



# Social Hierarchy of Miniature Cattle

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## QUESTION

•How does social hierarchy impact access to feed in the pasture?

## INTRODUCTION

For cattle, a hierarchy is established and maintained by social interactions. It is most obvious when cattle are closely confined, when individuals will be seen to differ in whether they move out of the way of other individuals. The hierarchy is based on the dominance-subordination relationships that exist between each animal, and each other individual in the herd (Hall, 2009).

The herd gets food from three sources, grain, hay, and grass. Understanding where each individual get most of their food is beneficial because it affects the size of each cow and how they make it through the winter. I hypothesize that lower individuals will spend more time grazing in the pasture, similar to what was found by Arave and Albright (1981).

The hierarchy structure in relationship to grooming aims to answer one of two possible hypotheses. The 'Grooming-for-Commodity' hypothesis posits that allogrooming is directed from low-ranking animals towards higher-ranking cows in exchange for tolerance and other favors. The 'Grooming-for-Stability' hypothesis predicts that allogrooming is performed by high-ranking animals down the hierarchy in order to perpetuate the stability of the social structure (Val-Laillet *et al.* 2009)

Understanding the social hierarchy of the herd of miniature cattle will help the rancher. This information is helpful when determining who to give more feed to. It also helps when sorting cattle to know which cows to sort together and which ones to keep apart to avoid fighting.

## MINIATURE CATTLE (*BOS TAURUS*)

•Cattle are the descendants of aurochs, which were domesticated around 9000 years ago in western Asia, Africa, China, and India. There are two distinct subspecies of cattle, zebu which are characterized by their shoulder hump, and taurine which are hump less (Hall, 2002).

•Miniature cattle are just like full-size cattle in every way other than their size. Their height ranges from 36 inches to 42 inches. Their weight can range from 500-700 pounds depending on breed. (Boden, 2008)

•The herd used in the study is of the Western Heritage bloodline. This bloodline was started in Iowa by Dustin Pillard. The goal of the bloodline was for small colorful cattle.



## MATERIALS AND METHODS

- The herd consists of 18 female miniature cattle at the Lazy N Ranch in Morgantown, IN U.S.A., which was studied and observed.
- The study area was a 2-acre pasture. The pasture has a ditch for water as well as a water tank. There are 3 hay feeders throughout the pasture. There is an enclosed pen that serves as the area where the cattle are fed grain.
- I observed the herd at various times of the day including early morning, afternoon, before and after feeding, and evening.
- For 10 hours, instantaneous behavior scans were performed every 5 minutes and behaviors based on the ethogram were recorded.
- Between scans, bouts of grooming were recorded when observed.
- I also filmed the cattle during grain feeding time to observe how long they spent eating. Four separate feedings were recorded.

