Smell of human stress can affect dogs' emotions, leading them to make more pessimistic choices

July 22 2024

Study participant Freddie sitting next to the jar containing the odor sample while waiting for the test to begin. Credit: University of Bristol

Dogs experience emotional contagion from the smell of human stress,

leading them to make more 'pessimistic' choices, new research finds. The University of Bristol-led study, published in *Scientific Reports* on 22 July, is the first to test how human stress odors affect dogs' learning and emotional state.

Evidence in humans suggests that the smell of a stressed person subconsciously affects the emotions and choices made by others around them. Bristol Veterinary School researchers wanted to find out whether dogs also experience changes in their learning and emotional state in response to human stress or relaxation odors.

The team used a test of 'optimism' or 'pessimism' in animals, which is based on findings that 'optimistic' or 'pessimistic' choices by people indicate positive or negative emotions, respectively.

The researchers recruited 18 dog-owner partnerships to take part in a series of trials with different human smells present. During the trials, dogs were trained that when a food bowl was placed in one location, it contained a treat, but when placed in another location, it was empty.

Once a dog learned the difference between these bowl locations, they were faster to approach the location with a treat than the empty location. Researchers then tested how quickly the dog would approach new, ambiguous bowl locations positioned between the original two.

A quick approach reflected 'optimism' about food being present in these ambiguous locations—a marker of a positive emotional state—while a slow approach indicated 'pessimism' and negative emotion. These trials were repeated while each dog was exposed to either no odor or the odors of sweat and breath samples from humans in either a stressed (arithmetic test) or relaxed (listening to soundscapes) state.

Freddie approaching the bowl placed at one of the ambiguous locations midway between the two trained locations to check if there is a treat inside. Credit: University of Bristol

Researchers discovered that the stress smell made dogs slower to approach the ambiguous bowl location nearest the trained location of the empty bowl. An effect that was not seen with the relaxed smell. These findings suggest that the stress smell may have increased the dogs' expectations that this new location contained no food, similar to the nearby empty bowl location.

Researchers suggest this 'pessimistic' response reflects a negative emotional state and could possibly be a way for the dog to conserve energy and avoid disappointment.

The team also found that dogs continued to improve their learning about the presence or absence of food in the two trained bowl locations and that they improved faster when the stress smell was present.

Dr. Nicola Rooney, Senior Lecturer in Wildlife and Conservation at Bristol Veterinary School and the paper's lead author explained, "Understanding how human stress affects dogs' well-being is an important consideration for dogs in kennels and when training companion dogs and dogs for working roles such as assistance dogs.

"Dog owners know how attuned their pets are to their emotions, but here we show that even the odor of a stressed, unfamiliar human affects a dog's emotional state, perception of rewards, and ability to learn. Working dog handlers often describe stress traveling down the lead, but we've also shown it can also travel through the air."

Dr. Zoe Parr-Cortes, Ph.D. student at Bristol Veterinary School and primary author and researcher on the project expressed her thanks to everyone involved in the study, especially all the participants and dog owners who took part in the research.

More information: Parr-Cortes, Zoe ; Muller, Carsten T ; Talas, Laszlo et al, The odour of an unfamiliar stressed or relaxed person affects dogs' responses to a cognitive bias test, *Scientific Reports* (2024). DOI: 10.1038/s41598-024-66147-1

Provided by University of Bristol