The shrimp bet: When big numbers outsprint the evidence

Sentience and moral priority-setting

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Shrimp welfare looks like the ultimate way to reduce suffering: massive numbers, cheap fixes, grim-sounding deaths. But the flagship farmed species—the penaeid shrimp L. vannamei—is an evidential outlier: beyond basic nociception and pharmacological modulation, the sentience case is close to empty, and the limited evidence we do have points the wrong way on key markers. In the report that kicked off this wave, it was included for administrative clarity, not because sentience looked likely. If you let precaution plus expected-value reasoning run on that evidential bar, you don't stop at shrimp, but you get pulled into insects and the rest of modern life's collateral killing. My view is that we shouldn't let raw numbers and optimistic assumptions about sentience guide our moral priorities: most weight should go to high-confidence, severe, tractable suffering, and extremely low-confidence beings with high numbers should be treated as explicit research-and-standards bets, unless at least some higher-order evidence actually suggests pain.

"At least I'm not a shrimp."

It's a line I'd often repeat to myself back in 2016, when I started taking animal suffering seriously and realized how fortunate I was to live a human life.
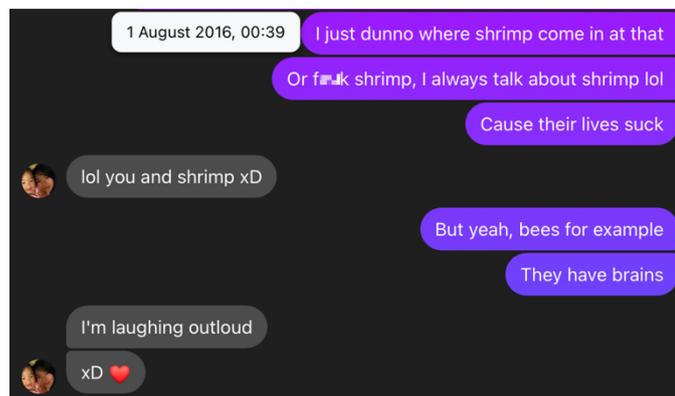
2016 midnight philosophy chat with my late friend Minah about shrimp

Of course, to most people this thought sounds entirely absurd, especially those who don't take animal sentience seriously. But I figured if you accept that animals, like ourselves, *are* sentient, that each *has* an individual life, and that we only get to live *one* life on this planet, then the odds that I'd be born human, rather than as a shrimp (or some other animal whose life plan is basically "get eaten"), were astronomically small.

By some crude moral arithmetic, I estimated that for every one human born on this planet, somewhere between 70-700 trillion shrimp-like creatures were born, living short lives and meeting what I assumed were horrible deaths, likely being acidified inside a predator's stomach.

I didn't know whether this was fully accurate, but the possibility felt overwhelming. By sheer statistical luck, we won the jackpot of human existence, and did so in an era of unprecedented peace, medicine, knowledge, and wealth.

This shrimp sentience thought experiment is no longer just hypothetical. Whether shrimp can feel pain—and if so, how much—has become a central and increasingly serious debate within suffering-focused practical ethics, particularly among effective altruists (EAs), and has gained mainstream coverage in newspapers such as *The Guardian* [1] and *Vox* [2].

The 2021 report that set off EAs' focus on this issue—Review of the Evidence of Sentience in Cephalopod Molluscs and Decapod Crustaceans [3]—was led by Jonathan Birch, who acted as the supervisor of my Master's dissertation on how cognitive sophistication affects moral status. So as a former animal sentience student who is focused on reducing suffering, I felt compelled to dig into the evidence to see if my beliefs about moral priorities needed updating.

PART 1: SHRIMP

Why focus on shrimp

My default view has been that those who are serious about reducing suffering should focus on the plight of chickens. Not just because their living conditions are clearly bad [4,5], but precisely because they are so numerous [6], particularly when compared to cows [7], and the number we kill looks to keep growing rapidly for at least the next few decades [8,9]. I thus share most of the underlying beliefs of those who promote focus on shrimp welfare: the scale, tractability, and neglectedness of pain matter.

