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What can kinematics tell us about the affective states of animals?

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Abstract

An animal's welfare state is intrinsically linked to its affective state. Evidence suggests that sentient, conscious animals can experience a range of affective states, such as pain, fear or boredom as well as positive affects like joy, curiosity, satiation or lust. In the behavioural assessment of animal welfare, there is increasing recognition that it is not simply which behaviours an animal engages in but also the quality of its movement. Kinematics is an approach which is being more widely applied to the behavioural assessment of animal welfare. Kinematics is a field of mechanics that describes the movement of points on a body by defining these points in a co-ordinate system and precisely tracking how they change in terms of space and time. A major opportunity exists for using kinematic technology to inform our understanding of the emotional state of animals. This review argues that kinematics is a useful methodology for identifying and characterising movement indicative of an animal's affective state. It demonstrates that kinematics: i) appears useful in detecting subtleties in the expression of affective states; ii) could be used in conjunction with, and add extra information to, affective tests (for example, an approach/avoidance paradigm); and iii) could potentially, eventually, be developed into an automated affective state detection system for improving the welfare of animals used in research or production. Furthering our knowledge of animal affective states using kinematics requires engagement from many areas of science outside of animal welfare, such as sports science, computer science, engineering and psychology.

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