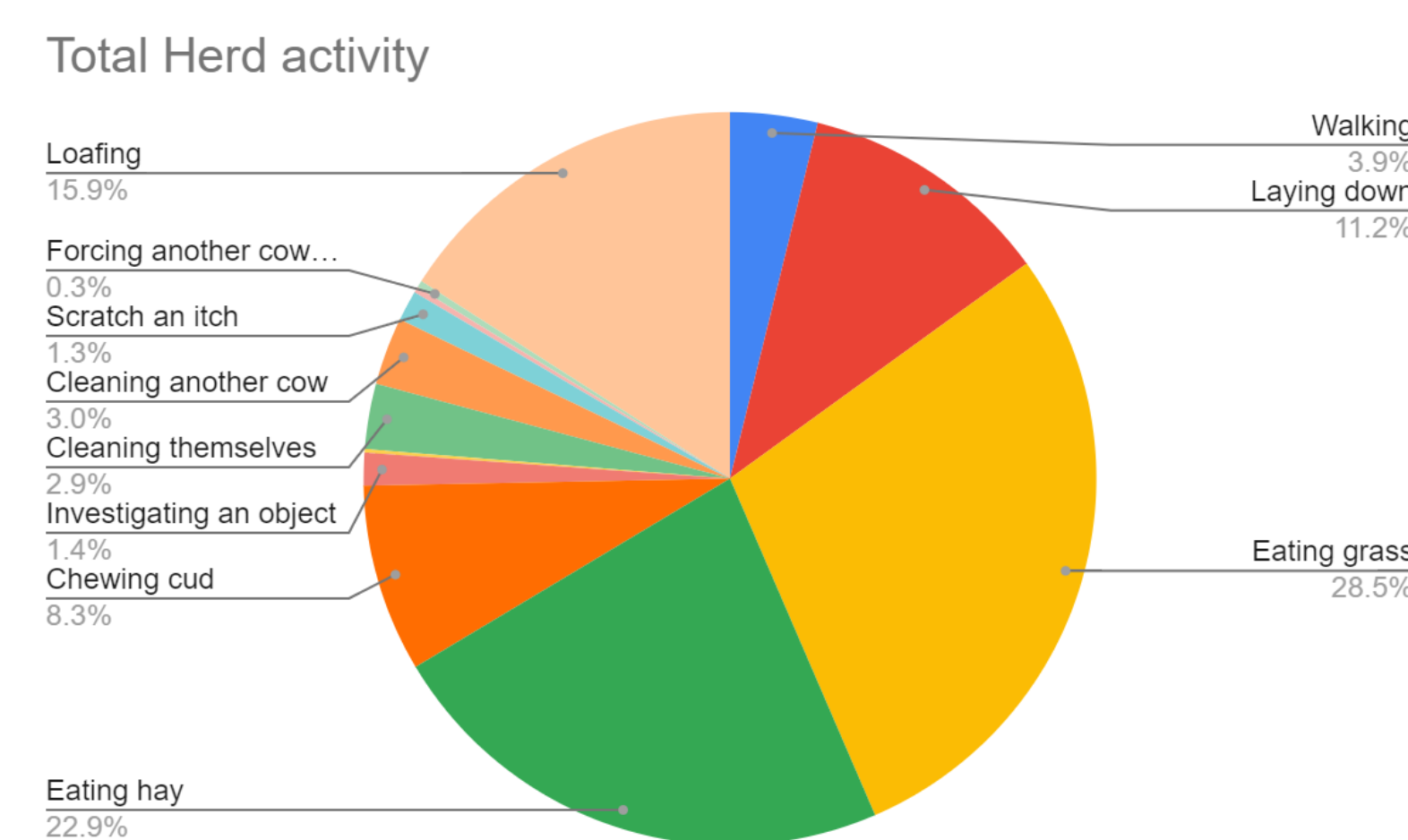
## ETHOGRAM

Behavior	Description	Behavior	Description
Walking	Walking more than 5ft	Cleaning themselves	Licking themselves
Laying down	Lying in 1 place for 1 min	Cleaning another cow	Licking another cow
Eating grass	Eating only grass for 30 sec	Scratch an itch	Rubbing part of their body on an object
Eating hay	Eating only hay for 30 sec	Flick their tail	Flicking their tail from side to side
Chewing cud	Chewing cud for 30 sec	Throw their head	Shaking their head at another cow
Investigating an object	Sniff an object for 5 sec or more	Forcing another cow out	Uses their head to push another cow.
Drinking water	Drink water for 5 sec	Loafing	Stands in the same place for 1 min