Shrimp are the perfect case to match this logic: their scale is enormous (farmed shrimp amount to close to half a trillion a year [10]—about five to six times as many as chickens, and more than 1,500 times as many as cows), their death seems painful (they tend to be killed in ice slurries, freezing to death [11]), improvements are highly tractable (simply using electric stunners rather than ice baths makes their death instant rather than potentially painful and drawn out), and, until recently, no one was doing anything about it.

The cost to improve things? About $1 per 1,000-1,500 shrimp that are switched from slowly freezing to being instantly electrically stunned to death [12]. May sound macabre, but if the logic holds, it's hard to argue you can get a better welfare bang for your buck.

Despite their sheer number, I've historically placed less moral priority on aquatic animals like shrimp. Part of this is undoubtedly terrestrial bias, but much of it is evidential.

For wild-caught aquatic animals—the majority of seafood by biomass up until 2024 [13]—I've never been too convinced that human capture is that morally distinctive from the violent deaths these animals would otherwise face in nature. Among farmed ones, the welfare picture is also far less clear than it is for terrestrial livestock [14]: we lack strong evidence that their lives are dominated by the kinds of chronic growth disorders, infections, and injuries that seem to make the lives of animals like chickens a net negative [15,16].

Most importantly, we simply weren't sure whether many aquatic animals feel pain at all [14]. While the evidence for pain in fish has grown increasingly persuasive [3], shrimp in particular remained a genuine question mark.

Enter Birch's work. In his 2024 book *The Edge of Sentience* [17], he offers a framework for decision-making under uncertainty about a being's sentience.

He argues that when there is credible evidence placing one near the "edge of sentience," the asymmetry of moral risk favors precaution: the harm of mistakenly *denying* sentience to a sentient being is typically much greater than the harm of mistakenly *extending* protections to a non-sentient one.

His sentience framework reviews evidence for sentience across eight criteria:

1. Presence of nociceptors
2. Integrative brain regions
3. Connections between nociceptors and integrative brain regions
4. Responses affected by local anesthetics or analgesics
5. Motivational trade-offs
6. Flexible self-protective behavior
7. Associative learning that goes beyond habituation or sensitization
8. Behavior indicating valuation of analgesia

As more of these criteria are met, Birch argues, it becomes increasingly implausible that no phenomenological, subjectively felt experience is present. At some point, it is more reasonable to assume that the animal feels something, however minimal, than that it performs complex behavior in a complete experiential vacuum [17].

His decapod review, which recommends "that all cephalopod molluscs and decapod crustaceans be regarded as sentient animals for the purposes of UK animal welfare law," [3] (p.8) has been highly influential. It helped inform the UK government's decision to include crustaceans within animal welfare law [18,19]—effectively banning practices such as boiling lobsters alive—and now serves as the central evidence cited by shrimp welfare advocates.

The evidence for shrimp pain

What should stand out right away in the decapod review is that the evidence varies dramatically across taxa. Among the six decapod taxa reviewed, true and anomuran crabs have been relatively well-studied, astacid lobsters, spiny lobsters, and caridean shrimp less so, and the shrimp species most commonly consumed by humans—*Litopenaeus vannamei* [20,21]; part of the penaeid shrimp family and the focus of shrimp welfare projects—sits at the bottom of this evidence spectrum.

L. vannamei scores low confidence on all but two of the eight criteria, the exceptions being (1) presence of nociceptors and (4) responses affected by local anesthetics or analgesics. Importantly, "low confidence" for a criterion here often means we *don't*

know, rather than negative findings: absence of evidence is not evidence of absence, and *L. vannamei* remains understudied on most of the criteria [3] (p.6).

The most direct behavioral finding supporting pain experience in *L. vannamei* is that during the common industry procedure of eyestalk ablation—the cutting of one or both eyestalks to accelerate maturation [22,23]—they exhibit reactions such as erratic swimming and tail flicking, which is reduced by the topical application of the anesthetic lidocaine [24].

This suggests the reaction may involve nociceptive pathways that can be dampened pharmacologically, which is consistent with possible pain experience. But rather than specific relief of pain or an aversive state, it could also simply reflect generalized motor suppression or reduced responsiveness.

