Repeated Calm Handling Can Lead to More Docile Cattle

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Summary with Implications

Changes in temperament in heifers when handled either frequently or infrequently were evaluated subjectively based on their behavior when restrained in (chute score) and exiting from (exit score) a squeeze chute. Chute scores decreased over time–a favorable direction–with more dramatic declines in heifers handled more frequently. Heifers with higher chute scores on the first day of handling had the largest reduction in score. Exit scores changed less over time. Chute score therefore may be more indicative of acclimation to a novel environment than exit score. Both scores appear to offer a fast, easy and inexpensive way to quantify docility in cattle. Heifers became calmer with repeated gentle handling. Producers therefore may benefit from allowing cattle a few days to acclimate to new working facilities before assessing docility.

Introduction

Temperament is often described as an animal's behavioral response to handling by humans, or any fear-eliciting situation. The response of cattle to handling depends not only on their reaction to humans, but also on elements such as social context, physical environment and novelty of the situation. Strong behavioral responses of cattle to stressors, human or otherwise, have been associated with increased risk to handlers, poorer weight gain and meat eating quality, decreased tolerance to disease, and increased production costs. Because of the negative consequences of excitable temperament in cattle, there has been an

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increase in selection for docility. Breeding values for docility have been established, but the success of selection depends on the consistency and accuracy of measures of temperament. Furthermore, such measures would benefit from being fast, simple and inexpensive to collect.

Behavior when restrained in (chute score) and exiting from (exit score) a squeeze chute have been proposed as methods to measure temperament of animals in a production setting. Research using these methods report inconsistent results, some proposing the use of scoring systems while others not. Therefore, the objectives of this study were to identify a procedure for evaluation of behavior that is indicative of stress, and to determine if behavior changes over time.

Procedure

A 3-year study conducted at Kentland Farm, Blacksburg, VA, utilized predominately Angus (75% or more), spring-born heifer calves. Each year, heifers arrived at the facility following a one week fence line weaning period at the Virginia Tech Shenandoah Valley Agriculture Research Extension Center, and placed in a single management group on grass.

The experiment had a factorial design consisting of two measurement protocols (Frequent (F); Infrequent (IF)), and three events, each one month apart (starting days of Oct. 13, Nov. 10, and Dec. 8). Prior to the beginning of each year's study, heifers (n = 40) were randomly split into measurement protocols, accounting for dam age, sire, and weaning weight. Frequent measurement protocol entailed collecting behavioral measurements over three consecutive days within each event while IF measurement protocol involved collecting behavioral measurements on the first day of each event.

On the first day of each event, a random group of 4 heifers, regardless of measurement protocol, were moved calmly into the tub from a holding pen. Each heifer was

calmly moved through the alley way into the squeeze chute, and the heifer's head caught and secured in the head gate. Before being approached, chute score (1 = docile, 6 = aggressive) was recorded by 3 experienced observers within the first 15 sec. Heart rate, rectal temperature, and a fecal and blood sample were then taken. Upon release from the squeeze chute, an exit score (1 = docile, 5 = aggressive) was recorded by the same 3 experienced observers.

On the second and third day of each event, a random group of 4 heifers at a time from the F measurement protocol were again calmly worked through the same protocol as on the first day.

Data Partitions

Chute and exit scores for each heifer were averaged across all 3 observers and split into threshold categories. Heifers with both an average chute and exit score greater than or equal to 2.5 (n = 21) were considered temperamental while heifers with both scores less than 2.5 (n = 54) were considered docile. This left some heifers that fell in neither category (n = 43).

As a second comparison, threshold groups were created based on chute score only. They consisted of heifers with chute scores greater than or equal to 3 (n = 27), between 2.5 and 3 (n = 21), between 2.0 and 2.5 (n = 27), between 1.5 and 2 (n = 24), and less than 1.5 (n = 19).

Statistical Analysis

Scores were treated as continuous, and analyzed using the GLIMMIX procedure in SAS. First, the effect of frequency group, event, and their interaction were compared on the first day within each event. Second, the effect of event and day within event were compared across all 9 days for heifers in the F group. Year was included as a random effect. Least squares means and standard errors (SE) for chute score and exit score were obtained using the Tukey function of SAS.
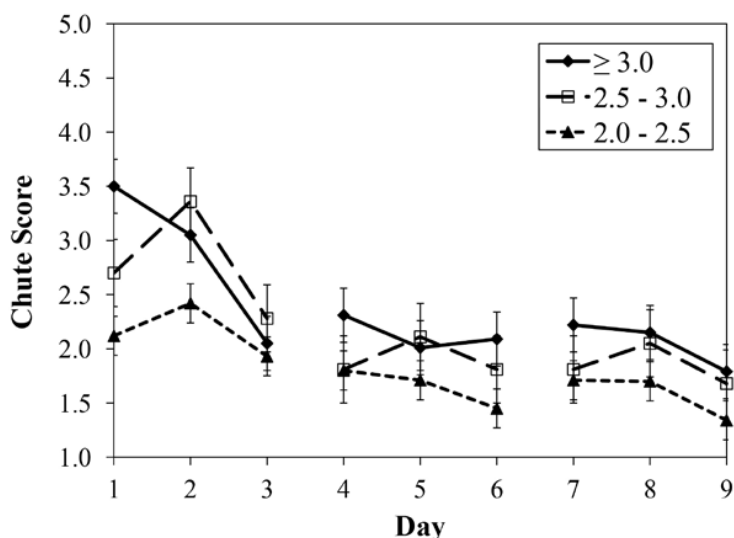
Figure 1. Average chute scores by day for the frequently handled group of heifers, separated by their chute score on their first day of handling.

Table 1. Effect of event on average chute score of temperamental and docile heifers.

