and Boyd, Kenneth M. (Eds.) (1991). *Lives in the balance: The ethics of using animals in biomedical research*. Oxford University Press.

Sneddon, Lynne U.; Elwood, Robert W.; Adamo, Shelley A.; and Leach, Matthew C. (2014). Defining and assessing animal pain. *Animal Behaviour*. 97: 201-212.