Beyond this, the picture for *L. vannamei* is muddy. One study on a caridean shrimp species—not peneaid, like *L. vannamei*—called *Palaemon elegans*, found that exposure of one antenna to low-pH acetic acid or high-pH sodium hydroxide elicited location-specific grooming and rubbing behavior—indicative of pain or irritation—which was attenuated by the local anesthetic benzocaine [25].

However, a later study, using three decapods—including the penaeid shrimp *Litopenaeus setiferus*, a close relative of *L. vannamei*—found no such directed grooming or rubbing, even when stronger pH stimuli were used [26].

Given the lack of solid direct evidence, the case for pain in *L. vannamei* is thus often an argument by association: better-studied decapods such as crabs and lobsters show evidence of pain-like behavior, so it's argued that *L. vannamei* likely has similar capacities [27].

As noted, the decapod report concludes with the recommendation to include *all* decapods, including *L. vannamei*, in animal welfare law. But Birch is candid about what this policy recommendation actually rests on.

In the conclusion, he writes:

"We have noted that there is very little evidence of sentience at present in penaeid [including *L. vannamei*] shrimps. However, if caridean shrimps were included, but penaeid [*L. vannamei*] shrimps excluded, the **potential for confusion** [emphasis added] would be high. Therefore, on balance, we reject the suggestion that protection should only be extended to specific infraorders of decapod." [3] (p.81)

L. vannamei gets included not because the evidence converges on "sentience looks likely," but because

excluding them while including other shrimps would make the law *confusing* in practice. So even within Birch's broadly precautionary posture, *L. vannamei* are an awkward outlier, included for administrative clarity rather than scientific confidence.

Three years after the decapod report, he sharpens and explains this choice in his book [17], noting that a neuroanatomical survey found that decapods generally have "hemiellipsoid bodies" [28]—integrative regions linked to learning and memory—but that in *L. vannamei* specifically, these regions appear miniaturized and weakly differentiated [17] (p.256).

Birch emphasizes why this matters: nervous tissue is metabolically expensive to run, so dramatic reduction is often what we expect to see when a system is no longer functionally significant. On this basis, he reports low confidence that *L. vannamei* has functional integrative brain regions—not that such regions are entirely absent, but that they may not do substantial integrative work. Without integration, it becomes harder to confidently argue an animal is *feeling* pain, rather than merely *reacting* through nociceptors.

He then draws a sharper taxonomic line: *Pleocyemata*—walking decapods and caridean shrimps
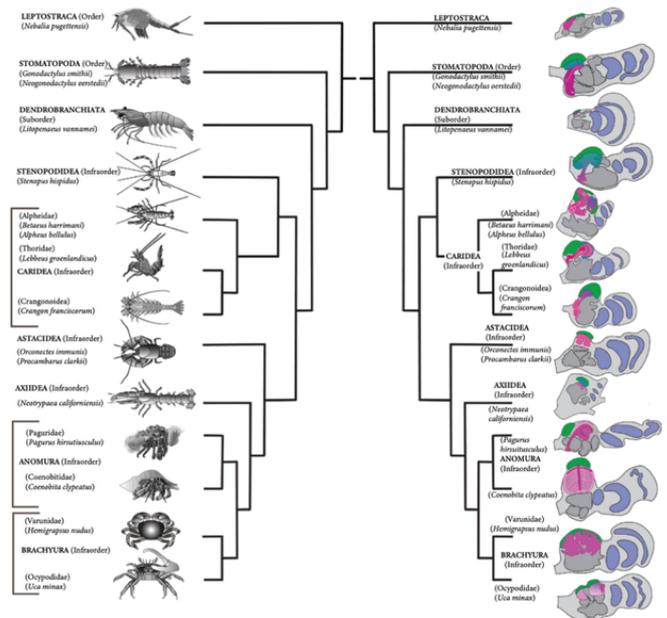

Figure from neuroanatomical survey on crustaceans; pink regions indicate integrative brain regions associated with learning and memory (hemiellipsoid bodies); L. vannamei circled in red [28]

—do count as sentience candidates (the evidence is substantial enough to warrant some precaution), while *Dendrobranchiata*, which include penaeid shrimps such as *L. vannamei*, do not [17] (p.258-262). In other words, across the six decapods he reviews, *L. vannamei* is the only one he does not class as a sentience candidate.