Measurement	Threshold Category	Event			SEM	P-Value[3]
		1	2	3		Event
Chute Score	Temperamental[1]	3.32	2.51	2.84	0.29	0.212
	Docile[2]	1.69	1.74	1.76	0.14	0.936
Exit Score	Temperamental[1]	3.16	2.95	2.80	0.20	0.277
	Docile[2]	1.57	1.68	1.57	0.15	0.624

[1]Temperamental calves are those with both chute and exit scores ≥ 2.5 (n = 21)
[2]Docile calves are those with both chute and exit scores < 2.5 (n = 54)
[3] Effect of frequency group and its interaction with threshold category were not significant ($P > 0.05$)

Table 2. Effect of event, and day within event, on average chute score of temperamental and docile heifers in frequently handled cattle.

Measurement	Threshold Category	Event			SEM	P-Value	
		1	2	3		Event	Day
Chute Score	Temperamental[1]	3.15[a]	2.48[b]	2.48[b]	0.17	0.005	0.102
	Docile[2]	1.90[a]	1.52[b]	1.40[b]	0.13	0.003	0.498
Exit Score	Temperamental[1]	3.04	2.97	2.92	0.22	0.580	0.402
	Docile[2]	1.53[a]	1.55[a]	1.38[b]	0.16	0.034	0.177

[1]Temperamental calves are those with both chute and exit scores ≥ 2.5 (n = 10)
[2]Docile calves are those with both chute and exit scores < 2.5 (n = 30)
[a,b] Means in a row with differing superscripts differ ($P < 0.05$)

Table 3. Effect of event on average chute score of both frequently and infrequently handled cattle

Chute Score	n	Event			SEM	P-Value[1]
		1	2	3		Event
≥ 3.0	27	3.57[a]	2.49[b]	2.51[b]	0.22	0.006
2.5–3.0	21	2.67[a]	2.01[b]	1.98[b]	0.16	0.018
2.0–2.5	27	2.18	1.91	2.03	0.16	0.463
1.5–2.0	24	1.58	1.71	1.83	0.13	0.351
1.0–1.5	19	1.17	1.46	1.46	0.13	0.148

[1] Effect of frequency group and the interaction not significant ($P > 0.05$)
[a,b] Means in a row with differing superscripts differ ($P < 0.05$)

Results

Mean chute and exit scores comparing temperamental and docile heifers by event can be found in Table 1. There was no effect of event, frequency group, or their interaction on either score for both temperamental and docile heifers. However, there was a larger numerical decrease in the temperamental group from event 1 to 3 for chute score compared to exit score, with no change in chute or exit score for the docile group. As expected, heifers that started with a lower chute score simply had less room to decrease on the scale.

While the effect of frequency group was not significant, there was a stronger decrease in chute and exit scores over time when considering the F group of heifers only. Table 2 shows the change in scores across events for both temperamental and docile heifers. Chute score decreased from event 1 to 2 ($P < 0.05$), but remained constant from event 2 to 3 for both categories ($P > 0.34$). Temperamental heifers started with a chute score of 3.15 ± 0.17 on event 1, which reduced to 2.48 ± 0.17 on event 2 and 3. Allowing heifers to acclimate to a novel environment may be worthwhile when evaluating their behavior in the chute. Exit score did change in the docile heifers from event 2 to 3 ($P < 0.05$); however this small of a change is likely not noticeable in practice. More importantly, the temperamental heifers did not significantly change in exit score across events.

Since chute score appeared to be the more sensitive measure, all heifers were separated based on their average chute score on day 1. Results comparing frequency groups across event are given in Table 3. The effects of frequency group, and the interaction of frequency group and event, were not significant for any chute score category. The effect of event was significant for the two chute score groups with the highest scores, with a decrease from event 1 to 2 (1.08 and 0.66 for ≥ 3.0 and 2.5–3.0 groups, respectively). These decreases from event 1 to 2 became smaller when the chute score on day 1 was lower, again as expected.

The F group of heifers was again considered separately. Chute scores numerically decreased across events for all heifers, except for the 1.0–1.5 group which remained constant. Heifers with starting scores greater than or equal to 3.0 and between 2.0

and 2.5 decreased in score from event 1 to 3 by 0.81 and 0.57 ($P \leq 0.05$), respectfully. Heifers with chute scores between 2.5 and 3.0 decreased almost a full point on the scale; however, the small number of animals (n = 9) coincided with a larger SE, and thus the decline in score only tended toward significance ($P = 0.073$).

The change in chute score across days for the three groups of F heifers with chute scores greater than 2.0 is shown in Figure 1. Overall, there was a decrease in chute score within each event. In the month time span between events, chute scores either slightly increased, or stayed the same as the previous observation. On the final day of the study, regardless of chute score on day 1, each category on average had a chute score less than 2.0. Subjectively, this score is indicative of a docile heifer. Thus, heifers appear to acclimate to calm handling in the chute.

Interestingly, there was an increase in chute scores from day 1 to 2 in cattle with chute scores between 1.5 and 3.0. This could indicate residual anxiety in these cattle from handling on day 1. However, with calm handling in the following days, they became more docile.

Conclusion

Docility in cattle is becoming a very popular selection criterion due to its impact on growth, carcass quality and well-being. Selection for docility on site requires a measurement that is fast, inexpensive and relatively easy to conduct. Chute and exit scores in cattle appear to be useful measures of docility. Importantly, heifers appear to acclimate to handling in a calm environment. Particularly in the more temperamental cattle, after just a few days, their chute scores decreased substantially and remained relatively constant thereafter. When cattle are excitable during their first handling experience, more than one observation of temperament may be beneficial before making selection decisions.

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