Effects of Stress on Animals
Behavior of Animals under Different Human Handling Conditions

Introduction
Increasing awareness of the treatment of animals is becoming a major issue in the animal industry. Meat quality is at risk with heavy amounts of stress pre-slaughter. According to Apple et al. (2006) “dark-cutting, a meat condition where the meat is a dark red or black in color, and dry and sticky in texture, are being diagnosed after slaughter. Meat quality costs the nation $132 to 170 million annually” (p. 3080). Ways of evaluating animal behavior and the effects that certain conditions have on meat quality and overall welfare of an animal are being researched, in order to find more suitable models of handling to prevent low quality meat and reduced performance.

Purpose
The purpose of this brief is to increase awareness to farmers and ranchers in beef, pork, and other agricultural industries about the effects of stress on animals.

The studies discussed in this brief involved Holstein steers and dark-cutting conditions, German Angus and Simmental beef cattle and production traits associated with human handling, dairy cows and housing, and pork quality. The studies were compared in order to find similarities in behavior from each animal and the conditions and quality of meat.

Dark-cutting in Beef
Apple, Kegley, Galloway, Wistuba, and Rakes (2005), found that exposing sheep to single six hour bout of restraint and isolation stress effectively increased circulating stress hormone concentrations, dramatically decreased glycogen reserves before slaughter, and produced 100% dark-cutting carcasses. Holstein steers were put under the same stressors as the sheep in order to measure the amount of dark-cutting beef that was produced under the different stressors. The restraint and isolation stressor (RIS) did find that Holstein calves were a good model to produce the dark-cutting condition in the meat. Different stressors were also used in order to try to find a reliable source of dark-cutting meat, such as treadmill exercise. This method did not prove positive in producing the dark-cutting. According to Apple et al. (2006) “treadmill exercise failed to produce any dark-cutting carcasses and would not be a suitable animal model for studying the dark-cutting condition” (p. 3088). RIS is the stressor that works best in finding suitable models in Holstein calves for dark-cutting beef.

Pork Conditions
Hambrecht et al. (2005) concluded that it was not clear why the long and rough transport or the short lairage treatment alone resulted in only limited effects on stress responses and pork quality. When combined with high pre-slaughter stressor treatment, pigs had increased stress responses and impaired meat quality. Although the pigs were exposed to high stressors before slaughter, such as long and rough transport, and electrical shocking while herding, the
effects on the meat quality were not tremendously altered, but the effects were more psychological. According to Hambrecht et al. (2005), “the greatest improvements in pork quality can be achieved by decreasing stress in the immediate pre-slaughter period” (p. 447). Decreasing stress in the environment will help the overall production of the pigs and increase the quality of the meat.

**Maternal Instincts in Cows**

Hoppe, Brandt, Erhardt, and Gauly (2008) found that cows after first calving showed the lowest behavioral response to human handling of their calves, indicating that they were more docile than older cows. Cows handled by humans at a younger age are more likely to be at ease around human when their calves are present. The maternal instinct of cows and the effects that different conditions have on the overall production of the animals was verified by this study.

Figure 1 shows the maternal protective behavior scores for both Simmental and German Angus beef cattle in relationship to one another. According to Hoppe, Brandt, Erhardt, and Gualy (2008), The graph shows that cows were more concentrated in stages two and three, showing the maternal instincts of the cow to slightly excited and worried about her calf, but not violent.

![Graph showing maternal protective behavior scores for Simmental and Angus cattle](image)

**Figure 1.** Adopted from “Maternal protective behavior of German Angus and Simmental beef cattle after parturition and its relation to production traits” by S. Hoppe, H. R. Brandt, G. Erhardt, and M. Gauly, 2008, *Applied Animal Behavior Science, 114*, p. 301.

**Housing and Dairy Cows**

Housing for dairy cows is important because cattle movement and lying is essential in the production of the dairy cows. According to Endres and Barberg (2007), “the ability and freedom to lie down and rest at ease are important for dairy cattle welfare” (p. 4193). Loose-housing systems such as compost barns should allow cattle freedom of movement. Different lying conditions were reported in order to find the best surface for dairy cattle to lie on. According to Endres and Barberg “there are four common lying positions assumed by cattle: flat on the side, head back, head on the ground, and head up, the most common position” (p. 4193). Social interactions, such as chasing away, pushing, head butting, and allo-grooming, was also monitored to see if different interactions between the cows helped with the conditions of housing.
Conclusion
The increase in awareness of the effects of human interaction and animal behavior are prevalent in today’s society. Different techniques can help animals and some can affect the quality of meat and overall psychological welfare of an animal. There are different ways to handle the animals and control the environment that the animal is put in. Controlling these situations will help with the quality and production of the animals. Dark-cutting conditions in cattle are costing the nation millions of dollars every year and ways to reduce the condition are being studied daily. Finding animal models and ways to develop the condition are performed with every breakthrough in technology, and researchers are trying to cut down on the production of low quality meat.

Other factors that affect the overall welfare of animals are the different stressors that are put on animals prior to slaughter. Long travel times and adverse conditions hinder the animals’ overall psychological welfare. Pigs are tested for meat quality and the effects that stress have on the animal. Decreasing the amount of stress put on animals will help the overall condition of the brain and overall condition of the meat and production of the animal. Human handling of cows will decrease the amount of stress that the animal feels and lessens the maternal instinct to strike if they think the calf is in any kind of harm. The cows are more likely to produce more offspring if humans are around them more often. These different techniques show how human interactions and handling of animals will produce a quality meat and have better production of animals overall.

Audience
This research is intended for cattle producers, farmers, and ranchers. The affects of beef quality and meat production are essential for the prosperity of the agricultural industry and this research will help the different producers become more aware of the effects of handling in the animals.

References