And that matters, because the move made by some shrimp advocates is extrapolation: if crabs and

lobsters show pain-like responses, it is argued shrimp probably do too. For example, one commonly cited welfare-range model explicitly approximates shrimp's probability of sentience as equivalent to the prior distribution used for crabs [29]. But critics point out that, given the structural differences between decapod lineages, this kind of taxonomic borrowing across suborders is shaky [30].

None of this is a full denial of sentience in *L. vannamei*, and Birch entertains the possibility that some lineages could evolve integrative capacities and later lose them. But the practical conclusion he draws is that *L. vannamei* is precisely a case where the integrative-architecture story looks too insecure and the evidential base too thin to treat sentience as likely, even within a precautionary framework [17] (p.257-258).

Because of the lack of research on *L. vannamei* and potentially large welfare stakes*,* Birch places them into the "investigative priority" category, together with beings such as worms and insect larvae [17] (p.276-281).

Skepticism

The overall *L. vannamei* evidence picture, in terms of where (very few) studies actually exist, thus looks roughly like this: there is high confidence that they (1) possess nociceptors and medium confidence that (4) their responses can be modulated by local anesthetics or analgesics [3,24]. There is low confidence that they (2) have functional integrative brain regions [3,28] or (6) that they show self-protective behavior in response to noxious stimulation [3,26].

There appear to be no studies bearing on (3) connections between nociceptors and integrative brain regions, (5) motivational trade-offs, (7) associative learning, or (8) behavior suggesting valuation of analgesia. And while that absence is not decisive, it matters that in practice, when we have strong evidence for the higher-order criteria (5–8), it usually comes from systems where we also have at least some independent support for integrative circuitry (2).

Even allowing for selection effects, nociceptors and pharmacological modulation are doing virtually all the work here—features that are widespread and not strongly diagnostic on their own. And if we can't safely generalize from related taxa, the sentience case for *L. vannamei* becomes extremely thin.

A plausible reason we commonly see framing along the lines of "we just haven't studied shrimp enough yet, but it's reasonable to assume they likely feel pain based on other decapods" is Birch et al.'s confidence scoring itself. In their system, low confidence can reflect two very different situations: either that a criterion has *not* been investigated in the

relevant species, or that it *has* been investigated and the results have been weak or negative.

As a result, it is easy to read the gap between shrimp and better-studied decapods as *only* a research gap. And to a large extent, that's true. But the limited evidence that is available is unsupportive on two important pain-relevant markers. This ambiguity in what "low confidence" denotes—an issue brought up by critics of Birch's original approach [30], which he appears to have addressed in later reports [31]—could therefore blur the distinction between "we don't know yet" and "the evidence so far leans against".

Another place where some caution about confidence is warranted is the welfare impact of ice slurry, the slaughter method often contrasted with electrical stunning.

Electrical stunning is rightly treated as one of the most humane commercially available options because it is designed to render animals rapidly insensible [32]. However, Birch, while recommending it as best current practice based on the available evidence (and indeed ahead of ice slurry), is explicit that we still don't know what the neural activity induced by electrical stunning *feels* like from the animal's point of view, or whether the resulting unresponsive state is truly unconsciousness rather than some form of continuing experience [3] (p.71-72).

At the same time, we also don't fully know whether chilling (from ice slurry) is actually painful in shrimp [3] (p.73) [33], and its effects are at least not uniform across species. One review notes that lobsters and crabs retained sensory-central nervous system responses in very cold conditions—suggesting chilling may not reliably anesthetize them—but for *L. vannamei* it describes a rapid collapse in activity when transferred to ice, interpreted by the authors as consistent with anesthesia [32]. This is a liberal interpretation, however, since reduced activity alone cannot establish insensibility.

