

Human-Cow Interactions: Production Effects

Temple Grandin, PhD

Department of Animal Science

Colorado State University

Fort Collins, CO 80523

W.D. Hoard, founder of Hoard's Dairyman, wrote over a 100 years ago that people working with dairy cows should have patience and kindness, and that rough treatment decreases the flow of milk. People who enjoy working with animals will have more productive animals.⁷ Jack Albright, Professor Emeritus at Purdue University, stated years ago that tame dairy cows that will approach people will give more milk. People have known for a long time that rough handling and stress is detrimental to dairy cattle, but some people have forgotten W.D. Hoard's wisdom. In fact the highest producing dairy in Colorado milks only twice a day, uses no growth hormone and has tame cows that will approach people.

Researchers have used statistical methods to determine the powerful negative effects of rough handling.¹⁴ Shocking or hitting a cow can reduce milk yield by 10%. Paul Hemsworth in Australia has found that cows that are fearful of people are less productive. Fear of people was measured on 14 dairy farms by measuring how close the cows would approach people. On dairies where cows had a large flight zone, there was significantly less milk production.⁶ Cows that avoided people and became restless when a person was nearby had lower milk production. Observation at a large dairy indicated that tame cows in a special research unit gave more milk. Breuer et al. (1997) found that dairy heifers that were slapped repeatedly before and after milking had reduced milk yield. Seabrook also demonstrated the beneficial effects of gentle treatment.¹⁶ Dairy cows that were slapped gave 13% less milk than cows that were gently stroked. People need to talk quietly to cattle. Yelling and whistling increased a cow's heartrate more than the sound of a gate slamming.¹⁷ Hemsworth and Coleman (1998) have authored an excellent book which outlines all the studies showing the beneficial effects of good stockmanship on farm animal productivity.

Fear Memory Formation

Fearful animals will be less productive. Animals have good memories for both good and bad experiences. Research at New York University has shown that animals can make fear memories that cannot be erased.¹⁰

These fear memories are located in a part of the brain called the amygdala, which is the lower more primitive part of the brain under the cortex. Fear memories are permanent. In the times when cows were wild animals, they would be more likely to be eaten by predators if they forgot where they had encountered a lion. Animals can learn to override a fear memory and become less fearful of the place where a scary experience occurred, but they can only override the fear memory as it cannot be erased. The emphasis has to be on preventing fear memories. Good stockmanship improves productivity by reducing fear.

Fear is Place Specific

Cattle and other animals tend to develop fear memories which are linked to certain places,¹³ prominent objects or people. Rushen et al. reported that the heart rate of a cow increases when she sees a person who had previously mistreated her. Animals are most likely to become fearful of a specific place or of a person wearing a certain type of clothing that can be associated with a painful or scary experience.¹² It would be very detrimental for milk production if a cow became afraid of the milking parlor. It is essential that a heifer's first experience in the milking parlor is a good experience. First experiences make a big impression on animals.⁵ If a heifer falls down or is shocked with an electric prod the first time she enters the parlor, she may develop a fear memory that is associated with the parlor.

Research done with rats shows the powerful effects of forming a fear memory. Rats were placed in a maze and allowed to explore all the alleys. If a rat was given a shock the first time it entered a new alley it would never enter that alley again.¹¹ However, if the rat entered the alley several times and found food and received a shock the fifth time it entered, it would be likely to continue to enter the alley.

If an animal has a painful or scary experience the first time it enters a new place, then the fear memory is associated with the new place. However, if a painful or scary event happens in a familiar place which has pre-

viously been safe, the cow will most likely associate it with something else, such as a person wearing a yellow raincoat. The fear memory will be associated with the raincoat instead of the place. The fear memory can resurface in any place the cow sees a yellow raincoat.

Introducing Heifers to the Parlor

Care must be taken to insure that nothing bad happens to a new heifer when she first walks through the parlor. Animals are naturally wary of new places, and if a new experience is suddenly shoved in the animal's face, it is more likely to be fearful. One of the best low stress ways to introduce a new place to animals is to allow them to voluntarily explore it. On smaller dairies heifers could be allowed to explore and walk around in the parlor before they freshen. On a large dairy this would probably not be practical.

French researchers have found that young calves which are handled frequently by people and have positive experiences with people will grow up into calmer cows with a smaller flight distance.^{2,3} Rushen¹⁴ emphasizes the importance of gentle handling of calves. Albright¹ and Hemsworth (1998b) also support the benefits of positive contact when a heifer first calves. On a large dairy a person could be hired to pet and handle calves. When the heifers get older they can be further tamed and quieted down by a person walking in their pens every day. During this time they will learn the sound of the familiar person's voice and footsteps. He or she should also wear the same clothing that the milkers wear, such as a yellow apron. This will help the heifers to associate milker clothing with a good experience. When the heifers first go in the parlor, they can be calmed by the sound and sight of a familiar, nice, safe person.

