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## Cows are highly motivated to access a brush

Grooming behavior is expressed by many animals, including cows, and helps them maintain a healthy coat and skin. Cows can groom themselves and herd mates by licking. When housed in naturalistic environments, they also use trees or other structures to scratch parts of their body that are otherwise difficult to reach. On some dairy farms cows do not have access to surfaces suitable for scratching themselves, but other farms are now providing cows with automated mechanical brushes that facilitate grooming behavior (Figure 1).



*Figure 1. Cow with automated mechanical brush at the UBC Dairy Education and Research Centre.*

When cows are allowed access to mechanical brushes they are cleaner and spend about five-fold more time grooming than when brushes are not available, suggesting that these brushes are important for the cow. To better estimate just how important access to an automated mechanical brush is to indoor-housed dairy cows, we conducted a study designed to test the

motivation of dairy cows to access a mechanical brush.

Motivation testing can be used to assess how important resources are to animals. In motivation studies, the willingness of animals to work for access to a resource of interest (in this case a mechanical brush) is typically compared to the animal's willingness to work for other resources known to be important for the animal (e.g. fresh feed). This allows researchers to compare the relative importance of the different resources to the animal. Animals are generally highly motivated to feed, especially after some hours of feed deprivation, so feed can be used as a 'gold standard' to compare with other resources.

In our experiment, cows were trained to push open a weighted gate. During training cows were rewarded with some grain after successfully pushing open the gate. It took about a week until all the cows learned to successfully open the gate from a closed position.

After the successful completion of training, the test sessions commenced. In the test sessions, the weight that cows were required to push to open the gate was gradually increased, thereby increasing the "work" required to access either a mechanical brush, fresh feed (tested after 1.5 hours of feed deprivation; a resource we assumed that cows would be highly motivated to access), or an empty pen (a resource we assumed that cows would not be highly motivated to access). To determine if testing order affected motivation to access the brush, all animals were

tested twice: once before (Brush I), and once after (Brush II), they had been tested for motivation to access the feed and empty pen.

To see a video of a cow using the gate to access the brush please use this link:

<https://www.youtube.com/watch?v=DAAvnPFEz0>

pressed against the side of the cow when she passed through it, perhaps causing discomfort for cows late in gestation. However, we found no difference in cow motivation to access the brush between the two test phases (that were approximately 2 months apart), indicating that

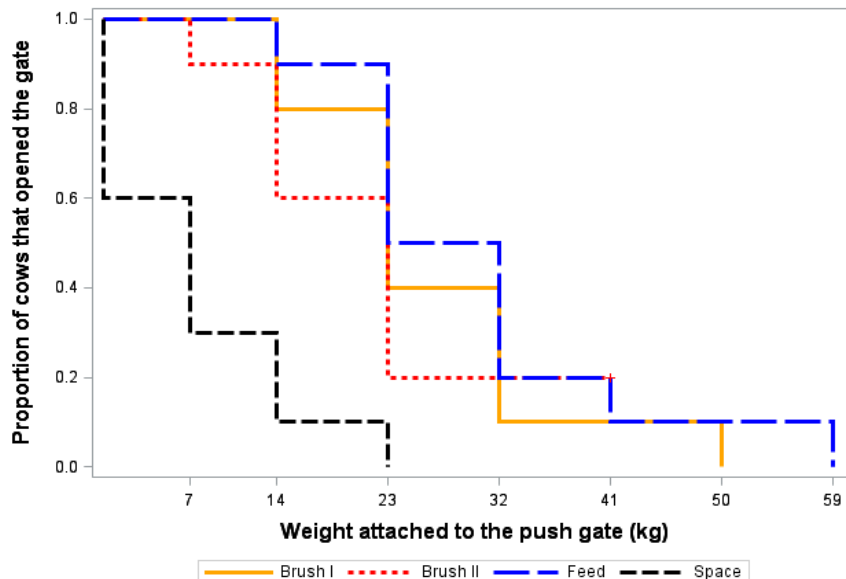


Figure 2. Willingness of cows ( $n = 10$ ) to work to get access to 1) the mechanical brush when first tested (Brush I), 2) fresh feed, 3) an empty pen (Space) and 4) the mechanical brush when re-tested at the end of the study (Brush II) (redrawn from McConnachie et al., 2018).

To access an empty pen, 4 of the 10 cows tested were not willing to push any weight, and the maximum weight pushed by any of the cows to access the empty pen was 14 kg (see Figure 2). In contrast, cows were willing to push much higher weights to access either food or the mechanical brush, with many cows pushing 23 kg and some pushing 41 kg or more to access these resources. The weight cows were willing to push was similar for the mechanical brush and for the fresh feed, and the weight cows were willing to push to access the mechanical brush did not differ between the first and second test phase.

In this study we worked with pregnant cows, potentially influencing our results; the gate

cows later in pregnancy did not find the gate more difficult to open.

The results of this study show that cows are highly motivated to access a mechanical brush, about as motivated as they are to access fresh feed after 1.5 h of feed deprivation, and much more motivated than they are to access an empty pen. These results indicate that access to a mechanical brush is important for dairy cows, and provides scientific evidence in support of the practice of providing cows access to these brushes on dairy farms.