Sheep and Face Identity

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Keith Kendrick, an expert in Behavior Neuroscience in the United Kingdom, has done a series of experiments which explored the ability of sheep to recognize the faces of other sheep and humans. I attended a presentation by Prof. Kendrick at Michigan State University and thought a number of his findings would be of interest to those of us who deal with sheep on a daily basis.

First as a matter of basic biology, sheep see a dichromatic world. Their vision is like a human who has red/green color blindness. As a result, they cannot see the lush green of summer pasture; it looks more like brown in their vision. The level of their vision is equal to that of 20-40 human vision, and they can see distance reasonably well.

It is common experience for us to realize that sheep do not like being alone. In one experiment, sheep were isolated and the increases in stress level and heart rate were measured. Then the sheep were shown pictures of a simple triangle, a goat or a sheep. Only when shown the picture of sheep was the stress and fear reduced. Additionally, it was shown that sheep could distinguish facial expressions of both sheep and humans, with a preference for happy versus upset faces. So, as you head out to the barn put on that smiley face. If you are having a bad day then, like your dog, the sheep are aware of it.

The basic format for the experiment took months of effort to train the sheep to be able to perform. First they had to teach the sheep to push a button with their nose in order to receive a treat pellet (I think I would have used beet pulp.) The sheep were then shown pictures above the button, and the sheep had to figure out that the nature of the picture related to the availability of the reward. It might take up to six months of training to be ready to do experiments. Some caught on quicker than others; some never did figure it out and had to be removed from the experiment. Yes, sheep have variable brain capacity, just like their owners. Professor Kendrick believed that, as with training primates for experiments, he had to educate them to a level of awareness or consciousness that they do not normally exercise. (He was interested in my stories of leader sheep, but the breed they used did not have such a subset to work with.)

On the basic issue: do sheep recognize their flock mates, the answer is clearly yes. Sheep could distinguish upwards of 50 different faces of sheep and 10 of humans. That is not a maximum number for either category; it was simply as far as they could take the experiment. In our flock my face does not elicit the same positive response that my wife's does, nor the negative responses they give to strangers. In the experiment they showed that strange human faces did upset the sheep. They further showed that memory of these faces was retained upwards of two years with 80% reliability. (Comparable to humans.)

The most recent experiments examined the sequence of neuron firing in the sheep brain. Just as with humans, it was shown that there was image recognition in the higher brain levels, not just in the visual cortex. It also appeared, but could not be proven, that sheep had the capacity to create, or recall images in the absence of visual stimuli. So perhaps it is true that they can think about us and plot their next adventure with our smiling faces as motivation.

A modest side point that they found when looking at comparative pictures of sheep brains and humans, was that when a ewe is in her hormone flush for breeding, a particular portion of the brain is activated when she sees a ram; this is the same portion of the brain that is excited in a human when in the presence of someone they are in love with. If the hormones are not flowing, that portion of the brain is not

activated in the presence of the ram. I'm not sure if this provides more insight about sheep or humans.

Although not a primary focus of the experimentation they had a few insights about the ewe –lamb identification process. It would take a week or so for a ewe to visually identify her lambs, with odor being a key support in early identification. For the lambs, it would take over a month for them to visually identify their mothers. The sheep in the experiment were plain white sheep and did not have the visual difference that so many of the Icelandic sheep possess, so the results might be different for Icelandics.

In sum sheep are social animals who use many visual clues to build their society, and they have the capacity to distinguish who is around them and how they are feeling, when visually expressed. With his work and the presentations of his work, the status of sheep have been enhanced. At Michigan State University, the presentation was heard by both animal scientists and neurologists. The most common comment after the presentation was: "I didn't know sheep were so intelligent."

Figure 1 -If you remember my face, I'll remember yours.