None of this shows that ice slurry is humane or painless, and electrical stunning *does* have the strongest welfare-based rationale. But it does make confident "ice = obvious agony" or "electrical stunning = painless" harder to state as if it's fact. The *Shrimp Welfare Project* is trying to get more peer-reviewed scientific data on this issue [11], which is a good thing.

This is also not at all to say that the science on *L. vannamei* is anywhere near settled, or that more evidence on their potential sentience isn't needed. But I do think taking the case seriously based on current evidence opens an—almost literally—enormous can of worms.

	Criterion 1: Nociception	Criterion 2: Sensory integration	Criterion 3: Integrated nociception	Criterion 4: Analgesia	Criterion 5: Motivational trade-offs	Criterion 6: Flexible self-protection	Criterion 7: Associative learning	Criterion 8: Analgesia preference
Penaeid shrimps (*L. vannamei*)	H	L	VL (NRF)	M	VL (NRF)	L	VL (NRF)	VL (NRF)
Orthoptera (crickets, grasshoppers)	H	VH	VL (NRF)	L	VL (NRF)	VL (NRF)	VH	VL (NRF)
Lepidoptera (butterflies, moths)	VH	VH	VL (NRF)	VL (NRF)	VL (NRF)	VL (NRF)	VH	VL (NRF)
Hymenoptera (bees, ants)	VH	VH	VL (NRF)	M	H	VL (NRF)	VH	VL
Diptera (flies, mosquitoes)	VH	VH	VH	VH	H	VL (NRF)	VH	VL (NRF)
Coleoptera (beetles)	VH	VH	VL (NRF)	VL (NRF)	VL (NRF)	VL (NRF)	VL (NRF)	VL (NRF)

Confidence levels: VL = Very low (brown); L = Low (yellow); M = Medium (orange); H = High (light green); VH = Very High (dark green); NRF = No research found (gray)

Recreation of Birch et al.'s evidence confidence tables for penaeid shrimps and insects

PART 2: PRIORITIZATION

The implications of this view

Indeed, if one does consider the case for *L. vannamei* as being enough to warrant precaution and acting on it, then Birch's own consistency arguments make it hard to deny comparable consideration to at least ants, fruit flies, and mosquitoes.

In fact, when these same sentience criteria are applied to insects, as Birch and colleagues have done in another report, flies and mosquitoes score high to very high confidence evidence for six out of eight criteria, and ants do so for four out of eight, compared to only one criterion for *L. vannamei* [31]. Importantly, this includes a functional central complex that *L. vannamei* appears to lack. Birch indeed proposes that, unlike *L. vannamei*, *all* adult insects are sentience candidates [17] (p.272).

We currently farm and kill about one trillion insects, and this is expected to increase to about ten trillion by 2030 [34] (though estimates vary). Slaughter methods include boiling, freezing, freeze-drying, blast drying, spraying with hot water, mechanical crushing, and shredding [17] (p.294), most if not all of which may be extremely painful.

By precautionary expected value reasoning, insects appear to make a stronger case than shrimp: they show more markers of sentience, are much larger in (projected) scale, and killed in equally (if not more) seemingly painful ways. Tractability might be one point where shrimp is stronger, though active work on insect welfare practices [35], instantaneous killing [35,36], and humane insecticides [37] could well exceed it there too.

Birch's framework is designed for ethical decision-making under uncertainty, where the evidence is incomplete, and the potential downside of getting it wrong could be massive. The difficulty is that, once you combine this precautionary posture with EA-style expected value reasoning, the moral priorities landscape easily gets hijacked by these low-probability, ultra-high-scale cases.

Insects are stitched into the basic metabolism of life: conservative estimates place annual insect deaths in agriculture at hundreds of trillions; others, once you include pesticides, habitat destruction, and crop harvesting, estimate around 3.5 quadrillion [17,37]. That's about half a million insects per human per year.

A tiny credence multiplied by an astronomical number of individuals multiplied by even very modest negative experience thus threatens to dominate moral attention. If one considers shrimp welfare as the "precautionary frontier," by this logic, insects aren't at the frontier, but already over the line. On this view, the main ethical crisis built into modern life is the quadrillions of insects we kill just to move around, wash, and eat food—under our shoes, beneath our tires, in our sinks, and across our food crops.

