

How do we recognise intelligence in an animal very different from us?

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An animal can fail a human-designed test because it lacks the capacity being tested. It can also fail because it does not see the relevant cue, cannot make the required movement, dislikes the reward or has misunderstood the situation. Recognising intelligence across species begins by making those alternatives experimentally distinguishable.

The goal is not to award every animal a place on one ladder. A more useful question asks whether an animal can learn a relation, inhibit an ineffective response, transfer a solution or adjust behaviour when conditions change. Each capacity requires an operational task, and each task needs controls that make success and failure interpretable.

1. The same apparatus may pose different problems

Consider a transparent barrier with food behind it and an accessible opening to the side. A subject that approaches the opening instead of striking the barrier succeeds. But the meaning of that success depends on whether the subject has learned that the material is impenetrable, can perceive its edges and has a comfortable route around it.

Using an identical apparatus is one kind of standardisation. Matching the perceptual and motor demands is another. Neither automatically guarantees the other. A task appropriate for a hand may impose a different cost on a beak or trunk; a reward attractive to one species may have little value for another. Such differences are potential confounds, not reasons to abandon comparison.

2. A comparison with a defined target

MacLean and colleagues compared 567 individuals from 36 species on two tasks addressing self-control. Their analysis related performance to brain measures and ecological variables; absolute brain volume was the strongest brain-size predictor in their sampled comparison. [1]

The crucial qualification is “performance on these tasks”. A correlation in a comparative sample is not a universal equation for intelligence, and brain volume is not a substitute for directly measuring the capacities of an untested animal. The result can guide further tests without turning one measurement into an all-purpose ranking.

Kabadayi and colleagues subsequently tested ravens, New Caledonian crows and jackdaws in a cylinder task and found performance comparable to great apes despite the birds' smaller brains. Their article distinguishes motor self-regulation from more demanding forms of self-control, such as foregoing an immediate reward for a delayed one. [2]

That distinction keeps the comparison productive. Detouring around a visible barrier and waiting for a future benefit may both involve inhibition, but success in one does not establish all the processes needed for the other. A task can measure something important without measuring everything.

3. What would count as stronger evidence?

A single successful attempt is often ambiguous. Repeated trials can distinguish stable performance from chance, but repetition also supplies learning opportunities. Researchers therefore need to report how performance changes across trials rather than allowing an average to hide the trajectory.

A hypothetical animal that succeeds in two of its first ten trials and nine of its last ten has a different evidential profile from one succeeding in eleven of twenty without improvement. The overall proportion can be identical while one record contains a marked learning pattern. These numbers illustrate why an aggregate score may be an inadequate description.

Transfer tests add another question. Does a solution persist when irrelevant features change, or only when the subject encounters the familiar arrangement? A change in colour, orientation or reward location can help separate a memorised response from sensitivity to a relation. But transfer failure is interpretable only if the new version preserves the cues and actions that the animal can actually use.

4. Controls are part of the explanation

A useful positive control establishes that the subject can perform the component demands. If an animal cannot locate an unobstructed reward, its failure with a barrier cannot straightforwardly identify an inhibitory deficit. A motivation check similarly asks whether the reward is worth obtaining under the test conditions.

An alternative-mechanism control asks whether an apparently complex solution could arise from a simpler cue. Suppose a subject repeatedly chooses the container with food. If that container has a distinctive smell, the result does not yet demonstrate inference about hidden objects. Removing or balancing that cue changes what the experiment can establish.

There is no need to assume that a simpler mechanism makes the animal uninteresting. Identifying the actual mechanism is the point. A behaviour can be adaptive, flexible and worth explaining without reproducing the particular mental process a human observer first imagined.

5. Comparing profiles rather than crowns

A defensible comparison can present a profile of capacities: performance in spatial learning, reversal, detour behaviour or other specified tasks. Relations among scores can then be investigated. They should not be assumed in advance merely because ordinary language places them under intelligence.

Sample size and experience also matter. Captive subjects may differ in prior exposure to people and materials. A small set of individuals cannot silently become a precise estimate for an entire species. Uncertainty about the population is distinct from uncertainty about the mechanism operating in the tested subjects.

Neither of the cited studies directly measures subjective experience. Behavioural flexibility, task success and neural organisation can motivate other questions, but this article's target is operational cognitive performance. Inferring what an animal feels requires a separate evidential argument and cannot be inserted as a reward for a high score.

The answer to the title is thus methodological and practical. We recognise particular cognitive capacities by designing tasks that an animal can perceive and act on, testing plausible alternative explanations, and examining learning and transfer. What remains

uncertain is how widely a result generalises and how different capacities relate. The error is to confuse an unfamiliar way of solving a problem with an absence of capacity, or one impressive performance with a complete theory of an animal's mind.

References

- [1] MacLean, E. L., et al. The evolution of self-control. *Proceedings of the National Academy of Sciences* 111(20), E2140–E2148 (2014). <https://doi.org/10.1073/pnas.1323533111>
- [2] Kabadayi, C., et al. Ravens, New Caledonian crows and jackdaws parallel great apes in motor self-regulation despite smaller brains. *Royal Society Open Science* 3, 160104 (2016). <https://doi.org/10.1098/rsos.160104>

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