Every year, people donate hundreds of billions of dollars to charities and relief funds, but while most of this intended for human benefit, large amounts go toward helping animals and the environment. This begs the question of whether or not the empathy we feel toward humans and nonhuman counterparts requires the same neural activity or if they are distinct. Dr. Vani A. Mathur, a faculty member of the Texas A&M Department of Psychological and Brain Sciences, and her associates conducted a study to investigate the neural overlap/distinction in neural response to pain inflicted on humans versus animals and nature. In this study, Dr. Vani A. Mathur hypothesized that there would be an overlapping neural response to pain in humans, animals and nature. They studied their hypothesis by observing neural activity in brain areas typically associated with pain perception (e.g. dACC, bilateral AI and thalamus) in a 3x2 within groups study. They observed these by use of fMRI.

Before performing the study, a group of 27 participants (20 female, 7 male) were shown the images used in the first study and rated the degree of perceived pain (how much pain do you think the person/animal/nature is in?), level of perceived pain agency (how much control do you think the person/animal/nature has over the situation) and empathy felt (how mad do you feel for the person/animal/nature?).

This research was done in order to validate the images that would be used in Dr. Mathur’s study. They found that there were significant main effects of valence of experience (painful versus neutral) and target group (people, animals, nature) on empathy rankings. There was also significant interaction between the valence and target groups, in that all participants reported more empathy toward the painful experiences than the neutral. The results also showed that they felt more empathy toward people and animals than nature, but there was no significant difference in empathy ratings towards people in comparison to animals.

In the study, there were 15 healthy, Caucasian participants (8 female, 7 male). Participants were exposed to visual scenes showing people (other Caucasians), animals (farm animals) and nature (plant life or natural waterways) under pain/distresses (people in natural disasters, sick or injured animals, deforestation or pollution) or under neutral conditions. For each of the 6 conditions (people pain, people neutral, animal pain, animal neutral, nature pain, nature neutral), 24 different scenes were shown while the participant underwent an fMRI. This study was conducted in order to establish the known groups of images that should evoke empathy and establishing that there was brain activity associated with the perception of pain.
As predicted from prior research, the main effect of pain recruited brain areas associated with the processing of pain and empathy (e.g. dACC, bilateral AI and thalamus) was consistent across all 3 targets (people, animals, nature). The results demonstrate overlapping neural representation underlying pain perceived in human and non-human entities, specifically animals and nature, which supports the original hypothesis that the perception of pain and suffering relies upon a shared neural network for human and non-human entities. These results indicate that there is similar brain activity in those watching people in pain and watching animals/nature be harmed.

This research is important to the field because it offers insight into the understanding of our response to pain. This study was the first of its kind and is an important consideration for future studies, especially those that further explore the functional specificity of empathic neural circuitry. The researchers even suggested that “these findings may provide a foundation for future studies examining the extent to which activity within these regions relies on anthropomorphic thinking, or is simply an automatic affective response to harmful situations, as well as the role that empathic neural circuitry plays in facilitating broad charitable action for living things in the natural world.” In other words, these studies help lay the groundwork for future studies in empathy and the associated brain activity.

For more information on this study, go to http://www.sciencedirect.com/science/article/pii/S0028393215302633.