And there the epistemic problem becomes practical: when you cut back on meat, you can tell a legible story—avoid something like ~10 chicken meals and, roughly, one chicken doesn't have to be raised and killed—but with insects you can't even define, let alone verify, the "insects not killed" counterfactual, so the moral arithmetic starts to outrun anything a human can responsibly act on. Just one fruit salad might rack up more deaths than your conscience can even render.

We can accept this "moral explosion" *if* we think it is simply the logical consequence of an otherwise coherent worldview—one that gestures toward something Benatarian: a view on which the cleanest way to reduce suffering appears to be to reduce sentient life itself [38]. That's not to say it's definitively wrong; perhaps the world really is largely made up of enormous invertebrate suffering.

Alternatively, we can try to add principled constraints that prevent low-confidence, ultra-high-n cases from hijacking the moral landscape.

Birch manages some of the high-n runaway logic through proportionality (distinguishing unavoidable collateral harms from avoidable, high-risk

practices; e.g., accidentally stepping on an ant vs. killing ants for food without effective stunning) [17] (p.154-170); democratic deliberation (using informed citizen processes to settle what trade-offs are proportionate) [17] (p.138-153); and making distinctions between sentience candidates and investigation priorities (the former getting precaution, the latter urgently needing more research) [17] (p.123-127), which are sensible brakes for governance as they prevent policy whiplash.

However, besides it seeming unlikely people will ever care about mosquito welfare—even after fifty years of modern animal advocacy [39] there is little evidence of a shift away from industrially farmed animal products at the population level, with chicken slaughter per person roughly quadrupling during this period [6,7]—these constraints don't solve the cause-prioritization problem, because they don't tell you how to compare 10 billion high-confidence extreme sufferers against 10 trillion low-confidence ones.

And even granting the usual EA filters—tractability, neglectedness, feasibility, and evidential robustness—the scale gradient from shrimp to insects (via agriculture-related deaths) is so steep that these filters don't, by themselves, explain why the precautionary logic should settle on shrimp. All else equal, once you shift to a target that is thousands of times larger, an intervention could be far less effective and still compete on expected impact.

Pain severity

I think it helps here to consider a set of observations that Birch collects that, whatever they ultimately imply about sentience, sit awkwardly with our usual inferences about severe suffering.
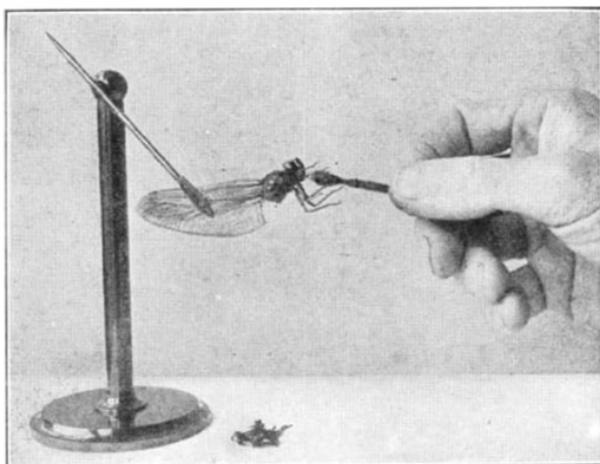
EATING ITS OWN BODY

The entire abdomen of this dragon-fly has been cut off, and the still living insect is eagerly devouring it. The particles merely pass through what is left of the insect and fall from the thorax as shown

From Bastin's 1927 report on insect pain [40]

He notes that insects "will continue normal feeding and mating behaviours despite catastrophic injury" [17] (p.264), with examples including "a dragonfly eating its own detached abdomen" and "a sleeping moth that is not woken by being pinned to a tree" [17,40] (p.264).