Painful Experience

Sometimes cows require veterinary treatments which may cause some pain or discomfort. It is important that these experiences are not associated with milking. To prevent associations with milking, never give an injection when a cow is in a milking stall. The cow should be taken to a veterinary area for treatment. She then learns that the rest of the dairy is "safe." If possible, milkers should not give injections. If this is not possible then the milker should dress differently, such as removing his yellow apron and putting on a big blue hat. Cows can easily distinguish between different clothing colors which are associated with good or bad treatment.¹⁵ Cows then learn that they can relax when they see the yellow apron, and the only time they will be anxious is when they see the blue hat. The hat should be a really wild one that no other employee would ever wear. It should

be put away in a box after the veterinary treatments so that the cows cannot see it. This will work unless a cow has had a bad experience with yellow aprons when she was a calf. Cows do not recognize human faces, but are able to recognize places, smells, a familiar person's voice, distinctive clothing and certain objects.

Memories Are Like Pictures

Since animals do not have language, they store their memories like pictures in a photo album, or as short bits of audio tape. For example, if a cow became afraid of yellow raincoats when she was a heifer, anything that sort of looked like a yellow raincoat may also scare her. A fear of yellow raincoats might generalize to yellow aprons. Basically, the cow matches what she is seeing and hearing to the fear memories in her brain.

Locking Stanchions

Some dairy managers have found that locking stanchions increased stress. This may be due to the methods used to introduce cattle to the stanchions. Before a stanchion is ever locked, the animals should associate it with eating. If the locking stanchion is associated with needles, the cow is more likely to be fearful. To avoid this association, the animal's first experience in the stanchion should be eating. If calves are gently trained to eat in stanchions they likely will not associate them with needles, even if they have received injections in them. It is more likely that the cows will associate the needles with an object, such as a Red "Sharps Container". They will be relaxed when they cannot see the container.

W.D. Hoard's wisdom has now been proven with science. Scientists have mapped the fear circuits in the brain and they know how they work. Dairy managers can use the information to train employees on the importance of treating dairy cows with kindness.

References

1. Albright, JL: Dairy cattle behaviour facilities, husbandry and handling. In: Grandin, T. *Livestock Handling and Transport*, 2nd Edition, CAB International, Wallingford, Oxon, United Kingdom 2000.
2. Boivin X, LeNeindre P, Chupin JP, Establishment of cattle-human relationships. *Appl Anim Behav Sci* 32, 325-335 1992a.
3. Boivin X, LeNeindre P, Chupin JM, Garel JP, Trillat G: Influence of breed and early management on ease of handling and open-field behavior of cattle. *Appl Anim Behav Sci*, 32, 313-323, 1992b.
4. DePassille AMB, Rushen J, Ladewig J, Petherick C: Dairy calves' discrimination of people based on previous handling. *J Anim Sci* 74, 969-974, 1996.
5. Grandin T: Assessment of stress during handling and transport. *J. Anim Sci.* 75:249-257, 1997.
6. Hemsworth PH, Breuer K, Barnett, JL, Coleman, GJ, Matthews, LR: Behavioural response humans and the productivity of commercial dairy cows. In: *Proceedings of the 29th International Congress of the International Society of Applied Ethology*, pp. 175-176, 1995b.

7. Hemsworth PH, Coleman GJ, Barnett JL: Improving the attitude and behavior of stockperson towards pigs and the consequences on the behavior and reproductive performance of commercial pigs. *Appl Anim Behav Sci* 39: 349-362, 1994a.
8. Hemsworth PH, Hensen C, Barnett JL: The effects of human presence at the time of calving on primiparous cows on their subsequent behavioural response to milking. *Appl Anim Behav Sci* 247-255, 1987.
9. Hemsworth PH, Barnett JL, Tilbrook AJ, Hansen C: The effects of handling by humans at calving during milking on the behaviour and milk cortisol concentrations of primiparous dairy cows. *Appl Anim Behav Sci* 22: 313-326, 1989c.
10. LeDoux J: *The Emotional Brain*, Simon and Schuster, New York, NY, 1996.
11. Miller NE: Learning resistance to pain and fear effects of over-learning, exposure and rewarded exposure in context. *J Exp Psychol* 60:137.
12. Munksgaard L, dePassille AMB, Rushen J, Thodberg K, Jensen MG: Discrimination of people by dairy cows based on handling. *J Dairy Sci* 80: 1106-1112, 1997.
13. Rushen J, Munksgaard L, dePassille AMB, Jensen MB, Thodberg K: Location of handling and dairy cows' responses to people. *Appl Anim Behav Sci* 55: 259-267, 1998.
14. Rushen J, Taylor AA, dePassille AM: Domestic animal's fear of humans and its effect on their welfare. *Appl Anim Behav Sci* 65:285-303, 1999.
15. Rushen J, dePassille AMB, Munksgaard L: Fear of people by cows and effects on milk yield, behavior and heart rate at milking. *J Dairy Sci* 82: 720-727, 1999a.
16. Seabrook MF: The psychological interaction between the stockman and his animals and its influence on performance of pigs and dairy cows. *Vet Rec* 115: 84-87, 1984.
17. Waynert DE, Stookey JM, Schwartzkopf, Gerwein JM, Watts CS, Waltz CS: Response of beef cattle to noise during handling. *Appl Anim Behav Sci* 62:27-42, 1999.

AABP FUTURE MEETINGS

2001	Vancouver	September 13-15
2002	Madison	September 26-28
2003	Columbus	September 18-20
2004	Ft. Worth	September 23-25

WBC FUTURE MEETINGS

2000	Punta Del Este, Uruguay
2002	Hannover, Germany