ANIMAL SENTIENCE
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Lack of imagination can bias our view of animal sentience

Commentary on **Crump et al** on *Decapod Sentience*

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Abstract: How an animal reacts to a sensory stimulus is often used to assess whether that animal can experience feelings such as pain and pleasure. This behavioural path is typically complemented with reference to how a human would normally respond to and experience an analogous stimulus. Together, these approaches can lead to a "hard to imagine otherwise" argument for feelings. It is time to go beyond these qualitative assessments and to now determine whether a nervous system can execute the neural functions necessary for sentience.

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We are born with it and experience it every subsequent waking moment. It is difficult to contemplate human life without the feelings of sight, touch, hearing, smell, and taste. They seem to constantly motivate us to behave the way we do.

But what about nonhuman animals—how do we know which animals have feelings such as pleasure or pain? A "hard to imagine otherwise" argument is commonly used to assert that certain animals must be sentient. As Jonathan Balcombe (2020), put it: "if we stop to watch insects closely — their

coordinated movements and complex, flexible actions — it seems hard to imagine them as little blank slates, going about their lives in a mental vacuum, without even a smidgen of awareness."

But could it be that our imagination is merely failing us?

How obvious is it that our own complex behaviours necessarily depend on conscious awareness? Let's test this idea by looking at one of the most complex of all human behaviours—speech. Many people engage in uncontrolled and unaware speech every night—sleep-talking. There are some extreme examples that are truly "hard to imagine" as not depending on a smidgen of awareness. Consider the example of a patient who suffered from aphasia (the loss of fluent and coherent speech) following a brain stroke (Straus et al., 1996). Ordinarily, this patient's speech patterns were distorted, for example:

> "*How butterfly goes through... butterfly… Butterfly goes through… hutterfu::es... but- tertly goes three processes of life… be::fore before before it um before it's an adult… before it big before it big.*" [:: demarcates abnormal vowel prolongations.]

Surprisingly, during sleep-talking, this patient spoke fluently, with normal syntax and rhythm. Clearly, the patient had no conscious control over this behaviour while asleep; if he did, his speech would have been distorted.

What are the lessons to be learnt here for judging whether a given species of animal is sentient or not? First, just because it is "hard to imagine" an animal doing what it is doing non-consciously, it doesn't follow that it is sentient. Second, we should expect that nervous systems have evolved to perform many functions without the need for either conscious control or feelings. And third, similarities between an animal's behaviour and our 'complex, flexible actions' are not a valid basis for judging whether the animal's behaviour is consciously controlled.

The target article by Crump et al. (2022) concludes that decapod crustaceans (*e.g.*, crabs) most likely feel pain. Crump and colleagues claim that certain behaviours could only be performed by animals capable of feeling. The structure of Crump et al.'s argument fits that of the "hard to imagine otherwise" argument for animal sentience Why else would an injured animal prefer a substance laced with "pain-killing" (analgesic) drugs if not because it feels pain? Though popular, this kind of argument is inconclusive since such compounds can block non-conscious, pain-free behaviours as well as pain (if present).

Before we too easily jump to conclusions, we must take a good look at the animal's nervous system and assess whether it has the capacity to perform the

neural functions underpinning feelings (Key et al., 2022). [*See also* Key 2016.] It is well accepted that awareness is the fundamental basis of feelings. For example, unless aware of a bee's sting, you won't feel pain. Given that a nervous system has no direct connection with the external environment it can only ever infer what it is processing based on its own internal neural activity. Therefore, a nervous system can possibly be sentient only if it has evolved the means both (1) of monitoring its own internal processing of sensory information and (2) of making inferences about what it is processing. An analogy would be an observer watching a chess game and figuring out what are correct moves in the game. If from monitoring the game the observer can predict future player moves, then the observer has some level of awareness of the rules of the game. "Observer networks" operate in nervous systems in similar ways and have specific physiological functions and anatomical structures related to the neural explanation of feelings.

We find observer networks in the mammalian brain, but not in the spinal cord (Key and Brown, 2018; Key et al., 2021; Key et al., 2022). We need to search for them in the crab nervous system. It is part of the natural evolution of any science to dispense with "hard to imagine otherwise" justifications, and the study of animal sentience is no exception.

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