Though based on observation rather than experimentation—so not proper experimental support—Eisemann et al. provide a vivid illustration of the pain severity-inference problem in insects:

"… our experience has been that insects will continue with normal activities even after severe injury or removal of body parts. An insect walking with a crushed tarsus, for example, will continue applying to the substrate with undiminished force. Among our other observations are those on a locust which continued to feed whilst itself being eaten by a mantis; aphids continuing to feed whilst being eaten by coccinellids; a tsetse fly which flew in to feed although half-dissected; caterpillars which continue to feed whilst tachinid larvae bore into them; many insects which go about their normal life whilst being eaten by large internal parasitoids; and male mantids which continue to mate as they are being eaten by their partners." [41]

These reports are not robust evidence, and recent work argues they are easy to misinterpret. "Normal" post-injury behavior is a slippery construct, potentially confounded by insect-specific biomechanics and control constraints—injury may not look like mammalian "limping" (when gait is measured changes have been found); by context effects—acute threat can suppress injury responses; and by selection effects—the vivid examples are disproportionately noticed and reported, even when we don't know how typical they are [42].

None of this settles the sentience question either way, but it highlights that our vertebrate-trained behavioral heuristics don't transport cleanly across taxa. It's also worth noting that there is evidence consistent with self-protection and valuation in some insects, such as wound-tending in cockroaches and moth larvae [31], and motivational trade-offs in fruit flies [43] and bees [31,44].

Still, if anything like this pattern generalizes, it suggests that catastrophic injury does not reliably produce the sustained, motivational suppression that often tracks severe, disabling distress. This may be compatible with the possibility that a system can implement aversion and learning without supporting highly integrated, persistent, life-dominating negative states. Of course, this remains a substantive

assumption, and one that we may never get definitive answers to.

Indeed, the current insect and general sentience literature is much better at answering "can they avoid or respond to noxious stimuli?" than "can they enter sustained, life-dominating distress?" Sentience markers often function as threshold tests but are poorly calibrated to severity. And the feasibility of "properly" studying pain severity in a clinical way (beyond observation) by intentionally inducing prolonged distress states seems ethically fraught and experimentally intractable.

The issue with severity is that it's a felt state that we don't get access to in other species. Even in humans, severity is not read directly off behavior or physiology; it's inferred from a bundle of self-report, choice, and bodily signals. In nonhumans we can't prove severity, but we can find some markers. When an adverse state produces persistent, system-wide motivational collapse (reduced feeding, exploration, sociality, mating), scales with objective harm (lesion burden, disease severity), and reverses under interventions that reduce harm, that is at least consistent with a life-interfering negative condition, not just local avoidance.

Conversely, when catastrophic injury appears to leave behavior broadly intact (feeding and mating continue with little to no suppression), that nudges the plausible interpretation toward highly local, easily overridden aversion, extreme compartmentalization, or no aversive experience at all. None of this delivers certainty, but it does bear on whether the system plausibly supports severe pain. We cannot establish that insect negative experience is "thin," but it's one tenable interpretation.

On a severity weighting view, moral priority-setting turns on what kinds of negative states a system can support. It can be encoded as a strict override (the controversial lexical priority view that even a moment of excruciating pain defeats *any* amount of moderate discomfort, which has serious issues [45]), or more modestly as extreme weights that make "disabling" or "excruciating" pain dominate "annoying" or "hurtful" pain by large orders of magnitude.

There is some empirical support for the general shape of this idea: in evaluations of aversive episodes people tend to overweight peak intensity and show surprising insensitivity to duration [46–52], and pain unpleasantness appears to increase extremely nonlinearly with intensity [53–55]. The *Welfare Footprint Institute*'s categories make this discontinuity in pain explicit: "annoying" and "hurtful" still leave room for positive welfare, whereas "disabling" and "excruciating" are, by definition, inconsistent with it [53].

Put succinctly, there is a (perhaps qualitative) difference between local aversions that leave a life largely intact and states that can crowd out positive experience and become life-dominating. A simple way to see the distinction is to consider mild human discomforts: a low-grade dehydration headache, a brief chill, a tired jaw from chewing too hard. Multiply those annoyances across billions of people and you can generate an enormous aggregate "amount" of unpleasantness, yet it seems hard to argue this is the kind of suffering that should dominate moral attention. What plausibly deserves priority are states that are severe and disabling—agonizing terminal illness, never-ending cluster headaches, debilitating depression, or sustained disabling states like severe lameness under rapid growth, suffocation from ascites, or stunning failures that leave one conscious through intense fear and pain at slaughter.

