

Name: _____ Class: _____

Animal emotions stare us in the face — are our pets happy?

By Mirjam Guesgen
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While the facial expressions of our friends and family can give us an idea about what they're feeling, the facial expressions of our pets largely remain a mystery to us. In this informational text, Mirjam Guesgen discusses researchers' attempts to create new technology that can decipher animals' facial expressions. As you read, take notes on what researchers know about animals' facial expressions, and what else they need to learn.

- [1] Scientists are starting to be able to accurately read animal facial expressions and understand what they communicate.

Facial expressions project our internal emotions to the outside world. Reading other people's faces comes naturally and automatically to most of us. Without your best friend saying a word, you know — by seeing the little wrinkles around her eyes, her rounded, raised cheeks and upturned lip corners — that she got that promotion she wanted.



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What if we could just as easily read the faces of other living beings? Will there come a day when we can hold up a smart phone to our cat and know how he's feeling?

Researchers are developing coding systems that enable them to objectively read animal facial expressions rather than inferring or guessing at their meaning. A coding system precisely describes how different facial features change when an animal feels a particular emotion, such as squinting an eye or pursing lips. By looking at photographs and scoring how much each of these features or "action units" change, we can determine how strongly an emotion is felt.

Pain recognition first frontier

- [5] So far, only pain coding systems (grimace scales) for non-primate animals have been scientifically developed. Despite their different anatomy; mice, rats, rabbits, horses and sheep (including lambs) all pull a similar pain-face. They tighten their eyes, bulge or flatten their cheeks, change the position of their ears and tense their mouths.

The push to develop grimace scales has largely come from our desire and ethical duty to assess and improve the welfare of animals used in labs or for food products.

Ideally, we want a way to accurately and reliably know how an animal is feeling by simply looking at them, rather than by drawing blood for tests or monitoring heart rates. By knowing their emotional states, we can help to reduce pain, boredom or fear and, ideally, foster curiosity or joy.

Animals, particularly social ones, may have evolved facial expressions for the same reason we did — to communicate with one another or, in the case of dogs, with us.

Particularly for prey animals, subtle cues that other members of their group (but not predators) can pick up on are useful for safety, for example. A pain behaviour cue may trigger help or comfort from other group members, or serve as a warning to stay away from the source of pain.

- [10] If we can decipher grimacing, we should also, theoretically, be able to understand facial expressions for other emotions such as joy or sadness. We would also likely want to comprehend facial expressions for the animals closest to our hearts: our pets.

Smart phone app for animal emotions

One day, pet owners, farmhands or veterinarians could hold up a smart phone to a dog, sheep or cat and have an app tell them the specific emotion the animal is showing.

However, getting to an automated emotion-identification system requires many steps. The first is to define emotions in a testable, non-species-specific way.

The second is to gather descriptive baseline data¹ about emotional expression in a controlled, experimental environment. One way to do this might be to put animals in situations that will elicit² a particular emotion and see how their physiology, brain patterns, behaviour and faces change. Any changes would need to occur reliably enough that we could call them a facial expression.

We already have some hints to go on: Depressed horses close their eyes, even when not resting. Fearful cows lay their ears flat on their heads and open their eyes wide. Joyful rats have pinker ears that point more forward and outward.

- [15] Once we have gathered this data, we would then need to turn that scientific information into an automated, technological system. The system would have to be able to extract the key facial action units from an image and calculate how those features differ from a neutral baseline expression.

The system would also need to be able to deal with individual differences in facial features as well as subtle differences in how individuals express emotion. The process of feature extraction and calculation also becomes difficult or fails when a face is poorly lit, on an angle or partially covered.

While we are making progress in automated human facial expression identification, we are still a long way off when it comes to animals. A more realistic short-term goal would be to better understand which emotions non-human animals express and how. The answers could be staring us right in the face.

1. data used as a basis for comparison or as a control in a study
2. **Elicit (verb):** to evoke or draw out a certain response

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which statement identifies the central idea of the text?
 - A. Through researchers' study of animals' facial expressions, they have determined that most animals are just as emotionally complex as humans.
 - B. Researchers are in the process of developing technology that deciphers animals' expressions, but still have much to learn.
 - C. Developing technology to decipher animals' facial expressions shouldn't be too challenging, as animals and humans share many facial expressions.
 - D. While technology is already being developed to decipher animals' facial expressions, many people wonder how this will impact humans' views on animals.

2. PART B: Which detail from the text best supports the answer to Part A?
 - A. "Without your best friend saying a word, you know — by seeing the little wrinkles around her eyes, her rounded, raised cheeks and upturned lip corners — that she got that promotion she wanted." (Paragraph 2)
 - B. "Despite their different anatomy; mice, rats, rabbits, horses and sheep (including lambs) all pull a similar pain-face. They tighten their eyes, bulge or flatten their cheeks, change the position of their ears and tense their mouths." (Paragraph 5)
 - C. "A pain behaviour cue may trigger help or comfort from other group members, or serve as a warning to stay away from the source of pain." (Paragraph 9)
 - D. "However, getting to an automated emotion-identification system requires many steps. The first is to define emotions in a testable, non-species-specific way." (Paragraph 12)

3. Which statement describes the author's purpose in the text?
 - A. to discuss the development of technology that could decipher animals' emotions, and how that technology would work
 - B. to show why developing technology that can decipher animals' facial expression isn't a worthwhile project for researchers
 - C. to discuss some of the problems that developing the technology that deciphers animals' facial expressions might cause
 - D. to stress how close researchers are to developing an app that can decipher animals' expressions automatically

4. Which statement describes the relationship between humans' ability to identify animals' grimaces and deciphering other facial expressions?
 - A. The author believes that humans' ability to recognize pain in animals should lead to the ability to recognize other facial expressions.
 - B. The author discusses how animals' ability to show pain through facial expression proves that they are capable of a wide range of expressions.
 - C. That author discusses how humans are only interested in identifying pained facial expressions in animals to improve the ethical treatment of them.
 - D. The author explains how a grimace can be used as a base-line emotion for animals, as all humans and animals have similar expressions of pain.

5. How does the author describe humans' ability to decipher animals' facial expressions and how that might affect humans' relationships with animals?

Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. In the text, the author discusses how understanding animals' facial expressions could make the treatment of animals in labs and food production more ethical. Do you think being able to recognize distress in animals would change the ethics of testing on, or using, animals? Why or why not?
2. How do you think being able to recognize emotions in animals would change your perception or treatment of them? Would you want to use an app that showed your pet's feelings? Do you think that pets are capable of complex emotions, like humans are? Why or why not?