

The unique pain of being human

We seem to experience pain differently to other animals. Why, wonders neuroscientist **Barbara Finlay**

FOR years I worked in Brazil on the evolution of vision in primates and was often stationed near monkeys who had undergone caesarean sections. Their recovery was impressive – in stark contrast with my own after two C-sections. Within hours, the monkeys would be sitting, climbing and annoying each other.

Looking at these unbothered monkeys, I began to think that some causes of the sensation of pain in humans might be fundamentally different to those in other animals.

The basic function of pain is the same for all vertebrates: it alerts an animal to potential damage and reduces activity after trauma. It is often argued that pain must be different in humans because of our ability to anticipate it or imagine its effects on us. But independent of whether cognition and culture can modify pain, I am suggesting a more basic difference in humans compared with animals: that some varieties, such as labour pain, appear only in humans, and others such as post-trauma pain are magnified.

These forms of pain appear in tandem with the ability to recruit help, to elicit an altruistic response in others. By “help” I mean the simple protection and provisioning that parents supply to children, not medical intervention – although our medical interventions probably first grew from this basis.

This view arises from work carried out nearly 50 years ago by pain researcher Patrick Wall. He was the first person to suggest a functional view of pain – that it should be understood as a mixture of sensation and the motivation to make it stop, not sensation alone. His starting point was the now well-researched placebo effect. His account

explained how rituals or procedures offered by a doctor or shaman, regardless of the efficacy or even existence of an actual treatment, could reduce pain.

But even with this early advocate for a functional view of it, studies of pain have mainly concentrated on receptors and specific clinical manifestations, while neglecting its purpose. Pain is a motivational signal to get an animal to do something – escape from a source of damage, protect a wound or devote energy to recovery. Wall argued that one of its roles in humans is as a motivation to seek help from some trusted source. When that goal is satisfied, pain is relieved.

I want to extend this view. I think that, over evolutionary time, several stimuli and situations that are not painful in other animals have come to be experienced as painful for humans. This is because our obvious distress elicits help from others and hence offers a survival advantage. This is distinct from the numerous demonstrations that context and culture can alter our sensation of pain. I argue that the primary circuitry of pain and malaise has been changed in human evolution in cases where getting help from others would be useful.

The pain of altruism

There is much indirect evidence in support of this “pain of altruism”. Take, for instance, the fact that certain types of pain are not associated with any physiological damage, and studies that show the presence of others can affect reported sensations of pain. Labour pain is another good example.

Across all human cultures, there are nearly always helpers, from relatives to medical

PROFILE

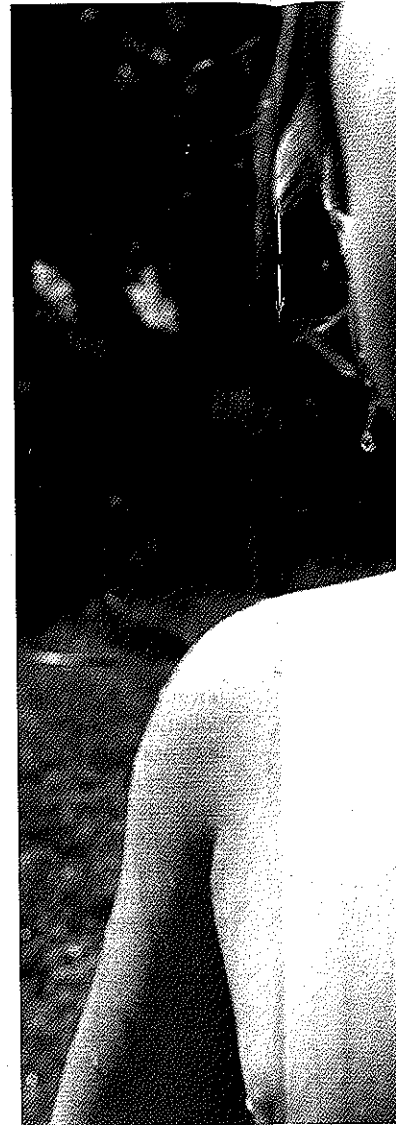
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Cry for help: it's just what nature wants you to do

professionals, who attend births. Giving birth is risky and help at any level improves survival. The cliché scenario of a mother from some exotic tribe going off to give birth alone is not unheard of, but is exceedingly rare. By contrast, among our primate relatives, solitary birth is the norm.

Human childbirth appears to be uniquely painful among members of the animal kingdom. Typically, scientists have accounted for this in terms of the size mismatch between the infant's head and the mother's pelvis, and not in terms of differences in social structure.

Human birth is dangerous, but we are not the only primates at risk – the smallest-bodied, large-brained monkeys, like marmosets, have similar head to pelvis disproportionality and birth-related mortality. Yet compared with



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humans, primates appear to give birth with little pain. Ungulates such as horses and cattle produce large, long-limbed offspring with a substantial chance of complications, but with little evidence of distress. Any such evidence, in fact, could prove fatal by alerting predators. So why is childbirth so painful for women?

The source of labour pain is the contraction of the uterus and dilation of the cervix, but these are not damaging or pathological in themselves. Rather they predict a risky and potentially lethal event: the actual birth, to occur hours later. I suggest that protracted labour pains make us show distress and recruit help from others well in advance of the birth – a strategy that offers a survival advantage, as the offspring of those who seek help are more likely to survive.

OTHER UNEXPLAINED AGONY

Pain exists to get an animal to change its behaviour. This functional account of pain may explain some ongoing mysteries, such as the cause of the muscle soreness that follows a day of intense exercise, which has eluded physiological explanation. The popular idea that it is due to the build-up of lactic acid has been discounted, as have other proposed theories. Bodybuilders have found that the optimal way to build muscle is to take a rest day after a strenuous workout. Perhaps nature has converged on the same idea, and muscle soreness is simply a signal to rest, to enable optimal muscle building.

But if the pain of labour is not linked to tissue damage and is primarily a call to enlist help, why does it have to be so excruciating?

Helping someone in pain comes at a cost to the helper, and societies can't afford to tolerate "cheating" in the form of excessive malingering or fake pain. I think that the pain of altruism may be connected to the concept of honest signalling in behavioural biology, whereby producing a signal has to be sufficiently costly to deter cheaters and freeloaders. Pain could be the obligatory cost of an honest signal, in the same way that a

"The availability of help from others might be the root cause of some pain"

peacock's tail or stag's antlers are hard-to-fake signs of their owner's underlying fitness. However, since pain has no concrete physical manifestation that others can verify, cheating is difficult to eliminate – there is probably not one person reading this article who has never exaggerated pain or illness for their own benefit.

If feeling pain to recruit the help of others is an evolutionarily assembled neural construct, this could be triggered in error. Perhaps this is what happens in the case of mysterious but distressing illnesses for which a direct physical cause cannot be found.

The pain of altruism also explains why malaise after trauma and infection are long and exaggerated for humans compared with laboratory mice. Mice, like most non-human animals, cannot provide the high level of social support needed to nurse an individual with an illness or a broken leg. Such injured animals must confine their energetically expensive immune response to the minimum time needed to survive without help.

It is also possible that this pain of altruism has been extended to domesticated livestock and pets, as they too can enlist human help. In contrast, most adult animals in the wild try to avoid showing disability or distress, which might attract rivals or predators.

Periods of extended illness might only be feasible in species where individuals protect and provide for others for such lengths of time. If help from others is the root cause of some types of pain, then this needs to be factored into our understanding of pain and disease. An evolutionary calculation that we cannot be aware of, rather than a specific physical cause, could be the source of much real agony. ■

MIKAEL ANDERSSON/PLAINPICTURE