You don't need a precise exchange rate to see the shape of the moral landscape on this view: it allows large numbers to matter in some way, while giving special weight to evidence-backed, severe, life-disrupting suffering. The critical question is whether shrimp or insects can support the kinds of negative states that make suffering severe, rather than merely possible.

Prioritization

On the pro side, shrimp welfare has a rare combination of features that make an intervention attractive: large numbers, a concrete and legible intervention, and a plausible story of large gains at very low cost. On the view that we shouldn't wait for proof when the downside risk could be large, shrimp appear like a reasonable place to act, especially insofar as the interventions are relatively low-regret and may generate spillovers like improved industry norms for other aquatic invertebrates—simply stunning before killing is a pretty low bar.

But the case is weaker than it often sounds, because the flagship species, *L. vannamei*, is supported by almost the thinnest evidential profile you can possibly have while still talking about pain at all. Beyond nociceptors and pharmacological modulation, there is *no* good evidence for sentience, and some evidence that is unsupportive. Among the six decapods he has reviewed, it is telling that Birch only excludes *L. vannamei* from sentience candidacy. If you respond to that level of uncertainty with precaution plus expected-value arithmetic, the logic expands to insects more strongly, given their stronger sentience

markers and their vastly larger numbers (and they are, indeed, considered "sentience candidates").

The severity-weighted approach seems attractive in cases like this: it does not deny that thin, uncertain harms can matter, but it says we should be cautious about letting astronomical low-certainty beings dominate the moral landscape when we remain unsure about both sentience and the capacity for severe, integrated distress. The empirical problem is that welfare science is much better at detecting negative states of some kind than at measuring how intense those states are, and it is far better developed for vertebrates than for invertebrates. Much of what passes for "severity" inference leans on vertebrate-centric proxies and human analogies, and the injury-tolerance cases in insects suggest those analogies may not transfer. However, if even spectacular tolerance to ripped off limbs can't count as *any* evidence against life-dominating distress, then it's unclear what observable pattern would ever count against it—and "severity" risks becoming insulated from evidence.

A final friction is practical: shrimp welfare is, unavoidably, a bet. If penaeid shrimp turn out not to be sentient, which I think is a plausible read given current evidence, the direct welfare impact collapses to near zero (leaving only indirect spillovers like better standards). That's a different kind of intervention from high-certainty cases, where the same dollars almost certainly reduce felt suffering, and such funding is desperately needed. That trade-off matters.

In practice, this pushes me toward a portfolio view with heavy emphasis on proven, serious suffering. I'd put the bulk of effort into high-confidence, disabling to severe suffering, ideally with proven interventions, and reserve a small share for high-n uncertain cases—treated more like research, standards-setting, and low-regret improvements than like a primary welfare bet. The precise percentages aren't the point; where the chance of near-zero direct impact is substantial, it's rational to limit how much you stake on it, and treat the work as a smaller, exploratory allocation.

On that view, shrimp welfare can be a component, particularly as a research and standards target, but not the default priority implied by simple "scale + tractability" arithmetic. I'd find shrimp welfare a bit more compelling if confidence accumulates that they can at least meet one basic sentience criterion outside of nociception—especially a higher-order one (5-8). Until then, I think it's reasonable to act with modesty: to treat it as worth some attention, but to resist the feeling that the numbers should settle what we ought to do, and to

keep our focus on reducing large-scale severe suffering in proven cases.

Disclosure: I'm not neutral. I've focused on chicken welfare since at least 2017. I should also note that in my 2020 LSE thesis I defended a fairly binary view of pain—either a being can suffer in a robust way, or it can't suffer at all—I'm less confident in that picture now. Some of that is genuine updating, but some of it might be motivated reasoning too.

Update: Feb 6, 2026 — changed some wording based on some thoughts from Bob Fischer on the article.

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