## DETERMINING THE HIERARCHY

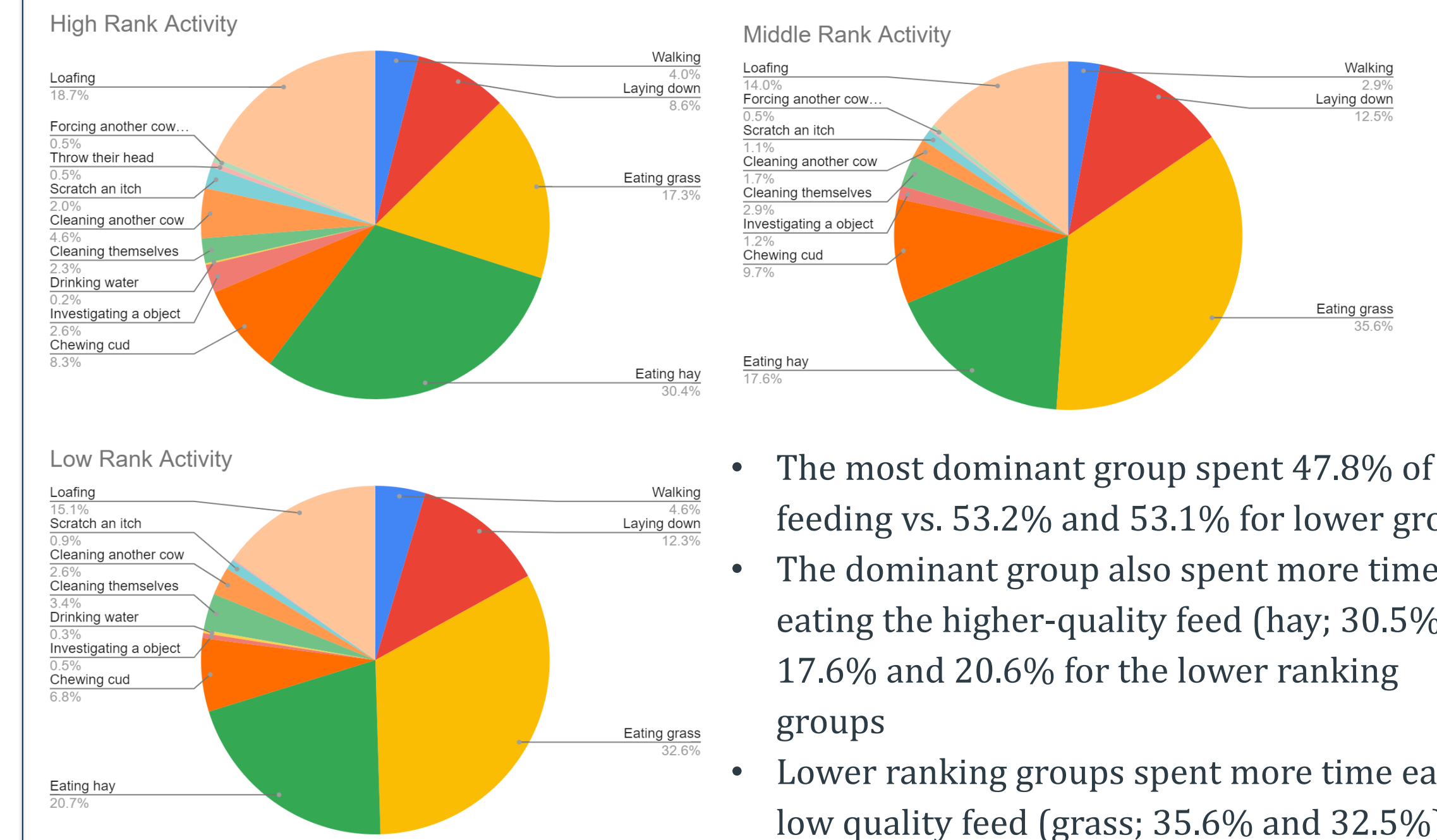
Hierarchy by Grain Eating Time (sec)		Hierarchy by Weight		Average Hierarchy		Hierarchy by Rank		Hierarchy by Rancher	
2.0	1429	MJ	575	2.0	1	2.0	2.0	2.0	2.0
MJ	1294	2.0	550	MJ	2	MJ	MJ	MJ	MJ
Mirage	1279	Ren	500	Mirage	3	Mirage	High	Mirage	Mirage
Caitlyn	1025	Deuces	500	Star	4	Storm	High	Deuces	Deuces
Georgia	1011	Mirage	475	Phoenix	5	Ren	High	Storm	Storm
Bubbles	985	Storm	425	Storm	6	Deuces	High	Ren	Ren
Storm	955	Phoenix	350	Caitlyn	7	Star	High	Star	Star
Tiger	830	Caitlyn	275	Ren	8	Phoenix	Middle	Phoenix	Phoenix
CC	790	Kitley	275	Deuces	9	Caitlyn	Middle	Caitlyn	Caitlyn
Kitley	785	Star	250	Kitley	10	Kitley	Middle	Kitley	Kitley
Julia	780	Georgia	225	Georgia	11	Georgia	Middle	Georgia	Georgia
Star	745	Tiger	200	CC	12	Tiger	Middle	CC	CC
Deuces	735	CC	150	Hazel	13	CC	Low	Hazel	Hazel
Hazel	670	Julia	150	Julia	14	Hazel	Low	Julia	Julia
Snow	570	Snow	150	Delta	15	Julia	Low	Delta	Delta
Ren	435	Hazel	125	Tiger	16	Delta	Low	Tiger	Tiger
Delta	355	Delta	125	Snow	17	Snow	Low	Snow	Snow
Phoenix	315	Bubbles	80	Bubbles	18	Bubbles	Low	Bubbles	Bubbles

## TOTAL HERD ACTIVITY BUDGET



- On average, the herd spend half (51.4%) of their time eating while in the pasture.
- The rest of their time was spent in various activities (48.6%).
- The next highest were low energy activities like loafing 15.9%, laying down 11.2%, and chewing cud 8.3%.

## ACTIVITY BUDGET BY HIERARCHY



- The most dominant group spent 47.8% of time feeding vs. 53.2% and 53.1% for lower groups
- The dominant group also spent more time eating the higher-quality feed (hay; 30.5%) vs. 17.6% and 20.6% for the lower ranking groups
- Lower ranking groups spent more time eating low quality feed (grass; 35.6% and 32.5%) than the higher-ranking individuals 17.3%.

## GROOMING



- I observed 22 bouts of grooming during the course of the study
- Allogrooming occurred most (20 times) between members of the same group in the hierarchy.
- Top ranking cows had the most grooming bouts (15), middle ranking (4), and bottom (3).

## CONCLUSION

- The hierarchy determined was nearly identical to what the rancher predicted.
- I found that individuals that were higher ranking spent less time eating hay and grass because they were receiving more grain. This is similar to what was found by Arave and Albright (1981).
- Lower ranking individuals had to spend more time grazing in the pasture to make up for lost grain. These individuals are also blocked from eating the higher quality hay.
- This is important information for the rancher because grain and hay are expensive. Therefore, the rancher would want a more even distribution of the food, so it is more cost effective.
- After eating, the most common activities were low energy activities. This is similar to findings by Hall (2009), in which cattle that receive supplementary feed will cut down on grazing behavior and instead spend this time laying or resting behaviors.
- When it comes to grooming, neither grooming hypothesis, Grooming-for-Stability and Grooming-for-Commodity, were supported. Rather the hypothesis by Arave and Albright (1981) was supported, which is that cows typically groom other closely ranked cows.
- The cows also seemed to have grooming partners. After once cow finished grooming the other cow would reciprocate the grooming some time after.
- Further research can be done on the effects of grooming. Is it done to maintain social status or is it a stress releaser?

## LITERATURE CITED

- For references, please email Cash Nelson at cnelson713@marian.edu

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